Full Proposal

for the

Doctor of Philosophy in Electrical Engineering

Corresponding to Specializations Currently Offered

in the Existing Degree

Doctor of Philosophy in Engineering

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Table of Contents

Executive Summary....2
1 Degree Proposal and Motivation....2
2 Curriculum Requirements....3
2.1 Current Program Requirements....3
2.2 Proposed Program Requirements....4
3 Degree administration....5
4 Evidence of need....6
4.1 Historical Data....8
5 Prospective enrollment....8
5.1 Target Enrollment....8
5.2 Admission Criteria....8
5.3 Student recruitment....9
6 Effort to enroll and retain underrepresented groups....9
7 Faculty and facilities....10
7.1 Faculty....10
7.2 Facilities....11
8 Need for additional facilities and staff....11
9 Projected additional costs....12
Appendix 1 – Electrical Engineering Course Descriptions....13
Appendix 2 – Electrical Engineering Faculty....18

Executive Summary

This proposal seeks to establish an independent Ph.D. in Electrical Engineering within the Department of Electrical Engineering of the College of Engineering & Computer Science at Wright State University. Faculty in electrical engineering currently advise students within the interdisciplinary Ph.D. in Engineering program. This program was established less than 20 years ago and has flourished under the leadership of Dr. Ramana Grandhi. As a natural next step in the growth and evolution of doctoral studies in engineering at Wright State University, the faculty in electrical engineering seek to establish an independent Ph.D. program to better serve their doctoral students and continue to grow the volume of doctoral-level study and research at the university.

1 Degree Proposal and Motivation

Wright State University proposes to establish a new Doctor of Philosophy in Electrical Engineering that represents a concentration of faculty from 3 of the 7 focus areas under the existing multi-disciplinary Doctor of Philosophy in Engineering degree. The focus areas to be merged are as follows:

- Controls & Robotics
- Electronics, Microwave, VLSI, & Nanotechnology
- Sensor Signal & Image processing

The existing Ph.D. in Engineering produced its first graduate in 1999, and since that time, it has produced a total of 141 with 47 of those graduates advised by faculty in Electrical Engineering. The Ph.D. in Engineering program averages roughly 100 active students per year with 41 students currently active under the advisement of faculty in Electrical Engineering. Hence, the proposed program is already thriving under the current multi-disciplinary degree, and establishing it as an independent degree program would have the following benefits:

- enhancement of our marketing of the degree to students,

  Enrollment in the Ph.D. in Engineering program for electrical engineering faculty is dominated by students that have earned earlier degrees at WSU and by local students. Both of these populations are aware of the program by virtue of proximity. Lack of an electrical engineering brand on the Ph.D. program makes it difficult to market to students outside of the Dayton region. Furthermore, we observe that the WSU Department of Electrical Engineering is not featured in the attached NRC rankings, owing in part to lack of our own independent Ph.D. program, despite our research output relative to peers.

- permit the development of program requirements and curriculum that is more responsive to student needs, and

  The Ph.D. in Engineering program currently requires core engineering courses outside the field of electrical engineering that are largely of no use to students seeking doctoral-level study in electrical engineering. The Ph.D. in Engineering program also requires 3 semester hours of a seminar course, comprising all focus areas and implying that most of the presented seminars will be for advanced research in areas that are inaccessible to doctoral students in electrical engineering. The proposed program will eliminate these requirements and refocus the curriciulum on doctoral-level preparation in electrical engineering.

- provide graduating students a degree that is more easily marketed to employers.

  The value of a "Ph.D. in Engineering" is not readily apparent to employers, requiring graduating students to explain that their course content and dissertation work largely mimic a Ph.D. in Electrical Engineering. Lacking the opportunity for this explanation students will may be disadvantaged in some employment pursuits or may take the liberty to represent their degree as a "Ph.D. in Electrical Engineering" on the resumes.

The combination of these benefits should lead to increased student enrollment and improved student outcomes. Faculty and students in this program would already be engaged with a wide variety of research sponsors and employers, for example: AFRL, NASIC, MacAulay-Brown, SAIC/Leidos, Matrix Research & Engineering, Etegent, Defense Research Associates, Defense Engineering Corporation, Northrop Grumman, SET Associates, Raytheon, Boeing, Systems Technology Research, National Science Foundation, Army Research Lab, UDRI, HPTi, Ohio Supercomputer Center, Ohio State University, Alphatech, ATK-Mission Research, and Wright Brothers Institute. Establishing an independent Ph.D. in Electrical Engineering would improve our brand recognition and expand our reach and impact in the local community and nationally.

2 Curriculum Requirements

2.1 Current Program Requirements

<u>The contents of this subsection are excerpted from the web site for the Ph.D. in Engineering program.</u>

To obtain the Ph.D. in Engineering degree, a student must complete an approved Program of Study that contains at least 90 semester graduate credit hours beyond the bachelor's degree in engineering or an equivalent degree, or 60 graduate semester credit hours beyond a Master's degree in engineering.

To meet the 90 semester graduate credit hours required for the Ph.D. in Engineering degree, a student must:

- Complete at least three interdisciplinary core courses and earn a minimum grade of "B" in each course. The core courses are
    - EGR-7010, Applied Linear Techniques
    - EGR-7020, Systems Engineering and Analysis
    - EGR-7030, Computation Engineering Analysis
    - EGR-7040, Design Optimization
    - EGR-7050, Design and Analysis of Engineering Experiments
- Complete 18 semester credit hours of major courses (7000-level and above) in electrical engineering, biomedical engineering, human factors engineering, mechanical engineering, materials science and engineering, or in a focus area
- Complete at least 9 semester credit hours of research focus area courses, i.e., graduate courses (6000-level and above). This may include core courses and courses used to satisfy graduate course requirements
- Complete at least 6 semester credit hours of breadth courses, i.e., graduate courses (6000-level and above) outside the research focus area
- Complete at least 6 semester credit hours of graduate (6000-level and above) courses in mathematics (MTH) or statistics (STT).
- Complete 3 semester credit hours of EGR 8910, Ph.D. Seminar
- Take no more than 3 semester credit hours of independent study (Course number 7900)
- Complete between 30-40 semester credit hours of dissertation research
- Complete the requirements of the Program Qualification
- Complete the Candidacy Examination satisfactorily
- Complete the Research Proposal Defense satisfactorily
- Present a 50-minute dissertation seminar during an EGR 8910 course meeting
- Submit at least one manuscript to a peer-reviewed journal
- Complete the Dissertation Defense satisfactorily
- Complete the final dissertation satisfactorily, as judged by the student's Dissertation Committee and the Graduate School

Students having non-engineering backgrounds are required to successfully complete the equivalent of the relevant math and science sequences required for an undergraduate engineering degree appropriate for their focus area. These courses cannot be used to satisfy degree requirements.

2.2 Proposed Program Requirements

To obtain the Ph.D. in Electrical Engineering degree, a student must complete an approved Program of Study that contains at least 90 semester graduate credit hours beyond the bachelor's (BS) degree in electrical engineering or an equivalent degree, or 60 graduate semester credit hours beyond a Master's (MS) degree in electrical engineering or a related area. These requirements are consistent with national norms.

In addition to meeting graduate credit hour requirement for the Ph.D. in Electrical Engineering degree, a student must do the following.

- Complete at least three EE breadth courses by choosing one course from each of at least three focus areas and earn a minimum grade of "B" in each course along with any associated laboratory component. None of these courses can be duplicative of courses already taken at the undergraduate level. Students originally enrolled in the Ph.D. in Engineering may count engineering core courses, which were completed in spring 2015 or earlier, towards the breadth requirement. Breadth courses must be at the 7000-level or above, although courses at the 6000-level may be permitted with approval from Director of Graduate studies. The Ph.D. in Electrical Engineering focus areas include the following.

VLSI	Electronics	RF & Microwave
Signal Processing	Communications	Controls

- Complete 20 semester credit hours of courses numbered 7000-level and above in electrical engineering. Core breadth courses may be included in the 20 semester hours.
- Complete at least 6 semester credit hours of graduate (6000-level and above) courses in mathematics (MTH) or statistics (STT).
- Take no more than 3 semester credit hours of independent study (EE 7900).
- Complete between 30-45 semester credit hours of dissertation research.
- Pass the Program Qualification Exam.

Upon completion of the coursework students are required to pass a qualifier where problem solving and independent research comprehension skills are thoroughly examined by a Ph.D. committee comprised of subject matter experts.

- Pass the Research Proposal Defense.

Upon passing the qualifier, a student is required to survey the literature to master the current state of the art in the student's intended area of research. Based on this study, the student is required to independently develop a novel research plan that proposes to push the envelope of current state of art in research in specific areas in a significant way. The novelty in the research proposal is reviewed, examined and approved by the subject matter experts in the Ph.D. committee.

- Present a seminar based on their dissertation research during an open meeting or conference.
- Submit at least one manuscript to a peer-reviewed (IEEE quality) journal.
- Pass the oral Dissertation Defense and satisfactorily complete the written Dissertation Document

A student is required to submit a comprehensive written report on the new research findings, which must be approved by the dissertation committee. Furthermore, the student is required to give an oral presentation to defend the findings in the written report to a Ph.D. dissertation committee comprised of subject matter experts in the field.

If needed, students are required to successfully complete any prerequisite material at the undergraduate level. These courses cannot be used to satisfy Ph.D. degree requirements.

3 Degree administration

The proposed Ph.D. in Electrical Engineering would be administered by the Department of Electrical Engineering within the College of Engineering & Computer Science at Wright State University. The curriculum would be established, assessed, evaluated, and maintained by the department's Graduate Studies Committee, which is chaired by the Director of Graduate Studies. The Department of

Electrical Engineering already has the largest graduate student population at the university with 393 students enrolled in the Master of Science in Electrical Engineering as of fall semester 2014. Therefore, the department will assign a 1/2-time administrative assistant to help support the Ph.D. program, and no administrative support will be sought from the Ph.D. in Engineering program. In addition, all students enrolled in the Ph.D. in Electrical Engineering would be required to have a dissertation advisor, who would naturally assume much of the responsibility in advising a student on defining their program of study and completing degree requirements.

4 Evidence of need

Establishing an independent Ph.D. in Electrical Engineering is a natural next step in the growth of doctoral engineering programs at Wright State University. This is consistent with national, state, and regional drives to increase education in the STEM fields at all levels. The Ohio 3rd Frontier program annually cites technology focus areas for investment in the state of Ohio. The list for 2014 included the following topics that would be impacted by a Ph.D. in Electrical Engineering: advanced materials, aeropropulsion power management, fuel cells & energy storage, medical technology, sensing & automation, and situational awareness & surveillance. Research within the Department of Electrical Engineering has historically touched on all of these areas, and establishment of an independent Ph.D. in Electrical Engineering would facilitate growth of student enrollment in these and supporting technology areas and would facilitate the attraction of faculty and industry partners in these areas.

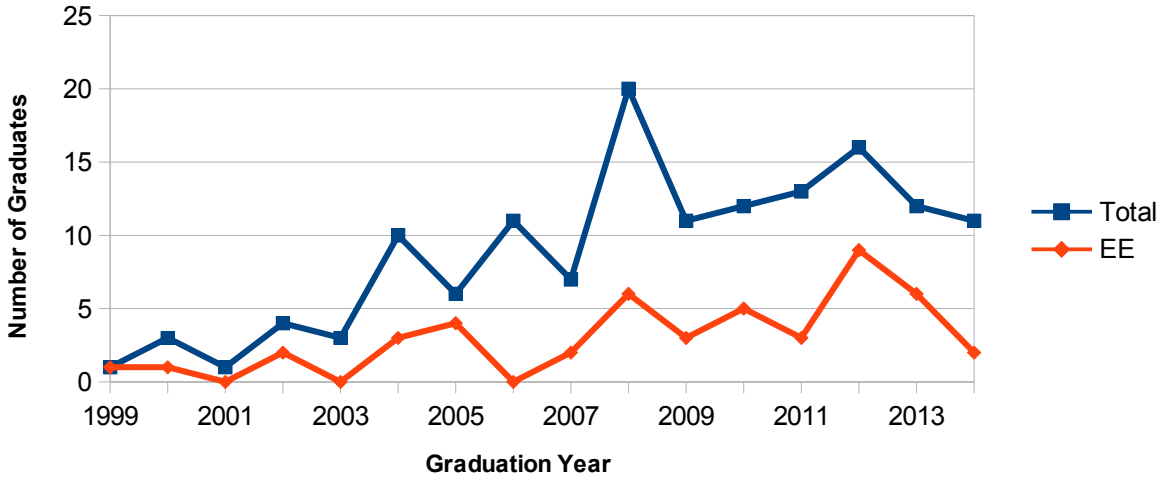
We also note the close proximity of Wright-Patterson Air Force Base, the largest employer in Ohio, which houses the Air Force Research Laboratory, the National Air & Space Intelligence Center, and several major program offices. These government facilities have attracted and sustained a surrounding ecosystem of support contractors. The combined government and private employers have substantial historical and ongoing needs for students trained in electrical engineering with advanced degrees. This is demonstrated by the large number of graduates from the Ph.D. in Electrical Engineering that are employed in the local community as listed in the table below.

Advisor	*Year*	*First*	*Last*	*Employer*	*Location (city, state)*
Dr. Brown	2014	John	Cetnar	Air Force Research Laboratory	Fairborn, OH
Dr. Brown	2014	John	Middendorf	Mound Laser and Photonics Center	Kettering, OH
Dr. Chen	2007	Kiranraj	George	California State University	Fullerton, CA
Dr. Chen	2007	Mingzhen	Wang	Science and Technology of China	Chengdu, China
Dr. Chen	2008	Kumar	Yelamarthi	Central Michigan University	Mount Pleasant, MI
Dr. Chen	2009	Yu-Heng George	Lee	RBS Technologies, LLC	Beavercreek, OH
Dr. Deibel	2012	Satya	Ganti	Alfred University	Alfred, NY
Dr. Emmert	2011	Harish	Gopalakrishnan	ANSYS-Apache Design Inc	San Diego, CA
Dr. Garber	2002	Michael	Bryant	Matrix Research	Beavercreek, OH
Dr. Hong	1999	Erik	Blasch	Air Force Research Laboratory	Rome, NY
Dr. Hong	2002	Shi	Shen	*	
Dr. Hong	2005	Joseph	Anderson		
Dr. Hong	2005	Shunguang	Wu		
Dr. Hong	2008	Peter	Hlinomaz		
Dr. Hong	2010	Arunesh	Roy		
Dr. Hong	2011	Nicholas	Gale		
Dr. Hong	2012	Andrew	Kondrath		
Dr. Hong	2012	Wu	Yang		
Dr. Kazimierczuk	2004	Brad	Bryant	Dayton-Phoenix Co	Dayton, OH
Dr. Kazimierczuk	2004	Karl	Gudmundsson	Iceland University	Reykjavik, Iceland
Dr. Kazimierczuk	2005	Donald	Kessler	Dayton-Reaserch Inst	Dayton, OH
Dr. Kazimierczuk	2005	Richard	Kleismit	Wright State Universiy	Dayton, OH
Dr. Kazimierczuk	2009	Gregory	Cazzell	WPAFB	Dayton, OH
Dr. Kazimierczuk	2010	Robert	Fitch	WPAFB	Dayton, OH
Dr. Kazimierczuk	2010	Nisha	Kondrath	Villanova University	Philadelphia, PA
Dr. Kazimierczuk	2010	Dakshina	Murthy Bellur	Cummins Power Generation	Minneapolis, MN
Dr. Kazimierczuk	2010	Simon	Tritschler	Wright State Universiy	Dayton, OH
Dr. Kazimierczuk	2012	Veda Prakash	Galigekere	Lear Co	Southfield, MI
Dr. Kazimierczuk	2012	Julie	Lee	Emeroson Co.	Cleveland, OH
Dr. Kazimierczuk	2012	Rafal	Wojda	ABB	Cracow, Poland
Dr. Petkie	2014	Ryan	Hamilton	Wright State University	Dayton, OH
Dr. Rattan	2004	James	Adams	Lockheed Martin	Boulder, CO
Dr. Rattan	2013	Nicholas	Baine	Grand Valley State University	Allendale, MI
Dr. Rattan	2013	Pratikkumar	Desai	Imbue, Inc	San Francisco, CA
Dr. Ren	2013	Christopher	Benedik	MacAulay-Brown	Dayton, OH
Dr. Rigling	2008	Philip	Hanna	AFRL	Dayton, OH
Dr. Rigling	2009	Lee	Patton	Matrix Research	Dayton, OH
Dr. Rigling	2011	Orelle	Fogle	Wright State Research Institute	Dayton, OH
Dr. Rigling	2012	Andrew	Lingg	Etegent Technologies	Dayton, OH
Dr. Shaw	2008	Vasu	Chakravarthy	Air Force Research Laboratory	Dayton, OH
Dr. Siferd	2000	Khalid	Abed	Jackson State University	Jackson, MS
Dr. Siferd	2008	Michael	Myers	Local Contractor, AFRL, WPAFB	Dayton, OH
Dr. Siferd	2008	Saiyu	Ren	Wright State University	Dayton, OH
Dr. Wu	2012	Ruolin	Zhou	Western New England University	Springfield, MA
Dr. Wu	2013	Xue	Li	Samsung America	San Diego, CA
Dr. F. Zhang	2013	Qi	Zhang	IGATE Corporation	Bridgewater, NJ
Dr. Xue	2012	Piyush	Shah	FMI Technologies, Inc.	Dayton, OH

* Not reported – faculty member on leave

4.1 Historical Data

Faculty within the Department of Electrical Engineering have been consistent and strong participants in the Ph.D. in Engineering program, and we expect this level of engagement to only improve with the establishment of an independent Ph.D. in Electrical Engineering that can be more directly tailored to student needs and faculty interests. As shown in the graph below, faculty in electrical engineering advised the first graduate of the Ph.D. in Engineering and continued to actively advise students, at time accounting for more than have of the graduates in a given year, even after the program had become well established.



5 Prospective enrollment

5.1 Target Enrollment

Our initial enrollment plan will be to sustain the current level of student enrollment, which includes 41 students that were actively registered during 2014. Through curriculum improvements, marketing, and outreach, we will seek to reach a target sustained enrollment level that is 50% greater, 60 actively registered students per year.

5.2 Admission Criteria

Students entering the Ph.D. in Electrical Engineering program must have an awarded M.S. degree in Electrical Engineering or a closely related field. Students with M.S. degrees in (non-electrical) engineering fields will frequently begin graduate-level coursework without remediation. Students from other STEM fields (e.g., mathematics, physics, computer science) may be required to complete some remedial coursework before beginning graduate-level studies.

Program admissions will be based on a completed application of background information, submitted transcripts for undergraduate coursework and prior graduate coursework, GRE scores, 3 letters of recommendation, and a written statement of research interests and objectives. International students will also need to submit scores measuring proficiency with the English language (e.g., TOEFL, IELTS).

Students must first satisfy requirements for admission into the Wright State University Graduate School (Graduate GPA $\geq$ 3.0, TOEFL $\geq$ 79 or IELTS $\geq$ 6.0). Subsequently, admission decisions will be made by the graduate program director based on the complete application package. Admission guidelines for academic criteria will generally be as follows.

1. Student GPA for prior graduate coursework should not be lower than 3.5.

2. Student GRE (math) score should not be lower than 155, and the student GRE composite score should not be lower than 300.
3. International student test scores for proficiency with the English language should not be lower than 79 for the TOEFL and should not be lower than 6.5 for the IELTS.

Prior work experience may improve an applicant's chances for admission but will not be considered as a substitute for required academic credentials.

5.3 Student recruitment

Enrollment in focus areas of the Ph.D. in Engineering that are associated with electrical engineering are already strong as shown earlier in this proposal. This enrollment is driven by 3 student populations: international, alum of WSU undergraduate programs, and people working in local government and industry, and we expect the same driving populations within the Ph.D. in Electrical Engineering. Thus far, extensive efforts in student recruitment have not been required, as the program is well-known within the local employer community and students in B.S. and M.S. degree programs are already recruited into the Ph.D. program with great frequency. At this time, no special marketing or recruiting effort is planned for the Ph.D. in Electrical Engineering on an ongoing basis. Necessarily, there will be some effort placed in publicity during the initial transition from participation in the Ph.D. in Engineering program.

6 Effort to enroll and retain underrepresented groups

The College of Engineering & Computer Science has already been long engaged in efforts to recruit underrepresented groups, most notably minorities and women, to engineering programs. The table below shows the current level of engagement of these groups in existing engineering programs. The Ph.D. in Electrical Engineering will continue to engage in college-led activities towards recruiting underrepresented groups to at least maintain this level of engagement.

	Minorities	**Women**	**Total Enrollment**
Undergraduate Engineering & Computer Science	384 (16%)	366 (15%)	2408
B.S. in Electrical Engineering	52 (17%)	*	304
Graduate Engineering & Computer Science (M.S.)	52 (6%)	246 (28%)	889
M.S. in Electrical Engineering	15 (22%) (excludes international)	*	393 (includes 325 international)
Ph.D. in Engineering	11 (13%)	*	84

* Not reported

Enrollment in the Ph.D. in Engineering is primarily driven by 3 student populations: international, alum of WSU undergraduate programs, and people working in local government and industry, and we expect the same driving populations within the Ph.D. in Electrical Engineering. Hence, the program's demographics among students from the US will be driven primarily by the local working population and our undergraduate enrollment. As we continue to pursue greater engagement of underrepresented groups in our undergraduate programs, we expect the presence of these groups within the Ph.D. in Electrical Engineering to likewise grow.

As an additional effort to grow engagement of underrepresented groups and recruit from outside the WSU community, we will seek to recruit McNair scholars. McNair Scholars is a U.S. Department of

Education program to increase the enrollment of underrepresented groups in doctoral studies. Every year, the WSU Graduate School receives a list of McNair Scholars from the Council of Graduate Schools. The Electrical Engineering Graduate Studies Committee will look within this list for students interested in electrical engineering to be contacted for recruitment.

7 Faculty and facilities

7.1 Faculty

All faculty within the Department of Electrical Engineering have been awarded terminal degrees. Their degree credentials and research areas are listed below.

- *Josh Ash*, Assistant Professor, Ph.D., The Ohio State University, 2007. Research interests: sensor signal and image processing.
- *Elliott Brown* (joint appointment with Physics), Professor, Ph.D., California Institute of Technology, 1985. Research interests: mmwave and THz mixers made from semiconductor hot-electron bolometers and magnetically-quantized photoconductors.
- *Henry Chen*, Professor, Ph.D., University of Minnesota, 1989. Research interests: VLSI/FPGA/GPU based on demand targeted to CMOS nanotechnologies which includes digital, analog and mixed-signal integrated circuits for signal processing, communication, radar and ultra wideband receivers.
- *Jason Deibel* (joint appointment with Physics), Associate Professor, Ph.D., University of Michigan, 2004. Research interests: terahertz and optical physics.
- *John (Marty) Emmert*, Professor, Ph.D., University of Cincinnati, 1999. Research interests: physical design automation for VLSI, VLSI systems, physical VLSI design, reconfigurable systems, digital CD, VHSIC hardware description language (VHDL), verilog, digital design, VLSI interconnections, analog integrated circuit design, signal processing, digital control systems.
- *Fred Garber*, Associate Professor, Ph.D., University of Illinois, 1983. Research interests: communication systems, target recognition, information theory, and pattern theory.
- *Steve Gorman*, Instructor, Ph.D., University of Kentucky, 1988. Research interest: signal and communication processing related to geolocation of modern signal transmitters including cellular and PC devices.
- *Lang Hong*, Professor, Ph.D., University of Tennessee, 1989. Research interests: computer vision, image processing and pattern recognition, robotic sensing and control, multisensor systems, stochastic systems, system modeling and estimation, and multitarget tracking.
- *Marian Kazimierczuk*, Professor, Ph.D., Technical University of Warsaw, 1978. Research interests: electronic circuit analysis, high-frequency tuned power amplifiers, power electronics, dc-dc PWM and resonant power converters, modeling and control of power converters, magnetic components, and renewable energy sources.
- *Pradeep Misra*, Associate Professor, Ph.D., Concordia University, 1987. Research interests: multivariable control theory, robotics and applied numerical analysis.
- *Doug Petkie* (joint appointment with Physics), Associate Professor, Ph.D., The Ohio State University, 1996. Research: spectroscopy of atmospheric and interstellar related molecules, microwave, mm-wave, and THz sensing and imaging.
- *Teri Piatt*, Lecturer, Ph.D., University of Colorado, 1999. Research interests: technical communications, circuits, linear systems, and control systems.

- *Kuldip Rattan*, Professor Emeritus, Ph.D., University of Kentucky, 1975. Research interests: control theory, robotics, verification and validation of cyber-physical systems (CPS).
- *Saiyu Ren*, Associate Professor, Ph.D., Wright State University, 2008. Research interests: RF and mixed signal integrated circuit design with applications to wireless transceivers, communications and signal processing.
- *Brian Rigling*, Professor and Chair, Ph.D., The Ohio State University, 2003. Research interests: sensor signal and image processing, system engineering and modeling.
- *Michael A. Saville*, Assistant Professor, Ph.D., P.E., University of Illinois at Urbana-Champaign, Illinois, 2006. Research interests: computational and applied electromagnetics, radar measurement and physics-based modeling of sensor signal processing.
- *Arnab Shaw*, Professor, Ph.D., University of Rhode Island, 1987. Research interests: sensor signal and image processing, automatic target recognition, hyperspectral image processing, high resolution angles of arrival estimation, and vibrometry based target recognition.
- *Raymond Siferd*, Professor Emeritus, Ph.D., Air Force Institute of Technology, 1977. Research interests: very large scale integrated circuit design, signal processing and analog integrated circuit design.
- *Zhiqiang (John) Wu*, Associate Professor, Ph.D., Colorado State University, 2002. Research interests: wireless communication and networking, cognitive radio and dynamic spectrum access, cognitive RF, multi-carrier transmission, underwater acoustic communication.
- *Jiafeng Xie*, Assistant Professsor, Ph.D., University of Pittsburgh, 2014. Research interests: cryptographic VLSI.
- *Kefu Xue*, Associate Professor, Ph.D., Pennsylvania State University, 1987. Research interests: digital image processing, computer vision and special purpose architecture for signal processing.
- *Xiaodong (Frank) Zhang*, Associate Professor, Ph.D., University of Cincinnati, 2001. Research interests: Fault diagnosis and prognosis, fault-tolerant control and contingency management, intelligent control and adaptive systems, distributed and cooperative control, verification and validation of complex control systems.
- *Yan Zhuang*, Associate Professor, Ph.D., Johannes Kepler University, Linz, Austria, 2000. Research interests: RF and microwave technology, magnetic materials, nano-composite materials, high speed Si-based electronics, MEMs/NEMs, micro aerial vehicle and sensors.

7.2 Facilities

The Ph.D. in Electrical Engineering will be supported by resources at the department, college, and university level, unchanged from those leveraged under the Ph.D. in Engineering. These include laboratory spaces assigned on a per faculty member basis by the department, computing and laboratory support provided by the College of Engineering & Computer Science computing staff, dedicated servers and computer labs maintained by the College of Engineering & Computer Science, and on-line and physical library resources, including electronic subscriptions to SPIE Digital Library and IEEExplore.

8 Need for additional facilities and staff

As this degree program is being established based on components of an existing multidisciplinary degree program, and as the Department of Electrical Engineering is already in the practice of supporting a substantial graduate student population, any additional resources required for an independent Ph.D. in Electrical Engineering will be negligible.

9 Projected additional costs

No additional costs are expected to establish the Ph.D. in Electrical Engineering.

Appendix 1 – Electrical Engineering Course Descriptions

EE 6000 Linear Systems II: Discrete time signals and systems, the z-Transform, input/output theory and discrete Fourier transform, IIR and FIR filter design, relationships, and sampling.

EE 6100 Nano-Fabrication of Integrated Solid State Devices: History, design, and fabrication of CMOS and micro-electro-mechanical systems (MEMS). Typical fabrication methods cover CMOS, front-end-of-line (FEOL), back-end-of-line (BEOL), surface and bulk micromachining. Typical VLSI devices and selected RF MEMS are covered.

EE 6120 Industrial Controls and Automation: Working knowledge of industrial controls and automation. Focus is on developing an understanding of wiring diagram creation, hardware selection, and programmable logic controller design and operation.

EE 6130 Continuous Control Systems: Introductory course providing students with a general control background. Major topics include block diagrams and signal-flow graphs, electromechanical modeling, time response, root locus, and design of PID controllers.

EE 6170 Digital Control Systems: Samples spectra and aliasing, analysis and design of digital control systems using root locus and transform techniques, discrete equivalents of continuous controller and quantization effects.

EE 6190 Introduction to Intelligent Control Systems: Foundations of fuzzy set theory, system modeling using fuzzy rules, structure of fuzzy controllers and PID fuzzy controller design. Also included are neural network foundations, single layered/multi-layered perceptions, learning rules, basics of adaptive controls and adaptive neural control.

EE 6210 Digital Communication: Topics include: analog communication vs digital communication, source coding, pulse shaping, digital moducation/demodulation, signal detection and optimal receiver, simulation of digital communication system is an integral part of this course.

EE 6360 Digital Signal Processing: Theory, Application and Implementation: Introduces principles and applications of digital signal processing (DSP) from the design and implementation perspective. Introduction to advanced digital signal processing design concepts. Focus on time and frequency domain algorithms. Methods include multirate signal processing. Filter banks, time-frequency analysis, and wavelets.

EE 6400 Nanoscience and Nanotechnology: Introduction to nanoengineering, nanoscience and nanotechnology. Topics include introduction to quantum mechanics, fabrication, characterization, materials, electronic properties, optical properties, magnetic properties, devices, MEMS, NEMS.

EE 6420 Microwave Engineering I - Passive Components: Transmission line theory and application wave propagation in rectangular waveguides, microwave network analysis, matching network, design of microwave filter and resonator, and introduction of electromagnetic compatibility.

EE 6440 Electronic Integrated Systems: Theory and applications of linear integrated circuits. Topics include bipolar and field effect transistor analysis and design, multi-stage and feedback amplifiers, ideal and real operational amplifiers, frequency response and compensation, active filters, comparators, and waveform generators.

EE 6460 Microwave Engineering II - Active Components and Circuits: Fundamental of RF active components; Design impedance matching network; microwave transistor amplifier design; Microwave transistor oscillator and mixer design; Introduction to microwave systems.

EE 6470 Antenna Theory and Design: Linear dipole antennas, antenna arrays, thin-wire antennas, moment method analysis examples (vee dipole, folded dipole, etc.), and broadband and frequency-independent antennas. Computer-aided design and analysis of wire antennas, feed networks, and antenna arrays using antenna CAD software.

EE 6540 Very Large Scale Integrated Circuit Design: Introduction to VLSI system design. Topics include CMOS devices and circuit design techniques, basic building blocks for CMOS design, fabrication processing and design rules, chip planning and layout, system timing and power dissipation, simulation for VLSI design, and signal processing with VLSI.

EE 6560 Introduction to Robotics: An introduction to the mathematics of robots. Topics covered include coordinate systems and transformations, manipulator kinematics and inverse kinematics, Jacobians, dynamic and trajectory planning.

EE 6600 Autonomous UAV Flight Control: Introductory course of UAV autopilot design. Major topics include quadrotor dynamics and modeling, UAV sensors, stabilization and control of altitude, pitch/roll, and yaw, position navigation using orientation angles, waypoint navigation, integration and practical issues.

EE 6620 Digital Integrated Circuit Design with PLDs and FPGAs:Digital design with behavioral level VHDL; application of VHDL to the design, analysis, and synthesis of digital integrated circuits; field programmable gate arrays (FPGAs); and design and application of digital integrated circuits using FPGAs. CAD tools, devices, and boards will be used in lab portion of the course. Topics include registers, counters, memory devices, register-level design, microcomputer system organization. Students must show competency in the design of digital systems.

EE 6700 MEMS and Sensors: Overview of basic sensor technology to provide the engineering student with practical working knowledge of sensors. Course will include basic operating principles, basic electronics and measurement principles.

EE 6730 Wireless Communication: Overview on various topics of wireless communication. Topics include cellular network concept, wireless communication channel and multi-path fading, digital modulation/demodulation techniques for wireless communication, performance analysis, equalization, diversity, and RAKE receiver, spreading spectrum technology and CDMA, cognitive radio and dynamic spectrum access, and wireless communication system simulation.

EE 6750 Introduction to Radar Systems: Introductory study of the radar equation, antenna patterns, target cross sections and system losses, radar measurements, pulse doppler and coherent techniques, detection probability and signal-to-noise ratio, sidelobe clutter, synthetic arrays, and pulse compression techniques.

EE 6840 Introduction to Machine Learning: Introduction to the field of probabilistic machine learning. Examples are drawn from sensor signal exploitation, biology, text processing, computer vision, and robotics. Key techniques are demonstrated and implemented in MATLAB.

EE 7010 Applied Linear Techniques: Graduate level linear engineering methods in finite and infinite dimensions.

EE 7020 Modern Control I: State variable representations of continuous and discrete systems. Linear vector spaces and similarity transformations; elgen-analysis, time and transform domain solutions of linear state equations; controllability, observability, and stability of linear systems.

EE 7080 Advanced Micro-Electro-Mechanical Systems (MEMS): Classical and advanced micro-sensing and actulation methods. Analytical and finite element methods utilized in investigating MEMS with computed results compared to published experimental data findings. Topics covered include bio-MEMs and microfluidics.

EE 7150 Digital Image Processing: Image representation, sampling/quantization, spatial/frequency concepts, image enhancement, color image theory, unitary image transforms, image data compression, image models, image coding, image restoration, feature extraction and description, and computer implementation of concepts and algorithms introduced.

EE 7160 Multisensor and Information Fusion: Sensor characteristics, sensor information processing, management, modeling, and coordination. Statistical, Bayesian and Fisher, weighted least-square, dynamic distributed and centralized, rule-based and adaptive sensor fusion. Demptster-Shafer technique. Fusion by Markov random fields. Multiresolutional sensor fusion. Fusion with out-of-sequence measurements.

EE 7170 Target Tracking and Data Association: Multitarget tracking and data association. Linear and nonlinear state estimation. Maneuvering targets. Single target and multitarget tracking in clutter. Joint probabilistic data association filter. Multiple hypothesis and distributed multitarget tracking. Track-to-track fusion.

EE 7200 Modern Control II: Analysis and design of digital control systems using the state approach, multirate digital control systems, and digital state observer and microprocessor control.

EE 7270 Adaptive Control: The goal of this course is to provide a rigorous introduction to the exciting world of adaptive/self-tuning systems and the application of adaptive techniques to control of dynamic systems with parametric uncertainty. Students will develop first-hand experience in the use of adaptive control techniques via computer simulations.

EE 7280 Intelligent Control: The course focuses on providing an introduction to the emerging area of intelligent control methods and their applications to the control and health monitoring of uncertain, complex dynamical systems. An additional goal is the development of the foundational tools needed for pursuing independent research, giving oral presentations, and producing written reports.

EE 7330 Modern Radar Theory: Application of probability and random process to the performance characterization of range/doppler radar. Development of the concepts of resolution, S/N, ambiguity function, and pulse compression, and their applications to radar systems design. Consideration is also given to coherent imaging radar.

EE 7350 Wireless Communication Techniques: The goal of this course is to provide students with a comprehensive and in-depth understanding of the frontier of modern wireless communication technologies. Topics include: uniqueness and difficulty of wireless communication system design, wireless communication channel and propagation model, modulation and demodulation techniques for mobile communication, multiple access technologies, wireless communicaton system simulation, etc.

EE 7360 Advanced Wireless Communication Techniques: Fading Counteraction including ISI mitigation and Adaptive Equaliztion, Diversity, Coding and Interleaving for error correction, Speech Coding, Multiplexing and Multiple Access techniques including TDMA, FDMA, and CDMA; OFDM, CDMA, Wireless Networking, Packet Radio, Wireless LAN's including Bluetooth.

EE 7400 Information Theory: Development of communication channel model and use of information theory as means of quantifying that model. Investigation of various error correcting and detecting codes. The popular Viterbi coding algorithm is also covered.

EE 7410 Power Electronics I: Silicon and silicon carbide power devices; Fast-recovery, ultra-fast-recovery, and p-n junctions and Schottky power diodes; performance parameters; Power MOSFETs and IGBTs; static and dynamice characteristics; voltage and current stress; Pulse-width modulated (PWM) DC-DC power converts: topologies of power stages of power converters, such buck-boost, flyback, forward, half bridger, full-bridge, and push-pull power stages.

EE 7420 Power Electronics II: Modeling, linearization, and control of open-loop power stages of PWM DC-DC power converters, voltage-mode and current mode control techniques of PWM power converters, DC and AC, steady-state, and transient performance of open-loop and closed-loop power converters.

EE 7430 High Frequency Magnetic Components: This course will cover topics in the area of high-frequency power magnetic components, such as inductors and transformers. Concepts that will be studied: such as complex permeability, eddy currents, skin effect, proximity effect, winding losses, Dowell's equation, core losses, self-capacitance, area-product method, core-geometry method, integrated inductors. Optimization of conductor dimensions will be performed. Design procedures of high-frequency inductors and transformers will be presented.

EE 7440 RF Power Amplifiers: The course covers the fundamental theory of radio frequency (RF) power amplifiers and their applications in wireless communications, radars, and radio and TV broadcasting. RF power passive and active devices are discussed.

EE 7460 Advanced Electromagnetics Engineering: Understand the physical and engineering principles of electromagnetic wave propagation, radiation and scattering; understand electro-dynamic forms of Maxwell's equations and the associated mathematical models and analysis methods; understand application of Maxwell's equations to engineering problems in radiation and scattering.

EE 7470 Electromagnetic Simulation Methods: Direct solution of Maxwell's differential equations in the time domain using the finite-difference time-domain (FTDT) method. Absorbing boundary conditions and waveguide or plane wave excitation methods. Application to the solution of problems relevant to radiation, radar cross section (or scattering) and microwave circuit design. Wave equation and integral implementation. Application of one-and two-dimensional EM problems. Comparison with the finite element method.

EE 7480 Advanced Microwave Engineering: Concepts and fundamental principles of advanced high speed electronic devices operating at frequencies greater than 1 GHz, including MESFET, HEMT, RF MOSFET, HBT, and carbon electronics. Models and discussions of semiconductor devices fabricated in a variety of material systems, such as strained Si, III-V compound semiconductors, Si-Ge, CNT and graphene. A description of advanced optoelectronic devices including light-emitting diodes, semiconductor lasers and photovoltaic systems (solar cell).

EE 7520 Low Power VLSI System Design: CMOS VLSI subsystems and low-power subsystems design. Includes data path operators for FIR and IIR filter design: counters, high-speed adders, multipliers, and memory elements.

EE 7530 VLSI Design Synthesis and Optimization: VLSI Synthesis and optimization including data path synthesis, glue logic synthesis control-unit synthesis, and resource sharing. Covers behavioral level to layout level synthesis and corresponding algorithms.

EE 7540 VLSI Testing and Design for Testability: Design for testability of VLSI circuits. Topics include importance of testing, conventional test methods, built-in test, CAD tools for evaluating testability, test pattern generators and compressors; and test for mixed-signal systems and systems-on-a-chip (SOC).

EE 7550 Trust in Integrated Circuit Design: This course will cover topics in "Trust for Integrated Circuit Design." We will explore the problem of Trust at each level of the Integrated circuit design process, from high level simulation all the way to layout, fabrication, and packaging.

EE 7560 Advanced Robotics: Detailed study of the dynamics and control of robotic systems and robot programming languages and systems. Material covered includes rigid-body dynamics; linear, nonlinear, adaptive, and force control of manipulators; and robot programming languages. Sensors, low-level and higher level vision techniques, task planning including obstacle avoidance and artificial intelligence and expert systems as applied to robotic systems.

EE 7580 CMOS Mixed Signal IC Design: Introduction to the techniques, limitations, and problems in the design of CMOS analog integrated circuits. Topics include CMOS analog circuit modeling and device characterization, analog CMOS subcircuits, CMOS amplifiers, CMOS comparators, and

CMOS Op Amps, CMOS Analog to Digital Converters, and CMOS Digital to Analog Converters, and Switched Capacitor Circuits.

EE 7590 CMOS Radio Frequency Integrated Circuit Design: Introduction to the design of Radio Frequency Integrated Circuits using CMOS technology. Topics include S-parameters, noise sources in RF Integrated Circuits, low noise RF amplifiers, RF mixers, RF oscillators and synthesizers, phase lock loops and phase noise.

EE 7610 Random Processes: Probability and random variable, distributions and density functions, random processes, strict-sense and wide-sense stationarity, auto-correlation and power spectral density, ergodicity, response of linear systems with stochastic inputs, discrete linear models, and Gaussian processes.

EE 7620 Detection, Estimation, and Optimal Filter Theory: Binary detection with single/multiple observations, linear minimum mean-square error filtering: Wiener and Kalman filters, MLE and MAP estimators, histogram, tests of hypotheses, regression analysis, model-free and model-based parameter estimation of random processes.

EE 7630 Stochastic Signal Processing: Processing, techniques for stochastic signals. Parametric and nonparametric spectral estimation. Introduction to adaptive systems, to adaptation with stationary signals, and to adaptive algorithms and structures.

Appendix 2 – Electrical Engineering Faculty

See attached.

Joshua N. Ash

Dept. of Electrical Eng.
Wright State University
3640 Colonel Glenn Hwy
Dayton, OH 45435

josh.ash@wright.edu
(937) 775-3983

Education

- **Ph.D.** in Electrical and Computer Engineering, Dec. 2007
  The Ohio State University, Columbus, OH.
  Dissertation: *On Singular Estimation Problems in Sensor Localization Systems*
  Dissertation committee: Randolph L. Moses (chair), Lee C. Potter, Jose B. Cruz, Alfred O. Hero III (Univ. of Michigan)
- **M.Sc.** in Electrical Engineering, May 2003.
  Washington University, Saint Louis, MO.
  Research: *Resource Allocation in Wireless Multirate DS-CDMA Ad-hoc Networks*
- **B.Sc.** in Electrical Engineering, May 1998.
  Washington University, Saint Louis, MO.
- **B.Sc.** in Physics, May 1998.
  Washington University, Saint Louis, MO.

Awards and Honors

- Best Paper Award, *IEEE Signal Processing Society*, 2009
- MIT Lincoln Laboratory Graduate Fellowship, 2005–2007
- Donald F. Wann Doctoral Fellowship, Washington University, 1998–2000
- The Electrical Engineering Award for Technical Achievement, Washington University, 1998
- IEEE Chapter Black Box Award, Washington University, 1998
- Helen-Marie and Milton E. Freund Scholarship, Washington University 1996–1998
- Dean's Honorary Scholarship, Washington University, 1994–1998
- Robert C. Byrd Scholarship, Indiana Dept. of Education, 1994–1998
- National Science Foundation Scholarship, 1994–1996

Professional Experience

- **Assistant Professor**, Jan. 2015–present
  Department of Electrical Engineering, Wright State University, Dayton, OH
  Research and student instruction in statistical signal processing and large-scale sensor systems, including synthetic aperture radar and hyperspectral imagery.
- **Research Scientist**, Oct. 2010–Dec. 2014
  Institute for Sensing Systems, Ohio State University.
  Basic research in statistical signal processing, statistical modeling and geometric interpretations of information. Application areas include sparse reconstruction, synthetic aperture radar, hyperspectral imagery, sensor networks, and computational biology.
- **Consultant**, Sept. 2013–2014
  Etegent Technologies, Cincinnati, OH
  Feature-learning strategies along with an adaptive and hierarchical classification framework for automated target recognition using synthetic aperture radar.

- **Postdoctoral Researcher**, Jan. 2008–Sept. 2010
  Institute for Sensing Systems, Ohio State University.
  Developed a novel real-time imaging algorithm for synthetic-aperture radar; performed research on robust time-delay estimation in the presence of signal warping and inhomogeneous media; and developed regularization methods and estimators of single-cell gene response functions from heterogeneous cell populations.
- **Graduate Research Associate**, 2003–2007
  Information Processing Systems Laboratory, Ohio State University.
  Performed research in statistical signal processing for inference in sensor networks, including the development of novel algorithms and performance metrics for sensor and target localization. Performed hardware and software development to support a wireless sensor network test-bed and conducted field experiments using acoustic and radio frequency modalities.
- **Consultant**, 2003–2004
  Nova Engineering, Cincinnati, OH
  Developed a performance prediction engine for a network-based acoustic localization system; included evaluations of design alternatives, performance bounds, and terrain and atmospheric propagation impacts.
- **Member Technical Staff**, 2000–2002
  Celox Networks, Saint Louis, MO
  Designed algorithms, developed software, and conducted software performance optimizations in C for distributed processors in a carrier-scale network aggregation router. Performed all phases of software development including high-level design, detailed design, implementation, unit test, system integration, and support.
- **Graduate Research Assistant**, 1998–2000
  Research Group in Telecommunications, Washington University.
  Created a novel Medium Access Control (MAC) protocol for wireless ad-hoc networks based on multi-rate CDMA. Designed and implemented a network simulator to analyze and advance the above new protocol. Performed comparative analysis between competing multiple access protocols in ad-hoc networks.
- **Undergraduate Research Assistant**, 1996–1998
  Magnetics and Information Science Center, Washington University.
  Studied, through experiment, the migration and reversibility patterns of bit-cells and grains in magnetic media with the application of DC erase fields. Designed and executed experiments to investigate the effects of azimuthal head angle variation with magnetic media to develop improved interaction models. Custom software was developed for adaptive experiment design.

Teaching Experience

- **Instructor**, Spring 2015
  EE7620: Detection, Estimation, and Optimal Filter Theory (24 Graduate students)
  Department of Electrical Engineering, Wright State University, Columbus, OH
  Binary detection with single/multiple observations, linear minimum mean-square error filtering: Wiener and Kalman filters, MLE and MAP estimators, histogram, tests of hypotheses, regression analysis, model-free and model-based parameter estimation of random processes.
- **Instructor**, Fall 2014
  ECE3050: Signals and Systems (40 Undergraduate students)
  Department of Electrical and Computer Engineering, Ohio State University, Columbus, OH
  Linear systems and models; convolution; Fourier series and transform; Laplace transform; frequency response; z-transform; feedback.
- **Instructor**, Winter 2003
  ECE309: Electrical Circuits Lab (44 Undergraduate students)
  Department of Electrical and Computer Engineering, Ohio State University, Columbus, OH
  AC and DC circuits; transducers; operational amplifiers; frequency response; active filters; AM modulation.

◇ **Student Evaluations of Instructor**
Sampling of student comments from Ohio State University's system for enrolled students to provide anonymous evaluations of instructors. Full student evaluations available upon request.

- "Very helpful instructor"
- "Very prepared, knew the material, and was very helpful"
- "Interested in helping students, quick email responses"
- "Encouraged students to figure out hard problems for themselves"
- "Made students think, explained subject matter clearly"
- "Super human"

◇ **Guest Lecturer**
Department of Electrical and Computer Engineering, Ohio State University, Columbus, OH
Gave numerous guest lectures in the following courses at Ohio State University

- ECE291: Introduction to Electrical and Computer Engineering
- ECE501: Introduction to Analog and Digital Communications
- ECE600: Introduction to Digital Signal Processing
- ECE2100: Electrical and Computer Engineering II

◇ **Head Grader**, 1999–2000
Department of Electrical Engineering, Washington University, Saint Louis, MO
Responsible for the grading and consulting of all EE courses offered at Washington University. Included interviewing and hiring of graders.

◇ **Graduate Student Advising**
Department of Electrical and Computer Engineering, Ohio State University, Columbus, OH
Co-advised (with R. Moses) the following ECE graduate students:

- A. Fasih, Ph.D. student, Characterization and imaging of moving targets using synthetic aperture radar.
- C. Austin, Ph.D. student, Applications of sparse reconstruction in continuous estimation problems.
- J. Meola, Ph.D. student, Atmospheric modeling and atmosphere-invariant change detection in hyperspectral imagery.
- A. Boytim, M.S./Ph.D. student, Spatial-temporal statistical analysis of aeroacoustic propagation in inhomogeneous media.

◇ **Undergraduate Student Advising (research projects)**
Department of Electrical and Computer Engineering, Ohio State University, Columbus, OH

- J. Balderas, Graduated June 2011, Honors Thesis: "Passive time synchronization in sensor networks using opportunistic FM radio signals"
- D. Stein, Graduated June 2010, Characterization of cross-talk in a consumer recording system
- S. Winfree, Graduated June 2007, Honors Thesis: "Angle of arrival estimation using received signal strength with directional antennas" (Co-advised with L. Potter)
- A. Kalash, Graduated June 2005, Honors Thesis: "Design and implementation of network localization service using angle-indexed signal strength measurements" (Co-advised with L. Potter)

PUBLICATIONS ◇ **Journal Publications and Book Chapters**

Names preceded by * are student advisees/co-advisees of J. Ash.

[J1] J. Ash, "A novel change detection architecture for interrupted SAR using approximate message passing," *IEEE Trans. Sig. Proc.*, (in preparation).

[J2] J. Ash and J. Meola, "Structured gaussian models for hyperspectral reflectance spectra," *IEEE Trans. Geoscience and Remote Sensing*, 2014, (in submission).

[J3] *A. Fasih, J. Ash, and R. Moses, "Moving target estimation Cramér-Rao bounds from radar sampling locations," *IEEE Trans. Aerospace and Electronic Systems*, (in submission).

[J4] J. Ash, E. Ertin, L. Potter, and E. Zelnio, "Wide-angle synthetic aperture radar imaging: Models and algorithms for anisotropic scattering," *IEEE Sig. Proc. Mag.; Special Issue on Advances in Synthetic Aperture Radar Imaging*, vol. 31, no. 4, pp. 16–26, July 2013.

[J5] L. Moore, L. Potter, and J. Ash, "Three-dimensional position accuracy in circular synthetic aperture radar," *IEEE Aero. Elect. Sys. Mag.*, vol. 29, no. 1, Jan. 2014.

[J6] F. Golub, L. Potter, J. Ash, A. Blank, and R. Ahmad, "Estimation of spin-echo relaxation time," *Journal of Magnetic Resonance*, vol. 237, pp. 17–22, Dec. 2013.

[J7] *C. Austin, J. Ash, and R. Moses, "Dynamic dictionary algorithms for model order and parameter estimation," *IEEE Trans. Sig. Proc.*, vol. 61, no. 20, pp. 5117–5130, Oct. 2013.

[J8] *J. Meola, M. Eismann, R. Moses, and J. Ash, "Application of model-based change detection to airborne VNIR/SWIR hyperspectral imagery," *IEEE Trans. Geoscience and Remote Sensing*, vol. 50, no. 10, pp. 3693–3706, Oct. 2012.

[J9] Joshua N. Ash, "An autofocus method for backprojection imagery in synthetic aperture radar," *IEEE Geoscience and Remote Sensing Letters*, vol. 9, no. 1, pp. 104–108, Jan. 2012.

[J10] *J. Meola, M. Eismann, R. Moses, and J. Ash, "Detecting changes in hyperspectral imagery using a model-based approach," *IEEE Trans. Geo*, vol. 49, no. 7, pp. 2647–2661, 2011.

[J11] Randolph L. Moses and Joshua N. Ash, "An autoregressive formulation for SAR backprojection imaging," *IEEE Trans. on Aerospace & Elect. Sys.*, vol. 47, no. 4, pp. 2860–2873, Oct. 2011.

[J12] *Joseph Meola, Michael Eismann, Randolph Moses, and Joshua Ash, "Modeling and estimation of signal-dependent noise in hyperspectral imagery," *Applied Optics*, vol. 50, no. 21, pp. 3829–3846, 2011.

[J13] *Christian Austin, Randolph Moses, Joshua Ash, and Emre Ertin, "On the relation between sparse reconstruction and parameter estimation with model order selection," *IEEE Journal of Selected Topics in Signal Processing*, vol. 4, no. 3, pp. 560–570, June 2010.

[J14] Dan Siegal-Gaskins, Joshua Ash, and Sean Crosson, "Model-based deconvolution of cell cycle time-series data reveals gene expression details at high resolution," *PLoS Computational Biology*, vol. 5, no. 8, Aug. 2009.

[J15] Joshua Ash and Randolph Moses, "Self-calibration of sensor networks," in *Handbook on Array Processing and Sensor Networks*, S. Haykin and K.J.R. Liu, Eds. IEEE-Wiley, 2010.

[J16] Joshua N. Ash and Randolph L. Moses, "On the relative and absolute positioning errors in self-localization systems," *IEEE Trans. Signal Process.*, vol. 56, no. 11, pp. 5668–5679, 2008.

[J17] Neal Patwari, Joshua N. Ash, Spyros Kyperountas, Alfred O. Hero III, Randolph L. Moses, and Neiyer S. Correal, "Locating the nodes: cooperative localization in wireless sensor networks," *IEEE Signal Processing Magazine*, vol. 22, no. 4, pp. 54–69, July 2005,
→ *847 total citations, ISI Web of Knowledge (as of 9/26/2014)*
→ **IEEE Signal Processing Magazine Best Paper Award 2009**.

[J18] Joshua N. Ash and Randolph L. Moses, "Acoustic time delay estimation and sensor network self-localization: Experimental results," *Journal of the Acoustical Society of America*, vol. 118, no. 2, pp. 841–850, 2005.

◇ **Conference Publications**

Names preceded by * are student advisees/co-advisees of J. Ash.

[C1] J. Ash, "A unifying perspective of coherent and non-coherent change detection," in *SPIE, Algorithms for Synthetic Aperture Radar Imagery XXI*, May 2014, vol. 9093.

[C2] J. Ash, "Joint imaging and change detection for robust exploitation in interrupted SAR environments.," in *Proc. SPIE, Algorithms for Synthetic Aperture Radar Imagery XX*, Baltimore, MD, May 2013, vol. 87460J.

[C3] Joshua Ash and Joseph Meola, "Incorporating spatial structure into hyperspectral scene analysis," in *Proc. IEEE Statistical Signal Processing Workshop*, Aug. 2012, pp. 5–8.

[C4] Joshua Ash, "Empirical space-time statistical models for inhomogeneous acoustic propagation environments," in *Proc. Unattended Ground, Sea, and Air Sensor Tech. and App. XIV, SPIE Defense and Security Symposium*, May 2012, vol. 8388.

[C5] K. Dungan, J. Ash., J. Nehrbass, J. Parker, L. Gorham, and S. Scarborough, "Wide angle SAR data for target discrimination research," in *Proc. Algorithms for Synthetic Aperture Radar Imagery XIX, SPIE Defense and Security Symposium*, April 2012, vol. 8394-21.

[C6] *Christian D. Austin, Joshua N. Ash, and Randolph L. Moses, "Performance analysis of sparse 3D SAR imaging," in *Proc. SPIE, Algorithms for Synthetic Aperture Radar Imagery XVIII*, April 2011.

[C7] Marisa C. Eisenberg, Joshua N. Ash, and Dan Seigal-Gaskins, "In silico synchronization of cellular populations through expression data deconvolution," in *Proc. IEEE/ACM 48th Design Automation Conference*, June 2011.

[C8] *Joseph Meoloa, Michael T. Eismann, Randolph L. Moses, and Joshua N. Ash, "Extension and implementation of a model-based approach to hyperspectral change detection," in *Proc. SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XVII*, April 2011.

[C9] *Christian Austin, Joshua Ash, and Randolph Moses, "Parameter estimation using sparse reconstruction with dynamic dictionaries," *IEEE International Conference on Acoustics, Speech, and Signal Processing*, May 2011.

[C10] Richard Kozick, Joshua Ash, and Gene Whipps, "Supersonic projectile models for asynchronous shooter localization," *Unattended Ground, Sea, and Air Sensor Technologies and Applications XIII, (SPIE) Defense and Security Symposium*, April 2011.

[C11] *Ahmed Fasih, Carl Rossler, Joshua Ash, and Randolph Moses, "Analysis of motion disambiguation using multi-channel circular SAR," in *Proc. SPIE, Algorithms for Synthetic Aperture Radar Imagery XVII*, April 2010, vol. 7699.

[C12] *Joe Meola, Joshua Ash, Randolph Moses, and Michael Eismann, "A model-based approach to hyperspectral change detection," in *Proc. SPIE, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XVI*, April 2010, vol. 7695.

[C13] Joshua N. Ash, Gene T. Whipps, and Richard J. Kozick, "Performance of shockwave-based shooter localization under model misspecification," *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing*, March 2010.

[C14] Joshua Ash and Randolph Moses, "Time-delay estimation in a time-warping environment," *Unattended Ground, Sea, and Air Sensor Tech. and App. XI, SPIE Defense and Security Symposium*, 2009, Orlando, FL.

[C15] *Christian D. Austin, Emre Ertin, Joshua N. Ash, and Randolph L. Moses, "On the relation between sparse sampling and parametric estimation," *Proc. IEEE DSP Workshop*, Jan. 2009, Marco Island, FL.

[C16] *Ahmed R. Fasih, Emre Ertin, Joshua N. Ash, and Randolph L. Moses, "SAR focusing performance for moving objects with random motion components," *Proc. Asilomar Conference on Signals, Systems, and Computers*, Oct. 2008, Pacific Grove, CA.

[C17] R. L. Moses and J. N. Ash, "Recursive SAR imaging," *Proc. of SPIE, Algorithms for Synthetic Aperture Radar Imagery*, vol. 6970, March 2008.

[C18] Joshua N. Ash and Randolph L. Moses, "On optimal anchor node placement in sensor localization by optimization of subspace principal angles," *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 2289–2292, Mar. 30–Apr. 4 2008.

[C19] Joshua N. Ash and Randolph L. Moses, "Sensor localization error decomposition: Theory and applications," in *Proc. IEEE Statistical Signal Processing Workshop*, Aug. 2007, pp. 660–664, (invited).

[C20] Joshua N. Ash and Lee C. Potter, "Robust system multiangulation using subspace methods," in *Proc. Information Processing in Sensor Networks*, April 2007, pp. 61–68,
→ **22% acceptance**.

[C21] Joshua N. Ash and Randolph L. Moses, "Relative and absolute errors in sensor network localization," *IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 1033–1036, April 15–20 2007.

[C22] Joshua N. Ash and Randolph L. Moses, "Outlier compensation in sensor network self-localization via the EM algorithm," *IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 749–752, March 19–23 2005.

[C23] Joshua Ash and Lee Potter, "Sensor network localization via received signal strength measurements with directional antennas," *Proc.* 42nd *Annual Allerton Conference on Communication, Control, and Computing*, pp. 1861–1870, Sept. 2004.

[C24] Jason Wilden, Jim Agniel, Randolph L. Moses, and Joshua N. Ash, "Position and orientation for distributed sensors: the PODIS network," *Proceedings of the 2004 MSS Battlefield Acoustics Symposium*, Aug. 2004.

[C25] Joshua N. Ash and Randolph L. Moses, "Acoustic sensor network self-localization: Experimental results," *2003 Military Sensing Symposia (MSS) Specialty Group on Battlefield Acoustic and Seismic Sensing, Magnetic and Electric Field Sensors*, Oct. 2003.

◇ **Other Publications**

[O1] Joshua N. Ash, *On Singular Estimation Problems in Sensor Localization Systems*, Ph.D. dissertation, Ohio State University, 2007.

[O2] Joshua N. Ash, "Resource allocation in wireless multirate DS-CDMA ad-hoc networks," Tech. Rep., Washington University, 2003.

Presentations

◇ **Invited Talks and Conference Presentations** (without proceedings)

[T1] Joshua Ash, "Decoding hyperspectral imagery: a communication theory perspective," *AFRL Sensors Directorate: ATR Center Summer Workshop*, Aug. 12, 2013, Dayton, OH (invited talk).

[T2] Joshua Ash, "Graphical models and methods of deterministic Bayesian inference: a primer," *AFRL Sensors Directorate: ATR Center Summer Workshop*, Aug. 12, 2013, Dayton, OH (invited talk).

[T3] Joshua Ash, "Joint imaging and change detection for robust exploitation in interrupted SAR environments," *AFRL Sensors Directorate: ATR Center Summer Workshop*, Aug. 13, 2013, Dayton, OH (invited talk).

[T4] Joshua Ash, "Incorporating spatial structure into hyperspectral scene analysis," *Ohio Innovation Sensor Summit–sponsored by IDCAST*, June 12, 2012, Dayton, OH (invited talk).

[T5] Dan Siegal-Gaskins, Joshua Ash, and Sean Crosson, "Model-based deconvolution of cell cycle time-series data reveals gene expression details at high resolution," in *10th International Conference on Systems Biology*. Stanford University, Aug. 2009, (poster).

[T6] Dan Siegal-Gaskins, Joshua Ash, and Sean Crosson, "Generalized deconvolution of population-level gene expression data reveals details with high temporal resolution," in *Cold Spring Harbor Laboratory meeting on Systems Biology: Networks*, Mar. 2009, (poster).

Funding

◇ J. Ash (PI), Mar. 2013–Dec. 2014, *Spatial and Bayesian Processing for Hyperspectral Image Analysis*, Air Force Research Lab : $154,000 (Awarded)

◇ J. Ash (co-PI), E. Ertin (co-PI), L. Potter (co-PI), 2013–2014, *Object Physics for Exploitation and Recognition Advancements*, subcontract to SAIC/Leidos : $100,000 (My portion: $30,000) (Awarded)

◇ J. Ash (co-PI), E. Ertin (co-PI), L. Potter (PI), 2014–2016, *Radio Frequency Signal Processing for Layered Sensing*, Air Force Research Lab : $1,400,000 (My portion: $300,000) (Awarded)

◇ Joshua N. Ash (PI), Mar. 2013, *Graphical Models Approach to Change Detection for Interrupted SAR*, Air Force Research Lab : $100,000 (Awarded)

◇ Joshua N. Ash (PI), Jan. 2012, *Moving Target Imaging with Synthetic Aperture Radar*, Air Force Research Lab : $73,874 (Awarded)

◇ Joshua N. Ash (PI), Aug. 2011, *Advanced Bayesian Estimation Techniques for Model-based Hyperspectral Change Detection*, Air Force Research Lab : $125,000 (Awarded)

◇ Joshua N. Ash (PI), Oct. 2010, *Persistent Synthetic Aperture Radar Sensing*, Air Force Research Lab : $14,451 (Awarded)

◇ Joshua N. Ash (co-PI), Lee C. Potter, Jul. 14, 2010, *Exploitation of Opportunistic Signals for Synchronization of Sensor Networks*, NSF REU : $7982 (Awarded, J. Ash sole proposal author)

◇ Joshua N. Ash (PI), Jan. 12, 2010, *Probabilistic Modeling of Acoustic Propagation in Time-warping Environments*, Army Research Lab : $104,685 (Awarded)

Professional Memberships

- IEEE
- Tau Beta Pi

Service

- Session Chair, SPIE Algorithms for Synthetic Aperture Radar: *Exploitation of Motion*, Baltimore, MD, May 1, 2013
- Session Chair, SPIE Algorithms for Synthetic Aperture Radar: *Image Formation*, Baltimore, MD, May 1, 2013
- Session Chair, SPIE Algorithms for Synthetic Aperture Radar: *Exploitation of Motion*, Baltimore, MD, April 26, 2012
- Technical program committee, IEEE Statistical Signal Processing Workshop, Ann Arbor, MI, Aug. 2012
- Graduate student representative on Chair Search Committee for the Dept. of Electrical and Computer Eng., Ohio State Univ., Spring 2006.
- Journal reviewer:
  IEEE Transactions on Signal Processing
  IEEE Transactions on Image Processing
  IEEE Transactions on Computers
  IEEE Signal Processing Letters
  IEEE Communications Letters
  IET Electronics Letters
  IET Research Journal in Signal Processing
  Elesevier Journal of Electronics and Communications
  Elesevier International Journal of Signal Processing
  EURASIP Journal on Wireless Communications and Networking
  ISIF Journal of Advances in Information Fusion

HENRY CHEN

Department of Electrical Engineering
Wright State University
Dayton, Ohio 45435

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EDUCATION

Institution	Concentration	Degree/Date
The University of Minnesota, Minneapolis	EE	Ph.D., 1989
The University of Iowa, Iowa City	EE	M.S., 1986
National Taiwan University, Taipei, Taiwan	EE	B.S., 1981

ACADEMIC EXPERIENCE

Institution/Organization	Position	Dates
Wright State University, Dayton, Ohio	Professor	2000-present
Wright State University, Dayton, Ohio	Associate Professor	1995-2000
Wright State University, Dayton, Ohio	Assistant Professor	1989-1995

RESEARCH INTERESTS

Computer-aided design and test of digital and mixed-signal RF IC, VLSI/FPGA/GPU for real-time signal processor, microwave and ultra wide-band receivers.

PROFESSIONAL SERVICE

Editorial Board	Service
Integration, the VLSI Journal	Associate Editor (2010-present)
VLSI Design Journal	Editor (2009-present)
Journal of Computers	Editor (2009-present)
International Journal of Advancements in Computing Technology	Associate Editor-in-Chief (2009-present)
VLSI Design: An International Journal	Guest Editor (2002)

Professional Committee	Service
2015 IEEE International Instrumentation and Measurement Technology Conf. (I^2MTC'15)	Technical Committee
2015 IEEE the 2nd International Workshop on the Design and Performance of Networks on Chip	Technical Committee
2014 IEEE International Instrumentation and Measurement Technology Conf. (I^2MTC'14)	Technical Committee
2013 IEEE International Instrumentation and Measurement Technology Conf. (I^2MTC'13)	Technical Committee

2013 IEEE International Conference on Smart Instrumentation, Measurement and Applications (ICSIMA'13)	Technical Committee
2012 IEEE International Instrumentation and Measurement Technology Conf. (I^2MTC'12)	Technical Committee
2011 IEEE International Instrumentation and Measurement Technology Conf. (I^2MTC'11)	Technical Committee
2010 IEEE International Symposium on Circuits and Systems (ISCAS'10)	Review Committee for "Ckts and Sys for Comm"
2010 IEEE Asia Pacific Conference on Circuits and Systems (APCCAS'10)	Technical Committee
2009 IEEE International Symposium on Circuits and Systems (ISCAS'09)	Review Committee for "Ckts and Sys for Comm"
2008 IEEE International Midwest Symposium on Circuits and Systems	Review Committee
2008 IEEE International Instrumentation and Measurement Technology Conf. (I^2MTC'08)	Technical Committee
2008 IEEE International Symposium on Circuits and Systems (ISCAS'08)	Review Committee for "Ckts and Sys for Comm"
2007 IEEE International Symposium on Circuits and Systems (ISCAS'07)	Review Committee for "Ckts and Sys for Comm"
2007 IEEE International Midwest Symposium on Circuits and Systems	Review Committee
2006 IEEE Instrumentation and Measurement Technology Conf. (IMTC'06)	Technical Committee
2006 IEEE International Symposium on Circuits and Systems (ISCAS'06)	Review Committee for "Ckts and Sys for Comm"
2005 IEEE Instrumentation and Measurement Technology Conf. (IMTC'05)	Technical Committee
2004 IEEE Instrumentation and Measurement Technology Conf. (IMTC'04)	Technical Committee
2003 Annual Conference of the IEEE Industrial Electronics (IECON'03)	Technical Committee
2002 IEEE International ASIC/SOC Conference (SOCC'02)	Technical Committee
2001 IEEE International ASIC/SOC Conference (SOCC'01)	Technical Committee
2000 IEEE International ASIC/SOC Conference (SOCC'00)	Technical Committee
1996 IEEE International ASIC Conference and Exhibit (ASIC'96)	Technical Committee
1995 Ohio Symposium on Information Science and Technology	Program Committee
1995 IEEE International ASIC Conference and Exhibit (ASIC'95)	Technical Committee

Journal and Conference	**Service**
1995 the 6th VLSI Design/CAD Symposium	Plenary Speaker
IEEE Transactions on Computer-Aided Design	Technical Reviewer
IEEE Transactions on Computers	Technical Reviewer
IEEE Transactions on Reliability	Technical Reviewer
IEEE Transactions on Aerospace & Electronic Systems	Technical Reviewer
IEEE Transactions on Circuits and Systems (I), (II)	Technical Reviewer
IEEE Transactions on Instrumentation and Measurement	Technical Reviewer
IEEE Transactions on VLSI	Technical Reviewer
IEEE Transactions on Semiconductor Manufacturing	Technical Reviewer
IEEE Transactions on Aerospace and Electronic Systems	Technical Reviewer
IEEE Signal Processing Letters	Technical Reviewer
ACM Transactions on Embedded Computing Systems	Technical Reviewer
International Journal of Computer Aided VLSI Design	Technical Reviewer
VLSI Design Journal	Technical Reviewer
Journal of Computers	Technical Reviewer
International Journal of Advancements in Computing Technology	Technical Reviewer
VLSI Design: An International Journal	Technical Reviewer
Journal of Electronic Testing	Technical Reviewer
ACM Transactions on Embedded Computing Systems	Technical Reviewer
Journal of VLSI Signal Processing Systems	Technical Reviewer
ACM/IEEE Design Automation Conference (DAC)	Technical Reviewer
IEEE International Conference on Computer-Aided Design (ICCAD)	Technical Reviewer
IEEE International Symposium on Circuits and Systems (ISCAS)	Technical Reviewer
IEEE International Midwest Symposium on Circuits and System (IMSCAS)	Technical Reviewer
IEEE Instrumentation and Measurement Technology Conf. (IMTC)	Technical Reviewer
IEEE International ASIC/SOC Conference	Technical Reviewer

International Test Conference (ITC) Technical Reviewer
VLSI Test Symposium (VTS) Technical Reviewer

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105. Chen, C.-I. H. and Yuen, J., "An Efficient Approach to Pipeline Scheme for Concurrent Testing of VLSI Circuits," *Proceedings of the IEEE International Symposium on Circuits and Systems (ISCAS),* San Diego, CA, pp. 657-660, May 1992.

106. Yuen, J.; Chen, C.-I. H. and Siferd, R., "VLSI Design and Implementation of Self-Testing Systolic Array Chip for Signal Processing," *Proceedings of the IEEE International Symposium on Circuits and Systems (ISCAS),* San Diego, CA, pp. 375-378, May 1992.

107. Chen, C.-I. H., "BISTSYN - A Built-In Self-Test Synthesizer," *Proceedings of the IEEE International Conference on Computer-Aided Design (ICCAD),* San Jose, CA, pp. 240-243, November 1991.

108. Chen, C.-I. H., "Allocation of Multiport Memory with Ports of Different Type Register Transfer Level Synthesis," *Proceedings of the IEEE International Conference on Computer Design (ICCD*), Boston, MA, pp. 418-421, October 1991.

109. Chen, C.-I. H., "Graph Partitioning for Concurrent Test Scheduling in VLSI Circuit," *Proceedings of the 28th IEEE/ACM Design Automation Conference (DAC),* San Francisco, CA, pp. 287-290, June 1991.

110. Chen, C.-I. H. and Smith, R., "A Self-Testing and Self-Diagnostic Systolic Array Cell for Signal Processing," *Proceedings of the IEEE International Conference on Wafer Scale Integration*, San Francisco, CA, pp. 75-81, January 1991.

111. Chen, C.-I. H. and Sobelman, G., "Singleport/Multiport Memory Synthesis in Data Path Design," *Proceedings of the IEEE International Symposium on Circuits and Systems (ISCAS),* Portland, OR, pp. 1110-1113, May 1990.

112. Chen, C.-I. H., "A Top-Down Built-In Self-Test Design in VLSI Testing," *Proceedings of the IEEE International Symposium on Circuits and Systems (ISCAS),* Portland, OR, pp. 2720-2723, May 1990.

113. Chen, C.-I. H. and Smith, R., "Incorporating Self-Testing Capabilities into Systolic Array Cell for Digital Signal Processing," *Proceedings of the IEEE International Conference on Systems Engineering,* Pittsburgh, PA, pp. 240-243 August 1990.

114. Chen, C.-I. H.; Dixon, R.; Hohne, R.; Peterson, L. and Siferd, R., "Built-In Self Test and VLSI Stack-Frame Reduced Instruction Set Computer Architecture," *Proceedings of the IEEE National Aerospace and Electronics Conference*, Dayton, OH, pp. 130-132, May 1990.

115. Chen, C.-I. H., "An Implicit Acceleration Algorithm in Test Generation for VLSI Circuits," *Proceedings of the IEEE National Aerospace and Electronics Conference*, Dayton, OH, pp. 43-46, May 1990.

116. Chen, C.-I. H., "An Efficient Approach to Test Verification for VLSI Circuits", *Proceedings of the IEEE National Aerospace and Electronics Conference,* Dayton, OH, pp. 47-51, May 1990.

117. Chen, C.-I. H., etc. "Task Reallocation for Fault Tolerance in Multiprocessor Systems," *Proceedings of the IEEE National Aerospace and Electronics Conference*, Dayton, OH, pp. 495-500, May 1990.

118. Chen, C.-I. H., and Sobelman, G., "An Efficient Approach To Pseudo-Exhaustive Test Generation For BIST Design," *Proceedings of the IEEE International Conference on Computer Design (ICCD),* Boston, MA, pp. 576-579, October 1989.

RESEARCH GRANTS AND CONTRACTS

Non-Uniform Compressive Sensing Technique Development for EW Receiver Application
DAGSI/Air Force Research Lab (2nd year)
Principal Investigator, $70,521 (05/07/14 – 05/06/15)

Ultra High Chirp Rate Digital Chirp Receiver Using Monobit IFM Digital Receiver as a Core
DAGSI/Air Force Research Lab (3rd year)
Principal Investigator, $69,911 (06/13/13 – 06/12/14)

Non-Uniform Compressive Sensing Technique Development for EW Receiver Application
DAGSI/Air Force Research Lab (1st year)
Principal Investigator, $69,360 (05/06/13 – 05/05/14)

Ultra High Chirp Rate Digital Chirp Receiver Using Monobit IFM Digital Receiver as a Core
DAGSI/Air Force Research Lab (2nd year)
Principal Investigator, $67,272 (06/13/12 – 06/12/13)

High Efficiency SIGINT Collection
EDAptive Computing, Inc
Principal Investigator, $20,000 + cost sharing $11,511 (11/07/2012 – 12/14/2013)

Ultra High Chirp Rate Digital Chirp Receiver Using Monobit Instantaneous Frequency Measurement Digital Receiver as a Core
DAGSI/Air Force Research Lab (1st year)
Principal Investigator, $66,571 (06/13/11 – 06/12/12)

New Electronic Warfare Specialists Through Advanced Research by Students (NEWSTARS)
DoD, Air Force Research Lab, NEWSTARs Plus-Up
My expenditure for 2010: $ 32,800

New Electronic Warfare Specialists Through Advanced Research by Students (NEWSTARS)
DoD, Air Force Research Lab, NEWSTARs Plus-Up
My expenditure for 2009: $13,000

FPGA-Based High Instantaneous Two-Signal Dynamic Range Digital Wide-Band Microwave Receiver
DoD, AFRL and MacAulay-Brown, Inc. (MacB)
Principal Investigator, $76,800 (04/10/07 – 07/31/08)

New Electronic Warfare Specialists Through Advanced Research by Students (NEWSTARS)
DoD, Air Force Research Lab, NEWSTARs Plus-Up
My expenditure for 2008: $10,000

RoCSTARS: Receiver-on-Chip Signal Techniques and Reconfigurable Simulations
Systran Federal Corp.
Principal Investigator, $1,140 (06/01/06 – 03/31/07)

New Electronic Warfare Specialists Through Advanced Research by Students (NEWSTARS)
DoD, Air Force Research Lab, NEWSTARs Plus-Up
My expenditure for 2007: $50,517

Receiver and Processing Concepts Evaluation
DoD, Air Force Research Lab
My expenditure: $67,980 (01/01/05 – 12/31/05)

New Electronic Warfare Specialists Through Advanced Research by Students (NEWSTARS)
DoD, Air Force Research Lab, NEWSTARs Plus-Up
My expenditure for 2006: $59,160

Performance Improvement of a Receiver on a Chip
Systran Federal Corp.
Principal Investigator, $15,000 (04/11/05 – 01/10/06)

Mathematic Model and Solution Approaches to the Systematic Design of Linear Feedback Shift Register (LFSR) BIST
The State of Ohio
Co-Principal Investigator, $10,000 (06/01/05 – 06/01/06) (Co-PI: X. Zhang)

Receiver and Processing Concepts Evaluation
DoD, Air Force Research Lab,
My expenditure: $53,650 (06/01/04 – 12/31/04)

Electronic Warfare (EW) Receiver-On-a-Chip (ROC)
DoD, Air Force Research Lab
Principal Investigator, $300,000 (06/01/03 – 06/01/05) (Co-PI: Marty Emmert)

Timing Verification for High Speed CMOS Design Styles
Baynacre, Inc.
Principal Investigator, $5,415 (05/99 – 08/99)

Complexity Management and Test/Diagnosis for Deep Submicron Integrated Circuit Design
State of Ohio
Principal Investigator, $10,800 (01/99 – 12/99)

Automatic Vector Generation and False Path Verification in Static/Dynamic Timing Analysis
Baynacre, Inc. and ITRI
Principal Investigator, $64,862 (08/01/98 - 07/31/99)

Optimal Physical Design, Design for Testability and Design Verification of a Monobit Receiver
DoD, Air Force Research Lab
Principal Investigator, $25,350 (03/01/98 – 08/30/98)

A Coupling of Timing Analysis and Simulation for Deep Submicron Integrated Circuit (IC) Technology
Baynacre, Inc.
Principal Investigator, $26,888 (12/01/97 – 03/31/98)

FFT Based VLSI Design Monobit Electronic Warfare Receiver
Air Force Office of Scientific Research (AFOSR)
Principal Investigator, $100,000 (08/01/96 – 03/31//98)

Testable Circuit Design of an Enhancement Memory Chip (EMC)
Wright Laboratories of U.S. Air Force
Principal Investigator, $20,000 (06/01/96 – 12/31/96)

VLSI Testability Synthesis on Graphics PIXEL VLSI Microcircuit
Wright Laboratories of US Air Force
Principal Investigator, $25,000 (09/01/95 - 05/15/96)

VLSI Testability Synthesis Tool (VTST)
Wright Laboratories of US Air Force
Principal Investigator, $547,148.00 (04/15/93 - 05/15/96)
($135,000 (04/93 - 09/94); $250,000 (09/94 – 08/95); $162,148 (09/95 – 05/96))

Internal Testability and Fault Coverage for MIPS R3x00
Texas Instruments
Principal Investigator, $35,000 (11/93 - 03/94)

Using VHDL in VLSI BIST Synthesis and Its Application to 3-D PIXEL Graphics Chip
Air Force Office of Scientific Research (AFOSR)
Principal Investigator, $20,000 (01/93 - 12/93)

VLSI VHDL Behavioral BIST Synthesis System
State of Ohio
Principal Investigator, $21,435 (2/93 - 12/93)

A Study on Incorporating Built-In Self-Test (BIST) features into the MIPSCo R3000-derived microcircuits
LSI Logic Corporation
Principal Investigator, $30,000 (06/92 - 09/92)

Modular Design Environment (MDE) Software System
LSI Logic Corporation
Principal Investigator, $17,500 (06/92 - 05/93)

Advanced BIST Design on SF1 RISC Processor
State of Ohio
Principal Investigator, $31,000 (01/90 - 12/91)

AWARDS and HONORS

Title of Award	Granting Association	Dates
Nominee for Excellence in Teaching	College of Engineering and Computer Science, WSU	2014
Nominee for Excellence in Teaching	College of Engineering and Computer Science, WSU	2007
Nominee for Excellence in Teaching	College of Engineering and Computer Science, WSU	2005
Research Excellence Award	College of Engineering and Computer Science, WSU	1995

ACADEMIC SERVICE

University Committees	Position	Dates
Scholarship Committee	Member	2012

College Committees	Position	Dates
Engineering College Faculty Development Committee	Member	2014-2015
EE Department Chair Search Committee	Member	2013-2014
Scholarship Committee	Member	2013-1014
Scholarship Committee	Chair	2011-2012
Scholarship Committee	Member	2010-2011
Student Affair Committee	Chair	2009-2010
Student Affair Committee	Member	2008-2009
Academic Computing Committee		2008-2009
Engineering College Ph.D. Program Affair Committee	Chair of Electronics, Microwave, VLSI, and Nanotechnology	2008-2010
Engineering College Ph.D. Program Affair Committee	Chair of Electronics, Microwave, VLSI, and Nanotechnology	2007-2008
EE Department Chair Search Committee		2007-2008
Engineering College Ph.D. Program Student Affair Committee	Chair of Microwave and Electronics	2006-2007
EE Department Chair 5-year Review Committee	Member	2006-2007
Graduate Council Standing Committee	Member	2005-2006
Engineering College Ph.D. Program Student Affair Committee	Chair of Microwave and Electronics	2005-2006
Engineering College Ph.D. Program	Chair of Microwave and Electronics	2004-2005

Student Affair Committee		
Engineering Ph.D. Program Committee	Member	1996-2004
Engineering College Faculty Development Committee	Member	2003-2005
Library Committee	Chair	2003-2004
Due Process	Member	2003-2004
Library Committee	Chair	2002-2003
Ad Hoc General Education Committee	Member	2000-2003
Ad Hoc Bylaws Review Committee	Member	1998-1999
Petitions Committee	Chair	1998-1999
Petitions Committee	Member	1997-1998
Academic Mediations Committee	Member	1994-1996
Dayton Area Graduate Studies Institute	Member	1992-1993

Department Committees	**Position**	**Dates**
Faculty/Instructor Search Committee	Chair	2014-2015
Instructor Search Committee	Chair	2011-2012
Faculty Development Committee	Member	2009-2014
Laboratory Resources Committee	Member	2009-2012
Graduate Study Committee	Member	2009-2014
Faculty Search Committee	Chair	2009-2010
Laboratory Resources Committee	Chair	2008-2009
Electronic/VLSI Subcommittee	Chair	2006-2008
Faculty Development Committee	Chair	2004-2005
Faculty Development Committee	Member	2000-2009
Faculty Search Committee	Member	1999-2009
Undergraduate Studies Committee	Member	2004-2008
Undergraduate Studies Committee	Chair	2003-2004
Electronic/VLSI Subcommittee	Chair	2003-2004
Graduate Studies Committee	Member	2003-2009
Laboratory Resources Committee	Member	2003-2009
Department Bylaw Committee	Member	2005-2007
Ad Hoc: Department Bylaw Committee	Member	2000-2003
Graduate Studies Committee	Member	1996-1999
Graduate Studies Committee	Member	1992-1993
Undergraduate Petitions Committee	Chair	1997-1999
Undergraduate Petitions Committee	Member	1994-1997
Laboratory Development Committee	Member	1989-2000
Curriculum Subcommittee for Electronics	Member	1990-2001

COURSES TAUGHT Graduate (G) and Undergraduate (U)

EE7520 - Low Power VLSI System Design (G)
EE7530- VLSI Design Synthesis and Optimization (G)
EE7540- VLSI Testing and Design for Testability (G)
EE7580 - CMOS Analog Circuit Design (G)
EE4540- VLSI Design (G&U)
EE459- Integrated Circuit Design Synthesis with VHDL (G&U)
EE4440- Electronic Integrated Systems (U)
EE3310- Electronic Devices and Circuits (U)
EE2000- Digital Design with VHDL (U)

Ph.D. DISSERTATION SUPERVISED

Jian-Feng Ren	High Speed Random Modulation Integrator for Bio-Sensor Applications (in progress).
Jian Chen	Design Architecture and Synthesis for Wide Tuning Radio Frequency Band Pass Filter with Controllable Pass Band and High Stopband Rejection, in progress (date passed Dissertation proposal: Fall 2014).
Ethan Lin	Digital Wideband Receiver based on Subsampling Data Compressive Sensing, in progress (date passed Dissertation proposal: Fall 2014).
Stephen Benson	Modern Digital Chirp Receiver: Theory, Design and System Integration, in progress (date passed Dissertation proposal: Fall 2013).
George Y.-H. Lee	Dynamic Kernel Function Fast Fourier Transform Variable Truncation Error Analysis and Performance Evaluation, Dec. 2009 (initial employer: Research Scientist, Wright State University, Dayton, OH).
Kumar Yelamarthi	Process Variation Aware Timing Optimization with Load Balance of Multiple Paths in Dynamic and Mixed-Static-Dynamic CMOS Logic, June 2008 (initial employer: Assistant Professor of Electrical Engineering, Central Michigan University, Mount Pleasant, MI).
Mingzhen Wang	High-Speed Low-Power Pipelined Flash A/D Converter for System-on-a-Chip Applications, Dec. 2007 (initial employer: Assistant Professor of Electronic Engineering Department at University of Electronic Science and Technology of China, Chengdu, China).
Kiran George	Design and Performance Evaluation of 1 Giga Hertz Wideband Digital Receiver, Sept. 2007 (initial employer: Assistant Professor of Computer Engineering, California State University, Fullerton, CA).

M.S. THESES SUPERVISED

Feiran Liu	UWB Receiver Architecture for High Instantaneous Two-Tone Signal Detection (in progress).
Surya Kiran Akkaladevi	Simulation Model for Magnetic Tunnel Junction Transistor for Logic (in progress)
Julin Sha	Compressive Sensing Front-End RF Applications (in progress)
Xin Hu	Autocorrelation Error Analysis of Digital Instantaneous Frequency Measurement Receivers (in progress)
Lihzong He	Fixed-Point Optimization Dynamic Kernel FFT Processor (in progress)
Linda Chu	Adaptive I/Q Mismatch Compensation for Wideband Receiver, fall 2014.
Kaushik Katpally	Dynamic Repeater with Booster Enhancement for Fast Switching Speed and Propagation in Long Interconnect, fall 2014 (Ph.D at Wright State University).
Hao Xue	Timing and Power Optimization for Mixed-Dynamic-Static CMOS, summer 2013 (Ph.D at Wright State University).
Duo Zhang	Dynamic CMOS MIMO Circuits with Feedback Inverter Loop and Pull-Down Bridge, summer 2013.
Ramadan Buzukuk	Dynamic Footed with Clock Overlapping and Load Balancing in Multiple Paths for Noise Tolerance in Dynamic CMOS Circuits, fall 2011 (initial employer: Qualcomm, San Diego, CA).
A. Vaidyanadeswaran	Circuit Techniques on Improving Timing and Noise in Dynamic CMOS, winter 2011 (initial employer: Intel, Folsom, CA).
Stephen Benson	Adaptive Thresholding for Detection of Radar Receiver Signals, summer 2010 (continueing Ph.D at Wright State University).
Dilip S. Murthy	Real-Time Hilbert Transform and Auto-correlation for Digital Instantaneous Frequency Measurement Receiver, fall 2008 (initial employer: IBM India Pvt Ltd, India).
Ryan Bone	FPGA-Based Low-Power 256-point FFT Processor, estimated summer 2008 (initial employer: Science Applications International Corporation (SAIC), Beavercreek, OH).

Vivek Sarathy	High Spurious-Free Dynamic Range Digital Wideband Receiver for Multiple Signal Detection and Tracking, fall 2007 (initial employer: QuStream Corportion, Huntsville, AL).
Rajasekhar Keerthi	Stability and Static Noise Margin Analysis of Static Random Access Memory, fall 2007.
James Helton	FPGA-Based Processor for Digital Instantaneous Frequency Measurement (IFM) Receiver, summer 2007 (initial employer: Science Applications International Corporation (SAIC), Beavercreek, OH).
Brian Poling	On-Chip Signal Generation and Response Waveform Extraction for Analog Built-In Self-Test of General Receiver Systems, summer 2007 (WPAFB, Dayton, OH).
Tony Chiang	Design and Performance Evaluation of a Discrete Wavelet Transform Based Multi-Signal Receiver, spring 2006 (initial employer: Daetwyler Corp., Dayton, OH).
Cyprian Sajabi	FPGA Frequency Domain Based GPS Code Acquisition Processor Using FFT, spring 2006 (initial employer: Nova Systems Solutions, Cincinnati, OH).
Siaw-Yuen Ng	Automated Generation, Optimization and Synthesis of 2-Dimensional Linear Feedback Shift Registers Framework for Built-In Self-Test, spring 2006 (initial employer: Jiin & Associates Co. Ltd., Segamat, Johor, Malaysia).
Sashank Kakulavarapu	High Speed Signed Multiplier Using Baugh-Wooley & On-The-Fly Conversion Algorithms, winter 2005 (initial employer: Harvard Pilgrim, Boston, MA).
Vivek Chandrasekhar	Low-Cost Low-Power Self-Test Design and Verification for On-chip ADC in System-on-a-Chip Applications, winter 2005 (initial employer: Intel Corp., Folsom, CA).
Jason Wibbenmeyer	Built-In Self-Test for Low-Voltage High-Speed Analog-to-Digital Converters, winter 2005 (initial employer: Ameren, St. Louis, MO).
Soumya Ramaswamy	High Speed 64-bit Thermometric Square-Root Carry Select Adder Based on the Chinese Abacus, winter 2005.
Rathod Snehal	Architecture of Hybrid Signed-Digit Adder using carry-free property of redundant arithmetic and parallel redundant-to-binary converter, winter 2005.
Shailesh Radhakrishnan	A Low-Power 4-b 2.5 Gsample/s Flash Analog-to-Digital Converter Using QV Comparator and DCVSPG Encoder, fall 2004 (initial employer: Link Electronics, Cape Girardeau, Missouri).
Darren Schindel	Arc Draw Algorithm Utilizing Bresenham Circle Algorithm and Multiple Clipping Techniques For Graphics Generation Using an Active Matrix Liquid Crystal Display, fall 2004 (initial employer: Unisys, Polymouth, MI.).
Kumar Yelamarthi	Design Synthesis of Re-Convergent Manchester Carry Chain Adders, fall 2004 (continue for Ph.D. at WSU)
Nilesh Gunjal	Design Synthesis of High-Speed Testable Hybrid Adders, fall 2004 (initial employer: Cingular Wireless, Dallas, TX.)
Pavan Lingamaneni	Low-Power Low-Leakage Asymmetric SRAM using Dual Threshold Voltages, summer 2004.
Mahesh Subramanian	Pipeline with Scan Insertion for Timing Driven Testable Convergent Tree Adders, summer 1999 (initial employer: Intel Corporation, San Jose, CA).
N. Thiagarajan	VHDL Modeling, Simulation and Synthesis of Fully-Testable Fast Binary Carry-Save Multiplier without Final Addition, summer 1998 (initial employer: NEC America, Austin, TX).
Mahesh Wagh	High-Level Design Synthesis with Redundancy Removal for High Speed Testable Binary Adders, summer 1998 (initial employer: Intel Corporation, Seattle, WA).
Khalil Habash	VHDL Modeling, Simulation and Testing of a Fast Binary Adder with Conditional Carry Generator, summer 1997 (initial employer: Cray Research Corporation, Wisconsin).
Joaquin Romera	Timing-Driven Testable VLSI Parallel Adders, summer1997 (initial employer: Intel Corporation, Portland, OR).
Rajesh Palamadai	Implementation of Dynamic Huffman Coding Using CAM-Based CMOS VLSI Architecture, winter 1997 (initial employer: Mentor Graphics, Warren, NJ).
Sin Kwang Pok	High Level Test Generation and Test Verification for the Enhanced Memory Chip (EMC), summer 1996 (initial employer: Baynacre, Union City, CA).

Anil Kempanna	Cellular Automata Based Test Generator, winter 1995 (initial employer: Cadence Spectrum Design, San Diego, CA).
Anup Kumar	Area-Time Optimal Digital Mixed CMOS/BiCMOS Parallel Adders, winter 1995 (initial employer: Credence Systems Corporation, Fremont, CA).
Chia-Lin Chan	Efficient Methods for Partial Scan Sequential Circuit Design, fall 1994 (initial employer: Oak Technology, Sunnyvale, CA).
Tim Noh	VHDL Behavioral Fault Modeling and Fault Simulation System, April 1994 (initial employer: FORE Systems, Inc., Warrendale, PA).
Vijay K. Singh	Circular Built-In Self-Test in VLSI Circuits, fall 1993 (initial employer: Advanced Micro Devices, Austin, TX).
Joel Yuen	Concurrent Testing and VLSI Built-In Self-Test Design in Systolic Array Chip, fall 1992 (initial employer: Intel Corp., Chandler, AZ).
Ji-Der Lee	Testability Enhancement and Hardware Partition for Testable Design, spring 1992.

Jan. 2015

Curriculum Vitae of

Dr. John M. Emmert

EDUCATION

1. Ph.D. in Computer Engineering, University of Cincinnati, 1999. Dissertation: *Algorithms for Physical Mapping of Circuits to Field Programmable Gate Arrays.*
2. M.S. in Electrical Engineering, Air Force Institute of Technology, 1993. Thesis: *Object Imaging for an Integrated Circuit Robotic Tactile Sensor Incorporating a Piezoelectric Thin Film.*
3. B.S. in Electrical Engineering, University of Kentucky, 1987.
4. Air War College, United States Air Force Air University, 2008.
5. Air Command and Staff College, United States Air Force Air University, 2005.
6. Squadron Officer School, United States Air Force Air University, 1998.

ACADEMIC PROFESSIONAL EXPERIENCE

1. Wright State University, OH: Tenured Professor of Electrical Engineering (August `13 to present)
2. Wright State University, OH: Tenured Associate Professor of Electrical Engineering (July `05 to July `13)
3. University of North Carolina at Charlotte, NC: Tenured Associate Professor of Electrical and Computer Engineering and Director of Computer Engineering (August `04 to June `05)
4. Wright State University, OH: Assistant Professor of Electrical Engineering (January `02 to August `04)
5. University of North Carolina at Charlotte, NC: Assistant Professor of Electrical and Computer Engineering (July `00 to December `01)
6. University of Kentucky, KY: Assistant Professor of Electrical Engineering (July `99 to June `00)
7. University of Cincinnati, OH: Research Assistant (September `96 to June `99), Teaching Assistant (January `98 to April `98)

OTHER PROFESSIONAL EXPERIENCE

1. Air Force Research Laboratory, Aerospace Systems Directorate, United States Air Force Reserves, Edwards AFB, CA: IMA to the AFRL Detachment 7 Commander (August `12 to present)
2. RBS Technologies Inc.: Consultant (March `08 to present)
3. Air Force Space Command, 689th Combat Communications Wing, United States Air Force Reserves: IMA to the Commander (November `11 to August `12)
4. Air Force Research Laboratory, Sensors Directorate, United States Air Force Reserves, Wright Patterson AFB, OH: On-site Senior IMA, Director of Digital Design Sensors Directorate, and Division Lead Reservist (January `05 to October `11)
    a. Level III APDP certified, SPRDE
    b. Level III APDP certified, Scientist
    c. Level II APDP certified, Test and Evaluation
5. Air Force Research Laboratory, Information Directorate, United States Air Force Reserves, Wright Patterson AFB, OH: Chief Technologist for External Programs (January `03 to December `05)

6. Air Force Research Laboratory, Avionics Directorate, United States Air Force Reserves, Wright Patterson AFB, OH: Research Scientists for United States Air Force Reserves (December `96 to December `02)
7. Emmert Consulting, Kettering, OH: Northeast Consortium for Engineering Education (NCEE) Research Scientist (January `97 to December `97)
8. Wright Laboratory, Electronics Directorate, United States Air Force, Wright Patterson AFB, OH: Electronic Circuits and Systems Research Engineer (December `93 to December `96)
9. Air Force Systems Command, 6545th Test Group, United States Air Force, Hill AFB, UT: Flight Test Engineer and Unmanned Air Vehicle Pilot (October `89 to May `92)
10. Officer Training School, United States Air Force, Lackland AFB, TX: Officer Trainee (June`89 to September `89)
11. Stokley's Marine, Nicholasville, KY: Mechanic (January`81 to June `89)

PROFESSIONAL MEMBERSHIPS

1. Senior Member of Institute of Electrical and Electronics Engineers (IEEE) since 2004
2. Member of United States Air Force Reserve (USAFR) since 1996
3. Member of United States Air Force (USAF) 1989-1996
4. Member of Institute of Electrical and Electronics Engineers (IEEE) since 1992
5. Member of Electrical Engineering Honor Society Eta Kappa Knu (HKN) since 1985

AWARDS AND MAJOR ACCOMPLISHMENTS

1. IEEE Harold Nobel Award, ('14)
2. Excellence in Teaching Award for Faculty (finalist), College of Engineering and Computer Science, Wright State University, (`13)
3. Promoted to Col, United States Air Force Reserve, (`11)
4. Excellence in Teaching Award for Faculty (finalist), College of Engineering and Computer Science, Wright State University, (`09)
5. James B. Tsui Award for best patent, Air Force Research Laboratory Sensors Directorate, (`08)
6. Officer Reservist of the Year, Air Force Research Laboratory, (`07)
7. Excellence in Teaching Award for Faculty (finalist), College of Engineering and Computer Science, Wright State University, (`06)
8. Presidential Award for Faculty Excellence in Early Career Achievement, Wright State University, (`04)
9. Selected to become a Senior Member of the IEEE, (`04)
10. Excellence in Teaching Award for Faculty (finalist), College of Engineering and Computer Science, Wright State University, (`03)

TEACHING (DISSERTATION/THESIS/ADVISING)

<u>PhD Dissertations</u>

1. Vipul Patel, Expected, (`15)

2. Harish Gopalakrishnan, *Energy Reduction for Asynchronous Circuits in SoC Applications*, (`11)

Masters Theses

1. Justin Pelan, *Hardware Implementation of a Pulse Descriptor Word Algorithm for Real-Time Processing of Radar Signals*, Expected, (`15)
2. Matthew Longbrake, *Hardware Implementation of a Digital Circuit for Real-Time Square Root Determination in a Radar Receiver*, Expected, (`15)
3. Christopher P. Taylor, *Analysis of a Two-Stage Voltage Divider for Logic Reduction in an Asynchronous Register*, (`14)
4. Thomas B. Pemberton, *A Structured ASIC Approach to a Radiation Hardened by Design Digital Single Sideband Modulator for Digital Radio Frequency Memories*, (`10)
5. Thomas A. Hopkins, *An Automated Approach to a 90-nm CMOS DRFM DSSM Circuit Design*, (`10)
6. Thomas C. Pestak, *Development of an Efficient Super-Resolution Image Reconstruction Algorithm for Implementation on a Hardware Platform*, (`10)
7. Harold S. Axtell, *Characterization and Design of a Completely Parameterizable VHDL Digital Single Sideband Modulator Circuit for Quick Implementation in FPGA or ASIC Electronic Warfare Platforms*, (`10)
8. Mohamad Rajgara, *Implementation of NULL Conventional Logic in COTS Field Programmable Gate Arrays*, MSEE, (`08)
9. John Flynn, *GPS Coarse Acquisition using the MonoBIT FFT Algorithm in a Broadband Receiver*, MSEE, (`08)John Flynn, *GPS Coarse Acquisition using the MonoBIT FFT Algorithm in a Broadband Receiver*, MSEE, (`08)
10. Jonathan G. Buck, *Improved Thresholding Technique for the MonoBIT Receiver*, MSEE, (`07)
11. Peter E. Buxa, *Parameterizable Channelized Wideband Digital Receiver for High Update Rate*, MSEE, (`07)
12. Sowrirajan Sampath, *FPGA Based Hardware Implementation of Advanced Encryption Standard (AES)*, MSEE, (`07)
13. Jason A. Cheatham, *Analysis of a Technique for Implementing a Spectrum Analyzer on a Chip*, MSCpE, (`04)
14. Gopal Balasubramanian, *Hardware Implementation of Cordic Algorithm for Time Difference Based Source Localization Technique in Electronic Warfare Receivers*, (`04)
15. Jothi Srinivasan, *Maximum Signal Detection Algorithm and Pulse Descriptor Word Generation for Hardware Implementation of a Radar Receiver Backend*, MSEE, (`04)
16. Sandeep Umarani, *FPGA Implementation of a Digital PID Controller*, MSEE, (`04) (co-advise with Dr. K. Rattan)
17. Sudhir Patli, *Hardware Implementation of a Radix-4 Fast Fourier Transform Technique with Improved Two-Tone Resolution for Electronic Warfare Applications*, MSEE, (`04)
18. David Kennedy Gaya, *A Rectilinear Placement Algorithm for Field Programmable Gate Arrays*, MSEE, (`04)
19. Badhrinath Jagannathan, *Statistical Analysis of Spectral BIST for Analog Fault Testing Using Mixed-Signal Systems*, MSEE, (`04)
20. Gaurav Singh, *Analysis of Hardware Improvements for Radar Receiver Integrated Circuit Processing*, MSEE thesis, (`03)

21. Stanley Baumgart, *On-Line Reconfiguration of FPGAs for Fault Tolerant Applications in Adaptive Computing Systems*, MSEE, (`01)
22. Pankaj Kataria, *Incremental Routing Strategy Based on Window Rip-Up*, MSEE, (`01)
23. Angela Schandling, *Silicon Compiler for Monobit Fast Fourier Transforms*, MSEE, (`01)
24. Brandon Skaggs, *On-Line Built-In Self-Test and Diagnosis of Field Programmable Gate Array Logic Blocks*, MSEE, (`00) (co-advise with Dr. C. E. Stroud)
25. Carter Hamilton, *On-Line Testing and Diagnosis of Field Programmable Gate Arrays for Fault Tolerance*, MSEE, (`00) (co-advise with Dr. C. E. Stroud)

TEACHING (COURSES)

Wright State University
EE 7550 – Trust for Integrated Circuit Design – 48 students (spring `15) [1]
EE 7530 – VLSI Design Synthesis and Optimization – 29 students (fall `14)
EE 7530 – VLSI Design Synthesis and Optimization Lab – 29 students (fall `14)
EE 4620/6620 – Circuit Design with CPLDs and FPGAs – 36 students (fall `14)
EE 4620/6620 – Circuit Design with CPLDs and FPGAs Lab – 36 students (fall`14)
EE 4620/6620 – Circuit Design with CPLDs and FPGAs – 114 students (summer `14)
EE 4620/6620 – Circuit Design with CPLDs and FPGAs Lab – 114 students (summer`14)
EE 7530 – VLSI Design Synthesis and Optimization – 29 students (summer `14)
EE 7530 – VLSI Design Synthesis and Optimization Lab – 29 students (summer `14)
EE 4620/6620 – Circuit Design with CPLDs and FPGAs – 130 students (spring `14)
EE 4620/6620 – Circuit Design with CPLDs and FPGAs Lab – 130 students (spring`14)
EE 2000 – Digital Design with HDLs – 56 students (spring `14)
EE 2000 – Digital Design with HDLs Lab – 56 students (spring `14)
EE 8000 – VLSI Cohort Remedial Instruction – 82 students (spring `14)
EE 8000 – VLSI Cohort Remedial Instruction Lab – 82 students (spring `14)
EE 7530 – VLSI Design Synthesis and Optimization – 57 students (fall `13)
EE 7530 – VLSI Design Synthesis and Optimization Lab – 57 students (fall `13)
EE 4620/6620 – Circuit Design with CPLDs and FPGAs – 37 students (summer `13)
EE 4620/6620 – Circuit Design with CPLDs and FPGAs Lab – 37 students (summer`13)
EE 2000 – Digital Design with HDLs – 54 students (spring `13)
EE 2000 – Digital Design with HDLs Lab – 54 students (spring `13)
EE 4620/6620 – Circuit Design with CPLDs and FPGAs – 57 students (spring `13)
EE 4620/6620 – Circuit Design with CPLDs and FPGAs Lab – 57 students (spring`13)
EE 2000 – Digital Design with HDLs – 46 students (fall `12)
EE 2000 – Digital Design with HDLs Lab – 46 students (fall `12)
EE 7530 – VLSI Design Synthesis and Optimization – 12 students (fall `12)
EE 7530 – VLSI Design Synthesis and Optimization Lab – 12 students (fall `12)
EE 160 – Digital Design with HDLs – 27 students (spring `12)
EE 462/662 – Circuit Design with CPLDs and FPGAs – 15 students (spring `12)
EE 462/662 – Circuit Design with CPLDs and FPGAs Lab – 15 students (spring`12)
EE 753 – VLSI Design Synthesis and Optimization – 23 students (winter `12)
EE 753 – VLSI Design Synthesis and Optimization Lab – 23 students (winter `12)
EE 301/501 – Circuit Analysis I – 36 students (winter `12)
EE 302/502 – Circuit Analysis I Lab – 78 students (winter `12)
EE 301/501 – Circuit Analysis I – 31 students (fall `11)
EE 301/501 – Circuit Analysis I – 35 students (fall `11)
EE 302/502 – Circuit Analysis I Lab – 70 students (fall `11)
Sabbatical break (fall `10 – spring `11)

[1] developed all new course material – part of Dept of CSE Cyber Security Program

EE 160 – Digital Design with HDLs – 27 students (spring `10)
EE 462/662 – Circuit Design with CPLDs and FPGAs – 21 students (spring `10)
EE 462/662 – Circuit Design with CPLDs and FPGAs Lab – 21 students (spring`10)
EE 160 – Digital Design with HDLs – 24 students (winter `10)
EE 753 – VLSI Design Synthesis and Optimization – 34 students (winter `10)
EE 753 – VLSI Design Synthesis and Optimization Lab – 34 students (winter `10)
EE 754 – VLSI Testing and Design for Testability – 5 students (fall `09)
EE 754 – VLSI Testing and Design for Testability Lab – 5 students (fall `09)
EE 454/654 – VLSI Design – 26 students (fall `09)
EE 454/654 – VLSI Design Lab – 26 students (fall `09)
EE 462/662 – Circuit Design with CPLDs and FPGAs – 16 students (winter `09)
EE 462/662 – Circuit Design with CPLDs and FPGAs Lab – 16 students (winter`09)
EE 454/654 – VLSI Design – 41 students (fall `08)
EE 454/654 – VLSI Design Lab – 41 students (fall `08)
EE 753 – VLSI Design Synthesis and Optimization – 18 students (spring `08)
EE 753 – VLSI Design Synthesis and Optimization Lab – 18 students (spring `08)
EE 462/662 – Circuit Design with CPLDs and FPGAs – 21 students (winter `08)
EE 462/662 – Circuit Design with CPLDs and FPGAs Lab – 21 students (winter `08) [2]
EE 301/501 – Circuit Analysis I – 21 students (fall `07)
EE 454/654 – VLSI Design – 19 students (fall `07)
EE 454/654 – VLSI Design Lab – 19 students (fall `07)
EE 462/662 – Circuit Design with CPLDs and FPGAs – 21 students (spring `07)
EE 462/662 – Circuit Design with CPLDs and FPGAs Lab – 21 students (spring `07)
EE 454/654 – VLSI Design – 23 students (winter `07)
EE 454/654 – VLSI Design Lab – 23 students (winter `07)
EE 462/662 – Circuit Design with CPLDs and FPGAs – 22 students (winter `07)
EE 462/662 – Circuit Design with CPLDs and FPGAs Lab – 22 students (winter `07)
EE 454/654 – VLSI Design – 50 students (fall `06) [3]
EE 454/654 – VLSI Design Lab – 50 students (fall `06) [4]
EE 462/662 – Circuit Design with CPLDs and FPGAs – 9 students (spring `06)
EE 462/662 – Circuit Design with CPLDs and FPGAs Lab – 9 students (spring `06)
EE 753 – VLSI Design Synthesis and Optimization – 36 students (spring `06)
EE 753 – VLSI Design Synthesis and Optimization Lab – 36 students (spring `06)
EE 454/654 – VLSI Design – 26 students (winter `06)
EE 454/654 – VLSI Design Lab – 26 students (winter `06)
EE 462/662 – Circuit Design with CPLDs and FPGAs – 23 students (winter `06)
EE 462/662 – Circuit Design with CPLDs and FPGAs Lab – 23 students (winter `06)
EE 454/654 – VLSI Design – 46 students (fall `05)
EE 454/654 – VLSI Design Lab – 46 students (fall `05)
EE 301/501 – Circuit Analysis I – 32 students (fall `05)
EE 458/658 – Circuit Design with CPLDs and FPGAs – 22 students (summer `04)
EE 458/658 – Circuit Design with CPLDs and FPGAs Lab – 22 students (summer `04)
EE 753 – VLSI Design Synthesis and Optimization – 40 students (spring `04)
EE 753 – VLSI Design Synthesis and Optimization Lab – 40 students (spring `04)
EE 458/658 – Circuit Design with CPLDs and FPGAs – 51 students (winter `04)
EE 458/658 – Circuit Design with CPLDs and FPGAs Lab – 51 students (winter `04)
EE 454/654 – VLSI Design – 51 students (fall `03) [5]
EE 454/654 – VLSI Design Lab – 51 students (fall `03) [6]

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[2] developed all new labs
[3] developed all new course material – based on development, characterization, and use of standard cells (130 nm cell technology)
[4] developed all new labs – updated all labs to use industry standard Cadence IC design flow
[5] developed all new course material – based on development, characterization, and use of standard cells (250 nm cell technology)

EE 753 – VLSI Design Synthesis and Optimization – 69 students (spring `03)
EE 753 – VLSI Design Synthesis and Optimization Lab – 69 students (spring `03)
EE 301/501 – Circuit Analysis I – 49 students (winter `03)
EE 458/658 – Circuit Design with CPLDs and FPGAs – 46 students (winter `03)[7]
EE 458/658 – Circuit Design with CPLDs and FPGAs Lab – 46 students (winter `03)[8]
EE 454/654 – VLSI Design – 42 students (fall `02)
EE 454/654 – VLSI Design Lab – 42 students (fall `02)
EE 753 – VLSI Design Synthesis and Optimization – 49 students (spring `02)
EE 753 – VLSI Design Synthesis and Optimization Lab – 49 students (spring `02)
EE 301/501 – Circuit Analysis I – two sections (winter `02)

University of North Carolina at Charlotte
ECGR 3181 – Digital Logic Design II (spring `05)
ECGR 4182/5182 – Digital Systems Test (spring `05)
ECGR 3182 – Digital Logic Devices (fall `04)
ECGR 4433/5133 – VLSI Systems Design (fall `04)
ECGR 2181 – Digital Logic Design (fall `01)
ECGR 6138/8138 – Physical Design Automation for VLSI Circuits and Systems (fall `01)
ECGR 6146/8146 – Advanced VHDL (spring `01)
ECGR 6138/8138 – Physical Design Automation for VLSI Circuits and Systems (fall `00)

University of Kentucky
EE 581 – Advanced Digital Logic Design (fall `99)
EE 599 – Physical Design Automation for VLSI Circuits and Systems (spring `00)[9]
EE 599 – Physical Design Automation for VLSI Circuits and Systems (spring `00)

SCHOLARSHIP

PUBLICATIONS

1. C. Taylor, J. M. Emmert, and S. Ren, "Two-Stage Voltage Divider for Logic Reduction in an Asynchronous Register Feedback Loop," *The Institution of Engineering and Technology Electronics Letters*, (Under Revision), Submitted 2014.

2. S. Ren and J. M. Emmert, "A Successive Approximation Pipelined (SAP) ADC with one clock cycle conversion rate," *The Institution of Engineering and Technology Electronics Letters*, 2012.

3. S. Ren, J. M. Emmert, and R. E. Siferd, "Design and Performance of a Robust 180nm CMOS Standalone VCO and Integrated PLL," *Journal of Analog Integrated Circuits and Signal Processing*, Volume 68, pp. 285-298, September 2011.

4. T. Pemberton, H. Axtell, T. Hopkins, and J. M. Emmert, "Radiation Hardened Digital Single Sideband Modulator ASIC," *GOMACTech-11*, April 2011.

5. R. Wang, B. Brakus, H. Gopalakrishnan, and J. M. Emmert, "A Substrate Noise Sensing Circuit for Noise Tolerance in Mixed-Signal Systems-on-a-Chip," *IEEE North Atlantic Test Workshop*, May 2008.

6. J. Buck, J. Tsui, S. Hary, C. Shreffler, D. Schwab, and J. M. Emmert, "Monobit Receiver Architecture and Signal Threshold Determination," *GOMACTech-07*, March 2007.

7. P. Buxa, G. Creech, and J. M. Emmert, "Parameterizable Digital Receiver with Decimation Filter for High Update Rate," *GOMACTech-07*, March 2007.

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[6] developed all new labs – from day one, students layout, extract, and simulate physical circuits
[7] developed all new generic course material (independent of commercial FPGA architectures)
[8] developed all new labs for Xilinx Virtex2 FPGAs – lab development includes 20 FPGA stations
[9] Introduced class

8. J. M. Emmert, M. Abramovici, and C. E. Stroud, "On-line, Fault Tolerance for FPGA Logic Blocks," *IEEE Transactions on VLSI Systems*, Volume 15, pp. 216-226, February 2007.

9. J. Emmert, J. Cheatham, and H. Axtell, "Analysis and Test of a Spectral, Mixed Signal BIST Technique for Systems on a Chip Applications," *IEEE North Atlantic Test Workshop*, May 2006.

10. J. A. Cheatham, J. M. Emmert, and S. R. Baumgart, "A Survey of Fault Tolerant Methodologies for FPGAs," *ACM Transactions on Design Automation of Computer Systems*, Volume 11, Number 2, pp. 501-533, April 2006.

11. S. Singh, A. Roy, K. Rattan, and J. M. Emmert, "Performance Tradeoffs of Hardware/Software Implementation of a Fuzzy Logic Controller on Programmable Hardware," 2005 *IEEE North American Fuzzy Information Processing Society Soft Computing for Real World Applications Conference*, June 2005.

12. J. M. Emmert and J. A. Cheatham, "Integrated Spectral BIST Technique for IRFFE Systems," *GOMACTech-05*, April 2005.

13. M. Abramovici, C. E. Stroud, J. M. Emmert, "On-line BIST and BIST Based Diagnosis of FPGA Logic Blocks," *IEEE Transactions on VLSI Systems*, Volume 12, Number 12, pp. 1284-1294, December 2004.

14. J. M. Emmert and J. A. Cheatham, "A Monolithic Spectral BIST Technique for Control or Test of Analog or Mixed-Signal Circuits," 2003 *IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems*, November 2003.

15. J. M. Emmert, J. A. Cheatham and B. Jagannathan, "An FFT Approximation Technique Suitable for On-Chip Generation and Analysis of Sinusoidal Signals," 2003 *IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems*, November 2003.

16. J. M. Emmert, S. Lodha, and D. K. Bhatia, "On Using Tabu Search for Design Automation for VLSI Systems," *Journal of Heuristics*, Volume 9, Number 1, pp. 75-90, January 2003.

17. M. Abramovici, C. E. Stroud, and J. M. Emmert, "Using Embedded FPGAs for SoC Yield Enhancement," Proceedings of the 2002 *ACM/IEEE Design Automation Conference*, 2002.

18. J. M. Emmert and D. K. Bhatia, "Two-Dimensional Placement Using TABU Search," *Journal of VLSI Design*, Volume 12, Number 1, pp. 13-23, December 2001.

19. J. M. Emmert, C. E. Stroud, S. R. Baumgart, P. Kataria, and M. Abramovici, "On-line Fault Tolerance for FPGA Interconnect with Roving STARs," Proceedings of the 2001 *IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems*, October 2001.

20. J. M. Emmert and J. A. Cheatham, "On-line Incremental Routing for Interconnect Fault Tolerance in FPGAs Minus the Router," Proceedings of the 2001 *IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems*, October 2001.

21. M. Abramovici, J. M. Emmert, and C. E. Stroud, "Roving STARs: An Integrated Approach to On-Line Testing, Diagnosis, and Fault Tolerance for FPGAs in Adaptive Computing Systems," Proceedings of the *IEEE Evolvable Hardware Conference*, pp. 75-94, July 2001.

22. C. E. Stroud, M. Lashinsky, J. Nall, J. Emmert, and M. Abramovici, "On-line BIST and Diagnosis of FPGA Interconnect Using Roving STARs," *Proceedings of the IEEE International Online Test Workshop*, 2001.

23. C. E. Stroud, J. M. Emmert, A. Taylor, and J. T. Ferry, "Recovering Faulty Processing Elements in VLSI Processor Arrays," *Autotestcon*, September 2001. (received Best Paper Award)

24. P. Kataria and J. M. Emmert, "Window Rip-up for Faster Testing and Fault Tolerance in FPGAs," *Autotestcon*, September 2001.

25. T. Slaughter, C. Stroud, J. Emmert, and B. Skaggs, "Fault Injection Emulator for Field Programmable Gate Arrays," *Proceedings of the International Society of Optical Engineering ITCOM*, pp. 1-9, 2001.

26. J. R. Heath, N. J. Vocke, C. E. Stroud, and J. M. Emmert, "Routing Algorithms for Programmable Logic Device Design and Manufacturing Test Development," *Autotestcon*, September 2001.

27. J. M. Emmert and D. K. Bhatia, "A Fault Tolerant Technique for FPGAs," in *Journal of Electronic Testing Theory and Applications*, Volume 16. Number 6, pp. 591-606, December 2000.

28. C. E. Stroud, J. R. Bailey, and J. M. Emmert, "A New Method for Testing Re-programmable Programmable Logic Arrays," in *Journal of Electronic Testing Theory and Applications*, Volume 16. Number 6, pp. 635-640, December 2000.

29. C. E. Stroud, J. M. Emmert, J. Bailey, D. Nikolic, and K. S. Chhor, "Bridging Fault Extraction from Physical Design Data for Manufacturing Test Development," *International Test Conference*, 2000.

30. M. Abramovici, C. E. Stroud, B. Skaggs, and J. M. Emmert, "Improving On-Line BIST-Based Diagnosis for Roving STARs," *Proceedings of the IEEE International Online Test Workshop*, pp. 31-39, 2000.

31. J. M. Emmert, C. E. Stroud, and J. Bailey, "A New Bridging Fault Model for More Accurate Fault Behavior," *Autotestcon*, September, pp. 481-485, 2000.

32. J. M. Emmert, C. E. Stroud, J. Cheatham, A. Taylor, P. Kataria, and M. Abramovici, "Performance Penalty for Fault Tolerance in Roving Self Testing Areas (STARs)," *Lecture Notes in Computer Science,* Springer-Verlag , Volume 1896, pp. 545-554, August 2000.

33. J. M. Emmert, C. E. Stroud, and M. Abramovici, "Dynamic Fault Tolerance in FPGAs via Partial Reconfiguration," *The Eighth Annual IEEE Symposium on Field-Programmable Custom Computing Machines*, April 2000.

34. J. M. Emmert and D. K. Bhatia, "Tabu Search: Ultra Fast Placement for FPGAs," *Lecture Notes in Computer Science*, Springer-Verlag, Volume 1673, pp. 81-90, September 1999.

35. J. M. Emmert, S. Blanacha, and D. K. Bhatia, "Physical Layout Techniques for Field Programmable Gate Arrays," invited paper, *IEEE, ACM, SIGDA Design and Test Workshop*, 1999.

36. J. M. Emmert and D. K. Bhatia, "A Methodology for Fast FPGA Floorplanning," *ACM Seventh International Symposium on Field-Programmable Gate Arrays*, February, pp. 49-56, 1999.

37. J. M. Emmert and D. K. Bhatia, "Fast Timing Driven Placement Using TABU Search," *IEEE International Symposium on Circuits and Systems*, May, pp. I302-I305, 1999.

38. J. M. Emmert and D. K. Bhatia, "Incremental Routing in FPGAs," *11th Annual IEEE International Application Specific Integrated Circuit Conference*, September, pp. 217-221, 1998.

39. J. M. Emmert, A. Randhar, and D. K. Bhatia, "Fast Floorplanning for FPGAs," *Lecture Notes in Computer Science*, Springer-Verlag, Volume 1482, pp. 129-138, September 1998.

40. J. M. Emmert and D. K. Bhatia, "Reconfiguring FPGA Mapped Circuits," *CERC/VIUF/IEEE Computer Society Workshop on 21st Century Electronics Systems Design: Breakthroughs in Quality and Productivity*, December 1997.

41. J. M. Emmert and D. K. Bhatia, "Reconfiguring FPGA Mapped Designs with Applications to Fault Tolerance and Reconfigurable Computing," *Lecture Notes in Computer Science*, Springer-Verlag, Volume 1304, pp. 141-150, August 1997.

42. B. C. Read, D. Barker, R. G. Bishop, L. M. Concha, J. M. Emmert, R. L. Ewing, G. L. Fecher, P. Jarusiewic, G. D. Peterson, M. Rubeiz, A. M. Sayson, "Developing the Next Generation Cockpit Display System," *48th National Aerospace & Electronics Conference*, Dayton, Ohio, May 1996.

US PATENTS

1. Digital Receiver Instantaneous Dynamic Range Enhancement. United States Patent # 7,769,108, August 3, 2010.
2. Kernel Function Approximation Receiver. United States Patent # 7,440,989, October 21, 2008.
3. Fault Tolerant Operation of Field Programmable Gate Arrays. Unites States Patent # 6,973,608. December 6, 2005.
4. Fault Tolerant Operation of Reconfigurable Devices Utilizing an Adjustable System Clock. United States Patent # 6,874,108. March 29, 2005.
5. Quadbit Kernel Function Algorithm and Receiver. United States Patent # 6,690,315. February 10, 2004.
6. On-Line Fault Tolerant Operation via Incremental Reconfiguration of Field Programmable Gate Arrays. United States Patent # 6,530,049. March 4, 2003.

BOOK CHAPTER SECTION

1. Book Section: "15.5 FFT-Based Mixed Signal BIST," *System on Chip Test Architectures*, Elsevier, ISBN: 978-0-12-373973-5, 2008.

TECHNICAL REPORTS

1. J. M. Emmert, "Active Transmit Attenuation and Cancellation (ATAC), Air Force Office of Scientific Research (AFOSR), 2012.
2. J. M. Emmert, J. A. Cheatham, and B. Jagannathan, "Built-In-Self-Test for Automatic Insertion into Mixed Signal Systems (BIST AIMS), Air Force Research Laboratory (AFRL), 2003.
3. M. Abramovici, C. E. Stroud, and J. M. Emmert, "On-Line Testing and Reconfiguration of FPGAs for Fault Tolerant Applications in Adaptive Computing Systems, Air Force Research Laboratory (AFRL), 2002.
4. J. M. Emmert and D. K. Bhatia, "TABU Search for Fast Timing Driven Placement of Circuits on FPGAs," University of Cincinnati Technical Report Number: TR219/09/98/ECECS, 1998.
5. J. M. Emmert and D. K. Bhatia, "Partial FPGA Routing for Fault Tolerance," University of Cincinnati Technical Report Number: TR209/10/97/ECECS, 1997.
6. J. M. Emmert and D. K. Bhatia, "Partial Reconfiguration of FPGA Mapped Designs," University of Cincinnati Technical Report Number: TR202/01/97/ECECS, 1997.

PROGRAMATIC BRIEFINGS (Facilitated establishment of RAPCEval program at Wright State)

1. "NEWSTARs Electronic Warfare Program," United States House of Representatives Staffers for Austria (Ohio) and Turner (Ohio), and United States Senate Staffers for Voinovich (Ohio) and Brown (Ohio), February 2009.
2. "NEWSTARs Electronic Warfare Program," United States House of Representatives Staffers for Hobson (Ohio) and Turner (Ohio), and United States Senate Staffers for Voinovich (Ohio) and Brown (Ohio), February 2008.
3. "NEWSTARs Electronic Warfare Program," United States House of Representatives Staffers for Hobson (Ohio) and Turner (Ohio), and United States Senate Staffers for Voinovich (Ohio) and Brown (Ohio), January 2007.
4. "NEWSTARs Electronic Warfare Program," Nine United States Senate/Representative Delegations, United States Capitol. January 2006.

5. "Electronic Warfare Receiver On-a-Chip (EWROC)," United States Senate Staffers for DeWine (Ohio), United States Capitol. February 2004.
6. "Receiver Processing and Concepts Evaluation (RAPCEval) Program," Senate Armed Services Committee (SASC) Majority and Minority Professional Staffers, United States Capitol. February 2004.
7. "Electronic Warfare Receiver On-a-Chip (EWROC)," United States House of Representatives Staffers for Hobson (Ohio), Turner (Ohio), Kingston (Georgia), and United States Senate Staffers for Chambliss (Georgia), (2 February 2004); and United States Senate Staffers for DeWine (Ohio), February 2004.

ABSTRACT, WORKSHOP, AND INVITED PRESENTATIONS

1. "Enabling Highly Integrated mm-Wave Phased Array," *Defense Advanced Research Projects Agency (DARPA)*, Chip-Scale Avionics Workshop, February 2007.
2. "Built-In-Self-Test for Automatic Insertion into Mixed-Signal Systems (BIST AIMS)," *Defense Advanced Research Projects Agency (DARPA) IRFFE PI Meetings*, May, 2002 (Kick-off); February, 2003; October, 2003; June, 2004, March 2005.
3. "A Comprehensive Design and Test Methodology for Mixed-Signal Microsystems," *Defense Advanced Research Projects Agency (DARPA) NeoCAD Program Kick-off Meeting*, August 2001.
4. "FPGA Layout Techniques," Invited Tutorial, *IEEE/ACM/SIGDA Third International Design and Test Workshop*, 1999.
5. "Poster Title: Reconfiguring FPGA Mapped Designs with Applications to Fault Tolerance and Reconfigurable Computing," *ACM Fifth International Symposium on Field-Programmable Gate Arrays*, February 1997.

GRANTS FUNDED

RBS Technologies LLC

1. Siferd, Emmert, George and Ren, Phase I SBIR, *Low Power Multi-Channel RF and Digital GPS Anti-Jam ASIC*, United States Air Force, 2013-2014. (waiting to hear on Phase II proposal)
2. Siferd, Emmert, George and Ren, Phase I and II SBIR, *High Resolution Wideband Direct Conversion Receiver*, United States Air Force, 2011-2013.
3. Siferd, Emmert and Ren, Phase I and II SBIR, *Multi Channel RFASIC for Handheld GPS Receiver Anti-JAM Enhancement*, United States Air Force, 2008-2011.
4. Siferd, Emmert and Ren, Phase I and II SBIR, *Digital Antijam (AJ) Processing Application Specific Integrated Circuits (ASIC) for Hand-held Global Positioning Satellite (GPS) Receiver*, United States Air Force, 2007-2010.

Wright State University

5. Emmert, *Active Transmit Attenuation and Cancellation (ATAC)*, **$73,000** Air Force Office of Scientific Research, 2011-2012.
6. Emmert, *Electronic, Optical and Electro-Optical Materials Research: Mixed-Signal Component Design*, **$755,000**, Air Force Research Laboratory (AFRL), 2007-2010.
7. Emmert and Garber, *New Electronic Warfare Specialists Through Advanced Research by Students (NEWSTARs)*, **$250,000** (`06), **$250,000** (`07), and **$500,000** (`09), Congress (Start Date 1 July 2006).
8. Emmert, *Anti-jam ASIC for Handheld GPS*, **$200,000**, RBS Technologies, 2008-2010.
9. Emmert, *RF ASIC for GPS*, **$30,000**, RBS Technologies, 2008.

10. Emmert, *Generic EW/RF Digital Design Toolbox Development*, **$94,788**, Air Force Research Laboaratory (AFRL), 2006-2008.
11. Chen and Emmert, *Electronic Warfare Receiver on a Chip (EWROC)*, **$300,000**, Air Force Research Laboratory (AFRL), 2003-2004.
12. Emmert, *Built-In-Self-Test (BIST) for Mixed Signal Microsystems*, **$400,000**, Defense Advanced Research Projects Agency (DARPA), 2002-2005.
13. Emmert, *FPGA Based Quadbit Receiver Design*, **$40,500**, Air Force Research Laboratory (AFRL), Sensors Directorate (SN), 2002-2003.
14. Emmert, *FPGA Based Monobit Receiver Design*, **$15,000**, Ball Engineering, 2002.
15. Emmert, *FPGA Lab Hardware Update*, **$11,370**, Wright State University, 2002.

University of North Carolina at Charlotte

16. Emmert and Stroud, *On-Line Testing and Reconfiguration of FPGAs for Fault Tolerance in Adaptive Computing Systems*, **$300,000**, Lucent Technologies, subcontract under a DARPA grant for $1,509,000, 2000-2001.
17. Emmert, *FPGA Based MonoBIT Receiver Design*, **$55,000**, Ball Engineering, 2000-2001.

University of Kentucky

18. Emmert, *On-Line Reconfiguration of FPGAs for Fault Tolerant Applications in Adaptive Computing Systems*, **$177,000**, Lucent Technologies, subcontract under a DARPA grant for $1,509,000, 1999-2000.
19. Stroud and Emmert, *CPLD Based Embedded Logic Analyzer*, **$35,000**, Cypress Semiconductor, 1999-2001.

SERVICE

PROFESSIONAL

1. Member of United States Air Force (USAF) 1989-1996
2. Member of United States Air Force Reserve (USAFR) since 1996 (on duty at an Air Force Base an average 5 weeks per year for the last 16 years)
3. Technical Committee: IEEE/ACM Great Lakes Symposium on VLSI Design (GLSVLSI)
4. Technical Committee: ACM/SIGDA International Symposium on Field Programmable Gate Arrays
5. Technical Committee: IEEE North Atlantic Test Workshop
6. Reviewer: IEEE Transactions on Very Large Scale Integration (VLSI) Systems
7. Reviewer: ACM Transactions on Embedded Systems
8. Reviewer: Journal of Very Large Scale Integrated Circuit Design
9. Reviewer: Journal of Electronic Testing
10. Reviewer: IEEE/ACM Great Lakes Symposium on VLSI Design (GLSVLSI)
11. Reviewer: ACM/SIGDA International Symposium on Field Programmable Gate Arrays
12. Reviewer: IEEE International Symposium on Circuits and Systems
13. Reviewer: International Test Conference (ITC)

14. Reviewer: Collaborative Technologies Symposium
15. Program monitor for several DARPA funded programs
16. Program monitor for several USAF SBIR programs

UNIVERSITY

Wright State University

1. Member University Athletics Council
2. Member University Petitions Committee
3. Member University Graduate Council Committee
4. Chair College Steering Committee (2007-2008, 2013-2014, 2014-2015)
5. Member College Steering Committee
6. Member College Curriculum Committee
7. Member College Faculty Development Committee
8. Member College Petitions Committee
9. Member College Program Affairs Committee
10. Member College Student Activities Committee
11. Member College Dissertation Qualified Faculty Committee
12. College PhD Focus Area Chair for Electronics, Microwave, VLSI, and Nanotechnology
13. Chair EE Under Graduate Studies Committee
14. Member Curriculum Committee
15. Chair EE Laboratory Resources Committee
16. Chair EE Core Subcommittee
17. Member EE Department ad hoc ABET Committee
18. Member EE Department Head Search Committee
19. Member Electronics/VLSI Subcommittee
20. Member Electrical Engineering Bylaws Committee
21. Member Electrical Engineering Faculty Search Committee

University of North Carolina at Charlotte

22. Director of Computer Engineering Program
23. Chair Undergraduate Administrative Committee (College)
24. Chair Focus Area Improvement Team (Department)
25. Member Promotion and Tenure Committee (Department)
26. Member Faculty Search Committee (Department)

Frederick Dwight Garber
Department of Electrical Engineering

Education:

Ph.D. in Electrical Engineering, October 1983.
University of Illinois, Urbana, Illinois
Dissertation: "Performance of Digital Communications over Selective Fading Channels."

M.S. in Electrical Engineering, May 1978.
University of Illinois, Urbana, Illinois
Thesis: "Signal-to-Noise Ratio Analysis of Two Implementations of Quadriphase Direct-Sequence Spread-Spectrum Multiple-Access."

B.S. in Electrical Engineering (with Honors), May 1975.
Tri-State University, Angola, Indiana.

Academic Experience:

Chair, Department of Electrical Engineering, Wright State University, 2000 – 2008.

Associate Professor, Department of Electrical Engineering, Wright State University, 1994 – Present.

Assistant Professor, Department of Electrical Engineering, Wright State University, 1990 – 1994.

Assistant Professor, Department of Electrical Engineering and ElectroScience Laboratory, The Ohio State University, 1983 – 1990.

Professional Memberships:

IEEE, ASEE, Eta Kappa Nu, Tau Beta Pi, Phi Kappa Phi.

Academic Awards:

College of Engineering and Computer Science Outstanding Teaching (Finalist), 2002

College of Engineering and Computer Science Outstanding Teaching, 1998

Teaching and Advising:

Courses Taught:

EE 140: Principles of Electrical Engineering (Originator)

EE 301 (2010): Circuit Analysis

EE 321 (3210): Linear Systems I

EE 421 (4210): Digital Communications

EE 701 (7010): Linear Systems

EE 740 (7400): Information Theory (Originator)

EE 745 (7350): Wireless Communication

EE 761 (7610): Random Processes

EE 762 (7620): Detection & Estimation

EE 890: Error Control Coding (Originator)

EGR 101 (1010): Introductory Mathematics for Engineering Applications

EGR 190: (co-developer) Fundamentals of Engineering – predecessor to EGR 1010

EGR 191: (lab component of EGR 190, co-developer) Fundamentals of Engineering

Dissertations Supervised or Co-Supervised to Completion:

Simon (Joe) Tritschler, "High Power Energy Scavenging for Portable Devices," June 2010.

M. Bryant "Manifold Techniques," June 2002.

Ö. Snorrason, "Development and Evaluation of Adaptive Feature Selection Techniques for Sequential Decision Procedures," August 1990.

O. S. Sands, "Matching of Structural Descriptions with Transitive, Anti-Symmetric Relational Attributes with Applications to Radar Target Identification," August 1990.

I. Jouny, "Bispectral Analysis of Radar Signals with Application to Target Classification," July 1990.

N. F. Chamberlain, "Recognition and Analysis of Aircraft Targets by Radar, Using Structural Pattern Representations Derived from Polarimetric Signatures," May 1989.

A. Djouadi, "Analysis of the Performance of a Parametric and Nonparametric Classification System: An Application to Feature Selection and Extraction in Radar Target Identification," March 1987.

Theses Supervised:

M. Eaton, "Extracting Movement commands from EEG Signals," August 2000.

R. Burns, "SAR Processing," June, 2000.

C. Brinegar, "A Pattern Theory Based System to Model and Measure Manmade Structure," February 1999.

T. A. Fister, "Symbolic Object Recognition Using Synthetic Aperture Radar," April 1993.

P. B. Silverstein, "Implementation and Evaluation of a Classification Algorithm Based on Structural Descriptions," November 1990.

A. A. Hwang, "Application of Convolutional Coding for Error Correction to a Shot-Noise Limited Optical Channel with Intersymbol Interference," March 1988.

D. J. Strausberger, "Modeling and Performance of HF/OTH Radar Target Identification Systems," November 1987.

G. M. Huffman, "Performance of Hybrid ARQ Formats Over a Binary Symmetric Channel," August 1987.

I. Jouny, "On M-ary Sequential Hypothesis Testing for the Classification of Radar Signals," July 1987.

Ö. Snorrason, "Feature Selection Applied to Radar Target Identification," June 1987.

M. Azizoğlu, "Performance Evaluation of ALOHA Systems with Adaptive Arrays," May 1987.

T. T. Goh, "X-Band ISAR Techniques for Radar Target Identification," March 1987.

A. J. Kamis, "Radar Target Identification Techniques Applied to a Polarization Diverse Aircraft Data Base," November,1986.

O. S. Sands, "Syntactic Pattern Recognition for Radar Target Identification," September 1986.

D. P. Michal, "Error Correcting Codes Applied to a Shot-Noise Limited Channel," August 1986.

D. R. Koberstein, "Near Field Synthetic Aperture Imaging of Probe Data for Scattering Studies of the ElectroScience Laboratory Compact Range," June 1986.

N. F. Chamberlain, "Surface Ship Classification Using Multipolarization, Multifrequency Skywave Resonance Radar," August 1984.

Scholarshp and Funding:

Publications in Refereed Journals:

A. J. Lingg, E. Zelnio, F. Garber, and B. D. Rigling, "A Sequential Framework for Image Change Detection", *IEEE Transactions on Image Processing*, 2014, vol. 23, no. 5, pp. 2405–2413.

V. Chakravarthy, X. Li, Z. Wu, M. Temple, F. Garber, R. Kannan, A. Vasilakos, "Novel overlay/underlay cognitive radio waveforms using SD-SMSE framework to enhance spectrum efficiency- part i: theoretical framework and analysis in AWGN channel", *IEEE Transactions on Communications*, 2009, vol. 57, no. 12, pp. 3794–3804.

I. Jouny, F. D. Garber, and R. L. Moses, "Radar target identification using the bispectrum: A comparative study," *IEEE Transactions on Aerospace and Electronic Systems*, vol. AES–31, no. 1, pp. 69–77, Jan. 1995.

I. Jouny, F. D. Garber, and S. C. Ahalt, "Classification of radar targets using synthetic neural networks," *IEEE Transactions on Aerospace and Electronic Systems*, vol. AES–29, no. 2, pp. 336–344, Apr. 1993.

Ö. Snorrason and F. D. Garber, "Evaluation of nonparametric discriminant analysis techniques for radar signal feature selection and extraction," *Optical Engineering*, vol. 31, no. 12, pp. 2608–2617, Dec. 1992.

D. J. Strausberger, F. D. Garber, N. F. Chamberlain, and E. K. Walton, "Modeling and performance of HF/OTH radar target classification systems," *IEEE Transactions on Aerospace and Electronic Systems*, vol. AES–28, no. 2, pp. 396–403, Apr. 1992.

I. Jouny and F. D. Garber, "M-ary sequential hypothesis tests for automatic target recognition," *IEEE Transactions on Aerospace and Electronic Systems*, vol. AES–28, no. 2, pp. 473–483, Apr. 1992.

P. B. Silverstein, O. S. Sands, and F. D. Garber, "Radar target classification and interpretation by means of structural descriptions of backscatter signals," *IEEE AES Systems Magazine*, vol. 6, no. 5, pp. 3–7, May 1991.

N. F. Chamberlain, E. K. Walton, and F. D. Garber, "Radar target identification of aircraft using polarization-diverse features," *IEEE Transactions on Aerospace and Electronic Systems*, vol. AES–27, no. 1, pp. 58–67, Jan. 1991.

O. S. Sands and F. D. Garber, "Pattern representations and syntactic classification of radar measurements of commercial aircraft," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. PAMI–12, no. 2, pp. 204–211, Feb. 1990.

A. Djouadi, Ö. Snorrason, and F. D. Garber, "The quality of training sample estimates of the Bhattacharyya coefficient," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. PAMI–12, no. 1, pp. 92–97, Jan. 1990.

F. D. Garber and M. B. Pursley, "Performance of binary FSK communications over frequency-selective Rayleigh fading channels," *IEEE Transactions on Communications*, vol. COM–37, no. 1, pp. 83–89, Jan. 1989.

F. D. Garber and D. P. Michal, "Performance of shot-noise limited optical communications in the presence of intersymbol interference," *Electronics Letters*, vol. 24, no. 16, pp. 1008–1010, Aug. 1988.

F. D. Garber and A. Djouadi, "Bounds on the Bayes classification error based on pairwise risk functions," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. PAMI–10, no. 2, pp. 281–288, Mar. 1988.

F. D. Garber and M. B. Pursley, "Performance of differentially-coherent digital communications over frequency-selective fading channels," *IEEE Transactions on Communications*, vol. COM–36, no. 1, pp. 21–31, Jan. 1988.

F. D. Garber and M. B. Pursley, "Performance of offset quadriphase spread-spectrum multiple-access communications," *IEEE Transactions on Communications*, vol. COM–29, no. 3, pp. 305–314, Mar. 1981.

F. D. Garber and M. B. Pursley, "Optimal phases of maximal length sequences for asynchronous spread-spectrum multiplexing," *Electronics Letters*, vol. 16, no. 19, pp. 756–757, Sept. 1980.

Intellectual Property:

"Frequency-Dependent Circuit RFID with 3-D Positioning," (with B. Rigling). US #7,988,055. Application, 2005, Awarded 2011.08.02. This property has been licensed to *Intellectual Ventures*.

Publications in Conference Proceedings:

A. Lingg, E. Zelnio, F. Garber, and B. Rigling, "Image sequence change detection via sparse representations," *Signals, Systems and Computers (ASILOMAR), 2010 Conference Record of the Forty Fourth Asilomar Conference on*, 2010.

V. Chakravarthy, Z. Wu, A. Shaw, M. Temple, and F. Garber, "Cognitive radio centric overlay/underlay waveform," *IEEE Symposium on New Frontiers in Dynamic Spectrum Access Networks*, October, 2008.

V. Chakravarthy, Z. Wu, A. Shaw, M. Temple, and F. Garber, "A general overlay/underlay analytic expression representing Cognitive Radio Waveforms," *IEEE Waveform Diversity and Design Conference*, June, 2007.

M. Bryant and F. Garber, "SVM Classifier Applied to the MSTAR public data set," in *Algorithms for Synthetic Aperture Radar Imagery VI,* (E. Zelnio, ed.), vol. 3721, Orlando, Florida, April 4–9, 1999.

F. Garber and E. Zelnio, "On Some Simple Estimates of ATR Performance, and Initial Comparisons for a Small Data Set," in *Algorithms for Synthetic Aperture Radar Imagery IV,* (E. Zelnio, ed.), vol. 3070, pp. 150 – 161, Orlando, Florida, April 22–25, 1997.

F. Garber and E. Zelnio, "Preliminary results on ATR performance evaluation," in *Third workshop on Conventional Weapon ATR* (R. D. Pittman, ed.), (Redstone Arsenal, Alabama), November 13–15, 1996.

E. Zelnio and F. Garber, "A characterization of ATR performance evaluation," in *Signal Processing, Sensor Fusion, and Target Recognition V* (I. Kadar and V. Libby, eds.), pp. 2 – 13, Orlando, Florida: Proceedings of the SPIE 2755, April 8–10, 1996.

F. Garber and E. Zelnio, "A geometrical formulation of RADAR signal complexity and target recognition performance capabilities," in *Signal Processing, Sensor Fusion, and Target Recognition IV* (I. Kadar and V. Libby, eds.), pp. 595 – 603, Orlando, Florida: Proceedings of the SPIE 2484, April 17–19, 1995.

M. Bryant, F. D. Garber, M. Jarratt, and M. Minardi, "Intrinsic separability for target recognition systems," in *ATRWG Conference Proceedings*, (Monterey, California), June 30 – July 2, 1993.

T. A. Fister, F. D. Garber, S. C. Sawtelle, and R. L. Withman, "Hypothesis likelihood function evaluation for synthetic aperture radar targets," in *Proceedings of the SPIE Technical Symposium on Automatic Object Recognition*, (Orlando, Florida), April 12–16, 1993.

T. A. Fister, F. D. Garber, S. C. Sawtelle, and R. L. Withman, "Target probability evaluation for synthetic aperture radar targets," in *NAECON Conference Proceedings*, (Dayton, Ohio), May 24–28, 1993.

O. S. Sands and F. D. Garber, "Distance measures and match complexity for reconstructable pattern segmentations," in *Proceedings of the SPIE Technical Symposium on Automatic Object Recognition*, (Orlando, Florida), pp. 236–245, April 20–24, 1992.

F. D. Garber, "Recent advances in automatic target recognition," in *NAECON Conference Proceedings*, (Dayton, Ohio), pp. 353–359, May 20–24, 1991.

I. Jouny, R. L. Moses, and F. D. Garber, "Classification of radar signals using the bispectrum," in *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing*, (Toronto, Ontario), pp. 3429–3433, May 14–17, 1991.

I. Jouny, F. D. Garber, R. L. Moses, and E. K. Walton, "Applications of the bispectrum in radar signature analysis and target identification," in *Proceedings of the SPIE Technical Symposium on Automatic Object Recognition*, (Orlando, Florida), pp. 142–153, April 1–5, 1991.

Ö. Snorrason and F. D. Garber, "Formulation and evaluation of adaptive, sequential feature selection – target classification algorithms," in *Proceedings of the SPIE Technical Symposium on Automatic Object Recognition*, (Orlando, Florida), pp. 116–127, April 1–5, 1991.

P. B. Silverstein, O. S. Sands, and F. D. Garber, "Radar target classification and interpretation by means of structural descriptions of backscatter signals," in *Proceedings of the IEEE National Radar Conference*, (Los Angeles, California), pp. 21–25, March 12–13, 1991.

M. Azizoğlu and F. D. Garber, "Performance of slotted satellite networks with adaptive arrays," in *Proceedings of the 1990 Bilkent International Conference on New Trends in Communication, Control, and Signal Processing*, (Ankara, Turkey), July 2–5, 1990.

D. J. Strausberger, N. F. Chamberlain, F. D. Garber, and E. K. Walton, "Modeling and performance of HF/OTH radar target classification systems," in *Proceedings of the 1990 IEEE International Radar Conference*, (Arlington, VA), pp. 579–584, May 7–10, 1990.

N. F. Chamberlain, E. K. Walton, and F. D. Garber, "Radar target identification of aircraft using time domain polarimetric signatures," in *Progress In Electromagnetics Research Symposium (PIERS) Proceedings*, (Boston, Massachusetts), pp. 166–167, July 25–26, 1989.

O. S. Sands and F. D. Garber, "Syntactic pattern classification of radar measurements of aircraft," in *Proceedings of the IEEE 1989 National Radar Conference*, (Dallas, TX), pp. 158–163, March 29–30, 1989.

S. C. Ahalt, F. D. Garber, I. Jouny, and A. K. Krishnamurthy, "Performance of synthetic neural network classification of noisy radar signals," in *Advances in Neural Information Processing Systems* (D. S. Touretzky, ed.), vol. 1, pp. 281–288, New York: Morgan Kaufman, 1989, (also, Proceedings of the 1988 NIPS Conference, Nov. 28 – Dec. 1, Denver, CO).

Ö. Snorrason and F. D. Garber, "Computation of the minimum-ASN boundaries for the modified SPRT: Performance analysis and comparisons," in *Proceedings of the 26-th Annual Allerton Conference on Communication, Control, and Computing*, (University of Illinois), pp. 11–12, September 28–30, 1988.

F. D. Garber, N. F. Chamberlain, and Ö. Snorrason, "Time–domain and frequency–domain feature selection for reliable radar target identification," in *Proceedings of the IEEE 1988 National Radar Conference*, (Ann Arbor, MI), pp. 79–84, April 20–21, 1988.

F. D. Garber and I. Jouny, "On M-ary sequential hypothesis testing for the classification of radar signals," in *Proceedings of the 1987 IEEE Military Communications Conference*, (Washington, D.C.), pp. 32.1.1–32.1.5, October 19-22, 1987.

G. M. Huffman and F. D. Garber, "Performance of hybrid ARQ coding formats over a binary symmetric channel," in *Proceedings of the 25-th Annual Allerton Conference on Communication, Control, and Computing*, (University of Illinois), pp. 622–623, September 30 – October 2, 1987.

F. D. Garber and M. B. Pursley, "Effects of frequency-selective fading on slow-frequency-hopped DPSK spread-spectrum multiple-access communications," in *Proceedings of the 1982 IEEE Military Communications Conference*, vol. 2, (Boston, Massachusetts), pp. 35.2.1–35.2.6, October 18–20, 1982.

F. D. Garber and M. B. Pursley, "Effects of time-selective fading on slow-frequency-hopped DPSK spread-spectrum communications," in *Conference Record, IEEE National Telecommunications Conference*, vol. 4, (New Orleans, Louisiana), pp. G8.1.1–G8.1.5, November 29–December 3, 1981.

M. B. Pursley, F. D. Garber, and J. S. Lehnert, "Analysis of generalized quadriphase spread-spectrum communications," in *Conference Record, IEEE International Conference on Communications*, vol. 1, (Seattle, Washington), pp. 15.3.1–15.3.6, June 8–12 1980 (Invited Paper).

M. B. Pursley and F. D. Garber, "Quadriphase spread-spectrum multiple-access communications," in *Conference Record, IEEE International Communications Conference*, vol. 1, (Toronto, Ontario), pp. 7.3.1–7.3.5, June 4–7 1978 (Invited Paper).

External Institutional Funding:

WSU Expenditures $1,613,000 of $3,000,000 Total Allocations

Congressional Add: New Electronic Warfare Specialists Through Advanced Research by Students (NEWSTARS), (with J. Emmert), June 2006 – June 2007. $225,000 (WSU share of $1,000,000). Facilitated collaborative involvement of: Professors H. Chen, J. Emmert, M. Kazimierczuk, R. Siferd.

Congressional Add: WBI-Advanced Sensor-Based Vigilance Technologies for Countering Irregular and Disruptive Threats (SAVig), (with B. Rigling) 2006, $1,000,000. Facilitated collaborative involvement of: Professors L. Hong, B. Rigling, A. Shaw.

Congressional Add: Receiver and Processing Concepts Evaluation Program (RAPCEval), March 2005 – June 2006, $225,000 (WSU share of $1,000,000). Facilitated collaborative involvement of: Professors H. Chen, J. Emmert, R. Siferd.

DOE-AFRL/Purdue/PCKA-Center for Security of Large Scale Systems: "Energy Grid Security," WSU POC, 2004. Facilitated collaborative involvement of: Professors J. Slater, M. Wolff, X. Zhang, S. Narayanan, F. Ciarallo, M. Kazimierczuk.

Congressional Add: "Receiver and Processing Concepts Evaluation Program (RAPCEval)," WSU POC, March 2004 – June 2005, $133,532 (WSU share of $500,000). Facilitated collaborative involvement of: Professors H. Chen, J. Emmert, R. Siferd.

Congressional Add: "Receiver and Processing Concepts Evaluation Program (RAPCEval)," WSU POC, March 2003 – June 2004, $29,671 (WSU share of $500,000). Facilitated collaborative involvement of: Professors H. Chen, R. Siferd.

Research Expenditures: (Apart from Institutional Funding)

Direct Responsibility of approximately $8,775,000 of approximately $21,401,000.
At WSU: Direct Responsibility of approximately $3,245,000 of approximately $11,270,000.

United Energy Systems: "Molecular Signatures," Co-Principal Investigator, May 2014 – , RSP# , $105,000

NSF-IUCRC Center for Surveillance Research: "Probabilistic Understand of SAR Signature Variation," Principal Investigator, September 2013 – May 2014, RSP# 668382, $44,000

Henry Jackson Foundation/711HPW: "HAPSITE ER Volitile Signature Recognition," Co-Principal Investigator, September, 2013 – September 2014, RSP# 669273, $484,651

RBS Technologies: "Wide Band Direct Conversion Receiver," Principal Investigator, Phase I SBIR October 2012 – September 2014, RSP# 669003, $55,699

Air Force Research Laboratory: "Automatic Target Recognition Center," Co-Principal Investigator, 2007 – Present, RSP# Various, $\sim$ $3,700,000

Sheet Dynamics Limited: "Performance Estimation of SAR imagery using NIIRS Techniques," Principal Investigator, Phase I SBIR February 2009 – September 2009, RSP# , $30,000

Air Force Office of Scientific Research: "Predictive Theories based on Posterior Probability Estimates," Principal Investigator, June 2009 – September 2009, $18,000

Air Force Research Laboratory: "Polymer Nanocomposites as Future Materials for Defense and Energy Applications," Co-Principal Investigator/Supervisor, September 2006 – January 2008, RSP# 666819, $476,869

Air Force Research Laboratory: "Intergovernmental Personnel Agreement-Bayraktaroglu," Co-Principal Investigator/Supervisor, September 2004 – September 2006, RSP# 665964, $466,524.

Air Force Research Laboratory: "Intergovernmental Personnel Agreement-Minardi," Co-Principal Investigator/Supervisor, May 2003 – April 2005, RSP# 665465, $324,882.

Air Force Research Laboratory: "Intergovernmental Personnel Agreement-Dilsavor," Co-Principal Investigator/Supervisor, May 2003 – April 2005, RSP# 665466, $295,350.

Air Force Research Laboratory: "Testing, Evaluation, and Measurement Automatic Target Recognition Systems (TEMATRS)," Co-Principal Investigator, February 2003 – August 2003, RSP#665406, $69,476.

Air Force Research Laboratory: "Intergovernmental Personnel Agreement-Bayraktaroglu," Co-Principal Investigator/Supervisor, September 2002 – September 2004, RSP# 665273, $401,253.

University of South Alabama: "Developing Effective Strategies and Performance Metrics for Automatic Target Recognition," Co-Principal Investigator, October 2001 – December 2002,

RSP# 665015, $23,683.

Air Force Research Laboratory: "Intergovernmental Personnel Agreement-Minardi," Co-Principal Investigator/Supervisor, February 2001 – February 2003, RSP# 664381, $439,863.

Air Force Research Laboratory: "Intergovernmental Personnel Agreement-Dilsavor," Co-Principal Investigator/Supervisor, February 2001 – February 2003, RSP# 664380, $399,876.

The Enrollment Planning Council: "Increasing Retention of Engineering Students," Co-Principal Investigator, Summer 1999, $50,202.

Wright Laboratories: "Performance Prediction of ATR Technologies for Estimating Sensor-to-Shooter Information Reliability," Principal Investigator, July 1998 – December 2002, RSP#663868, $234,500.

Mission Research Corporation/DARPA: "Unified Design of 1-D Automatic Target Recognition Systems for Surveillance and Attack (TRUMPETS)," Investigator, June 1998 – November 2000, RSP#663846, $80,000.

Air Force Research Laboratory: "Intergovernmental Personnel Agreement-Worrell," Principal Investigator/Supervisor, March 1999 – March 2001, RSP#663751, $141,249.

Wright State University: "Research Challenge Grant," Principal Investigator, June 1998 – June 1999, RSP Internal $10,000.

Air Force Research Laboratory: "Performance Evaluation of Automatic Target Recognition Systems," Principal Investigator, June 1994 – September 1998, RSP#662660, $266,143.

Wright State University Foundation: "Learning by Involvement in Communication Systems," Principal Investigator, January 1994 – December 1994, WSU#550752, $5,000.

Advanced Research Projects Agency/Ohio Aerospace Institute: "Feature-Based Automatic Target Recognition," Co-Principal Investigator, September 1993 – June 1994, RSP# 662516, $480,000.

Wright Laboratories: "Synthetic Aperture Radar Automatic Strategic Relocatable Target Identification System," Principal Investigator, June 1991 – September 1993, RSP#661868, $100,014.

Ohio Research Challenge Grant: "Recognition of Objects in Two-Dimensional Radar Data Arrays," Principal Investigator, August 1990, RSP (Internal) $3,000.

General Dynamics Corp.: "Development and Testing of Radar Target Classification Algorithms," Co-Principal Investigator, February 1990 – September 1990, $75,000.

Office of Naval Research: "Advances in Identification of Airborne Radar Targets," Co-Principal Investigator, November 1989 – October 1990, $134,000.

General Dynamics Corp.: "Development of Radar Target Identification Techniques," Co-Principal Investigator, August 1989 – December 1989, $88,000.

Office of Naval Research: "Identification of Airborne Radar Targets," Co-Principal Investigator, November 1988 – October 1989, $150,000.

National Science Foundation (Equipment Grant): "An Integrated Symbolic and Signal Processing Workstation for Research in Signal Analysis, Machine Perception, and Computer Architecture," Co-Principal Investigator, 1988, $60,000.

MITRE Corporation: "Feasibility Studies for Over The Horizon Radar Target Identification," Principal Investigator, July 1988 – October 1988, $11,000.

Office of Naval Research: "Target Scattering Analysis Methods," Co-Principal Investigator, September 1987 – October 1988, $120,000.

Office of Naval Research, Naval Research Lab: "Space Based Radar Target Identification," Co-Principal Investigator, July 1987 – October 1988, $149,604.

Office of Naval Research, Naval Weapons Lab: "Radar Target Classification Studies," Co-Principal Investigator, August 1986 – July 1987, $90,000.

NASA Lewis Research Center: "Adaptive Arrays and Packet Radio," Co-Principal Investigator, March 1986 – March 1987, $100,000.

Office of Naval Research: "Resonant Region NCTR Research," Co-Principal Investigator, January 1986 – December 1986, $300,000.

Office of Naval Research, Naval Weapons Lab: "Radar Target Classification Studies," Co-Principal Investigator, August 1985 – July 1986, $90,000.

The Ohio State University Seed-Grant Program Grant: "Analysis of the Probability of Error of Radar Target Classification Systems," Principal Investigator, June 1985 – September 1986, $7,000.

Student Support:

Since Promotion: 36 Quarters, Overall: 140 Quarters.

SERVICE:

University Committees:

2014-2015	Member	Faculty Senate
2013-2014	Member	Faculty Senate
2013-2014	Member at Large	AAUP-WSU Executive Committee
2013-2014	Member	Community Standards Panel
2012-2013	Member	Search Committee: Wright State University Provost
2012-2013	Member at Large	AAUP-WSU Executive Committee
2012-2013	Member	Faculty Senate
2012-2013	Member	Faculty Budget Priority Committee

2012-2013	Member	HB7 Energy Performance Review Committee
2012-2013	Member	Community Standards Panel
2011-2012	Vice President	AAUP-WSU
2011-2012	Member	Faculty Senate
2011-2012	Member	Faculty Budget Priority Committee
2011-2012	Member	Community Standards Panel
2010-2011	Member at Large	AAUP-WSU Executive Committee
2010-2011	Member	Ad Hoc Campus Master Plan Committee
2010-2011	Member	Ad Hoc Student Conduct Committee
2010-2011	Member	Commencement Committee
2010-2011	Member	Community Standards Panel
2009-2010	Member	Commencement Committee
2009-2010	Member	Community Standards Panel
2008-2009	Member	Judicial Review Panel
2008-2009	Member	Commencement Committee
2007-2008	Member	Judicial Review Panel
2006-2007	Member	Judicial Review Panel
2006-2007	Member	Search Committee: Chair, Department of Mathematics and Statistics
2004-2005	Member	P & T Appeals Committee
2004-2005	Member	Buildings and Grounds Committee
2004-2005	Member	Search Committee: Dean, College of Engineering and Computer Science
2003-2004	Member	Search Committee: Chair, Department of Mathematics and Statistics
2001-2002	Member	Search Committee: Director, Kettering Center
2000-2001	Member	CECS Representative to University Petitions Committee
1998-1999	Chair	Student Affairs Committee
1998-1999	Member	Academic Calendar Committee
1997-1998	Member	Student Evaluation of Teaching Committee
1996-1997	Member	Graduate Council
1996-1997	Member	Student Affairs Committee
1996-1997	Member	Commencement Committee
1996-1997	Member	CECS Representative to University Petitions Committee
1995-1996	Member	Search Committee, Director Research and Sponsored Programs
1995-1996	Member	Graduate Council
1995-1996	Member	Student Affairs Committee

College Committees:

2014-2015	Member	College Ambassadors
2014-2015	Member	Ad Hoc College Website Design Committee
2014-2015	Member	Ad Hoc College Awards Committee
2013-2014	Member	Search Committee: Chair, Department of Electrical Engineering
2013-2014	Member	College Ambassadors
2013-2014	Committee of One	College Bylaws Evaluation of Instruction
2013-2014	Member	Ph.D. Student Affairs Committee
2013-2014	Member	Ad Hoc College Awards Committee
2012-2013	Member	Ph.D. Student Affairs Committee
2012-2013	Member	Ad Hoc Distance Education Committee

2012-2013	Member	Staff Awards Committee
2011-2012	Member	College Steering Committee
2011-2012	Chair	Ph.D. SSIP Focus Area
2011-2012	Member	Ph.D. Program Affairs Committee
2011-2012	Member	College Steering Committee
2011-2012	Member	College Curriculum Committee
2011-2012	Member	Ad Hoc College Bylaws Committee
2011-2012	Member	College Faculty Development Committee
2011-2012	Chair	Ph.D. SSIP Focus Area
2010-2011	Member	College Steering Committee
2010-2011	Member	Ph.D. Program Affairs Committee
2010-2011	Member	College Faculty Development Committee
2010-2011	Member	College Curriculum Committee
2007-2008	Chair	Search Committee: Chair, Department of Computer Science and Engineering
2007-2008	Chair	Five-Year Chair Review Committee (BIE)
2007-2008	Member	Ph.D. Student Affairs Committee
2006-2007	Member	Ph.D. Student Affairs Committee
2005-2006	Member	College Faculty Development Committee
2005-2006	Member	Ph.D. Student Affairs Committee
2004-2005	Member	College Faculty Development Committee
2004-2005	Member	Ph.D. Student Affairs Committee
2004-2005	Chair	Ph.D. Sensor, Signal and Image Processing Focus Area
2003-2004	Chair	Ph.D. Sensor, Signal and Image Processing Focus Area
2003-2004	Member	Ph.D. in Engineering Director Advisory Committee
2001-2002	Member	Math Department Conference Committee (resolution of math instruction)
2001-2002	Member	Ten-Year Chair Review Committee (MME)
2001-2002	Member	Search Committee: CECS Assistant Dean
2001-2002	Chair	Ph.D. PCC Sensor Signal and Image Processing
2001-2002	Member	ad-hoc Engineering Math Course Development (precursor of EGR 101)
2000-2001	Chair	Ph.D. PCC Sensor Signal and Image Processing
2000-2001	Member	Undergraduate Petitions Committee
1999-2000	Chair	Ph.D. PCC Sensor Signal and Image Processing
1999-2000	Member	Undergraduate Petitions Committee
1998-1999	Member	Engineering First-Year Sequence (resulting in EGR 190-191)
1998-1999	Chair	Ph.D. PCC Sensor Signal and Image Processing
1997-1998	Chair	Ph.D. PCC Sensor Signal and Image Processing
1997-1998	Member	Ph.D. Admissions
1996-1997	Member	Five-Year Chair Review Committee (EE)
1996-1997	Chair	Petitions Committee
1995-1996	Chair	Petitions Committee
1995-1996	Member	Petitions Committee

Department Committees:

2000-2008	Chair	Department of Electrical Engineering
Various	Chair and/or Member	All Department Committees

Professional Service:

Conference Co-Chair and Member Technical Program Committee, SPIE 2000-2015.
Co-Organizer AFRL ATR Center Workshop, WSU, Dayton, 2009-2014.

Organizer ATR Theory Workshop, WSU, Dayton, August 8,9, 2001.
Executive Committee MWCAS Conference, Dayton, OH, August 14-17, 2001.
Session Chair and Member Technical Program Committee SPIE 1993, 1994, 1996, 1997.
Reviewer, IEEE Transactions on Aerospace and Electronic Systems.
Reviewer, IEEE Transactions on Antennas and Propagation.
Reviewer, IEEE Transactions on Communications.
Reviewer, IEEE Transactions on Information Theory.
Reviewer, IEEE Transactions on Neural Networks.
Reviewer, IEEE Transactions on Pattern Analysis and Machine Intelligence.
Reviewer, IEEE Transactions on Systems, Man, and Cybernetics.
Reviewer, IEEE Transactions on Vehicular Technology.
Reviewer, IEEE Journal on Selected Areas in Communications.
Reviewer, IEE Proceedings on Communications.

Community Service:

2004-Present	Faculty Advisor	Campus Crusade for Christ
2008-2008	Faculty Advisor	Tau Beta Pi
2006-2009	Faculty Advisor	Building Society
2004-2006	Faculty Advisor	Athletes in Action
1991-1993	Member	Board of Directors, Brookville Community Scholarship Foundation

Major Accomplishments:

During my first ten years at Wright State University, I focused on the development of curriculum and programs in the EE department resulting in, for example, the offering of engineering (EGR) and electrical engineering (EE) first-year course sequences, and aiding the institution and codification of our engineering Ph.D. program. These and other efforts led to my successful consideration as department chair effective Fall 2000.

During my tenure as department chair (2000 – 2008):

Undergraduate student head count increased from 197 to 218 (+10%)
Graduate student head count increased from 146 to 233 (+59%)
Full-time faculty count increased from 9 to 12 (+33%).
Publications per Faculty per Year increased from 2.7 to 4.7 (+74%).
Research Expenditures per Faculty per Year increased from $34,400 to over $131,000 (+280%).
The EE department moved from the least productive to the most productive department in the college in regard to research expenditures.

Additionally, during this period the Department of Electrical Engineering facilitated collaborative research efforts including at least twenty workshops were hosted as part of the SAVig, RAPCEVAL, NEWSTARS, and ATR Center programs, and for special topic areas such as ATR theory, image registration and geo-location, and micro-sensing. The Department also facilitated arrangements and appointments for visiting scientists, faculty, and researchers from outside agencies, and provided AFRL on-site research infrastructure and manpower in the form of contracted researchers and IPA assignments.

Since 2008, I have focused efforts on building and maintaining collaborative research programs, transitioning academic programs and on-line offerings, and serving in various leadership roles at the college and university levels.

Resume

Dr. Steve Gorman
301 Stewart Dr
Yellow Springs, Ohio 45387
850-748-3069

PROFESSIONAL EXPERIENCE

January 2014 - Present

Electrical Engineering Instructor at Wright State University, Dayton, Ohio

Develop and teach undergraduate and graduate Electrical Engineering courses

June 2007 - January 2014

Principal investigator at Ticom Geomatics, Inc Austin, Tx.

This position involved research and development in geolocation, communications and signal processing. My duties during this time included

- Developed novel signal processing and geolocation concepts to acquire R&D and other funding from various government agencies
- Performed many customer briefings for program management reviews and briefings for acquisition of new business
- Acted as technical lead and chief system engineer for Ticom Geomatics in many business areas such as geolocation of new signals including cellular signals such as GSM, CDMA2000, WCDMA, WiMax and LTE. Many other classified signals are included as well.
- Lead planning and lead system test events at test ranges such as YUMA, NTC (Fort Irwin) , Idaho national labs (INL) and many local field tests in Austin, Tx. for numerous projects
- Planned and oversaw integration of new capabilities into Ticom Geomatics baseline system software
- Managed technical teams in development of multiple new signal processing and geolocation algorithms and projects
- Developed most all of Ticom Geomatics concepts of operation (CONOPS) for new signal geolocation capabilities
- Performed duties as chief technical advisor to Ticom Geomatics company owners.
- Continued to developed signal processing Algorithms in Matlab as time permitted

August 2004 - June 2007

Associate Professor (with Tenure earned in 2005) at the University of West Florida/University of Florida ECE program (ABET Accredited). See accomplishments, courses taught and publications in latter sections.

August 2000 – May 2004

Assistant Professor at the University of West Florida/University of Florida ECE program (ABET Accredited)

May 2001 – June 2007

Part time Consulting

This position involved research and development in radio location, communications and signal processing. My work has focused on TDOA/FDOA radio location signal processing of analog and digital signals. My duties during this time included:

- Demodulation algorithm development for signals including: Thuraya OQPSK, GSM, HF-ALE, 802.11, IS-136 and other special signals
- Supervised development of algorithms for CDMA2000, WCDMA
- Developed various synthetic geolocation algorithms
- Blind beamforming algorithms
- Single node geolocation algorithms
- OFDM signal algorithms and simulations
- Support presentations and meetings

June 1988- July 2000

Engineering Fellow, Raytheon Systems Company, formerly E-Systems

This position was generally in the areas of signal processing and communications systems. However, I have also worked on a variety of projects involving control theory, digital and analog circuit design, power supplies, electromagnetic, software and systems engineering. Some of my experience and accomplishments at Raytheon are listed below.

- Developed, simulated and implemented various demodulation algorithms for FSK, MPSK, QAM, SSB-AM, FM, and TCM signals. This included timing recovery and DSP based carrier phase recovery algorithms, as well as equalization techniques including CMA, linear and decision feedback equalization and Viterbi equalizers.
- Developed, simulated and guided implementation of algorithms for a highway position system above a magnetic tape. Developed electromagnetic models for the system.

Applied noise rejection techniques from digital signal processing and digital communications theory to this application.

- Developed and simulated algorithms for TDOA based geolocation system which targets frequency hopping radios. This resulted in a 5 million dollar DARPA contract. Developed a novel baud timing approach which does not use cross correlation. Performed the system simulation for the project. Performed much of the hardware and software development and guided the project through system integration.
- Performed analysis on data collected from a direct sequence spread spectrum radio which frequency hops and is time division multiplexed.
- Simulated various spatial DSP based beam forming and interference cancellation algorithms
- Performed various analog circuit designs including duobinary demodulator, automatic gain control, analog filters, analog equalizers and power conditioning circuits.
- Developed a new method of geolocation of a transmitter with a single antenna collection system. A patent was granted for this technique.
- Designed several FIR, IIR, and multirate digital filters for various projects. Simulated these in Matlab and implemented many in "C" code.
- Designed and simulated a feedback control system for very fast positioning of a Laser based on Galvanometer mirror movements. The design used modern control state feedback techniques and a new design technique was developed.
- Evaluated implementation of synthetic aperture radar on reduced size CRAY computer.
- Developed algorithms for real time detection/collection of frequency hopping radios. This resulted in a 10 million dollar contract award to build such a system. The system was completed and is now operational. The algorithms included a novel tracking algorithm to de-interleave pulses, detection algorithm, and a novel clustering algorithm to eliminate adjacent channel energy false alarms. Other algorithm work was involved including FFT based polyphase channelization, baud rate and phase estimation, and radio network association.
- Developed and simulated a novel implementation for a variable rate FFT based polyphase channelizer.
- Developed a new partial column pipeline FFT algorithm that was published.
- Performed in depth analyses study of many FFT algorithms for hardware implementation using custom parallel processors.
- Performed various digital logic hardware designs using PLDs and Xilinx devices.
- Designed, built prototype, and tested a correlator card for timing recovery for a four level FSK receiver which frequency hops. This involved of both analog and digital circuit design.
- Designed, simulated, built prototypes, and tested many mixed analog/digital phase locked loops.
- Designed and build hardware test cards to identify and fix a long standing timing problem with a frequency hopping communications system.
- Developed a variety of embedded real-time software, both "C" and assembly language for DSP and non DSP applications.
- Developed a variety of workstation software in "C" and Matlab for simulation of various signal processing, communications, and control systems applications.

EDUCATION

Ph.D. in Electrical Engineering, University of Kentucky - May 1988.
MS in Electrical Engineering, University of Kentucky - Dec 1985.
BS in Electrical Engineering, University of Kentucky - Dec 1982.
A.S. in Electrical Power Technology, Eastern Kentucky University - May 1979.

PUBLICATIONS:

1. "Blind Beamforming for Enhanced T/FDOA Geolocation", B. E. Henneberger, S. F. Gorman, S. D. Richardson, B.K. Craig. *5th Symposium on Radiolocation and Direction Finding*, *Southwest Research Institute*, San Antonio, TX, May 4, 2004 (18 pages)

2. Gorman S, Widmann JF. "An Investigation of Multiphase Particle Image Velocimetry Using Monte Carlo Simulations." Atomization and Sprays, 14:525-543, 2004.

3. "Microprocessor Based Near Minimum Time DC Motor Position Control," Steve Gorman, *Electric Power Components and Systems*, vol 32, no. 5, Pages 505-527 May 2004

4. "Strategies and Preliminary Results for Improving Geolocation Performance: Error Mitigation and Cross-Platform Interoperability", B. Craig, B. Henneberger, L. Giulianelli, S. Nelson, C. Tucker, S. Gorman, W. Bratt. *4th Symposium on Radiolocation and Direction Finding*, *Southwest Research Institute*, San Antonio, TX, May, 2002 (19 pages)

5. "Velocity Measurements of Polydisperse Sprays Using Particle Image Velocimetry", Steve Gorman, John F. Widmann. *ILASS Americas, 15th Annual Conference on Liquid Atomization and Spray Systems*, Madison, WI, May 2002 (5 pages double column)

6. "Force Multiplying Multifunction Comms and Surveillance Platforms," H. Edwards, D. Davis S Gorman, M Patten, D. Vujcic. *Proceedings of The International Society for Optical Engineering*. Vol. 3577:279-287, Nov. 1998

7. "Partial Column FFT Pipelines", Steve F. Gorman, Jeffery M. Wills, *IEEE Trans. Circuits and Systems, Part II, Analog and Digital Signal Proc.* Pages 414-423, June, 1995.

8. "A Versatile Load Simulator for Electric Drives," S. F. Gorman, J. J. Cathey, *Electric Machines and Power Systems*, 21:103-113,1993

9. “Determination of Permanent Magnet Synchronous Motor Parameters for Use in Brushless DC Drive Analysis, “ S. F. Gorman, C. Chen, J. J. Cathey, *IEEE Trans. on Energy Conversion*, Vol3, No.3, 674-681, September 1988.

10. “A Multi-Microprocessor Controller for a VV-VF Cycloconverter-Link Brushless DC Motor Drive,” Stephen F. Gorman, J. J. Cathey, J. A. Weimer, *IEEE Trans. Industrial Electronics*, Vol. 35, No. 2, 278-283, May 1988.

11. “Laboratory Verification of a Cycloconverter-Fed, Microprocessor-Controlled Self Synchronous Motor,” J. J. Cathey, Stephen F. Gorman, Joseph A. Weimer. *IEEE Trans. Power Electronics*, Vol 3, No. 4, 474-483, October 1988.

12. “Digital Controller for a Cycloconverter Link Brushless DC Motor Pump Drive,” Stephen F. Gorman, J. J. Cathey, J. A. Weimer, presented at *NAECON, ‘87*, Dayton, OH, May 20, 1987. (8 pages)

13. "Comment on the recent results of Hopewell, Morris and Dixon-Brown on the radiation myelitis produced by irradiation of very short segments of rat spinal cord, " Robert J. Yaes, Stephen Gorman, Barry Berner, Andre Kalend, Yosh Maruyama *The British Journal of Radiology*, Vol. 61, No. 73 October 1988. (8 pages)

TECHNICAL CONSULTING REPORTS WRITTEN WHILE AT UWF

A Variable Data Compression Method for a TDOA/FDOA Geo-location System. Prepared for TICOM, Inc. June 2003

Demodulation/Re-modulation TOA/FOA Study for FSK/MSK signals. Prepared with Bernnie Henneberger for TICOM, Inc., December 2001

Signal Processing background and concepts related to Cross Ambiguity Function Processing. Prepared for TICOM, Inc., March 2002

Frequency estimation and differencing for velocity detection. Prepared for TICOM, Inc. January 2002

Report on OFDM system results for ACS Defense. Prepared for ACS Defense, Inc. August 2001

Effects of error correction coding and Eb/No requirement for the 16 QAM – 8 channel OFDM system. Prepared for ACS Defense, Inc. August 2001

EXTERNAL RESEARCH FUNDING RECEIVED WHILE AT UWF

- Spring 2001 – "Airborne Communications Node Phase II" from Raytheon, Inc. Falls Church, Virginia. Amount of contract was $4381.00
- Spring 2003 – "Adaptive Beamforming for T/FDOA Geolocation" from TICOM, Inc. Austin Texas. Amount of contract was $45,000.00
- Fall 2003 – "Adaptive Beamforming for T/FDOA Geolocation phase II" from TICOM, Inc. Austin Texas. Amount of contract was $11,330.00

TEACHING EXPERIENCE

Courses Taught at University of West Florida

EEL 3112 - Circuits 2 (continuous time signals and systems)
EEL 3135 - Signals and Systems
EEL 4713C - Computer Architecture and VHDL laboratory
EEL 3472 - Electromagnetic Fields and Waves
EEL 4306C - Electronics II and associated laboratory
EEL 4514 - Communications Systems
EEL 4514L - Communications laboratory
EEL 4515 - Digital Communications
EEL 4914C - Senior Design
EEL 4905 - Individual Problems in Electrical Engineering
EEL 4657L - Linear Controls Laboratory
EEL 4635 - Digital Control Systems

Courses Taught at George Mason University, Fairfax, Virginia

ECE 463 - Digital Communications Systems
ECE 521 - Graduate level modern systems theory (state space systems)
ECE 421 - Classical feedback control systems
ECE 422 - Discrete time feedback control systems
ECE 445 - Computer Architecture.
ECE 286 - Circuits II

Courses Taught at University of Kentucky

EE 480 - Junior level digital logic design
EE 583 - Senior/Graduate level microprocessors

UNIVERSITY SERVICE ACTIVITIES

- Former Member of CAS council
- Former Member of CAS governance sub committee
- Faculty advisor to the student branch of the IEEE

- Faculty advisor to the student branch of the Florida Engineering Society (FES)
- Former chair of the ECE curriculum committee – current member
- Former member of several faculty search committees
- Member of the ECE Fort Walton Beach expansion committee
- Faculty advisor to, and instructor of the UWF Brazilian Jiu-Jitsu sports club
- Member of two ABET accreditation preparation committees
- Chair of Fall 2004/Spring 2005 ECE faculty search committee
- Member of ECE department outcome assessment and retention committee
- Chair of ECE department student employment, Co-op and Alumni relations committee

AWARDS AND MISCELLANEOUS

- UWF Electrical and Computer Engineering Department Professor of the Year award, December 2003
- UWF Electrical and Computer Engineering Department Professor of the Year award, December 2001
- U.S. Patent no. 5502450 single antenna direction finding system., March 1996.
- Received The E-Systems annual award for individual technical excellence, June, 1992.
- Licensed Professional Engineer in Kentucky.
- University of Kentucky Graduate Fellowships 1986, 1988.
- Recognized by Kentucky society of professional engineers for being one of three individuals (out of 12,000) to achieve a perfect score on the national professional electrical engineering exam in 1988.
- Eastman Kodak scholarship for most outstanding EE student, 1981.

DOD CLEARANCE: TS/SI/TK

MARIAN K. KAZIMIERCZUK

Professor of Electrical Engineering
Wright State University
Dayton, OH 45435

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mkazim@cs.wright.edu

RESEARCH INTERESTS

Power Electronics, Switching-Mode PWM and Resonant DC/DC Power Converters, DC/AC Inverters, Resonant Rectifiers, RF Tuned Power Transistor Amplifiers and Oscillators, Power Management, Magnetic Devices, Semi-conductor Device Modeling, Power Integrated Circuits, Electronic Ballasts, Lighting Systems, Modeling and Controls of Power Converters, Sensors, Electronic Circuits, Integrated Circuits, Energy Harvesting/Scavenging, Renewable Energy, CAD, and Engineering Education.

EDUCATION

1966-1971 Department of Electronics, Technical University of Warsaw, Warsaw, Poland.
1972-1973 Post Graduate Study in Engineering Education, Technical University of Warsaw, Warsaw, Poland.

DEGREES

1971 **M.S.**
Thesis: "Gunn's diode oscillator for X-band with varactor tuning"
Advisors: Professor Adam Smolinski and co-adviser Professor Janusz Dobrowolski
Department of Electronics, Technical University of Warsaw, Warsaw, Poland

1978 **Ph.D.**
Dissertation: "High-efficiency tuned power transistor amplifier"
Advisor: Professor Jan Ebert
Department of Electronics, Technical University of Warsaw, Warsaw, Poland

1984 **D. Sci.**
Dissertation: "High-efficiency tuned power amplifiers, frequency multipliers, and oscillators," Warsaw Technical University Publisher, pp. 1-143, Warsaw 1984
Department of Electronics, Technical University of Warsaw, Warsaw, Poland

PROFESSIONAL ACADEMIC EXPERIENCE

1972-1978 Instructor, Department of Electronics, Technical University of Warsaw, Warsaw, Poland

1978-1984 Assistant Professor, Department of Electronics, Technical University of Warsaw, Warsaw, Poland

Courses taught
- High-Frequency High-Power Techniques
- Radio Transmitters
- Electromagnetic Field Theory
- Microwave Theory and Technique
- Electronic Measurements
- Fundamentals of Electronics
- Circuit Theory
- Electronic Circuits and Systems
- Radio Transmitters Laboratory
- Radio Receivers Laboratory
- Electronics Laboratory

Radio Electronics Laboratory, Chair, 1978-1984
Electronic Apparatus Laboratory, Chair, 1978-1984.

1984-1985 Visiting Professor, Department of Electrical Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061

Courses taught		
	EE3101	Electromagnetic Fields
	EE3201	Electronics I
	EE3202	Electronics II
	EE4201	Electronic Circuits and Systems I

1985-1990 Assistant Professor, Department of Electrical Engineering, Wright State University, Dayton, OH 45435
1990-1994 Associate Professor, Department of Electrical Engineering, Wright State University, Dayton, OH 45435
1994-pres Professor, Department of Electrical Engineering, Wright State University, Dayton, OH 45435

Courses taught		
	EE 331/531	Electronic Devices
	EE 431/631	Electronic Circuits
	EE 434/634	Electronic Circuits Laboratory
	EE 444/644	Linear Integrated Circuits
	EE 449/649	Pulse and Digital Circuits
	EE 499/699	Special Problems in Engineering
	EE 499	Design Industrial Clinics
	EE 741	Power Semiconductor Devices
	EE 742	Power Electronics II
	EE 743	Power Electronics III
	EE 744	RF Power Amplifiers
	EE 890	Independent Studies
	EE 899	Ph. D. Dissertation
	EGR 891	Ph.D. Seminar

ADVISING

17 Ph.D. students
81 M.S. students
6 post-doctoral positions
3 sabbatical positions

PROFESSIONAL NON-ACADEMIC EXPERIENCE

1984 Design Automation, Inc., 809 Massachusetts Avenue, Lexington, MA 02173, (617) 862-8998
Project Engineer responsible for designing high-efficiency switching-mode dc/dc converters
1991 Wright-Patterson AFB, Wright Laboratory, Dayton, OH, Summer Faculty Fellowship
1995 Wright-Patterson AFB, Wright Laboratory, Dayton, OH, Summer Faculty Fellowship
1996 Wright-Patterson AFB, Wright Laboratory, Dayton, OH, Summer Faculty Fellowship

PROFESSIONAL MEMBERSHIPS

IEEE, Fellow	2005-present
IEEE, Senior Member	1991-2004
Power Electronics Society	1991-present
Circuit and Systems Society	1991-present
Industrial Electronics Society	1991-present
Aerospace and Electronic Systems Society	1991-present
Industry Applications Society	1991-present
Tau Beta Pi	1992-present
Electrical Manufacturing and Coil Winding Association	1991-present
EMCWA, Board of Directors	1991-present
American Society for Engineering Education	2007-present

AWARDS

1977 President of the Technical University of Warsaw
1978 President of the Technical University of Warsaw
1979 President of the Technical University of Warsaw
1980 President of the Technical University of Warsaw

1981 Minister of Science, University Education, and Technology
1982 Minister of Science, University Education, and Technology
1983 Polish Academy of Sciences
1984 President of the Technical University of Warsaw
1985 Minister of Science, University Education, and Technology
1990 Harrel V. Noble Award, IEEE Dayton Section
1991 Excellence in Research Award, College of Engineering and Computer Science, Wright State University
1991 Presidential Award for Faculty Excellence in Research, Wright State University
1993 Excellence in Teaching Award, College of Engineering and Computer Science, Wright State University
1993 Nominated for the Presidential Teaching Excellence Award, Wright State University
1994 Nominated for the Presidential Teaching Excellence Award, Wright State University
1994 Electrical Manufacturing and Coil Winding for outstanding contribution
1995 Award for Outstanding Professional Achievement, the Affiliate Societies Council of the Engineering and Science Foundation of Dayton
1995 Outstanding Faculty Member, College of Engineering and Computer Science, Wright State University
1995 Presidential Award, Outstanding Faculty Member, Wright State University
1996-2000 Brage Golding Distinguished Professor of Research Award, Wright State University
1997 Excellence in Professional Service Award, College of Engineering and Computer Science, Wright State University
1997 Nominated for the Presidential Professional Service Award, Wright State University
2000 Excellence in Teaching Award, College of Engineering and Computer Science, Wright State University
2000 Nominated for the Presidential Teaching Award, Wright State University
2002 Excellence in Professional Service Award, College of Engineering and Computer Science, Wright State University
2002 Nominated for the Presidential Professional Service Award, Wright State University
2003 Excellence in Research Award, College of Engineering and Computer Science, Wright State University
2004 Board of Trustees' Award for Faculty Excellence, Wright State University (This is the highest award given by Wright State University. ``It is intended to honor those who serve as the most outstanding of role models for all faculties.")
2005 Finalist for the Excellence in Teaching Award, College of Engineering and Computer Science, Wright State University
2006 Nominated for Robert J. Kegerreis Distinguished Professor of Teaching by CECS
2007 Nominated for Robert J. Kegerreis Distinguished Professor of Teaching by CECS
2007 Finalist for the Excellence in Teaching Award, College of Engineering and Computer Science, Wright State University
2008 Nominated for Robert J. Kegerreis Distinguished Professor of Teaching by CECS
2008 Outstanding Teacher Award from the American Society for Engineering Education, North-Central Section.
2008 Excellence in Teaching Award, College of Engineering and Computer Science, Wright State University.
2008 Nominated for the 2009 Kyoto Prize in Advanced Technology.
2009 National Professor of Technical Sciences of Poland conferred by the President of the Republic of Poland.
2009 Nominated for Robert J. Kegerreis Distinguished Professor of Teaching by CECS.
2009-2013 Robert J. Kegerreis Distinguished Professor of Teaching, Wright State University.
2010 Award from the Senate of the State of Ohio.
2010 Southwestern Ohio Council for Higher Education (SOCHE) Teaching Award.
2010 Green County Achievement Award
2011 Ohio Magazine Excellence in Education Honoree, May 2011.
2014-2018 Frederick A. White Distinguished Professor of Professional Service, Wright State University

PUBLICATIONS

Books

1. M. K. Kazimierczuk and D. Czarkowski, *Resonant Power Converters*, John Wiley & Sons, New York, NY, pp. 1-481, 1995, ISBN 0-471-04706-6 (The monograph/textbook is intended for graduate courses and practicing engineers); M. K. Kazimierczuk and D. Czarkowski, *Resonant Power Converters*, IEEE Press and John Wiley & Sons , New York, NY 2nd Edition, 2011, pp. 1-595, ISBN 978-0-470-90538-8.

2. M. K. Kazimierczuk and D. Czarkowski, *Solutions for Resonant Power Converters*, John Wiley & Sons, New York, NY, pp. 1-80, 1995, ISBN 0-471-12849-X, ISBN-978-0-471-12849-6.

3. A. Aminian and M. K. Kazimierczuk, *Electronic Devices: A Design Approach*, Prentice Hall, Upper Saddle River, NJ, pp. 1-810, 2004, ISBN-10: 0-13-013560-7 and ISBN-13: 978-0130135605 (The text book is intended for undergraduate courses, 3 quarters or 2 semesters).

4. M. K. Kazimierczuk and A. Aminian, *Laboratory Manual to Accompany Electronic Devices*: *A Design Approach*, Prentice Hall, Upper Saddle River, NJ, pp. 1-149, 2004, ISBN 0-13086203-7 (The book is intended for undergraduate courses).

5. M. K. Kazimierczuk and A. Aminian, *Instructor's Solutions Manual to Accompany Electronic Devices*: *A Design Approach*, Prentice Hall, Upper Saddle River, NJ, pp. 1-543, 2004. ISBN 0-13-049984-6.

6. M. K. Kazimierczuk, *Pulse-Width Modulated DC-DC Power Converters*, John Wiley & Sons, New York, NY, 2008, pp. 1-782, ISBN-10: 0-470-77301-4, ISBN-13: 978-0-470-77301-7; 2nd Ed., 2015, in press. (The monograph/textbook is intended for graduate students, researchers, and practicing engineers).

7. M. K. Kazimierczuk, *Solutions Manual for Pulse-Width Modulated DC-DC Power Converters*, John Wiley & Sons, New York, NY, 2008, ISBN-978-0-470-74101-6.

8. M. K. Kazimierczuk, *RF Power Amplifiers*, John Wiley & Sons, New York, NY, 2008, pp. 1-405, ISBN 978-0-470-77946-0; 2-nd Ed. 2015, pp. 1-658. (The monograph/textbook is intended for graduate students, researchers, and practicing engineers). Best Seller. In Chinese, IEEE Press/John Wiley & Sons, Beijing, China, 2015.

9. M. K. Kazimierczuk, *Solutions Manual for RF Power Amplifiers*, John Wiley & Sons, New York, NY, 2008, ISBN 978-0-4-70-72134-6.

10. M. K. Kazimierczuk, *High-Frequency Magnetic Components*, John Wiley & Sons, New York, NY, 2009, pp.1-486, ISBN-978-0-470-71453-9, 2-nd Ed, 2014., pp. 1-729, ISBN-978-1-118-71779-0. (The monograph/textbook is intended for graduate students, researchers, and practicing engineers). In Chinese, IEEE Press/John Wiley & Sons, Beijing, China, 2012.

11. M. K. Kazimierczuk, *Solutions Manual for High-Frequency Magnetic Components,* John Wiley & Sons, New York, NY, 2009. ISBN: 978-0-470-72133-9.

12. M. K. Kazimierczuk, *Laboratory Manual for Electronic Circuits*, Prentice Hall, 2011. ISBN-10-1-256068438-3 and ISBN-13-978-1-256068438-3, 2011.

13. M. K. Kazimierczuk and A. Ayachit, *Laboratory Manual for Pulse-Width Modulated DC-DC Power Converters*, John Wiley & Sons, Chichester, UK, 2015.

Peer-Reviewed Archival Journal Articles

1. M. K. Kazimierczuk and J. M. Modzelewski, "Drive-transformer-less Class-D voltage switching tuned power amplifier," *Proceedings of the IEEE*, vol. 68, no. 6, pp. 740-741, June 1980.
2. M. K. Kazimierczuk, "Class E tuned power amplifier with shunt inductor," *IEEE Journal of Solid-State Circuits,* vol. SC-16, no. 2, pp. 2-7, February 1981.
3. J. Ebert and M. K. Kazimierczuk, "Class E high-efficiency tuned power oscillator," *IEEE Journal of Solid-State Circuits*, vol. SC-16, no. 2, pp. 62-66, April 1981.
4. M. K. Kazimierczuk, "A new approach to the design of tuned power oscillators," *IEEE Transactions on Circuits and Systems,* vol. CAS-29, no. 4, pp. 261-267, April 1982.
5. J. Ebert and M. K. Kazimierczuk, "High-efficiency RF power transistor amplifier," *Bull. Polon. Sci., Ser. Sci. Tech.*, vol. 25, no. 2, pp. 135-138, 1977.
6. J. Ebert and M. K. Kazimierczuk, "Applying the Class E concept to the RF power generator," *Bull. Acad. Polon. Sci., Ser. Sci. Tech.*, vol. 29, no. 1-2, pp. 79-87, 1981.

7. M. K. Kazimierczuk, "Effects of the collector current fall time on the Class E tuned power amplifier," *IEEE Journal of Solid-State Circuits*, vol. SC-18, no. 2, pp. 181-193, April 1983.

8. M. K. Kazimierczuk, "Exact analysis of Class E tuned power amplifier with only one inductor and one capacitor in load network," *IEEE Journal of Solid-State Circuits*, vol. SC-18, no. 2, pp. 214-221, April 1983.

9. M. K. Kazimierczuk, "Parallel operation of power transistors in switching amplifiers," *Proceedings of the IEEE*, vol. 71, no. 12, pp. 1456-1457, December 1983.

10. M. K. Kazimierczuk, "Charge-control analysis of Class E tuned power amplifier with only one inductor and one capacitor in load network," *IEEE Transactions on Electronic Devices*, vol. ED-31, no. 3, pp. 366-373, March 1984.

11. M. K. Kazimierczuk, "Accurate measurements of lifetime of excess base stored charge at high collector currents," *IEEE Transactions on Electronic Devices*, vol. ED-31, no. 3, pp. 374-378, March 1984.

12. M. K. Kazimierczuk, "Collector amplitude modulation of Class E tuned power amplifier," *IEEE Transactions on Circuits and Systems*, vol. CAS-31, no. 6, pp. 543-549, June 1984.

13. M. K. Kazimierczuk and N. O. Sokal, "Cause of instability of power amplifier with parallel-connected power transistors," *IEEE Journal of Solid-State Circuits*, vol. SC-19, no. 4, pp. 541-542, August 1984.

14. M. K. Kazimierczuk, "Class E tuned power amplifier with non-sinusoidal output voltage," *IEEE Journal of Solid State Circuits,* Vol. SC-21, pp. 575-581, August 1986.

15. M. K. Kazimierczuk, "Generalization of conditions for 100-percent efficiency and nonzero output power in power amplifiers and frequency multipliers," *IEEE Transactions on Circuits and Systems*, vol. CAS-33, no. 8, pp. 805-807, August 1986.

16. M. K. Kazimierczuk and K. Puczko, "Exact analysis of Class E tuned power amplifier at any *Q* and switch duty cycle," *IEEE Transactions on Circuits and Systems*, vol. CAS-34, no. 2, pp. 149-159, February 1987.

17. M. K. Kazimierczuk, "High-speed driver for switching power MOSFETs," *IEEE Transactions on Circuits and Systems*, vol. CAS-35, no. 2, pp. 254-256, February 1988.

18. M. K. Kazimierczuk, "Design-oriented analysis of boost zero-voltage-switching resonant dc/dc converter," *IEEE Transactions on Power Electronics*, vol. PE-3, no. 2, pp. 126-136, April 1988.

19. M. K. Kazimierczuk, "Steady-state analysis of a buck zero-current-switching resonant dc/dc converter," *IEEE Transactions on Power Electronics*, vol. PE-3, no. 3, pp. 286-296, July 1988.

20. M. K. Kazimierczuk, "A network theorem dual to Miller's theorem," *IEEE Transactions on Education*, vol. E-31, pp. 265-269, no. 6, November 1988.

21. M. K. Kazimierczuk and X. T. Bui, "Class E dc/dc converters with an inductive impedance inverter," *IEEE Transactions on Power Electronics*, vol. PE-4, no. 1, pp. 124-135, January 1989.

22. J. Jozwik and M. K. Kazimierczuk, "Dual Sepic PWM switching-mode dc/dc power converter," *IEEE Transactions on Industrial Electronics*, vol. IE-36, no. 2, pp. 64-70, February 1989.

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2010

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170. R. C. Fitch, Jr., M. K. Kazimierczuk, J. K. Gillespe, A. G. Mattamana, P. L. Prlando, K. S. Groves, and T. K. Quach, “Hybrid integration of microwave circuit solenoid inductors and ALGaN/GaN HEMTs using an Su-8 photosensitive epoxy interposer layer,” 218th Electrochemical Society’s 2010 Meeting, State-of-the-Art Program on Compound Semiconductors 52 (SOTAPOCS 52), Las Vegas, NV, October 10-15, 2010.

171. T. Poomalee, K. Jirasereeamornkul and M. K. Kazimierczuk, “Vacuum tube amplifiers using electronic dc transformer,” Audio Engineering Society 129th Convention, San Francisco, CA, November 4-7, 2010.

172. M. K. Kazimierczuk and H. Sekiya, “Core geometry coefficient for resonant inductors,” Proceedings of Electrical Manufacturing and Coil Winding Conference, Dallas, TX, October 18-20, 2010.

173. V. P. Galigerkere and M. K. Kazimierczuk, “Dynamic response of PWM Z-source inverter and PWM Z-source converter,” Proceedings of Electrical Manufacturing and Coil Winding Conference, Dallas, TX, October 18-20, 2010.

174. N. Kondrath, A. Kondrath, and M. K. Kazimierczuk, “Bandwidth of transformers,” Proceedings of Electrical Manufacturing and Coil Winding Conference, Dallas, TX, October 18-20, 2010.

175. R. Wojda and M. K. Kazimierczuk, “Comparison of winding resistance with litz wire and solid wire,” Proceedings of Electrical Manufacturing and Coil Winding Conference, Dallas, TX, October 18-20, 2010.

2011

176. V. P. Galigerkere and M. K. Kazimierczuk, “Small-signal modeling of PWM Z-source converter by circuit-averaging technique,” IEEE International Symposium on Circuits and Systems, Rio de Janeiro, Brazil, May 15-18, 2011, pp. 1600-1603.

177. M. K. Kazimierczuk and R. Wojda, “Design of Class F_3 RF power amplifier,” IEEE International Symposium on Circuits and Systems, Rio de Janeiro, Brazil, May 15-18, 2011, pp. 2785-2788.

178. T. Nagashima. X. Wei, H. Sakiya, and M. K. Kazimierczuk, “Power conversion efficiency of Class-E amplifier outside nominal operations,” IEEE International Symposium on Circuits and Systems, Rio de Janeiro, Brazil, May 15-18, 2011, pp. 749-752.

179. D. Murthy-Bellur and M. K. Kazimierczuk, “Active-clamp ZVS two-switch flyback converter,” IEEE International Symposium on Circuits and Systems, Rio de Janeiro, Brazil, May 15-18, 2011, pp. 241-244.

180. A. Ayachit, V. P. Galigerkere, and M. K. Kazimierczuk, ``Power electronics circuitry in LED modules: An overview,” Proceedings of Electrical Manufacturing and Coil Winding Conference, Nashville, TN, September 19-21, 2011.

181. R. Wojda and M. K. Kazimierczuk, ``Proximity winding loss in solid-round conductors,” Proceedings of Electrical Manufacturing and Coil Winding Conference, Nashville, TN, September 19-21, 2011.

182. D. Murthy-Bellur and M. K. Kazimierczuk, ``Design of loosely coupled wireless power transfer systems,” Proceedings of Electrical Manufacturing and Coil Winding Conference, Nashville, TN, September 19-21, 2011.

183. H. Sakiya, N. Sagawa, Y. Li, and M. K. Kazimierczuk, ``Design of Class-DE power amplifier including optimal resonant inductor design," Proceedings of Electrical Manufacturing and Coil Winding Conference, Nashville, TN, September 19-21, 2011.

184. R. M. Kotecha and M. K. Kazimierczuk, ``Audio-susceptibility of PWM dc-dc boost converter," Proceedings of Electrical Manufacturing and Coil Winding Conference, Nashville, TN, September 19-21, 2011.

185. T. Suetsugu and M. K. Kazimierczuk, "Diode peak voltage clamping of Class E amplifier," 37th Annual Conference of the *IEEE Industrial Electronics Society (IECON)*, Melbourne, Australia, November 7-10, 2011.

2012

186. M. Kavimandan and M. K. Kazimierczuk, ``Calculation of Inductance internal dimensions based on modified Grover's equation for desired inductance," Proceedings of Electrical Manufacturing and Coil Winding Conference, Milwaukee, WI, May 7-10, 2012.

187. M. Kavimandan and M. K. Kazimierczuk, ``Matlab base educational GUI calculators for spiral of Inductors," Proceedings of Electrical Manufacturing and Coil Winding Conference, Milwaukee, WI, May 7-10, 2012.

188. R. Wojda and M. K. Kazimierczuk, ``Optimization of foil windings for multi-harmonic currents," Proceedings of Electrical Manufacturing and Coil Winding Conference, Milwaukee, WI, May 7-10, 2012.

189. R. Wojda and M. K. Kazimierczuk, ``Optimization of solid-round windings for multi-harmonic currents," Proceedings of Electrical Manufacturing and Coil Winding Conference, Milwaukee, WI, May 7-10, 2012-2016.

190. A. Ayachit, D. Murthy-Bellur, and M. K. Kazimierczuk, ``Steady-state analysis of series resonant converter using extended describing function method," Proceedings of the 55th IEEE Midwest Symposium on Circuits and Systems, Boise, Idaho, August 5-8, 2012, pp. 1160-1164.

191. D. Murthy-Bellur, A. Bauer, W. Kerin, and M. K. Kazimierczuk, ``Inverter using loosely coupled inductors for wireless power transfer," Proceedings of the 55th IEEE Midwest Symposium on Circuits and Systems, Boise, Idaho, August 5-8, 2012, 1164-1167.

192. N. Kondrath and M. K. Kazimierczuk, "Audio-susceptibility of the inner-loop of peak current-mode controlled PWM dc-dc buck converter in CCM," Proc. 38th Annual Conference of the IEEE Industrial Electronics Society (IECON 2012), Montreal, Canada, October 25-28, 2012, pp. 249-254.

2013

193. R. Thippayanet, C. Ekkaravarodome. K. Jirassereeamornkul, K. Chamnogthai, M. K. Kazimierczuk, and K. Higuchi, ``Push-pull zero-voltage switching resonant dc-dc converter based on half bridge Class-DE rectifier," IEEE International Conference on Power Electronics and Drive Systems (PEDS'13), Kitakyushu, Japan, 22-25 April 2013.

194. T. R. Salvatierra and M. K. Kazimierczuk, ``Inductor design for PWM buck converter operated as dynamic supply or amplitude modulator for RF transmitters," IEEE Midwest Symposium on Circuits and Systems, Columbus, OH, August 3-7, 2013, pp. 37-40.

195. A. Ayachit and M. K. Kazimierczuk, ``Steady-state analysis of PWM quadratic buck converter in CCM," IEEE 56th Midwest Symposium on Circuits and Systems, Columbus, OH, August 3-7, 2013, pp. 493-496.

196. A. Ayachit and M. K. Kazimierczuk, ``Two-phase buck converter as a dynamic power supply for RF power amplifier applications," IEEE 56th Midwest Symposium on Circuits and Systems, Columbus, OH, August 3-7, 2013, pp. 493-496.

197. N. Kondrath and M. K. Kazimierczuk, ``Slope compensation and relative stability for peak current-mode controlled PWM dc-dc converters in CCM," IEEE 56th Midwest Symposium on Circuits and Systems, Columbus, OH, August 3-7, 2013, pp. 477-480.

198. N. Kondrath and M. K. Kazimierczuk, "Control-to-output transfer function including feed-forward gains of peak current-mode controlled PWM dc-dc converters in CCM," Proc. 39th Annual Conference of the IEEE Industrial Electronics Society Conference (IECON' 2013), Vienna, Austria, November 10-13, 2013, pp. 576-581.

2014

199. T. Nagashima, K. Inoue, X. Wei, E. Bou, E. Alarcon, M. K. Kazimierczuk, and H. Sekiya, ``Analytical design procedure for resonant inductively coupled wireless power transfer with Class-E^2 dc-dc converter," IEEE International Symposium on Circuits and Systems (ISCAS'2014), Melbourne, Australia, June 1-5, 2014, pp. 114-116.

200. M. Bojarski, D. Czarkowski, F. de Leon, Q. Deng, M. K. Kazimierczuk, and H. Sekiya, ``Multiphase resonant inverter with common resonant circuit," IEEE International Symposium on Circuits and Systems (ISCAS'2014), Melbourne, Australia, June 1-5, 2014, pp. 2443-2448.

201. A. Ayachit and M. K. Kazimierczuk, ``Open-loop small-signal transfer functions of the quadratic buck PWM dc-dc converter in CCM." IEEE International Symposium on Industrial Electronics (IECON'2014), Dallas, TX, October 29 – November 2014.

202. N. Kondrath and M. K. Kazimierczuk, ``Output Impedance of peak current-mode controlled PWM dc-dc converters with only inner loop closed in CCM," IEEE International Symposium on Industrial Electronics (IECON'2014), Dallas, TX, October 29 – November 2014.

203. A. Reatti and M. K. Kazimierczuk, ``DCM operated PWM dc-dc converter modeling including the effects of parasitic components on duty-ratio constraint," IEEE International Symposium on Circuits and Systems (ISCAS'2014), Melbourne, Australia, June 1-5, 2014.

204. A. Reatti and M. K. Kazimierczuk, ``Safety and monitoring system for a solar photovoltaic and thermal concentrator plant," IEEE International Symposium on Circuits and Systems (ISCAS'2014), Melbourne, Australia, June 1-5, 2014.

205. A. Reatti, L Ciani, and M. K. Kazimierczuk, ``Monitoring systems for a solar photovoltaic and thermal concentrator plant," 20th IMECO TC-4, Benevento, Italy, September 15-17, 1014, pp. 1012-1017.

2015

206. A. Ayachit and M. K. Kazimierczuk, "Small-signal model of the boost PWM dc-dc converter at boundary-conduction mode using circuit averaging technique," IEEE International Symposium on Circuits and Systems (ISCAS'2015), Portugal, June 2015.

207. A. Reatti and M. K. Kazimierczuk, ``Linear solar PV/T concentrator monitoring system based on performance index derivation," 2015 IEEE Instrumentation and Measurement Technology Conference, Pisa, Italy, May 11-14, 2015.

208. A. Ayachit, D. K. Saini, and M. K. Kazimierczuk, "Three-coil wireless power transfer system using Class E^2 resonant dc-dc converter," IEEE Energy Conversion Congress and Exposition (ECCE'2015), Montreal, Canada, September 2015 .

Citations

1. ISI Thomson-Reuters Science Citation Index, Web of Science, Web of Knowledge: 2602 citations of journal papers. The average citation of journal papers per paper = 16.08 and h-index = 31.
2. Google Scholar: 7515 citations, h-index = 44, i10-index = 152. Since 2009, 4478 citations, h-index = 33, i10-index = 106.
3. Microsoft Academic Ranking: 2360 citations, G-index = 36, h-index = 25.
4. Top Authors in Engineering, 229-th position in the world, 154-th in USA, 2-nd in Ohio.
5. Top Authors in Electrical & Electronic Engineering, 75-th position in the world, 52-nd in USA, 2-nd in Ohio.

Productivity

Approximately 4.5 articles in top international archival referred journals per year, 5 international conference papers per year, and 1 book per 2 years for the last 24 years. Grants and contracts include NSF, National Academy of Science, DOE, DOD, DARPA, and industry.

Journal Articles (In Polish)

1. J. Ebert and M. K. Kazimierczuk, "New method of improving efficiency of RF power amplifier," Tech. Report of Inst. of Radio-electronics, Technical University of Warsaw, no. 31, pp. 1-19, 1977.
2. J. Ebert and M. K. Kazimierczuk, "New method of improving efficiency of high frequency power amplifier," Prz. Telekom., vol. 40, no. 6, pp. 165-168, 1977.
3. M. K. Kazimierczuk, "Theory of Class E high-frequency power amplifier," Rozpr. Elektrot., vol. 25, no. 4, pp. 1957-1986, 1979.
4. M. K. Kazimierczuk, "Theoretical analysis of Class E amplifier at arbitrary switch duty ratio," Rozpr. Elektrot., vol. 25, no. 4, pp. 987-1003, 1979.

5. M. K. Kazimierczuk, "Theory of Class E high-frequency power amplifier with series inductor," Arch. Elektrot., vol. 29, no. 1, pp. 207-228, 1980.
6. M. K. Kazimierczuk, "Analysis of Class E amplifier with series inductor under optimum operating conditions," Rozpr. Elektrot., vol. 26, no. 3, pp. 707-721, 1980.
7. M. K. Kazimierczuk, "Collector power loss and collector efficiency of Class E amplifier with shunt capacitor," Elektronika, vol. 21, no. 5, pp. 24-30, 1980.
8. M. K. Kazimierczuk, "Theory of Class E high-frequency power amplifier with series capacitor," Arch. Elektrot., vol. 29, no. 2, pp. 487-490, 1980.
9. M. K. Kazimierczuk, "Theoretical analysis of Class E amplifier with series capacitor at arbitrary switch-duty ratio," Arch. Elektrot., vol. 29, no. 3, pp. 709-723, 1980.
10. M. K. Kazimierczuk, "Analysis of the Class E tuned power amplifier with series inductor," Tech. Report, Inst. of Radio-electronics, Technical University of Warsaw, no. 57, pp. 1-21, 1980.
11. J. Ebert and M. K. Kazimierczuk, "Concept of Class E tuned power oscillator," Tech. Report, Inst. of Radio-electronics, Tech. Univ. of Warsaw, no. 54, pp. 1-15, 1980.
12. M. K. Kazimierczuk, "Experimental verification of evaluation method for power loss and collector efficiency of Class E amplifier with shunt capacitor," Elektronika, vol. 22, no. 4, pp. 30-35, 1981.
13. M. K. Kazimierczuk, "Class E high-power high-frequency amplifier," Prz. Telekom., vol. 44, no. 2, pp. 35-43, 1981.
14. M. K. Kazimierczuk, "Analysis, design, and experimental results for Class E amplifier," Rozpr. Elektrot., vol., 27, no. 3, pp. 495-521, 1981.
15. M. K. Kazimierczuk, "Analysis of Class E amplifier with series inductor at arbitrary switch-duty ratio," Arch. Elektrot., vol. 30, no. 2, pp. 493-504, 1981.

Conference Papers (In Polish)

1. M. K. Kazimierczuk, "Class E high-frequency power amplifier with series inductor," III Kraj. Konf. Teoria Obwodow i Uklady Elektroniczne, Stawiska K. Gdanska, 24-27.10.1979, Teksty Referatow, ITE PG, IPE PW, SUE KEiT PAN, pp. 493-497.
2. M. K. Kazimierczuk, "Class E amplifier analysis method," VIII Symp. Metody Matematyczne w Elektrotechnice, Pokrzywna k. Glucholazow, 21-26.05.1979, Inst. Elektrot., WSI w Opolu, PTETiS, Zesz. Nauk. WSI w Opolu nr. 63, Elektryka, z. 10, cz. III, Uklady Elektryczne, pp. 119-129, 1980.
3. M. K. Kazimierczuk, "Design method of high-frequency power oscillators," IX Symp. Metody Matematyczne w Elektrotechnice, Pokrzywna k. Glucholazow, 26-31.05.1980, Inst. Elektrot., WSI w Opolu PTETiS, Zesz. Nauk. WSI w Opolu, no. 73, Elektryka, z. 16, cz.III, Uklady Elektryczne, pp. 83-96, 1981.
4. M. K. Kazimierczuk, "Method of analysis of Class E amplifier with series capacitor," IX Symp. Metody Matematyczne w Elektrotechnice, Pokrzywna k. Glucholazow, 26-31.05. 1980, Inst. Elektrot., WSI w Opolu, PTETiS, Zesz. Nauk. WSI w Opolu, no. 73, Elektryka, z. 16, cz. III, Uklady Elektryczne, pp. 69-82, 1981.
5. M. K. Kazimierczuk, "Method of analysis of Class E amplifier with shunt inductor," Prace X Symp. Metody Matematyczne w Elektrotechnice, Karpacz, 23-30.05.1981, PTETiS, Wydz. Elektryczny i Wydz. Elektroniki PW, pp. 493-504.
6. M. K. Kazimierczuk, J. Krakowski, and R. Rozycki, "Identification of the inverse current amplification for bipolar transistors," IV Kraj. Konf. Teoria Obwodow i Uklady Elektroniczne, Drzonkow k. Zielonej Gory, 28-30.10.1981, Teksty Referatow, IE WSI w Zielonej Gorze, IPE PW, SUE KEiT PAN, pp. 311-316.
7. M. K. Kazimierczuk and J. M. Modzelewski, "Measurements of switching power losses in high-frequency power transistor amplifiers," Zesz. Nauk. III Symp. Kierunki Rozwoju Metrologii Elektrycznej, Wilga, 14-15.05.1981, IETiME PW, SE KE PAN, pp. 66-71.
8. M. K. Kazimierczuk, "Class E amplifier with nonsinusoidal output voltage," V Kraj. Konf. Teoria Obwodow i Ukladow Elektronicznych, Sulejow-Podklasztorze, 24-26.11.1982, Teksty Referatow, IE PL, IPE, SUE KEiT PAN, PS IEEE, pp. 132-136.

9. M. K Kazimierczuk, "Charge analysis of saturated transistor with time-dependent collector current," VI Kraj. Konf. Teoria Obwodow i Uklady Elektroniczne, Kozubnik k. Porabki, 19-22.10.1983, Teksty Referatow, IE PSL, IPE PW, SUE KEiT PAN, PS IEEE, pp. 342-346.
10. M. K. Kazimierczuk and W. A. Tabisz. "Computer-aided analysis of the Class C-E tuned power amplifier," VIII Kraj. Konf. Teoria Obwodow i Uklady Elektroniczne, pp. 251-255, 1985, Teksty Referatow.

In Russian:

1. M. K. Kazimierczuk and J. Ebert, "Improvement of efficiency of power amplifiers," Izv. VUZ SSSR, Radioelektronika, vol. 20, no. 11, pp. 103-106, 1977.

PATENT INFRINGMENT EXPERTISE

Served as an expert witness and participated in many patent litigations and patent invalidations.

TECHNICAL REPORTS

1. M. K. Kazimierczuk, "A new type of electronic ballast for gas discharge lamps," Final Technical Report, Ohio Department of Development, Thomas Edison Program, June 30, 1990.
2. M. K. Kazimierczuk and N. Thirunarayan, "Characterization and application of power electronic devices," Final Technical Report of the Project for the U.S. Air Force, Southeastern Center for Electrical Engineering Education, January 1992.
3. M. K. Kazimierczuk and D. Q. Vuong, "High power density up/down power converter for the More Electric Aircraft", Final Technical Report of the Project for the U.S. Air Force, Southeastern Center for Electrical Engineering Education, February 1993.
4. M. K. Kazimierczuk, "Synthesis, analysis, and design of resonant dc/dc converters," Final Technical Report of the NSF Project, February 1994.
5. M. K. Kazimierczuk, "Female and minority undergraduate support program," Final Technical Report of the NSF Project, February 1994.
6. M. K. Kazimierczuk, "Research experience for undergraduate program, Final Technical Report of the NSF Project, February 1994.
7. M. K. Kazimierczuk and M. Vichare, "Characterization of silicon carbide power semiconductor devices for high-temperature operation," Final Technical Report for Universal Energy Systems, Inc., December 1996.
8. M. K. Kazimierczuk and V. R. Garuda, “Semiconductor devices for aircraft power system applications,” Final Technical Report for Universal Energy Systems, Inc., May 1998.
9. M. K. Kazimierczuk and D. Hanna, “Parameterized and distributed power regulator,” Final Report, August 2002.
10. M. K. Kazimierczuk, “Design of high-efficiency microwave power amplifiers with poly-harmonic operation,” NSF, Final Report, December 2002.
11. M. K. Kazimierczuk and K. S. Gudmundsson, “Evaluating phase-only filter algorithm performance on ARO IR image sequences using the quality metric scene evaluator,” US Army, Final Report, February 2004.
12. M. K. Kazimierczuk, ``Energy Conversion Science and Security of Large-Scale Systems, DOE, Final Report, June 2007.
13. M. K. Kazimierczuk, ``Power Line Urban Sentry (PLUS), Inductive Core and Recharging Research,” Defense Research Associates, 2009.

RESEARCH CONTRIBUTION

The objectives of my professional life have been the inquiry and advancement of knowledge and perform research for the benefit of humanity. I always wanted to be a good educator and researcher. My research has high practical relevance. It is transformative in nature. I have tried to achieve a sustained record of excellence and to make profound contribution to the field. A testimony to the quality of my research are peer reviewed archival journal papers, conference papers, and monographs at a high international level. My articles are published in the best peer-reviewed international journals and international conference proceedings, which are indexed in the leading databases of science and engineering, such as *Thomson-Reuters ISI Science Citation Index* and scholar.google.com. My monographs are published by top internationally recognized publishers, such as John Wiley & Sons, Prentice-Hall (Pearson), and IEEE Press. One of the main objectives of my research is to reduce the dependence of mankind on fossil fuel. The major contributions of my research are as follows:

1. Major and lasting contributions to the invention and development of electronic ballasts for fluorescent lamps. A multibillion dollar industry has been created. Electronics ballasts improve the quality of artificial light by *eliminating the flickering* and *producing healthy light*. They also improve the *power quality* by *reducing current harmonics* in utility power lines, *increasing power factor*, lowering electromagnetic pollution, and protecting environment. Electronic ballasts drive fluorescent lamps at high frequencies. Traditional incandescent bulbs convert only 5% of energy into artificial light and 90% of energy into heat. The efficiency of fluorescent lamps is over five times higher than that of incandescent lamps, thereby *saving a large amount of energy*. This invention was adopted quickly and rapidly diffused around the world. A new research discipline has been created. There are special issues on electronic ballasts in the top international archival journals and conference sessions. Fluorescent lamps driven by electronic ballasts have become the core of the worldwide lighting market. European Union has decided to replace all low-efficiency incandescent bulbs by fluorescent tubes with electronic ballasts. Electronic ballast are a significant component of ``green energy technology." The invention of electronic ballasts has a worldwide impact by improving of quality of life and saving energy. The U.S. Congress has set 2012 as the year in which the U.S. will phase out incandescent bulbs. Australia has chosen 2010 as its deadline to eliminate incandescent bulbs. European Union will eliminate all incandescent bulbs by 2012; 100 W bulbs by 2009, 75 W bulbs by 2010, 60 W by 2011, and 40 W and 25 W by 2011. The energy savings by replacing incandescent bulbs with fluorescent lamps is estimated to be $70 billion per year. It also reduces the emission of CO_2 by 15 mln tons a year. This has been an extraordinary and lasting contribution with a global impact for the greater good of humanity and the world. On September 20, 2010, General Electric made the last incandescent bulb.
2. Invention of the Class E RF zero-voltage switching power oscillator.
3. Invention of the Zeta (dual SEPIC) dc-dc converter widely used in industry.
4. Invention of feed-forward control of boost PWM dc-dc power converter (US Patent).
5. Invention of the Class E RF zero-current switching power amplifier.
6. Invention of the RF Class F power amplifier with quarter-wave transmission line.
7. Invention of high-frequency Class E rectifiers.
8. Derivation of small-signal circuit models of switching-mode PWM dc-dc power converters. These models are widely used for studying dynamic performance of dc-dc power converters and designing control circuits.
9. Derivation of a model for current-mode controlled PWM dc-dc converters. This model is useful in designing two-loop control circuits for PWM dc-dc power converters.
10. Contributions to analysis and design of PWM dc-dc converters (including a monograph and graduate textbook by John Wiley & Sons, 2008)
11. Development of high-efficiency high-frequency power amplifiers and RF transmitters, including Class E and Class D switching-mode power amplifiers (including a monograph and graduate textbook by John Wiley & Sons, 2008). Class E amplifier is the most efficient transmitter used in wireless communications.
12. Development of high-efficiency resonant dc-dc converters (including a monograph and graduate textbook by John Wiley & Sons, 1995).
13. Modeling and control of PWM dc-dc converters.
14. Analysis and design of high-frequency magnetic components.
15. Development of microwave microscope, used in testing superconductors and other materials, including biological tissues.
16. External research funding from the most competitive federal agencies, like NSF, National Academy of Science, and Department of Energy
17. Science Citation Index shows over 2000 citations and h-index = 28. Google Scholar shows 5589 citations, h-index=42, and i10-index = 126.

NEW COURSES DEVELOPED

EE 7410	Power Semiconductor Devices
EE 7420	Power Electronics
EE 7430	Power Electronics III
EE 8800	RF Power Amplifiers
EE 7440	Independent Studies
EE 8980	Ph.D. Dissertations
EGR891	Ph.D. Seminar
EE 3310	Electronic Devices
EE 332	Electronic Devices Laboratory
EE 431	Electronic Circuits
EE 432	Electronic Circuits Laboratory
EE 434	Electronics Laboratory
EE 4440	Linear Integrated Circuits (course and laboratory)
EE 449	Digital Electronics Laboratory
EE 499	Independent Studies

The objectives of his teaching activities have been to develop, advance, disseminate, and exploit knowledge. He as developed, has been maintaining, and updating a sequence of hardware laboratories in the area of electronics for undergraduate students of electrical engineering and computer engineering departments: EE332, EE432, EE434, EE444, and EE449. He has been responsible for all electronics courses and laboratories in the Department of Electrical Engineering for over 25 years. He has written an undergraduate text book: *Electronic Devices: A Design Approach, Prentice Hall, 2004* and a *Laboratory Manual to Accompany Electronic Devices: A Design Approach, Prentice Hall, 2004.*

He has developed a sequence of four graduate courses in the area of power electronics for graduate M.S and Ph.D. students: EE7410, EE 7420, EE7430, and EE7440.

1. EE7410 covers fundamental characteristics and simulation models of power devices, such as silicon (Si) and silicon-carbide (SiC) power MOSFETs, power junction and Schottky diodes, and IGBTs. In addition, power stages of PWM switching dc/dc converters are analyzed. A computer laboratory has been also developed.
2. EE7420 Power Electronics derives small-signal linear time-invariant models of power stages of PWM converters for continuous and discontinuous conduction modes. Using these models, transfer functions and step responses of power stages of PWM converters are derived. Voltage-mode control, current-mode control, and feed-forward strategies are discussed in detail. A computer laboratory has been also developed.
3. EE7430 High-Frequency Magnetic Components covers properties of magnetic materials, magnetic cores, complex permeability, core losses, eddy currents, skin effect, proximity effect, Dowell's equation. winding losses, losses caused by harmonics, self-capacitance, and design of power inductors and transformers.
4. EE7440 Power Electronics III covers RF resonant power amplifiers, high-frequency power dc/ac inverters, high-frequency rectifiers, and high-frequency magnetic devices. The theory is illustrated by design projects. For this course, he has written a graduate text book: *Resonant Power Converters, 1-st Ed., John Wiley & Sons,* 1995*, 2nd-Ed.,* 2011*.*

All the four courses are non-required and attract 60 to 105 graduate students every quarter or semester.
His teaching and research brings a healthy balance of scientific progress and spiritual depth.

LABORATORY DEVELOPMENT AND SUPERVISION

1. Developed and supervises student hardware laboratories for undergraduate courses EE332, EE432, EE444, and EE449.
2. Has written and published by Prentice-Hall a laboratory manual for these laboratories.
3. Developed and supervises software and hardware student laboratories for graduate courses EE7410, EE7420, EE7430, and EE7440.

COURSE DIRECTOR

EE331, EE332, EE431, EE432, EE401, EE444, EE449, EE741, EE742, EE743, EE880, EE4440, EE7410, EE7420, and EE7440.

BOOKS

1. Two undergraduate textbooks with solutions manuals in electronics area published by Prentice-Hall.
2. Three graduate books with solutions manuals in power electronics area published by John Wiley & Sons

GTAs

Four my Graduate Teaching Assistants won the College Excellence in Teaching Awards: Brad Bryant, Simon J. Tritschler, Weston R. Earick, and Dakshina Murthy. Thomas R. Salvatierra was a finalist in 2008.

INVITED SEMINARS

1. "Resonant dc/dc power converters," Department of Electrical Engineering, University of Toledo, Toledo, OH, November 11, 1991.
2. ``Modeling of switching-mode power converters," Guest speaker, Annual Meeting of Italian Researchers on Circuits and Systems, Caghiari, Italy, June 28, 1996.
3. "Relative stability of switching-mode power converters with current-mode control," Silesian University of Technology, Poland, December 2, 2009.
4. ``Engineering Education in the United States," Silesian University of Technology, Poland, December 3, 2009.

M.S. GRADUATE STUDENTS SUPERVISED AT WRIGHT STATE UNIVERSITY

1. Xung T. Bui	M.S.E.E.	1988
2. Jacek Jozwik	M.S.E.E.	1990
3. Shan Wang	M.S.E.E.	1991
4. Abdulkarim A. Abdulkarim	M.S.E.E.	1992
5. Nandakumar Thirunarayan	M.S.E.E.	1992
6. Dung Q. Vuong	M.S.E.E.	1992
7. Dariusz Czarkowski	M.S.E.E.	1993
8. Venkatramani Swaminathan	M.S.E.E.	1993
9. Nehru Sathappan	M.S.E.E.	1994
10. Manikantan K. Jutty	M.S.E.E.	1994
11. Peter T. Lamm	M.S.E.E.	1994
12. Robert C. Cravens II	M.S.E.E.	1994
13. Chuyun Wu	M.S.E.E.	1994
14. Richard E. Strawser	M.S.E.E.	1994
15. Kevin L. Thayer	M.S.E.E.	1994
16. Robert S. Geise	M.S.E.E.	1994
17. Sonny Nguyen	M.S.E.E.	1994
18. Ali Izadi	M.S.E.E.	1995
19. Makarand Vichare	M.S.E.E.	1996
20. ASM Nazirul Shaheen	M.S.E.E.	1997
21. Paul J. Baker	M.S.E.E.	1997
22. Carlos M. Cordoza	M.S.E.E.	1997
23. LaVern Starman	M.S.E.E.	1997
24. David C. Liptak	M.S.E.E.	1998
25. Venugopal Rao Garuda	M.S.E.E.	1998
26. Donald J. Kessler	M.S.E.E.	1998
27. Anders J. Edstrom	M.S.E.E.	1998
28. Masoud Pourali	M.S.E.E.	1999
29. David Hanna	M.S.E.E.	2000
30. Brad S. Bryant	M.S.E.E.	2000
31. Ronald L. McDonald	M.S.E.E.	2000

32. Skip Shattuck M.S.E.E. 2000
33. Kenroy Howard M.S.E.E. 2000
34. Jeffrey Allen Ross M.S.E.E. 2001
35. Anders P. Walker M.S.E.E. 2002
36. Erich J. Kring M.S.E.E. 2002
37. Mahbuba Rahman M.S.E.E. 2003
38. Simon Joe Tritschler M.S.E.E. 2003
39. Benjamin J. Gerten M.S.E.E. 2003
40. Bharath Tanneru M.S.E.E. 2004
41. Chris A. Evans M.S.E.E. 2004
42. Donald E. Peters M.S.E.E. 2004
43. Subash P. Ramakrishnan M.S.E.E. 2005
44. Melaka P. Senadeera M.S.E.E. 2005
45. Kim Ying Wong M.S.E.E. 2005
46. Emad M. Al-Tabakha M.S.E.E. 2005
47. Nisha Das M.S.E.E. 2005
48. Dakshina Murthy M.S.E.E. 2006
49. Weston R. Earick M.S.E.E. 2006
50. Derrick N. Langley M.S.E.E 2007
52. Julie J. Lee M.S.E.E. 2007
53. Veda Pakakash N. Galigekere M.S.E.E. 2007
54. Hamdi Abdelbagi M.S.E.E 2007
55. Thomas Lange M.S.E.E. 2008
56. Mandar D. Kavimanden M.S.E.E. 2008
57. Manish Dalal M.S.E.E. 2009
58. Gary Richard Doss M.S.E.E. 2009
59. Daniel J. Whitman M.S.E.E. 2010
60. Jeremy D. Gassmann M.S.E.E. 2010
61. Thomas R. Salvatierra M.S.E.E. 2010
62. Venkata Sai Aditya Kumar Choragudi M.S.E.E. 2011
63. Dhivya Ammanambakkan Nagarajan M.S.E.E. 2011
64. Ramchandran Mahendrabhai Kotecha M.S.E.E. 2011
65. Curt Zackiewicz M.S.E.E. 2011
66. Agasthya Ayachit M.S.E.E. 2011
67. Keshava Gopalakrishna M.S.E.E. 2013
68. Ramayya J. George M.S.E.E. 2014
69. Sourav Dey M.S.E.E. 2014
70. Shweta Chauhan M.S.E.E. 2014
71. Kevis Craig M.S.E.E. 2014
72. Nagasri Kollipara M.S.E.E. 2014
73. Aishwarya Raypati M.S.E.E. 2014
72. Dalvir K. Saini M.S.E.E. 2015
73. Lokesh Kathi M.S.E.E. 2015
74. Ankit Chadha M.S.E.E. 2015
75. Manohar Sambhangi M.S.E.E. 2015
76. Shalini Nagaraj M.S.E.E. 2015
77. Vivek Kumar H. M.S.E.E. 2015
78. Alex Compton M.S.E.E. 2015

Total 72 MS Students

Also, advised 36 M.S. students at the Department of Electronics, Warsaw University of Technology, Warsaw, Poland.

PH.D. STUDENTS

1. Karl S. Gudmundsson — 2004, Assoc. Prof., Dean, Keilir Institute of Technology, Island, karlsg@keilir.net, (354) 821-5664
2. Brad S. Bryant — 2004, Design engineer, Dayton-Phoenix Co., Dayton, OH, brad@bcaudio.biz.
3. Richard A. Kleismit — 2005, Assistant Research Prof., Physics Department, Wright State University
4. Donald J. Kessler — 2005, University of Dayton, (Formally General Dynamics), Dayton, OH, ki6sz@earthlink.net, (937) 429-8857
5. Greg Gazzell — 2009, Wright-Patterson Research Laboratory, US Air Force Base, Greg.Gazzell@wpafb.af.mil.
6. Simon Joseph Tritschler — 2010, Department of Biomedical, Industrial, and Human Factor Engineering, Wright State University, (formally Tiburon Co, Dayton, OH)
7. Nisha Kondrath — 2010, Assistant Professor, Department of Electrical and Computer Engineering, Villanova University, Villanova, PA 190850 (formally Assistant Professor, University of Minnesota-Duluth, Swenson College of Engineering, Department of Electrical and Computer Engineering, Duluth, MN, das.nisha@gmail.com, Tel.: (218) 726-6385); 2-12-, Villanova University, Department of Electrical and Computer Science, Philadelphia, PA.
8. Dakshina Murthy-Bellur — 2011, Assistant Professor, Penn State Erie, School of Engineering, Department of Electrical, Computer, and Software Engineering, REDC 166, 5101 Jordan Road, Erie, PA 16563-6153 (814) 898-7169, dsm19@psu.edu
9. Robert Carl Fitch, Jr. — 2011, Air Force Research Laboratories, WPAFB, Dayton, OH, Robert.Fitch@wpafb.af.mil
10. Veda Prakash N. Galigekere, 2012, Senior electrical engineer, Lear Co., 21557 Telegraph Rd, Southfield, MI48033, VGaligerkere@lear.com
11. Julie J. Lee — 2012, Case Western Reserve University, Dept of Electrical Eng., Cleveland, OH; 2013-, Emerson, Cleveland, OH;.
12. Rafal Wojda — 2012, Research and Development Scientist, ABB, Cracow, Poland.
13. Todd Grimes — 2013, Arand Co., Dayton, OH.
14. Thomas R. Salvatierra — Passed Qualifying Exam, Candidacy Exam (01/12/2010), Candidacy exam (07/23/13)
15. Agasthya Ayachit — Passed Qualifying Exam, Candidacy Exam (12/12/2013),
16. Weston R. Earick — Passed Qualifying Exam, Candidacy Exam, Research Proposal, 8/17/10
17. Mohamed A. Elemary — Passed Qualifying Exam (6/9/2008) Candidacy Exam, Research Pop. 7/22/10
18. Jeff Baugher — Passed Qualifying Exam (6/12/2009), Passed Candidacy Exam 4/6/2010.
19. Thomas A. Edelmann — Passed Qualifying Exam (4/13/2007), Candidacy Exam (2/22/2008)
20. Nima Emani — Passed Qualifying Exam (4/11/2007)
21. Daniel J. Whitman — Started (9/07/2010)
22. William C. Quinn — Started (8/25/2012)
23. Griffith Andrew — Restarted (F2012)

STUDENTS TEACHING AWARDS

1. Brad S. Bryant — 2002
2. Simon Joseph Tritschler — 2005
3. Weston R. Earick — 2003
4. Dakshina Murthy-Bellur — 2007 – 2008
5. Simon Joseph Tritschler — 2010

STUDENTS RESEARCH AWARDS

1. Brad S. Bryant — 2003 - 2004
2. Dakshina Murthy-Bellur — 2009 - 1010

UNDERGRADUATE STUDENT SCHOLARSHIPS

Attracted over $460,000 (about $22,000 per year) for student scholarships from the Electrical Manufacturing and Coil Winding Association (EMCWA) for the last 20 years.

GRADUATE STUDENT SUPPORT

J. Jozwik (10 quarters), N. Thirunarayan (9 quarters), D. Czarkowski (10 quarters), D. Q. Vuong (8 quarters), M. Hoffman (4 quarters), M. Vichare (9 quarters), V. Garuda (4 quarters), D. Hanna (2 quarters), Nisha Das (1 quarter), Jeff Bouger (16 quarters), and Thomas Salvatierra (9.67 semesters).

Total Support (70.67 quarters)

POST-DOCTORS, SABBATICALS, AND RESEARCH ASSOCIATES

1. Wojciech Szaraniec
2. Alberto Reatti (sabbatical)
3. Massimo Bartoli
4. Antonio Massarini (sabbatical)
5. Andrea Armanni
6. Giuseppe Sancineto
7. Tadashi Suetsugu (sabbatical)
8. Kamon Jirasereeamornkul
9. Hiroo Sekiya (sabbatical), Feb. 1, 2008-Feb. 1, 2010.

PATENTS

1. J. A. Weimer, M. K. Kazimierczuk, A. Massarini, and R. C. Cravens II, “Feed-forward control of aircraft bus dc boost converter,” U.S. Patent 5,982,156, November 9, 1999.
2. J. A. Weimer, B. T. Nguyen, M. K. Kazimierczuk, and B. A. Jordan, “Super-capacitor charging,” U. S. Patent 5,914,542, January 22, 1999.
3. J. A. Weimer, M. K. Kazimierczuk, and R. C. Cravens, “Super-capacitor battery clone,” U.S. Patent 5,848,652, December 15, 1998.
4. M. K. Kazimierczuk, "High-frequency power amplifier," Polish Patent, no. 113882, 1983.
5. M. K. Kazimierczuk, "High-frequency power amplifier," Polish Patent, no. 117980, 1984.
6. M. K. Kazimierczuk, "Method of compensation for dispersion of parameters for paralleled transistors in switching-mode amplifiers", Polish Patent, no. P-223321, 1983.
7. M. K. Kazimierczuk and J. M. Modzelewski, ”Class D tuned power amplifier," Polish Patent, no. P-218668, 1983.
8. M. K. Kazimierczuk and J. Ebert, "Tuned power oscillator," Polish Patent, no. P-213078, 1984.

EQUIPMENT DESIGNED

High-frequency high-voltage tuned power amplifier for nuclear accelerator at f = 200 MHz and V_o = 200 kV.
Meters for the power gain and the output power of high-frequency power transistors at 100, 175, and 400 MHz.
Radiotelephone for f = 175 MHz.
Meters of the distance of the Earth satellites.
Frequency multipliers for atomic frequency standard.
Meters of the cross-modulation distortion of PIN diodes.
Class E high-efficiency dc/dc converter at f = 2 MHz, V_o = 5 V, P_o = 50 W, and total efficiency over 75%.
Electronic ballast at f = 50 kHz, P_o = 80 W, and PF > 0.99.

GRANTS AND CONTRACTS

1. "High-efficiency switching-mode tuned power amplifiers," PI, Wright State University, Seed Grant, No. 216-028, 1986, $1500.
2. "Switched-mode resonant dc/dc converters," PI, Wright State University, Research Incentive Award, Grant No. 241-262, 1987/88, $1200.

3. "Resonant dc/dc power converters," PI, Ohio State Research Challenge Grant, No. 660-763, 3/7/88-6/30/89, $33,000.
4. "New type of ballast for gas discharge lamps," PI, Ohio Department of Development, Ohio's Thomas Edison Program, Contract No. 661-399, 3/1/89-6/30/90, $53,500.
5. "High-efficiency switching power supply," PI, ASTEC, Inc., Advanced Technology Group, Milpitas, CA, Contract No. 550-404, 5/1/90 - 4/30/91, $15,000.
6. "Synthesis, analysis, and design of resonant dc/dc converters," PI, NSF, Grant No. ECS-8922695, WSU No. 661708, 8/1/90 - 6/30/93, $98,719.
7. "Female and Minority Undergraduate Support Program," PI, NSF, Grant No. ECS-9246861, WSU No. 662060, 3/1/92 6/30/93, $15,000.
8. "Characterization and application of power electronic devices," PI, Southeastern Center for Electrical Engineering Education (SCEEE), Contract No. F33615-90-C-2088, WSU No. 661816, 2/19/91 - 1/31/92, $43,745.
9. "High power density up/down power converter for the More Electric Aircraft," PI, Southeastern Center for Electrical Engineering Education (SCEEE), Contract No. F33615-90-C-2088, WSU No. 662077, 4/13/92 - 2/7/93, $43,275.
10. "Research Experience for Undergraduates Program", PI, NSF, Grant ECS-9345338, WSU No. 662341, 1/5/93 - 6/30/93, $15,000.
11. “Heat sensitive color system,” Undergraduate Design Clinic Project, Standard Register Co., 09/15/94 - 06/10/95, $10,000.
12. "Development and packaging of SiC power semiconductor devices for aircraft applications," PI, Universal Energy Systems, Inc., Contract No. F33615-C-2284, WSU No. 662864, 3/1/95 - 9/30/96, $35,413.
13. "Semiconductor devices for aircraft power system applications," PI, Universal Energy Systems, Inc., Contract No. F33615-92-C2284, WSU No. 663374, 1/1/96 - 9/30/97, $28,200.
14. “Parameterized and distributed power regulator,” PI, University of Cincinnati, Contract No. F33615-96-2-1945, WSU No. 663-786, 3/1/98 – 9/30/98, $22,000.
15. “Design of high-efficiency microwave power amplifiers with poly-harmonic operation,” PI, NSF and National Academy of Sciences, Grant No. INT-0002341, WSU No. 664-661, 12/15/2000 – 12/31/2002, $15,000.
16. “Developing effective strategies and performance matrices for automatic target recognition,” Co-PI, Army Research Office, University of South Alabama, WSU No. 665015, 6/4/2003 – 12/31/2003, $15,690.
17. “EMCWA Technical Committee Grant,” Electrical Manufacturing and Coil Winding Association, Inc., 12/17/04, $450.
18. “State Technologies Advancement Collaborative Program (STAC),” PI, US Department of Energy, Contract No. 541-0319-3, WSU No. 666349, 01/01/05-12/31/07, $315,500 ($98,000).
19. ``Electromagnetic Far Field Distribution of Three-Phase Power Transmission Lines,” PI, Defense Research Associates, Inc., 9/1/2007-8/32/2008, $50,000.
20. NEWSTARs Program, US Air Force, Co-PI, Contract FA8650-D-1848, WSU Account nr. 666595, $80,000, 1/2/2008-31/12/2011.
21. ``Student Scholarship Program,” EMCWA, $440,000.
22. M. Emmert, F. Garber, and M. K. Kazimierczuk, Co-PI, NEWSTARs Program, US Air Force, Co-PI, Contract FA8650-D-1848, WSU Account nr. 666595, $12789, 1/2/2010-31/12/2013.
23. “Near-field nano-evanescent microwave microscope for interdisciplinary research,“ Co-PI, NSF Proposal No. 6539578, $1,518,942, Nov. 28, 2007 (05-610).
24. ``Electric dual mode vehicle development project,” Ohio Dept. of Development Technology, $1,467,124.
25. ``Power Line Urban Sentry (PLUS), Inductive Core and Recharging Research,” Co-PI, 3/21/2009-10/31/2009, WSU Nr. 667596, $73,091, Defense Research Associates.
26. `Electric dual mode vehicle development project,” Co-PI, WSU Proposal No. 09-307-10, Mono-mobile Corp., 40/1/2009-3/31/2010.

27. ``Research of multi-function software defined architecture-based cognitive electronic warfare technology," US Air Force, Co-PI, WSU Account 668266, $25,514, 11/23/2010-11/22/2011.

28. ``Class E, high-efficiency transmitting amplifier (CHEETA)," PI, WSU No. 668679, FO-P 668679-283015-20014, Contract No. FA8650-11-C-7184, DPAS Rating DO-07, 11/1/2011-12/30/2014, $351.256.

29. ``Micro-scale Power Conversion (MPC)," PI, DARPA, WSU Proposal Number 11-843-13, DARPA, $351,256.01 11/1/2011-11/1/2014.

30. ``Micro-scale Power Conversion (MPC)," PI, WSU Account Number 668679, DARPA, first phase $87,077.01, 11/1/2011-7/30/2012, second phase $88,066.32 ($175,143.33), 8/1/2012-4/30/2013, third phase $58,710.88 ($233,853.33), 5/1/2013-10/30/2013. Total $351,256.01, total 11/1/2011-11/1/2014.

31. ``Reexamination of the perfect fluid model within general relativity form an engineering prospective in light of the accelerating expansion phenomenon," Pi, WSU No. 12-0740-10, $113,962, 10/01/2012-09/01/2013.

The total sum of external funding $1,236,242 + 440,000 and internal funding $35,700; TOTAL External Funding: $1,262,456 + $440,000 = $1,702,456.

REVIEWER OF TECHNICAL JOURNALS, N.S.F. and PUBLISHERS

IEEE Transactions on Circuits and Systems (15 papers a year)
IEEE Transactions on Power Electronics (10 papers a year)
IEEE Transactions on Aerospace and Electronic Systems (12 papers a year)
IEEE Transactions on Industrial Electronics (8 papers a year)
IEEE Transactions on Electron Devices (3 papers a year)
IEEE Transactions on Control Systems Technology (2 papers a year)
IEEE Transactions on Magnetics (2 papers a year)
IEEE Transactions on Industry Applications (2 papers a year)
IEEE Transactions on Electromagnetic Compatibility (3 papers a year)
IEEE Transactions on Education (3 papers a year)
IEEE Transactions on Dielectric and Electrical Insulation (2 paper a year)
IEEE Power Electronics Specialists Conference (15 papers a year)
IEEE International Symposium on Circuits and Systems (6 papers a year)
IEE Proceedings, Pt. B, Electric Power Applications (10 papers a year)
IEE Proceedings, Pt. G, Circuits, Devices and Systems (4 papers a year)
IEE Proceedings on Control Theory and Applications (1 paper a year)
IEEE International Conference on Decision and Control (1 paper a year)
Journal of Power Electronics (3 papers a year)
Automatica (2 paper a year)
Electronic Letters (9 papers a year)
Solid-State Electronics (2 papers a year)
International Journal of Circuits Theory and Application (25 paper a year)
Journal of Circuits, Systems, and Computers (5 papers a year)
Analog Integrated Circuits and Signal Processing (1 paper a year)
COMPEL: Int. Journal for Computation and Mathematics in Electronics and Electrical Eng. (5 papers a year)
Archives of Electrical Engineering (1 year)
Emerald COMPEL: The International Journal for Computation and Mathematics in Electrical and Electronic Eng.
Journal of Power Electronics (3 paper a year)
Hindawi Publishing Corporation, VLSI
European Conference on Circuit Theory and Design (2 papers a year)
Reviewer for Dept. of Energy (DOE) (4 proposals a year)
Reviewer for NSF (4 proposals a year)
National Academy of Science, USA (1 proposal a year)
John Wiley & Sons Publishers (4 books)
Prentice-Hall (3 books)
Elsevier Scientific Publishing Company (1 book)
West Publishing Company (2 books)
Research Grants Council (REG) of Hong Kong (3 to 5 research proposals per year)
European Research Council (3 research proposals)

SERVICE AND ACADEMIC OUTREACH

UNIVERSITY COMMITTEES

Faculty Senate	Member	1997-1998
Senate Executive Committee	Member	1997-1998
Promotion and Tenure Committee	Member	1995-1997, 2001-2003, 2006-2007, 2009-2010
Student Affairs Committee	Member	1993-1995, 1999-2003, 2005-2006
Budget Review Committee	Member	1998-1999, 2001-2002
Graduate Council Committee	Member	1992-1995, 1996-1998, 1999-2003, 2009-2011, 2011-2013
Research Council Committee	Member	2011-2013
Outside Interest Committee	Member	1011-2014
Graduate School Hearing Committee	Member	2012
Students Affairs Committee	Member	2011-2011
Graduate Policy Committee	Member	2000-2001
Agenda Committee	Member	1994-1997
Academic Dishonesty Hearing Panel	Member	1994-1998
Due Process Committee	Member	1995-1996
Strategic Planning Council Committee	Member	1995-1997
Academic Programs Sub-committee	Member	1995-1997
Tenure Removal Committee	Member	1998-2001
Library Committee	Member	1999-2001
Faculty Diversity Committee	Member	1999-2001
Petitions Committee	Member	2003-2005, 2012-2013
Parking Committee	Member	2005-2010
Civil Engagement Task Force Committee	Member	2004-20012
Faculty Budget Priority Committee	Member	2005-2006
Buildings and Grounds Committee	Member	2005-2006
Dining Services Committee	Member	2006-2007
Marshall at Graduation Ceremony		1997, 1998, 2006
Undergraduate Academic Program Review Committee	Member	2007-2011
Teaching and Learning Advisory Council	Member	2008-2010
Service-Learning Sub-committee of UCAP	Member	2009-2012
Search Committee, Dean of College of Eng. & Comp. Sci.	Member	2010
Search Committee, Dean of College of Eng. & Comp. Sci.	Member	2013
Research Integrity Committee	Member	2013-
AAUP-WSU Bargaining Council Committee	Member	2010-11

COLLEGE COMMITTEES

Steering Committee	Member	2000-2006
Steering Committee	Chair	2001-2002
Faculty Development Committee	Member	1995-1999, 2002-2004, 2007-20014
Teaching Committee	Chair	2003-2004
Teaching Committee	Member	2009-2011
Curriculum Committee	Member and Scribe	1988-1989, 2004-2006
Due Process Committee	Chair and Scribe	1992-1993
Ad Hoc Committee to Review Bylaws	Member and Scribe	1992-1993
Due Process Committee	Member	1991-1993
Teaching Award Committee	Member	1993-1997, 2001-2004, 2008-2012
Three-Year Review Committee of EE Department Chair	Member	1995-1996
Ph.D. Dissertation Qualified Faculty		1997-
Ph.D. Student Affairs Committee	Member	2003-2006, 2008-2010
Ph.D. Planning Committee	Member	1996-2002
Ph.D. Admissions Committee	Member	1998-2003

Ph.D. Program Coordinating Committee	Member	1996-2006
Ph.D. Steering Committee	Member	1998-2003
EE Chair Search Committee	Member	1998-2000
Math Ad Hoc Committee	Member	2000-2002
Ph.D. Review Committee	Member	2000-2001
Petition Committee	Chair	2003-2005
Graduate Council Representative	Alternate	2003-2004, 2006-2007, 2009-2010
University Promotion and Tenure Committee	Representative	2006-2007
Senior Lecture Promotion Committee	Member	2008-2009
CSCE Ad-hoc Strategic Planning Advisory	Member	2009-2010
Ph.D. Program Students Affairs Committee	Member	2012-2013

DEPARTMENT COMMITTEES

EE Faculty Development Committee	Member	1990-2006, 2009-12
EE Faculty Development Committee	Chair	1996-2000, 2003-2004, 2007-2009 2010-2012
Engineering Physics Program Committee	Co-Director	1993-2008
Engineering Physics Program Committee	Member	2008-2011
Curriculum Committee	Member	1988-2009
Curriculum Committee	Chair	2004-2005
Graduate Program Committee	Member	1986-1988, 1994-2008
EE Undergraduate Studies Committee	Member	2004-2009
EP Undergraduate Studies Committee	Co-Director	2004-2006
GTA Committee	Member	1996-2001
Laboratory Resources Committee	Member	1986-2012
Laboratory Resources Committee	Chair	2003-2006
Electronics/VLSI Subcommittee	Chair	1988-2006
Electronics/VLSI Subcommittee	Member	2003-2008
EE Core Subcommittee	Member	2003-2006
Bylaws Committee	Member	2000-2002
Bylaws Committee	Chair	2002-2003, 2005-2007
Telecommunications Faculty Search Committee	Member	1999-2002
VLSI Faculty Search Committee	Member	1999-2002
Ad Hoc Faculty Search Committee	Member	2003-2006
Academic Computing Committee	Member	2013-2014

PROFESSIONAL SERVICE

PANEL REVIEW OF RESEARCH PROPOSALS

U.S. Department of Energy	2011-2012
European Research Council (ERC)	2012-
Advanced Grant Panel	2012-
Hong Kong Research Grants Council	1998-

ASSOCIATE EDITOR

IEEE Transactions on Circuits and Systems, I	1993-1995, 1997-2001, 2003-2005
IEEE Transactions on Industrial Electronics	2005-
International Journal of Circuits, Systems, and Computers	1992-2000
IEEE Transaction on Circuits and Systems, I, Special Issue on Switching Circuits and Systems	August 2003
IEEE Transaction on Power Electronics, Special Issue on Lighting Applications	May 2007
International Journal of Circuit Theory and Applications	2008-
IET Circuits, Devices & Systems	2013-

IEEE TECHNICAL COMMITTEE CHAIR

Technical Committee for Power Systems Electronics Circuits for the IEEE Circuits and Systems Society — 2001-2002, 2004-2005

IEEE CONFERENCE TRACK CHAIR

IEEE International Symposium on Circuits and Systems, Power Systems and Power Electronics Circuits — 2001, 2002, 2004, 2005, 2006

IEEE Power Electronics Specialists Conference, Topic Chair, Resonant Power Converters — 2006

DISTINGUISHED LECTURER

IEEE Distinguished Lecturer for the Circuits and Systems Society — 2004-2006

OHIO AEROSPACE INSTITUTE

Member of the Steering Committee of the Focus Group, "Aerospace Power and Propulsion"

CONFERENCE TECHNICAL PROGRAM COMMITTEE

IEEE International Symposium on Circuits & Systems — 1996-2006
IEEE Power Electronics Specialists Conference — 1994-2004
IEEE Energy Conversion Congress and Exhibition — 2010-2014
IEEE International Power Electronics Conference — 1999-2000
IEEE International Symposium on Industrial Electronics — 1996, 2014
International Conference of Electronics, Circuits, and Systems — 2004-2006
IEEE International Conference on Power Electronics and Drive Systems, International Steering Committee — 2007
Electrical Manufacturing and Coil Winding Association Conference Technical Program Co-Chair — 2008-

SESSION CHAIR

1st IEEE Conference on Control Applications, Dayton, OH — 1992
Session TP-4 Machines, Co-chair

IEEE Power Electronics Specialists Conference — 1993
Session 14 Topology IV: Power Factor Correction, Chair
Session 18 Topology V: Converter Topologies, Chair

IEEE Midwest Symposium on Circuits and Systems — 1996
Session: Antennas, Radar and RF Microwave Systems, Chair

IEEE International Symposium on Circuits and Systems, Atlanta, GA — 1996
Organized and Chaired a Panel Session on Power Electronics

IEEE Power Electronics Specialists Conference — 1996
Session: Passive Components 2, Chair

IEEE International Symposium on Circuits & Systems, Geneva, Switzerland — 2000
Session: Industrial Applications & Sensors I

Power Electronics Track for IEEE Intl Symposium on Circuits & Systems — 2001
Associate Chair

IEEE International Symposium on Circuits and Systems, Sidney, Australia — 2001
Organized and chaired two Special Sessions in Power Electronics

Midwest Symposium on Circuits and Systems — 2001
Organized and chaired two Special Sessions in Power Electronics

IEEE International Symposium on Circuits & Systems, Phoenix, AZ — 2002
Session Chair: Simulation of Power Electronic Circuits

IEEE International Symposium on Circuits and Systems, Bangkok, Thailand — 2003
Session Chair: Power Converters

IEEE International Symposium on Circuits and Systems, Vancouver, BC, Canada — 2004
Chair for Power Electronics Track and Power Systems Track
Session Chair: Power Converters

IEEE International Symposium on Circuits and Systems, Island of Kos, Greece — 2006
Session Chair: Integrated Power Converters
Session Chair: Power Electronic Circuits
Session Chair: Power Integration

Session Chair: Control of Power Converters
Session Chair: Power Circuits
IEEE International Symposium on Circuits and Systems, New Orleans 2007
Session Chair: Power Integrated Circuits
IEEE Midwest Symposium on Circuits and Systems 2007
Session Chair: Power Electronic Circuits

TRACK CHAIR

IEEE International Symposium on Circuits & Systems, Phoenix, AZ 2002
Co-chair of Power Electronics Track
Session: Simulation of Power Electronic Circuits
IEEE International Symposium on Circuits and Systems, Bangkok, Thailand 2003
Chair for Power Electronics Track and Power Systems Track
Session: Power Converters
IEEE International Symposium on Circuits and Systems, Vancouver, BC, Canada 2004
Chair for Power Electronics Track and Power Systems Track
Session: Power Converters
IEEE International Symposium on Circuits and Systems, Kobe, Japan 2005
Co-Chair for Power Electronics Track and Power Systems Track
Session: Power Converter Circuits
IEEE International Symposium on Circuits and Systems, Island of Kos, Greece 2006
Chair for Power Electronics Track and Power Systems Track
Session: Integrated Power Converters
IEEE Power Electronics Specialists Conference, Jeju, South Korea,
Track Chair for Resonant Converters 2006
IEEE International Symposium on Circuits and Systems, New Orleans
Chair for Power Electronics Track and Power Systems Track 2007
Session: DC-DC Power Converters
Session Chair 2008
Electrical Manufacturing Association Conference, Nashville, TN, 2009
IEEE International Symposium on Circuits and Systems, Paris, France
Review Committee Member (RCM) 2010
Session Chair: Integrated & Wireless Power Circuits
Session Chair: Power Electronics I
Session Chair: Switched Capacitor Converters & Power Amplifiers
American Society of Engineering Education
Session Chair 2010
Electrical Manufacturing Association Conference, Dallas, TX
Program-Co-chair
Session Chair: Power Electronics
IEEE International Symposium on Circuits and Systems, Rio de Janeiro, Brazil 2011
Review Committee Member (RCM)
Session Chair: Power Electronics Circuits I
Session Chair: Power Converters II
IEEE International Symposium on Circuits and Systems, Soul, South Korea 2012
Review Committee Member (RCM)

SPECIAL ISSUES

Organized two Special Issues on Automotive Electronics in the Journal of Circuits, Systems, and Computers Part 1, No. 4, 1994, Part 2, No. 1, 1995.

Organized two Special Issues on Power Electronics in the Journal of Circuits, Systems, and Computers Part 1, No. 3, 1995, Part 2, No. 4, 1995.

Gust Editor for Special Issues on Switching Circuits and Systems in the IEEE Transactions on Circuits and Systems-I, No. 8, August 2003.

Guest Editor for Special Issues on Electronic Ballasts in the IEEE Transactions on Power Electronics, No. 5, May 2007.

OTHER IEEE SERVICE
IEEE Power Electronics Society Superconductivity Committee, Representative 1992-1999

Electrical Manufacturing and Coil Winding 2008-present
Member of the Board of Directors

PH.D. COMMITTEES IN OTHER UNIVERSITIES

1. Randall Shaffer, University of Dayton, 1999
2. Ian Douglas de Vries, University of Cape Town, South Africa, 1999
3. Samuel Sau-Man Chan, City University of Hong Kong, 2005
4. Leung Ka Sing, City University of Hong Kong, 2005
5. Chin Yat Chung, City University of Hong Kong, 2006
6. Carl Ngai-Man Ho, City University of Hong Kong, 2006
7. Siu Wai Leung, City University of Hong Kong, 2007
8. Song Tingting, City University of Hong Kong, 2007
9. Szymon Pasko, Silesian University of Technology, Poland, 2010
10. P. V. V. Kishore, Andhra University, India, in progress.

PERSONAL

Date of Birth:	May 11, 1957
Place of Birth:	Poland
Marital Status:	Married
Wife's name:	Alicja
Children:	Anna and Andrew
Status:	U.S. and Polish Citizen

REFERENCES

Prof. Jan Ebert
Department of Electronics
Technical University of Warsaw
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University of California
Dept. of Electrical Engineering & CS
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Green Mountain Radio Research Company
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SAIYU REN, Ph.D.

Department of Electrical Engineering
Wright State University
Dayton, OH 45435

Phone: 937-775-5051 Fax: 937-775-3936
Email: saiyu.ren@wright.edu

EDUCATION

Degree	Institution	Date
Ph.D.	Wright State University	2008
M.S.	Wright State University	2001
M.S.	Chinese Academy of Sciences	1988
B. S.	South China University of Technologies	1985

PROFESSIONAL EXPERIENCE

Institution	Position	Dates
Wright State University	Associate Professor	09/2009-present
Wright State University	Visiting Assistant Professor	09/2008-08/2009
Wright State University	Senior Research Associate	03/2001-8/2008
Wright State University	Visiting Scholar	08/1998-02/2001
Shenzhen University	Assistant Professor	03/1993-08/1998
Shenai Semiconductor Co.	Test Engineer	06/1988-03/1993

PROFESSIONAL MEMBERSHIPS

Association	Status
Institute of Electrical & Electronics Engineers (IEEE)	Senior Member
Phi Kappa Phi	Member

PROFESSIONAL AWARDS

Title of Award	Granting Association	Dates
Early Career Achievement	College of Engineering and Computer	2014
IEEE Dayton Section Harrell V. Noble Award	IEEE Dayton Section	2012
Excellent Student Advisor Award	Shenzhen City Government	1997
Excellent Teaching Award	Shenzhen University	1994-1997
Second Place Award for Education Research	Shenzhen University	1996

TEACHING

Course Taught	Title	No. of Time
EE759	RF CMOS Integrated Circuit Design	1
EE758	CMOS Analog Integrated Circuit Design	6
EE454/654	VLSI Systems Design	8
EE459/659	IC Design Synthesis with VHDL	5
	Senior Design	2

- **Ph.D. Dissertation Supervised/Supervise** — **Graduation Date**

1. **Chris Benedik** — **07/2013**
2. Vinayashree Hiremath — passed Candidacy Exam

3. Hao Xue — 11/2014 passed Candidacy Exam
4. Naga Venkata Vijaya Krishna Boppana
5. Shuo Li
6. Xiaomeng Zhang

- **M.S. Thesis Supervised/Supervise — Graduation Date**

1. **Paesol Veerakitti — 06/2010**
2. **Vinayashree Hirmath — 11/2010**
3. **Tri Nygun — 03/2011**
4. **Steven Billman — 06/2011**
5. **Prashanth Muppla — 08/2011**
6. **Lawrence David Burich — 08/2012**
7. **Jian Chen — 08/2012**
8. **Sunny Raj Dommaraju — 07/2013 — Graduate Student Excellent Award 2014**
9. **Shuo Li — 12/2014**
10. **Xiaomeng Zhang — 12/2014**
11. **Naga Venkata Vijaya Krishna Boppana — 12/2014**
12. Tyler Moody — March 2015 (expected)
13. Joe Strzelecki — Summer 2015 (expected)
14. Eswar Raju Suraparaju — Fall 2015 (expected)
15. Pushpak Vasanth Rayudu Arja — Fall 2015 (expected)
16. Dinesh Varma Penumetcha — Summer 2015 (expected)

- **Senior Design Projects**

1. Spring 2013 to Fall 2013, J. Strzelecki, C. Meckstroth, L. Knief, and H. Erwin, "Arbitrary waveform generator design and implementation in 90nm CMOS technology".
   1) J. Srezelecki, S. Ren, "A 6.8 GBit/s 90nm CMOS 8-bit Shift Register for Digital Processing," *9th Annual Dayton Engineering Sciences Symposium (DESS 2013).*
2. Fall 2013, David McCarther, Robert Howells, and Nawaf Alshammari, "Light-based pinhole detector". **Won Outstanding Senior Design Team of CECS in 2014**.

- **Independent Studies Supervised/Supervise**

1. Chris Benedik
2. Kaushik Reddy Katpally
3. Naga Venkata Vijaya Krishna Boppana
4. Eswar Raju Suraparaju
5. Pushpak Vasanth Rayudu Arja
6. Zackary Quach

- **Mentoring Undergraduate Students**

1. Zachary Quach

- **Graduate Student Support**

Student Name	*GRA Quarters*
Paesol Veerakitti	3
Steven Billman	8
Vinayashree Hiremath	6.3
Prashrath Muppala	1
Dominic Maga	2
Jian Chen	2
Sunny Dommaraju	2/3

Sunny Dommaraju	2/3 semester
Chris Benedik	1 semester
Joe Strzelecki	1 semester
Total	**23 (Qs) + 2.6 (Semester)**

SCHOLARSHIP

Articles

- **Published and Accepted Refereed Journal Papers**

1. **S. Ren** and G. Lee, "A robust low power carbon nanotube sensor interface circuit in 180 nm CMOS technology," *IEEE Sensors Journal,* Vol. 13, No.12, pp. 4786-4796, Dec. 2013.
2. **S. Ren**, I. Abraham, and S. Hong, "1-6 GHz analog RF power driver in 90 nm CMOS technology for wireless applications," *International Journal of Circuit Theory and Applications,* DOI: 10.1002/cta.1941.
3. **S. Ren** and Chris Benedik, "RF active inductor band pass filter with post fabrication calibration option," *AEU International Journal of Electronics and Communications*, Vol. 67, No.12, pp. 1058-1067, Dec. 2013.
4. P. Muppala, **S. Ren**, and G. Lee, "High-frequency wide-range all digital phase locked loop in 90 nm CMOS," *Analog Integrated Circuits and Signal Processing Journal*, Vol. 75, No. 1, pp. 133-145, April 2013.
5. **S. Ren**, and J. Emmert, "Successive approximation pipelined ADC with one clock cycle conversion rate," *IET Journal, Electronics Letters*, Vol. 48, No. 20, pp. 1257-1258, Sept. 2012.
6. **S. Ren**, J. Emmert, and R. Siferd, "Design and performance of a robust 180 nm CMOS standalone VCO and the integrated PLL," *Analog Integrated Circuits and Signal Processing Journal*, Vol. 68, No. 5, pp. 285-298, May 2011.
7. **S. Ren**, and R. Siferd, "1GS/s pipelined delta sigma modulator ADC using residue averaging technique," *Analog Integrated Circuits and Signal Processing Journal*, Vol. 54, No. 1, pp. 31-44, January 2008.
8. B. Cheah, S. Ren, and R. Siferd, "Design algorithm and hardware implementation of FIR compensation filter implemented in 0.13um CMOS technology," *WSEAS Transactions on Circuits and Systems*, Vol. 4, Issue 12, pp. 1421-1433, December 2005.
9. W. Zhou and S. Ren, "Study on the Influence of Pulsed Light on Food Ingredients and Food Preserving", *Journal of Shenzhen University, Science and Engineering (China)*, Vol. 4, pp. 81-84, 1997.

- **Under Review Refereed Journal Papers**

1. C. Benedik, **S. Ren**, and M. K. Kazimierczuk, "Passive capacitor stacking to improve integrated circuit power supply decoupling," *IEEE Trans. Power Electronics.* (under review)
2. J. Strzelecki, and S. Ren, "Near-zero dead zone phase frequency detector with wide input frequency difference", *IET Electronics Letters*. (under review)
3. V. Krishna, and **S. Ren**, "A high speed and low power 64-bit digital comparator in 90nm CMOS technology", *IEEE Trans. on Very Large Scale Integration*. (under review)
4. C. Taylor, J. Emmert, and **S. Ren**, "Two-stage voltage divider for logic reduction in an asynchronous register feedback loop", *IET Electronics Letters*. (under review)

- **U. S. Patents**

1. J. Strzelecki and **S. Ren**, "High performance phase frequency detectors". (under review)
2. R. Siferd and **S. Ren**, "Pipelined Delta Sigma Modulator Analog to Digital Converter," US Patent No. 7034730, April 25, 2006.

- **Papers Published in Full and Official Proceedings (R=Refereed)**

1. H.Xue, T. Moody, S. Li, X. Zhang, and **S. Ren**, "Low overhead design for improving hardware Trojan detection efficiency," *IEEE National Aerospace and Electronics Conference*, Dayton, OH, July 2014.
2. V. K. Boppana, **S. Ren**, and H. Chen "Low power and high Speed CPL-CSA adder," *IEEE National Aero-*

space and Electronics Conference, Dayton, OH, July 2014.

3. T. Moody, R. Ewing, and **S. Ren**, "10 Bit current steering DAC in 90 nm technology," *IEEE National Aerospace and Electronics Conference*, Dayton, OH, July 2014.
4. X. Zhang, S. Li, T. Moody, H. Xue, and **S. Ren**, "Multi-finger MOSFET low noise amplifier performance analysis," *IEEE National Aerospace and Electronics Conference*, Dayton, OH, July 2014.
5. S. R. Dommaraju, **S. Ren**, and G. Lee, "Design and implementation of a 16 bit flexible ROM-less direct digital synthesizer digital integrated circuits*," IEEE International Midwest Symposium on Circuits and Systems*, Columbus, OH, August 4-7, 2013. **(R)**
6. C. Benedik, and **S. Ren**, "Passive component stacking to aid power supply decoupling*," IEEE International Midwest Symposium on Circuits and Systems*, Columbus, OH, August 4-7, 2013. **(R)**
7. J. Gerhardt, and **S. Ren**, "Digital down converter optimization*," IEEE International Midwest Symposium on Circuits and Systems*, Columbus, OH, August 4-7, 2013. **(R)**
8. C. Benedik, and **S. Ren**, "Modeling and simulation of packaging substrate effects on radio frequency integrated circuits," *IEEE National Aerospace and Electronics Conference*, Dayton, OH, July 2012.
9. J. Chen, G. Lee, and **S. Ren**, "Ultra-low power read-out-integrated circuit design," *IEEE National Aerospace and Electronics Conference*, Dayton, OH, July 2012.
10. S. R. Dommaraju and **S. Ren**, "An 180-nm CMOS low noise amplifier with single ended input and differential output," *IEEE National Aerospace and Electronics Conference*, Dayton, OH, July 2012.
11. **S. Ren**, I. Abraham, and R. Siferd, "CMOS analog RF driver operating at 1-10 GHz with 0 dBm output power," *IEEE Instrumentation and Measurement Technology Conference (I2MTC 2012),* Graz, Austria, May 2012. **(R)**
12. S. Billman, **S. Ren**, and R. Siferd, "Multiplier-less digital down converter in 90nm CMOS technology", *IEEE National Aerospace and Electronics Conference*, Dayton, OH, July 2011.
13. V. Hiremath and **S. Ren**, "A novel reconfigurable ultra high speed encoder for flash ADC", *IEEE National Aerospace and Electronics Conference*, Dayton, OH, July 2011.
14. **S. Ren** and R. Siferd, "CMOS 1.6 GHz bandwidth 12 bit time interleaved pipelined ADC,"*IEEE International Conference on Information Technology*, Las Vegas, Nevada, April 2011. **(R)**
15. V. Hiremath and **S. Ren**, "A 6-bit low power folding and interpolating ADC," *IEEE Instrumentation and Measurement Technology Conference (I2MTC 2011)*, Hongzhou, China, May 2011. **(R)**
16. G. Y. Lee and **S. Ren**, S. N. Kim and R. R. Naik "A tunable CMOS read-out integrated circuit for carbon nanotube-based bio-sensors," *IEEE Instrumentation and Measurement Technology Conference* (I2MTC 2011), Hongzhou, China , May 2011. **(R)**
17. V. Hiremath and **S. Ren**, "An ultra high speed encoder for flash A/D converters," *IEEE Instrumentation and Measurement Technology Conference (I2MTC 2010)*, Austin, Texas, May 2010. **(R)**
18. **S. Ren** and R. Siferd, "Performance comparison of two low power wide tuning range VCOS in 90 NM CMOS," *IEEE International SOC Conference*, Northern Ireland, UK, September 2009. **(R)**
19. **S. Ren** and R. Siferd, "A 7.8 GHz CMOS PLL VCO," *IASTED International Conference on Circuit and System (CS 2008)*, Kona-Kohala, Hawaii, August 2008. **(R)**
20. S. Ren and R. Siferd, "Flexible RF band pass analog to digital converter for multi-channel receivers," *Circuits, Signals and Systems (CSS)*, Banff, Canada, July 2007. **(R)**
21. S. Ren, R. Siferd, Robert Blumgold, and Nima Emami, "Pipelined delta sigma modulator analog to digital converter*," IEEE Midwest Circuits and Systems Symposium*, San Juan, P.R., August 2006. **(R)**
22. S. Ren, R. Siferd, and R. Blumgold, "Hardware Efficient FIR Compensation Filter for Delta Sigma Analog to Digital Converters," *IEEE Midwest Circuits and Systems Symposium*, Cincinnati, OH, August 2005. **(R)**
23. S. Ren, R. Siferd, and R. Blumgold, "Parallel time interleaved delta sigma band pass analog to digital converter for SOC applications," *IEEE International System on Chip Conference*, Santa Clara, CA, September 2004. **(R)**

24. M. Myers, S. Ren, M. Wang, and R. Siferd "Broadband delta sigma modulator with 1 GHz sampling rate and 4 bit quantizer in 0.18um CMOS technology," *NASA Symposium on VLSI Design*, Coeur d'Alene, Idaho, May 2003. **(R)**

25. R. Siferd, S. Ren, T. Grimes, R. Blumgold, C. Cerny, and T. Chang, "100 MHz delta sigma modulator with 4-Bit quantizer in 0.35um CMOS technology," *The 2002 International Multi-conference in Computer Science, VLSI*, Las Vegas, Nevada, June 2002. **(R)**

- **Student Papers in Symposium**

1. J. Srezelecki, S. Ren, "A 6.8 GBit/s 90nm CMOS 8-bit Shift Register for Digital Processing," *9th Annual Dayton Engineering Sciences Symposium (DESS 2013).* Awarded best undergraduate paper.

2. E. R. Suraparaju, P. V. R. Arja, and S. Ren, "A High Resolution In-phase and Quad-Outputs generator for ADPLL using CMOS 90-nm technology," 10*th Annual Dayton Engineering Sciences Symposium (DESS 2014).*

- **Technical Reports**

1. R. Siferd, S. Ren, and J. Emmert, "Multi-channel RF ASIC for Handheld GPS Receiver Anti Jam Enhancement," Phase II Final Report, Air Force Research Laboratory, February 2012.

2. S. Ren, George Lee, and Yan Zhuang, "Deployable Low Power Carbon Nanotube Sensors," Final Report, Air Force Research Laboratory, May 2011.

3. R. Siferd, J. Emmert, and S. Ren, "Antijam (AJ) Processing Application Specific Integrated Circuits (ASIC) for Hand- Digital held Global Positioning Satellite (GPS) Receiver," Phase II Final Report, Air Force Research Laboratory, March 2011.

4. R. Siferd, and S. Ren, "Digital Synthesizer with Tuning Filter for Advanced Electroni Warfare (EW) Application," Phase I Final Report, Air Force Research Laboratory, July 2009.

5. S. Ren, "Advanced CMOS IF Receiver Stage," Phase III Final Report, Raytheon RF Components, June 2009.

6. S. Ren and R. Siferd, "Advanced CMOS IF Stage", Final Report, Raytheon RF Component, June 2009.

7. R. Siferd, J. Emmert, and S. Ren, "Antijam (AJ) Processing Application Specific Integrated Circuits (ASIC) for Hand- Digital held Global Positioning Satellite (GPS) Receiver," Phase I Final Report, Air Force Research Laboratory, November 2008.

8. R. Siferd, S. Ren, B. Rigling, and J. Wu, "Non-coherent Dual Platform Advanced Mono-pulse Countermeasures (AMC) Standoff Jammer," Phase I Final Report, Air Force Research Laboratory, March 2008.

Grants Funded (Total Awarded=$904k; Ren Expenditures=$710k)

Title	*WSU RSP#*	*Funding Amount*	*Duration*	*Funding Agency*	*P.I.*	*Co-P.I.s*
Low Power Multichannel RF Front End and Digital Anti-jam GPS ASIC	669579	**$150k**	10/14-10/16	RBS Technologies, LLC	**Ren**	N/A
Equipment Enhancement for Nano-tube Sensor Research	667096	**$5K**	1/12-12/12	LEADER Consortium	**Ren**	N/A
Deployable Low Power Carbon-Nanotube Sensors	667885	**$146K** of $200K	12/09-4/11	USAF/AFMC DET 1 AF Research Laboratory	**Ren**	Zhuang
Digital Synthesizer with Tuning Filter, Phase II	667909	**200K**	11/09-5/2012	RBS Technologies, LLC	**Ren**	N/A
Multi Channel RFASIC for Handheld GPS Receiver Anti Jam Enhancement, Pase II	667654	**$199,374** .	4/09-2/12	RBS Technologies, LLC	**Ren**	N/A
Anti-jam ASIC for Handheld GP	667409	**60K** of 200K	7/08—2/11	RBS Technologies, LLC	Emmert	**Ren**

Advanced CMOS IF Receiver Stage, Phase III	667449	**$70K**	8/08—06/09	Raytheon RF Compo-nents	**Ren**	N/A
Digital Synthesizer with Tuning Filter	667504	**$30K**	11/08—09/09	RBS Technologies, LLC	**Ren**	N/A

- **Contributed to the Following WSU Research Contracts (Before my Tenure Track Appointment)**

1. "Multi-Channel RFASIC for Handheld GPS Receiver Anti Jam Enhancement", RBS Technologies, March 2008-November 2008, $33,000.
2. "Advanced CMOS IF Receiver Stage, Phase II," Raytheon RF Components, Jan 2007-Sept 2007, $60,000
3. "Advanced CMOS IF Receiver Stage, Phase I," Raytheon RF Components, December 2005-December 2006, $102,000
4. "High Speed Read Out Integrated Circuit (ROIC) for IR Focal Plane Array Phase II," RNET Technologies, April 2006-October 2008, $300,000.
5. "High Speed Read Out Integrated Circuit for IR Focal Plane Array Phase I," RNET Technologies, May 2005-Dec 2005, $33,000
6. "Wideband Array Analog to Digital Converter," Systran Federal Corporation, June 2004-June2007, $330,000.
7. "Pipelined Delta Sigma Analog to Digital Converter," Systran Federal Corporation, May 2003-Oct 2005, $300,000.
8. "High Speed/Resolution Parallel Time Interleaved Delta Sigma Analog to Digital Converter," Systran Federal Corporation, May 2001-May 2003, $353,000.
9. "Parallel Sub-sampling Analog to Digital Converter," Systran Federal Corporation, June 2002 - March 2003, $33,000.
10. "Radiation Hardened Analog to Digital Converter, Systran Federal Corporation," April 2001 - January 2002, $33,000.
11. "Analog to Digital Converter Development," Systran Federal Corporation, April 2001 - January 2002, $33,000.

SERVICE

- **Department Committees**

	Position	**Dates**
Graduate Studies	Member	2009--2011
Undergraduate Study	Member	2010--now
Laboratory Resources	Member	2012—2014
Faculty search	Member	2014
Chair search	Member	2014

- **Other Committees**

	Position	**Dates**
WSU STEMM Organization	Member	2010-now

- **Professional Service**

1. Reviewer, *International Journal of Circuit Theory and Application.*
2. Reviewer, *DYNAMICS OF CONTINUOUS, DISCRETE AND IMPULSIVE SYSTEMS*, Series B: Applications & Algorithms (DCDIS_B).
3. Reviewer, *IEEE Sensor Journal*.
4. Reviewer, *IEEE Transactions on Circuits and Systems II*
5. Reviewer, *IEEE Transactions on Instrumentation & Measurement*
6. Reviewer, *IEEE Transactions on Semiconductor and Manufacturing*
7. Session Chair, *IASTED International Conference on Circuit and System* (CS 2008), Kona-Kohala, Hawaii, Aug. 2008.
8. Reviewer, *2011 IEEE International Conference on Information Technology*.
9. Reviewer, *2009 IEEE International Symposium on Circuits and Systems*.

Brian D. Rigling, Ph.D.

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Dayton, OH 45435
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brian.rigling@wright.edu
http://www.ee.wright.edu/~brigling/
Citizenship: USA
DoD clearance: TOP SECRET

I. Educational History

Ph.D., Electrical Engineering, The Ohio State University 2003
- *Dissertation: Signal Processing Strategies for Bistatic Synthetic Aperture Radar*

M.S., Electrical Engineering, The Ohio State University 2000
- *Thesis: Physics, Fisher, and Phase: Information Content in SAR Images*

B.S., Physics-Computer Science, University of Dayton 1998

II. Employment History

Academic

Wright State University, Department of Electrical Engineering,
- Department Chair 2014 – present
- Professor 2013 – present
- Associate professor 2009 – 2013
  - Led the response to the ABET site visit in 2011, resulting in a 6-year accreditation for EE
  - Secured a new faculty position (Dr. Michael Saville) in the area of sensor exploitation through external funding and collaboration with Wright State Research Institute
- Director, Sensor Systems Research, Wright State Research Institute 2010 – present
- Assistant professor 2004 – 2009
- Faculty Program Director for Sensors, Wright State Research Institute 2006 – 2009

The Ohio State University, Department of Electrical Engineering, Graduate research assistant 1999 – 2000
University of Michigan, Department of Electrical Engineering, Graduate departmental fellow 1998 – 1999

Industry

SAIC, Reconnaissance & Surveillance Operation, Chief scientist 2009 – 2010
- Provided technical leadership to business development efforts in sensor exploitation

Independent consulting, Technical consultant 2005 – 2009
- Defense Research Associates – detection algorithms for visible missile warning
- MacAulay Brown, Inc. – algorithm development for EW applications
- SET Corp. – algorithms for urban GMTI of dismounts
- RBS Technologies – space-time adaptive beam forming algorithms
- Matrix Research & Engineering – algorithms for SAR image formation

Northrop Grumman Electronic Systems, Senior systems engineer 2000 – 2004
- Signal processing team lead for Synthetic Aperture Ladar for Tactical Imaging (SALTI)
- SAR IR&D team lead, topics: auto-focus, speckle-reduction, image formation
- Systems and/or signal processing lead on multiple major proposal efforts
- Synthetic aperture sonar IR&D: image formation

III. Teaching Activities

Graduate courses

EE 861 Adaptive Filters (renewed course offering)

EE 437/637	Modern Signal Processing (new course offering)
EE 763	Classical and Modern Spectral Analysis (renewed course offering)
EE 436/636	Digital Signal Processing
EE 475/675	Introduction to Radar Systems
EE 4360/6360	Digital Signal Processing
EE 4750/6750	Introduction to Radar Systems

Undergraduate courses

EE 250	Engineering Problem Solving with MATLAB (renewed course offering)
EE 321	Linear Systems I
EE 322	Linear Systems II
EE 326	Random Signals and Noise
EE 3810	Professional Skills for Electrical Engineers

Graduate students

Student	Completion Date	Degree
Andrew Kondrath	Summer 2006	M.S., *Efficient Side Lobe Suppression in Sparse Aperture SAR*
	Supported as GRA spring 2006	
Kelly Feirstine	Summer 2006	M.S., *Waveform Diversity Implementation Study*
	Supported as GRA fall 2005 through summer 2006	
Jose Montes de Oca	Winter 2007	M.S., *System Analysis and RF-Floodlight Exploitation of Short-Range GOTCHA Repeaters*
	Supported as GRA summer 2005 through fall 2006	
Brian Ore	Winter 2007	M.S., *Multilingual Articulatory Features for Speech Recognition*
Jason Blackaby	Spring 2008	M.S., *Simultaneous RF/EO Tracking and Characterization of Dismounts*
	Supported as GRA summer 2006 through spring 2008	
Philip Hanna	Spring 2008	Ph.D., *Expectation-Maximization Optical Tomosynthetic Volume Imaging*
Ellen Case	Fall 2008	M.S., *A Low-Cost Acoustic Array for Detecting and Tracking Multiple Acoustic Targets*
	Supported as GRA summer 2007 through fall 2008	
Lee Patton	Winter 2007	M.S., *A GNU Radio Based Software-Defined Radar*
	Spring 2009	Ph.D., *On the Satistfaction of Modulus and Ambiguity Function Constraints in Radar Waveform Optimization for Detection*
	Supported as RA fall 2005 through fall 2006	
Orelle Fogle	Spring 2011	Ph.D., *Human Micro-Range/Micro-Doppler Signature Extraction, Association, and Statistical Characterization for High-Resolution Radar*
	Supported as GRA summer 2008 through present	
Matt Horvath	Winter 2012	M.S.,*Extensions of Polar Format Scene Size Limits to Squinted Geometries*
	Supported as GRA fall 2010 through fall 2011	
Ryan Fuller	Summer 2012	M.S*., Adaptive Noise Reduction Techniques for Airborne Acoustic Sensors*
Kristjan Greenewald	Summer 2012	M.S., *Prediction of Optimal Bayesian Classification Performance for LADAR ATR*
Andrew Lingg	Fall 2008	M.S., *An Algorithm for the Detection of Handguns in Terahertz Images*
	Fall 2012	Ph.D., *Statistical Methods for Image Change Detection with Uncertainty*
	Supported as GRA summer 2007 through fall 2012	

Aaron Evers	Spring 2014	M.S., *Evaluation and Application of LTE, DVB, and DAB Signals of Opportunity for Passive Bistatic SAR Imaging*
co-advisor: Prof Julie Jackson (AFIT)		
Cody Lawyer	Spring 2014	M.S., *Impact of SAR Image Formation Quality on Target Separability*
Matthew Scherreik	Fall 2014	M.S., *A Probabilistic Technique For Open Set Recognition Using Support Vector Machines*
Aaron Jones	Fall 2011	M.S., *Frequency Diverse Array Receiver Architectures*
	Spring 2015*	*Ph.D., Performance Prediction in Radar Waveform Optimization*
Shaun Frost	Fall 2011	M.S., *Performance Analysis of Radar Waveforms for Congested Spectrums*
	Spring 2015*	*Ph.D., Performance Prediction in Sparse Frequency Waveform Design*
LeRoy Gorham	Spring 2015*	Ph.D., *Dual Format Algorithm for Synthetic Aperture Imaging*
Anne Zelnio	Spring 2009	M.S., *Detection of Small Aircraft Using an Acoustic Array*
	Spring 2015*	Ph.D., *Dynamic Dictionary Radar Waveform Classification*
	Supported as GRA summer 2010 through present	
Linda Moore	Fall 2014*	Ph.D., *topic TBD*
Robert Taylor	Spring 2015*	Ph.D., *topic TBD*

* projected

Postdoctoral Researchers and Research Scientists

Orelle Fogle	June 2011 – present
Sandeep Gogineni	November 2012 – present
Pawan Setlur	January 2013 – present

Thesis/Dissertation committees

Student	Completion Date	Degree
Qian Huang	March 2005	M.S., *Synchronous DS-CDMA Systems with Minimum-TSC Spreading and Matched-Filter*
Ahmed Nasif	March 2005	M.S., *The Capacity of the Gaussian Channel with Scalar, Multidimensional, orBand-limited Binary Input*
Karmon Vongsy	July 2007	M.S., *Change Detection Methods for Hyperspectral Imagery*
Priya Ganapathy	Fall 2009	Ph.D., *Development and Evaluation of a Flexible Framework for the Design of Autonomous Classifier Systems*

Scholarly Publications

Book Chapters

1. B. Rigling, "Bistatic synthetic aperture radar," *Advances in Bistatic Radar*, N.J. Willis and H. Griffiths, Eds., Scitech Publishing, 2007, pp. 320-431.
2. L. Patton and B. Rigling, "Autocorrelation constraints in radar waveform optimization for detection," *Waveform Design and Diversity for Advanced Radar Systems*, F. Gini, A. De Maio and L. K. Patton Eds., IET, 2012.
3. R. Fogle and B. Rigling, "Analysis of Human Signatures using High-Range Resolution Micro-Doppler Radar," *Radar Micro-Doppler Signatures –Processing and Applications*, V. Chen and D. Tahmoush Eds., IET, 2014.

Journal papers

1. R. John and B. Rigling. "Effect of Height to Width Ratio on K and CMOD Solutions for a Single Edge Cracked Geometry with Clamped Ends," *Engineering Fracture Mechanics*, 60, 147-156, 1998.
2. B. Rigling and P. Schniter. "Subspace Leaky LMS," *IEEE Signal Processing Letters*, 2004, 11(2): 136-139, February 2004.

3. B. Rigling and R. Moses. "Flight Path Strategies for 3-D Bistatic SAR," *IEE Proceedings – Radar, Sonar, and Navigation,* vol. 151, no. 3, 149-157, June 2004.
4. B. Rigling and R. Moses. "Polar Format Algorithm for Bistatic SAR," *IEEE Trans. Aerospace and Electronic Systems*, vol. 40, no. 4, 1147-1159, October 2004.
5. B. Rigling and R. Moses. "Taylor Expansion of the Differential Range for Monostatic SAR," *IEEE Trans. Aerospace and Electronic Systems*, vol. 41, no. 1, 60-64, January 2005.
6. B. Rigling and R. Moses. "Three-dimensional Surface Reconstruction from Multistatic SAR Images," *IEEE Trans. Image Processing*, vol. 14, no. 8, 1159-1171, August 2005.
7. B. Rigling and R. Moses. "Motion Measurement Errors and Autofocus in Bistatic SAR," *IEEE Trans. Image Processing*, vol. 15, no. 4, 1008-1016, April 2006.
8. B. Rigling. "Amplitude STAP for GMTI Laser Radar," *IEE Proceedings – Radar, Sonar, and Navigation*, vol. 153, no. 4, 361-364, August 2006.
9. B. Rigling. "Image Quality Focusing of Rotating SAR Targets," *IEEE Geoscience and Remote Sensing Letters*, vol. 5, no. 4, 750-754, October 2008.
10. B. Rigling. "Urban RF Multipath Mitigation," *IET Radar, Sonar & Navigation*, vol. 2, 419-425, December 2008.
11. B. Rigling. "Use of Nonquadratic Regularization in Fourier Imaging," *IEEE Trans. Aerospace and Electronic Systems*, vol. 45, no. 1, 250-265, January 2009.
12. J. Jackson, B. Rigling, and R. Moses. "Canonical Scattering Feature Models for 3D and Bistatic SAR," *IEEE Transactions on Aerospace and Electronic Systems,* vol.46, no.2, pp.525-541, April 2010.
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18. O. Fogle and B. Riglng. "Micro-Range/Micro-Doppler Decomposition of Human Radar Signatures," *IEEE Trans. Aerospace and Electronic Systems*, vol.48, no.4, pp.3058-3072, October 2012.
19. L. Patton and B. Rigling. "Phase Retrieval for Radar Waveform Optimization," *IEEE Trans. Aerospace and Electronic Systems*, vol.48, no.4, pp.3287-3302, October 2012.
20. M. Horvath, L. Gorham and B. Rigling, "Scene Size Bounds for PFA Imaging with Post-Filtering," *IEEE Trans. Aerospace and Electronic Systems*, vol. 49, no. 2, pp 1402-1406, April 2013.
21. S. Gogineni, M. Rangaswamy, B. Rigling and A. Nehorai, "Cramer-Rao Bounds for UMTS-based Passive Multistatic Radar," *IEEE Transactions on Signal Processing*, vol.62, no.1, pp.95-106, Jan 2014.
22. B. Rigling, W. Garber, R. Hawley and L. Gorham, "Wide-Area, Persistent SAR Imaging: Algorithm Tradeoffs," *IEEE Aerospace and Electronic Systems Magazine*, January 2014.
23. A. Lingg and B. Rigling, "Cramer-Rao Bound on Projective Image Registration from Feature Points," To appear in *IEEE Trans. Aerospace and Electronic Systems*, accepted September 2013.
24. A. Lingg, E. Zelnio, F. Garber and B. Rigling, "A Sequential Framework for Image Change Detection," *Image Processing, IEEE Transactions on* , vol.23, no.5, pp.2405,2413, May 2014
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Patents

1. F. Garber and B. Rigling. *Uncontrolled passive radio frequency identification tag and system with 3-D positioning*, US patent no. 7,988,055, issued 2 Aug 2011, licensed with $30,000 in royalties.

Conference papers

1. B. Rigling and F. Moore. "Exploitation of Sub-populations in Evolution Strategies for Improved Numerical Optimization," *MAICS-99 Proceedings*, 80-88, 1999.
2. B. Rigling, L. Potter, and R. Moses. "Relative Information in Phase of Radar Range Profiles," In *Algorithms for Synthetic Aperture Radar Imagery VII*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE Vol. 4053*, 2000.
3. (abstract only) R. Moses, L. Potter, B. Rigling, and Y. Akyildiz. "Scattering Center Models for Feature +Extraction in SAR Imagery," *PIERS 2000*, July 2000.
4. B. Rigling, et. al.. "Improved SAR Image Auto-focus Through Algorithm Hybridization," *EUSAR 2002*, 549–552, 2002.
5. B. Rigling and R. Moses. "Three-dimensional Surface Reconstruction from Multistatic SAR Images," In *Algorithms for Synthetic Aperture Radar Imagery X*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE Vol. 5095*, 2003.
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8. (invited) B. Rigling. "Performance Prediction in Adaptive Noise Radar," *Asilomar Conference on Signals, Systems, and Computers*, November 2004.
9. B. Rigling. "Adaptive Noise Radar for Simultaneous Bistatic SAR and GMTI," In *Algorithms for Synthetic Aperture Radar Imagery XII*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE*, 2005.
10. B. Rigling. "Intrinsic Processing Gains in Noise Radar," *IEEE Waveform Diversity Conference,* Lihue, HI, January 2006.
11. P.M. Hanna, B.D. Rigling, and E.G. Zelnio. "Virtual confocal microscopy," In *Three-Dimensional Image Capture and Applications VII*, B.D. Corner, P. Li and M. Tocheri, editors, *Proceedings of SPIE*, January 2006.
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15. (presentation only) B. D. Rigling, D. Brown, J. Dowd, A. Halley, S. Stevens, B. Wirick, "On the feasibility of a foliage-penetrating laser radar" *Great Lakes Photonics Symposium*, *Proceedings of SPIE*, 2006.
16. (invited) R. Fogle and B. Rigling. "Optimal Geometry Designs for Unconstrained and Topologically Constrained Multistatic Sensors," *Asilomar Conference on Signals, Systems, and Computers*, November 2006.
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19. B. Rigling. "Raider Tracer: a MATLAB-Based Electromagnetic Scattering Simulator," *Algorithms for Synthetic Aperture Radar Imagery XIV*, Edmund G. Zelnio, editor, *Proceedings of SPIE*, 2007.
20. (presentation only) J.M. Blackaby, O.R. Fogle and B.D. Rigling, "Parametric and Nonparametric Dismount Characterization Using Ultra-Fine Resolution MTI Radar," *DARPA RF Dismount Characterization Workshop*, Arlington, VA, 5-6 December 2007.

21. L. Patton and B. Rigling. “Modulus Constraints in Adaptive Radar Waveform Design,” *Proceedings of 2008 IEEE Radar Conference*.
22. J. Jackson, B. Rigling, and R. Moses. “Parametric Scattering Models of Bistatic Synthetic Aperture Radar,” *2008 IEEE Radar Conference*.
23. J. Vasquez, K. Tarplee, E. Case, A. Zelnio and B. Rigling. “Multisensor 3D tracking for counter small unmanned air vehicles (CSUAV),” *Acquisition, Tracking, Pointing, and Laser Systems Technologies XXII*, Steven L. Chodos; William E. Thompson, Editors, *Proceedings of SPIE*, 2008.
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28. A.R. Fasih, B.D. Rigling and R.L. Moses. “Analysis of target rotation and translation in SAR Imagery” *Algorithms for Synthetic Aperture Radar Imagery XVI*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE*, 2009.
29. L. Patton and B. Rigling. “Autocorrelation and Modulus Constraints in Radar Waveform Optimization,” *Waveform Diversity and Design Conference, 2009 International*, pp.150-154, 8-13 Feb. 2009.
30. (presentation only) L. Patton and B. Rigling, “Constrained Radar Waveform Optimization”, *SIAM Annual Meeting*, Denver, CO, Jul. 2009.
31. L. Patton and B. Rigling, “Efficient Design of Practical Radar Waveforms for Optimized Detection in Colored Noise”, *Proceedings of Defense Applications of Signal Processing (DASP)*, Kauai, HI, Sep. 2009.
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33. L.A. Gorham and B. D. Rigling. “Dual Format Algorithm for Monostatic SAR,” *Algorithms for Synthetic Aperture Radar Imagery XVII*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE*, 2010.
34. T.L. Lewis and B. Rigling. “Analysis of focused dismount signatures,” *Algorithms for Synthetic Aperture Radar Imagery XVII*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE*, 2010.
35. B.D. Rigling and C. Roush. "ACF-based classification of phase modulated waveforms," *Radar Conference, 2010 IEEE*, pp.287-291, 10-14 May 2010.
36. (presentation only) S. Frost and B. Rigling. “Performance Bounds on Radar Waveform Optimization,” *2011 Cognitive & Software-Defined RF Technology: Achieving Spectral Dominance for the Air Force of the Future*, Rome, NY, September 15-16, 2010.
37. A. Lingg, E. Zelnio, F. Garber and B. Rigling. “Image Sequence Change Detection via Sparse Representations,” *Asilomar Conference on Signals, Systems, and Computers*, November 2010.
38. M. Horvath and B. Rigling. “A comparison of SAR imaging algorithms for high-squint angle trajectories,” *Algorithms for Synthetic Aperture Radar Imagery XVIII*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE*, 2011.
39. S. Frost and B. Rigling. “Performance Comparison of Constrained Radar Waveform Design,” Radar Conference, 2011 IEEE, 23-27 May 2011.
40. O. Fogle and B. Rigling. “Micro-Range/Micro-Doppler Feature Extraction and Association,” Radar Conference, 2011 IEEE, 23-27 May 2011.
41. L. Patton and B. Rigling. “Optimal Signal/Filter Design for Multi-Target Detection in Colored Noise,” Radar Conference, 2011 IEEE, 23-27 May 2011.

42. (presentation only) S. Frost and B. Rigling. "Sidelobe Predictions for Spectrally-Disjoint Waveforms," *2012 Cognitive RF Workshop*, Dayton, OH, September 21-22, 2011.
43. M. Horvath and B. Rigling. "Approximation and bounding of distortion errors in polar format SAR imaging for squinted geometries ," *Algorithms for Synthetic Aperture Radar Imagery XIX*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE*, 2012.
44. L.A. Gorham and B. D. Rigling. "Dual format algorithm implementation with gotcha data ," *Algorithms for Synthetic Aperture Radar Imagery XIX*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE*, 2012.
45. B. Rigling. "Flying blind: a challenge problem for SAR imaging without navigational data ," *Algorithms for Synthetic Aperture Radar Imagery XIX*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE*, 2012.
46. A. Jones and B. Rigling. "Planar Frequency Diverse Array Receiver Architecture ," Radar Conference, 2012 IEEE, 7-11 May 2012.
47. S. Frost and B. Rigling. "Sidelobe Predictions for Spectrally-Disjoint Radar Waveforms ," Radar Conference, 2012 IEEE, 7-11 May 2012.
48. O. Fogle and B. Rigling. "Dismount Feature Extraction from Circular Synthetic Aperture Radar Data," Radar Conference, 2012 IEEE, 7-11 May 2012.
49. A. Zelnio and B. Rigling. "Detection-Based Localization of Passive Radar Receivers ," Radar Conference, 2012 IEEE, 7-11 May 2012.
50. B. Rigling, "Spectral Analysis of Unevenly Sampled Data via Uniform Resampling," in *American Geophysical Union, Fall Meeting 2012*, Dec 2012.
51. C.C. Barton, B. Rigling, N. Hunter and S.F. Tebbens, "Shoreline Position Dynamics: Measurement and Analysis," in *American Geophysical Union, Fall Meeting 2012*, Dec 2012.
52. B. Rigling and G. Goley. "On the Feasibility of ISAR Processing of Stepped Frequency Waveforms," *Radar Conference, 2013 IEEE*.
53. A. Zelnio, L. Moore, C. Roush and B. Rigling. "Cramer-Rao Lower Bound on Time of Arrival Estimates for an Envelope-Detected Pulse," *Radar Conference, 2013 IEEE*.
54. G. Goley and B. Rigling. "SAR based classification of ground moving targets to assist tracker performance," *Algorithms for Synthetic Aperture Radar Imagery XX*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE*, 2013.
55. A. Lingg and B. Rigling. "Foreground estimation in motion imagery using multiframe change detection techniques," Motion Imagery Technologies, Best Practices, and Workflows for Intelligence, Surveillance, and Reconnaissance (ISR), and Situational Awareness, Donnie Self, editor, *Proceedings of SPIE*, 2013.
56. B.D. Rigling, A. Mackey, E. M. Friel, J.W. Nehrbass and E.G. Zelnio. "Recent Improvements to the Radier Tracer Scattering Prediction Tool ," *Algorithms for Synthetic Aperture Radar Imagery XXI*, Edmund G. Zelnio & Frederick D. Garber, editors, *Proceedings of SPIE*, 2014.
57. (Best student paper award) M. Scherreik and B. Rigling, "Ladar ATR via probabilistic open set techniques ," *Automatic Target Recognition XXIV*, Firooz A. Sadjadi & Abhijit Mahalanobis, editors, *Proceedings of SPIE*, 2014.
58. S. Gogineni, M. Rangaswamy, B. Rigling and A. Nehorai. "Cramer-Rao Bound Analysis for Passive Multistatic Radar Using UMTS Signals," *Radar Conference, 2014 IEEE*.
59. S. Gogineni, M. Rangaswamy, B. Rigling and A. Nehorai. "Ambiguity Function Analysis for Passive Multistatic Radar Using UMTS Signals," *Radar Conference, 2014 IEEE*.
60. C. Lawyer and B. Rigling. "Automatic Target Recognition Driven Scene Size Limits for the Polar Format Algorithm," *Radar Conference, 2014 IEEE*.
61. A. Jones, B. Rigling and M. Rangaswamy. "Eigen-Space Analysis of Constrained Adaptive Radar Waveform Design," *Radar Conference, 2014 IEEE*.
62. A. Jones, B. Rigling and M. Rangaswamy. "Eigen-Basis Analysis of Expected Cumulative Modulus for Constrained Signal Design," A*silomar Conference on Signals, Systems, and Computers*, November 2014.
63. L. Moore, B. Rigling and R. Penno. "Characterization of Information in Phase of Radar Range Profiles," *Asilomar Conference on Signals, Systems, and Computers,* November 2014.

Software

1. B. Rigling. Raider Tracer, publicly available at http://www.cs.wright.edu/~brigling/RaiderTracer/RaiderTracer.htm
   - Download history: 2006- 64, 2007- 240, 2008- 241, 2009- 221, 2010- 271, 2011- 357, 2012- 170
   - Total downloads as of November 2012: 1564
   - Used by Rick Thompson (Northrop Grumman Electronic Systems) in an IR&D project, and acknowledged and cited in the resulting 2012 Tri-Service Radar paper, "Target matched illumination and signature behaviors."
   - Used by Mark Richards and Daniel Campbell (GTRI) in DARPA's Polymorphous Computing Architectures program, and discussed and cited in their 2009 final report, "Programming Methodology for High Performance Applications on Tiled Architectures."

Invited presentations

1. B. Rigling. "CRLB-Optimal Sensor Geometries for Multi-static Sensing," *Radar Waveform Design and Imaging Workshop*, Rensselaer Polytechnic Institute, Troy, NY, 19 May 2005.
2. B. Rigling. "Performance Prediction in Adaptive Noise Radar," *Radar Waveform Design and Imaging Workshop*, Rensselaer Polytechnic Institute, Troy, NY, 19 May 2005.
3. B. Rigling. "Micro-Range/Micro-Doppler RF Dismount Exploitation ," Multifunction RF Systems Symposium 2011 , Raytheon Corporation, Dallas, TX, 4 May 2011.

V. Professional Service and Membership

Professional organizations	Role	Year
IEEE ABET	Prog. Evaluator	2013-present
Evaluated Drexel University BS in Electrical Engineering program		2013
Evaluated University of Central Florida BS in Electrical Engineering program		2014
IEEE Signal Processing Society	Senior Member	2000–present
IEEE Aerospace and Electronic Systems Society	Senior Member	2000–present
IEEE Radar Systems Panel	Member	2009–present
IEEE Ultra-Wideband Radar Committee	Member	2011–present
IEEE Aerospace and Electronic Systems Magazine	Guest Editor	2012-2013
Special issue on Wide-Area and Staring Synthetic Aperture Radar – published January 2014		
SPIE Security & Defense Symposium, Algorithms for Synthetic Aperture Radar Conference	Tech Committee	2006–present
IEEE Radar Conference	Tech Committee	2007–present
	Publications Chair	2011
	General Chair	2014
	Past Chair	2015
IEEE Transactions on Image Processing (112 manuscripts administered)	Assoc. Editor	2009–2013
IEEE Conf. on Microwaves, Comm, Antennas & Electronic Systems	Tech Committee	2013
IEEE Forum for Leading Researchers	Invited Attendee	2013
IEEE Transactions on Image Processing	Reviewer	2004–present
IEEE Transactions on Signal Processing	Reviewer	2004–present
IEEE Transactions on Aerospace and Electronic Systems	Reviewer	2004–present
IEEE Geoscience and Remote Sensing Letters	Reviewer	2008–present
IET Radar, Sonar, & Navigation	Reviewer	2006–present
IET Signal Processing	Reviewer	2007–present
International Conference on Information Fusion	Reviewer	2005
Army Research Lab – Proposals	Reviewer	2006
International Journal of Adaptive Control and Signal Processing	Reviewer	2007
Elsevier Signal Processing	Reviewer	2007
2nd International Workshop on Collaborative Trusted Sensing	Tech Committee	2010

National Research Council of the National Academy of Sciences		
Review of Specialized Degree-Granting Graduate Programs of the Department of Defense in Science, Technology, Engineering, Mathematics and Management	Invited Panelist	2013
3rd International Workshop on Compressed Sensing Theory and its Applications to Radar, Sonar and Remote Sensing	Tech Committee	2015
NAECON/OIS	Planning Board	2015

Academic committees	**Organization**	**Role**	**Year**
Academic Computing	College of Engineering	Member	2004–2005
DSP/Wireless	Department of Electrical Engineering	Member	2004–2005
Graduate Studies	Department of Electrical Engineering	Member	2004–2005
EE Core	Department of Electrical Engineering	Member	2004–2005
Academic Computing	College of Engineering	Scribe	2005–2006
DSP/Wireless	Department of Electrical Engineering	Chair	2005–2006
Graduate Studies	Department of Electrical Engineering	Member	2005–2006
Academic Computing	College of Engineering	Member	2006–2007
DSP/Wireless	Department of Electrical Engineering	Chair	2006–2007
Graduate Studies	Department of Electrical Engineering	Member	2006–2007
EE Undergraduate Studies	Department of Electrical Engineering	Member	2006–2007
Laboratory Resources	Department of Electrical Engineering	Member	2006–2007
Academic Computing	College of Engineering	Chair	2007–2008
Academic Honesty	College of Engineering	Member	2007–2008
SSIP Focus Area	College of Engineering Ph.D.	Chair	2007–2008
University Technology	University	Member	2007–2008
Acad. Integrity Hearing Panel	University	Member	2007–2008
DSP/Wireless	Department of Electrical Engineering	Chair	2007–2008
EE Core Subcommittee	Department of Electrical Engineering	Chair	2007–2008
Graduate Studies	Department of Electrical Engineering	Member	2007–2008
EE Undergraduate Studies	Department of Electrical Engineering	Member	2007–2008
Ad Hoc: Department Bylaws	Department of Electrical Engineering	Member	2007–2008
Undergraduate Studies	Department of Electrical Engineering	Chair	2008–2009
Department Bylaws	Department of Electrical Engineering	Member	2008–2009
Strategic Planning	Department of Electrical Engineering	Member	2008–2009
Eminent ORS Search	Department of Electrical Engineering	Member	2008–2009
Curriculum	College of Engineering	Member	2008–2009
Academic Integrity Advisory	College of Engineering	Member	2008–2009
SSIP Focus Area	College of Engineering Ph.D.	Chair	2008–2009
Acad. Integrity Hearing Panel	University	Chair	2008–2009
Undergraduate Studies	Department of Electrical Engineering	Chair	2009–2010
Department Bylaws	Department of Electrical Engineering	Member	2009–2010
Strategic Planning	Department of Electrical Engineering	Member	2009–2010
Faculty Development	Department of Electrical Engineering	Member	2009–2010
Curriculum	College of Engineering	Member	2009–2010
SSIP Focus Area	College of Engineering Ph.D.	Chair	2009–2010
Acad. Integrity Hearing Panel	University	Chair	2009–2010
Graduate Studies	Department of Electrical Engineering	Director	2011–2012
Academic Affairs	Department of Electrical Engineering	Director	2011–2012
Curriculum	College of Engineering	Member	2011–2012
Graduate Studies	College of Engineering	Member	2011–2012
Student Affairs	College of Engineering Ph.D.	Member	2011–2012
Acad. Integrity Hearing Panel	University	Member	2011–2012
Research Integrity Inq. Comm.	University	Member	2011–2012

Undergraduate Studies	Department of Electrical Engineering	Director	2012–2013
Faculty search	Department of Electrical Engineering	Chair	2012-2013
- Created position through (50/50) cost share between research funds and WSRI for the first 3 years			
Curriculum	College of Engineering	Member	2012–2013
Program Affairs	College of Engineering Ph.D.	Member	2012–2013
Appeals Panel	University	Member	2012–2013
Research Integrity Inv. Comm.	University	Chair	2012–2013
Graduate Council	University	Member	2012–2013
Undergraduate Studies	Department of Electrical Engineering	Director	2013–2014
Curriculum	College of Engineering	Member	2013–2014
Faculty Development	College of Engineering	Member	2013–2014
Program Affairs	College of Engineering Ph.D.	Member	2013–2014
Appeals Panel	University	Member	2013–2014
Faculty Budget Priority	University	Member	2013–2014
Graduate Council	University	Member	2013–2014
Intern'l Programs Oversight	University	Chair	2013-2014
Undergraduate Student Success	University	Member	2013-2014
Graduate Council	University	Member	2014–2015

VI. External Contracts and Grants **(principle and sole investigator on all awards except as noted)**

Project Title	**Sponsor**	**Dates**	**Amount**
SALTI System Engineering Support	NGC (DARPA)	Jul-04 to Jun-05	$29,800
Operational Analysis of Simulated Urban RFID Data	AlphaTech (DARPA)	Aug-04 to Feb-05	$35,000
System Analysis and RF-Floodlight Exploitation of Short-Range GOTCHA Repeaters	AFRL/SNA	Jun-05 to Jan-08	$146,462
System Analysis and RF-Floodlight Exploitation of Short-Range GOTCHA Repeaters	Anteon (AFRL/SNA)	Jun-05 to Sep-07	$68,681
Waveform Diversity Implementation Study	ATK-MR (AFRL/SNR)	Oct-05 to Mar-07	$100,000
Staring Mode Airborne Radar Techniques	SET Assoc. (DARPA)	Jan-06 to Sep-06	$50,000
All-Weather Feature-Based Combat ID	SET Corp. (AFRL/SNA)	Jul-06 to Apr-08	$100,000
Multi-Sensor/Multi-Modal Sensor Development and Algorithm Research for Urban Vigilance *Co-investigators: B. Rigling (PI), L. Hong, A. Shaw, F. Garber*	WBI (AFRL/SNA)	Aug-06 to Mar-08	$416,500
Software-Defined Radio for Robust and Low-Cost Detection of Electronic Emitters *Co-investigators: B. Rigling (PI), Z. Wu*	MacAulay-Brown (AFRL/SNR)	Apr-07 to Jul-07	$10,000
Noncoherent Dual Platform AMC Jammer *Co-investigators: Z. Wu (PI), B. Rigling*	RBS Technologies (AFRL/SNR)	Jun-07 to Mar-08	$33,000
Dismount GMTI Technology for Urban Operations	SET Corp. (AFRL/SNR)	Jun-07 to Mar-08	$16,666
Institute for the Development and Commercialization of Advanced Sensor Technology (IDCAST) *Co-investigators: D. Petkie (PI), L.Lew Yan Voon, B. Rigling, L. Hong, A. Shaw*	University of Dayton (Ohio 3rd Frontier)	Feb-07 to Feb-10	$699,486
Center for ATR – IDIQ Contract	Ohio State University (AFRL/RYA)	Jul-07 to Oct-08	$199,805
Center for ATR – Research Infrastructure	Ohio State University (AFRL/RYA)	Sep-07 to Oct-09	$85,321
Modeling, Simulation and Analysis Technologies *Co-investigators: B. Rigling (PI), L. Hong, K. Rattan*	SAIC (AFRL/RYA)	Mar-08 to Nov-08	$33,579
Center for ATR – Task Order 004 *Co-investigators: B. Rigling (PI), L. Hong, D. Petkie, K. Rattan*	Ohio State University (AFRL/RYA)	May-08 to Mar-09	$308,000

NASIC DSP Training	NASIC	Jun-08 to Dec-08	$20,000
Center for ATR – Summer Intern Program	Ohio State University (AFRL/RYA)	Sep-07 to Oct-08	$41,668
Applied Optimization Technical Support	Applied Optimization	Aug-08 to May-09	$13,178
RemSense, Inc. Phase I SBIR Sensor Technology	RemSense, Inc. (AFRL/RYRT)	Jan-09 to Oct-09	$14,766
Academic Pipeline and Futures Lab *Co-investigators*: *D. Petkie (PI), K. Rattan, S. Ren, B. Rigling, J. Skipper, K. Xue, A. Shaw, K-L Chu, Y. Zhuang*	Ohio State University (AFRL/RYA)	Jun-09 to Jun-14	$690,000
Collaborative Research: Planning Grant: I/UCRC for Surveillance Theory	NSF	Aug-09 to Jul-10	$10,000
Collaborative Center for Surveillance Research	NSF	Mar-10 to Jan-15	$275,000
Collaborative Center for Surveillance Research	Membership fees	Jul-10 to Jun-11	$176,000
Cognitive Radio Co-Existence Analysis and Interference Impact Study	MacAulay-Brown (AFRL/RYR)	Mar-10 to Jun-11	$48,000
Center for ATR – CY2010 *Co-investigators: B. Rigling (PI), F. Garber*	Ohio State University (AFRL/RYA)	Mar-10 to Jun-11	$116,000
Application of Range Doppler Processing *Co-investigators: B. Rigling (PI), R. Fogle*	Matrix Research & Eng. (AFRL/RYA)	Mar-11 to Jul-11	$16,000
Revolutionary Intelligence and Influence Tech. (RIIT)	AFRL/RH	May-11 to Apr-12	$100,000
Center for ATR – Summer 2011 *Co-investigators: B. Rigling (PI), F. Garber*	Ohio State University (AFRL/RYA)	Jul-10 to Dec-11	$66,941
Center for ATR – Summer 2011 thru CY2012 *Co-investigators: B. Rigling (PI), F. Garber*	AFRL/RYA	Jul-10 to Dec-12	$581,095
Image Truthing of WAMI Data Sets *Co-investigators: B. Rigling (PI), F. Garber*	AFRL/RYA	Jul-10 to Jun-14	$818,000
Collaborative Center for Surveillance Research	Membership fees	Jul-11 to Jun-12	$154,000
Center for ATR – Fall 2011 thru Spring 2014 *Co-investigators: B. Rigling (PI), F. Garber*	AFRL/RYA	Oct-11 to Sep-13	$1,717,115
Collaborative Center for Surveillance Research	Membership fees	Jul-12 to Jun-13	$154,000
ISAR for Terrestrial Targets	Etegent (AFRL/RYA)	Jun-12 to Mar-13	$49,949
Algorithms for dismount Detection in Synthetic Aperture Radar *Co-investigators: B. Rigling (PI), R. Fogle*	Matrix Research (AFRL/RYA)	May-12 to Dec-13	$125,000
Wide-Area Motion Imagery and Radio Frequency Compressive Sensing Applications	SSCI (Navy STTR)	Jun-12 to Jan-13	$30,000
Passive Multistatic Radar *Co-investigators: B. Rigling (PI), R. Fogle*	Matrix Research (AFRL/RYM)	May-12 to Dec-12	$50,000
Collaborative Center for Surveillance Research	Membership fees	Jul-13 to Jun-14	$110,000
Layered Sensing Student Research	AFRL/RYA	Sep-12 to Jun-14	$411,750
HAPSITE ER Volatile Signature Reception *Co-inv.: M. Rizki (PI), F. Garber, B.Rigling*	Henry Jackson Found. (AFRL/RH 711th HPW)	Sep-13 to Sep-14	$484,651
Object Physics for Exploit. & Recog. Adv. (OPERA)	SAIC (AFRL/RYA)	Sep-13 to Feb-15	$74,993
Fiorano Virtual Test Track *Co-investigator: B. Rigling (PI), T. Rovito (AFRL)*	Ohio Supercomputer Ctr.		100k RU
AFRL Research Collaboration Program ATRC Summer Program *Co-investigator: B. Rigling (PI), F. Garber*	AFRL/RYA	Feb-14 to Jun-17	$1,083,504
Collaborative Center for Surveillance Research	Membership fees (AFRL/RYA)	Feb-14 to Jun-17	$44,000
AFRL Research Collaboration Program	AFRL/RYA	Feb-14 to Jun-17	$390,584

FAR Team Postdoctoral Researchers			
AFRL Research Collaboration Program Gotcha HPC Tools	AFRL/RYA	Feb-14 to Jun-17	$382,534
AFRL Research Collaboration Program AFRL RCP Image Truthing	AFRL/RYA	Feb-14 to Jun-17	$60,000
Novel Signal Processing for Airborne Passive Synthetic Aperture Radar	System Tech. Research (AFRL/RYA)	Jun-14 to Feb-15	$40,000
Cooperative RF Sensors	Matrix Research (AFRL/RW)	Jul-14 to Mar-15	$15,000
Robust Adaptive Sensing Research *Co-inv.: R. Fogle (PI), B.Rigling*	Defense Eng. Corp. (AFRL/RYM)	Aug-14 to Aug-15	$47,499
Parallel Synthetic Aperture Acoustic *Co-inv.: B. rigling (PI), D. Short*	HPTi (AFRL)	Nov-14 to Aug-15	$17,344
Utilization of Hybrid Computing *Co-inv.: B. rigling (PI), D. Short*	HPTi (AFRL)	Nov-14 to Aug-15	$14,253
Collaborative Center for Surveillance Research	Membership fees	Jul-10 to Jan-16	$110,000

VII. Awards and Professional Recognition

- 2013-2014 Faculty Excellence in Research Award, College of Engineering and Computer Science
- 2012-2013 Outstanding Faculty Member, College of Engineering and Computer Science, nominated for Trustees' Award for Faculty Excellence
- 2011-2012 College of Engineering and Computer Science nominee for the Brage Golding Distinguished Professor of Research Award
- 2009-2010 College of Engineering and Computer Science nominee for the Brage Golding Distinguished Professor of Research Award
- 2007-2008 Faculty Excellence in Research Award, College of Engineering and Computer Science
- 2006 Research and Sponsored Programs Annual Report, featured faculty member for the 2000s
- 2005-2006 Nominee for the Excellence in Teaching Award for Faculty, College of Engineering and Computer Science

Michael A. Saville, Ph.D., P.E.

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Wright State University
422 Russ Engineering Center
3640 Colonel Glenn Highway
Dayton, OH 45435

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michael.saville@wright.edu
http://www.cs.wright.edu/msaville/
Citizenship: USA
DoD clearance date: 2011

I. EDUCATION

Ph.D., Electrical Engineering, University of Illinois at Urbana-Champaign 2006

- *Dissertation:*
  Multilevel Multipole-Free Fast Algorithm for Electromagnetic Scattering Problems in Layered Media

M.S.E.E. Air Force Institute of Technology (AFIT) 2000

- *Thesis: Investigation of Conformal High-Impedance Ground Planes*

B.S.E.E., Texas A&M University, *Magna Cum Laude* (University Fellow & Honors Citation) 1997

II. PROFESSIONAL EXPERIENCE

Academic

Wright State University, Department of Electrical Engineering, Assistant professor 2012 – present
Air Force Institute of Technology, Department of Electrical Engineering, Assistant professor 2006 – 2011

Government

Sensors Directorate, Air Force Research Lab, Senior Research Engineer, 2011 – 2012

- Radar-based electromagnetic phenomenology for layered sensing
- Laboratory radar experimentation in semi-controlled environment
- Full-wave modeling and simulation of electromagnetic scattering by complex targets

US Air Force, Military Officer and Enlisted 1985 – 2011

- Deputy Chair, EE Division Chief, Department of Electrical and Computer Engineering, AFIT
- Section Chief, supervised 20-member team of electronic warfare engineers, analysts and technicians
- Electronic warfare systems analyst, calibration technician, radar maintenance specialist

III. ACADEMIC AWARDS

- 2015 Nominee for the Presidential Early Career Award for Faculty Excellence, College of Engineering and Computer Science, Wright State University
- 2014 Nominee for the Excellence in Teaching Award for Faculty, College of Engineering and Computer Science, Wright State University
- 2011 SOCHE Excellence in Teaching Award, Air Force Institute of Technology

IV. TEACHING

WSU Graduate courses

EE 7470	Electromagnetics Simulation Methods (renewed course offering)
EE 7640	Advanced Electromagnetics Engineering (new course offering)
EE 7330	Modern Radar Theory (renewed course offering)
EE 4000/6000	Linear Systems II

AFIT Graduate courses

EENG 509	Fundamentals of Electronic Warfare (new course offering)
EENG 535	Radar Systems Analysis

EENG 622	Advanced Electromagnetics I
EENG 634	Methods in Computational Electromagnetics
EENG 668	Advanced Radar Systems Analysis
EENG 678	Adaptive Clutter Suppression
EENG 714	Advanced Topics in Radar Applications (new course offering)

Undergraduate courses

EE 3450	Fundamentals of Electromagnetics
EE 3450/L	Electromagnetics Lab

Graduate students

Student	Completion Date	Degree
Oscar Mayhew	Summer 2007 (AFIT)	M.S.E.E., *Radar System Characterization Extended to Hardware-in-the-Loop Simulation for the Lab-Volt System*
Soner Ozer	Spring 2008 (AFIT)	M.S. *Increasing Combat Aircraft Survivability Through Coherent Self-Protection Jammers*
James Townsend	Spring 2008 (AFIT)	M.S.E.E., *Improvement of ECM Techniques through Implementation of a Genetic Algorithm*
Jawad Farooq	Spring 2009 (AFIT)	Ph.D., *Frequency Diversity for Improving Synthetic Aperture Radar Imaging*
James Weber	Spring 2009 (AFIT)	M.S.E.E., *Modeling of DRFM Waveforms for Classification and Identification of Input Signals*
Nicholas Amato	Spring 2009 (AFIT)	M.S.E.E., *Modeling and Simulation Architecture for Studying Doppler-Based Radar with Complex Environments*
Manuel Arriagada	Spring 2010 (AFIT)	M.S., *Performance of Scattering Matrix Decomposition and Color Spaces for Synthetic Aperture Radar Imagery*
Lester Long	Spring 2010 (AFIT)	M.S.E.E, *An Approach to Large Scale Radar-Based Modeling and Simulation*
Steven Brady	Spring 2010 (AFIT)	M.S.E.E. (Distinguished Graduate), *Frequency Diverse Array Radar: Signal Characterization and Measurement Accuracy*
Steven Sutara	Spring 2011 (AFIT)	M.S.E.E., *Experimental Investigation into the Radar Cross Section of the Gridded Square Trihedral*
Dane F. Fuller	Summer 2011 (AFIT)	Ph.D., *Phase History Decomposition for Efficient Scatterer Classification in SAR Imagery*
Daniel E. Hack	Summer 2013 (AFIT)	Ph.D. *Passive MIMO Radar Detection*
	Supported as GRA summer 2009 through summer 2010	
Justin Farmer	Summer 2014	M.S., *Pixel Qualification Methods in Attributed Scattering Center Extraction*
	Supported as GRA spring 2014 through summer 2014	
Jason Brand	Fall 2014	M.S., *Biaxial Material Design Method for the Reduced Aperture Waveguide Model*
	Supported as GRA summer 2013 through summer 2014	
Ryan Shaver	Spring 2015*	M.S., *A Modeling Approach for the transition waveguide*
Joshua Compaleo	Summer 2015*	M.S., *topic TBD*
Erin Best	Fall 2016*	M.S., *topic TBD*
	* projected	

Thesis/Dissertation committees

Student	Completion Date	Degree
Matt Holston	Mar. 2007	M.S.E.E
Uttam Majumder	Mar. 2007	M.S.
Murat Dogrul	Mar. 2008	M.S.
Brian Donnel	Mar. 2008	M.S.E.E.
Paul Brand	Mar. 2008	M.S.E.E.
William Keichel	Mar. 2009	M.S.E.E.
Adam Schultz	Mar. 2009	M.S.E.E.
William Gunn	Mar. 2010	M.S.E.E.
Chris Allen	Ma. 2010	M.S.E.E.
Matt Nelms	Mar. 2010	M.S.E.E.
Stephen Moon	Mar. 2011	M.S.E.E.
Matt Olney	Mar. 2011	M.S.E.E.
Cody Lawyer	May 2014	M.S.
Ryan Hamilton	Jul. 2014	Ph.D.
Kumar Daram	Aug. 2014	M.S.
Sourav Dey	Aug. 2014	M.S.
Ali Karbasi	Nov. 2014	M.S.
Alex Compton	Jan. 2015	M.S.

V. SCHOLARSHIP

Journal papers

1. (R) M. A. Saville and W. C. Chew, "Error Control for 2-D FIPWA in Complex, Homogeneous Media," *Journal of Electromagnetic Waves & Applications*, vol. 20, no. 5, pp.567-581, May 2006.
2. (R) W. C. Chew, J. L. Xiong, and M.A. Saville, "A Matrix-Friendly Formulation of Layered Medium Green's Function," *IEEE Antennas and Wireless Propagation Letters*, vol. 5, pp. 490 -494, 2006.
3. (R) M. A. Saville and W. C. Chew, "Multipole-Free Fast Inhomogeneous Plane Wave Algorithm," *AGU Radio Science*, vol. 42, September 2007.
4. (R) D. F. Fuller and M. A. Saville, "A High-Frequency Multipeak Model for Wide-Angle SAR Imagery," *IEEE Trans. on Geoscience and Remote Sensing*, vol. 51, no. 7, Part 2, pp. 4279-4291, 2013.
5. (R) K. Barcomb, D. Krill, R. Mills and M. A. Saville, "Establishing Sovereignty in Cyberspace," *International Journal of Cyber Warfare and Terrorism*, vol. 2, no. 3, pp. 26-38, July-September 2012.
6. (R) M. A. Saville, J. A. Jackson, D. F. Fuller, "Rethinking Vehicle Classification with Wide-Angle Polarimetric SAR," *IEEE Aerospace and Electronic Systems Magazine*, Special Edition on Wide Angle SAR, Eds. B. Rigling, S. Scarborough, vol. 29, no. 1, pp. 41-49, February 2014.
7. (R) D. Hack, L. Patton, M. A. Saville, B. Himed, "Centralized Passive MIMO Radar Detection," *IEEE Trans. Signal Processing*, vol. 62, no. 11, pp. 3013-3023, June 2014.
8. (R) D. Hack, L. Patton, M. A. Saville, B. Himed, "Centralized Passive MIMO Radar Detection without Direct-Path Reference Signals," *IEEE Trans. Signal Processing*, vol. 62, no. 11, pp. 2999-3012, June 2014.
9. (R) J. Farmer and M. A. Saville, "'Effects of local peak detection on attributed scattering centre extraction in SAR," *IET Electronics Letters*, submitted, January 2015.
10. (R) J. M. Brand and M. A. Saville, "Design method for uni/biaxial material from bulk dielectric," *IEEE Antenna and Wireless Propagation Letters*, submitted, February 2015.
11. (R) D. Saini, J. Smith and M. A. Saville, "Vehicle classification from attributed SAR imagery," *IET Radar, Sonar and Navigation*, submitted for public release February 2015.

Conference papers

1. (Abstract) M. A. Saville and P. J. Collins, Measuring Surface Waves on High-Impedance Ground Planes, *Progress in Electromagnetics Review*, Boston, MA, July 2000.
2. (N) B. N. Behnken and M. Saville, "A Design of Experiments Methodology for Developing Cross-Platform Chaff Programs," *69th Military Operations Research Society Symposium*, Annapolis, MD, June 2001.
3. (R) M. A. Saville and W. C. Chew, "Error control for the 3D FIPWA in complex media," *IEEE Antennas and Propagation Society International Symposium*, Washington DC, USA, June 2005.
4. (R) M. A. Saville and W. C. Chew, "Multipole-free fast multilevel algorithm for layered media," *IEEE Antennas and Propagation Society International Symposium*, June 2006.
5. (R) S. Hong, M. A. Saville, C. Simpson and P. Marshall, "Investigation on Genetic Algorithm for Countermeasure Technique Generator," in *Proc. IEEE International Symposium on Signals, Systems and Electronics*, Montreal, QC, Canada, July 2007.
6. (R) W. C. Chew, I. T. Chiang, C. P. Davis, A. Hesford. M. K. Li, Y. Liu, Z. G. Qian, M. A. Saville, M.; Sun, L.; M. S. Tong, J. Xiong, L. J. Jiang, H. Y. Chao and Y. H. Chu, "Integral equation solvers for real world applications-some challenge problems," *IEEE Antennas and Propagation Society International Symposium*, Albuquerque, NM, July 2007.
7. (N) M. Holston, M. Minardi, M. A. Temple, and M. A. Saville, "Characterizing geolocation ambiguity responses in synthetic aperture radar: ground moving target indication," *Algorithms for Synthetic Aperture Radar Imagery XIV*, Edmund G. Zelnio, editor, *Proceedings of SPIE*, 2007.
8. (R) J. Farooq, M. A. Temple, and M. A. Saville, "Application of Frequency Diverse Arrays to Synthetic Aperture Radar Imaging," *International Conf. on Electromagnetics in Advanced Applications* (ICEAA), Torino, Italy, September 2007.
9. (N) S. Ozer, M. A. Saville, P. J. Collins, and A. J. Terzuoli, "Increasing the Survivability of a Strike Aircraft Formation Through Coherent Self-Protection Jammers," *NATO RTO SET-130 Symposium on Military Sensing*, Orlando, FL, March 2008.
10. (R) J. Farooq, M. A. Temple, and M. A. Saville, "Exploiting Frequency Diverse Array Processing to Improve SAR Image Resolution," *IEEE Radar Conf.*, Rome, Italy, May 2008.
11. (R) S. Hong, M. Longbrake, M. A. Saville and W. Zhiqiang, "Non-coherent cooperative jammer for multi-platform applications," *IEEE Radar Conf.*, Rome, Italy, May 2008.
12. (R) S. Ozer, M. A. Saville, P. J. Collins, A. J. Terzuoli, and R. K. Martin, "Modeling of a strike formation with coherent self-protection jammers," *IEEE Radar Conf.*, Rome, Italy, May 2008
13. (R) J. D. Townsend, M. A. Saville, S. M. Hong, and R. K. Martin, "Simulator for Velocity Gate Pull-Off Electronic Countermeasure Techniques," *IEEE Radar Conf.*, Rome, Italy, May 2008.
14. (R) J. D. Townsend, M. A. Saville, S. M. Hong, R. K. Martin, C. Simpson, and O. Mayhew, "Waveform Optimization for Electronic Countermeasure Technique Generation," *IEEE Radar Conf.*, Rome, Italy, May 2008.
15. (R) M. Dogrul, P. J. Collins, M. A. Saville, K. Sertel and A. J. Terzuoli, "Improved bandwidth conformal bow-tie antennas printed on multi-scale triangular-patch high-impedance ground planes," ," *IEEE Antennas and Propagation Society International Symposium*, Honolulu, Hawaii, June 2008.
16. (R) M. Dogrul, P. J. Collins, M. A. Saville, K. Sertel and A. J. Terzuoli, "Simulation of Improved Bandwidth Conformal Bow-Tie Antennas for Remote Sensing Printed on Multi-Scale Triangular-Patch High-Impedance Ground Planes," *IEEE International Geoscience and Remote Sensing Symposium*, 2008.
17. (Abstract) M. Dogrul, P. J. Collins, M. A. Saville, K. Sertel, and A. J. Terzuoli, "Improved Bandwidth Conformal Bow-tie Antennas Printed on Multi-scale Triangular-patch High-impedance Ground Planes — Simulation," *Progress in Electromagnetics Review*, Cambridge, MA, July 2008.
18. (R) D. F. Fuller and M. A. Saville, "Rapid extraction of doubly-curved scattering centers for automobile detection in the presence of clutter," *IEEE Radar Conf.*, Pasadena, CA. USA, May 2009.
19. (N) D. F. Fuller and M. A. Saville, "The spectrum parted linked image test (SPLIT) algorithm for estimating the frequency dependence of scattering center amplitudes," *Algorithms for Synthetic Aperture Radar Imagery XVI*, Edmund G. Zelnio, editor, *Proceedings of SPIE*, 2009.

20. (N) D. E. Hack and M. A. Saville, "Verification of target motion effects on SAR imagery using the Gotcha GMTI challenge dataset, *Algorithms for Synthetic Aperture Radar Imagery XVII*, Edmund G. Zelnio, editor, *Proceedings of SPIE*, 2010.
21. (N) D. F. Fuller and M. A. Saville, Classification of canonical scattering through sub-band analysis," *Algorithms for Synthetic Aperture Radar Imagery XVII*, Edmund G. Zelnio, editor, *Proceedings of SPIE*, 2010.
22. (R) I. Bradaric, G. T. Capraro, S. H. Brady, M. A. Saville and M. C. Wicks, "Multistatic measurements in a controlled laboratory environment," *IEEE Radar Conf.*, Washington D.C. USA, May 2010.
23. (R) H. R. Brady and M. A. Saville, "Scaling radar measurements for advanced algorithms," *IEEE Radar Conf.*, Washington D.C. USA, May 2010.
24. (R) M. A. Saville, K. Monroe, C. Allen and R. K. Martin, "Processing-based tuner gain correction in a wideband multi-channel receiver," in *IEEE Radar Conf.*, Washington D.C. USA, May 2010.
25. (N) D. F. Fuller, D. E. Hack, S. Sutara, A. Tempelis, M. Jussaume, M. A. Saville, J. A. Jackson, "Integrating electromagnetics and signal processing into new radar algorithms," *2011 International Conf. on Electromagnetics in Advanced Applications (ICEAA)*, Torino, Italy, September 2011.
26. (Abstract) M. A. Saville**,** D.F. Fuller, and J. A. Jackson, "Advances in Polarimetric Synthetic Aperture Radar", *IEEE Antennas and Propagation Society International Symposium*, Chicago, IL., July 2012.
27. (N) K. Barcomb, D. Krill, R. Mills, and M. A. Saville, "Establishing Cyberspace Sovereignty," *International Conference on Information Warfare and Security*, Seattle, WA, March 2012.
28. (R) D. E. Hack, L. K. Patton, B. Himed, M. A. Saville, "On the Applicability of Source Localization Techniques to Passive Multistatic Radar," *IEEE 46th Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, CA, November 2012.
29. (R) D. E. Hack, L. K. Patton, A. D. Kerrick, M. A. Saville, "Direct Cartesian detection, localization, and de-ghosting for passive multistatic radar," *2012 IEEE 7th Sensor Array and Multichannel Signal Processing Workshop (SAM)*, Hoboken, NJ, June 2012.
30. (Abstract) J. M. Brand, M. A. Saville, J. W. Allen, M. S. Allen, "Coordinate Transformation for Conformal Circular Antenna Arrays in Anisotropic Non-Homogeneous Media," *Government Microcircuit Applications and Critical Technology Conference*, Charleston, SC, April, 2014.
31. (N) J. Farmer and M. A. Saville, "Qualifying Pixels for Attributed Scattering Center Extraction", *IEEE National Aerospace and Electronics Conf.*, July 2014.
32. (R) Y. Guzel, L. Lo Monte, M. A. Saville, M. C. Wicks, "Spectral and spatial diversity in radar," *IEEE Radar Conference 2015*, accepted for presentation January 2015.
33. (R) E. Shepherd, C. Rockett, T. Almutairi, E. Sum, J. Compaleo, and M. A. Saville, "Small antenna positioning system design at Wright State University," *IEEE Antennas and Propagation Society International Symposium*, accepted for presentation, Jul. 2015.
34. (R) E. Sum, J. Compaleo, and M. A. Saville, "Correcting phase offset with antenna positioning capability," *IEEE Antennas and Propagation Society International Symposium*, submitted January 2015.

Invited presentations

1. D. E. Hack and M. A. Saville, "An Investigation of OFDM Interference on Radar System Performance," presented to *MSS Tri-Service Radar Symposium*, Boulder, CO., July 2009.

Grants Funded

Project Title:	**Sponsor:**	**Dates:**	**Amount:**
Algorithms for Dismount Detection in Synthetic Aperture Radar	Matrix Research	May-12 to Dec-13	$75,848
Transformational Optics Design of Antenna	AFRL/RYMH	Jan-13 to Dec-13	$30,000
Feasibility Study on Radar Exploitation (REX) Using Compact Feature Extraction	Etegent (AFRL/RYM)	Sep-13 to May-14	$20,000
Transformation Optics Design of Antennas and Complex Electromagnetic structures	S4 (AFRL/RYMH)	Jan-14 to Oct-14	$30,000

Phase Noise Effects on SAR Complex Electromagnetic structures	AFRL/RYAP	May-14 to Aug-15	$56,000
Signatures Phenomenology and Measurement Test Bench	AFRL/RYAP	submitted Sep 14	$90,000
Synthetic Aperture Image Formation from CAD Models	DLA (DARPA)	submitted May 15	$502,570
Clutter Modeling for Ray Tracing Methods	Riverside Research (AFRL/RYMH)	submitted May 15	$31,500

VI. SERVICE

Professional organizations	**Role**	**Year**
IET Radar, Sonar, & Navigation	Reviewer	2006–present
AGU Radio Science	Reviewer	2007–present
IEEE Antenna and Propagation Society Meeting	Reviewer	2008–present
IEEE Radar Conference	Reviewer	2009–present
IEEE Transactions on Aerospace and Electronic Systems	Reviewer	2010–present
IEEE Transactions on Geoscience and Remote Sensing	Reviewer	2011–present
IEEE Antennas and Wireless Propagation Letters	Reviewer	2011–present
Progress in Electromagnetics Research Society (PIERS)	Assoc. Editor	2012–present
SHPE, 2013 Region 6 Leadership Development Conference, Dayton, Ohio	Tech. Chair	Mar. 2013

Academic committees	**Organization**	**Role**	**Year**
HLC Report	AFIT	Member	2009-2010
Administration	Electrical Engineering Division (AFIT)	Chief	2009-2010
Administration	Department of Electrical and Computer Engineering (AFIT)	Deputy Chair	2010-2011
Civilian Student Working Group	College of Engineering and Management (AFIT)	Member	2010-2011
Faculty Search	Department of Electrical Engineering	Member	2014–present
Scholarship	College of Engineering and Computer Science	Member	2015–present

CURRICULUM VITAE

Arnab K. Shaw

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Wright State University
Dayton OH 45435
Phone: (937)-775-5064; Email: ashaw@wright.edu

Citizenship Status: Citizen of USA
Marital Status: Married with 2 Children

EDUCATION

Institution	Concentration	Degree/Date	
University of Rhode Island, Rhode Island	Electrical Engineering	Ph.D.	1987
Villanova University, Pennsylvania	Electrical Engineering	M.S.	1983
Jadavpur University, Calcutta, India	Electrical Engineering	B.E.	1979

ACADEMIC EXPERIENCE

Institution	Position	Dates
Wright State University	Professor	Fall-2000-
Wright State University	Associate Professor	1994-2000
Wright State University	Assistant Professor	1987-1994
University of Rhode Island	Research Fellow	1984-1987
Southern Methodist University	Teaching Assistant	1983
Villanova University	Teaching Assistant	1982-1983

OTHER PROFESSIONAL EXPERIENCE

Organization	Position	Dates
Wright-Patterson AFB, Dayton	Sabbatical	2012-2013
Wright-Patterson AFB, Dayton	Summer Faculty	2012
Wright-Patterson AFB, Dayton	Sabbatical	2003-2004
Wright-Patterson AFB, Dayton	Summer Faculty	1992
Villanova University	Consultant, Computer Services	1983
Villanova University	Programmer, CAD Project	1982-83
Calcutta Electric Supply Company	Engineer Trainee	1980

PROFESSIONAL MEMBERSHIP

Association	Status	Dates
IEEE	Member	1978-present
Tau Beta Pi		

AWARDS

2006	Chief Scientist's Award, The Sensor's Directorate, AFRL, WPAFB, Dayton, OH. (For the work on Cognitive Radio in collaboration with Vasu Chakravarty and James Stephens)
1993-1994	Excellence in Research, College of Engineering and Computer Science, Wright State University
1984-1987	Transcom Research Fellowship, for pursuing Ph.D. studies at University of Rhode Island

LIST OF COURSES TAUGHT

UNDERGRADUATE LEVEL

EE 303/503	Circuit Analysis II
EE 304/504	Circuit Analysis II (Lab)
EE 331/531	Electronic Devices I
EE 332/532	Electronic Devices I (Lab)
EE 321/521	Linear Systems I
EE 322/522	Linear Systems II
EE 326/526	Random Signals and Noise
EE 421/621	Communication Theory
EE 435/635	Analog and Digital Filter Design
EE 473/673	Communication Systems Design I
EE 480/680	Probability Theory for Electrical Engineers

GRADUATE LEVEL

EE 701	Linear Systems
EE 7150	Digital Image Processing
EE 735	Wireless Communication Techniques
EE 736	Advanced Wireless Communication Techniques
EE 761	Analytical Techniques of Stochastic Analysis
EE 762	Detection, Estimation, and Optimal Filter Theory
EE 763	Classical and Modern Spectral Analysis

PRINTED SCHOLARSHIP

Journal Articles

1. Gilmore, S. W., Malas, J. A., Ryan P. A. , and Shaw, A. K., "Expressions for Statistics on Fluctuating Targets using Scattering Centers," *IEEE Transactions of Aerospace and Electronics Systems,* Submitted, November, 2014.
2. Shaw, A. K. Paul, A. S. and Williams, R., "Eigen-Template based HRR-ATR with Multi-Look and Time-Recursion,", *IEEE Transactions on Aerospace and Electronic Systems,* vol. 49, no. 4, pp. 2369-2385, Oct., 2013.
3. Chakravarthy, V.; Nunez, A.S.; Stephens, J.P.; Shaw, A.K.; Temple, M.A.., "Adaptive Waveform Having Spectral Sharing Capability," *AFRL Technology Horizons,* pp. 8-11, Vol. 7, No. 5, Oct. 2006.
4. Chakravarthy, V.; Nunez, A.S.; Stephens, J.P.; Shaw, A.K.; Temple, M.A.., "TDCS, OFDM, and MC-CDMA: A Brief Tutorial," *IEEE Communication Magazine,* Vol 43, Issue 9, pp. S11-S16, Sep. 2005.
5. Mitra, A. K., Shaw A. K., and Lewis T., "Rank-Order Filters for FOPEN Target Detection," *IEEE Signal Processing Letters*, vol. 11, No. 2, pp. 93-96, February, 2004.
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1. Smith, A., Shaw, A. K., Clouse, S., Sigmund, K., and Velten, V., "Remote Vibrometry Vehicle Classification," *Ground/Air Multisensor Interoperability, Integration, and Networking for Persistent ISR VI, SPIE-2014*, Baltimore, MD, April, 2015.
2. Smith, A., Shaw, A. K., Goley, S., Clouse, S., and Velten, V., "Comparison of Algorithms for Remote Vibrometry Vehicle Classification," *Signal Processing, Sensor/Information Fusion, and Target Recognition XXIV, SPIE-2014*, Baltimore, MD, April, 2015.
3. Smith, A, Kangas, S, Mendoza-Schrock, O., Dierking, M. and Shaw, A. K., "Stability Analysis of Laser Vibrometry for Vehicle Classification,", DS111-13, SPIE-2014, Baltimore, MD, April-2014.
4. Wilkins N. and Shaw, A. K., "Multiple Source Resolution for True Time Delay Beam-Space Processing", *SAM 2012 - The 7th IEEE Sensor Array and Multichannel Signal Processing*, June 17 to 20, 2012, Rutgers, NJ, USA.
5. Wilkins N. and Shaw, A. K., " Beamformer Bank Optimization for True Time Delay Beam-Space Processing", *SAM 2012 - The 7th IEEE Sensor Array and Multichannel Signal Processing*, June 17 to 20, 2012, Rutgers, NJ, USA.
6. Shaw, A. K., Rahn, D. and Depoy, R., "Fusion of UHF-SAR and LIDAR Elevation for Precise Buried Object Detection," *Defense and Security Symposium, SPIE-2012*, Baltimore, MD, April, 2012.
7. Wilkins N. and Shaw, A. K., "Frequency Invariant Electro-Magnetic Source Location Using True Time Delay Beam Space Processing", *2010 IEEE International Symposium on Phased Array Systems & Technology*, October 12 to 15, 2010, Waltham, Massachusetts, USA.

8. Simmons, D., Kerekes, J., Rahn, D., Shaw, A. K. and Medford, J., "Hyperspectral imaging phenomenology of genetically engineered plant sentinels", *IEEE International Geoscience and Remote Sensing Symposium, IGARSS'10. Honolulu, Hawaii, 25-30 July 2010.*
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11. Vongsy, K., Karimkhan, S., Shaw, A. K., and Wicker D., "Change Detection for Hyperspectral Imagery," *Defense and Security Symposium, SPIE-2007,* Orlando, FL, April, 2007.
12. Karimkhan, S., Vongsy, K., Shaw, A. K., and Wicker D., "Automated Recognition and Detection of Dismounts and Vehicles using Close-in Urban Hyperspectral Images," *Defense and Security Symposium, SPIE-2007,* Orlando, FL, April, 2007.
13. V. Chakravarthy, Z.Wu, A. Shaw, M. Temple, R. Kannan and F. Garber, "A General Overlay/Underlay Analytic Expression Representing Cognitive Radio Waveform", *IEEE Waveform Diversity Conference,* June 2007.
14. Lewis, T, Mitra, A. K. and Shaw, A. K., "An Iterative Approach for SAR Moving Target Detection and Geolocation in SAR", SPIE-2006, 62370W-62370W-12, Orlando, FL, April, 2006.
15. Shaw, A., Jamali, M. and Wilkins, N**,** Toward Bandwidth Invariance of Spatial Processing in the Non-Cooperative Receiver," (Paper#: S05.9), *Fourth IEEE Workshop on sensor array and multi-channel processing,* Waltham, MA, Jul 12-16, pp. 556-560, 2006.
16. Lewis, T, and Shaw, A. K., "An Iterative Method for SAR Moving Target Detection and Geolocation for Staring Radar Applications", SPIE-2005, Orlando, FL, March, 2005.
17. Chakravarthy, V., Stephens, J. P., Shaw, A. K. and Temple M. "Cognitive Radio – An Adaptive Waveform with Spectral Sharing Capability," *IEEE Wireless Communications & Networking Conference (WCNC),* March 2005.
18. Mitra, A., Lewis, T, and Shaw, A. K., "Ultra-wideband Radar Target Detection for Sloped and Diffuse Scattering Environments", SPIE-2004, Orlando, FL, April, 2004.
19. Roy, A., Shaw, A. K. and Kerrick, A.,"Colored Petri Net Simulation and Modeling of Air-to-Ground Targeting," SPIE-2004, Orlando, FL, April-2004.
20. Kerrick, A. and Shaw, A. K., "A Kill Chain Architecture for Prosecution of Ground Targets," SPIE-2004, Orlando, FL, April-2004.
21. Paul, A.S. and Shaw, A.K., "Robust HRR radar target identification by hybridization of HMM and Eigen template based matched filtering", *Automatic Target Recognition XIII, Proceedings of SPIE,* vol. 5094, pp. 278-289, Orlando, FL, April 2003.
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44. Shaw, A. K., "Optimally Decoupled Estimation of Rational Transfer Function Parameters," *Fifth IEEE Digital Signal Processing Workshop*, Starved Rock, IL, September 1992.
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50. Shaw, A. K., "Order Recursive Parametric Bispectrum Estimation," *IEEE International Conference on Acoustics, Speech and Signal Processing*, Toronto, Canada, pp. 3501-3504, May 1991.
51. Shaw, A. K. and Misra, P., "Time Domain Identification of Proper Discrete Systems from Measured Impulse Response Data," *IEEE International Conference on Acoustics, Speech and Signal Processing*, Toronto, Canada, pp. 1689-1692, May 1991.
52. Shaw, A. K., "A Novel Cyclic Algorithm for Maximum Likelihood Frequency Estimation," *IEEE International Conference on Systems Engineering*, Dayton, OH, pp. 412-415, August 1991.
53. Mitchell, R. and Shaw, A. K., "Vowel Recognition using Time Delay Neural Networks," *IEEE International Conference on Systems Engineering*, Dayton, OH, pp. 637-640, August 1990.
54. Shaw, A. K. and Mitchell, R., "Phoneme Recognition using Time Delay Neural Networks," *International Joint Conference on Neural Networks*, San Diego, CA, vol.-2, pp. 191-195, June 1990.
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57. Misra, P. and Shaw, A. K., "2-D State-space Filters with Reduced Number of Multipliers," *Asilomar Conference*, Pacific Grove, CA, September 1989.
58. Shaw, A. K. and Manickam, T., "A Parameter Adaptive Fast Simulated Annealing Algorithm," *IEEE International Conference on Systems Engineering*, Dayton, OH, pp. 213-216, August 1989.
59. Shaw, A. K. and Kumaresan, R., "Some Structured Matrix Approximation Problems'" *IEEE International Conference on Acoustics, Speech and Signal Pro*cessing, New York, NY, pp. 2324-2327, April 1988.
60. Shaw, A. K. and Kumaresan, R., "Estimation of Angles of Arrivals of Broad-band Sources," *IEEE International Conference on Acoustics, Speech and Signal Proce*ssing, Dallas, TX, pp. 2296-2299, April 1987.
61. Shaw, A. K. and Kumaresan, R., "Frequency-Wavenumber Estimation by Structured Matrix Approximation," *Third IEEE-ASSP Workshop on Spectrum Estimation and Mode*ling, Boston, MA, pp. 81-84, November 1986.
62. Kumaresan, R. and Shaw, A. K., "High Resolution Bearing Estimation Without Eigen-decomposition," *IEEE International Conference on Acoustics, Speech and Signal Processing*, Tampa, FL, pp. 576-579, April 1985.

GRANTS AND CONTRACTS

Total External Funding = $ 1,614,986 **Total Funding = $1,686,567**

1. Principal Investigator, Shaw, A. K., Hierarchical Classification of Vibrometry Data with Decision Level Fusion using Synthetic Aperture Radar, WSU Grant# - ??, NSF Center for Scientific Research, OSU-WSU. **(Aug-14 to Aug-15, $44,000)**
2. Principal Investigator, Shaw, A. K., Techniques of Unitary Transform and Modal Mutual Information, WSU Grant# - 668809, AFRL. **(Mar-13 to Mar-15, $111,680)**
3. Principal Investigator, Shaw, A. K., Separability and Stability Analysis of Laser Vibrometry Signals, & Ladar Techniques and Research. WSU Proposal# 13-095-10/13-0292-02 WSU Grant# - 668947/669477, AFRL (via LEIDOS/SAIC Subcontract). **(Sep-12 to May-16, $242,624)**
4. Principal Investigator, Shaw, A. K., PALODE-A Hand Launched Fire-and-Forget Surveillance for use by Ground Force Troops, WSU Proposal# 12-592-14. WSU Grant# - 668789, AFRL Student Challenge, Ohio Aerospace Institute. (Jan-12 to June-12, $5082)
5. PI, Shaw, A. K., Urban Vigilance Using Layered Sensing, WSU# 08-383-10. SBIR Phase II, Gitam Technologies, Inc. (May-08 to Jan-11, **$135,625**)
6. Principal Investigator, Shaw, A. K., Characterization of Hyperspectral Images for Automated Target Detection and Recognition, AFRL, RASER BAA: 04-03-SNK (Jul-05 to Nov-08, **$261,855**)
7. Principal Investigator, Shaw, A. K., Analysis and Characterization of Hyperspectral Images in Urban Combat, DARPA/AFRL via Alphatech Corporation. (Aug-04 to Feb-05, **$40,000**)

8. Co-Principal Investigator, Shaw, A. K, (with R. Moses, L. Potter, OSU and A. Terzouli AFIT), Performance Assessment for FOPEN Radar target Dection, Dayton Area Graduate Studies Institute (DAGSI). (July 1, 2001 to June 2004, **$50,849**)
9. Principal Investigator, Shaw, A. K., Controlling the Apparent Vocal Effort of Synthetic Speech, Air Force Research Lab, WPAFB via Veridian Corporation. (Jan-01 to Sep-03, **$114,264**)
10. Principal Investigator , Shaw, A. K., Order Statistics for FOPEN Target Detection, Air Force Research Lab, WPAFB via Sverdrup Corporation. (Oct-01 to Feb-03, **$25,000**)
11. Principal Investigator (Sub-contract), Shaw, A. K., Unified Design of 1-D Automatic Target Recognition Systems for Surveillance and Attack}, DARPA and WPAFB via Mission Research Corporation. (June 1998 to November 2000, **$130,233**)
    Note: A consortium of 4 Universities and 3 Corporations is conducting this 3-year project with $1.4mil/year award from DARPA.
12. Principal Investigator, Shaw, A. K., Algorithms for High-Range Resolution Automatic Target Recognition, AARC (via Sverdrup Corp.), Wright Patterson Air Force Base, Dayton, OH. Program Monitor : Dr. Rob Williams, (June 1996 to June 2001, **$143,466**)
13. Principal Investigator, Shaw, A. K., - Automatic Target Recognition using High-Range Resolution Data, jointly funded by AFOSR and Wright Laboratories, Program Monitors : Dr. Jon Sjogren and Dr. Rob Williams (April 1997 to December 1997, **$31,486**)
14. Principal Investigator, Shaw, A. K., Pipelined and Systolic Architectures for Signal Processing, Ohio Research Challenge Award, Wright State University, (June, 1997 to May 1999, **$16,222**)
15. Principal Investigator - A. K. Shaw, Algorithms for Digital Microwave Receivers and Optimal System Identification, Air Force Office of Scientific Research (AFOSR); Program Monitor : Dr. Jon Sjogren (October 1992 to October 1996, **$142,884**)
16. Principal Investigator - A. K. Shaw, High Resolution DOA Estimation, Research Incentive Award, Graduate Research Council, Wright State University, (July 1994 to June 1995, $7,500)
17. Principal Investigator - A. K. Shaw, Digital Signal Processing Algorithm for Digital EW Receivers, AFOSR - Research and Development Laboratory, Research Initiation Program, Program Monitor: Dr. James B. Y. Tsui, Avionics Laboratories, Wright-Patterson AFB (January 1993 to December 1993, **$20,000**)
18. Co-Principal Investigator - W. Hankey, P. Misra and A. K. Shaw, Inverse Methods for Iterative Refinement of Turbulence Models, WRDC, Wright Patterson Air Force Base (1990-1992, **$120,000**).
19. Principal Investigator - A. K. Shaw, New Algorithms for Broadband and Narrowband Source Localization, Air Force Office of Scientific Research (AFOSR), Program Monitor: Maj. Brian Woodruff, and Dr. Jon Sjogren (April 1989 to August 1991, **$35,647**).

20. Principal Investigator - A. K. Shaw, Faster Simulated Annealing Algorithms}, Research Incentive Award, Graduate Research Council, Wright State University (June 1989 to May 1991, 3,000).

21. Equipment Grant from Motorola, DSP 5600 Board (1991, $3,500).

22. Travel Grant, Graduate Research Council, Wright State University (September 1992, $450).

23. Travel Grant, Graduate Research Council, Wright State University (December 1991, $1,200).

TECHNICAL REPORTS

1. A. K. Shaw. - Urban Vigilance Using Layered Sensing, Gitam Technologies, Inc.& AFRL, WPAFB, Final and Monthly Reports, 2008-2010.

2. A. K. Shaw. - Characterization of Hyperspectral Images for Automated Target Detection and Recognition, AFRL, WPAFB, Final and Monthly Reports, 2005-2008.

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4. A. K. Shaw. - Order Statistics for FOPEN Detection, Sverdrup Corporation and Wright Laboratories, Monthly Reports, 2002-2003.

5. A. K. Shaw, - Controlling the Apparent Vocal Effort of Synthetic Speech, Veridian Corporation and Wright Laboratories, Monthly Reports. 2001-2003.

6. A. K. Shaw, - Algorithms for High-Range Resolution Automatic Target Recognition, Interim Technical Report, AARC (via Sverdrup Corp.), Wright Patterson Air Force Base, Dayton, OH.

7. A. K. Shaw, - Algorithms for Digital Microwave Receivers and Optimal System Identification, Air Force Office of Scientific Research (AFOSR); Final Technical Report, January 1997.

8. A. K. Shaw, Digital Signal Processing Algorithm for Digital EW Receivers, Final Report, AFOSR-RDL Research Initiation Program, December 1993.

9. A. K. Shaw, and Nunes, S., Detection and Adaptive Frequency Estimation for Digital Microwave Receivers, Final Report, AFOSR Summer Research Program, October 1992.

10. Shaw, A. K., New Algorithms for Broadband and Narrow-band Source Localization and Efficient Realization of 2D IIR Filters, Final Report, AFOSR-Bolling AFB, September 1991.

11. R. Kumaresan and A. K. Shaw, Description of Algorithms and Programs for Echo Cancellation, Final Report, Transcom Electronics, Newport, RI, 1987.

THESIS SUPERVISED

1. Randy Depoy — Ph.D.-EE, LiDAR-SAR Related topic - in progress (**Dissertation Director**)

2.	Nathan Wilkins	Ph.D.-EE, Angles-of-Arrival Estimation of Broadband Signals. in progress (**Dissertation Director**)
3.	Ashley Smith	Ph.D-EE, Hierarchical Classification of Vibrometry Data with Decision Level Fusion using Synthetic Aperture Radar, in progress (**Dissertation Director**)
4.	Majid Shaik	MS-EE, Angles-of-Arrival Estimation of Broadband Signals, in progress (**Thesis Director**)
5.	Douglas Preston	MS-EE, Topic on LIDAR signal processing, in progress (**Thesis Director**)
6.	Bashar Antoon	MS-EE, Display, Analysis and Automatic Target Recognition in SAL, in progress (**Thesis Director**)
7.	Eric Hillen	MS-EE, Memory Augmentation and Open Set ATR for HRR Data, in progress (**Thesis Director**)
8.	Ashley Smith	MS-EE, Separability and Stability Analysis of Laser Vibromelry Signals, 2014 (**Thesis Director**)
9.	Kandarp Patel	MS-EE, Analysis Of Human Echolocation Waveform For Radar Target Recognition, 2013 (**Thesis Director**)
10.	Randy Depoy	MS-EE, "UHF-SAR and LIDAR "Complementary Sensor Fusion for Unexploded Buried Munitions Detection," 2012 (**Thesis Director**)
11.	Vasu Chakravarty	Ph.D.-EE, "Evaluation of Overlay/Underlay Waveform via SD-SMSE Framework for Enhancing Spectrum Efficiency". 2008 (**Dissertation Director**)
12.	Karmon Vongsy	MS.-EE, "Change Detection Methods for Hyperspectral Imagery". 2007 (**Thesis Director**)
13.	Sivaram Bandaru	MS.-EE, "Turbo-Coding and Space-time Wireless Communication". 2004 (**Thesis Director**)
14.	Anindya Paul	MS-EE, "Improved Target Recognition and Target Detection Algorithms using HRR Profiles and SAR Images", September, 2003 (**Thesis Director**)
15.	Koel Das	MS-EE, "Perceived Distance of Synthesized Speech and Automatic Speaker Recognition using F0 Manipulation", December 2002 (**Thesis Director**)
16.	Radhika Prakash	MS-EE, "Feature-based HRR-ATR using HMM of Wavelet Coefficients" 2001, (**Thesis Director**)
17.	Titash Rakshit	MS-EE, "Physics-Based Modeling of Dispersive Scatterers". June, 2000 (**Thesis Director**)
18.	Rajesh Vashist	MS-EE, "Automatic Target Recognition using Wavelet Basis". March, 2000 (**Thesis Director)**
19.	Vijay Bhatnagar	MS-EE, "Automatic Target Recognition using High Range Resolution Data" 1998 (**Thesis Director**)
20.	Imtiaz Mohamed	MS-EE, "Efficient Architectures for Signal Processing Algorithms," 1996 (**Thesis Director**)
21.	Srikanth Pokala	MS-EE, "`Two-Dimensional Filter Design using Structured Matrix Approximation," 1995 (**Thesis Director)**

22. Wei Xia	MS-EE, "Angles-Of-Arrival and Radio Frequency Estimation in the Digital Electronic Warfare Receiver Design," 1994. (**Thesis Director**)
23. Shubhasish B. Kundu	MS-EE, "Linear and Nonlinear System Identification," 1992 (**Thesis Director**)
24. Richard A. Mitchell	MS-EE, "Speech and Speaker Recognition with a Time Delay Neural Network," 1990 (**Thesis Director**)

Thesis Committee Memberships (partial list)

1. Jian Ming	Ph.D.-EE, "Acoustical Source Localization in Microphone Array'', *Nanyang Technological University, Singapore, September 1998 (**External Examiner**)*
2. Prithiviraj Tissainayagam	Master of Engineering Science, "Subspace Decomposition and Tracking using Artificial Neural Networks*," University of Melbourne, Parkville, Australia, December 1994, **(External Examiner)***
3. Erik Blasch	Ph.D.-EE, "Simultaneous HRR Target Tracking and Identification," April, 2002 (Committee Member)
4. Arunesh Roy	MS-EE, "Synthesis of Controllers using the Polytope Algorithm," June 1999, (Committee Member)
5. Aneesa Kunju	MS-EE, "An FPGA Implementation of a 2D Pipelined Median Filter," June 1999, (Committee Member)
6. Masoud Pourali	MS-EE, "Quality Power for Sensitive Load," June 1999, (Committee Member)
7. Yusheng Sun	MS-EE, "Multirate Model Based Multipattern Data Association and Target Tracking Algorithm," June 1998, (Committee Member)
8. Rajamohana Hegde	MS-EE, "Design of Digital Filters using the Maximally Flat Criterion," July 1996 (Committee Member)
9. Sanjiv M. Karani	MS-EE, "Geometric Invariance in Computer Vision Considering Multiresolution Approaches," 1995 (Committee Member)
10. Gwo-Jieh Wang	MS-EE, "Real-Time Adaptive Multiresolution Multiple-Model Target Tracking," 1994 (Committee Member)
11. Weichang Wang	MS-EE, "Multiplatform Multiresolution Distributed Filtering for Maneuvering Targets with Adaptive-Rate Data Communication," 1994 , (Committee Member)
12. Hong-Hui Xu	MS-EE, "Integrating MHT/SB with IMM for Advanced Target Tracking," December 1993 (Committee Member)
13. Matthew P. Dierking	MS-EE, "A Spinning Mirror System for Laser Receiver Absolute Response Evaluation," 1991 (Committee Member)
14. Ron Kamm	MS-EE, "High-Speed Spectral Estimation using an Optical Implementation of the Discrete Hartley Transform," 1991 (Committee Member)
15. Thulasinath Manickam	MS-EE, "Principal Component Analysis of Multidimensional Systems: Theory and Applications," 1990 (Committee Member)

16. Clay Breznik	MS-EE, "A Neural Network for Detecting Edges in a Gray Scale Image," 1989 (Committee Member)
17. John Mossing	*MS-CS*, "Developing a Personal Computer Based Digital Signal Processing System," 1991 (Committee Member)
18. Deepak Advani	*MS-CS*, "Design and Implementation of a Driver for Token Ring LAN under UNIX Environment," 1990 (Committee Member)

SERVICE AND ACADEMIC OUTREACH

UNIVERSITY, COLLEGE AND DEPARTMENT

University Committee	**Position**	**Dates**
Academic Council (Faculty Senate)	Member (elected)	1995-1997
Parking	Member	2010-2011
Buildings and Grounds	Member	1997-1998
		2007-2008
Regent's Undergraduate Fellow Selection	Member	1995-2001
Undergraduate Petition Council	Member	1994-1995
Food Services	Member	1993
Library	Member	1989-90

College Committee	**Position**	**Dates**
Faculty Development	Member (elected)	2000-2002
		2004-2008, 2011
Academic Computing	Scribe	2009-2010
EE Chair Search	Member	1998-2000
Academic Mediation	Member	1999-2003
Due Process	Member	1997-2003
EE Chair Review	Member	1995-1996
Undergraduate Petitions	Member	1993-1995
Library	Member	1989-90

Department Committees	**Position**	**Dates**
Graduate Program	Chair	2014-
	Member	2009-
Lab Development	Chair	1996-2003
	Member	1993-1996
Faculty Search	Member	2013-2014
		2000-2003
Colloquium	Chair	1990
	Member	1988-89
		1996-2001

Curriculum (subcommittees)	Member	1987-present

INTERNATIONAL, NATIONAL AND LOCAL

Associate Editor **Editorial Board member**	1998-2004	**IEEE Transactions on Signal Processing**
Program Committee	2003	ACM Workshop on Biometrics
Panelist, Phenomenology Based ATR	April, 2000	SPIE-2000, Orlando, Florida
International Advisory Board and Reviewer	December, 1999	2nd International Conference on Information, Communications and Signal Processing
External Reviewer	Ph.D.-EE Dissertation September 1998	Nanyang Technological University, Singapore
Faculty Representative	1997-2000	IEEE Chapter, Wright State University.
President	1995-96	Local Chapter of IEEE Signal Processing Society, Dayton OH
Vice-President	1994-95	Local Chapter of IEEE Signal Processing Society, Dayton OH
Secretary	1993-94	Local Chapter of IEEE Signal Processing Society, Dayton OH
External Reviewer	Master of Engg Science December 1994	University of Melbourne, Parkville, Australia
Proposal Reviewer	1991-1992	National Science Foundation; reviewed 3 proposals
Paper Reviewer		IET, IEEE Transactions on Signal Processing; IEEE Transactions on Geoscience and Remote Sensing, IEEE Transactions on Circuits and Systems, IEEE Transactions on Control Systems, IEEE Transactions on Aerospace and Electronic Systems, IEEE Transactions on Multimedia; and IEE Proceedings, IEEE Signal Processing Letters. Also for several IEEE International Conferences.
Tutorial Presentation	May 1991	Classical & Modern Frequency Estimation, IEEE-NAECON-91, Dayton OH

Member, Organizing Committee	1989	IEEE International Conference on Systems Engineering, Dayton OH

APPENDIX A

STATEMENT ON TEACHING

A career in teaching ranks among the noblest of all professions. I strongly believe that a Professor's primary responsibility and highest priority should be teaching *i.e.*, imparting quality education; and I truly enjoy teaching a wide variety of undergraduate and graduate level courses.

Indeed, for an university the students we graduate are primarily the final products. Our excellence can perhaps be measured best by the quality of the graduates we offer to the society at large. Hence, as educators, our professional pride is most naturally tied to the achievements and successes of our students.

In facing the increasingly challenging working world beyond the university, our engineering graduates must receive a well-balanced engineering education with strong moorings in general education and social sciences in order to become successful as engineers, while being an active participant in the society. As professors it is our responsibility, indeed our duty, that we prepare and expose our students to such well-balanced and broad curricula.

Electrical Engineering is a rapidly growing field that is continually evolving and advancing in diverse dimensions. Hence, it is absolutely necessary for engineering educators to remain on top of the current developments by actively researching emerging theories and technologies for possible adaptation in future course curricula, or for constantly updating current course offerings. Perhaps more importantly, without continuous involvement in current research, it is impossible to train or advise graduate students in cutting-edge research topics. Hence, of necessity, a career in teaching thrives in ceaseless exchange and enrichment of new research ideas and it has always remained my only career goal.

In order to improve the effectiveness of my teaching, I have taken the following steps in the past several years:

1. In most Junior and Senior level undergraduate EE courses, I ask the students to take Preparatory quizzes on the first day of classes. These quizzes are meant to refresh the students' background on the prerequisite material they ought to have to perform well in the course. I go over the solutions along-with handouts in the next class day. Many students, who may have taken the pre-requisites a while back or lack the necessary mathematical background, find the coverage of preparatory material very useful.

2. In several of my undergraduate courses, I provide my own detailed class-notes to all students before the class meets. The students find this very helpful while preparing for the class. This also allows them to concentrate more on comprehending the materials during the lectures and they can actively participate in class discussions without having to worry about jotting down class notes.

3. I solicit written anonymous feedback from all students in all courses at least once or twice a quarter *during* the quarter. I have found this to be a remarkably helpful tool in gauging the students' perception of the materials covered and their overall interest in the subject matter. It also helps me fine-tune my lectures to address the students' specific concerns *during* the quarter.

4. I attended a full-day Seminar on effective teaching techniques organized by the College of Engineering and Computer Science in September 1991.

5. I completed a two-day teaching-effectiveness workshop administered by the SOCHE at their Research Park facilities in February 1992.

6. I participated in a full-day videoconference on "Total Quality Learning" (TQL) organized by the Wright State University in June 1993. One of the important concepts I had learnt from this workshop is that for each course there must be a predetermined set of learning objectives. Regardless of the grades that each student eventually receives, they must *all* master these minimal learning objectives in order to receive a passing grade. I do try my best to test students in this manner. I believe that the preparatory quizzes mentioned in item-2 above serve an important role as part of TQL.

7. I participated in a full-day short course on ``Integrating Design into the Engineering Curriculum" organized by the Wright State University in December 1993.

8. On my request, two senior Professors of my department have attended several of my lectures. I have had long in-depth discussion with both of them on improving teaching techniques. Both my senior colleagues had also provided verbal and written feedback and constructive suggestions from which I have benefited much.

9. Videotaping of one of my courses throughout spring 1993 has been very useful for me in critiquing and improving my own teaching. I found this to be a remarkably effective self-improvement tool because it acted as a real eye-opener and I took this effort very seriously.

CLASS AND LAB DEVELOPMENT AND IMPROVEMENT

1. **EE-304 Laboratory:** Since 1995, I have taken charge of the Circuits II (EE-304) Lab in the Electrical Engineering Department. I have continued to reorganize and restructure the Labs throughout this period. In the first major re-organization in 1995, the design contents for all the existing Labs and Pre-Labs were enhanced and emphasized. All the Lab Manuals were converted to Latex files so that those could be updated more easily by a TA or by myself. All the assignments and design problems were reviewed and modified at the same time. A more comprehensive reorganization of the EE-304 Lab was undertaken in 97 when all the Labs were re-written in order to make them more user friendly. This was done by clearly listing all the components and equipment necessary for conducting each lab so that the students do not waste time in searching for those during Lab-time. The objectives and expectations for each Lab and Pre-Lab were also clearly specified. The sequence of the Labs was modified in order to keep

pace with the EE-303 lecture schedule, which most students take concurrently. Out-dated materials were removed from some Labs and more current topics were added, where possible. Set-up circuits for some labs were also modified so that the available equipment in the lab inventory could be used more effectively. All the assignments and design problems were also modified or updated.

2. **EE-761-762-763 sequence:** I had originally developed and have continued to reorganize the graduate course sequence EE 761-762-763 further in the past few years. More current and advanced topics have been incorporated in the sequence with special emphasis on practical applications and computer-based Projects. The advanced level of EE-762 and EE-763 may be exemplified by noting that several of its course projects have led to IEEE conference publications.

3. **EE-322:** I was instrumental in restructuring the EE 322 Discrete-Time Linear Systems course to include digital filter design as well as several computer-aided course projects.

4. **EE-435 and DSP-Communication Design sequence:** In 1997, I have completely restructured the EE-435 course to include both Analog and Digital Filter Designs. The new course eliminates some repetitions of topics that existed in both EE-322 and the previous EE-435.

PAPERS CO-WRITTEN WITH STUDENTS

4 Journal papers and 21 Conference papers have been co-written with Graduate (MS) students.

APPENDIX B

STATEMENT ON RESEARCH

Curiosity is perhaps the mother of all new directions in research. A common trait among majority of tenured higher rank faculty in most schools is that they tend to remain active in a narrow area where they may have tasted some past success. Many researchers in university environments are hesitant of being a novice again, lest it should cause any pause in flow of publications. Hence, university researchers tend to limit their research to a comfortable zone rather than branch out into newer areas that the current marketplace may be demanding. Some university researchers tend to rely on graduate students to work out the details while involving themselves with the "big picture". Of course, one could argue that there are certain benefits to this trend. However, I personally try to be open to new ideas and enjoy starting at the bottom of a brand new area, and working my way up the ladder. I think most of my success as a researcher has come about because I have not been afraid to change areas given an interesting challenge.

New Research Topics: Following my previous promotion, I have redirected my research focus to more current and practical problems with high potentials for long term research collaboration with the local Air Force Base as well as significant publication potential. The four new research areas that I am currently emphasizing are:

1. **Detection of Resonant Structures on Ground Targets**: In January-99, I had been asked by DARPA and AFRL/SNAA to look into the problem of detecting dispersion causing structures on ground targets to enhance target recognition capabilities. This is part of physics-based modeling that is one of the primary current research goals of the Air Force. This is an immensely complicated inverse problem that has hitherto remained unsolved. In the last 8 months we have developed a statistical parameter estimation and detection framework that has already shown excellent performance in computer simulations. We expect several Journal and Conference publications out of this research.

2. **Automatic Target Recognition**: Since Summer-96, one of the major thrust of my research has been on developing effective algorithms for Automatic Target Recognition (ATR) in an Air-to-Ground scenario for the US Air Force. In this era of precision strikes with minimum possible co-lateral damage, ATR research is of high priority to the USAF. I had begun working on this topic almost from the scratch with minimal prior exposure, although I realized soon that my previous background is quite well suited to conduct fruitful research in this area. This is a highly challenging field with long-term funding potential from various defense-related Government sources. In particular, Wright Lab has shown significant interest in our work and has funded our research for the past two years. Our research was also funded jointly by Air Force Office of Scientific Research (AFOSR). More significantly, with direct encouragement and involvement of the ATR Branch at WL, a DARPA-funded 3-year project is being con-

ducted now by a consortium of 4 Universities (WSU, Ohio State, Univ. of Cincinnati and University of Florida, Gainesville) and 3 Corporations with a $1.4mil annual budget. My allotment is about $65K per year. Wright Lab will also continue to provide about $30K per year to support our efforts. We have 2 conference papers published on our research so far and a journal paper is currently under preparation. One Master's thesis has already been completed and three more are under way. I foresee enormous potential for this work benefiting WSU, both in terms of research accomplishments and funding.

3. **Pipelined and systolic implementation of DSP algorithms**: My previous work in Array Signal Processing and Spectrum Estimation had mainly centered on developing algorithmic solutions for these critical and classical problems. That field has attained certain maturity, and it was generally felt that with the advent of VLSI and advanced DSP hardware, time is ripe for hardware implementation of many of the Signal Processing algorithms developed over the past 2 decades. Hence, I had endeavored to develop hardware implementation of various DSP algorithms since 1995. We have 4 conference papers published on our research and a journal paper has been accepted for publication. One Master's thesis, devoted entirely to this topic, has also been completed. We had also received an internal funding in the form of a Research Challenge award. However, I found out that research in this area is mainly concentrated in industries. Furthermore, the defense related funding agencies, including Wright Labs, showed little interest in funding this type of research. Hence, I have decided to continue some work in this area primarily due to my personal academic interest.

4. **Mathematical modeling of Microwave structures**: I have also conducted collaborative research with another Faculty member of our Department (Dr. Krishna Naishadham) where I have applied some of my System Identification algorithms for modeling microwave structures. Preliminary results have been quite encouraging and 2 Conference papers have already been presented. A Journal paper on these results is currently under 2nd review. I had also submitted a joint proposal (with Professor Naishadham and Professor Jean of CS Department) on this topic to Wright Lab. Although that proposal was not funded, another limited joint proposal with Dr. Naishadham as PI did come through. However, since I have not drawn any funds from this contract yet, I did not include this contract in my External Funding list. We are hopeful that if we can generate further preliminary results, additional funding from Wright Labs is a distinct possibility.

Graduate students supported by External Grants

The following graduate students have been supported by various external funds:

Total: 39 Quarters (full), 4 Quarters (part)

1. Vinod Chandran – 1 quarter-MS (full)
2. Kiran Raj George – 1 quarter-MS (full)
3. Titash Rakshit – 7 quarters-MS (full)

4. Rajesh Vashist – 8 quarters-MS (full)
5. Vijay Bhatnagar - 7 quarters-MS (full), 1 quarter-Ph.D. (part, cost-shared with Dean)
6. Imtiaz Mohamed - 1 quarter-MS (full)
7. Srikanth Pokala – 8 quarters-MS (full), 2 quarters-Ph.D. (part, cost-shared with Dean)
8. Wei Xia - 5 quarters-MS (full)
9. Tareque Ahmed – 1 quarter-MS (part)
10. Vinay Verma – 1 quarter-MS (full)

Significance of Research Accomplishments and External funding

i) **Research Citations:** The quality of a researcher's contribution is perhaps best judged by the importance that is given to published work by other researchers in the same field. Over the years, many researchers throughout the world have cited a number of publications by myself and co-workers. The *ISI Science Citation Database* Search on the Internet produced more than 140 citations of our published work since 1990. Note that the *Citation Index* only considers papers cited in reviewed Journals and does not include citations in Conference publications. For a summary and details on the citations of my publications, please refer to the end of this Appendix.

ii) My prior work on frequency or Angles of Arrival (AOA) Estimation (published in the Trans. on ASSP in June 1986) has been detailed in several major textbooks used in many schools in graduate and undergraduate courses. Our algorithm is often cited in the literature and is commonly referred to as KiSS (Note : the last S of KiSS denotes Shaw). It is probably the best algorithm available for maximum likelihood frequency estimation.

iii) In a 1994 paper, we had proposed a new method for AOA estimation called, "Minimum-Norm Method without Eigendecomposition". According to one of the reviewers, our paper" …contains what I think is a significant breakthrough (comparable to spatial smoothing) in this narrow field of multiple source location…"

iv) All my journal articles are in well-respected and critically reviewed international journals and most are published in IEEE Journals, which go through rigorous standard for publication. Furthermore, most of the conference publications are in well-regarded IEEE-sponsored conferences or workshops such as ICASSP and ISCAS, where the acceptance rates are usually less than 40-50%.

v) I have been reviewing manuscripts for almost all the major International journals in our field for the past few years. I have also reviewed three NSF proposals for possible funding by two different NSF program monitors.

vi) Barring one joint work supported by the WPAFB, I am the *sole* principal investigator in all my externally funded projects and sub-contracts. These projects were awarded based on nationwide competition.

vii) I have been successful in bringing in more than $600K of external funding to Wright State since 1988. I have also received about $28K of internal funding.

viii) I have been asked to serve as External Examiner for an MS thesis from an Australian University as well as for a Ph.D. Dissertation of a University in Singapore.

ix) The College of Engineering and Computer Science, Wright State University recognized my research efforts with an "Excellence in Research" award for the year 1993-94.

x) I have been appointed an Associate Editor of the IEEE Transactions of Signal Processing to serve for the period of Feb-98 to Jan-2002. This is the most eminent journal on Signal Processing research in the world and I consider this appointment to be an important recognition of my professional career so far.

Summary of Citations of articles Authored and Co-authored by Arnab Shaw

The Database Search results for "Cited Reference Search" of *ISI (Institute for Scientific Information) Citation Databases* are enclosed next. The searches were conducted in the "Full Search" mode, using the first author names, as appeared in the articles that cited the reference. The following Table is a brief summary of the number of citations for each cited author/co-author name used as the Search Key.

Cited First Author Name (Search Key)	**Number of Hits**	**Total**
Shaw AK	1+5+3+3+1+2+2+5+1+1+1+2+5+1+1+2+3	39
Shaw A	2+1	3
Scharf LL	1	1
Kay SM	8+1	9
Kumaresan R	2+1+1+68+1+1+1+11+1+1+2+1+1+1+1	94

	Total number of Citations (1990-present)	**146**

Note: Out of this total, 17 citations were by at least one of the co-authors of the cited articles. All the other citations have been by other researchers.

Curriculum Vitae

Dr. Zhiqiang Wu

Associate Professor
Department of Electrical Engineering
College of Engineering and Computer Science
Wright State University

Phone: (937)-775-5060 (Office)

Email: Zhiqiang.Wu@wright.edu

EDUCATION

DEGREES AWARDED

Ph.D. in Electrical Engineering, **Colorado State University**, December 2001.

M.S. in Electrical Engineering, **Peking University**, July 1996.

B.S. in Electrical Engineering, **Beijing University of Posts and Telecommunications**, July 1993.

PROFESSIONAL EXPERIENCE

Associate Professor (2009 - present), Department of Electrical Engineering, Wright State University, Dayton, OH.

Assistant Professor (2005 - 2009), Department of Electrical Engineering, Wright State University, Dayton, OH.

Assistant Professor (2003 - 2005), Department of Electrical and Computer Engineering, West Virginia University Institute of Technology, Montgomery, WV.

Research Faculty (2002 - 2003), Department of Electrical and Computer Engineering, Colorado State University, Fort Collins, CO.

Postdoctoral Research Associate (2001 - 2002), Department of Electrical and Computer Engineering, Colorado State University, Fort Collins, CO.

Research Assistant (1998 - 2001), Department of Electrical and Computer Engineering, Colorado State University, Fort Collins, CO.

Research Engineer (1996 - 1998), Chinese Academy for Telecommunication Technology, Beijing, China.

ACADEMIC AWARDS

Air Force Office of Scientific Research (AFOSR) Summer Faculty Fellowship, 2007, 2008 and 2009.

Office of Naval Research (ONR) Summer Faculty Fellowship, 2011 and 2012

Excellence in Research Award, College of Engineering and Computer Science, WSU, 2010

Teaching Award Nominee, College of Engineering and Computer Science, WSU, 2012

Early Career Achievement Award, College of Engineering and Computer Science, WSU, 2009

Best Demo Award, IEEE Globecom, 2010

Finalist, InterDigital & California Institute for Telecommunications and Information Technology Innovation Challenge Competition, 2012

TEACHING

New Courses Created:

EE4210/6210 Lab, 2012

EE473/673 Wireless Communication I, 2007

EE474/674 Wireless Communication I Lab, 2007

EE476/676 Wireless Communication II, 2007

Courses Taught at Wright State University:

EE421/621 Communication Theory

EE735 Wireless Communication Technique

EE736 Advanced Communication Technique

EE322 Linear System II

EE480/680 Wireless Communication

EE473/673 Wireless Communication I

EE474/674 Wireless Communication I Lab

EE476/676 Wireless Communication II

Courses Taught at West Virginia University Institute of Technology:

Digital Signal Processing, Introduction to Microprocessor System, Embedded System, Wireless Communications, Computer Architecture, Linear System

Courses Taught at Colorado State University:

Digital Communication, Advanced Digital Communication

Senior Design Supervised:

(1) Ryan Overman, Trenton Katter, Brian Thomas and Thomas Rawls, *Reliable Communication from Ground Station to High Altitude Balloon*;

(2) Josh Larson, Thomas Kesler, James Sears and Amy Minehart, *Autonomous Antenna Steering for High Altitude Balloon*;

(3) Adam Chen, Josh Beighle and Aaron Seyfried, *High Altitude Balloon VOR-U*;

(4) Greg Taylor, Brandon Bayer, and Tom Holmes, *Software Defined Radio Video Transmission for High Altitude Balloon*;

(5) Tabish Khan, Anthony Ciacelli, Richard Lawrence, *Fuel Cell Power Source for MAV Sensors*;

(6) Kyle McClary, Kevin Ufferman, Joshua Land, *HAB Team DISCO: LED Tracker for HAB*;

(7) Elliott Moser, Adam Carpenter, Daniel Marietta, *HAB Team FoxHound: GPS Repeater for HAB*;

(8) Chad Morris, Paul Cary, Adam Baker, *HAB Team SDR: SDR Video for HAB*;

(9) Leila Carmichael, Meshal Albattah, Nathan Binkley, *HAB Team ATV: Analog TV Transmission for HAB*;

(10) Dominic Maga, Jason Bailey and Steve Powers, *Antenna Ground Station for High Altitude Balloon Project*;

(11) Todd Rogers, Aoun Barki and Henok Feseha, *Centralized Power Bus for High Altitude Balloon Project*;

(12) Andrew Crowdy, Steven Overmyer, *Robust Telemetry System for High Altitude Balloon Project*;

(13) Brent Guenther, Adam Kelly and Mark Falknor, *Real Time Video Transmission for High Altitude Balloon Experiments*;

(14) Luis Farfan-Ramos, Erica Allbaugh and Zachary Bates, *Wireless Analog/Digital I/O Board*;

(15) Brian Wirick & Sean Stevens: *High Altitude Balloon Solar Cell Experiment*;

(16) Heithem Taleb, Lee Fetty and Jonathan Moore: *Wireless Text Radio based on GNU Radio*;

(17) Steve Mascarella, Thomas Pestak, Chris Byers, *High Altitude Balloon Launch and Experiments*;

(18) Paul Haschke, Mike Justice, Mike Valley, Alex Sennet, *GPS Wireless Transmission via Bluetooth*

(19) Richard Reid, Pete Swartz, *Bluetooth Tracking Sensor*

(20) Shaun Frost, *A Non-Linear Flash Analog to Digital Architecture for Sinusoidal Input Signals in Communications*

(21) Michael Andras, Dan Rahn, *Centralized Power Bus for High Altitude Balloon Experiments*

(222) William Keatts, *Low-Cost Motion Detection and Counter Attacking Testbed for Swarm UAVs*;

(23) Terry Cunningham and Paul Casto: *Performance Testing of OFDM Wireless Transmission in Mobile Channel*

Postdoc Researchers Supervised:

Yao Ma, Research Assistant Professor at WSU, 2009-2012

Bing Xie, Peking University, Visiting Scholar at WSU, 2009-2010

Zheng Dou, Harbin Engineering University, Visiting Scholar at WSU, 2014

Yun Lin, Harbin Engineering University, Visiting Scholar at WSU, 2014

Ph.D. Dissertation Supervised:

Vasu Chakravarthy, "Evaluation of Overlay/Underlay Waveform via SD-SMSE Framework for Enhancing Spectrum Efficiency", 2008

Ruolin Zhou, "The Demonstration of SMSE Based Cognitive Radio in Mobile Environment via Software Defined Radio", 2011

Xue Li, "SMSE Framework Based Cognitive Radio in Mobile Environment", 2012

Master Theses Supervised:

(1) Josh Sanderson, "Automatic Modulation Detection of Underwater Acoustic Communication Signals," 2013

(2) Yang Qu, "Software Defined Radio based Automatic Modulation Detector using Higher Order Statistics," 2013

(3) Brent Gunther, “Multi-User Signal Classification Via Cyclic Spectral Analysis,” 2010

(4) Dan Sundersingh, “Frequency Domain Processing Based Chaos Communication for Cognitive Radio, ” 2010

(5) Omer Mian, ”Cognitive Radio via Software Defined Radio”, April 2008

(6) Meng Wu, ”Inter-Carrier Interference Cancelation in Multi-carrier Transmission”, June 2008

(7) Xue Li, ”Novel Approximation Method for Sum Lognormal Distribution”, August 2008

(8) Eric Like, ”Automatic Modulation Detection via Cyclostationary Analysis”, 2007

(9) Hemanth Kumar, ”OFDM and Multi-carrier Transmission for Small UAV Communication”, WVUIT, 2005

(10) Abhishek R. Sakhare, ”Air Borne Network for Swarm UAVs”, WVUIT, 2004

Independent Study Supervised:

Ruolin Zhou, Non-Binary Modulation in Wireless Communication;

David Chaboty, Bluetooth Digital Data Transmission in Interference Dense Environment;

Deepak Garikapati, Software Defined Radio Based Digital File Transmission;

Correy Sheppeard, Digital Communication;

Tyler Gareky, Digital Communication;

Pranjali Shelgikar, Multiple Input Multiple Output Stabilization.

Advising Ph.D. Students as Committee Chair:

John Ellinger (passed proposal), Charles Berdanier (passed proposal), Yang Qu

Advising Ph.D. Students as Committee Member:

Qi Zhang, Qian Han, Paul Bender, Mike Peterson, Rafael Aleman, Lee Patton, Tao Zhang

External Funded Student Support :

(1) Josh Sanderson, 4 quarters (2/3 of Fall 2012 Semester, 2/3 of Spring 2013 Semester, 2/3 of Fall 2013 Semester, 2/3 of Spring 2014 Semester)

(2) Qu Yang, 4.66 quarters (Fall 2012 Semester, 2/3 Fall 2013 Semester, 2/3 Spring 2014 Semester, Summer 2014)

(3) Qian Han, 4.66 quarters (Spring 2012, Summer 2012, Fall 2012 Semester, Spring 2013 Semester)

(4) Dan Sundersingh, 7 quarters (Fall 2008, Winter 2009, Spring 2009, Summer 2009, Fall 2009, Winter 2010, Spring 2010)

(5) Brent Guenther, 4 quarters (Fall 2009, Winter 2010, Spring 2010, Summer 2010)

(6) Arvind Kumar, 1 quarter (Fall 2009)

(7) Eric Like, 3 quarters (Fall 2006, Winter 2007, Spring 2007)

(8) Xue Li, 20 quarters (Fall 2007, Winter 2008, Spring 2008, Summer 2008, Fall 2008, Winter 2009, Spring 2009, Summer 2009, Fall 2009, Winter 2010, Spring 2010, Summer 2010, Fall 2010, Winter 2011, Spring 2011,

Summer 2011, Fall 2011, Winter 2012, Spring 2012, Summer 2012)

(9) Ryan Brown, 3 quarters (Fall 2007, Winter 2008, Spring 2008)

(10) Omer Mian, 2 quarters (Winter 2008, Spring 2008)

(11) Ruolin Zhou, 16 quarters (Winter 2007, Spring 2007, Summer 2007, Summer 2008, Fall 2008, Winter 2009, Spring 2009, Summer 2009, Fall 2009, Winter 2010, Spring 2010, Summer 2010, Fall 2010, Winter 2011, Spring 2011, Summer 2011)

(12) Meng Wu, 1 quarter (Summer 2007)

(13) Hemanth Kumar, 3 semesters (Spring 2004, Fall 2005, Spring 2005)

Total Quarters Support: 73 quarters (50 quarters since last promotion)

RESEARCH GRANTS SINCE LAST PROMOTION

(1) "Broadband High-Speed RF Spectrum Processor via Intelligent Spectrum Sensing," $45,056, 669391, single PI, National Science Foundation, February 2014 - July 2014

(2) "Software Defined Radio Laboratory Platform for Enhancing Undergraduate Communication and Networking Curricula," $600,000 (my share $300,000), 669290, PI, National Science Foundation, October 2013 - September 2016

(3) "Cognitive Radio and Cognitive Jamming via Tight Coupling with Navigation,", Phase II, single PI, $150,000, 669193, Air Force Research Laboratory, March 2013-March 2015

(4) "Cognitive Radio and Cognitive Jamming via Tight Coupling with Navigation,", Phase I, single PI, $45,000, 668891, Air Force Research Laboratory, March 2012-March 2013

(5) "RF Localization via Phase Variance," single PI, $25,000, 668782, Air Force Research Laboratory, November 2012 - October 2013

(6) "Ultra-Wideband Radio Frequency Vector Signal Generator with Channel Emulation Capability via Frequency Sampling and Parallel Processing," single PI, $45,000, 668773, Air Force Research Laboratory, November 2011 - October 2012

(7) "Spectrally Compliant Communication Waveform Generator over Non-Contiguous Spectrum Bands,", single PI, $24,000, 668920, Office of Naval Research, March 2012 - November 2012

(8) "Cognitive Radio Co-Existence Analysis," single PI, $25,000, 667954, Air Force Research Laboratory, March 2011 - March 2012

(9) "Cognitive RF Technologies Development via Software Defined Radio", single PI, $50,000, 668666, Air Force Research Laboratory, October 2011-September 2012

(10) "Multi-Function Software Defined Architecture Based Cognitive Electronic Warfare Technology", single PI, $51,247, 668997, Air Force Research Laboratory, Feb 2010 - Nov 2013

(11) "Frequency Domain Processing Based Chaotic Communication for Cognitive Radio and Dynamic Spectrum Access", single PI, $66,000, 667702, Air Force Research Laboratory, July 2009 - June 2010

(12) "Waveforms Optimization Algorithms for Electronic Warfare Countermeasures Development", co-PI, $130,000 (my share $120,000), 667614, Air Force Research Laboratory, March 2009 - September 2011

PUBLICATIONS

BOOKS

[1] C. R. Nassar, B. Natarajan, Z. Wu, D. Wiegandt, S. Zekavat, *Multi-carrier Technologies for Wireless Communications*, Kluwer Academic Publishers: Fall 2001

[2] V.D. Chakravarthy, Z. Wu and M. Temple, *Principles of Waveform Diversity and Design, Chapter 71: Hybrid Overlay/Underlay Waveform for Soft Decision Cognitive Radio via Spectrally Modulated Spectrally Encoded Framework*, Scitech Publishing Inc., 2009

[3] Z. Wu and Z. Wu, *Statistical Methods in Computational Biology: Bridging the Gap, Chapter 7: Exploring, preprocessing, and visualizing high-dimensional data*, Springer, 2009

[4] B. Wang, Z. Wu and Z. Yao, *Using Cross-Layer Techniques for Communication Systems, Chapter 12: Cross-Layer Design In Cognitive Radio Networks*, IGI Global Publishing, 2012

JOURNAL PUBLICATIONS

SINCE LAST PROMOTION

[1] X. Li, B. Plumb and Z. Wu, "WiFi leakage detection in LTE downlink for in-device interference avoidance," *IET Circuits, Devices & Systems*, vol. 8, issue 5, pp. 397-405, September 2014

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SERVICES

Co-Chair:
WSU Campus Scholarship and Innovation Campaign, 2006, 2007 and 2008

Mentor:
WSU Amateur Radio Club, 2010-present

Organizer:
WSU Cognitive Radio Workshop, 2011

Member:
WSU College of Engineering and Computer Science Program Development Committee of Multidisciplinary Engineering Program, 2011

Member:
WSU College of Engineering and Computer Science Scholarship Committee, 2006-2008

Member:
WSU College of Engineering and Computer Science Academic Computing Committee, 2008-2012, 2014-present

Chair:
Department Lab Resource Committee, 2007-2012, 2014-present

Member:
Department Undergraduate Studies Committee, 2010-2012, 2014-present

Member:
Department Graduate Studies Committee, 2005-2006

Member:
Department Faculty Search Committee, 2006-2007

Guest Editor:
IEEE MMTC E-Letter Special Issue on Acoustic and Audio Communication, 2011

Chair:
IEEE Communications Society Technical Committee on Multimedia Communications, Acoustic and Speech Processing Interest Group 2012-present

Co-Chair:
IEEE Communications Society Technical Committee on Multimedia Communications, Acoustic and Speech Processing Interest Group 2010-2012

Co-chair:
IEEE International Conference on Multimedia & Expo 2011
Workshop on Speech and Video Coding and Communications

Member:
IEEE

Member:
IEEE Communications Society, *IEEE Information Theory Society*
IEEE Vehicular Technology Society, *SPIE*, *ASEE*

Member:
The Honor Society of *Phi Kappa Phi*

Track Chair:
IEEE VTC 2013 Fall

Technical Committee Member:

IEEE Globecom 2005-2014,*IEEE ICC 2005-2014*, *IEEE Milcom 2009-2014*, *IEEE VTC 2005, 2009, 2012, 2013, 2014*,*IEEE CrownCom 2008*, *IEEE UWBST 2003*

Dean's Commendation for outstanding efforts in supervising 2006 and 2007 High Altitude Balloon Senior Design Projects, Wright State University.

Served as expert reviewer for John Wiley & Sons Publishing House.

Served as peer reviewer for various journals and conferences including:
IEEE Transactions on Wireless Communications
IEEE Transactions on Communications
IEEE Transactions on Vehicular Technology
IEEE Journal on Selected Areas in Communications
IEEE Journal on Selected Areas in Signal Processing
IEEE Communication Letters
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IEEE Globecom Conference
IEEE CrwonCom Conference
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RESEARCH INTERESTS

- VLSI cryptographic circuits for emerging embedded system security
- VLSI systems for emerging signal/image processing, and biomedical application
- Algorithm-architecture design for resource-constrained systems

EDUCATION

University of Pittsburgh, Pittsburgh, PA 01/2013-12/2014

- Ph.D. in electrical engineering, GPA 4.0/4.0
- Course work related to advanced computer architecture: emerging memory, image processing and computer vision, control theory, and signals and systems

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Yanshan University, Qinhuangdao, Hebei, China 09/2012-07/2006

- B. E. in measuring and control technology and instrumentations
- Main curriculum in automatic control, power electronics, mathematics, signal processing, pattern recognition, circuits and system, communication technology, computer programming, and physics

EXPERIENCE

Professional experience

- Assistant Professor, Department of Electrical Engineering, Wright State University, 1/2015-present
- Research assistant, Department of Electrical and Computer Engineering, University of Pittsburgh, January 2013–December 2014. Project: novel cryptographic circuits for emerging embedded systems security
- Researcher, School of Information Science and Engineering, Central South University, September 2011–June 2012. Project: hardware efficient digital image processing systems for emerging video standard
- Researcher, School of Information Science and Engineering, Central South University, September 2011–June 2012. Project: hardware efficient finite field multiplier for modern cryptographic systems
- Researcher, School of Information Science and Engineering, Central South University, September 2010–June 2011. Project: temperature modeling and

control strategy for large vertical furnace

- Research assistant, School of Information Science and Engineering, Central South University, September 2007–June 2009. Project: FPGA-based portable B-ultrasonic diagnosis device
- Research assistant, School of Information Science and Engineering, Central South University, September 2009–June 2010. Project: FPGA implementation of digital signal processing systems
- Research assistant, School of Electrical Engineering, Yanshan University, January 2006–July 2006. Project: emerging optical communication system

Teaching experience

- Instructor for Course EE-2010-*Circuit Analysis I*, Department of Electrical Engineering, Wright State University, 1/2015-present
- Teaching fellow for Course *Introduction of Electrical Engineering: Circuits and Systems*, Department of Electrical and Computer Engineering, University of Pittsburgh, September 2014–December 2014
- Teaching fellow for Course *Introduction to Image Processing*, Department of Electrical and Computer Engineering, University of Pittsburgh, September 2014–December 2014
- Teaching fellow for Course *Introduction of Electrical Engineering: Circuits and Systems*, Department of Electrical and Computer Engineering, University of Pittsburgh, September 2013–December 2013
- Teaching fellow for Course *Computer Organization*, Department of Electrical and Computer Engineering, University of Pittsburgh, May 2013–August 2013
- Teaching fellow for Course *Linear Circuits and System-II*, Department of Electrical and Computer Engineering, University of Pittsburgh, January 2013–April 2013
- Teaching assistant for mentoring graduate student on project *Finite Field Multiplier and Its Hardware design*, School of Information Science and Engineering, Central South University, April 2011–June 2012
- Teaching assistant for mentoring undergraduate student on project *FPGA-Based FIR Filter Design*, School of Information Science and Engineering, Central South University, September 2009–June 2010
- Teaching assistant for Course *Automatic Control*, School of Information Science and Engineering, Central South University, September 2007–June 2009

Industrial experience

- Research intern, Xi'an Electrical Meter, Inc., Xi'an, China, July 2005–August 2005. Project: modern electrical meter manufacturing

Professional activities

- Reviewer for *IEEE Trans. on Circuits and Systems-I*, *IEEE Trans. on Circuits and Systems-II*, *IEEE Trans. on VLSI Systems*, *Microelectronics Journal*, *IET Signal Processing*, *Journal of Signal processing systems*, and *Journal of*

Circuits, Computer and Systems

- Review committee member for the 2011 International Conference on Opto-Electronics Engineering and Information Science (ICOEIS 2011).

Research grants

- Grant proposal: Hardware efficient finite field multiplier for modern cryptographic system, to be submitted to NSF of China (Role: Co-PI. With Prof. Jianjun He, Central South University)

AWARDS & HONORS

- College Scholarship, Yanshan University, 2003
- Department Outstanding Thesis Award, Yanshan University, 2006
- Graduate Fellowship, Central South University, 2007, 2008, 2009, and 2010
- Best Paper Award, School of Information Science and Engineering, Central South University, 2009
- Best Paper Award, School of Information Science and Engineering, Central South University, 2011
- Teaching fellow scholarship, Department of Electrical and Computer Engineering, University of Pittsburgh, 2013, and 2014
- EE Rath Scholarship, Department of Electrical and Computer Engineering, University of Pittsburgh, 2013

PUBLICATIONS

In journals

1. **Jiafeng Xie**, P. K. Meher and Zhi-Hong Mao, "Low-latency high-throughput systolic multipliers over $GF(2^m)$ for NIST recommended pentanomials", submitted to *IEEE Trans. on Circuits & Systems-I: Regular Papers* (Accepted, available in IEEE Xplore).
2. **Jiafeng Xie**, P. K. Meher and Zhi-Hong Mao, "High-throughput digit-level systolic multiplier over $GF(2^m)$ based on irreducible trinomials", *IEEE Trans. on Circuits & Systems-II: Express Briefs* (Accepted, available in IEEE Xplore).
3. **Jiafeng Xie**, P. K. Meher and Zhi-Hong Mao, "High-throughput finite field multipliers using redundant basis for FPGA and ASIC implementations", *IEEE Trans. on Circuits & Systems-I: Regular Papers*, vol. 62, no. 1, pp. 110-119, 2015.
4. **Jiafeng Xie**, Jianjun He and P. K. Meher, "Hardware-efficient realization of prime-length DCT based on distributed arithmetic", *IEEE Trans. on Computers*, vol. 62, no. 6, pp. 1170-1178, 2013.
5. **Jiafeng Xie**, P. K. Meher and Jianjun He, "Low-complexity multiplier for $GF(2^m)$ based on all one polynomials", *IEEE Trans. on VLSI Systems*, vol. 21, no. 1, pp. 168-172, 2013.
6. **Jiafeng Xie**, Jianjun He and P. K. Meher, "Low latency systolic Montgomery multiplier for finite field $GF(2^m)$ based on pentanomials", *IEEE Trans. on VLSI Systems*, vol. 21, no. 2, pp. 385-389, 2013.
7. **Jiafeng Xie**, Jianjun He, and Guanzheng Tan, "FPGA realization of FIR filters for high-speed and medium-speed by using modified distributed arithmetic architectures", *Microelectronics Journal (Elsevier)*, vol. 41, no. 6, pp. 365-370, 2010.

8. **Jiafeng Xie**, Jianjun He and Weihua Gui, "Low latency systolic multipliers for finite field $GF(2^m)$ based on irreducible polynomials", *Journal of Central South University of Technology*, vol. 21, no. 5, pp. 1283-1289, 2012.
9. Jianjun He, **Jiafeng Xie**, and Mingfang He, "Area-efficient systolic multipliers for finite field $GF(2^m)$ based on irreducible trinomial", *Journal of Convergence Information Technology*, vol. 6, no. 5, pp. 305-313, 2011. (**Corresponding author**)
10. Jianjun He, and **Jiafeng Xie**, "Hardware efficient approach for memoryless-based multiplication and its application to FIR filter", *Journal of Computers*, vol. 6, no. 11, pp. 2376-2381, 2011. (**Corresponding author**)
11. **Jiafeng Xie**, and Guanzheng Tan, "Design of B-mode ultrasonic imaging system based on FPGA", *Journal of Zhongyuan University of Technology*, vol. 21, no. 2, pp. 72-75, 2010.
12. **Jiafeng Xie**, and Guanzheng Tan, "The research on locating the car license in the static image based on MATLAB", *PLC&FA*, vol. 6, no. 1, pp.668-671, 2009.

In conference

1. **Jiafeng Xie**, P. K. Meher and Jianjun He, "Low-latency area-delay-efficient systolic multiplier over $GF(2^m)$ for a wider class of trinomials using parallel register sharing", *IEEE International Symposium on Circuits and Systems-2012, ISCAS-12*, pp. 89-92, 2012.

In progress

13. **Jiafeng Xie**, P. K. Meher and Zhi-Hong Mao, "Efficient bit-parallel and digit-serial systolic multipliers over $GF(2^m)$ using Karatsuba decomposition and their applications", to be submitted to *IEEE Trans. on VLSI Systems.*
14. **Jiafeng Xie**, P. K. Meher and Zhi-Hong Mao, "Efficient digit-level structures for single and hybrid-double multiplications over $GF(2^m)$ based on reordered normal basis", submitted to *IEEE Trans. on Circuits & Systems-I: Regular Papers*.
15. **Jiafeng Xie**, P. K. Meher and Zhi-Hong Mao, "Efficient hybrid-double multiplication and its application in inversion over $GF(2^m)$ ", to be submitted to *IEEE Trans. on VLSI Systems.*
16. **Jiafeng Xie**, P. K. Meher and Zhi-Hong Mao, "Efficient elliptic curve cryptography processor with flexible throughput rate choices", to be submitted to *IEEE Trans. on Circuits and Systems-I.*

XIAODONG (FRANK) ZHANG

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EDUCATION

- Ph.D. in Electrical Engineering, University of Cincinnati, Cincinnati, OH, December 2001.
- M.S. in Electrical Engineering, Shanghai Jiao Tong University, Shanghai, China, March 1997.
- B.S. in Electrical Engineering, Huazhong University of Science and Technology, Wuhan, China, July 1994.

PROFESSIONAL EXPERIENCE

- 09/2012 – present Associate Professor, Department of Electrical Engineering, Wright State University, Dayton, OH
- 09/2007 – 08/2012 Assistant Professor, Department of Electrical Engineering, Wright State University, Dayton, OH
- 08/2005 – 08/2007 Sr. Researcher, Electrical & Controls Integration Lab, General Motors R&D Center, Warren, MI
- 05/2004 – 07/2005 Program Manager of Controls & Diagnostics, Intelligent Automation Inc., Rockville, MD
- 12/2001 – 04/2004 Sr. Research Engineer, Intelligent Automation Inc., Rockville, MD

PROFESSIONAL MEMBERSHIPS

- Associate Editor, *IEEE Transactions on Control Systems Technology*, 2012 - present.
- Member, IFAC Steering Committee on Fault Detection, Supervision and Safety for Technical Processes, TC 6.4
- Senior Member, IEEE

ACADEMIC AWARDS

- Second Place, Competition on Fault Detection and Isolation for Wind Turbines, the 2011 *IFAC World Congress*, Milan, Italy.
- NASA Tech Brief Award, 2010.
- Faculty Early Career Achievement Award, College of Engineering and Computer Science, Wright State University, 2010.
- Finalist for the ABB Best Application Paper Award, the *2009 IFAC SAFEPROCESS Symposium*, Barcelona, Spain.
- Finalist for the Paul Frank Best Theoretical Paper Award, the *2009 IFAC SAFEPROCESS Symposium*, Barcelona, Spain.
- NASA Tech Brief Award, 2004.
- Ralph H. Lee Department Prize Paper Award, the Industrial and Commercial Power System Department, IEEE Industry Applications Society, 2004.
- Finalist for the Kayamori Best Paper Award, the *2003 IEEE International Conference on Robotics and Automation*, 2003.
- Best Ph.D. Dissertation Award, Department of Electrical and Computer Engineering and Computer Science, University of Cincinnati, 2002.

GRADUATE STUDNETS ADVISED

1. **M.S. Students**
   1) Ryan Grube, *Automotive Battery State-of-Health Monitoring Methods*, Winter 2008.
   2) Hithesh Sanjiva Uliyar, *Fault Diagnosis of Vehicular Electric Power Generation and Storage System*, Summer 2010.
   3) Naharika Sonti, *A Unified Method for Detecting and Isolating Process Faults and Sensor Faults in Nonlinear Systems*, Fall 2010.
   4) Qi Zhang, *Distributed Fault Detection for a Class of Large-Scale Nonlinear Uncertain Systems*, Winter 2011.
   5) Luis Farfan-Ramos, *A Robust Real-Time Fault Detection and Isolation Method for Automotive Alternator system*, Winter 2011.
   6) Songling Zhao, *A Model-Based Fault Detection and Isolation Method for Wind Turbines*, Spring 2011.
   7) Remus Avram, Robust Adaptive Nonlinear Fault Diagnosis Methods for Aircraft Engines, Winter 2012.
   8) Hui Chen, expected Fall 2013.

2. **Ph.D. Students**
   1) Qi Zhang, Robust Distributed Fault Diagnosis in Nonlinear Large-Scale Uncertain Systems, Summer 2013.
   2) Remus Avram, spring 2012 – present, candidacy exam passed summer 2013, dissertation expected 2015.
   3) Mohsen Khalili, fall 2012- present, candidacy exam scheduled Oct. 2013, dissertation expected 2015.

SCHOLARSHIP

- **Refereed Journal Papers**

1. D. L. Simon, S. Borguet, O. Leonard, X. Zhang, "Aircraft engine gas path diagnostic methods: public benchmarking results," *Journal of Engineering for Gas Turbines and Power*, vol. 136, April 2014.
2. Q. Zhang, X. Zhang, M. M. Polycarpou, and T. Parisini, "Distributed Sensor Fault Detection and Isolation for Multimachine Power Systems," *International Journal of Robust and Nonlinear Control*, Vol. 24, pp. 1403-1430, 2014.
3. A. Scacchioli, G. Rizzoni, A. Salman, W. Li, S. Onori, and X. Zhang, "Model-based diagnosis of an automotive electric power generation and storage system", *IEEE Transactions on Systems, Man, and Cybernetics*,Vol. 44, No. 1, pp. 72-85, 2014.
4. Q. Zhang and X. Zhang, "Distributed sensor fault diagnosis in a class of interconnected uncertain systems," *IFAC Annual Reviews in Control*, vol. 37, pp. 170-179, 2013.
5. X. Zhang and L. Tang, "A nonlinear adaptive estimation based approach to robust fault diagnosis of aircraft engines," *IEEE Transactions on Control Systems Technology*, vol. 21, no. 3, pp. 861-868, 2013.
6. X. Zhang and Q. Zhang, "Distributed fault diagnosis in a class of interconnected nonlinear uncertain systems," *International Journal of Control*, vol. 85, no. 11, November 2012, pp. 1644-1662.
7. X. Zhang, R. Grube, K. Shin, M. Salman, and R. S. Conell, "Parity-relation-based state-of-health monitoring of lead acid batteries for automotive applications," *IFAC Control Engineering Practice*, vol. 19, no. 6, pp. 555-563, June 2011.
8. X. Zhang, "Detection and isolation of sensor bias faults in a class of nonlinear uncertain systems," *IEEE Transactions on Automatic Control*, vol. 56, no. 5, pp. 1220-1226, May 2011.
9. X. Zhang, Qi Zhang, and N. Sonti, "Diagnosis of process faults and sensor faults in a class of nonlinear uncertain systems," *Journal of Systems Engineering and Electronics*, Special Section on Fault, Detection, Diagnosis and Tolerant-Control, vol. 22, no. 1, pp. 22-32, February 2011.
10. X. Zhang, M. M. Polycarpou, and T. Parisini, "Adaptive fault diagnosis and fault-tolerant control of MIMO nonlinear uncertain systems," *International Journal of Control*, vol. 83, pp. 1054-1080, May 2010.

11. X. Zhang, M. M. Polycarpou, and T. Parisini, “Fault diagnosis of a class of nonlinear uncertain systems with Lipschitz nonlinearities using adaptive estimation,” *Automatica*, vol. 46, no. 2, pp. 290-299, February 2010.
12. X. Zhang, M. M. Polycarpou, and T. Parisini, "Design and analysis of a fault isolation scheme for a class of uncertain nonlinear systems," *IFAC Annual Reviews in Control*, vol. 32, pp. 107-121, 2008.
13. X. Zhang, T. Parisini, and M. M. Polycarpou, "A sensor bias fault isolation scheme for a class of nonlinear systems", *IEEE Transactions on Automatic Control*, vol. 50, no. 3, pp. 370- 376, 2005.
14. W. Wongsaichua, W.-J. Lee, S. Oraintara, C. Kwan, and X. Zhang, “Integrated high speed intelligent utility tie unit for distributed/renewable generation facilities*”, IEEE Transactions on Industry Applications*, vol. 41, no. 2, pp. 507-513, March/April 2005.
15. X. Zhang, T. Parisini, and M. M. Polycarpou, "Adaptive fault-tolerant control of nonlinear systems: a diagnostic information-based approach ", *IEEE Transactions on Automatic Control*, vol. 49, no.8, pp. 1259-1274, August 2004 (**Nominated for the *Axelby Best Paper Award***).
16. X. Zhang, R. Xu, C. Kwan, and Y. Yang, "Fault-tolerant control of UAV formation flight", *International Journal of Vehicle Autonomous Systems*, vol. 2, no.3/4, pp. 217-235, 2004.
17. X. Zhang, M. M. Polycarpou, and T. Parisini, "A robust detection and isolation scheme for abrupt and incipient faults in nonlinear systems", *IEEE Transactions on Automatic Control*, vol. 47, no. 4, pp. 576-593, April 2002.
18. X. Zhang, M. M. Polycarpou, and T. Parisini, "Robust fault isolation of a class of nonlinear input-output systems", *International Journal of Control*, vol. 74, no.13, pp. 1295-1310, September 2001.

- **Patents**
  1. L. Jian, X. Tang, X. Zhang, B. J. Koch, D. R. Frisch, W. Liu, M. J. Gielniak, “Method and system for characterizing a battery,” U.S. 8,552,687, 2013.
  2. Y. Zhang, N. Ampunan, M. J. Rychlinski, M. Howell, X. Zhang, K. Inbarajan, J. J. Correia, M. A. Salman, M. Gilbert, P. W. Loewer, S. B. Dost, “Telematics-enabled aggregated vehicle diagnosis and prognosis,” U.S. 8,374,745, 2013.
  3. X. Zhang, “Battery state-of-health monitoring system and method,” U.S. 8,315,829, 2012.
  4. W. Lin, B. Litkouhi, A. Alrabady, B. Murty, X. Zhang, S. Holland, M. Salman; R. Debouk, Y. Chin, “Autonomous vehicle maintenance and repair system,” U.S. 8,190,322, 2012.
  5. M. Salman, et al., “Integrated diagnosis and prognosis system as part of the corporate value chain,” U.S. 8,170,743, 2012.
  6. X. Zhang, “Battery state of health monitoring system and method,” U.S. 8,159,189, 2012.
  7. X. Zhang, N. Kapsokavathis, Y. Zhang, D. Walters, X. Tang, M. Salman, “Method for battery state-of-health monitoring using battery voltage during vehicle starting,” U.S. 8,111,037, 2012.
  8. M. Howell, M. Salman, X. Tang, Y. Zhang, X. Zhang, Y. Chin, et al., “Aggregated information fusion for enhanced diagnostics, prognostics and maintenance practices of vehicles,” U.S. 8,095,261, 2012.
  9. X. Zhang, X. Tang, J. Lin, Y. Zhang, M. Salman, Y-K. Chin, "Method for battery capacity estimation," U.S. 8,084,996 B2, 2011.
  10. X. Zhang, "A battery state-of-health monitoring system and method," U.S. 7,983,862 B2, July 2011.
  11. X. Tang, X. Zhang, Y. Chin, B. J. Koch, D. R. Frisch, "Model-based estimation of battery hysteresis," U.S. 7,957,921 B2, Jun 2011.
  12. X. Zhang, N. Kapsokavathis, M. Salman, D. Walters, X. Tang, "Method and apparatus for managing power flow of an electric power storage device," U.S. Patent 7,741,805, June 2010.
  13. M. Salman, N. Kapsokavathis, X. Zhang, D. Walters, X. Tang, "Method and article of manufacture for monitoring an electrical energy storage device," U.S. Patent 7,545,109, June 2009.

- **NASA Tech Briefs**
  1. L. Tang, X. Zhang, J. A. DeCastro, “Onboard nonlinear engine sensor and component fault diagnosis and isolation scheme,” *NASA Tech Briefs*, vol. 35, no. 1, pp. 25 -25, January 2011.
  2. C. Kwan, R. Xu, D. Mayhew, X. Zhang, “Automated analysis, classification, and display of waveforms,” *NASA Tech Briefs*, vol. 28, no. 12, pp. 24-25, December 2004.

- **Refereed Conference Papers**

1. M. Khalili and X. Zhang, “Distributed fault detection in interconnected nonlinear uncertain systems,” *the 2014 IEEE Conference on Decision and Control*, Maui, Los Angeles, CA.
2. R. C. Avram and X. Zhang, “Sensor Fault Diagnosis in Quadrotors Using Nonlinear Adaptive Estimators,” Annual Conference of Prognostics and Health Management Society, Dallas, Texas, 2014.
3. X. Zhang and R. C. Avram, “A unified nonlinear approach to fault diagnosis of aircraft engines,” *ASME Turbo Expo 2013*, San Antonio, Texas, June 2013.
4. D. L. Simon, S. Borguet, O. Leonard, X. Zhang, “Aircraft engine gas path diagnostic methods: public benchmarking results,” *ASME Turbo Expo 2013*, San Antonio, Texas, June 2013.
5. Q. Zhang and X. Zhang, “A distributed detection scheme for process faults and sensor faults in a class of interconnected nonlinear uncertain systems,” *the 2012 IEEE Conference on Decision and Control*, Maui, Hawaii.
6. Q. Zhang and X. Zhang, “Distributed sensor fault diagnosis in a class of interconnected nonlinear uncertain systems,” *the 2012 IFAC Symposium on Fault Detection, Supervision and Safety of Technical Processes*, Mexico City.
7. X. Zhang, L. Farfan-Ramos, Y. Zhang, and S. Salman, “Robust State-of-Health Monitoring of Alternators for Automotive Applications,” *the 2012 IFAC Symposium on Fault Detection, Supervision and Safety of Technical Processes*, Mexico City.
8. Q. Zhang and X. Zhang, “Distributed fault detection and isolation for multimachine power system,” *the 2012 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Application*, Suzhou, China.
9. X. Zhang and Qi. Zhang, “Distributed fault detection and isolation in a class of large-scale nonlinear uncertain systems,” *The 2011 IFAC World Congress*, Milan, Italy.
10. X. Zhang, Q. Zhang, S. Zhao, R. M.G. Ferrari, M. M. Polycarpou, T. Parisini, “Fault Detection and Isolation of the Wind Turbine Benchmark: an Estimation-based Approach”, *The 2011 IFAC World Congress*, Milan, Italy.
11. X. Zhang, H. Uliyar, L. Farfan-Ramos, Y. Zhang, and M. Salman, “Fault Diagnosis of Automotive Electric Power generation and *Storage Systems,” Proc. of the 2010 IEEE Multi-conference on Systems and Control*, Yokohama, Japan.
12. X. Zhang, “Decentralized Fault Detection and Isolation for a Class of Large-Scale Nonlinear Uncertain Systems,” *Proc. of the 2010 American Control Conference*, Baltimore, MD.
13. X. Zhang, “Sensor Bias Fault Diagnosis in a Class of Nonlinear Uncertain Systems with Lipschitz Nonlinearities,” *Proc. of the 2010 American Control Conference*, Baltimore, MD.
14. L. Tang, X. Zhang, J. Decastro, L. Farfan-Ramos, D. Simon, “A unified nonlinear adaptive approach for detection and isolation of engine faults,” *Proc. of the ASME Turbo Expo 2010*, Glasgow, UK.
15. X. Zhang, Gruber, M. Salman, and K. Shin, “Automotive battery state-of-health monitoring: a parity relation based approach,” *The 2009 IFAC Symposium on Fault Detection, Supervision and Safety of Technical Processes*, Barcelona, Spain (**finalist for the ABB Best Application Paper Award**).
16. X. Zhang, M. M. Polycarpou, and T. Parisini, “Fault diagnosis of a class of uncertain nonlinear systems with Lipschitz nonlinearities,” *The 2009 IFAC Symposium on Fault Detection, Supervision and Safety of Technical Processes*, Barcelona, Spain (**finalist for the Paul Frank Best Theoretical Paper Award**).
17. X. Zhang, M. M. Polycarpou, and T. Parisini, “Decentralized fault detection in large-scale nonlinear uncertain systems,” *Proc. of the 2009 IEEE Conference on Decision and Control*, Shanghai, China.
18. X. Zhang, L. Farfan-Ramos, K. Rattan, and M. M. Polycarpou, " Adaptive Fault-Tolerant Fuzzy Control of Robotic Systems," *Proc. of 2009 North American Fuzzy Information Processing Society Annual Conference*, Cincinnati, OH.
19. X. Zhang, R. Gruber, M. Salman, K. Shin, “Automotive Battery State-of-Health Monitoring: a Battery Cranking Voltage based Approach,” *Proc. of the 2008 Integrated System Health Management Conference*, Covington, KY.
20. X. Zhang, M. M. Polycarpou, and T. Parisini, "Adaptive Fault-Tolerant Control of a Class of Nonlinear MIMO Systems," *The 2008 IEEE Conference on Decision and Control*, Cancun, Mexico.
21. X. Tang, X. Zhang, B. Koch, and D. Frisch, “Modeling and estimation of Nickel Metal Hydride Battery Hysteresis for SOC Estimation,” *Proc. of the 2008 International Conference on Prognostics and Health Management*, Denver, CO.
22. X. Zhang, M. M. Polycarpou, and T. Parisini, "Isolation of Process and Sensor Faults for a Class of Nonlinear Uncertain Systems," *Proc. of the 2008 American Control Conference*, Seattle, WA.

23. X. Zhang, Y. Liu, R. Rysdyk, C. Kwan, R. Xu, “An intelligent hierarchical approach to actuator fault diagnosis and accommodation”, *Proceedings of the 2006 IEEE Aerospace Conference.*
24. X. Zhang, D. Miller, R. Xu, C. Kwan, and H. Chen, “A maximum entropy based approach to fault diagnosis using discrete and continuous features”, *Proceedings of the 2006 IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes.*
25. R. Xu, G. Zhang, X. Zhang, C. Kwan, and K. Semega, “Sensor validation using nonlinear minor component analysis”, *Proceedings of the 2006 International Symposium on Neural Networks.*
26. H. Deng, R. Xu, X. Zhang, C. Kwan, and L. Haynes, “Agent-based distributed intrusion detection methodology for wireless Ad hoc networks”, *Proceedings of the 2006 World Congress in Computer Science, Computer Engineering, and Applied Computing*.
27. M. Salman, P. Popp, Y. Zhang; X. Zhang; Y.-K. Chin, “Vehicle Diagnosis and Prognosis: Concepts, Trends, and Applications to Batteries”, *Proceedings of Convergence 2006.*
28. X. Zhang, R. Xu, C. Kwan, S. Y. Liang, “An integrated approach to bearing fault diagnostics and prognostics”, *Proceedings of the 2005 American Control Conference*, Portland, OR.
29. X. Zhang, M. M. Polycarpou, R. Xu, and C. Kwan, “Actuator fault diagnosis and accommodation for flight safety”, *Proceedings of the 2005 Joint IEEE ISIC-MED Conference, Limassol,* Cyprus.
30. M. M. Polycarpou, X. Zhang, R. Xu, Y. Yang, and C. Kwan, "A neural network based approach to adaptive fault tolerant flight control", *Proceedings of the 2004 Joint IEEE CCA, ISIC and CACSD conference* (invited paper), Taipei.
31. X. Zhang, M. M. Polycarpou, and T. Parisini, "Sensor bias fault isolation in a class of nonlinear systems", *Proceedings of the 2003 IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes*, Washington DC.
32. C. Kwan, R. Xu and X. Zhang, "A novel fault detection and isolation approach for aircraft hydraulic pumps", *Proceedings of the 2003 IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes*, Washington DC.
33. C. Kwan, X. Zhang and R. Xu, "Early fire detection using acoustic emissions", *Proc. of the 2003 IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes*, Washington DC.
34. C. Kwan, X. Zhang, R. Xu, and L. Haynes, "A novel approach to fault diagnostics and prognostics", *Proceedings of the 2003 IEEE International Conference on Robotics and Automation*, Taipei.
35. X. Zhang, M. M. Polycarpou, and T. Parisini, "Fault-tolerant control of a class of nonlinear systems", *Proc. of the 2002 IFAC World Congress on Automatic Control*, Paper No. 1291, Barcelona, Spain.
36. X. Zhang, M. M. Polycarpou, and T. Parisini, "Fault isolation in a class of nonlinear uncertain input-output systems", *Proc. of the 2001 American Control Conference*, Arlington, VA.
37. X. Zhang, M. M. Polycarpou, and T. Parisini, "Integrated design of fault diagnosis and accommodation schemes for a class of nonlinear systems", *Proceedings of the 2001 IEEE Conference on Decision and Control*, pp. 1448-1453, Orlando, FL.
38. X. Zhang, M. M. Polycarpou, and T. Parisini, "Abrupt and incipient fault isolation of nonlinear uncertain systems", *Proc. of the 2000 American Control Conference*, pp. 3713-3717, Chicago, IL.
39. M. M. Polycarpou, T. Parisini, and X. Zhang, "Fault isolation of nonlinear uncertain systems", *Proceedings of the 2000 IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes*, pp. 739-744, Budapest, Hungary.
40. X. Zhang, T. Parisini, and M. M. Polycarpou, "Robust parametric fault detection and isolation for nonlinear systems", *The IEEE Conference on Decision and Control*, pp. 3102-3107, Phoenix, AZ, 1999.

- **Paper Citations** (3 papers with highest number of citations based on Google Scholar)
  1. **285 citations**, X. Zhang, M. M. Polycarpou, and T. Parisini, "A robust detection and isolation scheme for abrupt and incipient faults in nonlinear systems", *IEEE Transactions on Automatic Control*, vol. 47, no. 4, pp. 576-593, April 2002.
  2. **231 citations**, X. Zhang, T. Parisini, and M. M. Polycarpou, "Adaptive fault-tolerant control of nonlinear systems: a diagnostic information-based approach ", *IEEE Transactions on Automatic Control*, vol. 49, no.8, pp. 1259-1274, August 2004
  3. **94 citations**, X. Zhang, T. Parisini, and M. M. Polycarpou, "A sensor bias fault isolation scheme for a class of nonlinear systems", *IEEE Transactions on Automatic Control*, vol. 50, no. 3, pp. 370- 376, 2005.

GRANTS FUNDED

- **External Funding (Total Awarded: $ 526,698)**

Title	*WSU Fund Number*	*Funding Amount*	*Duration*	*Funding Agency*	*P.I.*	*Co-P.I.s*
Data-Driven Approach to Lead Acid Battery State-of-Health Monitoring	667096	$76,014	10/2007-12/2010	General Motors R&D Center	Zhang	N/A
A Nonlinear Adaptive Approach to Isolation of Sensor Faults and Component Faults	667568	$30,000	01/2009 - 07/2009	NASA SBIR Phase I, Impact Technologies	Zhang	N/A
Multi-Agent Health Management System	667602	$20,833	03/2009 - 09/2009	Army SBIR Phase I , Intelligent Automation, Inc.	Zhang	N/A
Mobile-Agent-Based Autonomous Data Fusion for Distributed Sensors	667701	$21,000	06/2009 - 11/2009	ONR SBIR Phase I, Impact Technologies	Zhang	N/A
Fault Prognosis of Automotive Electric Power Generation and Storage Systems	667597	$49,519	03/2009 – 08/2010	General Motors R&D Center	Zhang	N/A
Adaptive Learning Methods for Battery Capacity Estimation, sponsored by Delphi Corporation	667731	$20,000	06/2009 – 08/2010	Delphi Corporation	Zhang	N/A
A Unified Nonlinear Adaptive Approach for Detection and Isolation of Engine Sensor, Actuator and Component Faults	667908	$169,998	11/2009 - 11/2011	NASA SBIR Phase II, Impact Technologies	Zhang	N/A
Multi-Agent Health Management System	668063	$81,335	04/2010-06/2012	Army SBIR Phase II , Intelligent Automation, Inc.	Zhang	N/A
Mobile-Agent-Based Autonomous Data Fusion for Distributed Sensors	668208	$57,999	09/2010-02/2012	ONR SBIR Phase II, Impact Technologies	Zhang	N/A

- **Internal Funding**

Title	*WSU Fund Number*	*Funding Amount*	*Duration*	*Funding Agency*	*P.I.*	*Co-P.I.s*
SOH Monitoring of Li-Ion Batteries	667125	$20,000	03/2008 - 08/2010	WSU Research Challenge	Zhang	N/A
Direct Fuel Injection and Intelligent Control of Small Engines	668035	$35,000	06/2010 - 03/2011	WSU Research Challenge	Dong	Zhang
Intelligent Distributed Fault Detection and Isolation	668378	$17,000	06/2011-02/2012	WSU Research Challenge	Zhang	N/A

PROFESSIONAL SERVICE

1. Associate Editor, *IEEE Transactions on Control Systems Technology* (2012-present).
2. Member, IFAC Steering Committee on Fault Detection, Supervision and Safety for Technical Processes, TC 6.4, 2010 - present.
3. Associate Editor, Conference Editorial Board of the IEEE Control Systems Society, 2008-2011.
4. Program Committee Member, the *50th IEEE Conference on Decision and Control and European Control Conference*, December 2011, Orlando, Florida.
5. Program Committee Member, the *20th International Conference on Artificial Neural Networks (ICANN 2010)*, Thessaloniki, Greece.
6. Program Committee member, the *19th International Conference on Artificial Neural Networks (ICANN 2009)*, Limassol, Cyprus.
7. Program Committee Member, *the 2005 Joint IEEE International Symposium on Intelligent Control and Mediterranean Control Conference*, Limassol, Cyprus.
8. Reviewer for technical journals including *IEEE Transactions on Automatic Control, International Journal of Control, Automatica, IEEE Transactions on Control System Technology, etc.*

CURRICULUM VITA

Yan Zhuang, Ph.D., Assistant Professor of Electrical Engineering
Department of Electrical Engineering
Wright State University
Dayton, Ohio 45435

EDUCATION

Institution	**Concentration**	**Degree/Date**
Johannes Kepler University, Linz, Austria	Physics	Ph.D., 2000
Beijing Laboratory of Electron Microscopy, Chinese Academy of Sciences, China	Materials of Science	M.Sc. 1992
Fudan University, China	Physics	B.Sc. 1989

PROFESSIONAL EXPERIENCE

Institution	**Position**	**Dates**
Wright State University	Associate Professor	2013-present
Wright State University	Assistant Professor	2008-2013
Delft University of Technology	Assistant Professor	2005-2008
Delft University of Technology	Postdoctoral Research Fellow	2000-2005
Institute of Semiconductors, Chinese Academy of Sciences	Research Associate/Research Professor	1992-1996

PROFESSIONAL MEMBERSHIPS (members):

- Materials Science Society

ACADEMIC AWARDS

- AFOSR Summer Fellowship, 2012.
- Outstanding Scientist (Innovational Research Incentives Scheme - **VIDI** (2003), by Netherlands Organization for Scientific Research (equivalent to NSF Early Career Award in Netherlands, details in supplement)
- North-South-Dialogue Scholarship Program (1996-2000)

TEACHING

Courses Taught at Wright State University

Course Number	*Title*	*Times Taught*
EE 3450/5450	Electromagnetics	7

EE 346/546, 4420/6420	Transmission lines, waveguides, and radiating systems	7
EE 445/645	Electromagnetic compatibility	1
EE 4460/6460	Microwave circuit design	6
EE 7480	Advanced microwave engineering	5
EE 480/680	Micro/nano- fabrication engineering for VLSI and MEMs	4

New Course Development

1. EE 480/680 "Micro/nano- fabrication engineering for VLSI and MEMs" four (4) credit hours, Spring 2009.
2. EE 880 "Advanced microwave engineering," four (4) credit hours, Spring 2010.
3. RF teaching lab for EE442 and 446
4. MEMs lab for EE480

Postdoc. Supervised

Name	*Thesis Title*	*Time period*	*University*
S. Frégonèse	Disposable dot field effect transistor for high speed Si integrated circuits	2005. 01 – 2006 .01	TUDelft, Netherlands
Y. Xing	Graphene based RF bio-/chemical sensors	2009.01 – 2010.01	WSU, USA

Ph.D. Dissertation Supervised

Name	*Dissertation Title*	*Graduation Date*	*Degree*	*University*
Y. Ma	Ferroelectric materials and artificial dielectric layer structures for microwave integrated circuit technologies	March 2011	Ph. D	TUDelft, Netherlands

Ph.D. Dissertation Supervising

Name	*Dissertation Title*	*Graduation Date*	*Degree*	*University*
S. Hussaini	Three dimensional integrated magnetic RF passive components	Aug. 2015	Ph. D	WSU, USA
J. Myers	Atomic thin 2-D crystal materials and devices	Aug. 2016	Ph. D	WSU, USA
J. Evans	Implantable artificial cochlea device	Aug. 2016	Ph. D	WSU, USA

K. Brockdorf	Graphene based RF/Microwave impedance chemical gas sensor	Aug. 2017	Ph. D	WSU, USA
H. Min Jeon	Multiferroic materials for RF/microwave tunable components	Jan. 2018	Ph. D	WSU, USA

Master Thesis Supervised (WSU)

Name	*Thesis Title*	*Graduation Date*	*Degree*
Sheena Hussaini	Radio frequency integrated bio-chemical impedance sensor	March 2011	Master
Xida Sun	Structured Silicon Macropore as Anode in Lithium Ion Batteries	Summer 2011	Master
Ruiping Zhou	Theoretical modeling of silicene and graphene for device applications	Spring 2012	Master
Joshua Myers	Surface impedance investigation by scanning microwave microscopy	Spring 2012	Master
Jiahui Wang	High-k materials based large scanning angle leaky wave antenna	Fall 2012	Master
Hyung Min Jeon	Mechanically and electrically reconfigurable leaky wave antenna	Spring 2013	Master
Gregory Hartman	Monolithically integrated non-reciprocal RF components	Spring 2013	Master
Bella Yao	Selective Free-Standing Through-Wafer Porous Silicon Membrane (SFTPSM) for Integrated Meta-material Devices	Spring 2013	Master
Jared Evans	Artificial thin film polymeric frequency selective artificial cochlea	Summer 2013	Master

Master Thesis Supervising (WSU)

Name	*Thesis Title*	*Graduation Date*	*Degree*
Pradyumna Aditva	Ferroelectric materials based tunable RF components	Spring 2015	Master
Timothy Jason Nicodemus	Formation NiFe nano wires for RF applications	Spring, 2015	Master
Zhonghang Ji	Theoretical study of strained induced band gap opening of 2-D material	Fall, 2014	Master
Carl Gross	Integrated RF nano-varactor	Spring, 2015	Master
FNU Kumar Vishal	Magnetostatic wave in multiferroic thin film	Spring, 2015	Master

Graduate Student Committee Membership (Masters unless otherwise noted, total 9)

Name	*Thesis Title*	*Graduation Date*	*Advisor*
Ruolin Zhou (Ph. D.)	A Software-defined Radio Based Hybrid Overlay/Underlay Cognitive Radio over Gray Space	Nov. 2011	John Wu (EE, WSU)
Huseyin Sagkol (Ph. D)	High-Aspect Ratio CMOS Add-on Modules for RF Passive Components	Mar. 2011	J. Burghartz (TUDelft)
C. Biasotto (Ph. D)	DotFETs: MOSFETs strained by a Single SiGe Dot in a Low-Temperature ELA Technology	Oct. 2011	L. Nanver (TUDelft)
Piyush J. Shah (Ph. D)	Nanostructured columnar thin films using oblique angle deposition: growth, SERs characterization and lithographic processing	May, 2012	Kefu Xue (EE, WSU)
Kirti Kant Paulla (Ph. D)	Computational Modeling of Nanosensors Based on Graphene Nanoribbons Including Electron-Phonon Effects	2014	Amir Farajian (ME, WSU)
C. R. Boggs	Characterization of room temperature terahertz direct detectors	Oct. 2011	E. Brown (Phys. WSU)
R. M. Buzakuk	Dynamic footed with clock overlapping and load balancing in multiple paths for noise tolerance in dynamic CMOS circuit	Nov. 2011	H. Chen (EE, WSU)
Arvind Vaidyanadeswaran	Circuit Techniques on Improving Timing and Noise in Dynamic CMOS	Mar. 2011	H. Chen (EE, WSU)
Larsen, Mads Jacob Hedegaard	Non-Contact Probes for Characterization of THz Devices and Components	April, 2013	Elliott Brown (Phys. WSU)
Yang Qu	Software-Defined Radio based Blind Hierarchical Modulation Detector via Second-Order Cyclostationary and Fourth-Order Cumulant	May, 2013	John Wu (EE, WSU)
Hao Xue	Timing and power optimization using mixed-dynamic-static CMOS	June, 2013	H. Chen (EE, WSU)
Duo Zhang	Dynamic CMOS MIMO circuits with feedback inverter loop and pull-down bridge	July 2013	H. Chen (EE, WSU)
George J. Ramayya	Two Speed Control Of Residential Compressors	June 2014	Kazimierczuk (EE, WSU)
Daram, Prasanna Kumar	Antenna-free Probes for Characterization of THz Integrated-devices and Components	Aug. 2014	Elliott. Brown

Undergraduate Students Supervised (total 61):

Kent Weaver, Matt Evenhoe, Mike Chapmen, Alex Pringer, Ben Steinhauer, Cory Snyder, Andy Bishop, Phillip Cooley, Mikiyas Barkneh, James Blair, Scott Metzger, Barrett Harber, Yongxing Jiang, Kartik Mathihalli, Gregory Hartman, Brian S. Marshall, Ed

Brinkman, Sekou Bush, Travis Burnette, Michael Garvin, Travis Kimbrell, Dominic Mozel, Larry Schimmoeller, Joenell Rosales, Myhuong Vo, Angela West, Justin S. Wells, David I. Boyer, David A. Bricker, David A. Bricker, Mo Kaidi, John Jackson, Clinton Stiverson, David Long, Rachel Bryant, Chris Kretzler, Wayne Staigl, Hang Zhang, Riyadh Al Qahtani, Joshua Rhynard, David Rackley, Timothy Nicodemus, Jared Evans, Jason Thompson, Katelyn Nguyen, Kent Weaver, Matt Evenhoe, Mike Chapmen, Alex Pringer, Ben Steinhauer, Cory Snyder, Andy Bishop, Phillip Cooley, Broc Robers, Fahad Alenezi, M. Alhazmi, W. Gouty, K. Hamblin, A. Couch, M. Vagedes , H. Moeder and N. Wurst.

SCHOLARSHIP

Peer-Reviewed Journal Publications (*14 since appointment at WSU, out of total 56)
Average impact factor: 1.96, Total time cited: 362 according to Web of Science)

1. *G. C. Hartman, R. Fitch, and **Y. Zhuang**, "Nonreciprocal magnetostatic wave propagation in micro-patterned NiFe thin films", IEEE Microwave and Wireless Components Letters, vol. 24, pp. 484–486, 2014 (Impact factor: 1.77, Time cited: 0)
2. *J. Myers, *T. Nicodemus, **Y. Zhuang**, T. Watanabe, and M. Yamaguchi, "Characterization of grain boundary conductivity of spin-sprayed ferrites using scanning microwave microscope", Journal of Applied Physics, Vol. 115, pp. 17A506, 2014 (Impact factor: 2.064, Time cited: 0)
3. *R. Zhou, L. C. Lew Yan Voon, and **Y. Zhuang**, "Properties of two-dimensional silicon grown on graphene substrate", Journal of Applied Physics, vol. 114, pp. 093711, 2013 (Impact factor: 2.064, Time cited: 0)
4. *I. Iramnaaz, H. Schellevis, B. Rejaei, and **Y. Zhuang**, "High-quality Integrated Inductors Based on Multilayered Meta-conductors", IEEE Microwave and Wireless Components Letters, vol. 22, pp. 345-347, 2012. (Impact factor: 1.77, Time cited: 1).
5. *X. Sun, H. Huang, K. L. Chu, and **Y. Zhuang**, "Anodized macroporous silicon anode for integration of lithium ion batteries on chips", IEEE Journal of electronic materials, vol. 41, pp. 2369-2375, 2012. (Impact factor: 1.43, Time cited: 8)
6. *I. Iramnaaz, H. Schellevis, B. Rejaei, and **Y. Zhuang**, "Self-biased low loss conductor featured with skin effect suppression for high quality RF passives", IEEE Transaction on Magnetics, vol. 48, pp. 4139-4142, 2012 (Impact factor: 1.053, Time cited: 0)
7. *Y. Xing, J. Myers, O. Obi, X. Sun, and **Y. Zhuang**, "Excessive grain boundary conductivity of spin-spray deposited ferrite/non-magnetic multilayer", Journal of Applied Physics, Vol. 111, pp. 07A512, 2012. (Impact factor: 2.064, Time cited: 2)
8. *Y. Xing, J. Myers, O. Obi, X. Sun, and **Y. Zhuang**, "Scanning Microwave Microscopy characterization of spin-spray deposited ferrite/non-magnetic films", IEEE Journal of electronic materials, Vol. 41, pp. 530-534, 2012. (Impact factor: 1.43, Time cited: 1)

9. *P. K. Amiri, B. Rejaei, **Y. Zhuang**, M. Vroubel, D. W. Lee, and S. X. Wang, "Nonreciprocal spin waves in Co-Ta-Zr films and multilayers", IEEE Transaction on Magnetics, vol. 45, pp. 4215-4218, 2009. (Impact factor: 1.053, Time cited: 2)
10. *P. K. Amiri, B. Rejaei, **Y. Zhuang**, M. Vroubel, D. W. Lee, S. X. Wang, and J.N. Burghartz, "Integrated microstrip lines with Co-Ta-Zr magnetic films", IEEE Transaction on Magnetics, vol. 44, pp. 3103-3106, 2008. (Impact factor: 1.053, Time cited: 2)
11. *Y. Ma, B. Rejaei, and **Y. Zhuang**, "Artificial dielectric shields for integrated transmission lines", IEEE Microwave & Wireless Components Letters, vol. 18, pp. 431-433, 2008. (Impact factor: 1.77, Time cited: 2)
12. *Y. Ma, B. Rejaei, and **Y. Zhuang**, "Low-loss on-chip transmission lines with micro-patterned artificial dielectric shields", IEEE Electronics Letters, vol. 44, pp. 913-915, 2008. (Impact factor: 0.97, Time cited: 3)
13. ***Y. Zhuang**, B. Rejaei, H. Schellevis, M. Vroubel, and J.N. Burghartz, "Magnetic-multilayered interconnects featuring skin effect suppression", IEEE Electron Device Letters, vol. 29, pp. 319-321, 2008. (Impact factor: 2.719, Time cited: 3)
14. *S.Frégonèse, **Y. Zhuang**, and J. N. Burghartz, "Modeling of strained CMOS on disposable SiGe dots: Shape impacts on electrical/thermal characteristics", Solid-State Electronics, vol. 52, pp. 919–925, 2008. (Impact factor: 1.391, Time cited: 2)
15. P. K. Amiri, B. Rejaei, M. Vroubel, and **Y. Zhuang**, "Nonreciprocal spin wave spectroscopy of thin Ni-Fe stripes", Applied Physics Letters, vol. 91, pp. 062502, 2007. (Impact factor: 3.820, Time cited: 16)
16. B. Yan, H. T. M. Pham, Y. Ma, **Y. Zhuang**, and P.M. Sarro, "Fabrication of in situ ultrathin anodic aluminum oxide layers for nanostructuring on silicon substrate", Applied Physics Letters, vol. 91, pp. 053117, 2007. (Impact factor: 3.820, Time cited: 11)
17. S. Frégonèse, **Y. Zhuang**, and J. N. Burghartz, "Modeling of Strained CMOS on disposable SiGe dots: strain impacts on devices' electrical characteristics", IEEE Transactions on Electron Devices, vol. 54, pp. 2321, 2007. (Impact factor: 2.267, Time cited: 6)
18. P.K. Amiri, B. Rejaei, **Y. Zhuang**, M. Vroubel, and J.N. Burghartz, "Ferromagnetic thin films for loss reduction in on-chip transmission lines", IEEE Transactions on Magnetics, vol. 43, pp. 2630-2632, 2007. (Impact factor: 1.053, Time cited: 3)
19. **Y. Zhuang**, M. Vroubel, B. Rejaei, and J.N. Burghartz, "Integrated RF inductors with micro-patterned NiFe core", Solid-State Electronics, vol. 51, pp. 405-413, 2007. (Impact factor: 1.391, Time cited: 19)
20. P.K. Amiri, **Y. Zhuang**, H. Schellevis, B. Rejaei, M. Vroubel, Y. Ma, and J.N. Burghartz, "High-resistivity nanogranular Co–Al–O films for high-frequency applications", Journal of Applied Physics, vol. 101, pp. 09M508/1-3, 2007. (Impact factor: 2.064, Time cited: 0)

21. P.K. Amiri, B. Rejaei, M. Vroubel, **Y. Zhuang**, and J.N. Burghartz, "Experimental determination of the nonuniform shape-induced anisotropy field in Thin Ni–Fe Films", IEEE Transactions on Magnetics, vol. 43, pp. 1880-1883, 2007. (Impact factor: 1.053**,** Time cited: 3)

22. **Y. Zhuang**, M. Vroubel, B. Rejaei, J.N. Burghartz, and K. Attenborough, "Shape-induced ultra-high magnetic anisotropy and ferromagnetic resonance frequency in micropatterned thin NiFe film", Journal of Applied Physics, vol. 99, pp. 08C705, 2006. (Impact factor: 2.064, Time cited: 4)

23. M. Vroubel, **Y. Zhuang**, B. Rejaei, and J. N. Burghartz, "10 GHZ bandstop microstrip filter using excitation of magnetostatic surface waves in a patterned NiFe ferromagnetic film", Journal of Applied Physics, vol. 99, pp.08P506, 2006. (Impact factor: 2.064, Time cited: 2)

24. **Y. Zhuang**, M. Vroubel, B. Rejaei, J.N. Burghartz, and K. Attenborough, "Magnetic properties of electroplated nano/microgranular NiFe thin films for rf application", Journal of Applied Physics, vol.97, pp. 1-3, 2005. (Impact factor: 2.064, Time cited: 14)

25. M. Vroubel, **Y. Zhuang**, B. Rejaei, J.N. Burghartz, A. Crawford, and S. Wang, "Calculation of shape anisotropy for micropatterned thin Fe–Ni films for on-chip RF applications", IEEE Transactions on Magnetics, vol. 40, pp. 2835-2837, 2004. (Impact factor: 1.053, Time cited: 18)

26. M. Vroubel, **Y. Zhuang**, B. Rejaei, and J.N. Burghartz; "Integrated tunable magnetic RF inductor", IEEE Electron Device Letters, vol. 25, pp. 787-789, 2004. (Impact factor: 2.719, Time cited: 24)

27. **Y. Zhuang**, B. Rejaei, E. Boullaard, M. Vroubel, and J.N. Burghartz, "Integrated solenoid inductors with patterned sputter-deposited Cr/$Fe_{10}Co_{90}$/Cr ferromagnetic cores", IEEE Electron Device Letters, vol. 24, pp. 224-226, 2003. (Impact factor: 2.719, Time cited: 33)

28. M. Vroubel, **Y. Zhuang**, B. Rejaei, and J.N. Burghartz, "Patterned FeNi thin film for RF and microwave components", Journal of Magnetism and Magnetic Materials, vol. 258-259, pp. 167-169, 2003. (Impact factor: 1.438, Time cited: 16)

29. A. Daniel, **Y. Zhuang**, V. Holy, J. Stangl, S. Zerlauth, F. Schaffler, G. Bauer, N. Darowski, and U.Pietsch, "X-ray grazing incidence study of inhomogeneous strain relaxation in Si/SiGe wires", Nuclear Instruments and Methods in Physics Research B, vol. 200C, pp. 267-272, 2003. (Impact factor: 0.984, Time cited: 1)

30. **Y. Zhuang**, B. Rejaei, E. Boellaard, M. Vroubel , and J.N. Burghartz, "GHz band-stop microstrip filter using patterned $Ni_{78}Fe_{22}$ ferromagnetic film", IEEE Microwave and Wireless Components Letters, vol. 12, pp. 473-475, 2002. (Impact factor: 1.77, Time cited: 13)

31. **Y. Zhuang**, M. Vroubel, B. Rejaei, E. Boellaard, and J.N. Burghartz, "Investigation of microstrips with NiFe Magnetic thin film (I): experiment", Transactions of the Magnetic Society of Japan, vol. 2, pp. 367-370, 2002. (Time cited: 5)

32. M. Vroubel, **Y. Zhuang**, B. Rejaei, and J.N. Burghartz, "Investigation of microstrips with NiFe magnetic thin film (II): modeling", Transactions of The Magnetic Society of Japan, vol.2, pp. 371-376, 2002. (Time cited: 12)

33. A. Daniel, V. Holy, **Y. Zhuang**, T. Roch, J. Grenzer, Z. Bochnicek, and G. Bauer, "GID study of strains in Si due to patterned SiO_2", Journal of Physics D: Applied Physics, vol. 34, pp. A197-202, 2001. (Impact factor: 2.109, Time cited: 2)

34. S. Rubini, E. Milocco, L. Sorba, E. Pelucchi, A. Franciosi, A. Garulli, A. Parisini, **Y. Zhuang**, and G. Bauer, "Structural and electronic properties of ZnSe/AlAs heterostructures", Physical Review B, vol. 63, pp. 155312/1-12, 2001. (Impact factor: 3.772, Time cited: 5)

35. **Y. Zhuang**, V. Holý, J. Stangl, N. Darowski, J. Grenzer, U. Pietsch, S. Zerlauth, F. Schäffler, and G. Bauer, "In-plane strain and shape analysis of Si/SiGe nanostructures by grazing incidence diffraction", Physica B: Condensed Matter, vol. 283, pp. 130-134, 2000. (Impact factor: 0.853, Time cited: 4)

36. Z. Kovats, T. H. Metzger, J. Peisl, J. Stangl, M. Muhlberger, **Y. Zhuang**, F. Schaffler, and G. Bauer, "Investigation of beta -SiC precipitation in $Si_{1-y}C_y$ epilayers by X-ray scattering at grazing incidence", Applied Physics Letters, vol. 76, pp. 3409-3411, 2000. (Impact factor: 3.820, Time cited: 13)

37. **Y. Zhuang**, A. Daniel, C. Schelling, F. Schäffler, G. Bauer, J. Grenzer, and S. Senz, "Optical and structural properties of Si/SiGe wires grown on patterned Si substrates", Thin Solid Films, vol. 380, pp. 51-53, 2000. (Impact factor: 2.023, Time cited: 0)

38. **Y. Zhuang**, C. Schelling, J. Stangl, C. Penn, S. Senz, F. Schäffler, A. Daniel, U. Pietsch, and G. Bauer, "Structural and optical properties of Si/Si1-x Gex wires", Thin Solid Films, vol. 369, pp. 409-413, 2000. (Impact factor: 2.023, Time cited: 1)

39. S. Rubini, B. Bonanni, E. Pelucchi, A. Franciosi, A. Garulli, A. Parisini, **Y. Zhuang**, G. Bauer, and V. Holy, "ZnSe/CdTe/ZnSe heterostructures", Journal of Vacuum Science and Technology B, vol. 18, pp. 2263-2270, 2000. (Impact factor: 1.419, Time cited: 1)

40. S. Rubini, B. Bonanni, E. Pelucchi, A. Franciosi, **Y. Zhuang**, and G. Bauer, "CdTe epitaxial layers in ZnSe-based heterostructures", Journal of Crystal Growth, vol. 201-202, pp. 465-469, 1999. (Impact factor: 1.850, Time cited: 2)

41. Z. Pan, Y.T. Wang, **Y. Zhuang**, Y. W. Lin, Z.Q. Zhou, L.H. Li, R.H. Wu, and Q.M. Wang, "Investigation of periodicity fluctuations in strained (GaNAs)1/(GaAs)m superlattices by the kinematical simulation of X-ray diffraction", Applied Physics Letters, vol. 75, pp. 223-225, 1999. (Impact factor: 3.820, Time cited: 18)

42. **Y. Zhuang**, V. Holy, J. Stangl, A.A. Darhuber, P. Mikulik, S. Zerlauth, F. Schäffler, G. Bauer, N. Darowski, D. Lübbert, and U. Pietsch, "Strain relaxation in periodic arrays of Si/SiGe quantum wires determined by coplanar high resolution x-ray diffraction and grazing incidence diffraction", Journal of Physics D: Applied Physics, vol. 32, pp. A224-A229, 1999. (Impact factor: 2.109, Time cited: 7)

43. **Y. Zhuang**, J. Stangl, A. A. Darhuber, G. Bauer, P. Mikulik, V. Holy, N. Darowski, and U. Pietsch, "X-ray diffraction from quantum wires and quantum dots", Journal of

Materials Science: Materials in Electronics, vol. 10, pp. 215-221, 1999. (Impact factor: 0.927, Time cited: 2)

44. C. Rosenblad, T. Graf, J. Stangl, **Y. Zhuang**, G. Bauer, J. Schulze, and H. von Känel, "Epitaxial growth at high rates with LEPECVD", Thin Solid Films, vol. 336, pp. 89-91, 1998. (Impact factor: 2.023, Time cited: 9)

45. N. Darowski, U. Pietsch, **Y. Zhuang**, S. Zerlauth, G. Bauer, D. Lübbert, and T. Baumbach, "In-plane strain and strain relaxation in laterally patterned periodic arrays of Si/SiGe quantum wires and dot arrays", Applied Physics Letters, vol. 73, pp. 806-808, 1998. (Impact factor: 3.820, Time cited: 10)

46. S. Heun, J.J. Paggel, L. Sorba, S. Rubini, A. Bonanni, R. Lantier, M. Lazzarino, B. Bonanni, A. Franciosi, J.-M. Bonard, J.-D. Ganiere, **Y. Zhuang**, and G. Bauer, "Strain and surface morphology in lattice-matched ZnSe/$In_xGa_{1-x}As$ heterostructures", Journal of Applied Physics, vol. 83, pp. 2504-2510, 1998. (Impact factor: 2.064, Time cited: 8)

47. L. Tapfer, L. De Caro, **Y. Zhuang**, P. Sciacovelli, and A. Sacchetti, "X-ray scattering study of quantum wires and lateral periodic heterostructures", Thin Solid Films, vol. 319, pp. 49-56, 1998. (Impact factor: 2.023, Time cited: 6)

48. C. Giannini, L. Tapfer, **Y. Zhuang**, L. De Caro, T. Marschner, and W. Stolz, "Structural ordering and interface morphology in symmetrically strained(GaIn)As/Ga(PAs) superlattices grown off-oriented GaAs(100)", Physical Review B: Condensed Matter, vol. 55, pp. 5276-5283, 1997. (Impact factor: 3.772, Time cited: 17)

49. **Y. Zhuang**, C. Giannini, L. Tapfer, T. Marschner, and W. Stolz, "Lateral periodicity in high-strained (GaIn)As/Ga(PAs) superlattices investigated by X-ray scattering techniques", Nuovo Cimento , vol. 19, pp. 377-383, 1997. (Time cited:1)

50. **Y. Zhuang**, Y.T. Wang, D.S. Jiang, Y.P. Yang, X.M. Jiang, J.Y. Wu, L.S. Xiu, and W.L. Zheng, "Study of double barrier superlattice by synchrotron radiation and double-crystal x-ray diffraction", Applied Physics Letters, vol. 68, pp. 1147-1149, 1996. (Impact factor: 3.820, Time cited: 6)

51. S.F. Cui, Y.T. Wang, **Y. Zhuang**, M. Li, and Z.H. Mai, "In-plane X-ray scattering of epitaxial structures", Journal of Crystal Growth, vol. 152, pp. 354-358, 1995. (Impact factor: 1.850, Time cited: 0)

52. S.F. Cui, J.H. Li, M. Li, C.R. Li, Y.S. Gu, Z.H. Mai, **Y. Zhuang**, and Y.T. Wang, "Determination of surface roughness of InP (001) wafers by X-ray scattering", Journal of Applied Physics, vol. 76, pp. 4154-4158, 1994. (Impact factor: 2.064, Time cited: 3)

53. J.H. Li, S.F. Cui, M. Li, C.R. Li, Z.H. Mai, **Y. Zhuang**, and Y.T. Wang, "Surface scattering of x-ray from InP (001) wafers", Applied Physics Letters, vol. 65, pp. 3317-3319, 1994. (Impact factor: 3.820, Time cited: 2)

54. M. Li, Z.H. Mai, S.F. Cui, J.H. Li, Y.S. Gu, Y.T. Wang, and **Y. Zhuang**, "X-ray scattering from a rough surface and damaged layer of polished wafer", Journal of

Physics D: Applied Physics, vol. 27, pp. 1929-1932, 1994. (Impact factor: 2.109, Time cited: 1)

55. **Y. Zhuang**, Z. Zhang, and D.B. Williams, "A transmission electron microscopy study of interphase dislocation between decagonal quasicrystalline and crystalline phase in Al75Ni10Fe15 alloy", Journal of Non-crystalline Solids, vol. 153\154, pp. 119-122, 1993. (Impact factor: 1.483, Time cited: 5)

56. Z. Zhang, and **Y. Zhuang**, "A transmission electron microscopy study of dislocations in $Al_{70}Ni_{10}Co_{20}$ and $Al_{75}Ni_{10}Fe_{15}$ decagonal quasicrystals", Philosophical Magazine Letters, vol. 65, pp. 203-209, 1992. (Impact factor: 1.262, Time cited: 13)

<u>Peer-reviewed conference proceedings</u> (5 *since appointment at WSU)*

1. *I. Iramnaaz, T. Sandoval, **Y. Zhuang**, H. Schellevis, B. Rejaei, "Ultra-high quality factor RF inductors using low loss conductor featured with skin effect suppression for Standard CMOS/BiCMOS", IEEE 61st ECTC, Lake Buena Vista, FL, pp. 163-168, May, 2011.

2. *I. Iramnaaz, Y. Xing, K, Xue, **Y. Zhuang**, and R. Fitch, "Graphene based RF/microwave impedance sensing of DNA", IEEE 61st ECTC, Lake Buena Vista, FL, pp. 1030-1034, May, 2011.

3. *S. Cheekati, Y. Xing, **Y. Zhuang**, and H. Huang, "Nanographene Platelets and Their Composites for Li-Ion Batteries", ECS Transactions, 33(39), 23-32, 2011

4. *S. Cheekati, Y. Xing, **Y. Zhuang**, and H. Huang, "Lithium storage in nano graphene platelets", Ceramic Transaction, vol. 124, pp. 117-127, 2011.

5. *Y. Xing, H. Huang and, and **Y. Zhuang**, "Evaluation of graphene and graphene derivatives for impedance based sensing", MRS Proceedings, 1303: mrsf10-1303-y10-35, 2011

6. (Invited) **Y. Zhuang**, M. Vroubel, B. Rejaei, and J. N. Burghartz, "Thin film magnetic materials for RFIC passives", Proc. IEEE Bipolar/BiCMOS Circuit and Technology Meeting (BCTM 2005), pp. 26-32, Santa Barbara, CA, October 9-11, 2005.

7. B. Rejaei, M. Vroubel, **Y. Zhuang**, and J.N. Burghartz, "Assessment of ferromagnetic integrated inductors for Si-technology", Digest of Papers 4th Topical Meeting on Silicon Monolithic Integrated Circuits in RF Systems, pp.100-103, Garmisch, Germany, April, 2003.

8. **Y. Zhuang**, M. Vroubel, B. Rejaei, and J. Burghartz, "Ferromagnetic RF inductors and transformers for standard CMOS/BiCMOS", Technical Digest IEDM 2002, pp. 18.06/1-18.06/4, San Francisco, CA, USA, December, 2002.

9. **Y. Zhuang**, C. Schelling, T. Roch, A. Daniel, F. Schäffler, G. Bauer, J. Grenzer, U. Pietsch, and S. Senz, "Investigation of inhomogeneous in-plane strain relaxation in Si/SiGe quantum wires by high resolution x-ray diffraction", Mat. Res. Soc. Symp. Proc., vol. 590, pp. 207, 2000.

Conference Proceeding/Abstracts:

1. J. Evans, B. Goldenberg, **Y. Zhuang**, "Piezoelectric Thin Film Membrane Based Frequency Selective Artificial Cochlea", abstract accepted MRS, 2014 fall
2. X. Sun, H. Huang, K. L. Chu, and **Y. Zhuang**, "Three-dimensional macroporous silicon membrane for lithium ion batteries", IEEE 62nd ECTC, 2012
3. S. Cheekati, Y. Xing, **Y. Zhuang**, and H. Huang, "Li storage in nano-graphene platelets and their composites", poster, Material Research Society, Fall Meeting, Boston, MA, December, 2010.
4. **Y. Zhuang**, M. Vroubel, B. Rejaei, E. Boellaard, and J.N. Burghartz, "Microstrips with micro-patterned $Ni_{78}Fe_{22}$ ferromagnetic film for RF passives", Proc. SAFE 2002, pp. 136-140, Veldhoven, The Netherlands, November, 2002.
5. M. Vroubel, B. Rejaei, **Y. Zhuang**, and J.N. Burghartz, "Patterned magnetic thin films for RF applications", SCEE-2002, pp. 195-196, Eindhoven, The Netherlands, June, 2002.
6. M. Vroubel, B. Rejaei, **Y. Zhuang**, and J.N. Burghartz, "Permeability and resonance frequency of patterned magnetic thin films", SAFE 2001, pp. 1-5, Veldhoven, the Netherlands, November, 2001.
7. **Y. Zhuang**, B. Rejaei, E. Boellaard, M. Vroubel, and J.N. Burghartz, "Study of magnetic on-chip inductors", Proc. SAFE 2001, pp. 229-233, Veldhoven, the Netherlands, November, 2001.
8. D.S. Jiang, L.Q. Cui, W.G. Wu, C.Y. Song, **Y. Zhuang**, Y.T. Wang, and R.Z. Wang, "Structural and photoelectric studies on double barrier quantum well IR detectors", Proceedings of the Eighth International Conference on Narrow Gap Semiconductors, World Scientific, Singapore, vol. 172, 1998.
9. W.G. Wu, D.S. Jiang, L.Q. Cui, C.Y. Song, and **Y. Zhuang**, "Structural and photoelectric studies on double barrier quantum well infrared detectors", 1997 IEEE Hong Kong Electron Devices Meeting, New York, NY, USA, 1997.
10. **Y. Zhuang**, Y.T. Wang, W.Q. Ma, W. Wang, X.P. Yang, Z.G. Chen, D.S. Jiang, and H.Z. Zheng, "X ray diffraction analysis of self-organized InAs quantum dots", Proc. SPIE vol. 2897, pp. 75, 1996.

External Grant Funded

1) At Delft University of Technology (The Netherlands)

Title	*Funding (My share)*	*Duration*	*Funding Agency*	
Ferromagnetic and ferroelectric materials for monolithic RF/Microwave technology	€ 600,000	01/04 to 01/09	Netherlands Organization for Scientific Research (VIDI)	PI
Disposable dot field effect transistor for high speed Si integrated circuits	€ 600,000	08/05 to 08/08	EU project	Co-PI

Total Awarded: €1,200,000

2) At Wright State University (U.S.A.)

Title	*WSU Acct.#*	*Funding Amount/ My share*	*Duration*	*Funding Agency*	
Sensing, control and modeling for a quad-winged micro air vehicle platform	667493	$50,000/$25,000	11/01/08 to 08/31/09	DoD-STTR Phase I, Taitech	Co-PI
Sensing testing system for design of a quad-winged micro air vehicle	667734	$238,157/$142,000	08/01/09 to 08/31/10	DoD-DURIP	Co-PI
Deployable low power carbon nanotube sensors	667709	$200,000/$50,000	01/01/10 to 01/01/11	AFRL	Co-PI
Fundamentals of Low Dimensional Carbon Films Grown by Sublimation of SiC	668368	$78,782/$17,640	09/01/11 to 08/31/13	AFRL-DAGSI	PI
Atomic thin 2-D crystal materials and devices	668941	$28,032/$28,032	09/01/12 to 08/31/13	AFRL	PI
Study on Plasmonics in 2D Materials	669230	$29,000/$29000	09/01/13 to 08/31/14	AFRL	PI
Artificial cochlea	668945	$124,222/$100,000	09/01/12 to 08/31/13	Advratech	PI
MJB3 lithography	668304	$10,000/$10,000	10/26/10 to 10/26/11	AFRL	PI
Multifunctional Oxide Heterostructure	669333	$60,443/$60,443	11/2013 to 11/2014	AFRL	PI

Total Awarded: $818,636/$462,115

Internal Grant Funded

Title	*WSU Acct. Number*	*Funding Amount / My share*	*Duration*	*Funding Agency*	
Integrated sensing and modeling for bio-inspired micro flights	667540	$22,000/$11,000	01/01/09 to 12/31/09	University Research Council	P.I.
Deployable bio-chemical ensor and organic LED based on graphene	668018	$30,000/$15,000	06/01/10 to 06/01/11	University Research Council	P.I.
Bio-inspired Hair-cell Sensor Development and Flow Measurement of Micro Air Vehicles	668368	$40,000/$20,000	04/01/11 to 03/31/12	University Research Council	Co-PI

Total Awarded: $92,000/$46,000

SERVICE

WSU Committee Service

Department Committee	Position	Dates
Lab-resources committee	member	2008-present
Undergraduate studies	member	2009-present
Ad Hoc EP program subcommittee	member	2009-present
Ohio research scholar search committee	member	2009
CECS Petitions Committee	member	2013-
Search committee of Associate Dean for Research and Graduate Studies of CECS	member	2013-08

External Professional Service

Journal Reviewer

- Journal of Applied Physics
- IEEE Transactions on Electron Devices
- IEEE Transactions on Magnetics
- SPIN
- IEEE Sensors Journal

Conference Paper Reviewer

- ISCAS2010
- MRS fall, 2010
- IEEE Intermag, 2012

Professional Service

- Section Chair: 12th Join MMM/Intermag Conference, Jan. 2013, Chicago, USA
- Invited speaker at AFRL, Dayton, USA, Sep. 14, 2012
- Invited speaker at AFRL, Dayton, USA, June 14, 2012
- Invited speaker at AFRL, Dayton, USA, Feb. 16, 2011
- Invited speaker at Stuttgart University, Germany, Jul. 22, 2007
- Invited speaker at Qinghua University, Beijing, China, Aug. 17, 2006
- Invited speaker at Institute of Semiconductors, Chinese Academy of Science, Beijing, China, Aug. 17, 2006
- Invited speaker at BCTM2005, Santa Barbara, USA, October 2005
- Section Chair: "RF integrated passives and devices", Intermag2005 Conference, Japan, April, 2005