Ronald A. Coutu, Jr.

A. Biographical Information

A.1 Demographic

Professor of Electrical Engineering
Professor of Mechanical Engineering
V. Clayton Lafferty Endowed Chair
Director, MEMS and Advanced Microsystems Test Lab
Director, Cleanroom and Device Fabrication Lab

Marquette University
OPUS College of Engineering
Department of Electrical and Computer Engineering
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Milwaukee, WI 53233
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Email: Ronald.Coutu@marquette.edu
Website: www.coutumems.com

Licensed Professional Engineer in Electrical Engineering (CA #E15570)
Retired USAF Officer (highest rank achieved: Lieutenant Colonel)

A.2 Education

2018 Faculty Leadership Program: Faculty Exploring Leadership Opportunities (FELOS)
Marquette University, Milwaukee, WI

2008 Professional Certificate in Infrared & Electro-Optical Technology
Georgia Institute of Technology, Atlanta, GA

2006 Masters' Certificate in Leadership: Emerging Leader Program
University of Dayton, Dayton, OH

2004 Ph.D., Electrical Engineering
Air Force Institute of Technology, Wright-Patterson AFB, OH
Dissertation Title: *Electrostatic Radio Frequency (RF) Microelectromechanical Systems (MEMS) Switches with Metal Alloy Electric Contacts*
(Advisor: Dr. Paul Kladitis)

1998 Experimental Flight Test Engineer Course (Class 97B)
Air Force Test Pilot School, Edwards AFB, CA

1995 MS, Electrical Engineering
California Polytechnic State University (CalPoly), San Luis Obispo, CA
Thesis Title: *Sensor-Blending Kalman Filters for Integrating Acceleration and the Differential Global Positioning System* (Advisor: Dr. Donley Winger)

1993 BS, Electrical Engineering
University of Massachusetts at Amherst, Amherst, MA

1990 AS, Engineering Science
Cape Cod Community College, West Barnstable, MA

A.3a Professional Experience (Academia)

2016 – Present **Professor of Electrical Engineering (Tenured)**
V. Clayton Lafferty Endowed Chair
Department of Electrical and Computer Engineering, Marquette University, Milwaukee, WI. Expertise in microelectronics, microelectromechanical systems (MEMS), microsystems, nanotechnology and device fabrication. Teaches undergraduate and graduate-level courses. Directs and advises Undergraduate projects, as well as, Masters and Ph.D.-level research. Leads the development of a Class 1,000 cleanroom and device test laboratories. Provides technical consultation to Industry, International collaborators and US Government agencies.

2009 – 2016 **Assistant/Associate Professor of Electrical Engineering**
(Tenure-Track / Tenured Civilian)
Department of Electrical and Computer Engineering, Air Force Institute of Technology (AFIT), Wright-Patterson AFB, OH. Expertise in microelectronics, MEMS, nanotechnology and device fabrication. Teaches graduate-level courses. Directs and advises Masters and Ph.D.-level research. Provides technical consultation to Air Force, Department of Defense, Defense Advanced Research Projects Agency, Department of Energy and national organizations.

2008 – 2009 **Assistant Professor of Electrical Engineering (Military Faculty)**, Department of Electrical and Computer Engineering, AFIT, Wright-Patterson AFB, OH. Expertise in microelectronics, MEMS, nanotechnology and device fabrication. Teaches graduate-level courses. Directs and advises Masters and Ph.D.-level research. Provides technical consultation to Air Force, Department of Defense, Defense Advanced Research Projects Agency, Department of Energy and national organizations.

2008 – 2016 **AFIT Cleanroom Director**
Leads multi-Departmental team consisting of faculty, students, and technicians in the daily operations and management of AFIT's $15.0M, 2300ft^2, Class 1,000 microelectronics fabrication facility. Provides long-

term vision and direction for one-of-a-kind AFIT cleanroom facility. Spearheads major equipment purchases and facility upgrades (e.g. SEM/FIB, HF vapor etching, laser lithography direct write, Micro-Raman, etc.) and facility upgrades (e.g. 1500 gallon external LN2 tank for house N2, upgrade to Class 1,000, corrosive etching chemistry exhaust, etc.).

A.3b Professional Experience (Military)

2006 – 2008 **Director of Test, Advanced Technologies**, Aeronautical Systems Center, 77th Aerospace Wing, Special Programs, Wright-Patterson Air Force Base, OH. Led 28-person, multi-agency, multi-location, Joint test team in planning, design of experiments, conducting, collecting data, analyzing data, and reporting results of highly classified experiments supporting a $2.0B+ activity.

2005 – 2006 **Executive Officer to the Vice Commander,** Air Force Research Laboratory, Headquarters, Wright-Patterson Air Force Base, OH. Led four Officers, one Noncommissioned Officers (NCO), and three civilians in providing executive and administrative support for NAF-equivalent Higher HQ (HHQ). Orchestrated daily operations and directed performance report and decoration processes. Coordinated packages for promotion, developmental education, special programs, and force shaping boards. Assistant Inspector General.

2004 – 2005 **Deputy Chief, Aerospace Components Division,** Air Force Research Laboratory (AFRL), Sensors Directorate, Wright-Patterson Air Force Base, OH. Senior leader for Squadron-size research division ($45M annual research budget) of 126 research and support personnel including 19 officers and one Senior NCO. Spearheaded several microelectromechanical systems (MEMS) micro-switch reliability projects. Jump-started the division's, small UAV, close-in sensing, test bed project. Cross-directorate flight and ground test safety review board (SRB) chairman.

2001 – 2004 **Doctoral Student, full time, USAF Sponsored**, Air Force Institute of Technology, Wright-Patterson AFB, OH.

1998 – 2001 **Section Leader, F-16 Block 50 Modular Mission Computer and Mid-Life Update,** Air Force Flight Test Center, 416th Combined Test Force, Edwards Air Force Base, CA. Led 12-person team consisting of project managers, test engineers, contractors, and test pilots. Responsible for planning, execution, data analysis, and reporting for Block 50 MMC (USAF) and MLU (European) flight test projects. Tested newest F-16 technologies to include: Inertially Aided Munitions (IAMs), Joint Helmet Mounted Cueing System (JHMCS), AIM-9X, Advanced Laser Targeting Pod, and Link 16. F-16 Flight Test Engineer and in-flight mission director.

1997 – 1998 **Flight Test Engineer Student,** AF Test Pilot School, Edwards AFB, CA.

1995 – 1997 **Deputy Test Director, Strategic Systems,** Space and Missile Systems Center, Detachment 9, Vandenberg Air Force Base, CA. Led five Officers and six NCOs during the Minuteman III Guidance Replacement Program (GRP) DT&E. Developed GRP unique launch procedures. Designed, fabricated, and tested a fiber-optic switch to route pre-launch data from silo to data reduction facility. Anomaly Team Chief during MM II test launches. Top Secret Control Officer.

1993 – 1995 **Chief, AFOTEC Data Analysis and Engineering Branch,** 576 Flight Test Squadron, Air Force Operational Test and Evaluation Center (AFOTEC), Vandenberg Air Force Base, CA. Supervised two NCOs in collecting and managing IOT&E test data. Performed system nuclear survivability analysis and evaluated electromagnetic interference and compatibility. Developed procedures, conducted fault detection/fault isolation tests, and evaluated system capabilities. Conducted nuclear event detector testing and evaluated crew response times. Conducted linear accelerator and fast burst nuclear reactor testing to confirm system hardness to nuclear effects.

1984 – 1992 **Avionics Technician**, VMFP-3 (RF-4B) and VMFA-531 (F/A-18), Marine Corps Air Station, El Toro, CA. 102nd Air Interceptor Wing (F-15), Otis Air National Guard Base, MA. 104th Tactical Fighter Group (A-10), Westfield Air National Guard Base, MA. Intermediate/backshop maintenance activity responsible for, component-level, troubleshooting and repairing of tactical camera, cockpit camera and video tape recorder systems.

A.4 Awards and Honors

2016 IEEE NAECON, Best Poster Award (#1/40)

2015 Eta Kappa Nu (HKN), Key Chapter Award – Faculty Advisor

2015 Eta Kappa Nu (HKN), Outstanding Teaching Award, ENG Faculty Instructor of the Year.

2015 AFIT 3rd Quarter CY15 Award, Civilian CAT III.

2015 Southwestern Ohio Council for Higher Education (SOCHE) Faculty Excellence Award.

2015 Elevated to Senior Member Status by the International Society for Optical Engineering (SPIE).

2015	Delta Xi, Eta Kappa Nu (HKN) Student Chapter Nominee for the national-level C. Holmes MacDonald IEEE/HKN Outstanding Teaching Award Outstanding Chapter Award (Faculty Adviser).
2014	AFIT Annual CY14 Award, Civilian Cat III.
2014	AFIT 3rd Quarter CY14 Award, Civilian CAT III.
2013	Eta Kappa Nu (HKN), Letter of Appreciation from the Director IEEE-HKN for "support and guidance" as Delta Xi Chapter Faculty Advisor.
2013	Sandia National Laboratory University Alliance MEMS Design Competition – Honorable Mention Award: Educational Design Category.
2013	AETC nominee for USAF-level John L. McLucas Basic Research Award.
2012	Eta Kappa Nu (HKN), Outstanding Teaching Award, ENG Faculty Instructor of the Year.
2012	IDEA Award, US Patent 7,906,738, "Shaped MEMS Contact (geometry)."
2012	Best Paper Award - 13th International Symposium on MEMS and Nanotechnology, Society of Experimental Mechanics Annual Conference.
2011	Delta Xi, Eta Kappa Nu (HKN) Student Chapter, Outstanding Chapter Award (Faculty Adviser).
2011	AETC Outstanding Engineer of the Year, Senior Civilian Category.
2011	AFIT Outstanding Engineer of the Year, Senior Civilian Category.
2010	Eta Kappa Nu (HKN), Outstanding Teaching Award, ENG Faculty Instructor of the Year.
2010	IDEA Award, US Patent 7,601,554, "Shaped MEMS Contact (process)."
2010	AETC Outstanding Engineer of the Year, Senior Civilian Category.
2010	AFIT Outstanding Engineer of the Year, Senior Civilian Category.
2010	Best Paper Award - 11th International Symposium on MEMS and Nanotechnology, Society of Experimental Mechanics Annual Conference.
2009	Blue Dart Award, Top 25 Student Paper Award, "'Electronic Nose' Could Eliminate Terrorist's IED Advantage."

2009	Best Presentation Award - 34th Annual AIAA Dayton-Cincinnati Aerospace Science Symposium (DCASS).
2008	IDEA Award, US Patent 7,235,750 "Method for selecting metal alloy electric contact materials for radiofrequency (RF) microelectromechanical system (MEMS) switches."
2006	Elevated to Senior Member Status by the Institute of Electrical and Electronics Engineers (IEEE)
1993 - 2009	Numerous Military Awards and Decorations: Meritorious Service Medal (2nd Oak Leaf Cluster), Aerial Achievement Medal, Air Force Commendation Medal (2nd Oak Leaf Cluster), Air Force Achievement Medal, USMC Good Conduct Medal, National Defense Service Medal, Global War on Terrorism Service Medal.
2004	Military R&D Engineer of the Year, AFRL (Sensors Directorate), Aerospace Components Division.
1995	Graduated Cum Laude, California Polytechnic State University (CalPoly) in San Luis Obispo.
1993	Graduated Cum Laude, University of Massachusetts at Amherst.
1990	Graduated with High Honors, Cape Cod Community College.

A.5 Professional Military Education

2009	Air War College (AWC, correspondence course)
2004	Intermediate Developmental Education (IDE) at AFIT (residence course)
2003	Air Command and Staff College (ACSC, correspondence course)
2000	USMC Amphibious Warfare School Nonresident Program
1998	Squadron Officers School (correspondence and residence courses)

A.6 Acquisitions Professional Certifications

2007	Level III, Program Management
2007	Level III, Systems, Planning, Research, Development & Engineering
2005	Level I, Acquisition Logistics
2000	Level III, Test and Evaluation

B. Scholarly Activities

B.1 Teaching

B.1.a Teaching Appointments

2018 – Present	Professor of Mechanical Engineering, Marquette University, WI
2016 – Present	Professor of Electrical Engineering, Marquette University, WI
2016 – Present	Adjunct Professor, Air Force Institute of Technology (AFIT), OH
2012 – Present	Adjunct Professor, University of Dayton (UD), OH
2008 – 2016	Assistant/Associate Professor, AFIT, OH
2006 – Present	Adjunct Professor, Wright State University (WSU), OH
2005 – 2008	Adjunct Assistant Professor, AFIT, OH
1995 – 1997	Adjunct Instructor, West Coast University (WCU), CA

MU Courses Taught or Co-taught

ELEN4490/EECE5490	Dev in Devices: Intro to Device Fabrication	Fa17, Fa18
EECE 6953	Seminar in EECE: Adv. Microsystems	Fa17, Sp18, Fa18
EECE 6932	Adv. Topics in EECE: Intro to MEMS	Sp18, Sp19
EECE 6932	Adv. Topics in EECE: Electrical Contacts	Fa18
EECE 1953	EECE Freshman Seminar I	Fa18
EECE 1954	EECE Freshman Seminar II	Sp19

AFIT Courses Taught or Co-taught

EENG 596	Integrated Circuit Technology	Fa10, Fa11, Fa12, Fa13, Fa14, Fa15
EENG 636	Intro to Microelectromechanical Systems (MEMS)	Wi09, Wi10, Wi11, Wi12, Wi13, Wi14, Wi15, Wi16
EENG 717,	Advanced Topics in Semiconductor Devices	Su10
EENG 777	Advanced MEMS	Su09, Su10, Su11
EENG 779	Introduction to Nanotechnology (co-taught)	Wi09
EENG 699	MS Special Study	Sp10(2), Fa11, Wi13(6), Sp13, Su13(3), Wi14(3), Sp14(3), Su14(2), Fa14, Wi15, Sp15(2) Su15(2), Fa15, Wi16 Sp16(3)
EENG 899	PhD Special Study	Fa10, Wi11, Wi13, Sp13, Wi14, Fa14, Wi15

WSU Courses Taught or Co-taught

EE410/610	Introduction to MEMS	Wi07, Su07, Fa07, Fa08, Su09, Fa09, Su10, Wi11, Su11, Wi12, Su12

EE708	Advanced MEMS	Sp07, Wi08, Sp11, Sp12

UD Courses Taught or Co-taught

ECE595	Introduction to MEMS	Su12

WCU Courses Taught

Calculus (I, II, III), Numerical Analysis, and Circuit Analysis

B.1.b Course and Curriculum Development

2019	EECE1954 (MU), EECE Freshman Seminar II. Developed new course.
2018	EECE1953 (MU), EECE Freshman Seminar I. Developed new course.
2018	EECE6932 (MU), Electrical Contacts. Developed new course.
2018	ELEN4490/EECE5490 (MU), Intro to Device Fabrication. Developed lab demos.
2017	EECE6932 (MU), Intro to MEMS. Developed new course.
2017	ELEN4490/EECE5490 (MU), Intro to Device Fabrication. Developed new course.
2015	EENG 596 (AFIT), Integrated Circuit Technology. Added tour of crystalline silicon growth facility at a local company in Eaton, OH (Silfex, Inc).
2014	EENG 636 (AFIT), Microelectromechanical Systems (MEMS). Major course revision, new text book, updated lectures, new homework problems.
2013	EENG 596 (AFIT), Integrated Circuit Technology. Major course revision, new text book, updated lectures, new homework problems.
2013	EENG 636 (AFIT), Microelectromechanical Systems (MEMS). Added HF wet etching and HF vapor etching lab demos to the course. The wet etching demo was previously done during EENG 777. HF vapor etching is state of the art and available now due to the acquisition of new lab equipment.
2012	EENG 596 (AFIT), Integrated Circuit Technology. Added lab demos to the course (i.e. photolithography, thin film deposition, wet and dry etching)
2012	ECE 595 (UD), Introduction to MEMS. Developed curriculum for UD's first-ever Intro to MEMS course.
2011	EENG 596 (AFIT), Integrated Circuit Technology. Added an oxidation/diffusion furnace lab demo to the course. The intent is to eventually use the material grown during this demo in subsequent microelectronics courses (i.e. EENG 675 and EENG 717)
2010	EENG 717 (AFIT), Advanced Topics in Semiconductor Devices. Revamped course content and revitalized the lab component. Redesigned course mask set to include RF testable MODFETS. Drastically updated device fabrication processing by incorporating Deep UV and electron beam lithography.

2010 EENG 777 (AFIT), Advanced MEMS. Refocused course to emphasize piezoelectric, piezoresistive, magnetic, magnetostrictive, and other advanced transduction techniques. In addition, weekly, in-depth journal article reviews were assigned. Added team research projects.

2009 EENG 777 (AFIT), Advanced MEMS. Revamped course content to include a lab component where MEMS devices fabrication is conducted in the cleanroom.

2009 EENG 779 (AFIT), Nanotechnology. Coordinated lectures from local experts from the Sensors Directorate of AFRL. Conducted equipment demonstrations (AFM, SEM, etc)

2009 EENG 636 (AFIT), Microelectromechanical Systems (MEMS). Revamped course content to include analytical derivations of key concepts. Added team research projects.

2008 Cleanroom Orientation, AFIT Short Course. Developed course materials for 2 week short course in basic cleanroom operations.

2007 EE708 (WSU), Advanced MEMS. Developed course material for an advanced course in MEMS. Course focuses on piezoelectric, piezoresistive, magnetic, magnetostrictive, and other advanced transduction techniques. In addition, in-depth journal article reviews were assigned.

B.1.c Evaluation of Teaching Proficiency

For each course offering at Marquette, on-line critique forms are filled out by students to evaluate the instructor's performance. The following is a summary of these evaluations.

Term	Course	Number of students/returned evaluations	Ave. Student Evaluation of instructor
Fa17	ELEN 4490 EECE 5490	11/8	5.4/6.0
Fa17	EECE 6953	4/4	NA
Sp18	EECE 6932	6/6	6.0/6.0
Sp18	EECE 6953	4/4	NA
Fa18	EECE1953	41/85	4.6/6.0
Fa18	ELEN 4490 EECE 5490	3/6	5.9/6.0
Fa18	EECE 6932	7/8	5.8/6.0
Fa18	EECE 6953	5/5	NA
AVERAGE			5.5/6.0

For each course offering at AFIT, critique forms are given to the students to evaluate the instructor's performance. The following is a summary of these evaluations.

Term	Course	Number of students/returned evaluations	Ave. Student Evaluation of instructor
Wi09	EENG 636	9/1	5.0/5.0
Su09	EENG 777	7/1	3.3/5.0
Wi10	EENG 636	6/1	3.6/5.0
Wi10	EENG 636L	6/1	3.6/5.0
Sp10	EENG 699	1/1	4.6/5.0
Sp10	EENG 699	1/1	3.7/5.0
Su10	EENG 777	5/3	4.63/5.0
Su10	EENG 777L	5/3	4.62/5.0
Su10	EENG 717	2/2	4.45/5.0
Su10	EENG 717L	2/2	4.1/5.0
Fa10	EENG 596	5/5	4.2/5.0
Fa10	EENG 899	1/1	5.0/5.0
Wi11	EENG 636	2/2	4.95/5.0
Wi11	EENG 636L	2/2	4.95/5.0
Wi11	EENG 899	1/1	5.0/5.0
Su11	EENG 777	1/1	4.0/5.0
Su11	EENG 777L	1/1	4.0/5.0
Fa11	EENG 596	5/3	5.0/5.0
Fa11	EENG 699	1/1	5.0/5.0
Wi12	EENG 636	3/3	5.0/5.0
Wi12	EENG 636L	3/2	5.0/5.0
Fa12	EENG 596	13/8	4.7/5.0
Wi13	EENG 636	13/3	4.83/5.0
Wi13	EENG 636L	13/2	5.0/5.0
Wi13	EENG 699	1/1	5.0/5.0
Wi13	EENG 899	1/0	N/A
Sp13	EENG 699	1/0	N/A
Sp13	EENG 899	1/0	N/A
Su13	EENG 699	3/0	N/A
Fa13	EENG 596	7/4	4.73/5.0
Wi14	EENG 899	1/0	NA
Wi14	EENG 636	5/1	5.0/5.0
Wi14	EENG 636L	5/0	N/A
Wi14	EENG 699	1/1	5.0/5.0
Sp14	EENG 699	3/1	5.0/5.0
Su14	EENG 699	2/0	NA
Fa14	EENG 596	5/2	5.0/5.0
Fa14	EENG 899	1/1	5.0/5.0
Wi15	EENG 636	2/2	4.9/5.0

Wi15	EENG 636L	2/2	5.0/5.0
Wi15	EENG 899	1/1	5.0/5.0
Wi15	EENG 699	2/0	NA
Sp15	EENG 699	1/1	5.0/5.0
Sp15	EENG 699	1/1	5.0/5.0
Su15	EENG 699	1/1	5.0/5.0
Su15	EENG 699	1/1	5.0/5.0
Fa15	EENG 596	4/3	4.57/5.0
Fa15	EENG 699	1/1	4.89/5.0
Wi16	EENG 636	2/	TBD
Wi16	EENG 636L	2/	TBD
Wi16	EENG 699	1/	TBD
Sp16	EENG 699	3/	TBD
AVERAGE			4.68/5.0

For each course offering at WSU, critique forms are given to the students to evaluate the instructor's performance. The following is a summary of these evaluations.

Term	Course	Number of students/returned evaluations	Ave. Student Evaluation of instructor
Wi07	EE410/610	19/17	4.6/5.0
Sp07	EE708	10/3	N/A
Su07	EE480/680	6/1	N/A
Fa07	EE410/610	12/11	4.9/5.0
Wi08	EE708	39/18	N/A
Fa08	EE410/610	12/9	N/A
Su09	EE410/610	9/1	3.9/5.0
Fa09	EE410/610	8/8	4.8/5.0
Su10	EE410/610	9/9	4.8/5.0
Wi11	EE410/610	8/1	3.5/5.0
Sp11	EE708	10/9	4.6/5.0
Su11	EE410/610	20/12	4.2/5.0
Wi12	EE410/610	25/19	4.3/5.0
Sp12	EE708	5/4	4.3/5.0
Su12	EE410/610	20/17	4.7/5.0
AVERAGE			4.4/5.0

B.1.d Thesis and Dissertation Advising

Post-Doctoral Fellows Advising: 1 current Post-Doc, 2 completed Post-Doc
Ph.D. Advising: 3 current Ph.D. students, 6 graduated Ph.D. students
MS Advising: 1 current MS students, 27 graduated MS students
Undergraduate Advising: 2 current BS students, 1 completed BS students

Current Students

- Post-Doctoral Fellows

- Doctoral (Dissertation Research Advisor or Co-Advisor)
  1. Protap Mahanta, *in progress*, Start date: September 2017.
     Research area: Micro-Electrical Contacts.
  2. Mohiuddin Munna, *in progress*, Start date: September 2017.
     Research area: Liquid Crystal Technologies.
  3. Turja Nandy, *in progress*, Start date: September 2017.
     Research area: CO/CO_2 Sensing Technologies.
  4. Mohammad Hossain, *in progress*, Start date: September 2018.
     Research area: Engineered Surfaces using MEMS Fab

- Masters (Thesis Research Advisor or Co-Advisor)
  1. Farhana Anwar, *in progress*, Start date: September 2017.
     Research area: Low-Cost Pressure Sensing.

- Undergraduates (Research Project Advisor or Co-Advisor)
  1. Wesley Gilmore, Lab helper, Start date: May 2017.
     Research area: Wheatstone bridge strategies.

Graduated/Completed Students

- Post-Doctoral Fellows
  1. Elizabeth Moore, *MEMS Tunable Metamaterials*, September 2010 – August 2011.
  2. Dushyant Tomer, *Micro-contacts, Phase Change Materials*, Mar - Dec 2017.
  3. Ashish Mishra, *Prototypes for simulating spinal injuries*, Date: May - Dec 2018.

- Doctoral (Dissertation Research Advisor or Co-Advisor)
  1. Crossley, Benjamin, Maj, USAF, *Carbon Nanotube Field Emission Arrays*, Sponsor: Air Force Research Laboratory, Materials and Manufacturing Directorate, Graduated: June 2011.
  2. Christianson, Bradley, Lt Col, USAF, *Investigation of Gallium Nitride Transistor Reliability Through Accelerated Life Testing and Modeling*, Sponsor: Air Force Research Laboratory, Sensors Directorate, Graduated September 2011.
  3. Langley, Derrick, Capt, USAF, *Design, Fabrication and Testing of Tunable RF Meta-Atoms*, Sponsor: Air Force Research Laboratory, Materials and Manufacturing Directorate, Graduated: June 2012.
  4. Glauvitz, Nathan, Maj, USAF, *MEMS Cantilever Sensor for THz Photoacoustic Chemical Sensing and Spectroscopy*, Sponsor: Air Force Office of Scientific Research, Graduated: December 2013.

5. Lake, Robert, Capt, USAF, *Novel Applications of a Thermally Tunable Bistable Buckling Silicon-on-Insulator (SOI) Microfabricated Membrane*, Sponsor: Air Force Institute of Technology, Graduated: September 2015.
6. Laurvick, Tod, Maj, USAF, *Improvements to Micro-Contact Performance and Reliability*, Sponsor: Air Force Office of Scientific Research, Graduated: December 2016.

- Masters (Thesis Research Advisor or Co-Advisor)
  1. Kossler, Mauricio, 1Lt, USAF, *Patterning and Growth and Characterization of Carbon Nanotubes Grown in a Microwave Plasma Enhanced Chemical Vapor Deposition Chamber*, Sponsor: Air Force Research Laboratory, Materials and Manufacturing Directorate, Graduated: March 2009.
  2. Lagoski, Thomas, 1Lt, *Retroreflector for Photonic Doppler Velocimetry*, Sponsor: Air Force Research Laboratory, Munitions Directorate, Graduated: March 2009.
  3. Gallagher, Daniel, Civ, DAF, *Surface Acoustic Wave Devices as Chemical Vapor Sensors*, Sponsor: Air Force Research Laboratory, Materials and Manufacturing Directorate, Graduated: March 2009.
  4. Smith, Nina, 2Lt, USAF, USAF, *Increasing the Sensitivity of Surface Acoustic Wave (SAW) Chemical Sensors and other Chemical Sensing Investigations*, Sponsor: Air Force Research Laboratory, Materials and Manufacturing Directorate, Graduated: March 2010.
  5. Ostrow, Scott, Capt, USAF, *Microelectromechanical Systems (MEMS) Designs for Anti-Tamper Response Applications*, Sponsor, Air Force Research Laboratory, Sensors Directorate, Graduated: March 2011.
  6. Lombardi, Jack, 2Lt, USAF, *Optical Metamaterial Design, Fabrication and Test*, Sponsor, Air Force Research Laboratory, Materials and Manufacturing Directorate, Graduated: March 2011.
  7. Schnapp, Jamie, Capt, USAF, *Linear Quadratic Control of MEMS Micromirrors Using Kalman Filtering*, Sponsor, Air Force Research Laboratory, Sensors Directorate, Graduated: December 2011.
  8. Ramsey, John, Civ, DAF, *Electroluminescence Studies on Long Wavelength Indium Arsenide Quantum Dot Microcavities Grown on Gallium Arsenide,* Sponsor, Air Force Research Laboratory, Sensors Directorate, Graduated: March 2012.
  9. Weisenberger, Richard, Civ, DAF, *Silicon Carbide Capacitive High Temperature MEMS Strain Transducer,* Sponsor, Air Force Research Laboratory, Propulsion Directorate, Graduated: March 2012.
  10. Blazevic, Stjepan, Flt Lt, AAF, *Photoacoustic Detection of Terahertz Radiation for Chemical Sensing and Imaging Applications*, Sponsor: Air Force Office of Scientific Research, Graduated: March 2013.
  11. Danner, Brent, 2Lt, USAF, *Characterization of Metal-Insulator-Transition (MIT) Phase Change Materials (PCM) for Reconfigurable Components, Circuits, and Systems*, Sponsor: Air Force Office of Scientific Research, Graduated: March 2013.
  12. Toler, Benjamin, 1Lt, USAF, *Novel Test Fixture for Characterizing Microcontacts: Performance and Reliability*, Sponsor: Faculty Research, Graduated: March 2013.
  13. Barajas, Eduardo, Capt, USAF, *Radio Frequency (RF) Responses and Material Characterization of Germanium Telluride (GeTe) and Germanium Antimony*

Telluride (GST), Sponsor: Air Force Office of Scientific Research, Graduated: March 2014.

14. Kebede, Bemnnet, Capt, USAF, *Characterization of the Pyroelectric Properties of AlN Thin Films Using MEMS Structures for Infrared Sensing Applications*, Sponsor: Air Force Research Laboratory, Graduated: March 2014.
15. Newberry, Richard, 2Lt, USAF, *Microelectromechanical Systems (MEMS) Photoacoustic (PA) Detector of Terahertz (THz) Radiation for Chemical Sensing*, Sponsor: Air Force Office of Scientific Research, Graduated: March 2014.
16. Pal, Rajan, Capt, USAF, *Microelectromechanical Systems (MEMS) for Hall Effect Thruster Plume Characterization*, Sponsor: Air Force Research Laboratory, Graduated: March 2014.
17. Stilson, Christopher, Capt, USAF, *Contact Resistance Evolution and Degradation of Highly Cycled Micro-Contacts*, Sponsor: Faculty Research, Graduated: March 2014.
18. Ziegler, Kyle, 2Lt, USAF*, Selectively Tuning a Buckled Si/SiO_2 Membrane MEMS Through Joule Heating Actuation and Mechanical Restriction*, Sponsor: Faculty Research, Graduated: March 2014.
19. Gwin, Alexander, 1Lt, USAF, *Materials Characterization and Microelectronic Implementation of Metal-Insulator Transition and Phase Change Materials*, Sponsor: Air Force Office of Scientific Research, Graduated: March 2015. **Distinguished Graduate; Outstand Contributor Award**
20. LaFleur, Robert, 1Lt, USAF, *Development of a Novel Hybrid Multi-Junction Architecture for Silicon Solar Cells*, Sponsor: Air Force Office of Scientific Research, Graduated: March 2015. **Distinguished Graduate; Dean's Award**
21. Walton, John, Capt, USAF, *Electrostatically Driven large Aperture Micro-Mirror Actuator Assemblies for High Fill-Factor, Agile Optical Phased Arrays*, Sponsor: Air Force Research Laboratory, Graduated: March 2015. **IEEE Student of the Year Award**
22. Lohrman, Jimmy, Capt, USAF, *Characterization for the Development of the Hybrid Multi-Junction Silicon Germanium Solar Cell*, Sponsor: Air Force Office of Scientific Research, Graduated: March 2016.
23. Kodama, Christopher, 2Lt, USAF, *Tunable Terahertz Metamaterials with Germanium Telluride Components*, Sponsor: Air Force Office of Scientific Research, Graduated: March 2016. **Distinguished Graduate; Dean's Award**
24. Kaval, William, Capt, USAF, *Electrostrictive Polymers for Mechanical-to-Electrical Energy Harvesting*, Sponsor: Air Force Research Laboratory, Graduated: March 2017.
25. Jones, Andrew, 1Lt, USAF, *Investigations into Near Infrared Sensitive Solar Cells*, Sponsor: Air Force Office of Scientific Research, Graduated: March 2017.
26. Nussbaum, John, Capt, USAF, *Analyzing the Viability of Photovoltaic Pavement Systems: Quantifying Climate Impacts on Potential Power and the Risks of Implementation*, Sponsor: AFCEC, Graduated: March 2017.
27. Eshelman, Justin, Capt, USAF, *Enhancing the Thermal Performance of Temporary Fabric Shelters for the Advanced Energy Efficient Shelter System*, Sponsor: AFCEC, Graduated: March 2017. **Distinguished Graduate**

- Undergraduates (Research Project Advisor or Co-Advisor)
  1. Andrew Postol, Lab helper, *3D printing*, May – July 2017.
  2. Dino Copoulos, Lab helper, *Predictive Maintenance Technologies,* May – Aug 2018.

- Ph.D. (Committee Member)
  MU: 2017 (1), 2018 (1)
  AFIT: 2009 (3), 2010 (3), 2011 (3), 2012 (2), 2013 (1), 2014 (1), 2015 (1)
  WSU: 2009 (5), 2010 (6), 2011 (5), 2012 (5), 2013 (4), 2014 (1), 2015 (1), 2016(1)
  UD: 2011 (1), 2102 (1), 2013 (1), 2014 (1), 2015 (1), 2016(1)
- MS (Committee Member)
  AFIT: 2007 (2), 2008 (1), 2009 (11), 2010 (5), 2011 (6), 2012 (3), 2013 (3), 2014(3), 2015 (3)

B.2 Research

Total Research Funding: $3,318,730 Total Personal Research Funding: $2,138,522
Total In-Kind Funding: $6,997,366

B.2.a Research Grants

When not designated as the Sole PI, personal share of research funding is indicated in parenthesis.

FY09

1. **Coutu, Jr., R.A.**, "Using MEMS Components in Miniaturized Warheads," $10K (FY09), AFRL/RWAV, 1 October 2008 - 30 September 2009.
2. **Coutu, Jr., R.A.**, "Micro-Contacts Study: Physics & Novel Materials," $31,583 (FY09), AFIT FRC, 1 November 2008 - 1 November 2009.
3. **Coutu, Jr., R.A.**, "Surface Acoustic Wave (SAW) Chem/Bio Sensors," $20K (FY09), AFRL/RXBN, 1 October 2008 – 1 September 2009.
4. **Coutu, Jr., R.A.**, (90%) and Kim, Y.C., "Semiconductor Physics and Reliability," $20K (FY09), AFRL/RYD, 16 December 2008 – 30 Sept 2009.
5. Collins, P.J., **Coutu, Jr., R.A.**, (25%) and Starman, L.A., "Carbon Nanotube Field Emission," $182K (FY09), NRO/AS&T, 1 January 2009 – 31 December 2011.
6. **Coutu, Jr., R.A.**, (50%) and Starman, L.A., "Microelectronics/MEMS Anti-Tamper and Self Destruct Technologies," $50K (FY09), AFRL/RYTA, 1 December 2008 – 1 July 2010.
7. **Coutu, Jr., R.A.**, (25%), Starman, L.A., Collins, P.J. and Marciniak, M.A., "RF/Optical/Thermal Metamaterials Research," $164,820 (FY09), AFRL RX, 15 February 2009 – 31 December 2009.
8. **Coutu, Jr., R.A.**, "MEMS Anti-Tamper Sensors," $20K (FY09), AFRL/RYT, 10 June 2009 – 30 September 2010.

FY10

9. **Coutu, Jr., R.A**., "Microelectronics/MEMS Anti-Tamper and Self Destruct Technologies," $100K (FY10), AFRL/RYTA, 1 October 2009 – 1 September 2010.

10. **Coutu, Jr., R.A.**, (95%) and Kim, Y.C., "Semiconductor Physics and Reliability," $30K (FY10), AFRL/RYD, 16 December 2009 – 30 September 2010.
11. **Coutu, Jr., R.A.**, (33%), Collins, P.J. and Marciniak, M.A., "RF/Optical/Fabrication Metamaterials Research," $330,000 (FY10), AFRL RX, 15 February 2009 – 31 December 2010.
12. **Coutu, Jr., R.A.**, "Cleanroom Orientation/Usage," $27K (FY10), AFRL/RXBN, 1 October 2009 – 31 December 2010.
13. **Coutu, Jr., R.A.**, "Cleanroom Orientation/Usage," $5K (FY10), AFRL/RXBT, 1 October 2009 – 31 December 2010.
14. **Coutu, Jr., R.A.**, (50%) and Todd Weatherford (NPS), "Electronic Component Failure Prediction Tool Development," $90K (FY10), NRO/AS&T Outreach, 1 November 2009 – 31 October 2010.

FY11

15. Collins, P.J., **Coutu, Jr., R.A.**, (25%) and Starman, L.A., "Carbon Nanotube Field Emission," $85K (FY11), NRO/AS&T, 1 January 2009 – 31 December 2011.
16. **Coutu, Jr., R.A.**, "Cleanroom Orientation/Usage," $10K (FY11), AFRL/RXBN, 1 August 2010 – 30 September 2011.
17. **Coutu, Jr., R.A.**, (50%) and Todd Weatherford (NPS)., "Electronic Component Failure Prediction Tool Development," $110K (FY11), NRO/AS&T Outreach, 1 November 2010 – 31 October 2011.
18. **Coutu, Jr., R.A.**, (33%), Collins, P.J. and Marciniak, M.A., "RF/Optical/Fabrication Metamaterials Research," $233,333 (FY11), AFRL RX, 15 February 2010 – 31 December 2011.
19. **Coutu, Jr., R.A.**, "Semiconductor Physics and Reliability," $40K (FY11), AFRL/RYD, 16 December 2010 – 30 September 2011.
20. Collins, P.J., **Coutu, Jr., R.A.**, (25%) and Starman, L.A., "Carbon Nanotube Field Emission," $85K (FY11), NRO/AS&T, 1 January 2009 – 31 December 2011.
21. **Coutu, Jr., R.A.**, "Terahertz Component-Level Research for Sensing Applications," $20K (FY11), WSU CRADA, 1 January 2011 – 31 January 2012.

FY12

22. Collins, P.J. and **Coutu, Jr., R.A.** (25%), NRO, "Field Emission Technology Investigations," $75K (FY12), NRO/AS&T, 1 January 2012 – 31 December 2012.
23. **Coutu, Jr., R.A.**, "Cleanroom Orientation/Usage," $35K (FY12), AFRL/RXBN, 1 August 2011 – 30 September 2012.
24. **Coutu, Jr., R.A.**, "Cleanroom Orientation/Usage," $2K (FY12), AFRL/RYS, 1 August 2011 – 30 September 2012.
25. **Coutu, Jr., R.A.**, "Cleanroom Orientation/Usage," $5K (FY12), AFRL/RYDD, 1 August 2011 – 30 September 2012.
26. **Coutu, Jr., R.A.**, "Cleanroom Orientation/Usage," $15K (FY12), AFRL/RYHI, 1 August 2011 – 30 September 2012.
27. **Coutu, Jr., R.A.**, "Photoacoustic Detection of Terahertz Radiation for Chemical Sensing and Imaging Applications," $41,958 (FY12 - $131,349 Total for 3 year project), AFOSR MOA, 1 November 2011 – 31 March 2014.

28. **Coutu, Jr., R.A.**, "Device Fabrication and Test Support," $49,839 (FY12), AFRL/RYHI, 1 May 2012 – 1 June 2013.

FY13

29. **Coutu, Jr., R.A.**, "Photoacoustic Detection of Terahertz Radiation for Chemical Sensing and Imaging Applications," $44,193 (FY13 - $1131,349 Total for 3 year project), AFOSR MOA, 1 November 2011 – 31 March 2014.
30. **Coutu, Jr., R.A.**, "Characterizing Metal-Insulator Transition (MIT) Phase-Change Materials (PCM) for Micro-switching Elements," $41,440 (FY13 - $142,293 Total for 3 year project), AFOSR MOA, 1 December 2012 – 1 September 2015.
31. **Coutu, Jr., R.A.** (80%) and Langley D., "Pyroelectric Characterization of Aluminum Nitride (AlN) Thin Films," $24,282 (FY13), AFRL/RYDP, 15 February 2013 – 31 December 2013.
32. Langley, D and **Coutu, Jr., R.A.** (20%), "3D Photolithography and Molding of Micro-devices," $15,288 (FY13), AFRL/RYDP, 12 June 2013 – 31 December 2013.

FY14

33. **Coutu, Jr., R.A.**, "Photoacoustic Detection of Terahertz Radiation for Chemical Sensing and Imaging Applications," $59,717 ($46,459)-(FY14 - $1131,349 Total for 3 year project), AFOSR MOA, 1 November 2011 – 31 March 2014.
34. **Coutu, Jr., R.A.**, "Characterizing Metal-Insulator Transition (MIT) Phase-Change Materials (PCM) for Micro-switching Elements," $62,331 ($49,899)-(FY14 - $142,293 Total for 3 year project), AFOSR MOA, 1 December 2012 – 1 September 2015.
35. **Coutu, Jr., R.A.**, "Characterizing Ultrathin and Ultrathin Structured Films for Improved Detector Efficiency," $42,502 (FY14 - $129,569 Total for 3 year project), AFOSR MOA, 15 February 2014 – 30 November 2016.
36. **Coutu, Jr., R.A.**, "Clean room and mask making support," $13,000 (FY14), AFRL/RYDH, 15 January 2014 – 15 January 2015.
37. Allen, M., Wenner, B., Leedy, K., Allen, J., **Coutu, Jr., R.A.** (23.33%) and Look, D., "Low Loss Plasmonic Devices using Transparent Conducting Oxides," $34,888 (FY14 – $105,000 Total 3 year project), AFOSR LRIR, 15 February 2014 – 30 November 2016.
38. **Coutu, Jr., R.A.**, "Electrostatically tunable beamforming structures for lasers," $25,000 (FY14), AFRL/RYDP, 15 February 2014 – 15 March 2015.
39. **Coutu, Jr., R.A.** (80%) and Langley, D., "Design, Model and Fabricate a 5x5 Large Tip, Tilt and Piston MEMS Micromirror Array," $88,918 (FY14), AFRL/RYDP, 28 March 2014 – 28 March 2016.

FY15

40. **Coutu, Jr., R.A.**, "Characterizing Metal-Insulator Transition (MIT) Phase-Change Materials (PCM) for Micro-switching Elements," $50,950 (FY15 - $142,293 Total for 3 year project), AFOSR MOA, 1 December 2012 – 1 September 2015.
41. **Coutu, Jr., R.A.**, "Characterizing Ultrathin and Ultrathin Structured Films for Improved Detector Efficiency," $43,183 (FY15 - $129,569 Total for 3 year project), AFOSR MOA, 15 February 2014 – 30 November 2016.

42. **Coutu, Jr., R.A.**, "Experimental Investigation of This Film Spreading Resistance Modeling for Improved Micro-Contact Performance," $45,903 (FY15 - $139,939 Total for 3 year project), AFOSR MOA, 1 January 2015 – 31 December 2017.
43. Allen, M., Wenner, B., Leedy, K., Allen, J., **Coutu, Jr., R.A.** (23.33%) and Look, D., "Low Loss Plasmonic Devices using Transparent Conducting Oxides," $35,729 (FY15 – $105,000 Total 3 year project), AFOSR LRIR, 15 February 2014 – 30 November 2016.
44. **Coutu, Jr., R.A.** (80%) and Langley, D., "Design, Model and Fabricate a 5x5 Large Tip, Tilt and Piston MEMS Micromirror Array," $95,995 (FY15), AFRL/RYDP, 28 March 2014 – 28 March 2016.
45. **Coutu, Jr., R.A.**, "Clean room and mask making support," $15,000 (FY15), AFRL/RYDP, 15 January 2014 – 31 December 2015.

FY16

46. **Coutu, Jr., R.A.**, "Characterizing Ultrathin and Ultrathin Structured Films for Improved Detector Efficiency," $43,884 (FY16 - $129,569 Total for 3 year project), AFOSR MOA, 15 February 2014 – 30 November 2016.
47. **Coutu, Jr., R.A.**, "Experimental Investigation of Thin Film Spreading Resistance Modeling for Improved Micro-Contact Performance," $46,639 (FY16 - $139,939 Total for 3 year project), AFOSR MOA, 1 January 2015 – 31 December 2017.
48. Allen, M., Wenner, B., Leedy, K., Allen, J., **Coutu, Jr., R.A.** (23.33%) and Look, D., "Low Loss Plasmonic Devices using Transparent Conducting Oxides," $35,695 (FY16 – $105,000 Total 3 year project), AFOSR LRIR, 15 February 2014 – 30 November 2016.
49. **Coutu, Jr., R.A.**, "Multipactor mitigation," $112K, NRO/AS&T Outreach, 1 February 2016 – 1 August 2016.

CY17

50. **Coutu, Jr., R.A**., "Low Cost Pressure Sensing using Micromachined Membranes," $48,000 (CY17), Water Equipment & Policy (WEP) NSF Center, 1 Jan 2017 – 31 Dec 2017.
51. **Coutu, Jr., R.A.**, Crovetti, J., Foley, C, Weise, N., and Newman D., "Demonstrate Mechanical & Electrical Performance over Time for the Solar Roadways, Incorporated (SRI) 'SR3' Photovoltaic Paver Panels," $180,038, Solar Roadways, Inc. (SRI), 10 Mar 2017 – 1 Nov 2018.
52. **Coutu, Jr., R.A**., "Microswitches for commercial applications," $2,400 (CY17), NSF Milwaukee I-Corps Program, Oct 2017 – Nov 2017.

CY18

53. **Coutu, Jr., R.A**., "Low Cost Pressure Sensing using Micromachined Membranes – Follow-on project," $75,000 (CY18), Water Equipment & Policy (WEP) NSF Center, 1 Jan 2018 – 31 Dec 2018.
54. **Coutu, Jr., R.A**., "Develop Lab Demonstrations for the Introduction to Device Fabrication course," $5,000 (CY18), OCOE Student Centered Learning RFP, 1 Jan 2018 – 31 Dec 2018. - Submitted 31 Oct 17

55. Budde, M., Kurpad, S., Schmit, B., and **Coutu, Jr., R.A**. (25%), "Translating Novel Diffusion MRI Markers of Chronic Spinal Cord Injury," $50,000 (CY18), AHW/NIH-MCW CTSI Pilot Award Proposal, 1 Jan 2018 – 31 Dec 2018. - Submitted 24 Aug 17
56. Ababei, C., NAME, and **Coutu, Jr., R.A**. (25%), "Design and Implementation of Semi-autonomous Underwater Vehicle for Water Quality Monitoring," $20k, William and Nancy Stemper Award, 13 April 2018 – 30 April 2019.
57. **Coutu, Jr., R.A**., "Microelectromechanical Systems (MEMS) -based Mid Infrared (MIR) Photoacoustic (PA) System for Simultaneous Detection of CO and CO_2," $50,000 (CY18), Lafferty Family Foundation, 15 May 2018 – 31 Dec 2018. - Submitted 16 Apr 18

CY19

58. Borg, J., **Coutu, Jr., R.A**. (33%), Roy, S., "Connecting Experiments and Simulations while Designing Functionality into the Dynamic Behavior of Surrogate Energetic Systems," $300,000 (FY2018; $1.5M Total for 3 years), AHW/NIH-MCW CTSI Pilot Award Proposal, 1 September 2018 – 31 Dec 2021.
59. **Coutu, Jr., R.A**., "Low Cost Pressure Sensing using Micromachined Membranes – Follow-on project," $75,000 (CY19), Water Equipment & Policy (WEP) NSF Center, 1 Jan 2019 – 31 Dec 2019.

Research Grants – In Work or In Review

In Kind Funding:

1. FY08 Sandia National Lab (SUMMiT V with integrated SFET devices) - $120,000
2. FY08 ENG Fallout Funding (cleanroom supplies) - $15,000
3. FY09 ENG Fallout Funding (thermal imager, 20 GHz PNA, HS camera, Lakeshore RF/DC environmental probe station) - $305,628
4. FY10 AU 3080 Fallout Funding (Heidelberg Laser Litho System) - $265,000
5. FY10 ENG Fallout Funding (CO2 dryer, HF etcher, RIE etcher) - $355,000
6. FY10 ENG Fallout Funding (Zygo 7300 white light interferometer) - $177,000
7. FY11 ENG Fallout Funding (cleanroom supplies) - $25,000
8. FY11 AU 3080 Fallout Funding (SEM/FIB/EDAX equipment) - $792,907
9. FY11 AFRL/Munitions Directorate (high-voltage triggers) - $3,000
10. FY11 AFRL/Sensors Directorate (1500 Gallon external LN2 tank and associated stainless steel gauges, valves and other hardware) - $275,000
11. FY11 ENY Cleanroom Funds (misc supplies and LN2 tank install) - $23,000
12. FY11 ENG Cleanroom Funds (misc supplies and LN2 tank install) - $50,000
13. FY11 AU 3400 Fallout Funds (optical network analyzer, 26 GHz PNA, RIE Loadlock/ICP/corrosive chemistries/gas cabinet, nanoindentor) - $410,000
14. FY12 AU 3080 Fallout Funding (PECVD system) - $332,500
15. FY12 ENG Fallout Funding (thin film reflectometer, Lakeshore air table) - $28,000
16. FY12 ENG Cleanroom Funds (misc supplies and equipment maintenance) - $16,000
17. FY12 ENG Fallout Funding (handheld O'scope, adapters, cables - $6,000

18. FY12 ENG Cleanroom Funds (silicon wafers and wafer carriers - $3,000
19. FY12 ENG Cleanroom Funds (equipment maintenance - Denton high vacuum valve repair and Lakeshore RF probes - $5,500
20. FY13 ENG Fallout Funding (Denton Sputtering heater mod) - $13,500
21. FY13 ENG Fallout Funding (sputtering targets) - $27,000
22. FY13 AU 3080 Fallout Funds (TeraView THz-TDS spectroscopy) - $481,471
23. FY13 ENG Fallout Funding (cleanroom supplies) - $40,500
24. FY13 AU 3400 Fallout Funds (Horiba ellipsometer, FemtoTools force sensors, AMMT LabGalv electroplater, Cleanroom airshower, XACTIX XeF2 etching system, FLIR cooled 1-5 camera - $592,075
25. FY14 AU 3080 Fallout Funds (Atomic Layer Deposition System) - $284,000
26. FY14 AU 3400 Fallout Funds (Thermal Evaporator System) - $226,000
27. FY14 ENG Fallout Funding (FLIR uncooled 7-14 camera, SEM detectors) - $51,000
28. FY14 AFRL/Sensors Directorate (Semiconductor wafer dicing saw) - $150,000
29. FY15 AU 3080 Fallout Funds (Horiba Micro-Raman System) - $371,700
30. FY15 AU 3400 Fallout Funds (Micromanipulator Probe station 8060) - $186,000
31. FY16 AU 3080 Fallout Funds (Lesker LAB18 Sputtering system) - $393,585
32. FY16 AU 3080 Fallout Funds (Karl Suss MABA6 Mask Aligner) - $485,000
33. FY16 AFCEC Travel/Supplies funding for Solar Tents project - $10,000
34. FY16 AFCEC Funding for Global Solar Lab project - $20,000
35. FY16 AFIT CE School Funding for Global Solar Lab project - $35,000
36. CY17 MU GWC equipment funds (Trion T2 RIE) - $80,000
37. CY17 Milwaukee Tools (electric drill and misc hand tools donation) - $2,000
38. CY17 A.O. Smith (power supplies and test equipment donation) - $5,000
39. CY17 OCOE: Class 100 cleanroom (Clean Air Products – soft wall) - $15,000
40. CY18 OCOE funds (Filmetrics table top white light interferometer) - $37,000

B.2.b Publications

Journal Publications

* Denotes student
** Denotes non-faculty
# Most Recent Impact Factor

1. ***Coutu, Jr., R.A.** and Kladitis, P.E., "Modeling and Simulation of Classical Micro-Electro-Mechanical Systems (MEMS) Actuators," *AIAA Student Journal*, vol. Spring, pp. 46-54, 2002. – (# NA)
2. ***Coutu, Jr., R.A.**, Kladitis, P.E., Starman, L.A. and **Reid, J.R., "A Comparison of Micro-Switch Analytic, Finite Element, and Experimental Results," *Sensors and Actuators A*., vol. 115, pp. 252-258, 2004. – **(# 1.769)**
3. **Coutu, Jr., R.A.**, Kladitis, P.E., Leedy, K.D. and Crane, R.L., "Selecting Metal Alloy Electric Contact Materials for MEMS Switches," *Institute of Physics (IOP) Journal of Micromechanics and Microengineering,* vol. 14, pp. 1157-1164, 2004. – **(# 1.731)**

4. **Lee, H.,* **Coutu, Jr., R.A.**, Mall, S. and Kladitis, P.E., " Nanoindentation technique for characterizing cantilever beam style RF MEMS switches," *IOP Journal of Micromechanics and Microengineering.*, vol. 15, pp. 1230-1235, 2005. – **(**# **1.731)**
5. **Coutu, Jr., R.A.**, **Reid, J.R., **Cortez, R., **Strawser, R.E. and Kladitis, P.E., "Microswitches with Sputtered Au, AuPd, Au-on-AuPt, and AuPtCu Alloy Electric Contacts", *IEEE Transactions on Components & Packaging Technologies*, vol. 29, no. 2, pp. 341-349, 2006. – **(**# **1.180)**
6. *Lee, H., **Coutu, Jr., R.A.**, Mall, S. and **Leedy, K.D., "Characterization of metal and metal alloy films as contact materials for MEMS switches," *IOP Journal of Micromechanics and Microengineering.*, vol. 16, pp. 557-563, 2006. – **(**# **1.731)**
7. *Crossley, B.L., *Kossler, M., **Coutu, Jr., R.A.**, Starman, L.A. and Collins, P.J., "Effects of Hydrogen Pretreatment on Physical-Vapor-Deposited Nickel Catalyst for Multi-Walled Carbon Nanotube Growth," *Journal of Nanophotonics*, vol. 4, 049502, pp. 1-6, 2010. – **(**# **1.686)**
8. *Wagner, T.J., **Bohn, M.J., **Coutu, Jr, R.A**., **Gonzalez, L.P., **Murray, J.A., **Schepler, K.L. and **Guha S. "Measurement and modeling of infrared nonlinear absorption coefficients and laser-induced damage thresholds in Ge and GaSb," *J. of the Optical Society of America B*, vol 27, no. 10, pp. 2122-2131, 2010. – **(**# **1.97)**
9. *Ostrow II, S.A. and **Coutu, Jr., R.A.**, "Novel microelectromechanical systems image reversal fabrication process based on robust SU-8 masking layers," *Journal of Micro/Nanolithography, MEMS and MOEMS (JM3),* vol. 10, no. 3, pp. 033016-1 – 033016-7, 2011. – **(**# **1.428)**
10. **Coutu, Jr., R.A.**, Collins, P.J., *Moore, E.A., *Langley, D., *Jussuame, M.E. and Starman, L.A., "Electrostatically Tunable Meta-Atoms Integrated with In-Situ Fabricated MEMS Cantilever Beam Arrays," *IEEE/ASME Journal of Microelectromechanical Systems,* vol. 20, no. 6, pp. 1366-1371, 2011. – **(**# **1.754)**
11. *Moore, E.A., *Langley, D., *Jussaume, M.E., *Rederus, L.A., *Lundell, C.A., **Coutu, Jr., R.A.**, Collins, P.J. and Starman, L.A., "SRRs Embedded with MEMS Cantilevers to Enable Electrostatic Tuning of the Resonant Frequency," *Journal of Experimental Mechanics*, vol. 52, pp. 395-403, 2012. (Digital Object Identifier (DOI) 10.1007/s11340-011-9498-8) – **(**# **1.764)**
12. *Ostrow II, S.A., *Lake, R.A., *Lombardi, J.P., **Coutu, Jr., R.A.** and Starman, L.A., "Fabrication Process Comparison and Dynamics Evaluation of Electrothermal Actuators for a Prototype MEMS Safe and Arming Device," *Journal of Experimental Mech.*, vol. 52, pp. 1229-1238, 2012. (DOI 10.1007/s11340-011-9579-8) – **(**# **1.764)**
13. Starman, L.A. and **Coutu, Jr., R.A.** "Stress Monitoring of Post-Processed MEMS Silicon Microbridge Structures Using Raman Spectroscopy," *Journal of Experimental Mech.*, vol. 52, pp. 1341-1353, 2012. (DOI 10.1007/s11340-011-9586-9) – **(**# **1.764)**
14. *Langley, D., **Coutu, Jr., R.A.** and Collins, P.J. "Low-loss meta-atom for improved resonance response," *American Institute of Physics (AIP) Advances*, vol. 2, .012196, pp. 1-5, 2012. (DOI) 10.1063/1.3701709) – **(# 1.591)**
15. Starman, L.A., and **Coutu, Jr., R.A.**, "Using Micro-Raman Spectroscopy to Assess MEMS Si/SiO2 Membranes Exhibiting Negative Spring Constant Behavior," *Journal of Experimental Mechanics*, vol. 53, pp. 593-604, 2012. (DOI 10.1007/s11340-012-9656-7) – **(# 1.764)**

16. *Christiansen, B.D, **Heller, E.R., **Coutu, Jr., R.A.**, **Ventury, R. and **Shealy, J.B., "A Very Robust AlGaN/GaN HEMT Technology to High Forward Gate Bias and Current," *Hindawi Publishing Corporation, Journal of Active and Passive Electronic Components*, vol. 2012, article ID 493239, pp. 1-4, 2012. (DOI 10.1155/2012/493239) – **(# N/A)**
17. *Langley, D., **Coutu, Jr., R.A.** and Collins, P.J., "Using Inductance as a Tuning Parameter for RF Meta-atoms," *Nano-Micro Letters*, vol. 4, no. 2, pp. 103-109, 2012. (DOI 10.3786/nml.v4i2.p103-109) – **(# 1.975)**
18. *Paul, J.V., Collins, P.J. and **Coutu, Jr., R.A.**, "A New Look at Azimuthal Wave Propagation Constants of an n-Layered Dielectric Coated PEC Cylinder," *IEEE Trans. on Antennas and Propagation*, vol. 61, no. 5, pp. 2727-2734, 2013. - **(# 2.181)**
19. *Paul, J.V., Collins, P.J. and **Coutu, Jr., R.A**., "An efficient cost function for the optimization of an n-layered isotropic cloaked cylinder," *IOP Journal of Physics D: Applied Physics*, vol. 46, 335101, pp. 1-8, 2013. (DOI 10.1088/0022-3727/46/33/335101) – **(# 2.721)**
20. *Toler, B.F., **Coutu, Jr., R.A.** and McBride J.W., "A review of micro-contact physics for microelectromechanical systems (MEMS) metal contact switches," *IOP Journal of Microengineering and Micromechanics*, vol. 23, 103001, pp. 1-16, 2013. (DOI 10.1088/0960-1317/23/10/103001) – **(# 1.731)**
21. **Coutu, Jr., R.A.** and *Ostrow II, S.A., "Microelectromechanical Systems (MEMS) Resistive Heaters as Circuit Protection Devices," *IEEE Transactions on Components, Packaging and Manufacturing Technology,* vol. 3, no. 12, pp. 2174-2179, December 2013. (DOI 10.1109/TCPMT.2013.2282362) – **(# 1.180)**
22. *Glauvitz, N.E., **Coutu, Jr., R.A.**, Medvedev, I.R. and Petkie, D.T., "MEMS Cantilever-based Design for Terahertz Photoacoustic Sensor," *IEEE/ASME Journal of Microelectromechanical Systems*, vol. 24, no. 1, pp. 216-223, February 2015. (DOI: 10.1109/JMEMS.2014.2327916) – **(# 1.754)**
23. *Lake, R.A. and **Coutu, Jr., R.A.**, "Using Cross-linked SU-8 to Flip-Chip Bond, Assemble and Package MEMS Devices," *IEEE Transactions on Components, Packaging and Manufacturing Technology,* vol. 5, no. 3, pp. 301-306, March 2015. (DOI: 10.1109/TCPMT.2015.2395999) – **(# 1.180)**
24. Ren, W.,*Chang, C, *Chen, Y., *Xue, S. and **Coutu, Jr., R.A.**, "Investigation of the Surface Adhesion Phenomena and Mechanism of Gold-Plated Contacts at Superlow Making/Breaking Speed," *IEEE Transactions on Components, Packaging and Manufacturing Technology,* vol. 5, no. 6, pp. 771-778, 2015. (DOI: 10.1109/TCPMT.2015.2431494) **(# 1.180)**
25. *Gwin, A.H., *Kodama, C.H., *Laurvick, T.V. and **Coutu, Jr.,R.A.**, "Improved terahertz modulation using germanium telluride (GeTe) chalcogenide thin films," *Applied Physics Letters,* vol. 107 no. 031904, pp. 1-4, (July 2015). (DOI: 10.1063/1.4927272) – **(# 3.302)**
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56. *Stilson, C.L. and **Coutu, Jr., R.A.**, "Contact Resistance Evolution of Lightly Loaded, Highly Cycled, Micro-Contacts," *SPIE Photonics West Symposium, Reliability, Packaging, Testing, and Characterization of MOEMS/MEMS, Nanodevices, and Nanomaterials XIII Conference*, pp. 1-12, San Francisco, CA, 1-6 February 2014.
57. *Ziegler, K.K., *Lake, R.A. and **Coutu, Jr., R.A.**, "Isolating the negative stiffness region of a buckled Si/SiO_2 membrane," *SPIE Photonics West Symposium, Micromachining and Microfabrication Process Technology XIX Conference*, pp. 1-10, San Francisco, CA, 1-6 February 2014.
58. *Kebede, B., **Coutu, Jr., R.A.** and Starman, L.A.,, "Using microelectromechanical systems (MEMS) test structures for investigating pyroelectric response," *Government Microcircuit Applications and Critical Technology Conference*, pp. 1-4, Charleston, SC, 31 March – 3 April, 2014.
59. *Dowden, R.M., Langley, D., **Coutu, Jr., R.A.** and Starman, L.A., "Fabrication of Spheroidal Microdevice Packages," *Government Microcircuit Applications and Critical Technology Conference*, pp. 1-5, Charleston, SC, 31 March – 3 April, 2014.
60. *Ziegler, K.K., *Lake, R.A. and **Coutu, Jr., R.A.**, "Spring Constant Characterization of a Thermally Tunable MEMS Regressive Spring," *The 15th International Symposium on MEMS and Nanotechnology, SEM Annual Conference*, pp. 1-9, Greenville, SC, 2-4 June, 2014.
61. *Dowden, R.M., Langley, D., **Coutu, Jr., R.A.** and Starman, L.A., "Bonded Hemishell Approach to Encapsulate Microdevices in Spheroidal Packages," *The 15th International Symposium on MEMS and Nanotechnology, SEM Annual Conference*, pp. 1-9, Greenville, SC, 2-4 June, 2014.
62. *Krones, R.P., Langley, D., Collins, P.J. and **Coutu, Jr., R.A.**, "Modeling and Testing RF Meta-Atom Designs for Rapid Metamaterial Prototyping," *The 15th International Symposium on MEMS and Nanotechnology, SEM Annual Conference*, pp. 1-8, Greenville, SC, 2-4 June, 2014.
63. *Stilson, C.L. and **Coutu, Jr., R.A.**, "Micro-contact Resistance of Au/Au on Engineered Contact Surfaces using Grayscale Lithography," *The 27th International Conference on Electrical Contacts*, pp. 1-6, Dresden, Germany, 23-26 June, 2014.
64. *Stilson, C.L. and **Coutu, Jr., R.A.**, "Reliability Evolution of Au/Au, Au/Ru and Au/RuO_2 Micro-Contacts," *The 27th International Conference on Electrical Contacts*, pp. 1-6, Dresden, Germany, 23-26 June, 2014.
65. *Sullivan, N.P., Borghetti, B.J. and **Coutu, Jr., R.A.**, "Energy Harvesting & Recapture from Human Subjects: Dual-Stage Thermal MEMS Energy Converter," *Proceedings of the IEEE Conference on Reliability Science for Advanced Materials and Devices (RSAMD)*, pp. 1-4, Golden, CO, 7-9 September 2014.
66. *Hendrix, R.M., *Jones, H.R., *Fosnight, R., *Shaver, R., *Best, E., **Coutu, Jr., R.A.**, Langley, D., Starman and L.S., Deibel, J.A., "Bending Induced Tuning of the Resonant Response of a Flexible THz Metamaterial Device," *Proceedings of the 39th International Conference on Infrared, Millimeter and Terahertz Waves*, pp. 1-2, Tucson, AZ, 14-19 September 2014.
67. *Stilson, C.L, *Laurvick, T.V. and **Coutu, Jr., R.A.**, "Contact Resistance Evaluation of Micro-Contacts with upper Hemisphere and Lower Planar or Engineered

Surfaces," *Proceedings of the 60th IEEE Holm Conference on Electrical Contacts*, pp. 124-131, New Orleans, LA, 12-15 October 2014.

68. *Laurvick, T.V., *Stilson, C.L and **Coutu, Jr., R.A.**, "Experimental Investigation of Thin Film Spreading Resistance in Micro-Contacts," *Proceedings of the 60th IEEE Holm Conference on Electrical Contacts*, pp. 412-417, New Orleans, LA, 12-15 October 2014.
69. *Lake, R.A., *Ziegler, K.K. and **Coutu, Jr., R.A.**, "Tunable MEMS Buckled Membrane Actuator," *Proceedings of Eurosensors XXVIII,* vol. B4P-LO2, pp. 1-4, Brescia, Italy, 7-10 September 2014.
70. *Gwin, A.H. and **Coutu, Jr., R.A.**, "Electronic control of Germanium Telluride (GeTe) phase transition for electronic memory applications," *SPIE Photonics West Symposium, Oxide-based Materials and Devices VI Conference*, pp. 1-8, San Francisco, CA, 7-12 February 2015.
71. *LaFleur, R.S. and **Coutu, Jr., R.A.**, "Hybrid Multi-Junction Silicon Solar Cell Simulation," *SPIE Photonics West Symposium, Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV Conference*, pp. 1-8, San Francisco, CA, 7-12 February 2015.
72. *Walton, J.P., **Coutu, Jr., R.A.** and Starman, L.A., "Modeling and Simulations of New Electrostatically Driven, Bimorph Actuator for High Beam Steering Micro-Mirror Deflection Angles," *SPIE Photonics West Symposium, MOEMS and Miniaturized Systems XIV Conf.*, pp. 1-8, San Francisco, CA, 7-12 February 2015.
73. *Sattler, J.M. and **Coutu, Jr., R.A.**, "Design and Fabrication of Phase Change Material Devices – Electrical Properties of GeTe Resisters," National Aerospace & Electronics Conference & Ohio Innovation Summit (NAECON-OIS), pp. 1-6, Dayton, OH, 16-19 June 2015.
74. *Lake, R.A. and **Coutu, Jr., R.A.**, "Tunable Pressure Sensing Applications of a MEMS Buckled Membrane," National Aerospace & Electronics Conference & Ohio Innovation Summit (NAECON-OIS), pp. 1-6, Dayton, OH, 16-19 June 2015.
75. *Lohrman, J.J., *Kodama, C.H., *Lake, R.A., *Laurvick, T.V., and **Coutu, Jr., R.A.**, "Mechanical Logic using MEMS," National Aerospace & Electronics Conference & Ohio Innovation Summit (NAECON-OIS), pp. 1-6, Dayton, OH, 16-19 June 2015.
76. *Lohrman, J.J. and **Coutu, Jr., R.A.**, "Designing, Fabricating and Testing multi-junction Silicon Solar Cells," National Aerospace & Electronics Conference & Ohio Innovation Summit (NAECON-OIS), pp. 1-6, Dayton, OH, 16-19 June 2015.
77. *Kodama, C.H. and **Coutu, Jr., R.A.**, "Determining the Non-ideal Parallel-Plate Capacitance of a Split-Ring Resonator Gap," *The 9th International Congress on Advanced Electromagnetic Materials in Microwaves and Optics: Metamaterials 2015,* pp. 1-3, University of Oxford, Oxford, UK, 7-12 September 2015.
78. *Laurvick, T.V. and **Coutu, Jr., R.A.**, "Micro-contact Performance and Reliability under low frequency, low amplitude, alternating current (AC) test conditions," *Proceedings of the 61th IEEE Holm Conference on Electrical Contacts*, pp. 1-5, San Diego, CA, 11-14 October 2015.
79. *Laurvick, T.V. and **Coutu, Jr., R.A.**, "Experimental Validation of External Load Effects on Micro-Switch Performance and Reliability," *Proceedings of the 61th IEEE Holm Conference on Electrical Contacts*, pp.1-5, San Diego, CA, 11-14 Oct 2015.

80. *Laurvick, T.V. **Coutu, Jr., R.A.,** and Lake, R.A., "Integrating nanosphere lithography in device fabrication," *Proceedings of the SPIE Advanced Lithography* Symposium, Advances in Patterning Materials and Processes XXXIII, vol. 97791S, pp. 1-13, San Jose, CA, 21-25 February 2016.
81. *Laurvick, T.V. and **Coutu, Jr., R.A.**, "Experimental validation of external load effects for micro-contact under low frequency, low amplitude, alternating current (AC) test conditions," *The 28th International Conference on Electrical Contacts*, pp. 1-5, Edinburgh, UK, 6-9 June, 2016.
82. *Eshleman, J.E. Lake, R.A. and **Coutu, Jr., R.A.**, "Enhancing the Thermal Performance of Temporary Fabric Shelters for the Advanced Energy Efficient Shelter System," National Aerospace & Electronics Conference & Ohio Innovation Summit (NAECON-OIS), pp. 1-6, Dayton, OH, 26-29 June 2016.
83. *Jones, A.M., **Coutu, Jr., R.A.**, and Lake, R.A., "Design and Analysis of Novel Ge-GeTe PN Junction for Photovoltaics," National Aerospace & Electronics Conference & Ohio Innovation Summit (NAECON-OIS), pp. 1-6, Dayton, OH, 26-29 June 2016.
84. *Kaval, W.G., **Coutu, Jr., R.A.** and Lake, R.A., "Electrostriction Polymers for Mechanical-to-Electrical Energy Harvesting – Alternative Design and Implementation Methods," National Aerospace & Electronics Conference & Ohio Innovation Summit (NAECON-OIS), pp. 1-6, Dayton, OH, 26-29 June 2016.
85. *Laurvick, T.V. and **Coutu, Jr., R.A.**, "Improved Grayscale Lithography," National Aerospace & Electronics Conference & Ohio Innovation Summit (NAECON-OIS), pp. 1-6, Dayton, OH, 26-29 June 2016. **Best Poster Award (#1/40)**
86. *Nussbaum, J.H., Lake, R.A. and **Coutu, Jr., R.A.**, "Standardized Testing of Non-Standard Photovoltaic Pavement Surfaces," National Aerospace & Electronics Conference & Ohio Innovation Summit (NAECON-OIS), pp. 1-6, Dayton, OH, 26-29 June 2016.
87. *Sattler, J.M., **Coutu, Jr., R.A.**, and Lake, R.A., "Engineered Surfaces to Control Secondary Electron Emission for Multipactor Suppression," National Aerospace & Electronics Conference & Ohio Innovation Summit (NAECON-OIS), pp. 1-6, Dayton, OH, 26-29 June 2016.
88. *Blach, N., Lake, R.A. and **Coutu, Jr., R.A.**, "Design of FerroElectric MEMS Energy Harvesting Devices," National Aerospace & Electronics Conference & Ohio Innovation Summit (NAECON-OIS), pp. 1-6, Dayton, OH, 26-29 June 2016.
89. *Kodama, C.H. and **Coutu, Jr., R.A.**, "Reconfigurable Terahertz Metamaterials with Germanium Telluride," *The 10th International Congress on Advanced Electromagnetic Materials in Microwaves and Optics: Metamaterials 2016,* pp. 1-3, Chania, Crete, 17-22 September 2016.
90. *Sattler, J., **Coutu, Jr., R.A.,** Lake, R.A., and Laurvick, T.V., "Engineering and modeling micro-porous surfaces for secondary electron emission control," International Workshop on Multipactor, Corona and Passive Intermodulation (MULCOPIM), pp. 1-4, The Netherlands, 5-7 April 2017.
91. *Kaval, W.G., Lake, R.A., and **Coutu, Jr., R.A.**, "PVDF-TrFE Electroactive Polymer Mechanical-to-Electrical Energy Harvesting – Experimental Bimorph Structure," *2017 MRS Spring Meeting and Exhibit*, Phoenix, AZ, 17-21 April 2017.
92. *Kaval, W.G., Lake, R.A., and **Coutu, Jr., R.A.**, "PVDF-TrFE Electroactive Polymer Based Microelectromechanical Systems (MEMs) Structures," *The 17th*

International Symposium on MEMS and Nanotechnology, SEM Annual Conference, pp. 1-4, Indianapolis, IL, 12-15 June, 2017.

93. *Mahanta, P.K. and **Coutu, Jr., R.A.**, "Improved Microcontact Test Fixture for Efficient Reliability and Performance Characterization," *Proceedings of the 29th International Conference on Electrical Contacts together with the 64th IEEE Holm Conference on Electrical Contacts*, pp. 31-37, Albuquerque, NM, 14-18 October 2018.
94. Babadi, A.N., Miyazi, M, and **Coutu, Jr., R.A.**, "Serviceability Optimization of the Next Generation Wind Turbines Using Internet of Things Platform," Smart Grid Conference (SGC), pp. 1-5, Kurdistan, Iran, 28-29 November, 2018

Refereed Conference Publications (based on full paper review) – In-Review

* Denotes student

1. *Anwar, F. and **Coutu, Jr., R.A.**, "Low-Cost, Water Leak Detection using Micromachined Burst Disk," *Proceedings of Eurosensors XXXIII,* vol. #, pp. 1-2, Berlin, GE, 23-27 June 2019.
2. *Nandy, T. and **Coutu, Jr., R.A.**, "Modelling and Simulation of MEMS Membrane Based Miniaturized Photoacoustic Detection Technique for CO Gas Sensing," *Proceedings of Eurosensors XXXIII,* vol. #, pp. 1-2, Berlin, GE, 23-27 June 2019.

Refereed Conference Presentations (based on abstract review)

* Denotes student

1. Hanson, R. and **Coutu, Jr., R.A.**, "A General Description of the Pulse Width Dependence of the Radiation upset Threshold in Semiconductor Devices and Circuits," *Proceedings of the Hardened Electronics and Radiation Technology (HEART) Conference*, Orlando, FL, March 1996.
2. *Chen, L., McGruer, N.E., Adams, G.G., **Coutu, Jr.**, **R.A.** and Leedy, K.D., "An SPM-Based System for Contact Reliability Characterization," *Proceedings of the 52nd International Symposium of the American Vacuum Society*, session MN-MoM6, Boston, MA, 30 October 2004 – 4 November 2005.
3. *Daniel Gallagher, Steve Szymanski, Mark Allard, Lawrence Brott, **Ronald Coutu, Jr.**, Wendy Goodson, Jesse Enlo, Tim Bunning, and Rajesh Naik, "Chem/Bio Sensing Platforms Based on SAW and RFID Technologies," *presented at the AFRL/RX Biotech Review*, Arlington, VA, 12-13 November 2008.
4. *Coleman, N., Starman, L.A., and **Coutu Jr., R.A.**, "Micro-Scale Flapping Wings," *presented at The 34th Annual AIAA Dayton-Cincinnati Aerospace Science Symposium (DCASS)*, Dayton, OH, 3 March 2009. (**Best Presentation Award)**
5. *Chabak, K., Starman L.A., and **Coutu Jr., R.A.**, "Conceptual Study of Rotary-Wing Microrobotics," *presented at The 34th Annual AIAA Dayton-Cincinnati Aerospace Science Symposium (DCASS)*, Dayton, OH, 3 March 2009.
6. *Perello, D., Yun, M., and **Coutu, Jr., R.A.**, "Extremely Sensitive and Selective Single Nanowire Array on a Chip for Chemical and Explosive Detections," *Nanotechnology for Defense Applications*, Atlanta, GA, 3-6 May 2010.

7. *Crossley, B.L., **Coutu, Jr., R.A.**, Starman, L.A. and Collins, P.J., "Characterization of an Optimized Carbon Nanotube Field Emission Array," *presented at the SEM Annual Conference, The 11th International Symposium on MEMS and Nanotechnology,* Indianapolis, IN, 7-9 June 2010.
8. *Dawson, B., Cobb, R., **Coutu, Jr, R.A.** and Reeder, M. "Manufacture of Flapping Wing Micro Air Vehicles by Chemical Etching," *presented at The 6th Annual Dayton Engineering Science Symposium*, Dayton OH, 25 October 2010.
9. *Jones, H.R., *Ganti, S., Deibel, J.A. and **Coutu, Jr., R.A.**, "Characterization of Metamaterial Devices Using Terahertz Time-Domain Spectroscopy," *presented at The 7th Annual Dayton Engineering Science Symposium*, Dayton, OH, 24 November 2011.
10. **Coutu, Jr., R.A.** and Starman, L.A., "Surface Micromachined Contact Support Structure for Microswitch Lifecycle Testing," *presented at the SEM Annual Conference, The 13th International Symposium on MEMS and Nanotechnology,* Costa Mesa, CA, 11-14 June 2012.
11. *Glauvitz, N.E., **Coutu, Jr., R.A.**, *Kistler, M.N., *Hamilton, R.F., Petkie, D.T. and Medvedev, I.R., "A MEMS Cantilever-based Photoacoustic Detector of Terahertz Radiation for Chemical Sensing," *presented at The 68th International Symposium on Molecular Spectroscopy*, Columbus, OH, 17-21 June 2013.
12. *LaFleur, R.S. and **Coutu, Jr., R.A.**, "Hybrid Multi-Junction Silicon Solar Cells," *The XXIII International Materials Research Congress*, Cancún, Mexico, 17-21 August 2014.
13. *Hendrix, R., Deibel, J.A., **Coutu, Jr., R.A.** and Langley D., "Bending Induced Tuning of the Resonant Response of a Flexible THz Metamaterial," *The 10th Annual Dayton Engineering Sciences Symposium*, Dayton, OH, 28 October 2014.
14. *Lafleur, R.S. and **Coutu, Jr., R.A.**, "Hybrid Multi-Junction Silicon Solar Cell Efficiency," *The 10th Annual Dayton Engineering Sciences Symposium*, Dayton, OH, 28 October 2014.
15. *Gwin, A.H. and **Coutu, Jr., R.A.**, "Transmission and Reflectance of Germanium Telluride (GeTe) Thin Films," *The 10th Annual Dayton Engineering Sciences Symposium, Dayton*, OH, 28 October 2014.
16. *Lake, R.A. and **Coutu, Jr., R.A.**, "Composite SU-8/CNT MEMS Beams," *The 10th Annual Dayton Engineering Sciences Symposium, Dayton*, OH, 28 October 2014.
17. *Lake, R.A. and **Coutu, Jr., R.A.**, "Design of Experiments: MEMS Buckled Membrane Structures," *The 10th Annual Dayton Engineering Sciences Symposium, Dayton*, OH, 28 October 2014.
18. *Walton, J., **Coutu, Jr., R.A.** and Starman, L.A., "Microelectromechanical Systems (MEMS) Micro-Mirrors for Beam Steering," *The 10th Annual Dayton Engineering Sciences Symposium, Dayton*, OH, 28 October 2014.
19. *Walton, J., Lafleur, R.S., Gwin, A., **Coutu, Jr., R.A.** and Starman, L.A., "MEMS Bimorph Cantilever Beams (MBCB) Thermal Management System," *The 10th Annual Dayton Engineering Sciences Symposium, Dayton*, OH, 28 October 2014.
20. *Laurvick, T.V. and **Coutu, Jr., R.A.**, "Micro Device Test Station," *The 10th Annual Dayton Engineering Sciences Symposium, Dayton*, OH, 28 October 2014.
21. *Laurvick, T.V. and **Coutu, Jr., R.A.**, "Micro-Switch Figure of Merit," *The 10th Annual Dayton Engineering Sciences Symposium, Dayton*, OH, 28 October 2014.

22. *Kodama, C.H. and **Coutu, Jr., R.A.**, "Characterizing Microelectronic Substrates for Fabricating Terahertz Metamaterial Structures," *The XXIV International Materials Research Congress (IMRC)*, Cancún, Mexico, 16-20 Aug 15.
23. Lake, R.A, Laurvick, T.V. and **Coutu, Jr., R.A.**, "Characterizing Reactive Ion Etching of Germanium Telluride with Inductively Coupled BCL3 Plasma," *The XXIV International Materials Research Congress (IMRC)*, Cancún, Mexico, 16-20 Aug 15.
24. *Lake, R.A. and **Coutu, Jr., R.A**., "Variable Response Thermally Tuned MEMS Pressure Sensor," *Eurosensors XXVIII,* Freiburg, Germany, 6-9 September 2015.
25. *Lohrman, J.J. and **Coutu, Jr., R.A.**, "Thin Film Solar Cells using Ge/GeTe," *The 11th Annual Dayton Engineering Sciences Symposium, Dayton*, OH, 2 November 2015.
26. *Kodama, C.H. and **Coutu, Jr., R.A.**, "Optimizing the dimensions of a GeTe, indirect-heating switch for active metamaterial applications," *The 11th Annual Dayton Engineering Sciences Symposium, Dayton*, OH, 2 November 2015.
27. *Sattler, J.M., *Laurvick, T.V. and **Coutu, Jr., R.A.**, "Micromachined Surfaces for Mulitpactor Mitigation," *2016 Solid State Sensor, Actuator, and Microsystems Workshop at Hilton Head*, Hilton Head, SC, 5-9 June 2016.
28. *Jones, A. and **Coutu, Jr., R.A**., "Germanium Photovoltaic PN junctions using N-type Ge and P-type GeTe," *The XXV International Materials Research Congress (IMRC)*, Cancún, Mexico, 14-19 Aug 2016.
29. Tomer, D., Kuyel, B., Moghadam, A.D., and **Coutu, Jr., R.A.**, "Plasma Enhanced Atomic Layer Deposition of GaN using GaCl3 and N2 on Si wafers," *American Vacuum Society (AVS), Prairie Chapter,* Milwaukee, WI, 7 September 2017.
30. Mahanta, P. and **Coutu, Jr., R.A**., "Improved and Optimized Microswitch Lifecycle Test Fixture for Simultaneously Measuring Contact Resistance (Rc) and Contact Force (Fc) in Controlled Ambient Environments," *American Vacuum Society (AVS), Prairie Chapter,* Milwaukee, WI, 7 September 2017.
31. *Mohiuddin, M., *Nandy, T., and **Coutu, Jr., R.A.**, "Voltage controlled Resistive and Capacitive Response of Nematic Liquid Crystal (LC) and LC Composites for DC and RF Switching Applications," *Proceedings of the 20th TechConnect World Innovation Conference & Expo Co-Located with NanoTech Conference & Expo*, Anaheim, CA, 13-16 May 2018.
32. Daniel Zitomer, Brooke Mayer, Patrick McNamara, David Strifling, **Ronald A. Coutu, Jr.,** and Chung Hoon Lee, "Industry/University Cooperative Research to Advance Water Reclamation," *91st Annual Meeting of the Central States Water Environment Association (CSWEA), Inc.*, IL, 14-16 May 2018.
33. **Coutu, Jr., R.A.,** "Marquette University MEMS and Advanced Microsystems Research update," International Conference on electronics and Electrical Engineering (ICEEE), Barcelona, Spain, 26-27 July 2018.

Refereed Conference Presentations (based on abstract review) – In-Review

* Denotes student

1. *Anwar, F. and **Coutu, Jr., R.A.**, "Water Leak Detection Sensing using Micromachined Burst Disks," *Proceedings of the 21st TechConnect World Innovation*

Conference & Expo Co-Located with NanoTech Conference & Expo, Boston, MA, 17-19 June 2019.

2. *Anwar, F., *Munna, M., *Hossain, M., *Mahanta, P., *Nandy, T., and **Coutu, Jr., R.A.**, "Switching Dynamics and Contact Surface Characterization for Ohmic MEMS Switches," *Proceedings of the 21st TechConnect World Innovation Conference & Expo Co-Located with NanoTech Conference & Expo*, Boston, MA, 17-19 June 2019.
3. *Nandy, T. and **Coutu, Jr., R.A.**, "Multiple Trace Gas Analysis using Micromachined PZT/SOI Membrane based Infrared Photoacoustic Cell," *Proceedings of the 21st TechConnect World Innovation Conference & Expo Co-Located with NanoTech Conference & Expo*, Boston, MA, 17-19 June 2019.

Invited Talks and Presentations

* Denotes student

1. **Coutu, Jr., R.A.**, "Micro-Switches with Noble Metal and Alloy Electric Contact Materials" presented at Sandia National Laboratory, Albuquerque, NM, April 2005.
2. **Coutu, Jr., R.A.**, "Microelectronics at AFIT," Collaboration meeting with AFRL/RX, Wright-Patterson AFB, OH, 5 September 2008.
3. **Coutu, Jr., R.A.**, "Microelectronics at AFIT," Collaboration meeting with Wright State University, Dayton, OH, 21 January 2009.
4. **Coutu, Jr., R.A.**, "LASER Micromachining for MEMS," Collaboration meeting with Mound Laser and Photonics Center, Miamisburg, OH, 8 June 2009.
5. **Coutu, Jr., R.A.**, "Microelectronics and MEMS" collaboration meeting with Army Research Laboratory (ARL), Adelphi, MD, 28 August 2009.
6. **Coutu, Jr., R.A.**, "Device Fabrication for Metamaterials" project update presentation at Tri-Service Metamaterials Workshop, Hope Hotel, Wright-Patterson AFB, OH, 18 September 2009.
7. **Coutu, Jr., R.A.**, "Basic Cleanroom Operations and Device Fabrication" presentation for NASIC Intel Analysts, Wright-Patterson AFB, OH, 17 November 10.
8. **Coutu, Jr., R.A.**, "THz Components and Device Fabrication" The Fall 2010 Wright State University THz Workshop, OH, 19 November 2010.
9. **Coutu, Jr., R.A.**, "MEMS switches- current status of the technology," *57th IEEE Holm Conference on Electrical Contacts Technical Committee update*, Minneapolis, MN, 12 September 2011.
10. **Coutu, Jr., R.A.**, "MEMS switches- current status of the technology," *58th IEEE Holm Conference on Electrical Contacts Technical Committee update*, Portland, OR, 17 September 2012.
11. Deibel, J.A., *Jones, H.R., *Fosnight, A., *Best, E., Langley, D., Starman, L.A. and **Coutu, Jr., R.A.**, "Flexible Terahertz Metamaterials for Frequency Selective Surfaces," *Proceedings of the SEM Annual Conference, The 14th International Symposium on MEMS and Nanotechnology,* vol. 5, pp. 129-134, Lombard, IL, 3-5 June 2013.
12. *Glauvitz, N.E., **Coutu, Jr., R.A.**, Petkie, D.T. and Medvedev, I.R., "A Micro-Cantilever based Photoacoustic Detector of Terahertz Radiation for Chemical

Sensing," *Proceedings of the 38th International Conference on Infrared, Millimeter and Terahertz Waves*, session Mo8, pp. 1-3, Mainz, Germany, 1-6 September 2013.

13. **Coutu, Jr., R.A.**, "MEMS switches- current status of the technology," *59th IEEE Holm Conference on Electrical Contacts Technical Committee update*, Newport, RI, 23 September 2013.
14. **Coutu, Jr., R.A.**, "Design, Fabrication and Testing of Micro-Contacts for MEMS Switches," Worcester Polytechnic Institute Graduate Seminar, Worcester, MA, 24 March 2014.
15. **Coutu, Jr., R.A.**, "Design, Fabrication and Testing of Micro-Contacts for MEMS Switches," Invited talk at the Fraunhofer Institute of Electronic Nano Systems (ENAS), Chemnitz, Germany, 27 June 2014.
16. **Coutu, Jr., R.A.**, "Design, Fabrication and Testing of Micro-Contacts for MEMS Switches," Invited talk at the Fraunhofer Institute of Photonic Microsystems (IPMS), Dresden, Germany, 2 July 2014.
17. **Coutu, Jr., R.A.**, "MEMS switches- current status of the technology," *60th IEEE Holm Conference on Electrical Contacts Technical Committee update*, Newport, RI, 14 October 2014.
18. **Coutu, Jr., R.A.**, "MEMS switches- current status of the technology," *61th IEEE Holm Conference on Electrical Contacts Technical Committee update*, San Diego, CA, 13 October 2015.
19. **Coutu, Jr., R.A.**, "MEMS switches- current status of the technology," *62th IEEE Holm Conference on Electrical Contacts Technical Committee update*, Tampa, FL, 12 October 2016.
20. **Coutu, Jr., R.A.**, "Design, Fabrication and Testing of Micro-Contacts for MEMS switches," University of Southampton, Seminar for the Department of Electro-Mechanical Engineering and the Zepler Institute, Southampton, UK, 3 April 2017.
21. **Coutu, Jr., R.A.**, "Overview of Advanced Microsystems research at Marquette University," *TechConnect World Innovation Conference & Expo; NanoTech Conference & Expo 2017,* Invited talk for the MEMS & NEMS Devices, Modeling & Applications Session, Washington, DC, 14 May 2017.
22. **Coutu, Jr., R.A.**, "Design, Fabrication and Testing of Micro-Contacts for MEMS switches," Universidad Popular Autonoma del Estado de Puebla (UPAEP), Seminar for the Department of Mechatronics, Puebla, Mexico, 13 June 2017.
23. **Coutu, Jr., R.A.**, "Electronic Control of Germanium Telluride (GeTe) phase transition for electronic memory applications," *Second International Workshop on Thin-Films for Electronics, Electro-Optics, Energy and Sensors (TFE3S)*, Invited talk for the Thin Films of Phase Change Materials and Sensors Session (6a), University of Dayton, Dayton, OH, 27 June 2017.
24. **Coutu, Jr., R.A.**, "MEMS switches- current status of the technology," *63d IEEE Holm Conference on Electrical Contacts Technical Committee update*, Denver, CO, 10-13 September 2017.
25. **Coutu, Jr., R.A.**, "Energy Harvesting and Smart Microgrids," *Congreso de Ingenieria y Arquitectura (CONIA)*, Keynote Speaker, Central American University, San Salvador, El Salvador, 5-6 October 2017.

26. **Coutu, Jr., R.A.**, "Design, Fabrication and Testing of Micro-Contacts for MEMS switches," Tulane University, Seminar for the Department of Physics and Engineering Physics, New Orleans, LA, 30 October 2017.
27. **Coutu, Jr., R.A.**, "Should I go to Graduate School?" Marquette University, Seminar for the IEEE/HKN Student Section, Milwaukee, WI, 20 March 2018.
28. **Coutu, Jr., R.A.**, "MEMS switches- current status of the technology," *64th IEEE Holm Conference on Electrical Contacts Technical Committee update*, Albuquerque, NM, 14-18 October 2018.
29. **Coutu, Jr., R.A.**, "Thin Films for MEMS," *Third International Workshop on Thin-Films for Electronics, Electro-Optics, Energy and Sensors (TFE3S)*, Invited Talk, University of Iceland, Reykjavik, Iceland, 24-26 June 2019.
30. **Coutu, Jr., R.A.,** "Design, Fabrication and Testing of Micro-Contacts for MEMS switches," *2nd International Conference on electronics and Electrical Engineering (ICEEE)*, Keynote Speaker, Rome, Italy, 22-23 July 2019.

Book Chapters

* Denotes student

1. *Crossley, B.L., *Glauvitz, N. E., *Quinton, B. T., **Coutu, Jr., R. A.** and Collins, P.J., (June 2011), Chapter Title: *Characterizing Multi-walled Carbon Nanotube Synthesis for Field Emission Applications*, (Editor: Prof Jose Mauricio Marulanda), Book Title: *Carbon Nanotubes / Book 2*, ISBN: 978-953-307-496-2 (First Edition, pp 1-22), InTech Open Access Publisher.
2. *Toler, B.F., **Coutu, Jr., R.A.** and McBride, J.W., (December 2013), Chapter Title: *Microelectromechanical Systems (MEMS) Metal Contact Switches*, (Editor: Dr. Paul G. Slade), Book Title: Electrical Contacts: Principals and Applications, (Second Edition, pp. 1-53), ISBN-10: 1439881308, CRC Press, Taylor & Francis Group. **Invited**
3. *Glauvitz, N., **Coutu, Jr., R.A.**, Medvedev, I.R. and Petkie, D.T., (February 2016), Chapter Title: *MEMS-based Terahertz Photoacoustic Chemical Sensing System* (Editor: Dr. Wen Wang), Book Title: *Chemical Sensors*, ISBN: 978-953-51-4653-7, (First Edition, pp 1-27), InTech Open Access Publisher. **Invited**
4. *Kodama, C.H. and **Coutu, Jr., R.A.**, (March 2017) Chapter Title*: THz Metamaterial Characterization using THz-TDS* (Editor: Dr. Jamal Uddin), Book Title: *Terahertz Spectroscopy – A Cutting Edge Technology*, ISBN: 978-953-51-3032-1, (First Edition, pp 1-27), InTech Open Access Publisher. **Invited**
5. **Coutu, Jr., R.A.,** (May 2017), Chapter Title: *Additive Manufacturing at the Micron Scale* (Editors: Drs. Adedeji Badiru, Vhance Valencia and David Liu), Book Title: *Additive Manufacturing Handbook: Product Development for the Defense Industry*, ISBN: 978-148-22-6408-1, (First Edition, pp 1-8), CRC Press. **Invited**

Multimedia Presentation

* Denotes student

1. ***Coutu, Jr., R.A.** and Kladitis, P.E., "Contact Force Models, Including Electric Contact Deformation, for Electrostatically Actuated, Cantilever-Style, RF MEMS

Switches," *Multimedia Presentation, Exploring Nanotechnology Encyclopedia*, 2004 Edition. **Invited**

2. *Gwin, A.H., *Kodama, C.H., *Laurvick, T.V. and **Coutu, Jr.,R.A.**, "Improved terahertz modulation using germanium telluride (GeTe) chalcogenide thin films," *Applied Physics Letters,* vol. 107 no. 031904, pp. 1-4, (July 2015). – Key Scientific Article featured in the Advances in Engineering Series website: (https://advanceseng.com/), February 2016. **Invited**

UNITED STATES PATENTS (Issued and Pending)

* Denotes student

1. **Coutu, Jr., R.A.** *et al.*, "Method for selecting metal alloy electric contact materials for radiofrequency (RF) microelectromechanical system (MEMS) switches," US Patent 7,235,750, 26 June 2007.
2. **Coutu, Jr., R.A.** *et al.*, "Shaped MEMS Contact (process)," US Patent 7,601,554, 13 October 2009.
3. **Coutu, Jr., R.A.** *et al.*, "Shaped MEMS Contact (geometry)," US Patent 7,906,738, 15 March 2011.
4. *Ostrow, S. A. and **Coutu, Jr., R.A.**, "Novel MEMS Fabrication Processes Based on SU-8 Masking Layers," US Patent 8,574,821, 5 November 2013.
5. **Coutu, Jr., R.A.** *et al.*, "Thermal Management Using MEMS Bimorph Cantilever Beams," **PENDING** – submitted to USPTO 28 July 2017.
6. **Coutu, Jr., R.A.** and Kodama, C.H., "Tunable Split-Ring Resonator," **PENDING** – submitted to USPTO 13 November 2017.

Technical Reports

Space and Missile Systems Center (SMC)

1. **Coutu, Jr., R.A.**, "Minuteman III Guidance Replacement Program (GRP) Telemetry System Upgrade - Fiber Optic Switch design, fabrication and test results," *Final Report (Detachment 9, SMC/TEVM)*, Vandenberg AFB, CA, 1997.

Air Force Flight Test Center (AFFTC)

2. Dunlop, D., Guiddings, M., Seldon, T. and **Coutu, Jr., R.A.**, "Operational Characterization of the F-16 Z2 Operational Flight Program (OFP) Ground Collision Avoidance System (GCAS) (HAVE MAP)," *TPS Test Management Project (HAVE MAP) Final Report (AFFTC-TR-98-09)*, Edwards AFB, CA, 1998.
3. **Coutu, Jr., R.A.**, "F-16 Block 10/15/30 LN-93 Rev B Ring Laser Gyro (RLG) Single Flight Investigation," *Final Report (F-16 CTF Technical Letter Report)*, Edwards AFB, CA, 1998.
4. Skeen, M. and **Coutu, Jr., R.A.**, "F-16 Y2K Demonstration Report of Results," *Final Report (F-16 CTF Technical Letter Report)*, Edwards AFB, CA, 1999.
5. **Coutu, Jr., R.A.** and Clark, C., "F-16 Mid-Life Update (MLU) M2 Avionic Integration Flight Test," *Final Report (AFFTC-TR-00-12)*, Edwards AFB, CA, 2000.
6. **Coutu, Jr., R.A.** and Hoang, T., "F-16 Blk 50 M2+ Avionic Development & Integration Flight Test & Eval," *Final Report (AFFTC-TR-01-01)*, Edwards AFB, CA, 2001.

Air Force Research Lab (AFRL)

7. Stackhouse, M., Starman, L.A. and **Coutu, Jr., R.A.**, "Nanoporous Energetic Silicon-Based Anti-Tamper Response," *Technical Report (AFRL-TR)*, Wright-Patterson AFB, OH, 2010.

Solar Roadways, Inc.

8. **Coutu, Jr., R.A.**., "Test Results: "SR3" Moisture Conditioning – Duration Testing," *Final Report*, Marquette University, Milwaukee, WI, 8 December 2017.
9. **Coutu, Jr., R.A.**., "Test Results: "SR3" Shear Testing," *Final Report*, Marquette University, Milwaukee, WI, 5 May 2018.
10. **Coutu, Jr., R.A.**., "Test Results: "SR3" Freeze/Thaw Testing," *Final Report*, Marquette University, Milwaukee, WI, 6 May 2018.
11. **Coutu, Jr., R.A.**., "Test Results: "SR3" Heavy Vehicle Simulation (HVS) Testing," *Final Report*, Marquette University, Milwaukee, WI, 18 September 2018.

B.3. Service

Institute/University Service

Marquette

2018	Member, Interview Panel for the new VP in Corporate Engagement
2018 - Present	Team Member, Informal Faculty Advisory Group to investigate DoD funding opportunities
2017	Team Member, Technology Transfer Dimension, President's Task Force on Corporate Engagement
2017	Faculty representative, Council on Competitiveness, Energy and Manufacturing Competitiveness Partnership (EMCP) – The Energy Sector meeting
2016 – 2018	Member, Committee on Research (OCOE Representative)

AFIT

2015	Dean's Representative for a Doctoral Candidate's Oral Examination Committee (Captain Maurio S. Holston)
2014 – 2016	ENG Representative to the EN Awards and Honorifics Committee
2014	Dean's Representative for a Doctoral Candidate's Oral Examination Committee (Major Darrell S. Crowe)
2012	AFIT Cleanroom facility: house N2 system upgraded from four, individual, in-lab, 200L dewars to a large external 1500 gallon (5,678L) liquid N2 (LN2) tank and enclosure
2011 – 2016	Chief Faculty Advisor, Tau Beta Pi (TBP) Student Chapter
2011	Member, Building 644 Naming Committee
2010	AFIT Cleanroom facility: upgraded from Class 10,000 to Class 1000
2008 – 2016	Director, AFIT Cleanroom
2003	Student Chapter President, Tau Beta Pi (TBP)

Departmental/College Service

Marquette

2018 - 2021	Chairman, ECE Promotion and Tenure Committee
2018 - Present	Coordinator, ECE Freshman Seminar
2018 - Present	Member, ECE Leadership Committee
2018 - Present	Member, ECE Program Advisory Committee
2018 - Present	Member, ECE Graduate Committee
2017 - 2018	Chairman, Faculty Search Committee (ECE Dept Chair Position)
2017 - 2018	Member, Faculty Search Committee (Comp Eng Assist Prof Position)
2016 - Present	ECE Faculty Advisor, Tau Beta Pi (TBP) Student Chapter
2016 - 2018	Member, ECE Promotion & Tenure Committee
2016 - 2017	Member, ECE Graduate Studies Committee
2016	Reviewer/Evaluator, OCOE Legacy Initiative Grants

AFIT

2016	Member, Faculty Search Committee (Cyber Physical Faculty Position)
2015	Member, Faculty Search Committee (VLSI Faculty Position)
2014 – 2016	Chairman, ENG Awards and Honorifics Committee
2014 – 2016	Member, ENG Promotion & Tenure Committee
2012 – 2014	Member, ENG Awards and Honorifics Committee
2010 – 2016	Chairman, ENG Microelectronics, Microelectromechanical systems (MEMS) and Nanotechnology Curriculum
2010 – 2016	Chairman, ENG Microelectronics, Microelectromechanical systems (MEMS) and Nanotechnology Curriculum
2008 – 2016	Faulty Advisor, Eta Kappa Nu (HKN) Student Chapter
2003	Student Chapter President, Eta Kappa Nu (HKN)

Professional Service and Memberships

- Activities

2018 – Present	***Chairman; Technical Program Committee***, The 65th IEEE Holm Conference on Electrical Contacts
2018 – Present	***Session Co-Chair*****,** MEMS, NEMS Devices, Modeling & Applications, NanoTech 2019 Conference & Expo, 17-19 June 2019, Boston, MA
2018 – Present	***Member, Technical Program Review Committee***, TechConnect World Innovation Conference & Exp, 17-19 June 2019, Boston, MA
2018 – Present	***Technical Paper Reviewer***, IOP Smart Materials and Structures
2018	***Proposal Reviewer***, Stanford Linear Accelerator (SLAC), Laboratory Research and Development (LDRD) – Detector Technologies
2017 – 2018	***Chairman; Technical Program Committee***, The 29th International Conference on Electric Contacts together with The 64nd IEEE Holm Conference on Electrical Contacts

2017 - 2018	***Session Co-Chair*****,** MEMS, NEMS Devices, Modeling & Applications, NanoTech 2018 Conference & Expo, 13-16 May 2018, Anaheim, CA
2017 - 2018	***Member, Technical Program Review Committee***, TechConnect World Innovation Conference & Exp, 13-16 May 2018, Anaheim, CA
2017 - Present	***Member***, ***Editorial Board***, Academic Star Publishing Company, Journal of Modern Environmental Science and Engineering (JMES&E)
2017 - 2018	**Member, Organizing Committee**, International Conference on Electronics & Electrical Engineering (ICEEE – 2018), 26-27 July 2018, Barcelona, Spain
2017 - 2018	**G*uest Editor***, MDPI Technologies, Microelectromechanical Systems (MEMS) Special Issue: Microswitching Technologies
2017 - 2018	**G*uest Editor***, IEEE Transactions on Components, Packaging and Manufacturing Technology, Special Section: 2016 Holm Conference and the 2016 International Conference on Electric Contacts (ICEC)
2017 - Present	***Member***, ***Editorial Board***, MedCrave, International Journal of Biosensors & Bioelectronics (IJBSBE)
2016	***Textbook Reviewer***, CRC Press, *Nanofabrication: Principles to Laboratory Practice* by Andrew Sarangan
2016	***Technical Paper Reviewer***, MDPI Materials Journal
2016	***Technical Paper Reviewer***, Elsevier Tribology International Journal
2016	***Technical Paper Reviewer***, MDPI Micromachines Journal
2016	***Instructor***, IEEE Short Course, Intensive Course on Electrical Contacts
2016 - 2017	**G*uest Editor***, IEEE Transactions on Components, Packaging and Manufacturing Technology, Special Section: 2015 Holm Conference
2015 – 2017	***Vice Chairman; Technical Program Committee***, The 62nd IEEE Holm Conference on Electrical Contacts
2015	***Session Chair***, Materials III*,* The 11th Annual Dayton Engineering Sciences Symposium (DESS), ASME Dayton Section
2015	***Technical Paper Reviewer***, IEEE Transactions on Education
2015	***Proposal Reviewer,*** AFOSR/RTA – Investigating α-Sn (Grey Tin) for semiconductor devices
2015	***Proposal Reviewer,*** AFOSR/RTA – 2D/3D Heterojunction Bipolar Junction Transistors
2015	***Proposal Reviewer,*** AFOSR/RTA – Tunable Oxide Power Electronics with Two-Dimensional Electron Gas Interfaces
2015	***Technical Paper Reviewer***, The 61st IEEE Holm Conference on Electrical Contacts
2015	***Technical Paper Review Coordinator***, Micro-Electrical Contacts, The 61st IEEE Holm Conference on Electrical Contacts
2015	***Technical Program Committee Member***, The 61st IEEE Holm Conference on Electrical Contacts
2014 – Present	***Member***, IEEE Nanotechnology Council for Advancing Nanotech for Humanity

2014 - Present	***Associate Editor*****,** IEEE Transactions on Components, Packaging and Manufacturing Technology
2014	***Instructor***, IEEE Short Course, Intensive Course on Electrical Contacts
2014	***Session Chair***, Renewable and Clean Energy*,* The 10th Annual Dayton Engineering Sciences Symposium (DESS), ASME Dayton Section
2014	***Technical Paper Reviewer***, Journal of Mechanical Engineering Science
2014	***Technical Paper Reviewer***, American Institute of Physics: Advances
2014	***Technical Paper Reviewer***, Journal of Applied Physics A: Materials Science and Processing
2014	***Technical Paper Reviewer***, The 60th IEEE Holm Conference on Electrical Contacts
2014	***Technical Paper Review Coordinator***, Micro-Electrical Contacts, The 60th IEEE Holm Conference on Electrical Contacts
2014	***Technical Program Committee Member***, The 60th IEEE Holm Conference on Electrical Contacts
2014	***Organizing Committee Member***, The 15th International Symposium on MEMS and Nanotechnology, Society of Experimental Mechanics (SEM) Annual Conference
2014	***Program Committee Member***, Micromachining and Microfabrication Process XIX Conference (8973), 2014 SPIE Photonics West Symposium (MOEMS-MEMS)
2013	***Competitor***, Sandia National Laboratory University Alliance, MEMS design competition
2013	***Session Chair***, Device Fabrication I, The 14th International Symposium on MEMS and Nanotechnology, Society of Experimental Mechanics (SEM) Annual Conference
2013	***Session Organizer***, Devices and Fabrication, The 14th International Symposium on MEMS and Nanotechnology, Society of Experimental Mechanics (SEM) Annual Conference
2013	***Technical Paper Reviewer***, The 59th IEEE Holm Conference on Electrical Contacts
2013	***Technical Paper Review Coordinator***, Micro-Electrical Contacts, The 59th IEEE Holm Conference on Electrical Contacts
2013	***Technical Program Committee Member***, The 59th IEEE Holm Conference on Electrical Contacts
2013 - Present	***Technical Paper Reviewer***, Institute of Physics, Journal of Physics D: Applied Physics.
2013 - Present	***Technical Paper Reviewer***, Journal of Nanoengineering and Nanosystems
2013	***Text Book Reviewer***, Introduction to Sensors and Actuators, IET Press
2012 – Present	***Technical Paper Reviewer***, New Journal of Physics
2012	***Session Chair***, Size Effects in Metals, The 13th International Symposium on MEMS and Nanotechnology, Society of Experimental Mechanics (SEM) Annual Conference

2012	***Competitor***, Sandia National Laboratory University Alliance, MEMS design competition
2012	***Session Organizer***, Devices and Fabrication, The 13th International Symposium on MEMS and Nanotechnology, Society of Experimental Mechanics (SEM) Annual Conference
2012	***Technical Paper Reviewer***, The 58th IEEE Holm Conference on Electrical Contacts
2012	***Technical Paper Review Coordinator***, Micro-Electrical Contacts, The 58th IEEE Holm Conference on Electrical Contacts
2012	***Technical Program Committee Member***, The 58th IEEE Holm Conference on Electrical Contacts
2012 - Present	***Technical Paper Reviewer***, IEEE Transactions on Components, Packaging and Manufacturing Technology
2011 – Present	***Technical Paper Reviewer***, ASME Journal of Tribology.
2011 – Present	***Technical Paper Reviewer***, Elsevier, Journal of Sensors and Actuators A: Physical
2011	***Session Organizer and Chai*r**, Metamaterials, The 12th International Symposium on MEMS and Nanotechnology, Society of Experimental Mechanics (SEM) Annual Conference
2011	***Session Chair***, Micro-contacts, The 57th IEEE Holm Conference on Electrical Contacts
2011	***Technical Paper Reviewer***, The 57th IEEE Holm Conference on Electrical Contacts
2011	***Technical Paper Review Coordinator***, Micro-Electrical Contacts, The 57th IEEE Holm Conference on Electrical Contacts
2011	***Technical Program Committee Member***, The 57th IEEE Holm Conference on Electrical Contacts
2011	***Competitor***, Sandia National Laboratory University Alliance, MEMS design competition
2010 – Present	***Technical Paper Reviewer,*** Institute of Physics, Journal of Smart Materials and Structures
2010 – Present	***Technical Paper Reviewer,*** Nano-Micro Letters
2010 – Present	***Technical Paper Reviewer,*** IEEE Transactions on Industrial Electronics
2010	***Proposal Reviewer,*** NASA Astrophysics Research and Analysis (APRA) – MEMS micro-shutters for space applications
2010	***Session Co-Chair,*** Joint ICEC and 56th IEEE Holm Conference on Electrical Contacts
2010	***Competitor***, Sandia National Laboratory University Alliance, MEMS design competition
2010	***White paper and proposal reviewer***, AFRL/RYDD, Metamaterials for Optical Domain Applications
2010 – Present	***Technical Paper Reviewer,*** Institute of Physics, Journal of Micromechanics and Microengineering
2010 – Present	***Technical Paper Reviewer,*** Nanoscale Research Letters
2010 – Present	***Technical Paper Reviewer,*** Tribology International Journal

2010	***Technical Paper Reviewer***, Joint ICEC and The 56th IEEE Holm Conference on Electrical Contacts
2010	***Technical Paper Review Coordinator***, Micro-Electrical Contacts, Joint ICEC and The 56th IEEE Holm Conference on Electrical Contacts
2010	***Technical Program Committee Member***, Joint ICEC and The 56th IEEE Holm Conference on Electrical Contacts
2010	***Proposal Reviewer,*** AFOSR/AOARD US-Korea Nano/Bio/Information Technology (NBIT) Phase II
2010	***Session Chair,*** The 35th Annual AIAA Dayton-Cincinnati Aerospace Science Symposium (DCASS)
2009 - 2012	***Technical Paper Reviewer***, IEEE Transactions on Components and Packaging Technologies
2009	***Competitor***, Sandia National Laboratory University Alliance, MEMS design competition
2009	***Session Chair,*** The 34th Annual AIAA Dayton-Cincinnati Aerospace Science Symposium (DCASS)
2009	***Session Co-Chair,*** SPIE Optics & Photonics Conference
2009	***Technical Paper Reviewer***, The 55th IEEE Holm Conference on Electrical Contacts
2009	***Full Proposal Evaluator***, Casimir Effect Enhancement (CEE), DARPA/MTO
2008	***Abstract Evaluator***, Casimir Effect Enhancement (CEE), DARPA/MTO
2007 - Present	***Technical Paper Reviewer***, IEEE Electron Device Letters
2006 - Present	***Technical Paper Reviewer***, IEEE/ASME Journal of Microelectromechanical Systems
2005	***Technical Paper Reviewer***, Proceedings of the ASME World Tribology Congress III
2005	***Full Proposal Evaluator***, Navigation-Grade Integrated Micro Gyroscopes (NGIMG), Defense Advanced Research Projects Agency (DARPA), Microsystems Technology Office (MTO)

- <u>Memberships</u>

2010 – 2012	Material Research Society (MRS), Member
2009 – 2014	Society of Experimental Mechanics (SEM), Member
2009 – Present	International Society for Optical Engineering (SPIE), Member (2009), Senior Member (2015)
2002 – Present	Tau Beta Pi (TBP) Engineering Honor Society, Life Member
2001 – Present	Eta Kappa Nu (HKN) Electrical Engineering Honor Society, Life Member
1993 – 2016	Air Force Association (AFA)
1991 – Present	Institute of Electrical and Electronics Engineers (IEEE), Member (1991), Senior Member (2006)