



# INTERDISCIPLINARY MICROSYSTEMS GROUP

## ANNUAL REPORT 2016

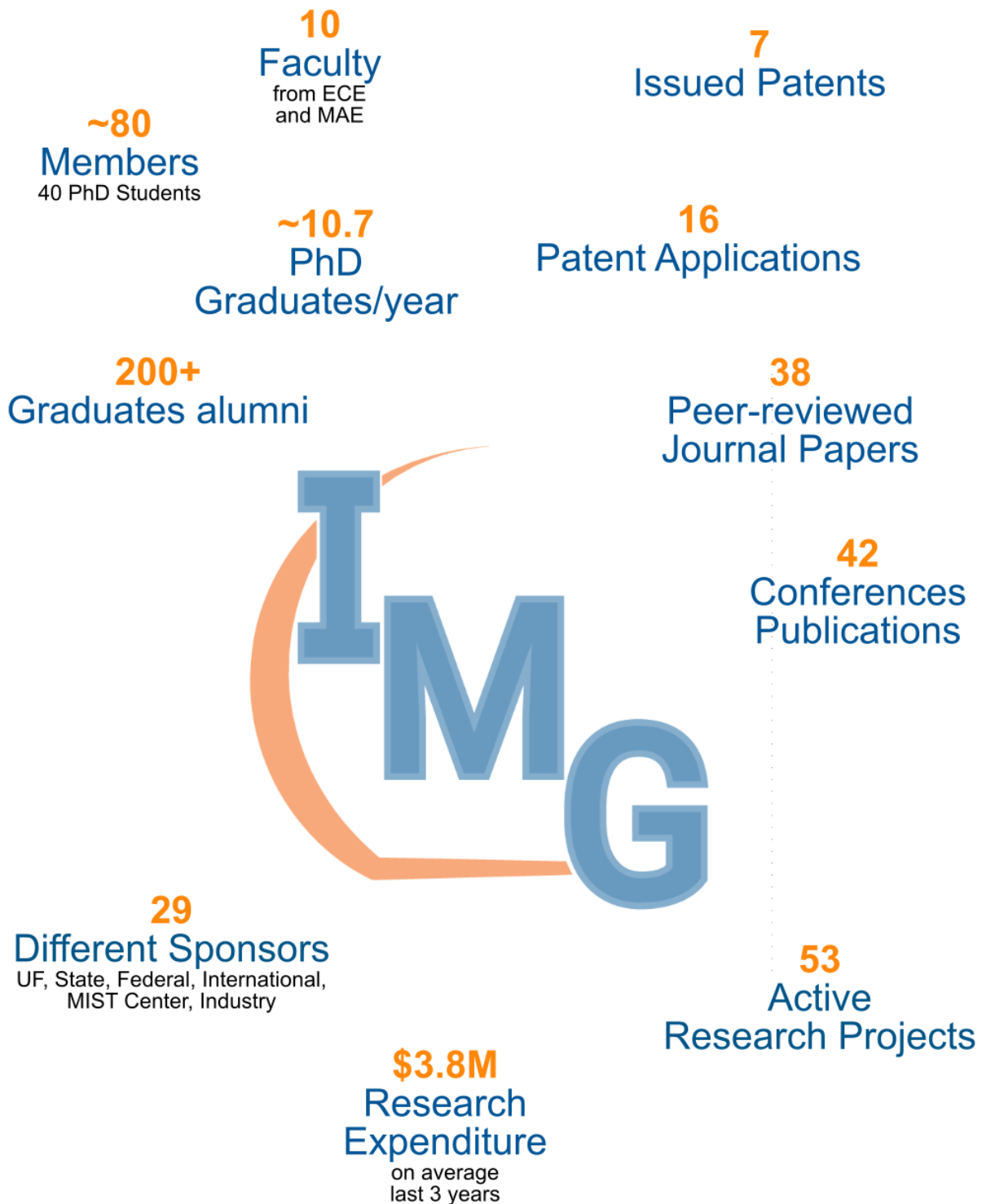


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## 2016 Key Figures



## Introduction

The Interdisciplinary Microsystems Group (IMG) is a college-wide multi-departmental education and research program of the College of Engineering at the University of Florida. IMG operates under the direction of Mark Sheplak, Hugh Fan, and Saeed Moghaddam of the Department of Mechanical and Aerospace Engineering and Toshikazu Nishida, Huikai Xie, David Arnold, Y.K. Yoon, Jack Judy, Roozbeh Tabrizian and Alexandra Garraud of the Department of Electrical and Computer Engineering.

IMG research focuses on micro- and nanosystems for healthcare, energy, security, aerospace, transportation, consumer electronics, and other industries. Efforts include design, fabrication, characterization, and ultimately deployment of micro and nanotechnologies for a wide variety of applications.

Founded in 1998, IMG has steadily grown in size, scope, and impact. Since its inception, IMG faculty have participated in 255 sponsored research projects valued at \$87M (IMG portion was \$46M). Of these, 200 projects (78%) were led by an IMG faculty member as PI, and 58 (23%) included more than one IMG investigator.

Over the past three years (2014-2016), IMG has collectively averaged \$3.8M/year in budgeted research, 32 journal publications/year and 22 conference papers/year, along with 10.7 graduated PhD students/year. IMG has a diverse track record of fundamental and applied research for government, defense, and industry sponsors. IMG's research and graduate/undergraduate student training record have been fueled by true interdisciplinary research and strong internal and external collaborations.



## Faculty Spotlight

### David P. Arnold

#### *Professor*

David P. Arnold is the George Kirkland Engineering Leadership professor in the Dept. of Electrical and Computer Engineering at the University of Florida. He also holds an affiliate appointment in the Dept. of Materials Science and Engineering. He is currently Director of the Interdisciplinary Microsystems Group (IMG) and also Deputy Director of the NSF Multi-functional Integrated System Technology (MIST) Center.



He received dual B.S. degrees in electrical and computer engineering in 1999, followed by the M.S. degree in electrical engineering in 2001, from the University of Florida, Gainesville. He received the Ph.D. degree in electrical engineering at the Georgia Institute of Technology, Atlanta in 2004. His research focuses on magnetic thin/thick films and magnetic micro/nanostructures; magnetic microsystems and electromechanical transducers; and compact (<100 W) power/energy systems.

Dr. Arnold is an active participant in the magnetics and MEMS communities, serving on conference committees for the MEMS, PowerMEMS, Hilton Head, Transducers, Sensors, MMM, and Intermag meetings. He was the technical program co-chair of the 2009 PowerMEMS and is currently on the editorial board of J. Micromechanics and Microengineering and Energy Harvesting and Systems. His work has been recognized with several prestigious awards, including the 2008 Presidential Early Career Award in Science and Engineering (PECASE) and the 2009 DARPA Young Faculty Award. Dr. Arnold is the current UF chapter faculty advisor and member of the Eta Kappa Nu ECE engineering honor society. He is also a Senior Member of IEEE and a member of Tau Beta Pi.

Beyond his passion for research and teaching, he most enjoys spending time with his wife and three children.

#### *Education*

Graduation Year	Degree	University	Program of study
2004	Doctorate	Georgia Institute of Technology	Electrical Engineering
2001	Master of Science	University of Florida	Electrical and Computer Engineering
1999	Bachelor of Science	University of Florida	Electrical Engineering
1999	Bachelor of Science	University of Florida	Computer Engineering



## Z. Hugh Fan

### *Professor*

Dr. Hugh Fan is the George N Sandor Faculty fellow and professor of the Department of Mechanical and Aerospace Engineering, J Crayton Pruitt Family Department of Biomedical Engineering, and Department of Chemistry at the University of Florida (UF). He was an E.T.S. Walton visiting professor in Biomedical Diagnostics Institute at Dublin City University, Ireland in 2009. Prior to joining UF in 2003, Dr. Fan was a Principal Scientist at ACLARA BioSciences Inc. (Mountain View, CA) and was previously a Member of the Technical Staff at Sarnoff Corp. (Princeton, NJ).



Dr. Fan's research interests include microfluidics, BioMEMS (Bio-medical MicroElectroMechanical Systems), sensors, and bioengineering. His research focus is to develop microfluidics and BioMEMS technologies and apply them to biological applications. Microfluidics is promising to reach the holy grail of "lab-on-a-chip". In analogy to shrinking a computer from the size of a room in the 1950s to a laptop today, instruments for chemical and biological analyses may be miniaturized using modern microfabrication technology. Potential applications of the portable, miniaturized devices may include point-of-care testing (e.g., in emergency rooms), environmental monitoring, and detection of biowarfare agents in the field.

Dr. Fan is a recipient of Fraunhofer-Bessel Research Award from Alexander von Humboldt Foundation. He is a Fellow of the American Association for the Advancement of Science (AAAS), an editor of *Microsystems and Nanoengineering* (Nature Publishing Group), and an editorial board member of *Scientific Report* (Nature Publishing Group). He received his B. Sc. from Yangzhou Teachers' College (now a part of Yangzhou University) in China and his Ph.D. from the University of Alberta in Canada. Dr. Fan worked as a postdoctoral fellow at Ames Laboratory of US Department of Energy at Iowa State University. He joined UF in 2003 after more than eight years of industrial experience.

### *Education*

Graduation Year	Degree	University	Program of study
1994	Doctorate	University of Alberta	Chemistry
1985	Bachelor	Yangzhou Teachers' College	Chemistry

Alexandra Garraud

*Research Assistant Professor*

Alexandra Garraud is currently a research assistant professor in the Electrical and Computer Engineering department at the University of Florida. Her research interests include the fabrication, the development and the characterization of microsystems with a particular attention for power and biomedical applications.

She received the B.S. degree in electrical engineering in 2005, and the M.S. degree in applied physics in 2008, from ENS Cachan and Paris-Sud University (France). She received the Ph.D. degree in electrical engineering from Montpellier 2 University (France) in 2011, with a support from a ENS Cachan fellowship.



During her postdoctoral position, from 2012 to 2015, in the Electrical and Computer Engineering and the Biomedical Engineering departments, she has acquired significant multidisciplinary experience by working on multiple sponsored research projects (particle beam physics, biomedical engineering).

*Education*

Graduation Year	Degree	University	Program of study
2011	Doctorate	Montpellier University	Electrical Engineering
2008	Master of Science	Paris-South University	Electrical Engineering
2005	Bachelor of Science	Paris-South University	Electrical Engineering



## Jack Judy

### *Professor*

Dr. Jack Judy is the Intel Endowed Chair of Nanotechnology and the Director of the Nanoscience Institute for Medical and Engineering Technology. Dr. Judy was formerly a program manager in the Microsystems Technology Office of the Defense Advanced Research Projects Agency (DARPA) and Professor at UCLA. While at UCLA, he served as Director of the NeuroEngineering Program, the Nanoelectronics Research Facility, and the Microfabrication Laboratory. Dr. Judy has received the prestigious National Science Foundation Career Award and the Okawa Foundation Award. He received his B.S.E.E. degree with summa cum laude honors from the University of Minnesota in 1989, and an M.S. and Ph.D. from the University of California, Berkeley, in 1994 and 1996, respectively.



### *Education*

Graduation Year	Degree	University	Program of study
1996	Doctorate	University of California, Berkeley	Electrical Engineering
1994	Master of Engineering	University of California, Berkeley	Electrical Engineering
1989	Bachelor of Science	University of Minnesota	Electrical Engineering

Saeed Moghaddam

*Assistant Professor*

Saeed Moghaddam, Ph.D., is an Assistant Professor in University of Florida. Before joining the University of Florida in 2010, he was a postdoc (2007-2010) in Chemical and Biomolecular Engineering Department at University of Illinois at Urbana-Champaign. His research is focused on micro/nanoscale transport and nanotechnology. His major contributions to science and technology are: demonstration of membrane-based absorption/desorption cycle with a significantly higher performance compare to the existing technologies; the most detailed physical insight, over nearly a century of nucleate boiling science, on the nature of thermal field at the bubble-surface interface; development of the first Si-based proton exchange membrane (PEM) capable of operating at dry ambient; and development of the world's smallest fuel cell. Dr. Moghaddam earned his PhD from the University of Maryland at College Park in 2006.



*Education*

Graduation Year	Degree	University	Program of study
2006	Doctorate	University of Maryland at College Park	Mechanical Engineering

Toshikazu (Toshi) Nishida

*Professor*

Dr. Nishida's research interests include the development of reliable, high performance, multi-functional semiconductor devices, sensors, and actuators for microsystems employing strained Si, SiGe, GaN, ferroelectrics, and polymers and enabling multi-functional integrated system technology for smart systems.

Dr. Nishida received his Ph.D. (1988) and M.S. degrees in Electrical and Computer engineering and B.S. degree in Engineering physics at the University of Illinois at Urbana-Champaign. With colleagues and students, he has published over 150 refereed journal and conference papers and received three best paper awards. He also received the 2003 College of Engineering Teacher of the Year award. He holds 11 U.S. patents. He is a distinguished lecturer for the IEEE Electron Devices Society and a senior member of IEEE.



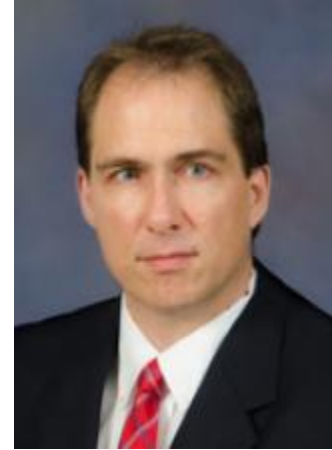
*Education*

Graduation Year	Degree	University	Program of study
1988	Doctorate	University of Illinois at Urbana-Champaign	Electrical and Computer Engineering
1985	Master of Science	University of Illinois at Urbana-Champaign	Electrical and Computer Engineering
1983	Bachelor of Science	University of Illinois at Urbana-Champaign	Electrical Engineering

Mark Sheplak

*Professor*

Mark Sheplak is currently a Professor holding joint appointments in the Department of Mechanical and Aerospace Engineering and the Department of Electrical and Computer Engineering at the University of Florida. Prior to joining UF in 1998, he was a postdoctoral associate at the Massachusetts Institute of Technology's Microsystems Technology Laboratories, Cambridge, MA from 1995-1998. He received a BS degree in 1989, a MS degree in 1992, and a Ph.D. degree in 1995 in Mechanical Engineering from Syracuse University, Syracuse, NY. During his Ph.D. studies he was a GSRP Fellow at NASA-LaRC in Hampton, VA from 1992-1995. His current research focuses on the design, fabrication, and characterization of high-performance, instrumentation-grade, MEMS-based sensors and actuators that enable the measurement, modeling, and control of various physical properties. Specific applications include technology development to enable large-channel count micromachined directional microphone arrays for aeroacoustic noise source localization and miniature skin-friction sensors for aerodynamic drag characterization and flow control.



He is a member of the Multi-functional Integrated System Technology Center (MIST) and the Florida Center for Advanced Aero-Propulsion (FCAAP). He is member and past chair of the AIAA Aerodynamic Measurement Technology Technical Committee. He is also an associate editor for Journal of the Acoustical Society of America (JASA) and JASA Express Letters. He is an associate fellow of AIAA and a fellow of the Acoustical Society of America.

*Education*

Graduation Year	Degree	University	Program of study
1995	Doctorate	Syracuse University	Mechanical Engineering
1992	Master of Science	Syracuse University	Mechanical Engineering
1989	Bachelor of Science	Syracuse University	Mechanical Engineering

## Roozbeh Tabrizian

### *Assistant Professor*

Roozbeh Tabrizian joined the Electrical and Computer Engineering Department at the University of Florida (UF) in 2015, as an Assistant Professor. He received the B. S. degree in Electrical Engineering from Sharif University of Technology, Iran, in 2007, and the Ph. D. degree in Electrical and Computer Engineering from Georgia Institute of Technology, Atlanta, in 2013. Before starting at UF he was a postdoctoral scholar at the University of Michigan.

His research activities are focused on theoretical and experimental investigation of phononic devices, resonant micro- and nano-systems, and mixed-domain physical sensors.

Dr. Tabrizian's research has resulted in more than 25 journal and conference papers, and 6 patents. He is the recipient of outstanding paper awards at the 27th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2014) and the 16th International Conference on Solid-State Sensors, Actuators, and Microsystems (Transducers 2011).



### *Education*

Graduation Year	Degree	University	Program of study
2013	Doctorate	Georgia Institute of Technology	Electrical and Computer Engineering
2007	Bachelor of Science	Sharif University of Technology	Electrical Engineering

## Huikai Xie

### *Professor*

Dr. Huikai Xie is currently a professor at the Department of Electrical and Computer Engineering at the University of Florida. He is also an affiliate faculty of UF Biomedical Engineering Department and a member of the UF Shands Cancer Center. His research interests include MEMS/NEMS, microsensors, microactuators, CMOS-MEMS, integrated gyroscopes, integrated power passives, optical MEMS, microspectrometers, micro LiDAR, biophotonics, endomicroscopy, optical coherence tomography, and in vivo brain imaging. He has published over 280 referred journal and conference papers, and holds 16 issued US patents.



Dr. Xie received his BS and MS degrees in microelectronics from Beijing Institute of Technology, his MS degree in photonics from Tufts University, and his PhD degree in electrical and computer engineering from Carnegie Mellon University. Prior to joining UF in 2002, he worked as a research faculty at Tsinghua University (1992-1996), a summer intern at Bosch (2001), and Director of Engineering at Akustica Inc. (now part of Bosch) (2002). He also worked as a Summer Faculty Fellow at the Air Force Research Lab, Ohio (2007-2009). He is an editor for the IEEE Sensors Letters and the International Journal of Optomechatronics. He is a senior member of IEEE, OSA and SPIE.

### *Education*

Graduation Year	Degree	University	Program of study
2002	Doctorate	Carnegie Mellon University	Electrical and Computer Engineering
1998	Master of Science	Tufts University	Electro-Optics
1992	Master of Science	Beijing Institute of Technology	Electronic Engineering
1989	Bachelor of Science	Beijing Institute of Technology	Electronic Engineering



Y.K. Yoon

*Associate Professor*

YK Yoon is currently an Associate Professor in the Department of Electrical and Computer Engineering at the University of Florida, Gainesville, FL. His current research interests include three dimensional (3-D) micromachining and nano fabrication; design and implementation of metamaterial for radio frequency (RF) and microwave applications; micromachined millimeter wave and terahertz antennas and waveguides; bio/microfluidic systems for the lab-on-a-chip applications; wireless telemetry systems for biomedical applications; and ferroelectric material development for high density memory devices and/or tunable RF devices.



He received his BS and MS degrees in electrical engineering from Seoul National University in Korea. He also earned an MSEE degree from the New Jersey Institute of Technology, Newark, NJ in 1999 and the Ph.D. degree in electrical and computer engineering from the Georgia Institute of Technology, Atlanta, GA in 2004. He held a postdoctoral position in the Microelectronics Research Center of Georgia Institute of Technology from 2004 to 2006. In 2006, he joined the faculty of the University at Buffalo, the State University of New York as an Assistant Professor in the Department of Electrical Engineering, where he directed the Multidisciplinary nano and Microsystems (MnM) laboratory until 2010. He received the NSF Early Career Development Award (CAREER) in 2008 and the Young Investigator Award from the University at Buffalo in 2009. He has more than 90 peer reviewed publications. He is a member of IEEE society. He actively participates in multiple technical conferences including Microelectromechanical systems (MEMS), Transducers, Hilton Head, micro total analysis systems ( $\mu$ TAS), American Vacuum Society (AVS), International Microwave Symposium (IMS) and Antenna Propagation Symposium (APS).

*Education*

Graduation Year	Degree	University	Program of study
2004	Doctorate	Georgia Institute of Technology	Electrical and Computer Engineering
1999	Master of Science	New Jersey Institute of Technology	Electrical and Computer Engineering
1994	Master of Science	Seoul National University	Electrical Engineering
1992	Bachelor of Science	Seoul National University	Electrical Engineering

## Finance

### Internal Sponsorship

Title of Grant	Funding Sponsor	Faculty's Portion (Funding Period)	Expenditures (Reporting Period)
Electron Paramagnetic Resonance Microresonators for Mammalian Cells	UF Division of Sponsored Research Opportunity Fund	\$30,373	\$27,031
Establishing an Interdisciplinary Team and Competitive Platform for a Quantum Grant titled "Dialysis-Like Cancer Cell Removal"	UF Division of Sponsored Research Opportunity Fund	\$185,414	\$105,197
A MEMS-based Fiber-Optic Two-Photon Microscopy Probe For <i>in vivo</i> 3D Imaging of Neural Activity in Unrestrained, Behaving Animals	UF Division of Sponsored Research Opportunity Fund	\$25,244	\$15,226
Biological and Fluidic Measurements using Magnetic Microdiscs	UF OTL	\$22,005	\$14,328
Electrodynamic Wireless Power Transmission Prototype	UF OTL	\$25,526	\$5,824
UF Health Cancer Center Pilot Project Grants funded through the Florida Consortium of National Cancer Institute Centers Program	UF Health Shands Hospital	\$38,000	\$12,441
IPPD 2015-2016	Miscellaneous Donors Industry Funds	\$16,500	\$16,500
IPPD Subproject: MEMS IMU Stabilization via Direct Thermal Control	Miscellaneous Donors Industry Funds	\$16,500	\$0
	<b>Total</b>	<b>\$359,562</b>	<b>\$196,547</b>

### Federal/State Sponsorship

Title of Grant	Funding Agency	Faculty's Portion (Funding Period)	Expenditures (Reporting Period)
Photoresponsive Polymers for Autonomous Structural Materials with Controlled Toughening and Healing	Army Research Office	\$640,000	\$191,577

<b>Implantable Multimodal Peripheral Recording and Stimulation System (IMPRESS)</b>	DARPA (HAPTIX)	\$24,412	\$0
<b>Levitated Microfactories for High-speed Adaptive Microassembly</b>	DARPA (through SRI Intl)	\$170,000	\$91,105
<b>Tissue-Engineered Electronic Nerve Interfaces (TEENI)</b>	DARPA (ElectRx)	\$467,148	\$300,177
<b>A Combined Water Heater, Dehumidifier and Cooler (WHDC)</b>	DOE	\$802,000	\$371,654
<b>AOI 3 – High-Temperature Sapphire Pressure Sensors for Ha</b>	DOE	\$850,571	\$293,554
<b>Multiplexed Detection Platform for Point-of-Service Testing of Zika Virus</b>	FL Dept of Health	\$449,883	\$0
<b>Diagnostic Techniques to Elucidate the Aerodynamic Performance of Acoustic Liners</b>	NASA	\$239,349	\$23,998
<b>NIH R01: A Multimodal Imaging System and Targeted Nanoprobe for Image-Guided Treatment of Breast Cancer</b>	NIH	\$90,919	\$10,772
<b>Mentored Quantitative Research Career Development Award</b>	NIH	\$896,920	\$96,861
<b>Modeling of the Magnetic Particle Imaging Signal Due to Magnetic Nanoparticles</b>	NIH	\$63,261	\$23,395
<b>Collaborative Research: Tailoring Energy Flow in Magnetic Oscillator Arrays</b>	NSF	\$250,000	\$58,572
<b>EAGER: Processes for Manufacturing High-Performance Magnetic Materials in Electronic Systems</b>	NSF	\$76,652	\$1,950
<b>Ferroelectric HfO<sub>2</sub> on Germanium Tunnel Junctions Towards Sub-Femto Joule Switching</b>	NSF	\$128,779	\$0
<b>Ferroelectric HfO<sub>2</sub> on Germanium Tunnel Junctions Towards Sub-Femto Joule Switching</b>	NSF	\$167,424	\$0
<b>I/UCRC Phase I: Multi-functional Integrated System Technology</b>	NSF	\$370,500	\$147,463
<b>I/UCRC Phase I: Multi-functional Integrated System Technology</b>	NSF	\$185,250	\$73,731
<b>IDBR: Type A: Highly Efficient and Rapid Viral Aerosol Detection System (HERVADS)</b>	NSF	\$174,036	\$38,105
<b>MEMS-based Fiber-optic Two-photon Microscopy Probe for</b>	NSF	\$258,468	\$104,375

Real Time In vivo 3D Neural Imaging in Freely Behaving Animals			
PIRE: Collaborations with Japan and France on Complex and Multiphase Fluid Technologies	NSF	\$390,761	\$2,310
Probing interfacial phase-change transport events in flow boiling on micro- and nanotextured surfaces	NSF	\$306,019	\$83,982
RI: Medium: Collaborative Research: Novel Depth Sensor D	NSF	\$135,633	\$70,542
Sandia Fellowship - Casey Barnard Year 2	Sandia National Laboratories	\$65,022	\$17,032
Physics of Ultrasonic Drying Process	UT-Battelle (through DOE)	\$176,733	\$73,067
	<b>Total</b>	<b>\$7,379,740</b>	<b>\$2,074,222</b>

### NSF I/UCRC MIST Center Sponsorship

Title of Grant	Funding Agency	Faculty's Portion (Funding Period)	Expenditures (Reporting Period)
Arnold portion	Multiple Sponsors	\$94,187	\$28,073
Fan portion	Multiple Sponsors	\$64,960	\$24,150
Moghaddam portion	Multiple Sponsors	\$30,169	\$13,527
Nishida portion	Multiple Sponsors	\$48,433	\$24,421
Sheplak portion	Multiple Sponsors	\$164,000	\$106,590
Yoon portion	Multiple Sponsors	\$108,516	\$69,330
	<b>Total</b>	<b>\$510,265</b>	<b>\$226,091</b>

### Industry Sponsorship

Title of Grant	Funding Agency	Faculty's Portion (Funding Period)	Expenditures (Reporting Period)
Directional Antennas for Glass Interposer Communication at 77 GHz	Corning Inc	\$39,038	\$32,132

Engineered silica for high-frequency circuit boards	Corning Inc	\$50,000	\$78
STTR Phase II-Highly Resolved Wall Shear Stress Managemer	IC2	\$225,000	\$45,333
Miniaturized Dynamic Pressure Sensor Arrays with Sub-Millimeter	IC2	\$50,000	\$46,544
Low-Profile, Low Frequency Adaptively Tunable Acoustic L	IC2	\$30,000	\$29,996
DOD SBIR A12-086 (Army) – Flexible, Compact Acoustic Transducer Arrays	IC2	\$100,000	\$34,378
A Responsive Closed-Loop Approach to Treat Freezing of Gait in Parkinson’s Disease	Michael J. Fox Foundation	\$111,818	\$31,523
Prototype for Continuous Electrokinetic Dewatering of Phosphatic Clay Suspensions	Mosaic Fertilizer, Inc	\$421,902	\$13,671
FHTCC: Mask-less Injection Microstereolithography for 3D	Nanoptics Inc	\$84,000	\$7,114
Texas Instruments/SRC Fellowship for Patrick Lomenzo	Semiconductor Research Corp	\$246,166	\$18,433
Strain Engineered High-k Hafnium Oxide Ferroelectric Thin	Semiconductor Research Corp	\$20,000	\$1
	<b>Total</b>	<b>\$1,266,106</b>	<b>\$227,680</b>

### *Foreign Sponsorship*

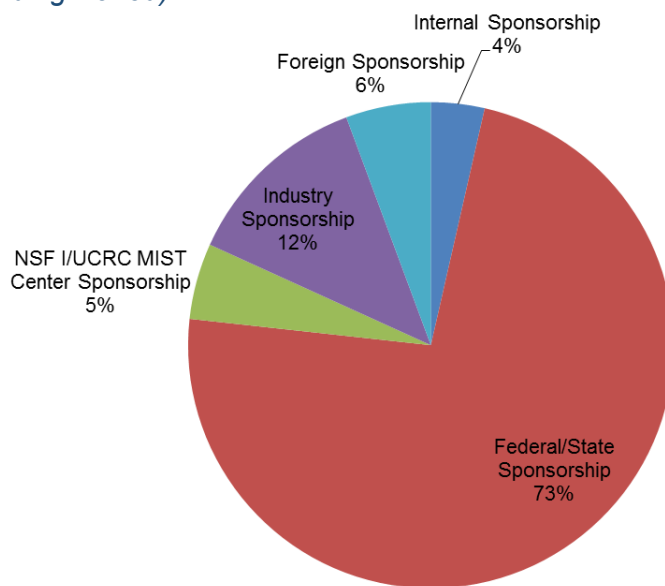
Title of Grant	Funding Agency	Faculty’s Portion (Funding Period)	Expenditures (Reporting Period)
Compact Array Antennas with High-Gain and High Electromagnetic Proof Characteristics	ETRI	\$120,000	\$37,280
Heterogeneous System IC Integration Process Technology Using IPD Si-Substrate	Korea Electronics Technology Institute	\$314,101	\$21,902
Heterogeneous System IC Integration Process Technology Using IPD Si-Substrate – Supplement	Korea Electronics Technology Institute	\$104,019	\$70,744
A New Generation of Endoscope with Integrated & Distributed	Université De Franche-Comté	\$33,000	\$29,409
	<b>Total</b>	<b>\$571,120</b>	<b>\$159,335</b>

## Finance Summary

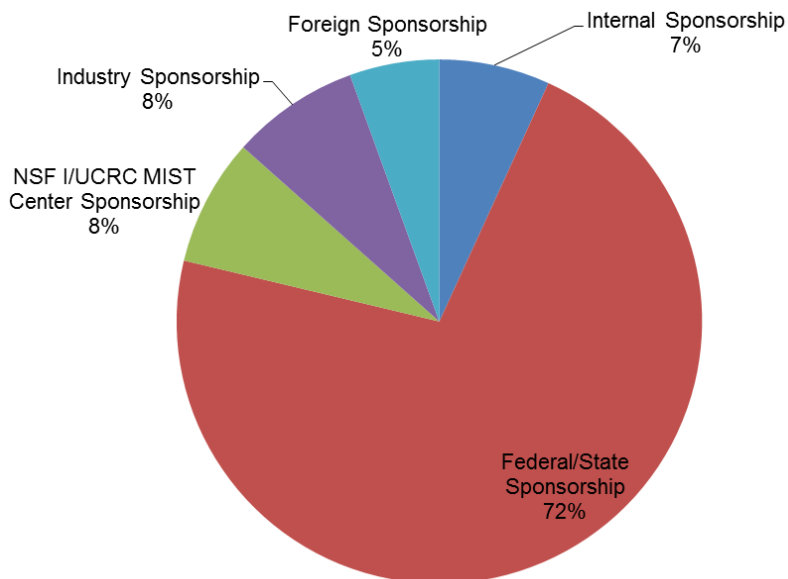
### Total Funding

	Faculty's Portion (Funding Period)	Expenditures (Reporting Period)
Total	\$10,086,793	\$2,883,875

### Faculty's Portion (Funding Period)



### Expenditures (Reporting Period)





## Personnel Accomplishments

### Faculty Accomplishment

- Prof. David Arnold:
  - George Kirkland Engineering Leadership Professorship 2016-present
  - UF Research Foundation Professorship 2016-2019
  - UF Technology Innovator 2016
- Prof. Z. Hugh Fan
  - UF Research Foundation Professorship 2014-2017
  - George N Sandor Faculty Fellow 2015-2018
  - American Association for the Advancement of Science (AAAS) Fellow 2016-present
- Prof. Mark Sheplak
  - UF Technology Innovator 2016
- Prof. Yong-Kyu Yoon
  - Institute of Physics (IOP) Outstanding Reviewer Awards (for Journal of Micromechanics and Microengineering) 2016

### Students Awards

- Justin Correll, Todd Schumann, Sheng-Po Fang, Yong-Kyu Yoon, and Fong Wong: **Global Youth Innovator Award at 2016 iCAN International CES** – “H3 Mouthguard for Self-Fitness Monitoring and Head, Heat, and Heart-Related Injuries Prevention (Intelligent Mouthguard for Fitness and Sports)”.
- Brett Freidkes: **2016 National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP) Fellowship** – “*A MEMS-Based Three-Dimensional Surface Force Sensing System for Fluid Dynamic Applications*,” under the supervision of Dr Mark Sheplak.
- Jose Varillas: **Clinical and Translational Science Institute (CTSI) TL1 Fellowship**, 2016-2017 – “*Enumeration of Circulating Tumor Cells for Monitoring Cancer Treatment Response*,” under the supervision of Dr. Hugh Fan.
- Seahee Hwangbo: **2016 IEEE Antenna and Propagation Society Doctoral Research Fellowship** – “*Millimeter-wave Wireless Interconnects for Intra-/Inter chip Communications using Through Glass Via (TGV) Disc-loaded Antennas in 3D-IC*,” under the supervision of Dr. Y.K. Yoon.
- Arian Rahimi: **2016 IEEE Microwave Theory and Techniques Society (MTT-S) Graduate Fellowship** – “*Nanotechnology-Inspired Multi-Layer Conductors for High Performance Microwave Passive Components*,” under supervision of Dr. Y.K. Yoon.
- Arian Rahimi: **2016 IEEE International Microwave Symposium (IMS) Student Paper Competition Finalist** – “Magnetically Tunable Nano-Superlattice Metaconductors for RF Applications,” under supervision of Dr. Y.K. Yoon.
- Keisha Castillo-Torres and Nicolas Garraud: **SPIE ‘Smart Biomedical and Physiological Sensor Technology XIII’ Conference Best Paper Award** – “*Investigation of magnetic microdiscs for bacterial pathogen detection*”. Dr. Arnold and Dr. Eric McLamore (ABE Dept.) are co-authors.
- Keisha Castillo-Torres and David Arnold: **Best Paper**, Frontiers in Biomagnetic Particles Conf.

- Casey Barnard: **UF Herbert Wertheim College of Engineering Attribute of a Gator Engineer Award** in the area of Leadership based on his service within IMG, MAE, COE and NRF.
- Tiffany Reagan: **Linda Hudson Scholarship** by the Committee of 200 (C200).

### Graduation

Graduate student	Advisor	Title
<b>Bigham, Sajjad</b>	Moghaddam, Saeed	Physics of Interfacial Phase Change Transport Events in Microscale Flow Boiling on Micro- and Nano-Textured Surfaces
<b>Caroll, Robin</b>	Arnold, David Sheplak, Mark	Microfabricated Magneto-Mechanical Oscillator Device for Tuning and Characterization of Bandgap Response Behaviors
<b>Duan, Can</b>	Xie, Huikai	Planar and Integrated MEMS Micromirrors Based Endoscopic OCT Imaging
<b>Fazeli, Abdolreza Seyyed</b>	Moghaddam, Saeed	Microscale Phase Separation through Nanoporous Membranes
<b>Lomenzo, Patrick</b>	Nishida, Toshi	Ferroelectric and Antiferroelectric Properties of HfO <sub>2</sub> -Based Thin Films
<b>Mortazavi, Mehdi</b>	Moghaddam, Saeed	Physics of Absorption and Desorption Processes of Binary Mixtures on Textured Surfaces
<b>Rahimi, Arian</b>	Yoon, YK	Low Loss Passive Component Technologies for High Performance Radio Frequency Circuits Using Micro/Nano Machining
<b>Ravi, Saitej</b>	Moghaddam, Saeed	Capillary Transport Characteristics of Micropillar Array-Based Homogeneous and Hybrid Wick Structures
<b>Rogers, John</b>	Sheplak, Mark	A Passive Wireless MEMS Dynamic Pressure Sensor for Harsh Environments
<b>Shaeffer, Reid</b>	Moghaddam, Saeed	Design of a Compact, Lightweight Absorption Chiller
<b>Takmeel, Mohammad Qanit B</b>	Moghaddam, Saeed	3D Anodes for Direct Methanol Fuel Cells: Science and Synthesis
<b>Zhang, Xiaoyang</b>	Xie, Huikai	Robust Electrothermally Actuated Scanner for Fiberoptic Endoscopic Imaging and Wide-angle Optics

### Proposal Defense

Graduate student	Advisor	Title
Castillo-Torres, Keisha	Arnold, David	<i>Bacterial Pathogen Detection via Optical Interrogation of Magnetic Microdiscs</i>
Fang, Sheng-Po	Yoon, YK	<i>Functionalized Electrospun Nanofibers and Their Biomedical Applications</i>
Garraud, Nicolas	Arnold, David	<i>Instrumentation for Characterizing the Rotational Dynamics of Magnetic Particles in Suspension</i>
Varillas, Jose	Fan, Hugh	<i>Enumeration, Characterization, and Clinical Usage of Circulating Tumor Cells</i>
Walters, Glen	Nishida, Toshi	<i>Scaling and Design of Thin Film Ferroelectric Hafnium Oxide for Memory and Logic Devices</i>
Wen, Xiao	Arnold, David	<i>On the Exploration of Electro-Infiltrated Magnetic Nanocomposites</i>

### New Alumni

Alumnus	Degree	Advisor	Company
Bigham, Sajjad	Doctorate	Moghaddam, Saeed	Michigan Technological University
Carroll, Robin	Doctorate	Arnold, David Sheplak, Mark	Pall Aerospace
Chugh, Devesh	Doctorate	Moghaddam, Saeed	<a href="#">Intel Corporation</a>
Desai, Vidhi	Post-Doctorate	Judy, Jack	<a href="#">St. Jude Medical</a>
Duan, Can	Doctorate	Xie, Huikai	<a href="#">Texas Instruments</a>
Joag, Pracheetee	Master of Science	Nishida, Toshi	<a href="#">Intel Corporation</a>
Kiehne, Justin	Master of Science	Sheplak, Mark	Agilis Engineering
Lomenzo, Patrick	Doctorate	Nishida, Toshi	<a href="#">Northrop Grumman</a>
Mortazavi, Mehdi	Doctorate	Moghaddam, Saeed	Ohio State University
Rahimi, Arian	Doctorate	Yoon, YK	<a href="#">Intel Corporation</a>

<b>Ravi, Saitej</b>	Doctorate	Moghaddam, Saeed	<a href="#">Intel Corporation</a>
<b>Shaeffer, Reid</b>	Doctorate	Moghaddam, Saeed	Battelle Institute
<b>Shafor, Chancellor</b>	Master of Science	Judy, Jack	UF Law School
<b>Takmeel, Mohammad Qanit B</b>	Doctorate	Moghaddam, Saeed	<a href="#">Global Foundries</a>
<b>Zhang, Xiaoyang</b>	Doctorate	Xie, Huikai	Goertek

## IMG Seminars Series

Supported by the IMG Alumni fund

Date	First speaker	Second speaker
<b>December 2,</b>	Casey Barnard (Dr Mark Sheplak) – <i>Development of an aerodynamic wall shear stress measurement system</i>	Seahee Hwangbo (Dr YK Yoon) – <i>An EMI Immune GPS Array Antenna for UAV &amp; Drone Application</i>
<b>November, 18</b>	Nnenna Lindsay and Cherie Oertel (Counseling and Wellness Center) [Invited] – <i>Living a Balanced Lifestyle</i>	Xiaoyang Zhang (Dr. Xie) – <i>A Wide-angle Immersed MEMS Mirror and Its Application in Optical Coherence Tomography</i>
<b>November, 4</b>	Brent Gila (NRF) [Invited] – <i>Research background and new NRF resources/processes overview</i>	
<b>October, 21</b>	Xiao Wen, Camilo Velez and Nicolas Garraud (Dr. Arnold) – <i>2016 Magnetic Material and Magnetism Conference rehearsals</i>	
<b>September, 29</b>	Dr. Sunil Bhawe, Purdue University [ECE seminar, Invited] – <i>Monolithic MEMS + Photonic Systems</i>	

## Publications

### Editorial Advisory Boards

- David Arnold: Editorial Board, *J. Micromechanics and Microengineering* 2013-present
- David Arnold: Associate Editor, *Energy Harvesting and Systems* 2013-present
- Z. Hugh Fan: Editorial Board, *Scientific Report* 2013-present
- Z. Hugh Fan: Editor, *Microsystems and Nanoengineering* 2017-present
- Toshi Nishida: Editorial Board, *Sensors (MDPI)* 2015-present
- Mark Sheplak: Associate Editor, *Journal of Acoustical Society of America* 2011-present
- Mark Sheplak: Associate Editor: *JASA Express Letters* 2011-present
- Huikai Xie, Editor, *IEEE Sensors Letters* 2017-present
- Huikai Xie, Associate Editor, *the International Journal of Optomechatronics* 2011-present

### Reviewers for Scholarly Journals

- ACS Applied Material of Interfaces
- AIAA Journal
- Analytical Chemistry
- Applied Physics Letter
- Biomicrofluidics
- IEEE Sensors Journal
- IEEE Transactions on Electron Devices
- Journal of Electrochemical Society
- Journal of Microelectromechanical Systems
- Journal of Micromechanics and Microengineering
- Journal of the Acoustical Society of America
- Lab on a Chip
- Microfluidics and Nanofluidics
- Physica Status Solidi
- PLOS ONE
- RSC Advances
- Sensors and Actuators A

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- C. Cleveland, M. E. Orazem, S. Moghadam, "Response to "Comment on Nanometer-Scale Corrosion of Copper in De-Aerated Deionized Water," *Journal of The Electrochemical Society*, vol. 163, Y5-Y11, 2016.
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- S. Fazeli, S. Bigham, S. Moghaddam, "Microscale Layering of Liquid and Vapor Phases Within Microstructures for a New Generation Two-Phase Heat Sink," *International Journal of Heat and Mass Transfer*, vol. 95, pp. 368-378, 2016.
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  - T. Nishida “Mission Innovation: The Driver for Global Pollution Monitoring Node Today, Tomorrow and in 2025,” *Commercialization of Micro, Nano, and Emerging Technologies*, Houston, TX, 2016.
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- W. Wang, J. Chen, Q. Tanguy, H. Xie, "A Monolithic Michelson Interferometer with a Large Piston MEMS Micromirror," *2016 IEEE Optical MEMS and Nanophotonics*, Singapore, 2016.
- Y.-K. Yoon, A. Rahimi, "RF Metaconductors for 5G Communications," *US-Korea Conference*, Dallas, TX, 2016.
- X. Zhang, L. Zhou, C. Duan, D. Zheng, S. Koppal, Q. Tanguy, H. Xie, "A Wide-angle Immersed MEMS Mirror and Its Application in Optical Coherence Tomography," *2016 IEEE Optical MEMS and Nanophotonics*, Singapore, 2016.
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