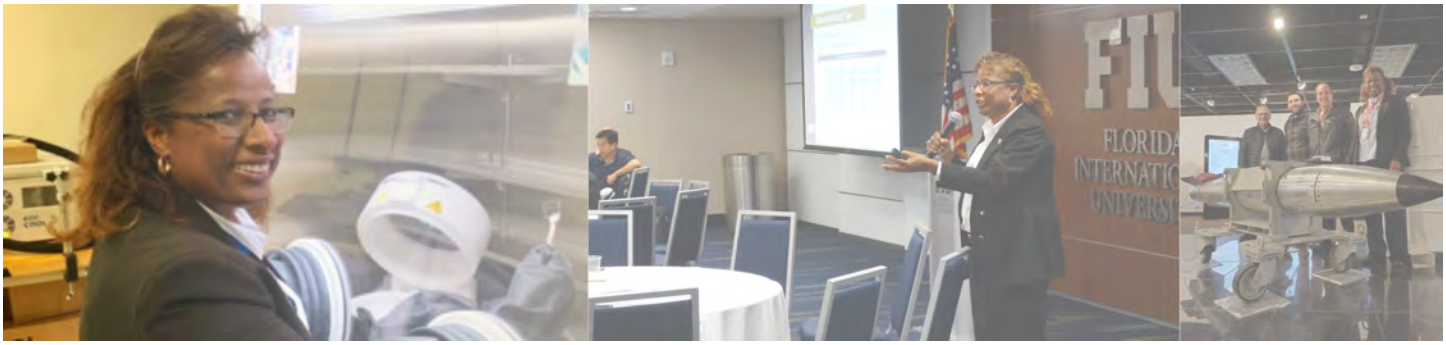
FIU Engineering & Computing

Electrical and Computer Engineering

ANNUAL REPORT

Contents

ECE Emerging and Innovating



Welcome to the Department of Electrical and Computer Engineering at the Florida International University (FIU). FIU is a top-tier Carnegie Classified Institution of Higher Education for doctoral research – R1: Doctoral University – Highest Research Activity. FIU is an Emerging Preeminent and top public research university ranking no. 64 in the nation. The Department of Electrical and Computer Engineering (ECE) at FIU continues to lead transformation and innovation within the engineering community, ranking No. 42 in the U.S. News and World Reports. FIU is ranked in the Top 15 in innovation among public universities and the Top 10 in undergraduate teaching. ECE research awards exceeded $12.4 million last year, with 41 patents issued between 2021 to 2023. ECE has 43 faculty and over 1,300 enrollments in Fall 2023. The total number of ECE degrees awarded in AY 2022-2023 was 485. ECE is home to 8 NSF Career Award recipients and 13 Faculty Fellows from AAAS, AIMBE, ECS, IEEE, NAE, NAI, and ISEES.

Our ECE programs received ABET re-accreditation on Oct. 1st, 2023. We have the first and only 100% online ABET-accredited B.S. in Electrical and Computer Engineering programs in the State of Florida, one of three R1 universities with this accreditation, and one of two universities in Computer Engineering. In AY 2022-2023, the ECE department received more than $12 million in sponsored research contracts. We continue to strive for excellence, innovation, and growth with the development of new areas of study in Quantum Engineering, Nuclear Engineering, Artificial Intelligence, Cybersecurity, Robotics, Electric Vehicle Engineering, Semiconductors, Nanotechnology, Power/Energy, RF/Microwave/Wireless Communication, Embedded Systems, Internet-of-Things and Entrepreneurship. The growth and accomplishments of the department would be unimaginable without the unwavering support and dedication that our faculty, staff, advisors, students, and alumni demonstrate daily across the university. Welcome to FIU ECE!

Deidra R. Hodges, Ph.D.
Department Chair, Associate Professor
Electrical and Computer Engineering (ECE)
Website: https://ece.fiu.edu/

FIU Engineering & Computing
Electrical and Computer Engineering

Welcome to Our New Interim Dean

Dr. Inés R. Triay is the Interim Dean of Florida International University's (FIU) College of Engineering and Computing (CEC) and the executive director of the Applied Research Center (ARC).

The College of Engineering and Computing is South Florida's leading engineering education resource. The college offers a complete range of fully accredited engineering bachelor's, master's and doctoral degree programs in cybersecurity; data sciences; information technology; internet of things; biomedical; civil and environmental; electrical and computer; mechanical and materials; and interdisciplinary engineering; construction management; and computing and information sciences. With close to $75M of external funding, research is an integral part of the college's mission and its success. The college is committed to diversity, and is the largest pro-ducer of Hispanic engineers, and one of the top producers of African American engineers and females with doctoral degrees in engineering.

At ARC, Dr. Triay drives the center's focus to solve real-world problems in partnership with government and private industry through multi-disciplinary research collaborations within the University's increasingly talented applied and basic research units.

Dr. Triay joined FIU in October 2012 after a distinguished history as scientist and administrator at the Department of Energy (DOE), which includes positions as Assistant Secretary for the DOE's Office of Environmental Management. In her role as Assistant Secretary, she led the largest, most diverse, and most technically complex environmental cleanup program in the world with an annual budget of $6 billion, a workforce of more 30,000 federal and con-tractor employees, and originally involving more than 2 million acres at 107 sites located in 35 states.

Prior to coming to DOE, Dr. Triay was a scientist and leader at the Los Alamos National Laboratories for fourteen years where she did seminal work in the areas of environmental reme-diation and radioactive waste management. In her distinguished career, Dr. Triay has received numerous honors, including the Presidential Rank Award, the DOE Secretary Exceptional Service Award, the National Award for Nuclear Science, and the Dixie Lee Ray Award from the American Society of Mechanical Engineers, among others.

Dr. Triay earned her Ph.D. in Physical Chemistry at University of Miami, FL in 1985. She holds a Bachelor of Science degree in Chemis-try from the University of Miami (Magna Cum Laude).

FIU | Engineering & Computing

School of Electrical, Computer and Enterprise Engineering

Fast Facts

2023

RESEARCH

$12.4M in total research awards

$652K per principal investigator

18 research laboratories

INNOVATION
41 patents issued in 2021-2023

STUDENT PROFILE

1378 students
1,139 Undergraduates
239 Graduates

15% Female
80% Undergraduates
20% Graduates

***U.S. News and World Report* Public Institutions Rankings for Graduate Programs:**

WE ARE AMONG TOP 50

Electrical and Electronic Engineering: **#42**
Engineering Electrical and Electronic: **#39**
Computer Science and Information System: **#44**
Telecommunication Engineering: **#27**
Engineering and Technology: **#41**
Best Online Engineering Programs: **#35**

3:1
Ph.D. student advising per faculty ratio

30 FACULTY SPONSORS

- National Science Foundation
- National Security Agency
- Central Intelligence Agency
- U.S. Air Force Research Laboratory
- U.S. Department of Energy
- U.S. Department of Defense
- National Aeronautics & Space Administrat
- University of California Berkeley
- Florida Power and Light
- Office of Naval Research
- Battelle
- University of Florida
- Florida State University
- New York University
- North Carolina State University

Research Awards

Dr. Mohammad Ashiqur Rahman received **$2.5 million** from the U.S. Department of Energy and National Security Agency

Dr. Shekhar Bhansali received **$1.4 million** from the U.S. Department of Energy, Honeywell Federal Manufacturing & Techno and Consolidated Nuclear Security LLC

Faculty Awards

Dr. Selcuk Uluagac

Faculty Senate Award for Excellence in Research

Winner of the 2023 President's Council Real Triumphs Faculty Award

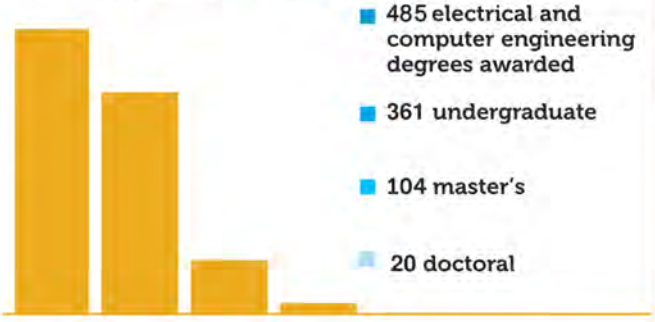
Dr. Shekhar Bhansali

2023 Sigma Xi Fellow

TOTAL DEGREES AWARDED IN AY2022-2023

B.S. **361** M.S. **104** Ph.D. **20**

DEGREES AWARDED



20 Ph.D. Degrees in AY 2022-2023

Florida International University ranked 64 in Top Public Schools
FIU RANKED 57th WORLDWIDE UNIVERSITIES GRANTED U.S. UTILITY PATENTS

41 Patents in 2021-2023

Issue Date	*Patent Number*	*Tittle*	*Name*
4/11/2023	11,626,731	Hybrid Renewable Energy Source Systems	Arif Sarwat ,Temitayo Olowu
2/28/2023	11,593,479	Systems and Methods for Detecting an Attack on a Battery Management System	Arif Sarwat ,Asadullah Khalid
2/28/2023	11,592,417	Fuel Cell Sensors and Methods of Using and Fabricating the Same	Ahmed Jalal ,Arif Sarwat
11/22/2022	11,507,041	Systems and Methods for Boosting Resiliency of a Power Distribution Network	Arif Sarwat ,Shamini Dharmasena ,Temitayo Olowu
10/25/2022	11480626	Systems and Method for Testing Battery Management Systems	Alexander Stevenson,Arif Sarwat,Asadullah Khalid
10/18/2022	11476673	Systems and Methods for Distribution Optimal Power Flow	Arif Sarwat,Temitayo Olowu
10/11/2022	11469519	Antenna Arrays with Three-Dimensional Radiating Elements	Abdul-Sattar Kaddour,Stavros Georgakopoulos
8/9/2022	11410776	Systems and Methods for Formal Threat Analysis of a Smart Healthcare System	Mohammad Rahman,Nur Imtiazul Haque
7/5/2022	11381582	Energy Cyber-Physical System Digital Twin Playground	Ahmed Aly Saad Ahmed,Osama Mohammed
5/31/2022	11347997	Systems and Methods Using Angle-Based Stochastic Gradient Descent	Alexander Perez-Pons,Chongya Song
5/24/2022	11342795	Power Transfer and Harvesting System Having Anchor-Shaped Antennas	Dieff Vital,John Volakis,Shubhendu Bhardwaj
5/10/2022	11329806	Systems and Methods for Authentication and Key Agreement in a Smart Grid	Kemal Akkaya,Mumin Cebe
4/12/2022	11303029	Arrays with Foldable and Deployable Characteristics	Constantinos Zekios,Muhammad Hamza,Stavros Georgakopoulos
3/22/2022	11284255	Systems and Methods for Distributed Authentication of Devices	Kemal Akkaya,Mia Abdelmaguid Mahmoud Abdelmalek
11/30/2021	11190055	Simultaneous Wireless Power and Data Transfer System	Stavros Georgakopoulos
10/5/2021	11135589	Large Microfluidic Bioreactor and Manufacturing Method Thereof	Natalia Bourgignon,Shekhar Bhansali
9/28/2021	11130283	Glass Scintillators and Methods of Manufacturing the Same	Nezih Pala
9/28/2021	11132441	Systems and Methods for Inhibiting Threats to a Computing Environment	Arif Uluagac,Enes Erdin,Kemal Akkaya,Kyle Denney,Leonardo Babun Abijana
9/28/2021	11133588	Phase Change Material Based Reconfigurable Intelligent Reflective Surfaces	Nezih Pala,Randy Matos
9/28/2021	11133851	Beamforming Configuration via Cross-Mixing	Elias Alwan,John Volakis,Rimon Hokayem
9/21/2021	11128463	A Cost-efficient IoT Forensics Framework with Blockchain	Arif Uluagac,Kemal Akkaya,Mumin Cebe,Suat Mercan
9/7/2021	11110052	3D Navigation of Nanoparticles Via Induction of Metastable Diamagnetic Response	Abhignyan Nagesetti,Sakhrat Khizroev,Tiffanie Stewart
8/3/2021	11076786	Wound Monitoring Sensors and Use Thereof	Shekhar Bhansali,Sohini Choudhury,Yogeswaran Umasankar
7/20/2021	11065164	Smart Bandage for Electrochemical Monitoring and Sensing Using Fabric-Integrated Data Modulation	Dieff Vital,John Volakis,Pulak Bhusan,Shekhar Bhansali,Shubhendu Bhardwaj
7/13/2021	11063475	Power Transfer and Harvesting System Having Anchor-Shaped Antennas	Dieff Vital,John Volakis,Shubhendu Bhardwaj
7/6/2021	11056791	Arrays with Foldable and Deployable Characteristics	Constantinos Zekios,Muhammad Hamza,Stavros Georgakopoulos
6/1/2021	11022720	System for Forecasting Renewable Energy Generation	Aditya Sundararajan,Arif Sarwat,Avinash Jeewani,Hugo Riggs,Shahid Tufail
4/6/2021	10969436	Systems and Methods for Forecasting Battery State of Charge	Aditya Sundararajan,Arif Sarwat,Asadullah Khalid
3/23/2021	10958211	Systems and Methods for Power Management	Aditya Sundararajan,Arif Sarwat,Temitayo Olowu
3/9/2021	10940639	Glass Scintillators and Methods of Manufacturing the Same	Nezih Pala
3/9/2021	10944166	Balun for Increasing Isolation in Simultaneous Transmit and Receive Antennas	Alexander Hovsepian,John Volakis,Satheesh Bojja Venkatakrishnan
3/2/2021	10938109	Foldable and Reconfigurable Antennas, Arrays and Frequency Selective Surfaces with Rigid Panels	Shun Yao,Stavros Georgakopoulos
2/23/2021	10926046	Gravity Dependent Ventilator	Grover L. Larkins
2/23/2021	10926261	Large Microfluidic Bioreactor and Manufacturing Method Thereof	Natalia Bourgignon,Shekhar Bhansali
2/23/2021	10929530	Systems and Methods for Monitoring Activity in an HDMI Network	Arif Uluagac,Kemal Akkaya,Leonardo Babun Abijana,Luis Puche Rondon
2/23/2021	10931022	Reconfigurable Arrayswith Multiple Unit Cells	Abdul-Sattar Kaddour,Constantinos Zekios,Stavros Georgakopoulos
2/2/2021	10909438	Passive RFID Temperature Sensors With Liquid Crystal Elastomers	Stavros Georgakopoulos,Yousuf Shafiq
2/2/2021	10910691	Multiple Input Multiple Output Antenna Devices	Constantinos Zekios,Nicholas Russo,Stavros Georgakopoulos
2/2/2021	10910713	Reconfigurable Rotational Reflectarrays	Abdul-Sattar Kaddour,Stavros Georgakopoulos
2/2/2021	10910835	Systems and Methods for Protecting Against Fault Currents	Mohammad Mahmoudian Esfahani,Osama Mohammed
2/2/2021	10911471	Systems and Methods for Network-Based Intrusion Detection	Alexander Perez-Pons,Chongya Song

FIU Top Scholar Awardees 2022-2023

Dr. Ahmed Ibrahim

Dr. Ahmed Ibrahim has been honored as an FIU Top Scholar awardee for the academic year 2022-2023 for his exceptional work in the field of wireless communication and for developing a cellular testbed to evaluate the security of mobile systems. This recognition is in the category of Junior Faculty with Significant Grants (STEM), highlighting his achievements in research and creative activities.

Dr. Atoussa H. Tehrani has been recognized as an FIU Top Scholar awardee for the 2022-2023 academic year for her remarkable contributions to teaching in the sciences. This honor is bestowed in the category of Faculty with Notable Gains in Student Learning and Success, celebrating Dr. Atoussa H. Tehrani's commitment to enhancing student learning through professional development, the continuous improvement of courses, and equipping students for a competitive job market.

Dr. Atoussa H. Tehrani

Dr. Elias Alwan

Dr. Elias Alwan has been distinguished as an FIU Top Scholar awardee for the academic year 2022-2023. This honor, within the category of Jun-ior Faculty with Significant Grants (STEM), acknowledges Dr. Elias Alwan's impactful work on the Next Generation Universal Radio Platform, receiving support for three PhD students, and attaining the Instrumenta-tion Grant.

Dr. Kemal Akkaya has been recognized as an FIU Top Scholar awardee for the academic year 2022-2023. This prestigious acknowledgment falls under the category of Award Winning Creative Works/Honors and commends Dr. Kemal Akkaya for his engaging and valuable contributions to the discourse on cybersecurity and the Internet of Things (IoT). His work has not only resonated within the scientific community through highly cit-ed papers but has also earned a place in the World's Top 2% Scientists List of 2021.

Dr. Kemal Akkaya

FIU Top Scholar Awardees 2022-2023

Dr. Sumit Paudyal

Dr. Sumit Paudyal has been honored as an FIU Top Scholar awardee for the 2022-2023 academic year, receiving recognition in the category of Established Faculty with Significant Grants (STEM). This accolade is awarded for Dr. Sumit Paudyal's exemplary work in integrating clean and distributed energy resources into the electric power grid, significantly enhancing the reliability and sustainability of energy delivery.

Dr. Selcuk Uluagac has been selected as an FIU Top Scholar awardee for the academic year 2022-2023, being recognized in the category of Established Faculty with Significant Grants (STEM). This honor is a testament to Dr. Selcuk Uluagac's extensive and influential work in the field of cybersecurity.

Dr. Selcuk Uluagac
2023 Faculty Senate Award for Excellence in Research
Winner of the 2023 President's Council Real Triumphs Faculty Award

Dr. Selcuk Uluagac

Dr. Wilmer Arellano

Dr. Wilmer Arellano has been recognized as an FIU Top Scholar awardee for the 2022-2023 academic year, in the category of Dedicated Mentoring (Teaching - undergraduate & graduate). This acknowledgment celebrates Dr. Wilmer Arellano's commitment to the extensive and dedicated mentoring of students across a broad spectrum, from senior design students and first-year undergraduates to prospective FIU students at the high school and middle school levels.

Research Awards 2022-2023

Dr. Ashiqur Rahman

Dr. Ashiqur Rahman has secured a substantial total of $2.5 million in research grants for two groundbreaking projects. With a generous $2 million grant from the U.S. Department of Energy, Dr. Rahman is leading the way in investigating Intelligent Mechanism Design to bolster the resilience of Wide Area Monitoring, Protection, and Control Systems. Additionally, a $499,998 grant from the National Security Agency has been awarded to Dr. Rahman for his pioneering work in Digital Twin-Assisted Hardware and Software Platforms for Unmanned Aircraft System Security Research, Education, and Training.

Dr. Shekhar Bhansali

Dr. Bhansali received a total of $1.4M grant in 2023. He is the recipient of 3 major research grants in 2023. Dr. Bhansali received $896,356 from the NNSA/MSIPP for the ASTERIX Consortium, from which he is PI. The ASTERIX Consortium aims to train students on nuclear safety sensors and systems and use this training to build a sustainable pipeline of talented diverse engineering students who are ready to enter the STEM workforce of Department of Energy/National Nuclear Security Administration (DoE/NNSA). He also received a $310,000 research grant from Y12/Consolidated Nuclear Security to conduct research on the "Bionic Glove Augmented with Virtual Reality for Training Personnel in the High-Risk Environments" project, which develops prototype thermal feedback response hardware/software. Lastly, Kansas City Nuclear Security Campus/ Honeywell awarded him a $175,000 grant to continue research for the "In-Situ Process Monitoring" project, which aims to develop methods to monitor manufacturing processes in real-time, in order to improve manufacturing and quality.

Dr. Shekhar Bhansali — 2023 Sigma Xi Fellow

Dr. Elias Alwan

Dr. Elias Alwan received a total of $1.34M grant in fiscal year 2023. Prof. Elias Alwan and Prof Arjuna Madanayake are leading the development of technology to connect smartphones directly to satellites, enabling high-speed internet access without the use of cell towers and communication bases. The research project was funded for $500K by Digital Locations, an innovative satellite communications company. The technology would stand to benefit many. Residents in rural areas could use it to have consistent high-speed internet access. Passengers on a cruise ship could use their phones to make video calls from the open ocean. After a hurricane, the technology could help residents in a city that has suffered damage to its cell towers sustain high-speed communications.

Research Awards 2022-2023

Dr. Sumit Paudyal

In a significant stride towards fostering a sustainable STEM workforce, Dr. Sumit Paudyal has spearheaded the Consortium for Research and Education in Power and Energy Systems (CREPES). This pivotal project, backed by a continuation award from the U.S. Department of Energy, has secured funding of $1,000,000. This accomplishment not only underscores Dr. Paudyal's leadership in the field but also reinforces the College of Engineering and Computing's commitment to advancing research and education in energy systems.

Dr. Arjuna Madanayake

During the 2023 fiscal year, Dr. Arjuna Madanayake's innovative research projects across various domains of electrical and computer engineering secured a commendable total of $990K in funding. This considerable sum was awarded for groundbreaking work, including the development of next-generation wireless communications supported by the National Science Foundation and the research in terahertz measurement facilities funded by New York University, the initial grant is $150,000. Dr. Arjuna Madanayake's work also made significant advances in Advanced Communications & RF Systems Assessment, he got an initial grant of $250,000 for this project, the primary sponsor is DEFENSEWERX. Moreover, the professor contributed to wearable ultrasound therapy technologies and noise-shaping techniques for large aperture arrays, attracting support from prestigious institutions like the Office of Naval Research, the grant is $150,000. This series of achievements underscores Dr. Arjuna Madanayake's exceptional role in advancing technology and engineering education.

Dr. Vladimir Pozdin

In the 2023 fiscal year, Dr. Vladimir Pozdin made a remarkable impact with a total funding achievement of $980K across three innovative projects. With a $60,000 grant from Philips, Dr. Pozdin led the "Monitoring Critical Limb Threatening Ischemia" project, aiming to advance medical diagnostics. A substantial $546,273 from the Office of Naval Research fueled the "Next Generation of Systems Enabled by Nanoscale Coatings" initiative. Additionally, the project "ASCENT: Reconfigurable Metal-Free Microsystems with Alternative Power Sources," backed by North Carolina State University and the National Science Foundation with $375,000, underscored Dr. Pozdin's commitment to sustainable technology.

Research Awards 2022-2023

Dr. John Volakis

Dr. John Volakis received a total of $725 K grant in the last fiscal year 2023. He has achieved notable success in advancing research. Through his expertise, Dr. Volakis secured a series of awards last year, underscoring the innovative nature of his work and the confidence of several funding agencies in his research's potential impact. His work on an unspoofable Location Information System as a GPS alternative has attracted substantial investment from Luminous Cyber Corp, supported by the U.S. Department of Defense, for this project, he got a grant of $300K. Additionally, the Central Intelligence Agency has recognized the importance of his endeavor to fabricate and demonstrate a Passive Millimeter-Wave Camera and sponsored him $100k for his research. Lockheed Martin has also funded $200K for his pioneering project on Dual Polarized 2-50GHz Ultrawideband Aperture. These cumulative awards reflect Dr. Volakis's outstanding contribution to the field and his ongoing commitment to advancing technology in communications and defense.

Dr. Arif Sarwat

Eminent Scholar Chaired Professor Dr. Arif Sarwat received a total of $725 K grant in the 2023 fiscal year. By focusing on the recruitment, retention, and development of a highly skilled workforce, Dr. Sarwat's ENRGE (Enabling Native Researchers and Graduate Engineers) grant represents a critical step toward the capacity building and pipeline development required to support DOE/NNSA's mission. The initial grant is $300K, and its objectives encompass the establishment of rigorous graduate programs, covering a wide range of engineering concentrations, which will prepare students for careers in critical STEM industries. Furthermore, the emphasis on hands-on training and research capabilities in the domains of Advanced Energy Systems and Nuclear Safety underscores the practicality and real-world relevance of the programs.

Dr. Stavros Georgakopoulos

Dr. Stavros Georgakopoulos received a total of $630 K grant in the fiscal year 2023. He is the professor and director of the Transforming Antennas Center, and received funding for his project “Sub-THz and THz Measurement Instrumentation for 6G Communications and Remote Sensing ”, the initial grant is $393,616. This award received by Dr. Georgakopoulos came through the U.S. Air Force Office Research Laboratory. It will be used to acquire Sub-THz and THz Network Analyzer Modules, instrumentation that will enable his research team to advance their work at higher frequencies. Dr. Georgakopoulos has pioneered the development of foldable, deployable, reconfigurable, and multifunctional electromagnetic systems, and novel technologies for 5G/6G communication systems.

Research Stories

Dr. Himanshu Upadhyay

Dr. Himanshu Upadhyay has received $859K from Department of Defense – Director, Operation Test &Evaluation (DOD-DOT&E) to establish the Artificial Intelligence (AI) Center of Excellence to support the Test & Evaluation Innovation Center. DOT&E - AI Center of Excellence activities will involve research & development of Advanced Automated Machine Learning System (AAMLS), Automaton General Purpose Data Intelligence Platform, Computer Vision & Natural Language Processing – Large Language Models for multi-domain operations, Generative AI, Big Data Spark clusters for machine Learning, AI workforce development (AI Fellows), hackathons, and workshops for DOD-DOT&E professionals. Recently, Dr. Himanshu Upadhyay has received the NSF award titled "Cyber Tech: Expanding Opportunities in Cybersecurity" through Broward college in the amount of $77,562 focused on co-teaching in cyber security.

Dr. Nezih Pala

Dr. Pala and his collaborators have received $2M award from NSF Accelerating Research through International Network-to-Network Collaborations (AccelNet) program. The project “Broadening Carbon Ring” brings together FIU, University of Miami, San Diego State University, UC Irvine and Clemson University for a strategic alliance that aims to advance the state of the art in carbon materials and devices by bringing together researchers from different research communities. The goal is to fill the knowledge gap in carbon materials, accelerate new carbon materials discovery, create and share fabrication and manufacturing toolboxes, explore frontier carbon device and new applications, and train highly diverse researchers and technical leaders with skillsets to conduct complex projects requiring international coordination.

Dr. Tauhidur Rahman

The US CHIPS Act aims to train computer architects for innovative hardware design, a field heavily reliant on software-based simulation and used in teaching computer architecture. However, current educational simulators have steep learning curves, hindering accessibility and leading to errors. To address this, assistant professor and the Director of SeRLoP Research Lab Tauhidur Rahman received a $100,000 National Science Foundation grant titled “Collaborative Research: EAGER: AI-Assisted Just-in-Time Scaffolding Framework for Exploring Modern Computer Design” to develop Scaffolded AI-driven Learning Simulation (SAILS). What’s more, Dr. Rahman, along with Wright State University and the University of Kansas principal investigators, hosted the National Security Agency (NSA) Cybersecurity Pathways Workshop in Sinclair College, Ohio, to expose community college students to topics in cybersecurity, including network security, information assurance, software protection, artificial intelligence-enabled cybersecurity, hardware-oriented security for system verification, resilience, and trust.

Research Stories

Dr. Shamim Shawkat

Dr. Mst Shamim Ara Shawkat joined the ECE department in the Fall of 2021 as an assistant professor. She has recently been awarded her first major grant—a remarkable $750,000 grant from the Department of Energy (DoE), the initial award is $250K. For the new era of exploring physics laws, high energy physics (HEP) demands highly sensitive, fast, noise-free, and radiation-hard detectors. In this project, she aims to develop novel high-performance single photon avalanche (SPAD) detector arrays for HEP applications, which will provide training and research opportunities for underrepresented communities in HEP-related fields at FIU. The research part of this project aims to develop low-cost, low-noise, and compact SPAD arrays, specialized for HEP applications, in particular, for quantum-assisted two-photon interferometry with great impact on the cosmic frontier topics and radiation hard SPAD arrays for the energy frontier topics. The project also plans to expand FIU's capacity to conduct research on HEP projects by developing sensor design and testing facilities at FIU in collaboration with a national laboratory.

Professor Urban attended and participated as a presenter of both a talk and a poster on the topic of solving ellipsometry problems using AI. Ellipsometry measures surfaces and interfaces using light and is a critical technology for PV as well as chip manufacturing among other applications. He also is a member of the inaugural AVS Ellipsometry Technology Group which put on the first technical program after being formed during the past 12 months. Overall the conference had a program of many hundreds of presentations from academia as well as industry. The Chips Act was on everyone's lips.

Dr. Frank Urban

Deepanshu Trivedi

Deepanshu Trivedi, a PhD student at Florida International University, co-guided by Dr. Arjuna and Dr. Krasnok, has made a significant mark in quantum technology. His paper, "Fano-qubits for quantum devices with enhanced isolation and bandwidth," featured in the 2023 APL Rising Stars Collection, was selected as the Editor's Pick in Applied Physics Letters. The team addresses an important challenge – the requirement for efficient quantum isolators. Traditionally, solutions for these problems were fraught with shortcomings, such as limited bandwidth, low tunability, high losses, and lack of compatibility with planar technologies like circuit QED. However, the team's innovative approach leverages the inherent nonlinearity of qubits and spatial symmetry disruption to transform Lorentz-type qubits into Fano-type qubits. This leap forward heralds a new era in the development of compact, high-performance, planar-compatible non-reciprocal quantum devices. Such advances promise to revolutionize quantum computing, communication, and sensing, by providing superior noise protection and a broader bandwidth.

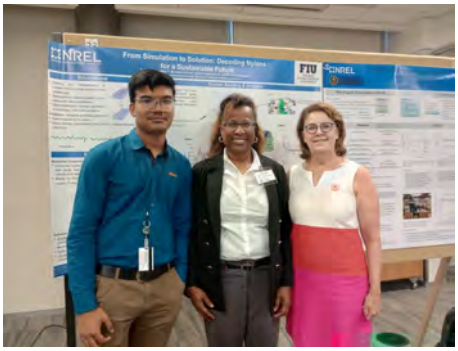
Department Activity

2023 DOE Lab Visits to INL, BNL and NREL for MSI Engagement Opportunities

We were invited to visit Idaho National Laboratory (INL) Advance Test Reactor, Nuclear Materials and Fuels Complex and other INL facilities to explore potential collaborative opportunities and MSI pathways. We were also invited to visit Brookhaven National Laboratory (BNL) and the National Renewable Energy Laboratory (NREL) for MSI engagement opportunities.

NREL FIU STAR

At NREL, we are participating in the FIU Student Training and Applied Research (STAR) Program with Dr. Ellen Morris, Dr. Daria Lazarenko, Dr. Prem Chapagain, Aakash Shrestha and Dr. Deidra Hodges.



FPL and NextEra Energy

Florida Power and Light (FPL) and NextEra Energy leadership lab visits and workshop presentations discussing needs in the area of Nuclear Energy and Solar Photovoltaics. Meetings had very high engagement and participation, with many questions and discussion.

NSF SpectrumX Broadband MAP US

Our faculty and undergraduate students participating and presenting at NSF Spectrum week in D.C. and at Northwestern University, as a part of a Notre Dame University project. Shown below are Dr. Arjuna Madanayake, Dr. Satheesh Venkatakrishnan, Natalie Jiminez, Gia Azcoitia, Daidreuna Donaldson, and Shawna-Lee Pommells.

Faculty Retreat

The 2023 ECE Department's Annual Faculty Retreat was held in September at FIU's Graham Center at the Modesto A. Maidique Campus (MMC). Dean John Volakis opened the retreat with updates about the CEC and ECE. The retreat continued with working items and very engaging discussions. We discussed and initiated plans for the 7 year program review, T&P, post tenure review, personnel changes, industry and government lab visits. Metrics including enrollments, graduate rates, attrition, and research were discussed. Dr. Herman Watson and Dr. Gustavo A. Chaparro-Baquero shared the ABET updates and new concentrations for Industry. Dr. Nezih Pala, Dr. Ou Bai and Dr. Kang Yen lead engaging discussions about changes to Ph.D. policies and student mentoring, and the graduate student handbook and catalog. Dr. Vladimir Pozdin lead changes and engaging dis-cussions about the Graduate Catalog and curriculum changes. Dr. Wilmer Arellano presented the latest information on Senior Design updates, and encouraged more faculty to mentor teams, due to large numbers of senior design teams. The University of Maryland's Dr. Derrek Dunn and his team attended and participated remotely. We had a faculty training session on the Ph. D. guidelines and mentoring. There were comments from many of the faculty that this was the best retreat to date. Discussions were engaging and we only accomplished one half of the agenda. Our growth is inseparable from everyone's hard work and dedication. Best wishes to FIU and FIU ECE!











ABET

The Engineering Accreditation Commission (EAC) of ABET, Inc. accredits engineering programs on a nationwide basis. ABET accreditation provides assurance that a college or university program meets the quality standards established by the profession for which the program prepares its students. We received ABET re-accreditation for our B.S. in Electrical Engineering (EE) and B.S. in Computer Engineering (CpE) programs. We also received for the first time, ABET accreditation of our 100% Online B.S. in EE and B.S. in CpE programs. Special thanks to Dr. Herman Watson, Dr. Gustavo Chaparro-Baquero, and Dr. Wilmer Arellano who successfully led the ABET effort.

ECEDHA

We attended the Electrical and Computer Engineering Department Head Association (ECEDHA) 2023 Annual Conference in Santa Ana Pueblo, NM. We engaged in sessions on topics including the CHIPS Act, Semiconductors, AI, Cybersecurity, and Robotics. Sessions were attended with many vendors and sponsors of ECEDHA present. There were presentations by the Santa Ana Pueblo tribal members. We toured Sandia National Laboratory facilities.



Educational Enhancements

ECE New Courses/Concentrations

FIU | Electrical & Computer Engineering

The ECE department at FIU is adding new undergraduate and graduate courses in the following areas:
(i) Clean Energy,
(ii) Electric Vehicle Engineering,
(iii) Robotics,
(iv) Microelectronics and Semiconductors for the CHIPS Act,
(v) Quantum Engineering.

New courses were added to these concentrations, covering topics in Applied Photovoltaics, Advanced Machine Learning, Signal Processing, Computer Visualization of the Electrical Brain Activities, Quantum Computers, Foundation of Electrical Vehicle Engineering, Smart Mobility with Electric Vehicles, Analysis with Cloud Services, Big Data, Applied Nuclear Engineering, Python Programming, Electronic Warfare, Radar Systems, among others. Some of these courses will be available starting Spring 2024, with new additions continuing in Fall 2024.

ECE Social Media Promotion

Xinyu Yang works for Florida International University - Electrical & Computer Engineering department as a Data/Web Engineer Assistant. He led the data analysis, website construction and social media operation of the ECE department. He collects and analyzes data on student learning and research, supports the department listen to the voice of students, analyzes department registration and development data, and provides developmental insights. With his efforts, Florida International University - Electrical & Computer Engineering department has reached about 1800 followers since he took over the position. We will continue to share more information about the department on our social media!

Scan and follow FIU-ECE Social Media

LinkedIn

X (Twitter)

Aspen Institute's Climate Visit:

Exploring the Future of Resilient Energy at FIU's AIR Microgrid

The Aspen Institute's Miami Climate Conference

For the second year now, Miami has become the home of the annual Aspen Climate Conference where global thought leaders, policymakers, and experts from across fields gather each year to deliberate on strategies to combat climate change. The purpose is to explore innovative solutions, including the role of artificial intelligence and renewable energy, to build re-silience in the face of, and combat a changing climate. As part of this conference, attendees at-tend excursions to many different locations in Miami, and once again, Florida International University's Artificial Intelligence-Based Renewable (AIR) Microgrid, which represents a joint project between Florida Power & Light Company (FPL) and Dr. Arif Sarwat's research group, Energy, Power, Sustainability, and Intelligence's (EPSi), was a top attraction for showcasing energy resilience in an evolving climate and against threats to the power grid. This unique microgrid, which boasts a 1.4MW solar canopy, and 9MWh/3MW grid-forming Battery Energy Storage System (BESS), has not only redefined how we generate and consume energy but also how we prepare for a more sustainable, resilient future.

Florida International University's AIR Microgrid Tour

Attendees of the Aspen Climate Conference had the unique opportunity to tour the cutting-edge facilities on-site at the College of Engineering. This includes multiple EPSi research labs such as 1) the Proactive Analytics and Data-Oriented Research on Availability & Security PANDORAS Lab which is equipped with the actual capabilities of Advanced Distribution Management Systems (ADMS) as used by FPL for managing millions of customers across Flori-da, 2) the Grid Energy Intelligence Exploration Research Lab (GENIE) Lab, which is a state-of-the-art simulation lab that houses OPALRT, and microgrid hardware, thereby providing the capability to test, simulate, and validate inverters, bat-teries, and other grid-based equipment, and 3) the EPSi Wireless Power Transfer (WTP) testbed which is developing both static and dynamic WPT technologies for advancing Electric Vehicle (EV) capabilities. This infrastructure, including the AIR microgrid, is a testament to human ingenuity and FIU's ongoing research to improve the integration of solar and battery storage for advanced grid operations and towards the development of AI-based controllers for optimized grid operations. It's a glimpse into the future of energy grids, where AI will seam-lessly manage the ebb and flow of clean, sustainable power.

Energy Systems Research Laboratory researchers worked on developing Sustainable Power Generation and Secure Distribution Systems for NASA Artemis Mission

Lunar electrical systems, characterized by dynamically changing load and source variables like energy storage state, efficiency, and load priority, necessitate a distributed control architecture and a secure communication network. This network is essential for balancing load and generation, and addressing cybersecurity and communication media challenges for optimal control system operation.

At the Energy Systems Research Laboratory (ESRL) of Florida International University, Prof. Osama Mohammed, Dr. Daniela Radu, and doctoral students Ahmed Soliman and Ibtissam Kharchouf developed a hardware-based lunar power system testbed. This testbed, equipped with moni-toring equipment, embedded controllers, and non-linear loads, facilitates the modeling of various operational scenarios of a Lunar energy system.

The envisaged Lunar power system features a main bus with unique generation modules, distributed loads, and energy storage systems. The primary load consists of in-situ resource utilization (ISRU) production, mining, excavation, and habitats, with future expansions including lunar science experiments and rover charging. Effective control and power management are vital to meet power demands and maximize resource utilization in space microgrids (MGs).

The control system for these MGs, similar to terrestrial MGs, can adopt centralized, decentralized, or distributed techniques. While centralized control faces issues like single point of failure and high demands on computational resources, decentralized control struggles with achieving global optimum. Distributed control, with its scalability and flexibility, emerges as a preferred solution, where each agent communicates with its neighbors towards a collective goal. However, challenges like transmission delays, data loss, and the risk of cyber attacks like False Data Injection Attacks (FDIA), which corrupt data integrity, are significant concerns in the space environment.

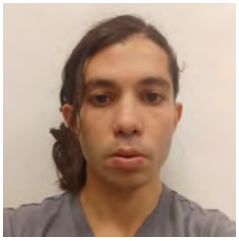
SCADA system controlling the whole ESRL smart grid testbed, a NASA officer visited our ESRL testbed at FIU

FIU ECE Ph.D. First Author Publication Incentive Awards 2023

BAE SYSTEMS

Dr. Deidra Hodges created this award to inspire, encourage and reward the ECE Ph.D. students to publish in high-impact factor journals, as the first author. The goal of this initiative is to motivate our ECE Ph.D. students in their scholarly research activities. The recipients of this award gives a presentation about their research as a part of the acknowledgment of their award. The number of 2023 recipients increased significantly, compared to the inaugural 2022. We thank the sponsors of this year's awards BAE Systems and FIU ECE.

Ahmed Aghmedi



Michail Anastasiadis

Srabanti Datta

Photo Not Available

Md Rakibul Islam

Md Khadimul Islam

Alvi Ataur Khalil

M Al Mamum

Yassine Mekdad

Imtiaz Nasim

Md Rakibur Rahman

Sukanta Roy

Alper Savasci

Ricardo Sendrea

Rashed Shelim

Ahmed Soliman

Pontakorn Sonchan

Md Abu Taher

Md Nurul Anwar Tarek

Deepanshu Trivedi

Md Nazim Uddin

Kefayet Ullah

First Name	Last	Advising Professor(s)	Journal	Title of Publication
Ahmed	Aghmedi	Dr. Osama Mohammad	MDPI Inventions	A Comprehensive Review of Architecture, Communication, and Cybersecurity in Networked Microgrid Systems
Michail	Anastasi-adis	Dr. John Volakis	IEEE Microwave and Wireless Technology Letters	GaN/AlGaN Solid-State Traveling-Wave Amplifier (SSTWA) Operating at *W*-Band
Srabanti	Datta	Dr. Deidra Hodges	IEEE Access	A Comprehensive Review of the Application of Machine Learning in Fabrication and Implementation of Photovoltaic Systems
Md Rakibul	Islam	Dr. John Volakis	IEEE Open Journal of Antennas and Propagation	Packable and Readily Deployable Tightly Coupled Dipole Array (TCDA) With Integrated Planar Balun
Md Khadimul	Islam	Dr. Shubhendu Bhardwaj and Dr. Arjuna Madanayake	Nature Scientific Reports	Generation of vector vortex wave modes in cylindrical waveguides
Alvi Ataur	Khalil	Dr. Mohammad Ash-iqur Rahman	Elsevier Computer Networks	Deep learning-based energy harvesting with intelligent deployment of RIS-assisted UAV-CFmMIMOs
M Al	Mamum	Dr. Sumit Paudyal	IEEE Transactions on Power Systems	Computationally Efficient Dynamic Simulation of Integrated Transmission and Distribution Systems
Yassine	Mekdad	Dr. Selcuk Uluagac	Elsevier Computer Networks	A survey on security and privacy issues of UAVs
Imtiaz	Nasim	Dr. Ahmed S. Ibrahim	IEEE Access	Millimeter Wave Beamforming Codebook Design via Learning Channel Covariance Matrices Over Riemannian Manifolds
Md Rakibur	Rahman	Dr. John Volakis	IEEE Journal of Microwaves	Experimental Demonstration of Interference Mitigation Using Ultra-Wideband Spreading
Sukanta	Roy	Dr. Arif Sarwat	Sustainability	Characterizing Current THD's Dependency on Solar Irradiance and Supraharmonics Profiling for a Grid-Tied Photovoltaic Power Plant
Alper	Savasci	Dr. Sumit Paudyal	IEEE Transactions on Industry Applications	Two-Stage Volt-VAr Optimization of Distribution Grids With Smart Inverters and Legacy Devices
Ricardo	Sendrea	Dr. Stavros Georgakopoulos	IEEE Transactions on Antennas and Propagation	Multifidelity Surrogate Modeling Based on Analytical Eigenfunction Expansions
Rashed	Shelim	Dr. Ahmed S. Ibrahim	IEEE Transactions on Vehicular Technology	Learning Wireless Power Allocation Through Graph Convolutional Regression Networks Over Riemannian Manifolds
Ahmed	Soliman	Dr. Osama Mohammad	IEEE Transactions on Industry Applications	Experimental Validation for Artificial Data-Driven Tracking Control for Enhanced Three-Phase Grid-Connected Boost Rectifier in DC Microgrids
Pontakorn	Sonchan	Dr. Armando Barreto	MDPI Sensors	Benchmarking Dataset of Signals from a Commercial MEMS Magnetic–Angular Rate –Gravity (MARG) Sensor Manipulated in Regions with and without Geomagnetic Distortion
Md Abu	Taher	Dr. Arif Sarwat	IEEE Access	Analyzing Replay Attack Impact in DC Microgrid Consensus Control: Detection and Mitigation by Kalman-Filter-Based Observer
Md Nurul Anwar	Tarek	Dr. Elias Elwan	IEEE Journal of Microwaves	Improving Isolation in Monostatic Simultaneous Transmit and Receive Systems Using a Quasi-Symmetrical Self-Interference Cancellation Architecture
Deepanshu	Trivedi	Dr. Alex Krasnok and Dr. Arjuna Madanayake	Applied Physics Letters	Fano-qubits for quantum devices with enhanced isolation and bandwidth
Md Nazim	Uddin	Dr. Elias Elwan	IEEE Open Journal of Antennas and Propagation	A Reconfigurable Beamsteering Antenna Array at 28 GHz Using a Corporate-Fed 3-Bit Phase Shifter
Kefayet	Ullah	Dr. John Volakis	IEEE Journal of Microwaves	RFSoC-FPGA Realization of a Code-Multiplexed Digital Receiver (CMDR) Using 1-ADC/Quad-Channel

Industry Advisory Board and Partnerships

Sal Pazhoor
President & CTO of NAZTEC International Group
Over 30 years of experience in business management, information technology, elections industry, manufacturing technologies, quality systems, international trade, and various engineering disciplines
Holder of 19 product invention patents granted by the United States Patent

Sherneatha Youngblood
Executive Director
Chase Investment Bank – Merchant Services Production Management
Chair Emeritus for BOLD Tampa
Active member of the Voices of Those Who Served (VETS)
Senior Sponsor of Florida International University (FIU)
Mentor for the Big Brothers Big Sisters (BBBS) School to Work Program

Dr. Juan M. Gers
Founder of GERS
Served as a professor at Florida International University, Gonzaga, Penn State, and University of Valle
Held the position of Viceminister of Mines and Energy of Colombia in 2002
Author of the book "Distribution System Analysis and Automation" (2nd Ed), Co-author of the book "Protection of Electricity Distribution Networks" (4th Ed)
Chartered Engineer of the IET and IEEE Senior Member

Dr. C.J. Reddy
Dr. Reddy is a Fellow of IEEE, Fellow of ACES (Applied Computational Electromagnetics Society) and a Fellow of AMTA (Antenna Measurement Techniques Association)
Associate Editor for IEEE Open Journal of Antennas of Propagation
Chair of IEEE APS Young Professionals Committee

Dr. Dan Ewing
Dr. Dan Ewing received a BS in Materials Engineering from Brown University, and a MS and PhD in Materials Science and Engineering from Carnegie Mellon University. He has more than 15 years of experience in thin films processing, integrated circuit and microelectronic device fabrication and characterization. His current projects include novel GaN devices, utilizing nanoscale material properties for sensing applications, including ink jet printed nanomaterials for optical and chemical sensing, and magnetic thin films for detecting magnetic fields. Prior to joining KCNSC, he was a post-doctoral fellow at the Army Research Lab in Maryland, and a process integration engineer at Northrop Grumman Electronic Sys-tems in Baltimore. Member of IEEE

Carlos Perez-Crissien
Senior Project Manager at CEMEX
In charge of the Electrical Engineering for capital projects related to CEMEX USA Aggregates Operations
Electrical Engineering Bachelor's degree and a Master of Business Administration from Florida International University

Kane Crisler

Physicist, Electrical Engineer, and former federal law enforcement. Professional experience in LASER/Detector physics, signal processing, embedded design, cyber security and investigations and president

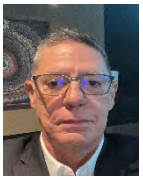
Marc Banghart

Senior Technical Fellow with KBR (KBR.org) and leads the Advanced Analytics and Cloud Program within the Defense Systems Engineering Business Unit. Ph.D. in Industrial and Systems Engineering from Mississippi State University

Riaz Merhant

Founder and CEO of Mertech Data Systems

MS in Computer Engineering from Florida International University (1993)



Alexander Elorriaga

Chairman of SimpleTV

Partner of Scale Capital

Dr. Ali Hadjikhani

Hardware engineer at Google

Ph.D in Electrical Engineering at FIU under the supervision of Dr. Sakhrat Khizroev

Postdoc at University of California, Berkeley

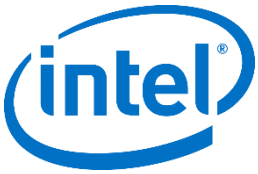
Dr. Vikram Kapoor, University of Central Florida

Mr. Randy Fraser, Ford Motor Company

Mr. Andres Lacambra, Senior Director, ASTRO Devices, Motorola Solutions

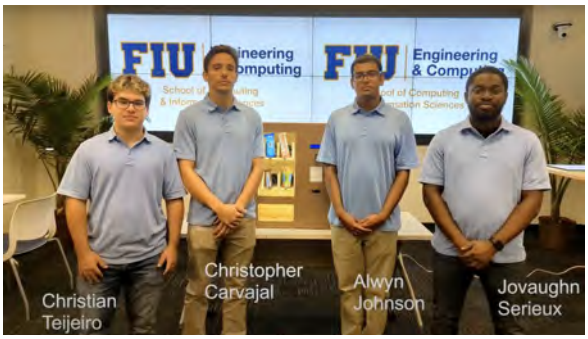
Dr. Subbarao Wunnava, Prof. Emeritus Distinguished, ECE Dept., Florida International University

Industry Advisory Board and Partnerships



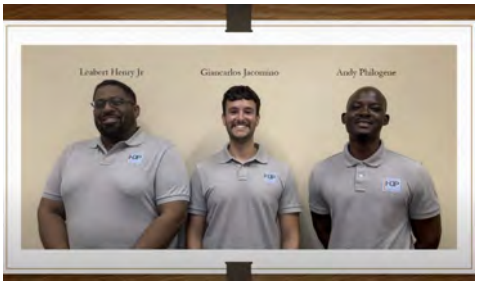
Sirius XM Radio	TEN, LLC	Consolidated Nuclear Security, LLC	Intel	Cisco
ManTech International Corporation	Packet Forensics	Altair	Lockeed	Tesla
Energy Service, INC	Prisma Technologies Corporation and Scale Capital	Mertech Data Systems	Florida Power & Light	Space X
Naztec	PLC Power	Microsoft	BAE	Meta
The Ohio State University	JP Morgan Chase	Google	Nexter	Twitter
KBR, Inc	U.S. Dept. of Energy	IBM	AWS	CESI
Cemex				

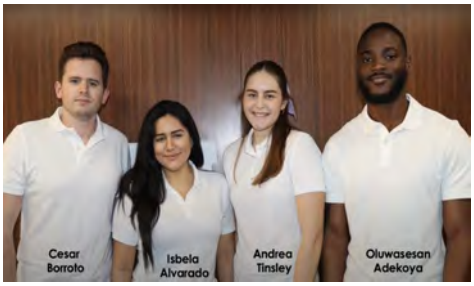
2023 FIU Senior Design Showcase

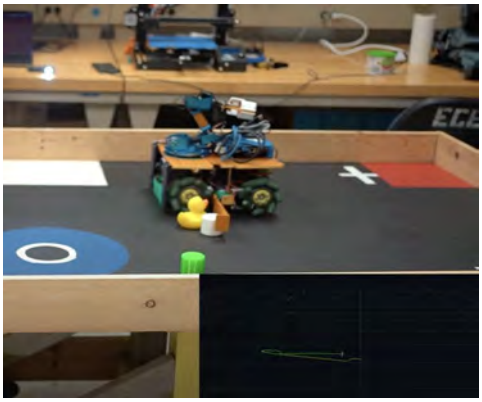


Voice Activated Vending Machine

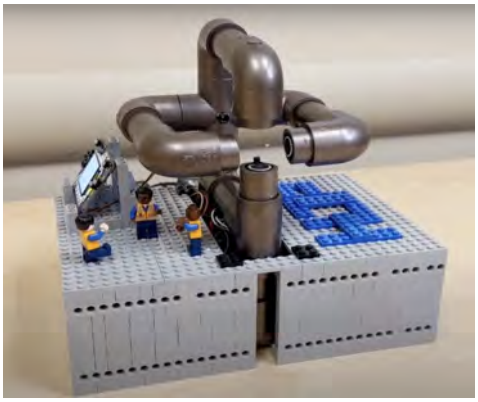
Hostile Environment Low Profile Emergency Rover (HELPER)







AMIRA Autonomous Robot Vision and Control



Acoustic Levitation

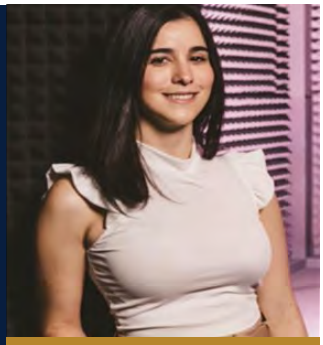
Enhanced Sensory Glove

Student Success

Md Nazim Uddin

In the summer of 2023, Md Nazim Uddin completed an 11-week internship as a research scientist intern at Meta. During this internship, he focused on reducing the Envelope Correlation Coefficient (ECC) of a MIMO (Multiple Input, Multiple-Output) antenna within a compact system. Nazim started his Ph.D. program in Electrical Engineering at FIU in 2021 under Dr. Elias Alwan's supervision. His research focuses on 5G mmWave antennas, reconfigurable beam steering, aperture-shared antenna, and antenna design using a machine learning approach.

Marisol completed a 10-week internship with Northrop Grumman's APD Team at Space Park, California, where she worked as an antenna engineering intern. Her responsibilities included serving as a backup antenna designer, documenting the antenna testing ranges, and assisting with the post-processing of tested coupons from one of the antenna ranges. Additionally, she contributed to the team by working on improving the website before its rollout. Marisol's internship provided valuable experience and insights into the field of aerospace engineering, contributing to her professional growth.



Marisol Roman Guerra

Tatiana Valera

Tatiana interned for 12 weeks at the Electromagnetic Spectrum Sciences Division in the U.S. Army Combat Capabilities Development Command (DEVCOM) Army research laboratory throughout Summer 2023. She focused on miniaturized, wideband antenna designs for Global Positioning Systems/Global Navigation Satellite Systems during her internship. Tatiana is now a second-year graduate student of Dr. Volakis at FIU's RF Communications, Millimeter Waves, and Terahertz lab. Her research focuses on reconfigurable antennas and space-based imaging. In her two years of graduate research, Tatiana has published her work at the International Symposium on Antennas and Propagation and the National Radio Science 2023 conferences.

John, a driven undergraduate student in Electrical Engineering at Florida International University (FIU). In the summer of 2022, he undertook an on-site internship at the prestigious Y-12 National Security Complex, known for its critical role in national security. His impressive performance during this internship and subsequent involvement with ASTERIX paved the way for his transition to a Ph.D. program. John secured a coveted fellowship with McNair and is currently in the process of applying to Georgia Tech for a Ph.D. in Robotics, showcasing his commitment to advancing knowledge in his chosen field.

John Marcial

Student Success

Tinsley Elizabeth Defrost

Tinsley, a Ph.D. student in Electrical Engineering at Florida International University, has had a notable first year with significant academic and professional accomplishments. During the summer of 2022, she completed a remote internship at Los Alamos National Laboratory (LANL), where her outstanding performance fostered a strong collaborative relationship with the lab's researchers. Her success at LANL led to a Graduate Research Assistant position in the summer of 2023, funded by renewed BES funding, allowing her to continue her research there for the rest of her Ph.D. program. Tinsley's research focuses on the electrical properties of oxides, which is crucial for improving energy technologies such as solid oxide fuel cells, batteries, and electrolyzers. Her work aims to advance sustainable and efficient energy solutions. Additionally, within a year, she contributed to eight publications and conferences, including an original research paper as the first author.

Rashed Shelim

During a ten-week internship at Nokia Bell Labs, Rashed Shelim focused on 5G and cognitive network optimization, particularly enhancing the Near real-time RIC in the 5G access network using O-RAN architecture. The project aimed to integrate dynamic status indicators from XR-type applications into the controller for predictive network insights. Key goals included adapting frame sizes to network conditions, ensuring timely delivery, and generating accurate predictive insights for network management. He achieved significant milestones, demonstrating the feasibility of the approach with an inference latency of less than 5.7 milliseconds per flow. His machine learning solution predicted critical network metrics with over 98% accuracy. The highlight of his internship was a proof-of-concept demonstration showcasing predictive insight generation for frame management in a 5G RAN emulation environment.

Alexander Stevenson

Alexander Stevenson, a Ph.D. student at FIU under Dr. Arif Sarwat, began a yearlong internship in March 2023 at the National Renewable Energy Laboratory (NREL). His research focuses on hardware in the loop testing, rapid control prototyping, and machine/reinforcement learning, aligning with his work at FIU's EPSi group on AI-based Renewable Microgrids. Initially working remotely, Alexander developed physics-based models for machine learning code and real-time simulations, which were tested at NREL's Flat Irons facility in Boulder, Colorado. During his summer on-site work in Denver, he collaborated on various projects involving renewable energy sources like wind, hydro, solar power, and battery storage. A significant achievement of his internship was developing a reinforcement learning method to enhance physical hardware emulation in power plant modeling, which will be presented at the AAAI Fall Symposium Conference in October 2023. Alexander's NREL internship will continue until Spring 2024.

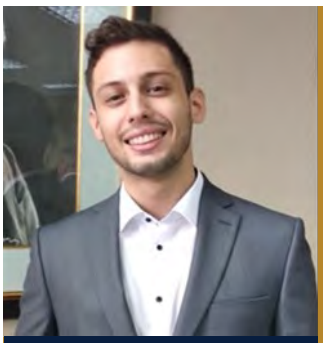
Student Success

Ahmed Soliman

ECE Doctoral Candidate Ahmed Soliman at FIU won first place in multiple national and international IEEE conferences for his groundbreaking research in data-driven intelligent control algorithms for DC microgrid applications in renewable energy integration. His work, tested as part of a NASA project at ESRL, FIU, has led to a pending US patent and several journal articles. Key achievements include winning at IEEE IECON 2022 in Brussels for his paper on data-driven based power converters control; first place at IEEE Region 3 Southeast Conference 2023 in Orlando for his work on SCADA security; and first place award at the IEEE EEEIC 2023 in Madrid for his research on inverter-based resources. Soliman is also a recipient of the IAS AMTGP Grant in 2022, 2023, ECE 1st author publication award and FIU DYF Spring 2024.

In the SeRLoP Research lab, researchers, including Ph.D. student Md Sadik Awal, are exploring "impedance leakage," a new security concern and tool in the realm of connected device hardware. This concept refers to how impedance, or a circuit's opposition to alternating current, can inadvertently leak sensitive data. As devices operate, their impedance fluctuates, revealing information about their internal processes. Awal demonstrated at the HOST conference that by monitoring these variations, particularly in embedded processors executing cryptographic algorithms, attackers could potentially deduce data and encryption keys.

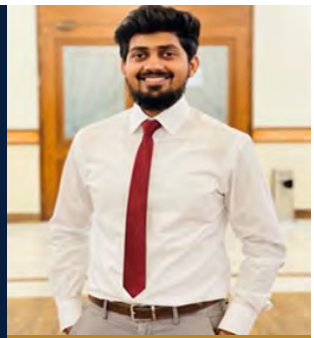
Md Sadik Awal



Dimitrios Lialios

Dimitrios Lialios was selected as one of the ten FINALISTS to the 2022 IEEE International Symposium on Phased Array Systems & Technology Student Paper Competition for his paper ‘A New Class of Ultra-Wideband Beamforming Networks for sub-6 GHz Bands.

Muhammad Hamza was selected as one of the ten FINALISTS amongst 221 papers submitted to the 2023 IEEE AP-S Student Paper Competition for his paper ‘A 33–101 GHz Ultra-Wideband Tightly Coupled Monopole Array (TCMA)’.



Muhammad Hamza

Congratulations Class of 2023!

Congratulations to all 2023 engineering and computing graduates! This induction is not merely a ceremonial act but a pivotal milestone for students in the Department of Electrical and Computer Engineering. This is a new beginning, and we bless our ECE graduates for a bright and impactful future. No matter where your career leads you, FIU ECE is always your home!

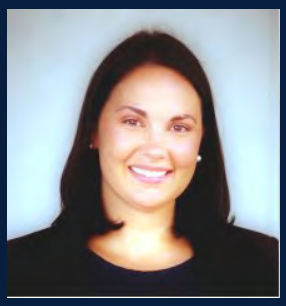
ECE Staff

Ms. Xiang Li has been the Lab Manager (Level-2) of the ECE department for more than 18 years. She is employed in the role of AFSCME employee. She used to work for Acer and Alienware, two major global computer manufacturers, as a Senior Engineer, Lab Manager, and Laptop Development Manager for 11 years, and she specialized in product development, multiple functions, and technical training. She is in charge of the management, maintenance and upgrading of lab equipment. She is also our ECE webmaster for two web design systems, she keeps our website always up-to-date, professional, and user-friendly. She is the ECE media support, big poster designer, in charge of poster print, and design SDII moves for the department.

Ms. Layla El-Hilu is a Program Specialist working for the School of Electrical, Computer and Enterprise Engineering. She provides administrative support to the Graduate Program Director for the M.S. programs, distributes information, She manages the M.S. in Network Security program working closely with the Program Director for the program, FIU Online, and the Division of External Programs for the College of Engineering and Computing to hold monthly information webinars, enroll students in courses, and interacts as a liaison between students and various University personnel to communicate on a variety of logistics and resolving problems when it pertains to students. She also assists the ECE department with processing travel arrangements, travel reimbursements. requisitions, purchasing and assisting graduate students by addressing their questions and concerns.

Gilda Castillo is a Program Specialist. She provides administrative support to the Chair and Department leadership. She serves as a point of contact to faculty and students to assist them with their needs. She prepares monthly reconcil-iation, provide details on transactions as needed for account reconciliation, budgeting, and reporting purposes, create purchase requisitions in People Soft, tracks purchase orders and confirm for payment to vendors. She prepare schedules and travel arrangements for the Department. She prepare agendas, flyers for seminar speakers, help the designated School Events Liaison with the preparation of School and College-wide events, such as the Senior Design Expo, Induction, and others. She maintains Department office supplies inventory and processes office supplies orders, Obtain & collect Master graduate information data, and answer phone calls.

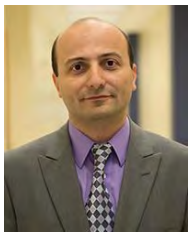
Ana Munoz is a Program Specialist. She assist faculty and students with their needs. She creates purchase requisitions or purchase items needed for a project. She input invoice information into FIU system for payment. She prepare Travel Authorization Requests, agendas, expense reports, monthly reconciliation and credentialing requests. She disseminate, and obtain & compile PH-D graduate information data. She is responsibe for transfer of charges, and answer phone calls.



Luisa Ruiz serves as the Program Manager for the School of Electrical, Computer and Enterprise Engineering. She works closely with the school Director to establish goals, priorities, and strategies for the school's two departments future growth. Ms. Ruiz assists the ECE department with travel arrangements, travel reimbursements, requisitions, procurement, financial activities, and assists the department's Graduate Program Directors with preparation and information as needed as well as responding to potential future student inquiries. She is responsible for managing all things related to students on graduate assistantships including issuing offer letters, providing paperwork for students to complete their on-boarding, submitting contracts, assisting with holds and enrollment, and ensuring that students questions and concerns are addressed.

Faculty Research Interests

Malek Adjouadi
Research Interests: Image Processing, Neuroimaging, Machine Learning and Assistive Technology



Kemal Akkaya
Research Interests: Network Security, Internet of Things, Cyber-Physical Systems Security, Blockchain

Mohammad Shah Alam
Research Interests: Wireless Communication and Networking, Internet of Things, Grid Modernization

Elias Alwan
Research Interests: Antennas, RF System, Millimeter-wave, Secure 5G Commu-nication Systems

Jean H. Andrian
Research Interests: Application of Category Theory on Modeling Complex Sys-tems

Wilmer Arellano
Research Interests: Electronic Design, Vehicular Ad Hoc Networks (VANETs), VANET Simulations

Ou Bai
Research Interests: Autonomous Systems, Robotics, and Control, Biomedical Sensors, Signals, and Systems

Mandrita Banerjee
Research Interests: Hardware-assisted security of processor and IoT security

Armando Barreto
Research Interests: Digital Signal Processing and Image Processing

Shekhar Bhansali
Research Interests: Micro/ Nanotechnology with a Special Interest in Biomedical Sensors

Amaury Caballero
Research Interests: Electrical Communication, Control Systems, Construction Management

Mercedes Cabrerizo
Research Interests: Signal and Image Processing

Gustavo Chaparro-Baquero
Research Interests: Computer Organization and Architecture, Real-time Systems and Applications, Embedded Systems

Mehmet Hazar Cintuglu
Research Interests: Energy storage, microgrids, multiagent systems, and cyber -physical security of power systems

Hai Deng
Research Interests: Networking Commu-nication, Radar Signal Processing, MIMO Radar, and Radar Networks

Yu Du
Research Interests: Wireless Communication, Internet of Things, Engineering Education

Ahmed Ebrahim
Research Interests: Power Electronics Control, Renewable Energy Integration, Smart Grid, Energy management

Juan Farah
Research Interests: Real Time Transmission System Contingency Analysis, Transmission Constraints and Bulk Energy Management Systems

Trina Fletcher
Research Interests: Data science, longitudinal analysis, DEI in engineering and computing education

Luis Galarza
Research Interests: Image Processing, Signal Processing, System Design

Faculty Research Interests

Stavros V. Georgakopoulos
Research Interests: Origami Antennas, Wireless Power Transfer, Wearable Antennas

Mehdi Hatamian
Research Interests: CMOS Integrated circuits and SoC systems, Biomedical electronics, and cancer screening technologies

Deidra Hodges
Research Interests: Quantum Circuits, Optoelectronic Devices, Photovoltaics and Radiation Detectors

Seng Hong
Research Interests: Antenna Array, Radar Systems, Electronic Warfare Technology

Ahmed Ibrahim
Research Interests: Wireless Communication and Networking with Emphasis on Millimeter Wave and Vehicular Communications

MD Shafiul Islam
Research Interests: Artificial intelligence, robotics, embedded system, FPGA, DSP, renewable, and biomedical engineering.

Aleksandr Krasnok
Research Interests: Photonics, Quantum Optics, Quantum Physics

Grover L. Larkins
Research Interests: R&D of Cryogenic Communications Systems intended for space-based applications

Arjuna Madanayake
Research Interests: Multidimensional Signal Processing, Antenna Array Processing and Phased-array Technologies

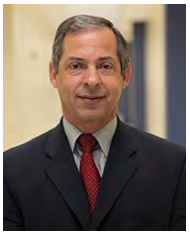
Osama A. Mohammed
Research Interests: Solving the Smart Grid Operation and its Communication

Mubarak Mujawar
Research Interests: IoT, Wearable Sensors, Micro/nanofabrication, MEMS, Engineering Education

Nonnarit O-Larnnithipong
Research Interests: Digital Signal Processing, MEMS Inertial Sensors, Human-Computer Interactions

Nezih Pala
Research Interests: Integrated Nanotechnology and Biotechnology

Sumit Paudyal
Research Interests: Power and Energy Systems, Smart Grid, Cyber-Physical Systems



Alexander Pons
Research Interests: Cybersecurity, IoT, Networking and Embedded Systems

Vladimir Pozdin
Research Interests: Wearable Health Monitoring In-situ Sensing Organic Electronics Flexible Inorganic Devices

Gang Quan
Research Interests: Real-time computing system design, advanced computer architecture, cloud computing

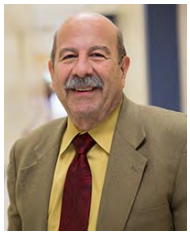
Mohammad Ashiqur Rahman
Research Interests: Security and Resiliency Analysis and Design, Cyber-Physical Systems/Internet of Things, Computer Networks

Md Tauhidur Rahman
Research Interests: Hardware Security and Trust, Emerging Memory Technologies, Reliability

Pulugurtha Markondeya Raj
Research Interests: Electronic and bioelectronic systems, RF/5G Components

Faculty Research Interests

Reynaldo Max Padro
Research Interests: Engineering Entrepreneurship



Gustavo Roig
Research Interests: Engineering Education, Human Potential Development

Arif I. Sarwat
Research Interests: Smart Grids, Smart Cities, High-penetration Renewable Systems, Microgrid, Critical Infrastructure, EV and Security

Mst Shamim Ara Shawkat
Research Interests: VLSI Circuit Design, Neuromorphic Computing Hardware, Photodetector design, Integrated Smart Sensors for Biomedical Applications

Jayesh Soni
Research Interests: Artificial Intelligence and Cyber Security

Atoussa H. Tehrani
Research Interests: Computer Architecture, Embedded Systems, Data Communi-cations

A. Selcuk Uluagac
Research Interests: Cybersecurity, Security of IoT, Security of Cyber-Physical Systems

Himanshu Upadhyay
Research Interests: Artificial Intelligence, Machine Learning, Deep Learning, Big Data, Visualization, Cybersecurity, Advanced Cyber Analytics, Memory Forensics

Frank Urban
Research Interests: Ellipsometry; Beta Gallium Oxide Endocrinology; Cortisol Modeling Biomechanics: Fatigue Modeling

Rafael Soltero Venegas
Research Interests: Engineering Entrepreneurship

Satheesh Bojja Venkatakrishnan
Research Interests: In-band full duplex techniques, Interference Mitigation, wireless communications, remote sensing, and bio-medical sensing and systems

John Volakis
Research Interests: RF/ Electromagnetics, Medical Sensing, Antennas & Communications

Herman Watson
Research Interests: Embedded Systems, ARM, Biomedical Sensors

Kang K. Yen
Research Interests: Control Systems and Cyber-Physical Systems

Konstantinos Zekios
Research Interests: Theoretical & computational electromagnetics, Antennas, Microwave engineering

Yuri Vlasov (Retired)
Research Interests: Solid State Physics, MEMS, Sensors, Nanotechnology

Subbarao Wunnava(Retired)
Research Interests: Data Communication and Networking, VLSI

FIU Engineering & Computing
Electrical and Computer Engineering

Florida International University
College of Engineering & Computing
Department of Electrical and Computer Engineering
10555 West Flagler Street, EC 3900

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