



Department of Physics and Engineering

Alumni Newsletter

Featured Alumnus: Mike Scarangella



Mike Scarangella is the Director of Systems Technology at Lockheed Martin, where he leads an organization specializing in cyber, data analytics, and innovation. With a 24-year career at Lockheed Martin, Mike has held roles of increasing responsibility in systems engineering, software engineering, and as a chief engineer. Throughout his career, Mike has focused on developing mission systems across fixed and rotary-wing aircraft, aligning architectures and solutions for different programs and customers. He holds a B.S. in Computer Engineering from the University of Scranton, where he was the first student to graduate from the newly introduced program.

During his time at Scranton, Mike was active in IEEE, led the Men's Volleyball club team, and served as a Resident Assistant. As a Long Island native, he moved to upstate New York after college to begin his career at Lockheed Martin. At Lockheed Martin, Mike was accepted into their Engineering Leadership Development program, which allowed him to rotate into different engineering roles while completing a Master's in Systems Engineering from Cornell University. He currently lives in Vestal, New York with his wife Rosalie (class of '01) and their children, Ryan (17), David (15), and Julia (11).

Dr. Chi-Hou Lei, a recent addition to the University of Scranton from Saint Louis University, brings a unique blend of expertise in mathematics, applied physics, and engineering mechanics. His research is centered on multi-physics modeling and computational design of multifunctional materials. These advanced materials, such as shape memory alloys, ferroelectric, ferromagnetic, electrocaloric, and ion batteries, are studied at various length and time scales.

Dr. Lei's use of phase-field models and simulations to understand the influence of microstructures on the physical properties of materials has led to significant advancements in material optimization and control. His work has been published in journals such as Applied Physics Letters, Acta Materialia, Science Advances, and Nature Communications. He also works on material characterization using microscopy at micro- and nanoscales.

At his previous institution, Dr. Lei was inspired by his colleagues to engage in cross-multidisciplinary research. This collaborative spirit led him to apply mechanics and computational methods to develop a real-time adjustable air-cell cushion system and a variable-stiffness ankle foot orthosis for rehabilitation. Beyond his academic pursuits, Dr. Lei is passionate about educational outreach. He organizes interactive science sessions for K-12 students to engage in science and engineering.

New Faculty: Chi-Hou Lei





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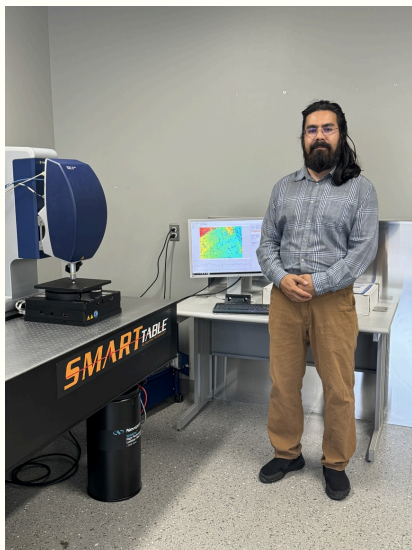
Dr. Frissell Leads NASA-Selected Eclipse Study

NASA, the National Science Foundation (NSF), and other grants awarded to Nathaniel Frissell, Ph.D., assistant professor physics and engineering at The University of Scranton, have supported the development of an international network of ham radio operators to collect and monitor changes in the ionosphere. In the Fall of 2023, the University installed state-of-the-art ham radio equipment and antennas on the roof of The Loyola Science Center, supported by an Amateur Radio Digital Communications (ARDC) grant awarded to Dr. Frissell.



Dr. Frissell's project for ham radio operators to collect transmission data during the eclipse was one of just five projects selected by NASA for the study of the total solar eclipse. As the students viewed the eclipse from the fifth floor of the Loyola Science Center, they used the ham radios in the studio to connect with a network of ham radio operators in order to collect data of changes in the Earth's electrically charged upper atmosphere that occur during the eclipse.

Optical Profilometer Acquisition



Dr. Mojib Saei has recently acquired an optical profilometer (also known as an optical surface profiler) for surface characterization applications. An optical profilometer is a non-contact instrument that measures the surface profile of an object by capturing its features as a surface. This instrument, which has comparable resolution to that of an SEM/AFM (X-Y resolution of 60 nm and vertical resolution of 2 nm), will be used to create 3D images of the surface of various samples. Additionally, this machine is unparalleled in surface analysis capabilities, enabling the user to report 1D, 2D, and statistical parameters of the surface. The nominal value of the machine and the accompanying isolation system (optical table) is close to \$200,000.

This machine can be used to characterize the surface of samples ranging in roughness from nanometers to microns. Additionally, samples with minimum surface preparation are appropriate for this machine. This significantly improves the user-friendliness of this setup in comparison to other characterization methods such as SEM and AFM. This machine will be used to study the surface characteristics of different manufacturing processes, where manufacturing parameters will be optimized to produce ideal surface quality. This machine will also become an integral part of the Manufacturing Processes course, where students will study the surface of polymeric samples as well as metallic samples produced through machining, welding, and casting.





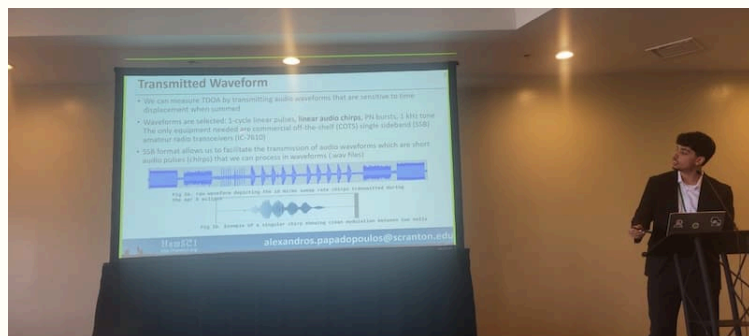
Students Present Research at National Conference

Eight students and Dr. Nathaniel Frissell presented research at the National Science Foundation CEDAR (Coupling, Energetics, and Dynamics of Atmospheric Regions) Workshop in San Diego, California, this past June. Four of the students also joined Dr. Frissell to attend and present research at the NASA Living with a Star Interhemispheric Asymmetries Meeting at the Laboratory for Atmospheric and Space Physics in Boulder, Colorado, in May.



James P. Fox, Hillsborough, New Jersey, a computer science major at Scranton, presented his research titled "Detection of SuperDARN-Observed Medium Scale Traveling Ionospheric Disturbances in the Southern Hemisphere" in poster and oral presentation formats at the National Science Foundation CEDAR Workshop. He also attended and presented with Dr. Frissell at the NASA Living with a Star Interhemispheric Asymmetries Meeting at the Laboratory for Atmospheric and Space Physics in Boulder, Colorado.

Nicholas Guerra '24, Scranton, who earned his bachelor's degree in computer science from Scranton in 2024 and is pursuing a master's degree in software engineering here, presented his research poster titled "Implementation of the Revised SuperDARN MSTID MUSIC Algorithm in the DARNtids Analysis Toolkit" at the National Science Foundation CEDAR Workshop. He also attended and presented with Dr. Frissell at the NASA Living with a Star Interhemispheric Asymmetries Meeting at the Laboratory for Atmospheric and Space Physics in Boulder, Colorado.



Michael Molzen, Bloomsbury, New Jersey, a physics major at Scranton, presented his research poster titled "MSTID Activity During January 2016 Detected by the SuperDARN MUSIC Algorithm" at the National Science Foundation CEDAR Workshop. He also attended and presented with Dr. Frissell at the NASA Living with a Star Interhemispheric Asymmetries Meeting at the Laboratory for Atmospheric and Space Physics in Boulder, Colorado.

Cuong Nguyen '23, Ashley, earned a Bachelor of Science degree in computer engineering and computer science from Scranton in 2023 and is now pursuing a master's degree in software engineering. He presented his research titled "Software Development for the Grape Personal Weather Station v2" in poster and oral presentation formats at the National Science Foundation CEDAR Workshop.

Alexandros Papadopoulos, Scotrun, a computer engineering major at Scranton, presented his research titled "Analysis of the HamSCI Solar Eclipse High Frequency Time Difference of Arrival Experiment Observations Using Automated Techniques" in poster and oral presentation formats at the National Science Foundation CEDAR Workshop.

Gerard N. Piccini, Monroe Township, New Jersey, an electrical engineering major at Scranton, presented his research titled "A Low-Cost Low-Power Chirp Ionosonde for Studying Eclipse Ionospheric Impacts" in poster and oral presentation formats at the National Science Foundation CEDAR Workshop.





Student Internships, Graduate Programs, and Employment Highlights

Robert Brudnicki (CE '24) - Schott Advanced Optics
Matthew Dittmar (CE '24) - Constellation Power
Andrew Geise (ME '24) - Texas State University
James Harrington (ME '24) - Power Systems Manufacturing
Tyler Kover (PHYS '24) - University of Central Florida
Logan McGowan (ME '24) - U.S. Patent and Trademark Office
John Nelson (CE '24) - Lumen Technologies
Mitchell Sporing (ME '24) - Jesuit Volunteer Corps

Evan Hromisin (EE '25) was awarded an internship with Unison Industries, a GE Aerospace Company, in Norwich, NY. This was his second rotation within the General Electric Aerospace family, spending last summer at the headquarters located just outside of Cincinnati, OH. Unison is a global supplier to nearly every aviation engine and airframe program for both commercial and military operations. Their vast portfolio of products includes industry leading permanent magnetic alternators/generators (PMAs/PMGs), solid state ignition systems, temperature and speed sensors, and more. There is about an 85% chance that a commercial plane's FADEC is being powered by a PMA/PMG manufactured in Unison's Norwich plant.

Evan spent his summer as a member of the Sensors team. He had the opportunity to work on variety of projects that exposed him to new perspectives and allowed him to learn about many different products. One of his most notable projects involved designing and constructing a rig for testing a military optical sensor according to the Acceptance Testing Procedure (ATP). The ATP is a series of tests that verifies that the sensor meets the stated performance requirements under various conditions. The challenge is designing the rig such that the sensor can be efficiently and accurately tested. An important piece of that challenge is eliminating as many sources of human error that can be introduced by the operator testing the sensor as possible.

This project allowed Evan to gain a great deal of experience in design and modeling, process development behind sensor manufacturing, and writing test plans for engineering research purposes.

Zainab Shah (CE '25) was awarded a paid internship at Marvell Technology at their site in Westborough, MA for twelve weeks. Marvell is a semiconductor company that develops and sells technology for data infrastructure. During the internship, Zainab was able to work with a team of Computer and Electrical Engineers in developing a Large Language Model for Verilog code; Zainab was also able to learn about standard chip verification done by the company.



Zainab's work involved writing test benches in Verilog to feed to the LLM created by the engineers. Zainab also created a database for papers and use in the industry. The chips put through the verification process will be used commercially and will act as models for further enhancement.





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Adapted Vehicles Provided to Area Children

Forty University of Scranton students have spent time this semester soldering, drilling, sawing and sewing – and doing whatever else they deemed necessary – to adapt commercially available ride-on cars for use by area children with limited mobility.



The students, who are majoring in occupational therapy and mechanical engineering and range from first-year students to graduate students, presented their altered vehicles to the children at a special community event in the Byron Recreation Center in May. The students are members of the inaugural chapter of The University of Scranton's Go Baby Go, which is a national research, design, and community outreach program that provides modified ride-on cars to children with limited mobility. Through the program, the students use readily available, low-cost items to adapt the toy vehicles.



The Go Baby Go initiative, originating from the University of Delaware, has expanded to become a national, community-based research, design, and outreach program that provides modified ride-on cars to children who experience limited mobility. Through the generosity of the Edward R. Leahy Jr. Endowment, the Occupational Therapy department was able to bring the inaugural chapter of Go Baby Go to the University of Scranton.

"The students used adaptive switches from Home Depot, swim kick pads and foam noodles, plywood and other materials. They learned to drill, solder, saw and upholster as they adapted their children's vehicle. They even used a 3D printer to create some parts," said Stephanie DeNaples, OTD G'17, a faculty specialist in the Occupational Therapy Department at the University who oversees the project and Scranton's Go Baby Go chapter. To recruit children to participate, Dr. DeNaples reached out to various agencies and families at the University and in the greater Scranton community.

The occupational students first met the children in February, when they surveyed their preferences for different types of motorized cars, and assessed the children's fine and gross motor abilities and measured them for fit into vehicles. They were also attentive to the children's preferences, such as their favorite colors, which they also used in their designs.



Throughout the Spring of 2024, the teams of students met with the families to conceptualize, design and execute the necessary modifications to suite each child's needs. The families received education on the use of the cars, and an unveiling event was held in the Byron Center to present the cars to the families.

The majority of the cars received a modification that changed them from being pedal powered to hand powered via a button switch on the steering wheel, while one car was modified to be both powered and steered by a joystick. Other modifications included postural supports, seat cushioning, harnessing, and a 'kill switch' to cut the power supply instantly.





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Hayes Family Science Competition

Over 200 area students participated in The University of Scranton's annual Hayes Family Science Competition for High School Physics and Engineering Students. The academic competition tested the high school students' knowledge of physics and engineering through a series of quizzes and hands-on challenges. Students competed individually and in teams.

Sean Rossi from Crestwood High School came in first place in the individual competition, based on a quiz given to all participants and placement in a Jeopardy game of those with highest quiz scores. Dillon Brace from North Pocono High School came in second place. Christian Segiel from North Pocono High School came in third place.



In the team competition, team three from Berwick High School placed first. Members of that team were: Chris Bowman, Nate Hook, Makayle Brown, Skye Terrones and Emma Czychowski. Matthew Shrader was their coach. Team one from Wallenpaupack High School came in second place. Members of the Wallenpaupack team were: Michael Soskil, Owen Wolff, Manny Caufield, Michael McCloskey, and Josh Rupp. Ryan Neenan was their coach. Team two from Honesdale High School placed third. Members of the third-place finishing team were: Kayla Benson, Bryce Dressler, Avery Ohliger, Liam Miller, Evan Funk, and Zach Meagher. Rebecca Kretschmer was their coach.



The theme for the daylong competition was "energy and motion." High school students participated in teams in a series of hands-on challenges that tested their skills in several areas of physics and engineering, including a Conductivity Event, a Car Launch Event, an Optics Event and Tagging the Mascot Event. The competition was organized by the University's Department of Physics and Electrical Engineering to encourage more students to pursue careers in physics and engineering.

Edward Hayes '61, physics department alumnus, along with his wife Margaret, have provided a charitable trust to ensure that our high school physics competition will continue for many years to come. The Hayes family donations have provided annual funding for our high school physics competition and for department budget enhancements for yearly equipment purchases each year.





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Students Place at IEEE SAC

University of Scranton students earned first- and second-place finishes in all three competitions that took place at the Institute of Electrical and Electronics Engineers (IEEE) Student Activities Conference for a 14-state region and Washington D.C. Hosted by Marshall University in Huntington, West Virginia, on the weekend of Oct. 20-22, the three competitions were the Sumo Bot event, the Hack-5K event, and the Micro Mouse event.



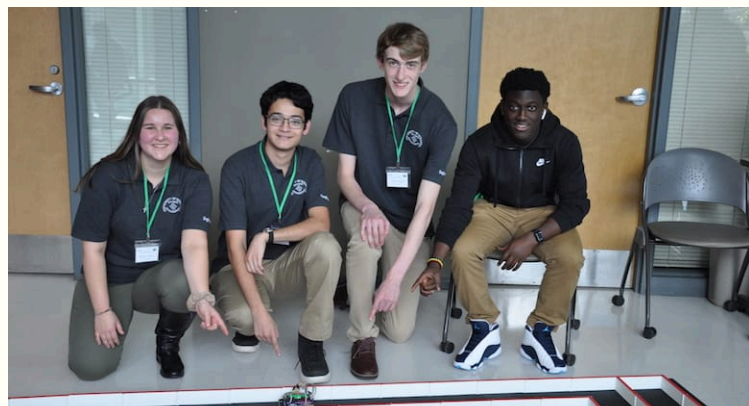
In the Sumo Bot event, students are given a prebuilt bot and tasked with coding it to strategically push the other team's bot out of the ring. The University of Scranton team won first place. Team members were (below, from left): **Matthew J. Felicia** (captain), a computer engineering major from Medford, New Jersey; and **Joseph J. Martini**, an electrical engineering major from Freeport, New York; **Robert D. Troy**, an electrical engineering major from Dunmore; and **Matthew K. Dittmar**, an electrical engineering major from Easton.



In the Hack-5k event, students were given a handful of electronic components and were asked to create an idea and demo for a product that would "push humanity forward." University of Scranton graduate student **Cuong Nguyen**, Ashley, won first-place for his idea and demo. Nguyen, who earned a Bachelor of Science degree in computer engineering from the University in 2023, developed what he called "ColorVista," which was an accessory for a device like an apple watch that could accurately determine the color of an object and display that color's name. Nguyen (below, second from left) is pursuing a master's degree in software engineering at Scranton.



In the Micro Mouse event, teams were tasked with fully creating and coding small robots from scratch to be able to successfully complete a maze challenge. Scranton's team won second place. Members were (below, from left): **Deanna Holbert**, an engineering management major from Simpson; **Gerard Piccini** (captain), an electrical engineering major from Monroe Township, New Jersey; **Carlton J. Hackett**, a computer engineering major from Lansdale; and **Eldridge G. Charway**, a computer engineering major from Piscataway, New Jersey.





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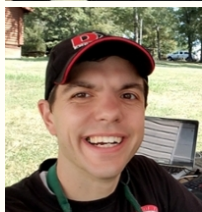
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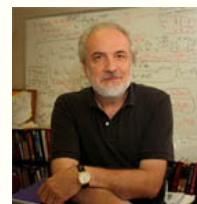
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