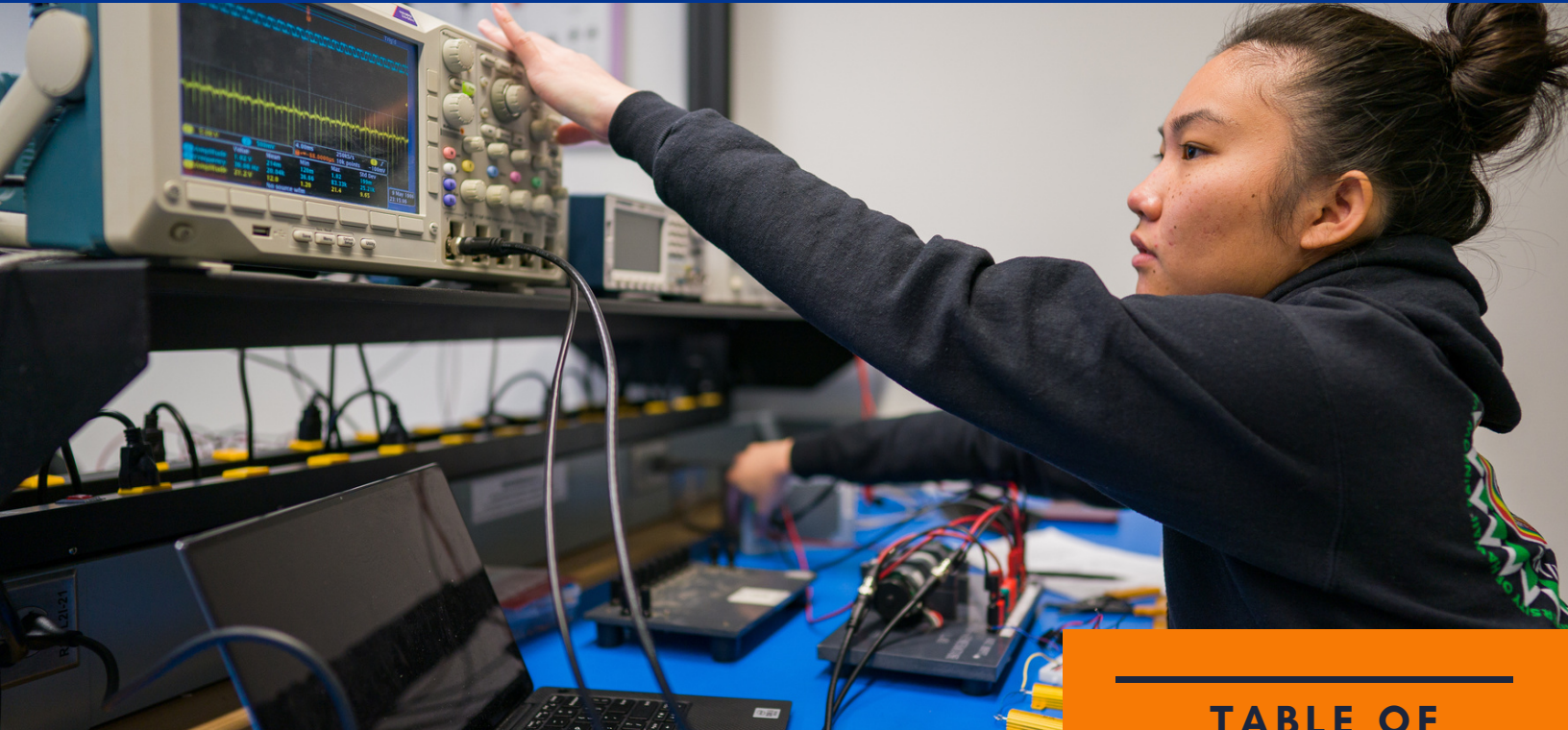


# SIGNALS & NOISE

## DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

ISSUE 2 • MAY 2023



## ECE UPDATES

### WHAT A YEAR!

Biomedical Engineering Club formed in March 2023. Pictured from left to right: Dylan Callahan, Nora Kosakowski (Vice President), Donovan Menick (President), Libby Segal (Treasurer), Erin McDonald (Secretary), and Jackie Wolthers (Officer). Not photo'd Prof. MD Shaad Mahmud (Faculty Advisor), Prof. Diliang Chen (Co-Faculty Advisor) and Prof. Edward Song (Co-Faculty Advisor).



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Check Us Out!



# CHAIRMAN'S CORNER

## Professor John LaCourse



### What A Year!

With an all-out effort to have more of a media and social presence to show our academic and corresponding community, we have filled our social media website page with videos and pictures of students in the laboratories, staff and faculty performing short skits, and more! We couldn't have done it without the recommendation from our IAB to show and advertise our accomplishments and capabilities. Our growing social media presence all started with the resurrection of the Signal and Noise Newsletter. I bring your attention to a few hits with students such as "What the H\*ll is it Wednesday?" with Dr. Messner, ECE got Moxie, and ECE window fishing. If you haven't seen any of these videos, check them out on our Instagram or Facebook!

It has been a busy but an exciting year with ECE and CEPS having over forty events. I offer the following examples: Old Fogey (Emeriti) Day, End of the Year BBQ with all ECE students (UG and G), and faculty, ECE alumni gathering after the URC-ISE, first departmental "Three Minute Defense" with all graduate students, and our ECE graduate game luncheon.



Above: Sabby Clemmons (EE Freshman) was awarded the Research Experience & Apprenticeship Program (REAP) award!

During the past year the professoriate has modified the curricula and requirements for the EE and CE programs and the MSECE, MEng, and PHD programs. Also, the faculty are preparing for an ABET visit in October. Furthermore, we just received approval for a MSECE with a Biomedical Engineering Option which adds a path for students in our present BSEE-BME option and BSCE-BME option. Both baccalaureate options seem to have generated interest causing an increase in freshman enrollment. With student interest, the Department now has a Biomedical Engineering Club.

Yes! It has been a busy year, but we have had help! A large number of alumni and supporters have donated to the ECE department through the 603 Challenge, and we've hired two new work study office assistants, Emily Fandel and Ashley Lescarbeau, who have been a huge help in our social media boost!

Oh! By the way, it appears I have been elected chairman again.

To the right: ECE Faculty Emerti Tom Miller and his wife Vicki were featured on WMUR for 16 years of running the Boston Marathon together.

Image provided by WMUR

<https://www.wmur.com/article/durham-tom-vicki-miller-16th-boston-marathon-nh/43594447>



## UNDERGRADUATE STUDENT HIGHLIGHT

**Paige McAfee** is a freshman studying electrical engineering and computer science. Upon arrival at UNH, all Paige knew about electrical engineering was that she wanted to learn as much as possible. The variety of hands-on experiences and passionate faculty in the ECE department has helped her become more knowledgeable about foundational electrical engineering concepts. So far, her favorite projects have been a presentation she did on FM radio transmitters and an octal to 7-segment LED display lab. Though she has much more to learn, she remains excited and open to all new opportunities. Paige is particularly interested in communications technology.

The ECE department has helped Paige work toward her academic goals in a way no other college could. When she began the application process, UNH was a blip on her radar. What grabbed Paige's attention was everyone's positive, encouraging perspective.

Other colleges she met with weren't willing to accommodate someone who wanted to obtain two bachelor's degrees, whereas UNH and the ECE department welcomed the opportunity. The staff and administration's willingness to listen, consider and envision Paige's goals to help her forge a path ahead made all the difference.

Paige has many interests when she isn't studying. Along with being an accomplished alpine ski racer, she rides motorcycles, snowmobiles, skates, and sews costumes. She has also been known to run a game of D&D from time to time. Some student organizations Paige is in are the Honors College, IEEE, and WUNH. She is very happy to be at UNH; say "hi" if you see her on campus.



## GRADUATE STUDENT HIGHLIGHT

**Alberta Ansah** is a Ph.D student at the Human Computer Interactions lab supervised by Dr. Andrew L. Kun. Her research interests are HCI methods and technologies including virtual reality and eye tracking. She has worked on a number of projects including a study on the impact of Virtual Reality (VR) and mindfulness on creativity, and a study of eye-tracking with collaborative groups. Most recently, she was part of an interdisciplinary research group exploring the effect of distractions on group productivity in online meetings. Her current research is focused on investigating tasks and technologies to support remote work for collaborative groups.

Publications for her research can be found on her [Google scholar](#) page. Alberta is also an active member of the HCI community, currently serving as the Assistant to the technical program chairs and accessibility co-chair of the [CHIWORK](#) symposium. Alberta has also worked as a teaching assistant in the ECE department. She coordinated labs for ECE 401, Perspectives in Electrical and Computer engineering and ECE 543, Introduction to digital systems. Her other interests include cooking, listening to podcasts and spending time with friends and family.

Pictured to the right: Alberta working in the lab



# FACULTY HIGHLIGHT

## Assistant Professor MD Shaad Mahmud

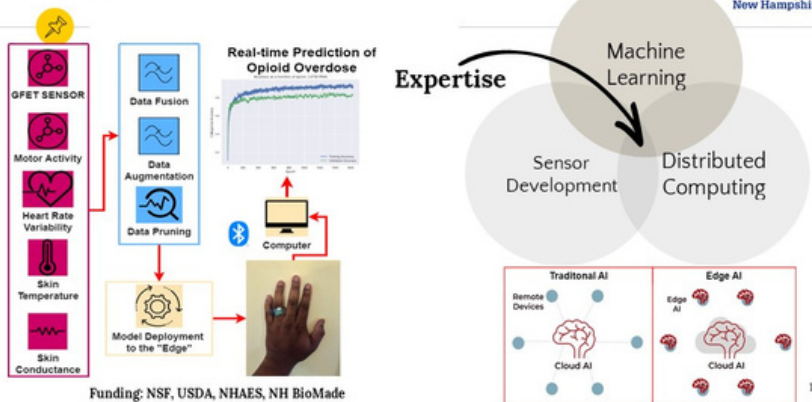
**Assistant Professor Md Shaad Mahmud** is an emerging leader in the area of sensor development and edge machine learning at the University of New Hampshire (UNH). As the director of the Real-time Sensing Lab ([www.rsl.unh.edu](http://www.rsl.unh.edu)), Dr. Mahmud is committed to fostering a culture of diversity, equality, and inclusion among his team, where innovation and talent can flourish. As a faculty member in the Department of Electrical and Computer Engineering (ECE), his research is focused on developing innovative sensor technologies and implementing edge machine learning techniques to improve data analysis and decision-making in various fields.

Dr. Mahmud's research interests are multifaceted, and he has conducted extensive work on wireless sensor networks, Internet of Things (IoT), and machine learning. He has published numerous papers in leading scientific journals, including IEEE Internet of Things Journal, IEEE Transactions on Wireless Communications, and ACM Transactions on Sensor Networks, among others.

One of Dr. Mahmud's notable contributions is his work on developing sensors that can detect environmental pollutants. These sensors use wireless communication technology to transmit real-time data to a central location for analysis. Mahmud's research has important implications for environmental monitoring and public health, as these sensors can provide early warning of hazardous pollutants in the soil or water. His research also extends to edge machine learning, which involves processing and analyzing data locally on the sensor or device, rather than sending it to a centralized server. This approach reduces latency and improves the overall efficiency of data analysis. His work in this area has focused on developing machine learning algorithms that can run on low-power microcontrollers, which are commonly used in IoT devices.



**Real-time Sensing Lab (RSL) : Md Shaad Mahmud (PI)**  
[rsl.unh.edu](http://rsl.unh.edu)



In addition to his research and teaching activities, he has been instrumental in the formation of the biomedical engineering option and club under the Electrical and Computer Engineering (ECE) department at UNH. As a faculty advisor of the club, he has been actively involved in promoting cross-disciplinary collaborations and facilitating hands-on learning experiences for students interested in the intersection of engineering and medicine. His leadership and vision have helped to establish a vibrant community of students and faculty engaged in cutting-edge research and innovation in the biomedical field. His contributions to the ECE department and the broader UNH community are a testament to his commitment to excellence in teaching and research.



# ALUMNI HIGHLIGHT

## David Drouin – MS ECE degree in 1989

I graduated from UNH with a BS degree in Physics in 1986, and decided to pursue my interest in electrical engineering in the MS ECE degree program. Right after graduating with a MS ECE degree in 1989, I moved out to California to work in Silicon Valley. My first job was at Verbatim/Kodak as a Test Engineer working on the development of a magneto-optical disk drive. Since this time, my career has had a focus on data storage. I have enjoyed being responsible for everything from servo control firmware, electronics design, test and development software tools, to mechanical design and prototyping.

I've also had the fortune to receive patents for ten inventions developed while working at various companies. I joined the startup company Zentek in 1991 as one of the first five employees. We designed the electronics and firmware for an optical disk drive. I worked at SyQuest Technology for 4 years starting in 1993. SyQuest designed and manufactured removable media disk drives, and I was responsible for servo control firmware and test software development. The founder of SyQuest started a new venture in 1997, and I left SyQuest to lead the servo control development at Castlewood Systems. The company produced removable media disk drives and disk cartridges.

In 2002, I was part of a group of five who started a new company RioSpring/GSMagicStor, designing high-capacity small form factor disk drives, where I built and led the servo engineering team. The company designed and manufactured 4.4GByte 1 inch disk drives. It's amazing to think back and realize that this product was actually competitive with flash memory at the time. I joined TDK Headway Technologies in 2007. Headway designs and manufactures read/write heads for disk drives. Our group developed testing hardware, electronics, firmware and software for head parametric testing. TDK has business areas beyond heads for disk drives, so I was also having fun working on firmware and software for battery management systems, MEMs optical scanners, and micro-fluidic cell processing.

In 2017 I left TDK to start my own contract engineering business. I've been working on high-speed measurement electronics and battery management hardware and software.

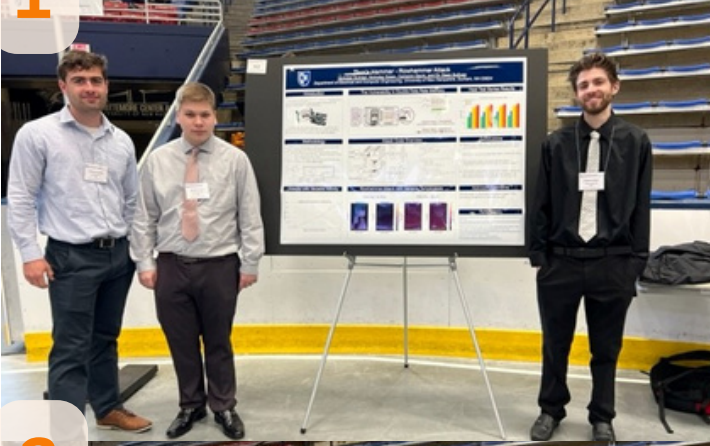
I feel very fortunate to have had an interesting and fun working life. I often think back about my time at UNH and how that experience is an important part of my whole journey. I've been married to my wonderful wife Cara for 28 years. We have a son Joseph and grandson Ricky. In 2015 we completed building a house, barn and workshop in the foothills east of San Jose where we keep horses, goats, chickens, rabbits, cats and a dog. I also enjoy working on electronics projects when I have a chance. I have an interest in sensing and measurement devices, and recently completed building a water well depth sounder, a scanning-tunneling microscope and a proton precession magnetometer. I just can't stop engineering.



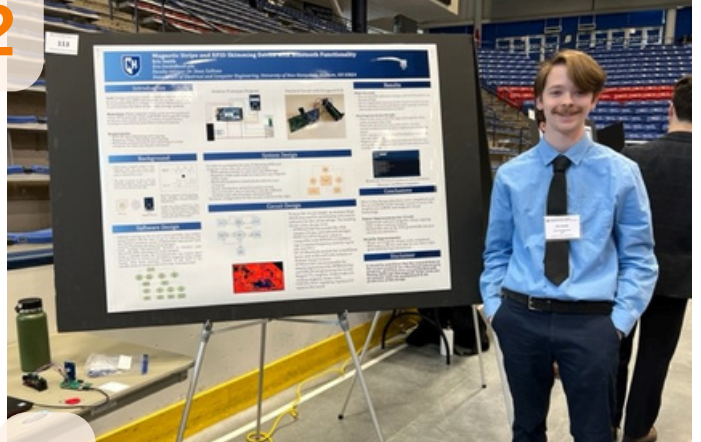
# URC-ISE PHOTO GALLERY

To see all these posters and video recordings go to: <https://media-gallery.unh.edu/gallery/>

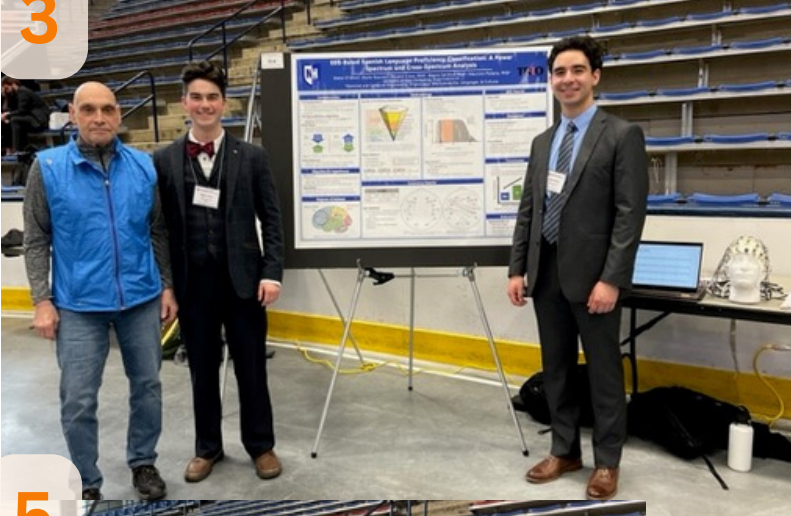
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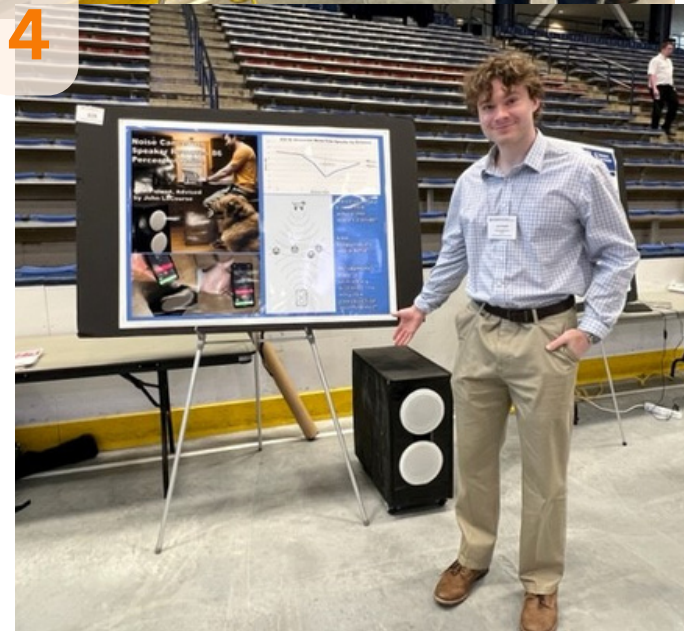
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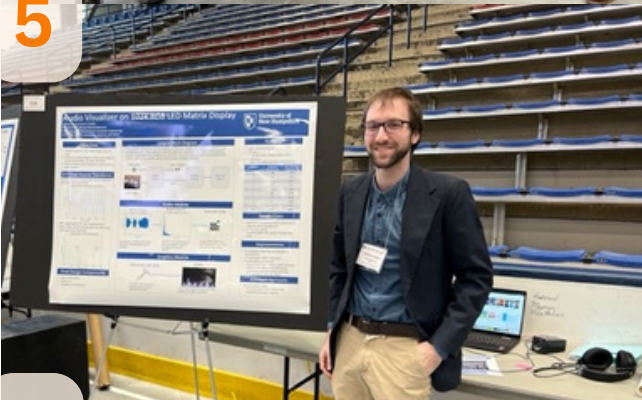
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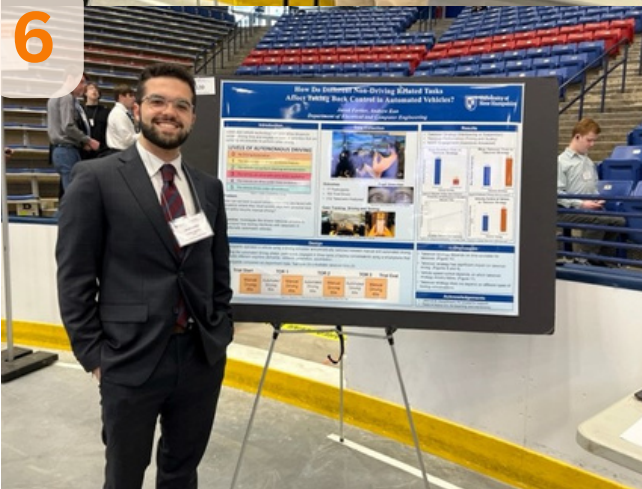
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## LIST OF PROJECTS

1. Thor's Hammer- Cameron Gavin (CE), Nicholas Green (CE), and Nicholas Quinlan (CE)
2. Magnetic Stripe and RFID Skimming Device with Bluetooth Functionality - Eric Smith (EE)
3. EEG-Based Spanish Language Proficiency Classification: A Power Spectrum and Cross-Spectrum Analysis - Skyler Baumer (CE) and Blaise O'Mara (EE)
4. Noise Cancelling Speaker - Levi Poland (EE)
5. Audio Visualizer - Demetrio Galatis (EE)
6. How Do Different Non-Driving-Related Tasks Affect Taking Back Control in Automated Vehicles? A Within-Subjects Study Using the Minisim Driving Simulator - Jared Fortier (CE)

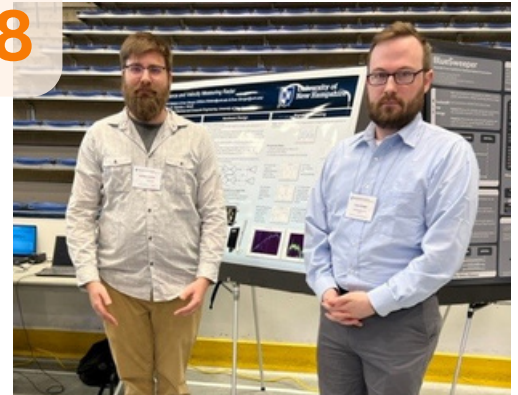
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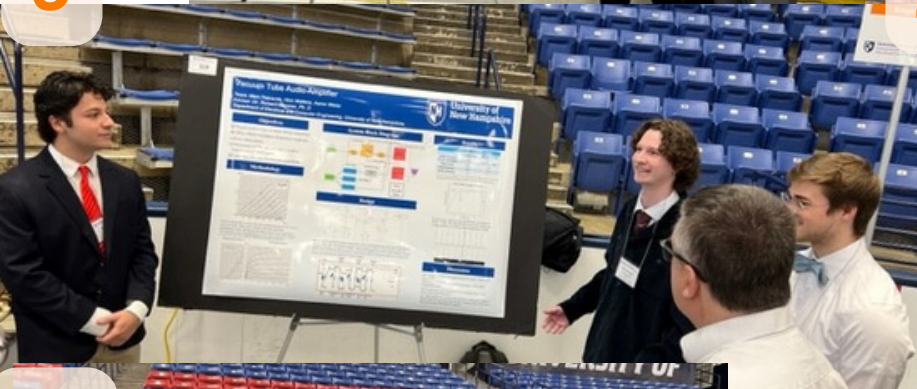
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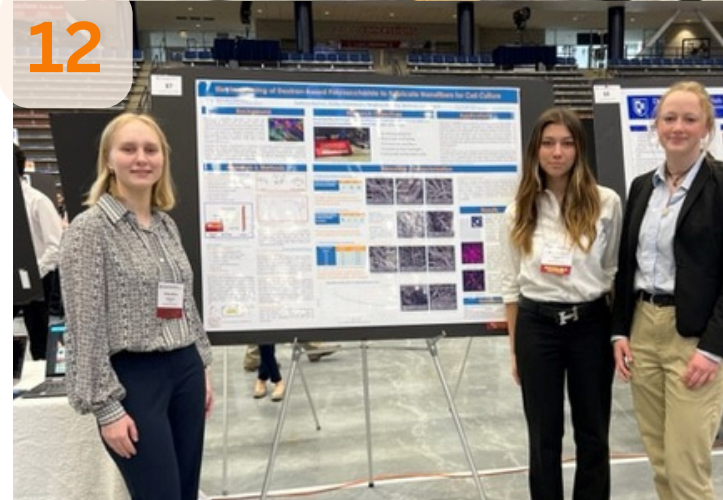
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11



12



## LIST OF PROJECTS

- 7. BlueSweeper: Bluetooth Frame Injection for Existing Peripheral Connections - Emilie Leavitt and Wesley Newsam
- 8. Distance and Velocity Measuring Radar - William Ralston and Evan Stenger
- 9. Vacuum Tube Audio Amplifier - Marc Patnaude (EE), Nick Wallace (EE), and Aaron Weiss (EE)
- 10. Trike for the Visually Impaired - Jie Huang (EE), Francis Molino (EE), Matthew Rollend (EE)

## NON-CAPSTONE UNDERGRADUATE PROJECTS

- 11. Student Organization: EVO Moped Conversion - Dylan Callahan (EE:BioMed), Adam Elsner (CS-IT), Nick Snyder (CE), Owen Tovle (ME), Logan White (CS-IT)
- 12. Innovation Scholar Project: Electrospinning of Dextran-Based Polysaccharide to Fabricate Nanofibers for Cell Culture - Andrea Bartus, Sabby Clemmons (EE), Meghan Herlihy

# BRIEF ANNOUNCEMENT

Pictured below from left to right: Prof. Rich Messner, Jeremiah Vardaman M.S Student, his advisor Prof. Kent Chamberlin, Prof. John LaCourse, and Joe Burke. Jeremiah successfully defended his thesis on April 24th. Congratulations!



IEEE CREW! Pictured right from left to right: Paige McAfee (Social Outreach), Connor Marvin (Chief Technology Officer), Joshua Calzadillas (President), Matthew Hamilton (Vice President), Nathan McGillicuddy (Chief Technology Officer), Olivia Giralt (Secretary), and Ethan Foss (Treasurer)



# ECE'S HISTORY

The UNH student branch of AIEE was formed in 1909 as an outgrowth of the Engineering Society established two years before by J.H. Priest. At that time, the AIEE was the oldest of the engineering societies on campus. The American Institute of Electrical Engineers (AIEE) and the Institute of Radio Engineers (IRE) merged to create the Institute of Electrical and Electronics Engineers (IEEE) on January 1, 1963. Portions adapted from "The Granite 1947".

## STAY CONNECTED!

We would like to stay connected with our alumni and friends. We also welcome newsletter contributions and suggestions.

Please send in your news items, e.g., awards, promotions, personal updates, memories of UNH, and suggestions to Lauren Foxall at [lauren.foxall@unh.edu](mailto:lauren.foxall@unh.edu).

The Electrical and Computer Engineering Faculty, Staff, Graduate Students, and Undergraduate Students immensely appreciate the support we have received from our generous donors. Thank You!

If you would like to make a financial contribution to the ECE Department, please visit: [www.unh.edu/give/ceps](http://www.unh.edu/give/ceps)

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