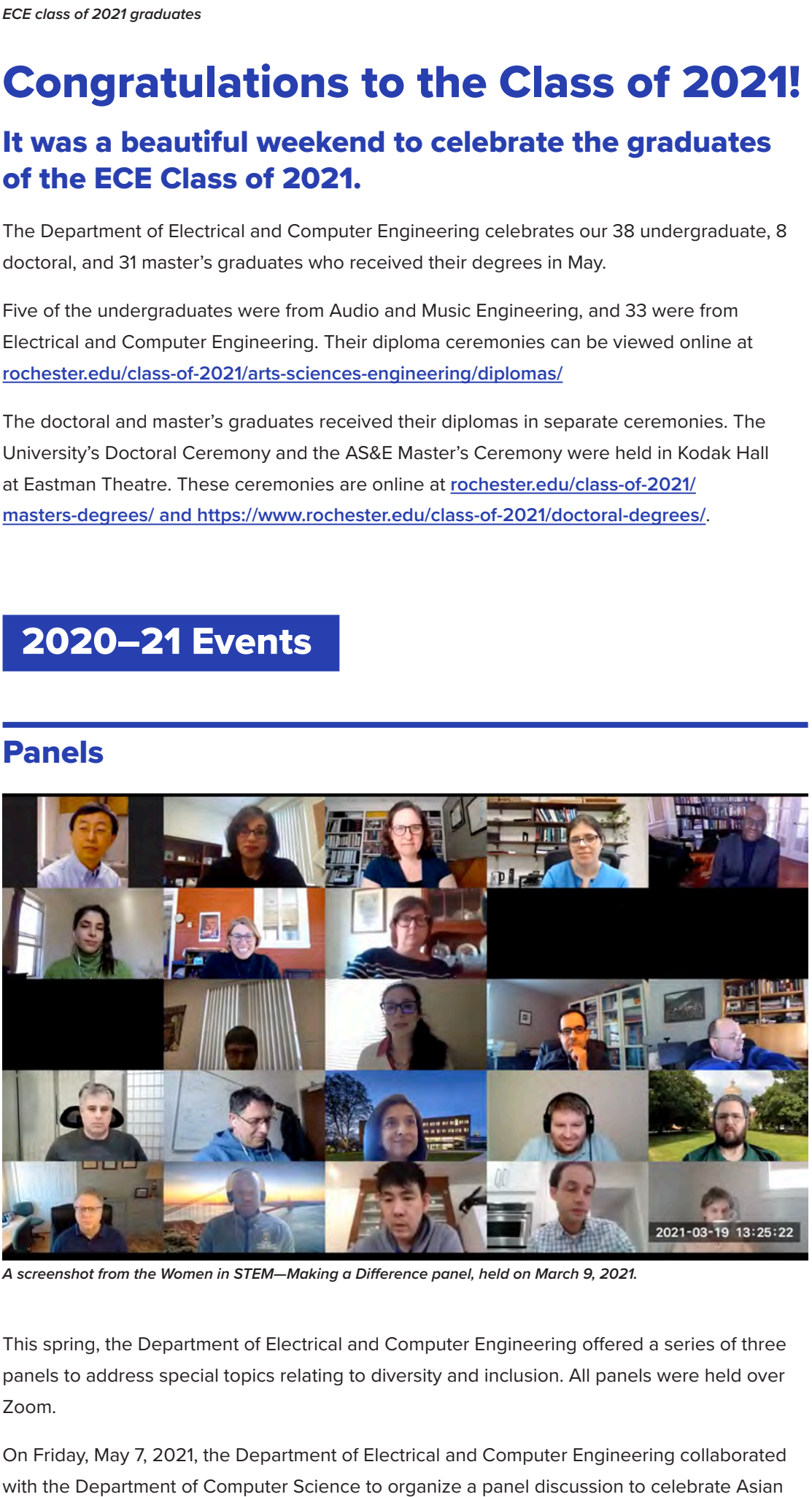


# ECE 2020-21

## A Year in Review

Department of Electrical and Computer Engineering  
Hajim School of Engineering & Applied Sciences  
University of Rochester



ECE class of 2021 graduates

## Congratulations to the Class of 2021!

### It was a beautiful weekend to celebrate the graduates of the ECE Class of 2021.

The Department of Electrical and Computer Engineering celebrates our 38 undergraduate, 8 doctoral, and 31 master's graduates who received their degrees in May.

Five of the undergraduates were from Audio and Music Engineering, and 33 were from Electrical and Computer Engineering. Their diploma ceremonies can be viewed online at [rochester.edu/class-of-2021/arts-sciences-engineering/diplomas/](https://rochester.edu/class-of-2021/arts-sciences-engineering/diplomas/)

The doctoral and master's graduates received their diplomas in separate ceremonies. The University's Doctoral Ceremony and the AS&E Master's Ceremony were held in Kodak Hall at Eastman Theatre. These ceremonies are online at [rochester.edu/class-of-2021/masters-degrees/](https://rochester.edu/class-of-2021/masters-degrees/) and <https://www.rochester.edu/class-of-2021/doctoral-degrees/>.

## 2020-21 Events

### Panels



A screenshot from the Women in STEM—Making a Difference panel, held on March 9, 2021.

This spring, the Department of Electrical and Computer Engineering offered a series of three panels to address special topics relating to diversity and inclusion. All panels were held over Zoom.

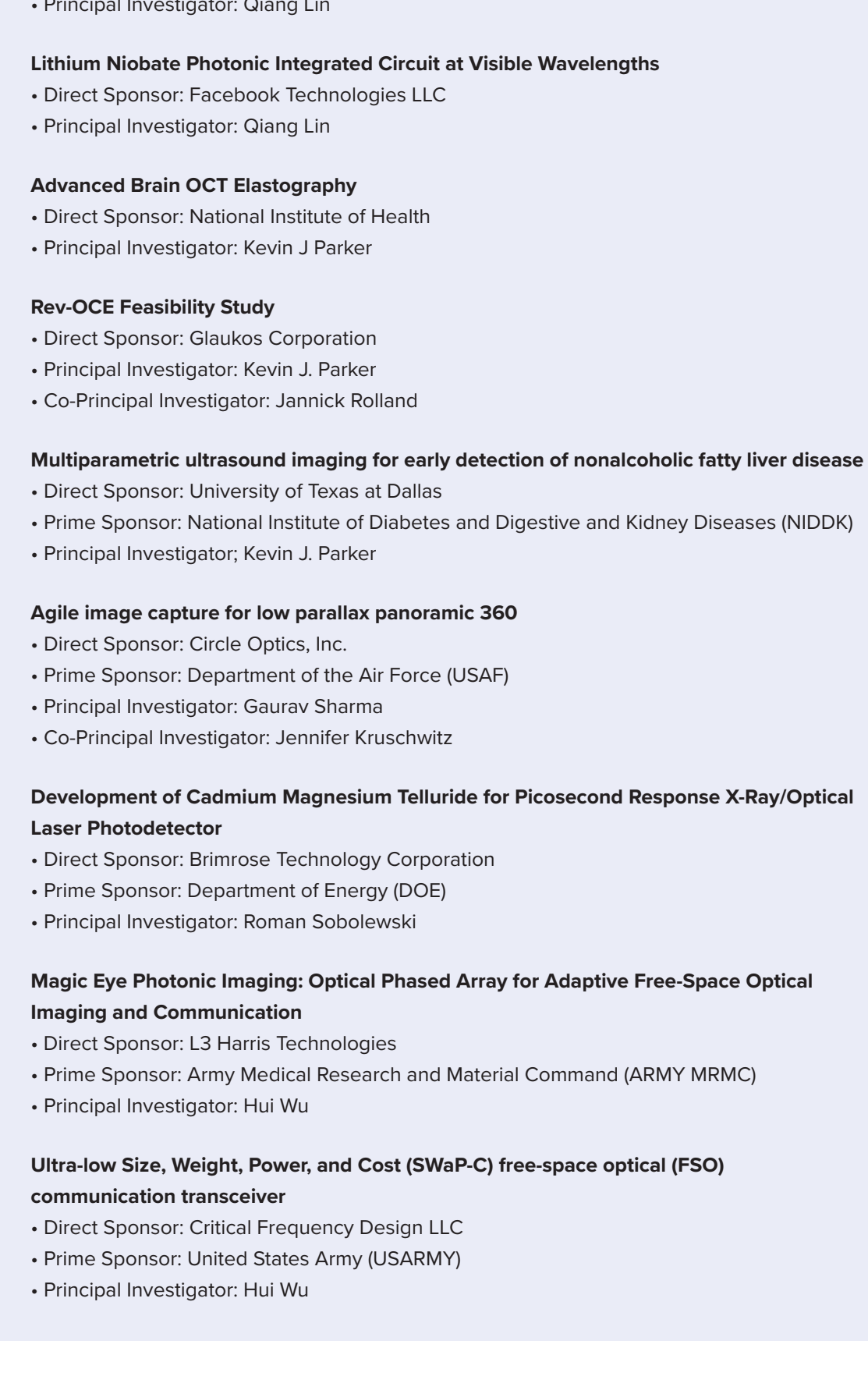
On Friday, May 7, 2021, the Department of Electrical and Computer Engineering collaborated with the Department of Computer Science to organize a panel discussion to celebrate Asian and Pacific American Heritage Month. Titled *History and Challenges of Asian/Pacific Americans in STEM Fields*, it discussed the historical and current contributions by Asian Americans in STEM fields and addressed the challenges that they face in today's world. A virtual social hour followed for open discussion. [Learn more at hajim.rochester.edu/ece/news-events/events/archives/2021/2021-05-07\\_aapanel.html](https://hajim.rochester.edu/ece/news-events/events/archives/2021/2021-05-07_aapanel.html).

The hour-long Black History Month panel discussion, *Experiences and Accomplishments of African Americans in Academia, Industry, and Research*, was held on Friday, February 26, 2021. [Read more at hajim.rochester.edu/ece/news-events/events/archives/2021/2021-02-18\\_bhm\\_panel.html](https://hajim.rochester.edu/ece/news-events/events/archives/2021/2021-02-18_bhm_panel.html).

The Women's History Month panel discussion, *Women in STEM—Making a Difference: Accomplishments and challenges experienced in the field and how to increase the pipeline of women in STEM*, was held on March 9, 2021. [Read more at hajim.rochester.edu/ece/news-events/events/archives/2021/2021-03-19\\_whm\\_panel.html](https://hajim.rochester.edu/ece/news-events/events/archives/2021/2021-03-19_whm_panel.html).

### Seminar Series

In addition to the fall seminar series, the spring seminar series featured a robust group of speakers and topics.



On March 3, Assistant Professor of Electrical and Computer Engineering Tom Howard presented the lecture "Learning Adaptive Models for Human-Robot Teaming." Howard discussed progress towards model adaptation for robot intelligence in the context of human-robot teaming, including recent efforts in natural language understanding for human-robot interaction and robot motion planning.

**Sensory Interventions: Real-time integration of passive sensing and adaptive passive interventions**  
**Tanzeem Choudhury, Professor of Computing and Information Sciences at Cornell Tech**  
Wednesday, February 3, 2021  
[Learn More...](#)

**Imaging the Biomechanical Properties of Tissue—Development of Elastography**  
**Kevin J. Parker, William F. May Professor of Engineering**  
Wednesday, February 10, 2021  
[Learn More...](#)

**Learning Adaptive Models for Human-Robot Teaming**  
**Tom Howard, Assistant Professor of Electrical and Computer Engineering**  
Wednesday, February 17, 2021  
[Learn More...](#)

**A World Built of Sound**  
**Mark Bocko**  
Wednesday, February 24, 2021  
[Learn More...](#)

**Strain-driven phase transitions in 2D van der Waals based devices**  
**Stephen M. Wu, Department of Electrical and Computer Engineering and Department of Physics and Astronomy**  
Wednesday, March 3, 2021  
[Learn More...](#)

**Terahertz Photonics**  
**Roman Sobolewski**  
Wednesday, March 10, 2021  
[Learn More...](#)

**Towards an Intelligence Architecture for Human-Robot Teaming**  
**Rohan Paul, Indian Institute of Technology Delhi, India**  
Wednesday, March 17, 2021  
[Learn More...](#)

**Controlling Laser Beams for Grand Challenge Applications**  
**D. H. Fraula, Physics Department and Laboratory for Laser Energetics**  
Wednesday, March 24, 2021  
[Learn More...](#)

**Research Challenges in High Performance Integrated Systems**  
**Eby G. Friedman**  
Wednesday, March 31, 2021  
[Learn More...](#)

**Superconducting single-photon detector**  
**Professor Robert Hadfield, University of Glasgow, United Kingdom**  
Wednesday, April 7, 2021  
[Learn More...](#)

**Presentation on BIPOC composers and musicians**  
**Lara Downes, NPR**  
Monday, April 26, 2021  
[Learn More...](#)

**Planar nanodiodes for THz detection and emission**  
**Javier Mateos, University of Salamanca, Spain**  
Wednesday, April 28, 2021  
[Learn More...](#)

**Towards Ambient Superconductivity: Novel Hydrogen-Rich Materials**  
**Ranga Dias, Assistant Professor of Mechanical Engineering and Assistant Professor of Physics and Astronomy**  
Wednesday, May 5, 2021  
[Learn More...](#)

### Connect With Us:

View a list of upcoming ECE events at:  
[hajim.rochester.edu/ece/news-events/events/index.html](https://hajim.rochester.edu/ece/news-events/events/index.html)

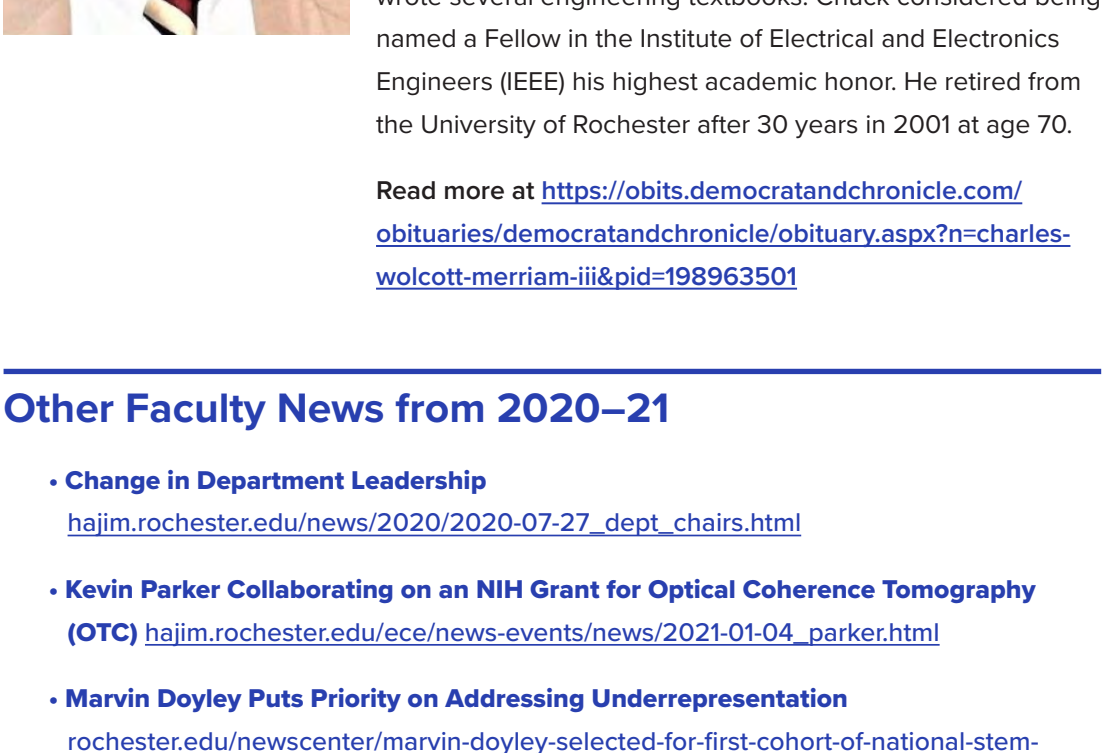
Watch recordings of past ECE events at:  
[hajim.rochester.edu/ece/news-events/events/recorded/index.html](https://hajim.rochester.edu/ece/news-events/events/recorded/index.html)

### Open Sessions

Open Sessions allows our student engineers to gain experience in the studio and obtain content for their portfolios as aspiring audio engineers, as well as provides local musicians with a free recording experience in the Gavett Recording Studio.

Open Sessions held four studio sessions in the 2020–21 academic year. Local bands featured included the Yvonne Rogers Project, Bellweather Breaks, The Rafael Enciso Trio, and the Painted Birds. [Learn more at uropensessions.com](https://hajim.rochester.edu/news/2021/2021-04-02-open-sessions.html).

[Read more at hajim.rochester.edu/news/2021/2021-04-02-open-sessions.html](https://hajim.rochester.edu/news/2021/2021-04-02-open-sessions.html).



## 2020-2021 Awarded Research Funding

A total of \$3,032,356 in grant funding was awarded to the following ECE research projects this year:

**Flat-Panel Loudspeakers/Microphones for First Responder Handheld Devices**  
• Direct Sponsor: L3 Harris Technologies  
• Principal Investigator: Michael Heilemann

**CRII/HCC: Smart Acoustic Surfaces as Multimodal Interfaces**  
• Direct Sponsor: National Science Foundation  
• Principal Investigator: Michael Heilemann

**REU Site: Imaging in Medicine and Biology for Underrepresented Minorities**  
• Direct Sponsor: National Science Foundation  
• Principal Investigator: Marvin Doyley  
• Co-Principal Investigator: Jiebo Luo

**Abstract Meaning Representation for Grounded Language Communication with Collaborative Robots**  
• Prime Sponsor: Army Research Laboratory (ARL)  
• Principal Investigator: Thomas Howard

**Wavelength by Design Using Nonlinear Integrated Circuits**  
• Direct Sponsor: Caltech  
• Prime Sponsor: Defense Advanced Research Projects Agency (DARPA)  
• Principal Investigator: Qiang Lin

**Lithium Niobate Photonic Integrated Circuit at Visible Wavelengths**  
• Direct Sponsor: Facebook Technologies LLC  
• Principal Investigator: Qiang Lin

**Advanced Brain OCT Elastography**  
• Direct Sponsor: National Institute of Health  
• Principal Investigator: Kevin J. Parker

**Rev-OCE Feasibility Study**  
• Direct Sponsor: Glaukos Corporation  
• Principal Investigator: Kevin J. Parker  
• Co-Principal Investigator: Jannick Rolland

**Multiparametric Ultrasound imaging for early detection of nonalcoholic fatty liver disease**  
• Direct Sponsor: University of Texas at Dallas  
• Prime Sponsor: National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)  
• Principal Investigator: Kevin J. Parker

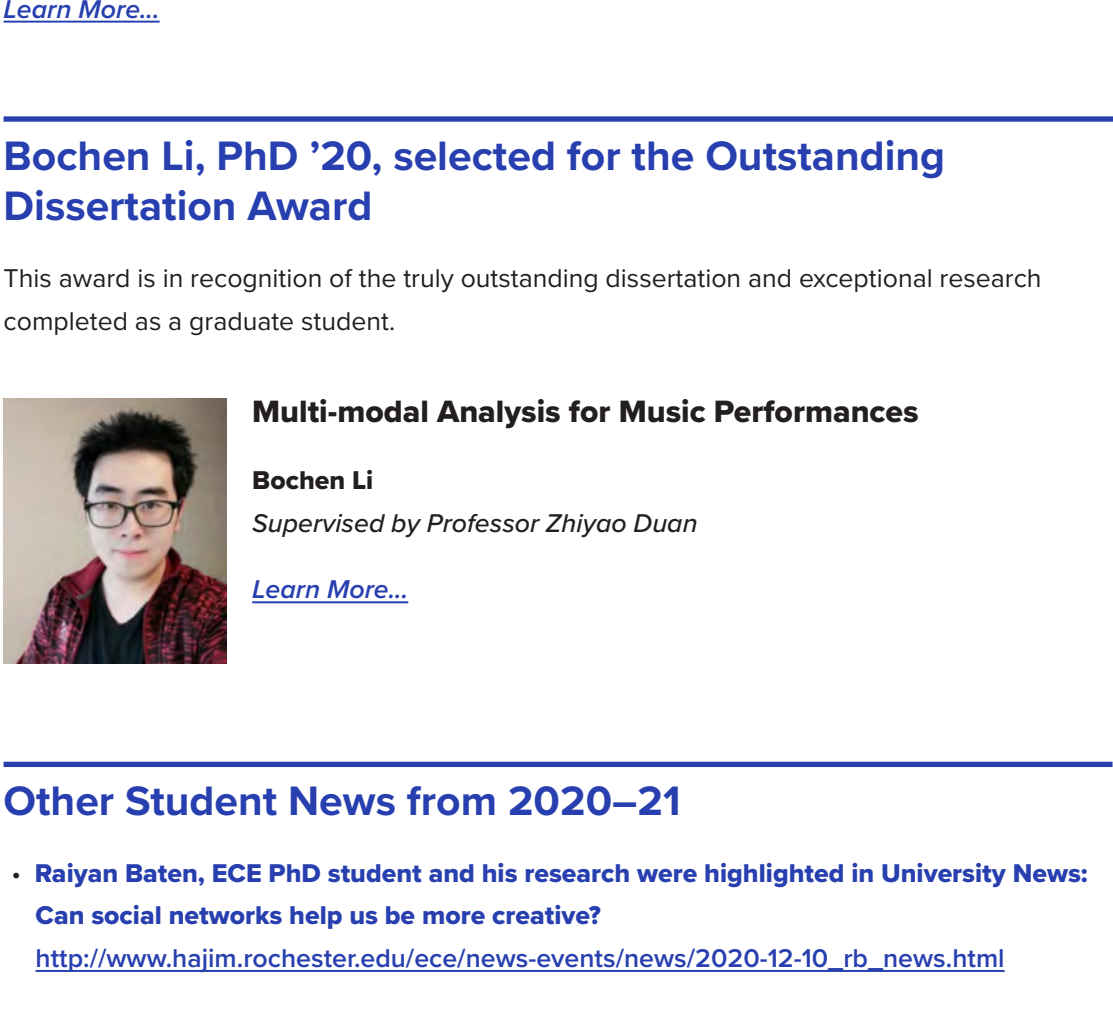
**Agile image capture for low parallax panoramic 360**  
• Direct Sponsor: Circle Optics, Inc.  
• Prime Sponsor: Department of the Air Force (USAF)  
• Principal Investigator: Gaurav Sharma  
• Co-Principal Investigator: Jennifer Kruschwitz

**Development of Cadmium Magnesium Telluride for Picosecond Response X-Ray/Optical Laser Photodetector**  
• Direct Sponsor: Brimrose Technology Corporation  
• Prime Sponsor: Department of Energy (DOE)  
• Principal Investigator: Roman Sobolewski

**Magic Eye Photonic Imaging: Optical Phased Array for Adaptive Free-Space Optical Imaging and Communication**  
• Direct Sponsor: Circle Optics  
• Prime Sponsor: National Institute of Defense and Material Command (ARMY MRMCM)  
• Principal Investigator: Hui Wu

**Ultra-low Size, Weight, Power, and Cost (SWaP-C) free-space optical (FSO) communication transceiver**  
• Direct Sponsor: Critical Frequency Design LLC  
• Prime Sponsor: United States Army (USARMY)  
• Principal Investigator: Hui Wu

### Departmental News



## Introducing New Quantum Engineering Concentration for Master's Students

The fields of quantum engineering and quantum information science are on the verge of disruptive breakthroughs, with a potential for having an impossible to overestimate impact on society and national security. They reside at the core of all these breakthroughs as an enabling technology by connecting networks of quantum computers for multi-party processing or enabling communications with absolute security rooted in the laws of physics.

The concentration brings together an interdisciplinary team to solve important technological problems related to quantum information processing with a focus on:

- Socially important issues such as rapidly growing presence and overall importance of computers and computing in our present daily lives

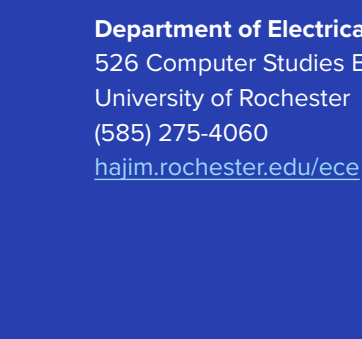
- Data/information security

- Economic and social impact of seemingly unlimited capabilities of data (often personal) processing and storage, as well as how the latter is going to change our perception as human beings, when augmented reality and virtual reality will become our "daily" reality.

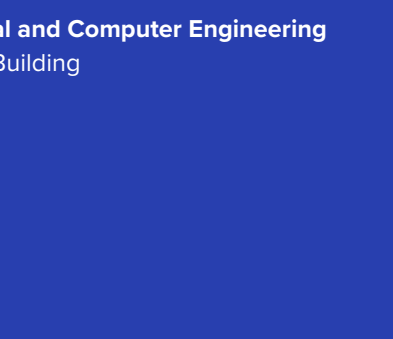
### Faculty News



Michael Heilemann



Mark Bocko



Gonzalo Mateos

## Professor Michael Heilemann receives National Science Foundation Award

Congratulations to Michael Heilemann for receiving the NSF award for research in smart acoustic surfaces as multimodal interfaces. His project developed a framework for designing surfaces, such as the display screen of a device, to serve as acoustic and vibrotactile interfaces.

[Read more at hajim.rochester.edu/ece/news-events/news/2021-04-07\\_news\\_heilemann\\_nsf.html](https://hajim.rochester.edu/ece/news-events/news/2021-04-07_news_heilemann_nsf.html)

## Mark Bocko awarded the Edmund A. Hajim Outstanding Faculty Award

"Mark has not only excelled in research, teaching, and service, he has also spearheaded the development of a number of key initiatives in the Hajim School, including the creation of our signature audio and music engineering program," said Dean Wendi Heinzelman in announcing Mark as the recipient of the 2021 Edmund A. Hajim Outstanding Faculty Award.

[Read more at hajim.rochester.edu/bravo/2021-05-25-bocko-faculty.html](https://hajim.rochester.edu/bravo/2021-05-25-bocko-faculty.html)

## Gonzalo Mateos co-author of a paper selected for the 2020 IEEE SPS Young Author Best Paper Award

Gonzalo Mateos, associate professor of electrical and computer engineering and Asaro Bigger Family Fellow in data science, are co-authors of a paper selected for the 2020 IEEE SPS Young Author Best Paper Award. The paper, by lead author Santiago Segarra, is entitled "Network Topology Inference from Spectral Templates," originally published in IEEE Transactions on Signal and Information Processing over Networks, September 2017. The award will be presented during ICASSP '21 in Toronto, Canada.

[Read more at hajim.rochester.edu/ece/news-events/news/2021-05-05\\_gm\\_paper.html](https://hajim.rochester.edu/ece/news-events/news/2021-05-05_gm_paper.html)

### In Memoriam: David T. Blackstock



David T. Blackstock, a former electrical engineering faculty member, passed away last month at the age of 91. Blackstock joined the department in 1963 and helped pioneer "weak shock theory" which became a key foundation for the field of nonlinear acoustics. An icon in the Acoustical Society of America, David was elected to the National Academy of Engineering in 1992.

[Read more at hajim.rochester.edu/ece/news-events/news/2021-05-18\\_blackstock.html](https://hajim.rochester.edu/ece/news-events/news/2021-05-18_blackstock.html)



### In Memoriam: Charles Merriam III

Charles Merriam III, a former electrical engineering chair and faculty member, passed away in August 2020 at the age of 89. Chuck joined the department in 1971 to serve as chair of the Electrical Engineering department. He was chair for more than a decade and thereafter remained a professor. Famous for his demanding teaching style, Chuck was beloved by colleagues and students alike for his devotion to excellence in education and teaching. He served on several University committees and wrote several engineering textbooks. Chuck considered being named a Fellow in the Institute of Electrical and Electronics Engineers (IEEE) his highest academic honor. He retired from the University of Rochester after 30 years in 2001 at age 70.

[Read more at https://obits.democratandchronicle.com/obituaries/democratandchronicle/obituary.aspx?n=charles-wolcott-merriam-iii&pid=198963501](https://obits.democratandchronicle.com/obituaries/democratandchronicle/obituary.aspx?n=charles-wolcott-merriam-iii&pid=198963501)

### Other Faculty News from 2020–21

- **Change in Department Leadership**  
[hajim.rochester.edu/news/2020/2020-07-27\\_dept\\_chairs.html](https://hajim.rochester.edu/news/2020/2020-07-27_dept_chairs.html)

- **Kevin Parker Collaborating on an NIH Grant for Optical Coherence Tomography (OCT)**  
[hajim.rochester.edu/ece/news-events/news/2021-01-04\\_parker.html](https://hajim.rochester.edu/ece/news-events/news/2021-01-04_parker.html)

- **Marvin Doyley Puts Priority on Addressing Underrepresentation**  
[rochester.edu/newscenter/marvin-doyley-selected-for-first-cohort-of-national-stem-leadership-program-394002/](https://rochester.edu/newscenter/marvin-doyley-selected-for-first-cohort-of-national-stem-leadership-program-394002/)

- **Gonzalo Mateos 'Connects the Dots' of Complex Networks**  
[hajim.rochester.edu/about/spotlights/mateos.html](https://hajim.rochester.edu/about/spotlights/mateos.html)

**Get the Latest News**  
[hajim.rochester.edu/ece/news-events/news/index.html](https://hajim.rochester.edu/ece/news-events/news/index.html)

### Undergraduate Student News



For Senior Design Day, ECE students Rose McDonogh, Sharifa Sharfaldien, and Jessica Wang designed a wearable fitness tracker that interfaces with a mobile app to encourage the user to keep on track with their fitness goals by taking care of a virtual pet. The multipatform mobile app was created in React Native. The hardware for the wearable fitness tracker consisted of Arduino Nano, DFRobot Heart Rate Monitor, Adafruit Flora Accelerometer, and Bluetooth LE.

## ECE Students Present Projects at Senior Design Day

Electrical and computer engineering students selected their own teams and their own projects for this year's Senior Design Day 2021. Potential customers came before the class in the fall 2020 semester to present their requests. Teams then brainstormed, wrote a project proposal document, and ordered the necessary parts. In the spring 2021 semester, teams assembled prototypes and wrote code, conducted tests, refined designs, and then assembled a final model to present. This year's Senior Design Day was held virtually, and you can view all of the student projects online.

[Read more at hajim.rochester.edu/senior-design-day/](https://hajim.rochester.edu/senior-design-day/)

### Honor Society Inductees May 2021

Congratulations to these students who were recently inducted into **Phi Beta Kappa**, the nation's oldest academic honor society. Inductees are chosen based on exceptional academic performance and a letter of recommendation from a faculty or staff member. (Note: many of these students are also completing majors outside the Hajim School.)

- Andrew Balogh '21
- Shuangyang Li '21

Congratulations as well to these students, recently inducted into **Tau Beta Pi**, the engineering honor society, which recognizes engineering students who have distinguished themselves by their academic performance and exemplary character.

- Abrar Rahman Prottyasha '21
- Zexheng Xu '21
- Eric Elias '22



### Ethan Fahnestock '21 Receives Goldwater Scholarship

Ethan Fahnestock '21 has received the Barry Goldwater Scholarship, a prestigious national award for undergraduate science majors. The scholarship, named after the former senator and presidential candidate, awards merit-based scholarships to college sophomores and juniors who plan to pursue graduate degrees and research-oriented careers in those fields. The scholarship is worth up to \$7,500 and helps cover tuition, room and board, books, and mandatory fees.

This year's 396 Goldwater Scholars were selected from 1,343 students nationwide.

[Read more at rochester.edu/newscenter/ethan-fahnestock-goldwater-scholarship-429422/](https://rochester.edu/newscenter/ethan-fahnestock-goldwater-scholarship-429422/)

### Graduate Student News

### Spring 2021 PhD Defenses

#### Architectures for Accelerated Computation Beyond the von Neumann Hardware

**Richard Afoakwa**  
Supervised by Professor Michael C. Huang

[Learn More...](#)

#### Bochen Li, PhD '20, selected for the Outstanding Dissertation Award

This award is in recognition of the truly outstanding dissertation and exceptional research completed as a graduate student.



**Multi-modal Analysis for Music Performances**  
**Bochen Li**  
Supervised by Professor Zhiyao Duan

[Learn More...](#)

### Other Student News from 2020–21

- **Raiyan Baten, ECE PhD student and his research were highlighted in University News: Can social networks help us be more creative?**  
[http://www.hajim.rochester.edu/ece/news-events/news/2020-12-10\\_rb\\_news.html](http://www.hajim.rochester.edu/ece/news-events/news/2020-12-10_rb_news.html)

- **ECE student, Yujin Nakamoto, awarded the Robert L. Wells Prize**  
[http://www.hajim.rochester.edu/ece/news-events/news/2020-11-09\\_nakamoto.html](http://www.hajim.rochester.edu/ece/news-events/news/2020-11-09_nakamoto.html)

### Diversity, Equity, and Inclusion



### DEI Committee 2020-2021

The ECE's Diversity, Equity, and Inclusion Committee brings together undergraduate students, graduate students, postdocs, staff and faculty together to:

- Identify areas for improvement with respect to diversity, equity, and inclusion.
- Define specific goals for improving in these areas.
- Develop and execute action plans to achieve these goals.

Members

- Top row: Linda Weidman, Ming-Lun Lee, Narges Mohammadi, Jessica Luo
- Middle row: Erin Driscoll, Abrar Rahman Prottyasha, Michele Foster, Hui Wu
- Bottom row: Dan Pinney, Richard Afoakwa, Evelyn Goldman, Michael Heilemann
- Not pictured: Evelyn Ferwall, Jojo Walugembe