Great Lakes ECE Chairs Meeting

Jeff Fessler

Interim Chair, ECE

University of Michigan

2024-09-11

ECE at Michigan at a glance

People

T/TT Faculty	**69**
Research Sci.	**20**
Lecturers	**4**
Postdocs	**25**

Faculty Honors

Nobel Prize	**1**
NAE Members	**5**
NAI Fellows	**3**
Fellows	**72**
Young Fac. Awards	**62**
Education Awards	**55**

A Look at ECE TODAY

Research Expenditures
$53.7M

Tech Transfer

Startups (since 2010)	**33**
Invention Disclosures	**72*** (FY23)
License Agreements	**19*** (FY23)
U.S. Patents	**28*** (FY23)

more than any other unit in the College of Engineering

Students

UG EE	**303**
UG CE	**342**
MS/MENG ECE	**521**
PhD ECE	**277**

Rankings
ECE academic programs are consistently ranked in the **TOP 10** in the country by U.S. News & World Report

New Faculty recruited in W24

**Jun
Gao**

Assistant Prof

Computer
vision/graphics

Start: F25

**Inigo
Incer**

Assistant Prof

Complex Systems

Start: F24

**Shubhanshu
Shekhar**

Assistant Prof

Informat. Theory,
Data Science, ML

Start: F24

Assistant Prof

Power Systems

Start: W25

**Junyi
Zhu**

Assistant Prof

Medical sensing
devices, HCI

Start: W25

Artificial photosynthesis for sustainable fuel

Prof. Zetian Mi's team has achieved 9% efficiency in converting water into hydrogen and oxygen—mimicking a crucial step in natural photosynthesis.

Mi's team recently won a $400,000 DOE Hydrogen Shot Incubator prize for this work.

"We believe that artificial photosynthesis devices will be much more efficient than natural photosynthesis, which will provide a path toward carbon neutrality."   – Zetian Mi

Tunable memristors reduce energy cost of AI

Artificial neural networks may soon be able to process time-dependent information, such as audio and video data, more efficiently.

The first memristor with a 'relaxation time' that can be tuned by adding variations on a base material, enabling memristor networks to mimic the timekeeping mechanism of biological neural networks.
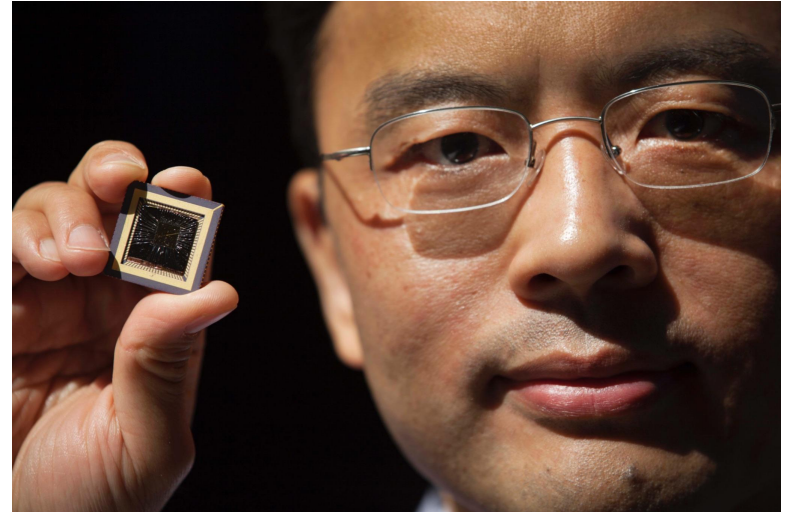

"Right now, there's a lot of interest in AI, but to process bigger and more interesting data, the approach is to increase the network size. That's not very efficient." — Prof. Wei Lu

OptoGPT: Generative AI for material design

Well-designed multilayer structures can improve solar cells, smart windows, telescopes, and more.

OptoGPT produces designs for multilayer film structures within 0.1 seconds, almost instantaneously. In addition, OptoGPT's designs contain six fewer layers on average compared to previous models, meaning its designs are easier to manufacture.
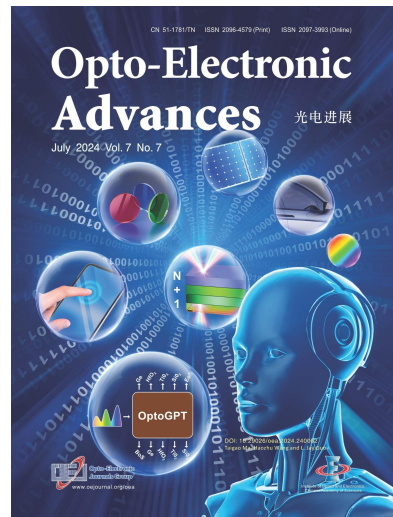

"The high-dimensional data structure of neural networks is a hidden space, too abstract to understand. We tried to poke a hole in the black box to see what was going on." – L. Jay Guo

Low-cost detection of impaired drivers

Existing advanced Driver Assistance Systems (ADAS) combined with facial recognition and LiDAR tools could effectively detect drunk, drowsy or distracted drivers before they get on the road.

A new federal requirement for all new passenger vehicles to have this safeguard passed as part of the 2021 Infrastructure Investment and Jobs Act, and the deadline could come as soon as 2026.
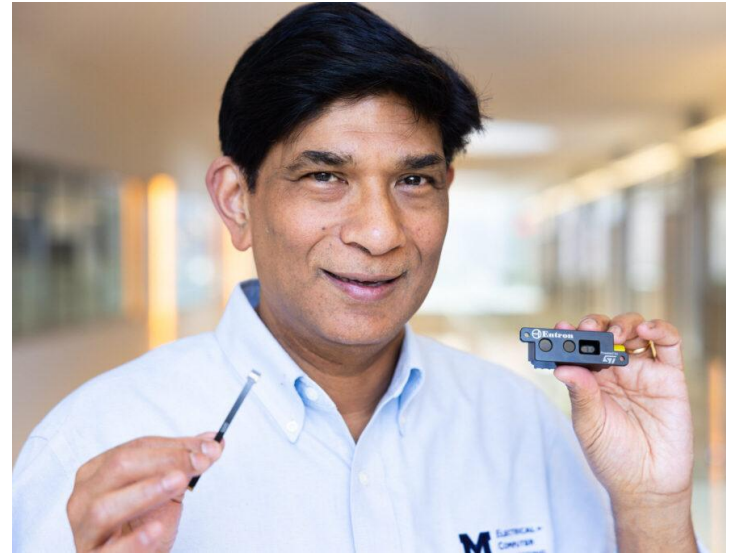

"I believe there have been studies done that showed that the technology of this kind in the vehicle, as many as 10,000 lives a year, can be saved in the United States alone." – Mohammed Islam

UG students win national energy prize

Two undergraduate students created a business plan for a company selling artificial kelp forests that could benefit communities living within 50 miles of a coast—up to 50% of the national population.

The students' successful pitches earned them $25K in prize money in the EnergyTech University Prize 2024 competition.

Jessica Beck and Samantha Jayasundera
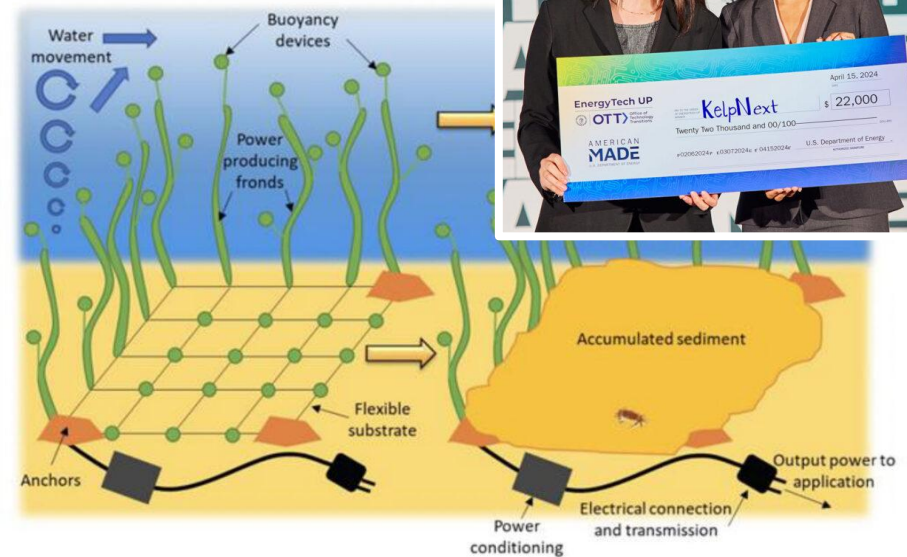
Be the next ECE CHAIR at MICHIGAN
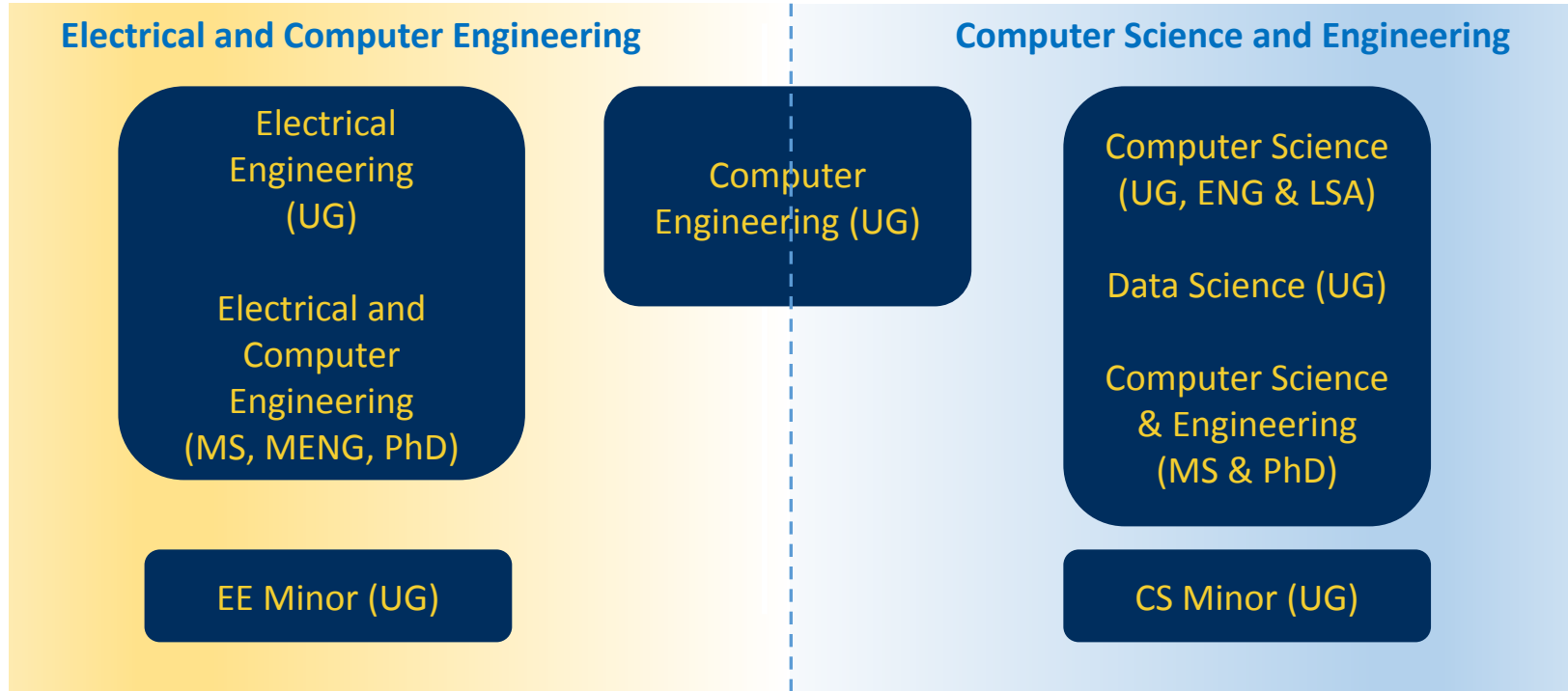
Are you ready to make an impact?

Step into leadership in a community where innovation is key. As the next Chair of Electrical and Computer Engineering at the University of Michigan, you will guide a vibrant community of scholars and inventors while shaping the future. Join us in our mission to drive academic achievement, interdisciplinary teamwork, and entrepreneurial thinking in a thriving environment that champions diversity in all its forms. Go Blue!

Learn more about ECE:
ece.engin.umich.edu

EECS Degree Programs

Electrical and Computer Engineering

Electrical Engineering (UG)

Electrical and Computer Engineering (MS, MENG, PhD)

Computer Engineering (UG)

EE Minor (UG)

Computer Science and Engineering

Computer Science (UG, ENG & LSA)

Data Science (UG)

Computer Science & Engineering (MS & PhD)

CS Minor (UG)

ECE UG Program

Degrees
BSE, Electrical Engineering
BSE, Computer Engineering
Minor, Electrical Engineering

New courses
Specialty courses in quantum information science and engineering at all levels

Machine learning courses designed for ECE students

UG Major Design Courses

VLSI Design I
(EE and CE)

Advanced Embedded Systems
(EE and CE)

Monolithic Amplifier Circuits
(EE)

Digital Signal Processing Lab
(EE and CE)

Wireless Link Design
(EE)

Advanced Lasers and Optics Lab
(EE)

Computer Architecture
(EE and CE)

Microwave Circuits
(EE)

Integrated Microsystems Lab
(EE)

Autonomous Robotics Design Experience (CE)

ECE at a glance

Faculty

Professors: 69

Research Scientists: 20

Lecturers: 4

Postdocs: 25

Alumni: 20,000+

Research: $53.7M

Enrollment (Fall 23)

Undergraduates: 645 (EE 303; CE 342)

Master's: 521

PhD: 277

Tech Transfer

33 startups since 2010

FY23 (19 depts/units in CoE)

Invention disclosures: 72 (29% of CoE)

License agreements: 19 (27% of CoE)

U.S. Patents: 28 (32% of CoE)

Rankings (2023-24)
(US News & World Report)

Undergraduate

Electrical Engineering - 9
Computer Engineering - 6

Graduate

Electrical Engineering - 7
Computer Engineering - 6

Commemorating Juneteenth

Over 200 community members came together for the department's 5th annual Juneteenth celebration, featuring musical performances, presentations by students, talks by distinguished alumni, and local Black-owned food trucks.
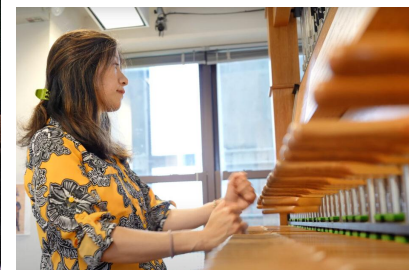
Electrify Tech Camp

Nano Size It (nanotechnology)

Entangle It (quantum)

Zap It (plasma science)

Power Up (circuits)

AI Magic (gen AI)