

AT A GLANCE

\$29M Research Funding
AY 2024/25

52 Tenure-Track Faculty

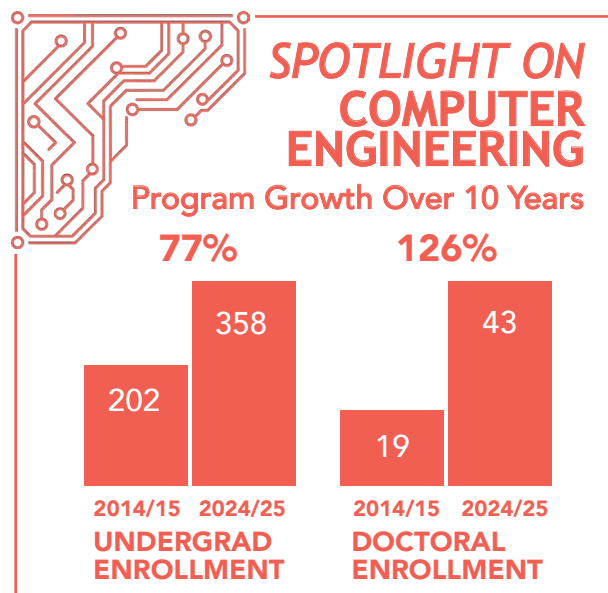
49 Society Fellows

4 National Academy Members

525 Undergraduate Students

154 Masters Students

146 Ph.D. Students



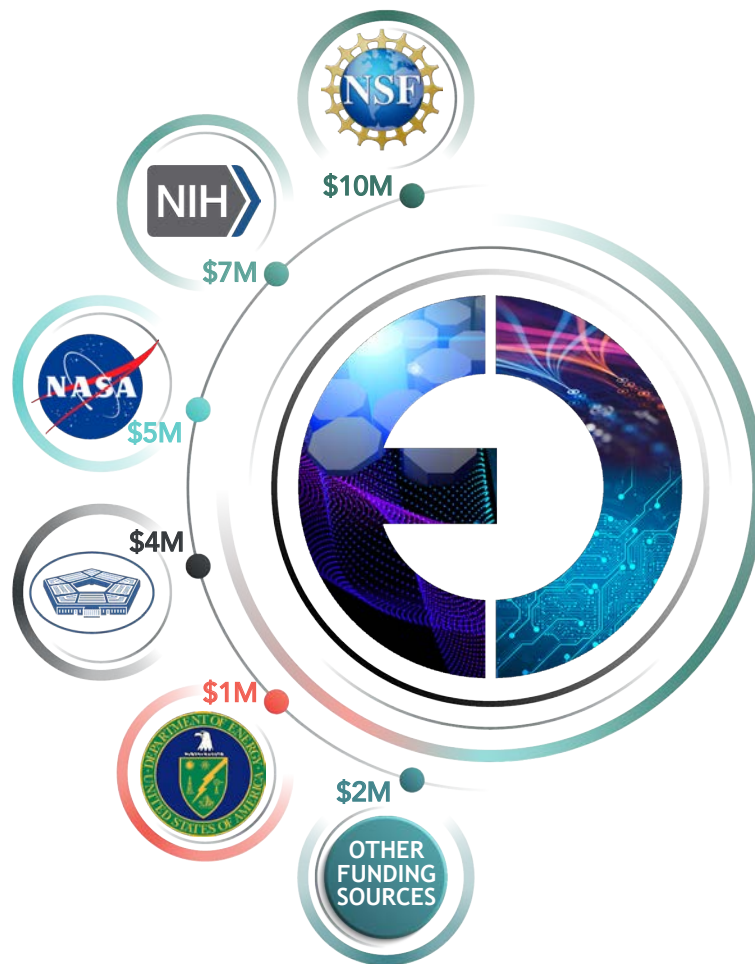
RISING IN THE RANKS

16% Undergraduate Admissions Selectivity

#27 Graduate Engineering Program*

#4 Field Weighted Citation Impact*

\$1M Annual Research Expenditures Per Faculty Member*



*U.S. News & World Report 2025

UNFLAGGING PROGRESS

In this challenging time for higher education, I'm proud of BU ECE for pressing on, undeterred, in pursuit of our mission to advance both innovation and instruction. In these pages, you'll discover enhancements to our society's technological infrastructure, breakthroughs addressing key challenges in human health, CAREER Award-winning improvements to AI functionality, and strides taken towards a sustainable, green energy future. Not to mention outreach beyond the Ivory Tower, from all-ages presentations at Boston's Museum of Science to an appearance on the classic science program, NOVA. Read on, and see for yourself!

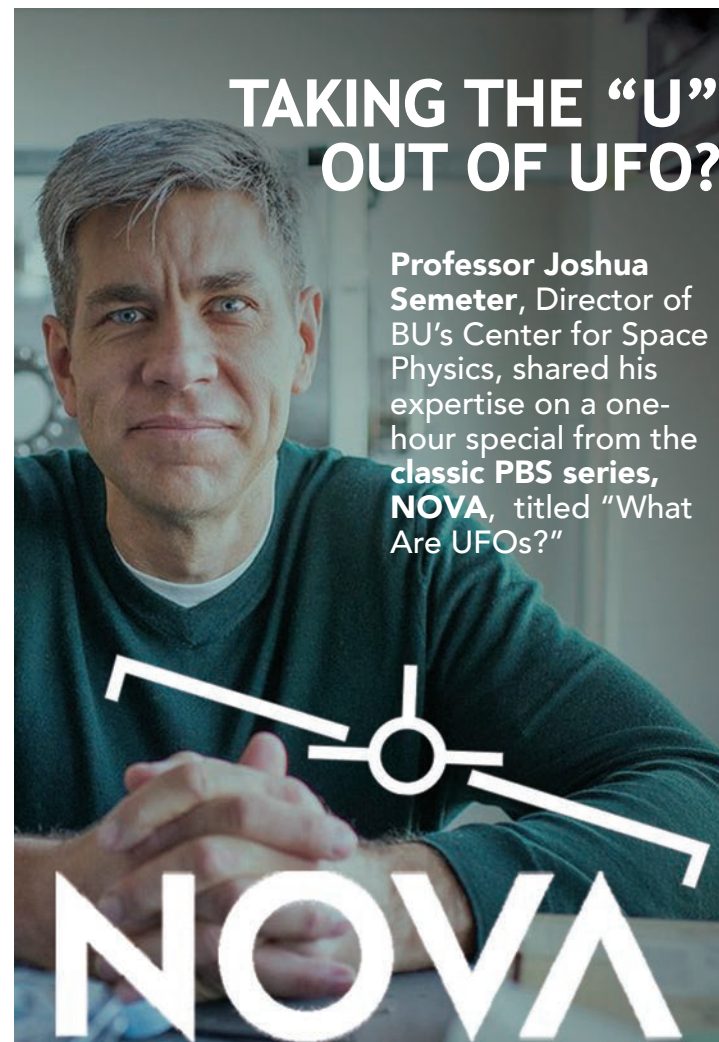
-W. Clem Karl, Chair



ECE IN THE MEDIA

TAKING THE "U" OUT OF UFO?

Professor Joshua Semeter, Director of BU's Center for Space Physics, shared his expertise on a one-hour special from the classic PBS series, NOVA, titled "What Are UFOs?"



NEW FACULTY SPOTLIGHT

CALCULATING SUSTAINABILITY

Associate Professor Emiliano Dall'Anese specializes in optimization, control, and learning in complex cyber-physical and network systems.

His research focuses on the development of **theoretical methods and algorithms**, with applications in **sustainable energy**.



AT THE FOREFRONT OF ENGINEERING A BETTER WORLD

\$3M TO STIMULATE OUT-OF-BOX IDEAS FOR RENEWABLE ENERGY

Professor Brian Kulis is the data science/AI lead on a \$3M interdisciplinary NSF Training Grant focused on bringing together PhD students from varied disciplines to devise practical new ideas for **converting and storing sustainable energy**.

IEEE XPLORE HIGHLIGHTS “INVISIBLE” LIGHT TECH



Professor Vivek Goyal’s team is developing a novel **3D imaging** technology using wavelengths of light outside the human visual range for spatial modeling and sensing, with significant potential applications for **AV navigation, covert operations**, and more.



NSF CAREER AWARD AI TO INTERPRET AI

Under the auspices of an NSF CAREER Award, Professor Kayhan Batmanghelich is working to develop a new generation of **Vision-Language Models (VLLMs)** which can “translate” the obscured processes of **black-boxed domain-specific AI models** for users and developers. Focusing on AI diagnostic tools and predictive models trained on medical images like CT scans, this AI “interpreter” will assist clinicians and engineers to identify errors and hallucinations, debug, and improve performance.

NSF CAREER AWARD ACCESSIBLE AI



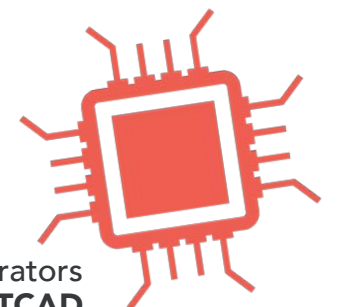
Professor Eshed Ohn-Bar is on a mission to remake the development of AI models from a **human-centric perspective**. With the support of an NSF CAREER Award, his team is developing **the first large-scale dataset of AI interactions and user preferences**, with a particular focus on low-vision individuals. “There’s a critical gap in how AI understands and supports people with different abilities,” Ohn-Bar points out.

Ohn-Bar is aiming for a new AI model trained to respond less generically than today’s AI assistants, which assume a “one-size-fits-all” user. Instead, this agent will **adjust intelligently to individual user feedback**, “especially in safety-critical, real-world settings” like navigation in busy urban environments.



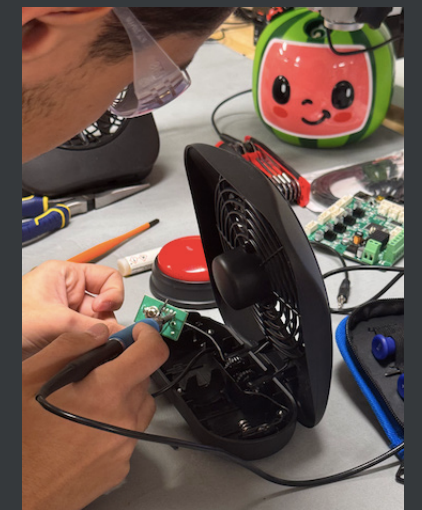
BEST PAPER AWARD FOR SIMULATION BREAKTHROUGH

Professor Ayşe Coskun and collaborators received the prestigious **2024 IEEE TCAD Donald O. Pederson Best Paper Award** for their ground-breaking parallel thermal simulator. Highly precise, fast, and open source, the tool enables seamless adaptation to new design and cooling technologies, resulting in **greener, more sustainable computing**.

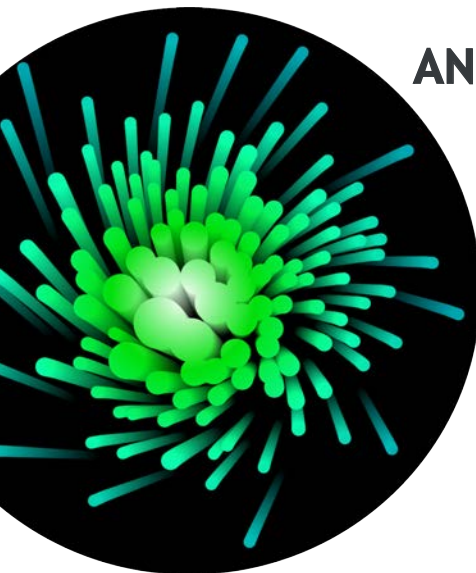


ASSISTIVE TECH FOR TOTS

Members of the **student BU Mars Rover Club** ran a week-long workshop to switch-adapt toys for young children with disabilities, adding **accessibility features** to **over 100 toys** which were donated and distributed for free.



TECH INFRASTRUCTURE PIONEERS



AN OPTICAL TWIST: SOLVING THE DATA BOTTLENECK

Professor Siddharth Ramachandran's helical structured-light transmission technology, which yields **up to 50 times greater bandwidth** than current fiber-optic cables and has **twice been covered by Science**, could significantly reduce energy and cost per bit. It also shows potential for **deeper-than-ever brain imaging**.

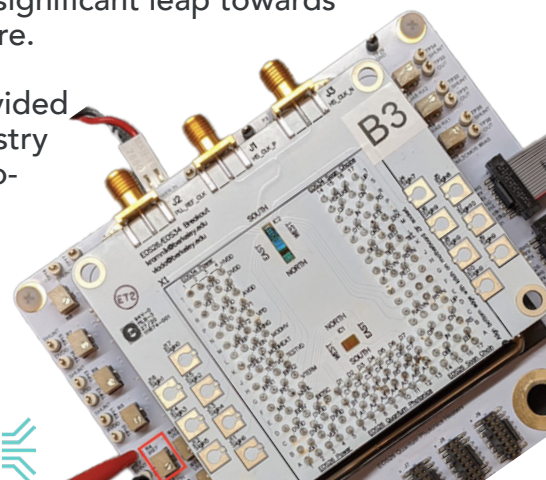
\$6M FOR ADVANCED WIRELESS

With support from the Northeast Microelectronics Coalition (NEMC) Hub, **Professor Rabia Yazicigil** is co-leading a project to drive the **domestic development and manufacture** of advanced semiconductor technologies, specifically by pioneering "**universal data decoding chips**" with ultra-low energy consumption and faster, more secure transmission, in collaboration with academic and industry colleagues.

HYBRID CHIPS WITH QUANTUM LIGHT

In an article published in *Nature Electronics*, **Professor Miloš Popović** and colleagues report fabricating the **world's first electronic-photonic-quantum system on a chip**. This advance represents the capacity to build controllable quantum systems, at scale, in commercial semiconductor foundries - a significant leap towards the quantum computing future.

Fabrication support was provided in part by Ayar Labs, an industry leader in silicon photonics, co-founded by Popović.

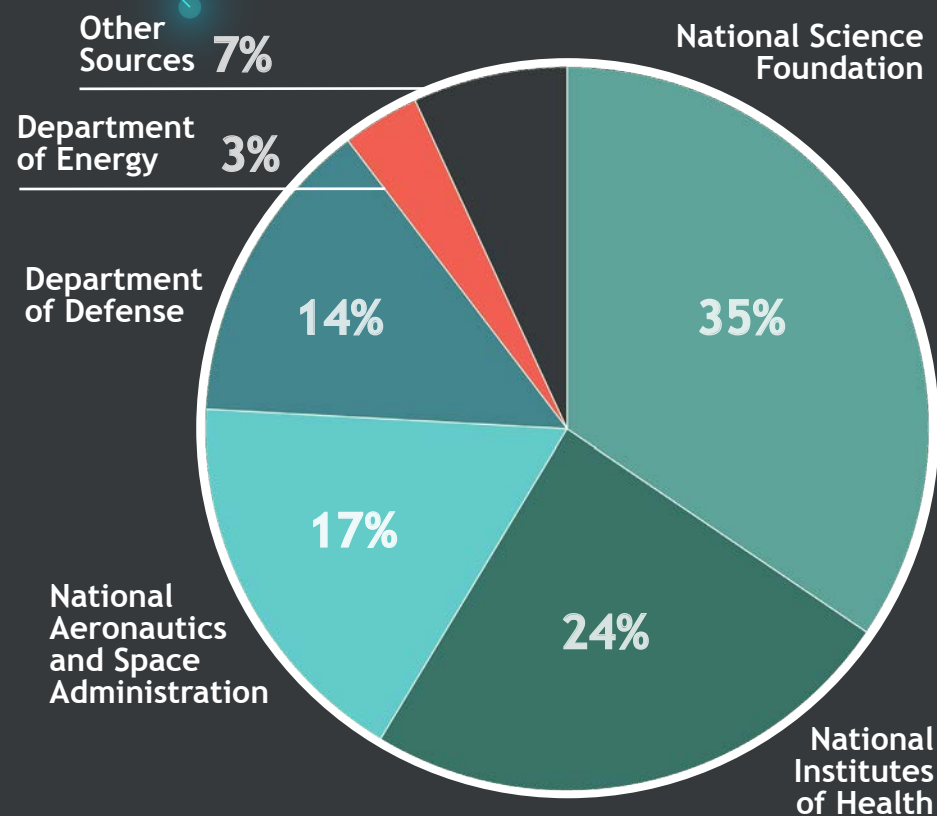


MAJOR FUNDING

- \$10M NSF
- \$7M NIH
- \$5M NASA
- \$4M DoD
- \$1M DoE
- \$2M Other Sources

\$29M
AY 2024/25

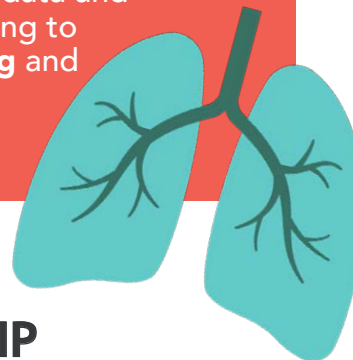
A DIVERSE PORTFOLIO



LEADERS IN HEALTHCARE TECH

\$3M FOR AI-DRIVEN COPD RESEARCH

Professor Kayhan Batmanghelich is leading an effort to develop **novel, interpretable biomarkers** for COPD using advanced AI. Supported by an **NIH R01 grant**, Batmanghelich and his team will use an approach integrating multi-modal imaging, genetic data and personalized biomechanical tissue modeling to achieve **more accurate disease subtyping** and **earlier, patient-specific predictions** of disease progression.



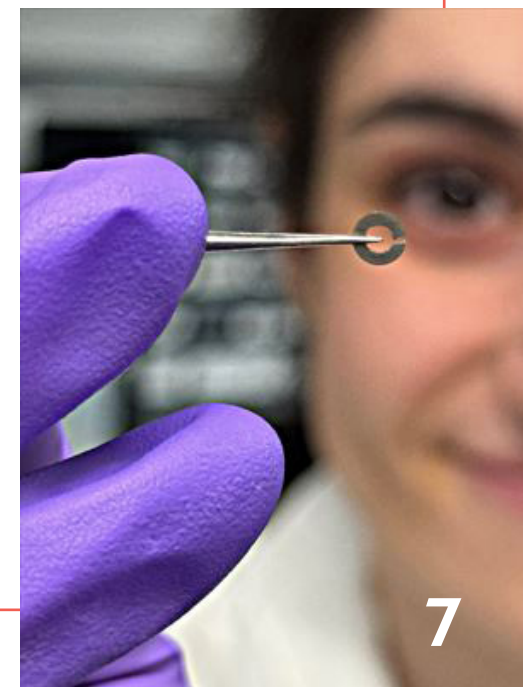
VIRUS DETECTION ON A CHIP

An optical biosensor developed by **Professor Selim Ünlü** and collaborators enables fast, accurate detection of the mpox virus at point-of-care, according to findings published in *Biosensors and Bioelectronics*. Portable, affordable, and capable of supporting testing for a variety of viruses with one boxed kit, the technology has the potential to help **prevent another global pandemic**.



MICROWAVES TO TREAT EPILEPSY

Professors Ji-Xin Cheng and **Chen Yang** report advances in microwave-based neuro-modulation technology, in an article in *Science Advances*. Their tiny, ring-shaped antenna, implanted in the brain in a minimally invasive procedure, can receive a small dose of microwave transmission from a hand-held device to **selectively suppress neurons** which cause epileptic seizures.



FACULTY HONORS

MICHELLE SANDER 2025 PECASE

PRESIDENTIAL EARLY CAREER AWARD
FOR SCIENTISTS & ENGINEERS

The U.S. government's highest honor for early-career researchers.



NEWEST SOCIETY FELLOWS



MICHELLE SANDER
Optica

for advances in ultrafast fiber lasers.



LEI TIAN
Optica

for groundbreaking work on computational imaging.

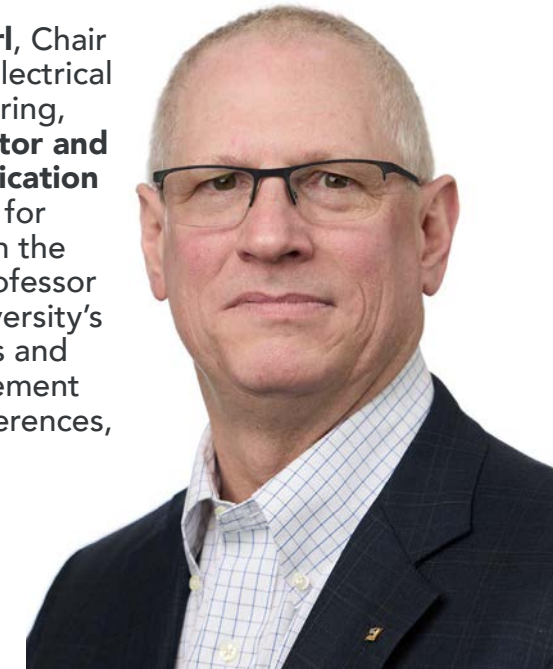


JANUSZ KONRAD
EURASIP

for contributions to visual motion analysis and video processing

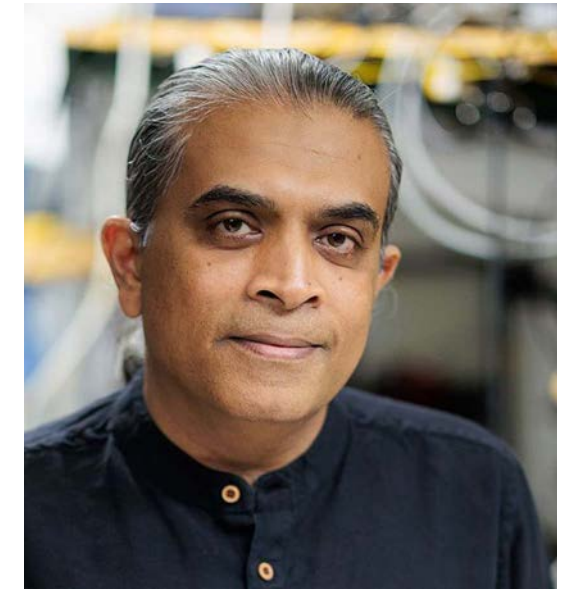
A STEADY HAND WITH GLOBAL REACH

Professor **W. Clem Karl**, Chair of the Department of Electrical and Computer Engineering, has been elected **Director and Vice President of Publication Services and Products** for the **IEEE**, with a seat on the **Board of Directors**. Professor Karl brings Boston University's characteristic standards and integrity to the management of IEEE's journals, conferences, and scientific record.



LEADERSHIP AT THE TOP OF HIS FIELD

Distinguished Professor of Engineering **Siddharth Ramachandran** has been appointed **Editor-in-Chief** of **Optics Express**, one of the premiere peer-reviewed journals in the field of Optics and Photonics.



CAREER DEVELOPMENT PROFESSORSHIP

Assistant Professor **Tianyu Wang** was awarded the **2024 Peter J. Levine Career Development Professorship** by the BU Office of the Provost, recognizing him as a **future leader in his field**.

FACULTY In NUMBERS



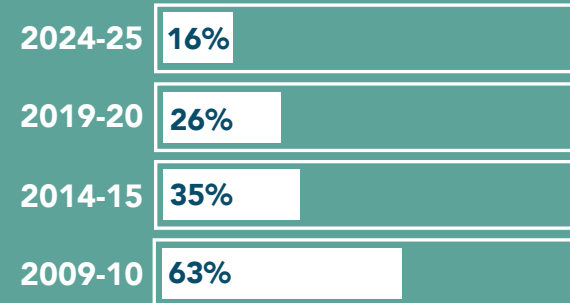
EDUCATIONAL EXCELLENCE



SCHOLAR-TEACHER AWARD

Professor Lei Tian's dedication to "integrating cutting-edge research with a strong commitment to teaching and mentoring" was recognized with the **2025 Boston University Provost's Scholar-Teacher of the Year Award**.

SELECTIVE ADMISSIONS



% engineering undergraduate applications accepted



BEYOND HIGHER ED: BU ECE at the Museum of Science

BU ECE faculty partnered with Boston's celebrated **Museum of Science**, bringing five experts face-to-face with an all-ages audience with short, engaging presentations designed to inspire a **new generation** of budding scientists and engineers!



STUDENT & ALUM ACHIEVEMENTS:

2024 BEST PAPER AWARDS

IEEE International Conference on Cloud Engineering, to Dr. Mert Toslali (PhD'23) and current PhD student Syed Qasim, et al.

IEEE International Green and Sustainable Computing Conference, to Dr. Prachi Shukla (PhD'22) and current PhD student Amin Khodaverdian, et al.

NATURE COMMUNICATIONS

A paper first-authored by Dr. Cansu Demirkiran (PhD'24) and published in **Nature Communications** lays out a "blueprint for precise and fault-tolerant analog neural networks."

DATA CENTERS AS GREEN ASSETS



Professor Ayse Coskun has taken up the role of Chief Scientist for **Emerald AI**, a new startup which aims to transform data centers from destabilizing drains on power grids to dynamically responsive consumers which strengthen them, instead. Professor Coskun has a strong record of research aimed at promoting **data center energy flexibility** and **sustainable computing** in general.



STARTING UP PROGRESS

OPTIMIZING COMMUNICATION



Burak Aksar (PhD'24)'s start-up, **Spiky.AI**, raised **\$3.2M in its most recent round of seed funding**. The company's product applies machine learning to the challenge of effective interpersonal business communication.

EFFICIENT ENCRYPTION



CipherSonic Labs, a start-up founded by Professor **Ajay Joshi** and Research Scientist **Rashmi Agrawal** (PhD'23) and supported by a 2024 BU Ignition Award, aims to commercialize their research into **efficient encryption methods for cloud data**.

CLEANING UP SOLAR POWER

Annie Rabi Bernard (ECE PhD'20) and former BU ECE Research Scientist and Post-doctoral Associate **Ryan Eriksen** are bringing self-cleaning solar panel technology to market with their new company, **Sol Clarity**.



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SHINE ON:

FOR POPOVIĆ, THE LIGHT OF INNOVATION IS UNDIMMABLE.

For two decades, **Professor Miloš Popović** has seen the light; that is, the potential of light as a revolutionary technological inflection point to drive next-generation scaling of computing systems. In 2015, alongside his colleagues at CU Boulder and collaborators from UC Berkeley and MIT, he demonstrated the **first-ever microprocessor to communicate with other chips using light**. That same year, he co-founded Ayar Labs, a start-up dedicated to transforming university-based silicon photonics research into commercially practical devices.

Fast forward to 2025, and technologies pioneered by Popović and Ayar Labs, such as **optical hardware interconnects**, have become **crucial to the immediate future of fast-expanding AI technologies**, rapidly scaling up through collaborative efforts between major companies and governments around the globe.

"Very-large-scale integration (VLSI) silicon photonics—with hundreds and thousands of photonic components tightly integrated with electronics—is now the focus of major industry efforts aimed at transitioning it into volume production, driven primarily by the needs of optical interconnects for AI hardware."

- Miloš Popović

Even as his optical revolution is well and truly underway, Popović maintains laser-like focus on breaking ever-newer ground; a recent collaboration with fellow researchers at UC Berkeley and Northwestern University, which he led, resulted in another first: an **electronic-photonic-quantum system-on-a-chip**, fabricated in a standard 45-nanometer manufacturing process, a **significant leap in progress towards scaled-up quantum computing**.

