# School of Electrical Engineering and Computer Science

NEWS

PennState College of Engineering


The Penn State School of Electrical Engineering and Computer Science (EECS) welcomes nine new faculty members for the 2020-21 academic year: Abutalib Aghayev, Mohammad Hajiabadi, Syed Rafiul Hussain, Wooram Lee, Daniel López, Ying Sun, Chunhao Wang, Dong Xie, and Rui Zhang. >>

## Fall 2020

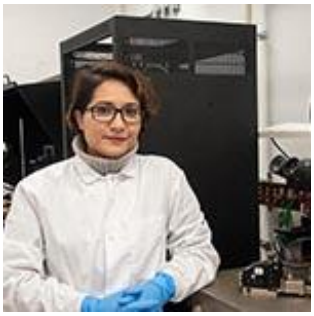
# FEATURES

## Researchers receive Hall of Fame award for seminal paper on smartphone security

A multi-institution team of researchers recently received a Hall of Fame Award from the Association for Computing Machinery's Special Interest Group on Operating Systems for their 2010 paper that was the first to expose the ways in which smartphone applications use personal data.

"The first Apple phone was available in late 2007 and the first Android phone was 2008," said Patrick McDaniel, William L. Weiss Chair in Information and Communications Technology and a co-author of the paper. "A lot of people hadn't even experienced smartphones. At the time, there was a lot of denial from the providers about security concerns. This was the first paper to uncover the hidden economy of these apps." >>

## New bacterial testing method to improve health care, food safety and more



Detecting viable bacteria is important for various fields, from food safety to medical diagnosis. The existing techniques to conduct antibiotic susceptibility testing (AST) - testing that, for example, allows health care providers to prescribe the correct dose of antibiotics for a particular infection - are slow, require skilled personnel, or utilize bulky and expensive instruments. A new electrochemical sensor developed by Penn State researchers led by Aida Ebrahimi, assistant professor of electrical engineering, now can make that process simpler, while being low-cost and portable, and can directly monitor viable bacteria in liquid samples such as blood or milk. >>

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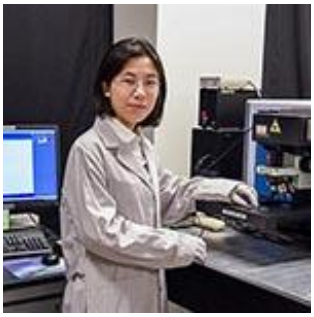
## Tailoring 2D materials to improve electronic and optical devices



New possibilities for future developments in electronic and optical devices have been unlocked by recent advancements in two-dimensional (2D) materials, according to Penn State researchers.

The researchers, led by Shengxi Huang, assistant professor of electrical engineering and biomedical engineering, recently published the results of two separate but related discoveries regarding their success with altering the thin 2D materials for applications in many optical and electronic devices. >>

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## Researchers use NSF Convergence Accelerator to shorten drug discovery timeline

A $960,000, nine-month National Science Foundation (NSF) Convergence Accelerator grant has been awarded to a team of Penn State researchers led by Swaroop Ghosh, Joseph R. and Janice M. Monkowski Career Development Associate Professor of Electrical Engineering and Computer Science, to explore faster and more cost-efficient methods of discovering pharmaceuticals using quantum artificial intelligence. >>

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## App developed by Penn State students is central to literacy boot camp in Kenya

Nyansapo, an app developed by Penn State students, uses artificial intelligence to assist children in learning literacy skills. The app was launched in August during a 10-day boot camp in Kenya where reported results showed participants increased their level of literacy.

Tanish Rastogi, a sophomore majoring in computer science, is one of the students who developed Nyansapo. He said literacy rates in Kenya are low due in part to a 40-to-one student-to-teacher ratio in the classroom. >>

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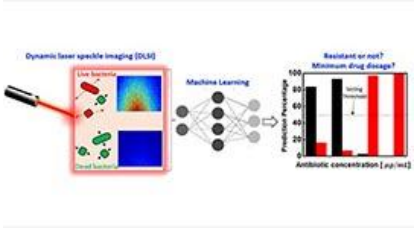
## Inexpensive and rapid testing of drugs for resistant infections possible

A rapid and simple method for testing the efficacy of

antibacterial drugs on infectious microbes has been developed and validated by a team of Penn State researchers that includes Aida Ebrahimi, assistant professor of electrical engineering.




Antimicrobial resistant infection is one of the major threats to human health globally, causing 2.5 million infections and 35,000 deaths annually, with the potential to grow to 10 million deaths annually by 2050 without improved techniques for detection and treatment. >>

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## Researchers explore at-home testing method of viral loads for HIV patients

Development of a new method to monitor the effectiveness of human immunodeficiency virus (HIV) treatment at home instead of in hospitals is underway by a team of Penn State researchers led by Weihua Guan, assistant professor of electrical engineering. The research is supported by a three-year, $1,012,996 grant from the National Institutes of Health. >>

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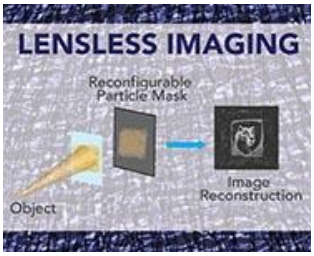
## A multishot lensless camera in development could aid disease diagnosis




A new type of imaging that does not require a lens and uses reconfigurable particle-based masks to take multiple shots of an object is being developed by a team at Penn State that includes researchers from the Department of Electrical Engineering. The electric-field directed self-assembling mask technology is expected to have uses in lower-cost and faster disease diagnosis, the enhancement of optical microscopy, and may even lead to thinner cellphone technology. >>

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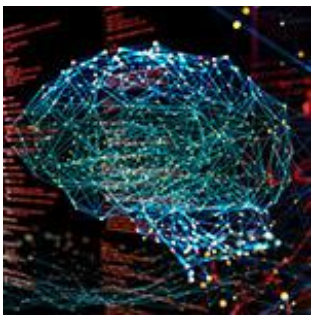
## Researchers fuse novel devices with biological inspiration for future AI systems



In order to develop more intelligent and efficient artificial intelligence systems, computer scientists use neuromorphic computing, a field that relies on mimicking the human nervous system in order to create efficient and intelligent computing systems. However, researchers in the nascent field are still working toward success, and the sought-after power efficiencies have yet to be achieved.

Now, thanks to a three-year, $1 million grant from the National Science Foundation, Penn State computer scientists are exploring ways to achieve these power efficiencies through a specific approach called spiking neural networks. >>

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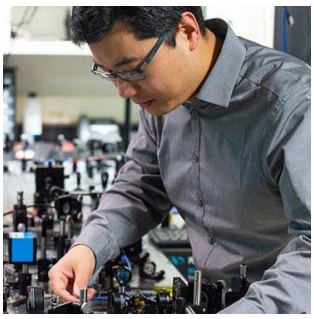
## Seeing the light: Researchers combine technologies for better light control



A new technology that can allow for better light control without requiring large, difficult-to-integrate materials and structures has been developed by Department of Electrical Engineering researchers. The new photonic integrated chip could allow for many advances in the optical field and industry, ranging from improvements in virtual-reality glasses to optical remote sensing, according to the researchers. >>

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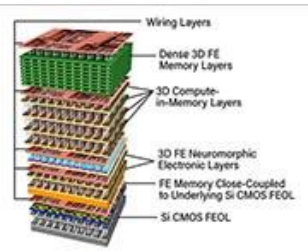
## Over $10 million awarded to Penn State for energy center




Penn State will receive more than $10 million from the U.S. Department of Energy as an Energy Frontier Research Center Award. This is one of 10 awards announced in 2020, and the second EFRC awarded to Penn State researchers.

This large center grant will focus on 3D ferroelectric microelectronics, according to principal investigator Susan Trolier-McKinstry, Evan Pugh University Professor and the Steward S. Flaschen Professor of Ceramic Science and Engineering and Professor of Electrical Engineering. >>

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# RECOGNITIONS & AWARDS

- Electrical engineering graduate student named Leighton Riess Graduate Fellow >>
- EECS faculty member named AAAS fellow >>
- Engineering professor receives association's Outstanding Contributions Award >>
- Electrical engineering student receives American Society of Heating, Refrigerating and Air-Conditioning Engineers scholarship >>
- Penn State researchers receive Best Paper award at the 2020 ASEE conference >>
- College of Engineering, three programs rise in U.S. News undergraduate rankings >>
- Electrical engineering major selected as College of Engineering student marshal >>
- Engineering professor named to DARPA ISAT study group >>
- Engineering professor receives Geoffrey Marshall Mentoring Award >>
- Electrical engineering professor honored with Evan Pugh Professorship >>
- Electrical engineering professor named Electromagnetics Academy fellow >>
- Electrical engineering student to research Salmonella with Erickson Discovery Grant >>
- Computer science and engineering professor named to CACM Editorial Board >>

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