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## Going Places

University of Dayton

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# NEWS

*Tuesday November 8, 2016*

## Going Places

A University of Dayton assistant physics professor is among 58 faculty nationwide sharing in nearly \$21 million in U.S. Air Force Office of Scientific Research Young Investigator Awards to promising young scientists to help jumpstart their research careers.

Jay Mathews, who also performs research in the University's department of electro-optics and photonics in the School of Engineering, will receive nearly \$360,000 during the next three years to help develop better and more affordable lasers and semiconductors that could improve and lower the cost of electronic devices.

"The silicon industry has never been content with today's technology, and there has been a constant stream of research into producing better, faster and cheaper devices," Mathews said. "Much of this research is funded by U.S. government agencies."

Silicon has been great for generations of electronic devices, but can't be used for the LEDs and lasers commonly found in many of today's fiber optics communications, according to Mathews.

"Silicon can't absorb infrared light from lasers beyond a certain point and is an inefficient light emitter, so it can't be used to produce lasers," Mathews said. "Other materials are compatible with the lasers but not silicon. Those materials and silicon must be produced separately and aren't easily integrated into a silicon chip. This is expensive and limits use in everyday products.

"LEDs and lasers compatible with silicon can enable production of next-generation microprocessors for high-speed computing."

If Mathews can find a silicon-compatible laser, it could help create faster communication devices and computers for military and civilian use. This could have an impact in areas like the internet, which require low-cost, high-speed

communication, or lead to faster smartphones and personal computers. He believes the key is growing a material that can absorb and emit light in the optimal range on the surface of silicon chips.

"In this area of research known as silicon photonics, scientists and engineers around the world are attempting to turn this idea into something real," said Mathews, who began working in this area as a graduate student at Arizona State University.

Mathews also is working with Imad Agha, a University of Dayton assistant physics professor; they have six graduate students and two undergraduates working in their labs. They also are working with researchers around the world.

The University of Dayton department of electro-optics and photonics is one of nine in the nation and secures nearly \$2.5 million in research awards annually. It is ranked among the top three by the National Research Council.

The University of Dayton ranks second nationally in federally funded materials research, third in all sponsored materials research and development, and ninth among private comprehensive research universities without medical schools in the U.S.

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