

# Northrop Grumman Donation Boosts UCF Research in Extreme Ultraviolet Lithography

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University of Central Florida optics researchers and students are poised to become leaders in the next generation of [computer chip](#) manufacturing thanks to a \$24 million donation of intellectual property, equipment and cash from Northrop Grumman.

The largest donation in UCF history will boost the College of Optics and Photonics' [research](#) in **extreme ultraviolet lithography**, a process that **computer chip manufacturers expect to begin using in about four years** because it will allow for smaller, denser features to be imprinted on chips. UCF already is researching the shorter-wavelength light sources that will be used in extreme ultraviolet lithography.

"This now gives us a platform to train the future scientists and engineers who are going to be needed as this new form of lithography comes into being," said optics professor Martin Richardson, who will be the first Northrop Grumman Professor of X-Ray Photonics at UCF. "We can now broaden our optics program into a program of major impact in the extreme ultraviolet lithography field."

Northrop Grumman is contributing about \$22 million in intellectual property, which includes patents and patent applications. The California-based company also is donating equipment worth about \$2 million that will give UCF the latest technology in extreme ultraviolet optics and about \$140,000 in cash to help pay for equipment maintenance and the professorship that Richardson will hold. The cash donation will be made over the next four years.

"We are pleased that Northrop Grumman recognizes UCF as a leader in optics and laser research," UCF President John Hitt said. "This generous donation will give students and faculty more opportunities to improve the chips that power our computers, and our university will be able to continue to develop new technology that we can transfer to our corporate partners."

In announcing the donation last week, Northrop Grumman executives praised the close relationship they have formed with the university and the College of Optics and Photonics over the years. The college houses the Center for Research and Education in Optics and Lasers, known as CREOL, and the Florida Photonics Center for Excellence, a state-funded center created in 2003 through which some of UCF's work in extreme ultraviolet lithography has been funded.

UCF and Northrop Grumman have worked together on research related to lasers, communications systems and land mine detection systems. The company, which has two sectors with long-established operations in Central Florida, also has hired many UCF graduates.

"As one of the country's premiere educational research centers for optics and lasers, the university will leverage the intellectual property and equipment we are donating to continue expanding the boundaries of chip-making processes," said Wes Bush, president of Northrop Grumman Space Technology, which made the donation. "Its work will help industry overcome existing limitations on chip density, enabling further leaps in computing power and storage capacity."

The computer chip industry continues to look for ways to shrink the size of laser-imprinted features in the silicon-wafer chips so they can become denser and more powerful. International Sematech, a group formed by the world's leading manufacturers of computer chips that also is a supporter of UCF's research in extreme ultraviolet lithography, has

predicted that extreme ultraviolet lithography will replace the current use of ultraviolet lasers to manufacture chips in about four years.

Extreme ultraviolet light has a shorter wavelength than ultraviolet light, which will allow manufacturers to imprint smaller features. In the 1970s, the smallest imprinted features were about 10 microns wide, or about one-tenth of the thickness of a human hair, Richardson said. Companies now imprint features as small as 100 nanometers, or a thousandth of the thickness of a human hair. Their goal through extreme ultraviolet lithography is to lower the smallest size of features to about 10 nanometers.

Northrop Grumman's donation, through the company's Space Technology Sector, will include 11 patents and 10 patent applications. The value of the intellectual property and equipment was set by an independent appraiser. In addition to naming a professorship after the firm, UCF will rename a lab in the CREOL building in Northrop Grumman's honor.

The donation is the second multimillion-dollar gift UCF has accepted during the past three weeks. Al and Nancy Burnett of Winter Park gave \$10 million last month to help UCF establish the new Burnett College of Biomedical Sciences and construct a new building for biomedical researchers. That gift is eligible for \$10 million of state matching funds.

Source: University of Central Florida

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