

UC SANTA BARBARA

# THE *Current*

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## **DARPA Funds Joint Industrial-Academic Effort to Develop Advanced Optical Packet Router Technologies**

A team of researchers in industry and higher education, led by a group at the University of California, Santa Barbara, has been awarded major financial support by the Defense Advanced Research Project Agency's Microsystems Technologies Office to develop new technologies to advance optical router capacity far beyond the current state of the art. The team has been awarded \$6.3 million for the first phase of its research, with optional phases that raise the total to \$15.8 million.

The team expects to develop and demonstrate all-optical technologies and systems that route data packets, the currency of the Internet, with no optical-to-electrical conversion. The potential payoff of avoiding optical-to-electrical conversions is to greatly increase the data speed and significantly reduce power requirements over today's approaches. The anticipated breakthroughs from this groundbreaking collaboration are expected to open new possibilities for the distribution of rich data, voice, and video content at vastly greater speeds and using less power.

"Imagine a data stream greater than 10,000 feature-length films blasting through an optical router in one second," said Daniel Blumenthal, a professor of electrical and computer engineering at UC Santa Barbara and leader of the research team, in explaining the team's goal. The research, he explained, will seek "to revolutionize optical integration density and develop new technologies to advance optical router

capacity beyond 100 Terabits per second (Tbps)," or about 100 times the capacity of current state-of-the-art routers.

The team is known as LASOR, for Label Switched Optical Router, and is made up of researchers from several leading technology companies---Agility Communications, Calient Networks, Cisco Systems, Inc., JDS Uniphase---as well as Stanford University and UC Santa Barbara. The team's work will be supported over four years by the DARPA

Microsystems Technologies Office's Data in the Optical Domain (DoD-N) program, managed by Jagdeep Shah.

"Given the historical role of the government in creating the foundation of today's Internet, it is fitting that DARPA would support the development of new technologies that could dramatically affect the future of the Internet," said Prem Jain, senior vice president, Routing Technology Group, Cisco Systems. "Cisco is excited to bring its routing and optical technology leadership to bear in this innovative research program. Whether through our own research and development efforts or participating in these kinds of collaborative programs, Cisco is committed to helping develop next-generation network technologies."

UCSB Chancellor Henry T. Yang called the participation of prominent industry leaders in the project "very exciting for our university, where we have developed an exceptionally strong research program in optical communication and networking. The team that will carry out this research has enormous talent and resources, and we are confident that this landmark collaboration will bring about innovations of major importance."

Added Matthew Tirrell, dean of the College of Engineering at UCSB: "The LASOR project team brings excellent research leaders from UCSB's faculty together with leading industrial and academic partners to try to increase the state of the art in the routing of optical signals by two orders of magnitude."

One of the key technologies that will be utilized is the tunable all-optical wavelength converter, an integrated device that acts as a "tunable photon copier" (see <http://www.engineering.ucsb.edu/news/65>) and is used to direct packets through the router using the color of light itself. The team's ultimate goal is to shrink the size of state-of-the-art routers that occupy a full 7-foot equipment rack today down to a single linecard. To achieve this goal, the LASOR team will push the boundary of how

many optical devices can be integrated onto a single chip, ushering optics from the equivalent of electronics of the 1950s to the electronic revolution of the 60s and 70s.

### **Statement from the industrial partners:**

The statements contained in this press release that are not purely historical are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Act of 1934. Such forward-looking statements include, but are not limited to, any statement or implication that the products described in this press release (i) will be successfully introduced or marketed, (ii) will be used in or useful for commercial applications, (iii) will be qualified and purchased by our customers, or (iv) will perform to any particular specifications or performance or reliability standards. Such forward-looking statements involve risks and uncertainties that, if realized, could materially impair the companies' results of operations, business, and financial condition. These risks and uncertainties include, but are not limited to, (a) the failure of the products (i) to perform as expected without material defects, (ii) to be manufactured at acceptable volumes, yields, and cost, (iii) to be qualified and accepted by customers, and (iv) to successfully compete with products offered by competitors, and (b) factors discussed from time to time in reports filed by the companies with the Securities and Exchange Commission. The forward-looking statements contained in this news release are made as of the date hereof, and the companies do not assume any obligation to update or qualify any of the statements made herein.

### **Background Resources**

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#### *Project Sponsor*

Defense Advanced Research Projects Agency (DARPA)

<http://www.darpa.mil/>

*DARPA's Data in the Optical Domain Network program*

<http://www.darpa.mil/mto/solicitations/baa03-19/s/section1.html>

*LASOR Project Partners*

Agility Communications

<http://www.agility.com/>

Calient Networks

<http://www.calient.net/>

Cisco Systems

<http://www.cisco.com/>

JDS Uniphase

<http://www.jdsu.com/>

Stanford University

<http://www.stanford.edu/>

UC Santa Barbara

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The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.