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LSU Researcher Seeks Breakthrough in Nanophotonic Devices

Georgios Veronis, Charles Siess, Jr., Distinguished Assistant Professor of the LSU Division of Electrical & Computer Engineering and Center for Computation & Technology (CCT), has received a five-year NSF Faculty Early Career Development, or CAREER, award. The CAREER award is one of the NSF's most prestigious grants, awarded to promising junior faculty who exemplify the role of teacher-scholar through outstanding research, excellence in education, and the integration of research and education.

Veronis will receive $400,000 to support the development of physics-based modeling techniques, which could lead to novel nanoplasmonic devices with optimal performance and minimum size for high-density optical information processing.

“The realization of such devices would tremendously expand the applicability of plasmonics and would have profound implications for computing and communications,” said Veronis.

Veronis’ plan consists of developing physics-based models for 3D plasmonic waveguides and devices and using these models to develop optimization techniques of multi-parameter nanoplasmonic devices that greatly reduce the required number of computationally expensive full-wave device simulations. In addition, modeling techniques that calculate the effect of random manufacturing imperfections on nanoplasmonic devices will be developed. These techniques will, in turn, be utilized to design robust nanoplasmonic devices.

"The results of the project will represent important breakthroughs in integrated optics, optical information processing, and renewable energy sources, which have broad impacts on modern technology and human life," added Veronis.

As part of the award, Veronis will develop a new interdisciplinary course, provide research opportunities for undergraduate students, and also enhance minority undergraduate research and education opportunities. In addition, through outreach to three local high-schools with a strong science curriculum, Veronis will introduce students to the field of nanophotonics to generate excitement for careers in science and technology.

Veronis earned a diploma in electrical and computer engineering from the National Technical University of Athens, Greece, and an M.S. and Ph.D. in electrical engineering from Stanford University. His research is centered on theory and simulation of photonic materials, nanoscale photonic devices, plasmonics, and computational electromagnetics.

For more information on Veronis’ research or the LSU CCT, visit cct.lsu.edu.

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Center for Computation & Technology
2003 Digital Media Center • Telephone: +1 225/578-5890 • Fax: +1 225/578-8957