Propelling Moore's Law into the Future

John Fourkas

Millard Alexander Professor of Chemistry, Department of Chemistry & Biochemistry Professor, Chemistry & Biochemistry

CURRENT RESEARCH

Advancing technology from basic research to industry

Moore's Law, first proposed by Gordon Moore, the co-founder of Intel, states that every 18 months, the number of transistors per square inch on integrated circuits will double. In other words, the number of simultaneous operations that can be performed on a computer chip doubles due to the rapid advancement of technology. Historically, Moore's Law has proven to be a consistent trend; however, for the first time in history, the speed of advancement has slowed. Dr. John Fourkas, Millard Alexander Professor of Chemistry at the University of Maryland, College Park, is working to change the way in which computer chips are written, a field called lithography, so that Moore's Law can continue to hold true. In order to continue to make ever smaller features on integrated circuits, novel approaches must be developed to solve difficult problems. Dr. Fourkas and his group have paved a path towards a completely new way of approaching such problems using visible light to achieve incredible resolution. His research, currently at a tipping point between fundamental work and industrial applications, will help to produce devices that are much less expensive and far more powerful in the near future.

Using lasers to study and sculpt matter at the nanoscale, Dr. Fourkas is developing entirely new methods for semiconductor lithography in which visible light can be used to create structures 100,000 times smaller than the width of a human hair. In order to achieve this goal, he and his group are exploring new technologies that involve the use of multiple colors of light. As pioneers in the development of multicolor lithography and having already demonstrated the basic premise of multicolor, visible light lithography, the next major...

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AFFILIATION

University of Maryland College Park Campus

EDUCATION

- B.S., in Chemistry with Honors, 1986 , California Institutie of Technology
- M.S., in Chemistry, 1986 , California Institute of Technology
- Ph.D., in Physical Chemistry, 1992 , Stanford University
- Postdoctoral Fellow, 1991-1993 , University of Texas
- Postdoctoral Fellow, 1993-1994 , Massachusetts Institute of Technology

AWARDS

- Beckman Young Investigator, 1997
- Research Corporation Cottrell Scholar, 1997
- Alfred P. Sloan Research Fellow, 1998
- Camille Dreyfus Teacher-Scholar, 1999
- Regents Faculty Award for Research, Scholarship and Creative Activity, 2012

RESEARCH AREAS

Technology, Chemistry, Materials Science / Physics, Nanotechnology

FUNDING REQUEST

Your contributions will support the continued research of Dr. John Fourkas, of the University of Maryland, College Park, as he uses lasers to study and sculpt matter at the nanoscale. Donations will fund the necessary $60K/year required to fund each graduate student and $100K/year required to support each postdoctoral researcher. Donations of any amount will aid in facilitating the acceleration of advances within Dr. Fourkas' group and thus lead to breakthroughs in industry at a faster pace. As society becomes more reliant upon technology each day, help to fund the research behind its development!