



**Southeastern Michigan Section
"Chapter IV" Speaker Series
Fri., Oct. 24, 2008, 2:00 pm
Chrysler Auditorium,
North Campus, University of Michigan
2121 Bonisteel Blvd., Ann Arbor, MI**

**Sponsored by: Southeastern Michigan IEEE Antennas & Propagation Society
University of Michigan Radiation Laboratory Student Programs Committee
The Department of Mechanical Engineering, University of Michigan**



The Quest for the Superlens

**Professor Xiang Zhang
University of California, Berkeley**

Abstract:

Recent theory predicted a new class of meta structures made of engineered sub wavelength entities - meta "atoms" and "molecules" which enable unprecedented electromagnetic properties that do not exist in the nature. Especially, the predicted superlens made of metamaterials that breaks the fundamental diffraction limit, which may have a profound impact in a wide range of applications such as nano-scale imaging, nanolithography, and ultra-dense data storage.

I'll discuss a few recent experiments that demonstrated these intriguing phenomena. We have created the first bulk optical metamaterials that demonstrate negative refraction. We have also demonstrated the unique superlens and hyperlens using carefully designed plasmonic material dispersions. I will further discuss a new technology based on the superlens for nano-scale lithography that may transform the next generation of nano-manufacturing, along with nano plasmonics for imaging and bio-sensing. The surface plasmon indeed promises an exciting engineering paradigm of "x-ray wavelength at optical frequency".

Speaker's Biography:

Professor Xiang Zhang is Chancellor's Professor at UC Berkeley and the Director of NSF Nano-scale Science and Engineering Center (NSEC) which includes Berkeley-Stanford-UCLA-UNCC-HP Labs. He also serves as Director of Department of Defense MURI Center on Metamaterials and Devices that includes Berkeley-MIT-UCLA-UCSD-Duke-Imperial College (UK) and as a faculty scientist in the Lawrence Berkeley National Laboratory.

Professor Zhang's current research focused on nano-scale science and technology, meta-materials, nano-photonics and bio-technologies. He has published more than 80 technical papers including publications in Science and Nature Materials. He has given over 120 invited, plenary or keynote talks at international conferences and institutions. Professor Zhang is on editorial boards of three journals. He is a co-chair of NSF Nanoscale Science and Engineering Annual Grantee Conference in 2004-2005, Chair of Technical Program of IEEE 2nd International Conference on Micro and Nano Engineered and Molecular Systems in 2007.

Professor Zhang's Hyperlens was selected as Discover Magazine's Top 100 Science Stories of 2007, and his research has been selected to be one of Top Ten Nanotechnology Breakthroughs in 2005, and Fast Breaking Papers, as one of the most cited recent papers in Physics in 2006, and R&D Magazine's top 25 the Most Innovative Products of 2006. He was selected as a Finalist for the 2005 Small Times Magazine 2005 Small Tech Best Researcher Award. His research was frequently featured by media such as MRS Bulletin (Materials Research Society), Laser Focus World, Photonics Spectra, Materials Today, Physics Web, San Jose Business Journal, R&D Magazine, as well as international media including BBC News, UK, Better Humans, Canada, The Hindu, India. Professor Zhang is a recipient of NSF CAREER Award (1997); Engineering Foundation Award (1997); SME Dell K. Allen Outstanding Young Manufacturing Engineer Award (1998) and ONR Young Investigator Award (1999). He was nominated in 2004 for the Millennium Technology Prize, the world's largest technology award. He was selected as a "Distinguished Lecturer" at University of Texas at Austin in 2004 and SEMETECH in 2005.

Professor Zhang received his Ph.D from UC Berkeley (1996). He was an assistant professor at Pennsylvania State University (1996-1999), and associate professor (1999-2003) and full professor (2003-2004) at UCLA prior to joining Berkeley faculty in 2004. He is also a member of NASA Institute of Cell Mimetic Space Exploration (CMISE) and member of Berkeley Nanoscience and Nanotechnology Institute (BNNI).

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