

David Schurig

108 Newell Street
Durham NC 27705
dschurig@duke.edu

Duke University
Department of ECE
Box 90291
Durham NC 27708



Education

Ph.D. **University of California, San Diego**
Physics, 2002

Indefinite Focusing

Sheldon Schultz (chair), Norman Kroll, Dimitri Basov, Paul Yu, Alan Schneider,
Marshall Rosenbluth

BS **University of California, Berkeley**
Engineering Physics, 1989

Grants and Fellowships

Funding Institution:	Intelligence Community Postdoctoral Fellowship Program
Subject:	High gain metamaterial lens antennas
Participation:	proposal author and postdoctoral researcher
Period:	September 2004 - September 2007

Selected Publications

Peer Reviewed Articles

Schurig D, Mock JJ, Justice BJ, Cummer SA, Pendry JB, Starr AF, Smith DR
"Metamaterial Electromagnetic Cloak at Microwave Frequencies."
Science, v314, n5801, p977-80 (2006)

Pendry JB, Schurig D, Smith DR
"Controlling electromagnetic fields."
Science, v312, n5781 (2006)

Schurig D
"Off-normal incidence simulations of metamaterials using FDTD."
International Journal of Numerical Modelling-Electronic Networks Devices and Fields, v19, n2 (2006)

Schurig D, Mock JJ, Smith DR
"Electric-field-coupled resonators for negative permittivity metamaterials."
Applied Physics Letters, v88 n4, artn041109 (2006)

Schurig D, Smith DR
"Sub-diffraction imaging with compensating bilayers."
New Journal of Physics, v7, artn162 (2005)

Schurig D, Smith DR
"Negative index lens aberrations."
Physical Review E, v70, n6 (2004)

Smith DR, Kolinko P, Schurig D
"Negative refraction in indefinite media."
Journal of the Optical Society of America B-Optical Physics, v21, n5, p1032-43 (2004)

Smith DR, Schurig D, Mock JJ, Kolinko P, Rye P
"Partial focusing by a slab of indefinite media"
Applied Physics Letters, v84, n13, p2244-6 (2004)

Schurig D, Smith DR
"Spatial filtering using media with indefinite permittivity and permeability tensors."
Applied Physics Letters, v82, n14, p2215-17 (2003)

Smith DR, Schurig D
"Electromagnetic wave propagation in media with indefinite permittivity and permeability tensors."
Physical Review Letters, v90, n7, p077405/1-4 (2003)

Smith DR, Schurig D, Rosenbluth M, Schultz S, Ramakrishna SA, Pendry JB
"Limitations on sub-diffraction imaging with a negative refractive index slab."
Applied Physics Letters, v82, p1506 (2003)

Smith DR, Schurig D, Pendry JB
"Negative refraction of modulated electromagnetic waves."
Applied Physics Letters, v81, n15, p2713-15 (2002)

Jin S, Tiefel TH, McCormack M, O'Bryan HM, Chen LH, Ramesh R, Schurig D
"Thickness dependence of magnetoresistance in La-Ca-Mn-O epitaxial films."
Applied Physics Letters, v67, n4, p557-9 (1995)

Schurig DA, Klunder GL, Shannon MA, Russo RE, Silva RJ.
"Signal analysis of transients in pulsed photoacoustic spectroscopy."
Review of Scientific Instruments, v64, n2, p363-73 (1993)

Book Chapter

Schurig D, Smith DR
"Lens Design with Negative Index and Indefinite Metamaterials"
in *NEGATIVE REFRACTION METAMATERIALS: Fundamental Properties and Applications*
G.V. Eleftheriades and K.G. Balmain (Editors) John Wiley & Sons

Teaching Experience

University of California, San Diego

Development

Preparing Future Physics Faculty

Year long instruction and discussion group aimed at preparing physics graduate students for teaching and other non-research related aspects of faculty positions.

Mentoring

California Space Institute

Supervised undergraduate students in developing space mission feasibility studies with occasional lecturing duties.

Teaching Assistant

Physical Measurements (Upper Division)

Physical measurement lab course with an emphasis on electronic methods and instrumentation.

Physics Laboratory—Electricity and Magnetism, Waves, and Optics

Experiments in optics, electronics.

Invited Presentations

Inaugural Lecture

"Transformation optics and metamaterials, a path to interesting devices"

Young Scientist Meeting on Metamaterials

Noviembre 2006, Sevilla, España

"Transformation optics, a path to invisibility cloaks, concentrators and other devices"

Red Raider Symposium

November 2006, Lubbock, Texas

"Electric Metamaterials."

Progress in Electromagnetics Research Symposium

March 2006, Cambridge, Massachusetts

"A New Electric Metamaterial and Two Application Areas."

International Workshop on Electromagnetic Metamaterials: Phenomenology and Applications

January 2006, Los Alamos National Laboratory

"Negative Index Lenses."

SPIE International Congress on Optics and Optoelectronics

September 2005, Warszawa, Rzeczpospolita Polska

"Negative Index Lenses Aberrations."

Optical Society of America, Information Photonics

June 2005, Charlotte, North Carolina

“Negative Index Materials.”

Physics Department Colloquium, California State University, Los Angeles
April 2004

“When Refraction is Negative.”

Physics Department Colloquium, California State University, Long Beach
October 2003

“Wave Propagation in Indefinite Media.”

Progress in Electromagnetics Research Symposium
October 2003, Honolulu, Hawaii

“Spatial Filtering Using Indefinite Media.”

Progress in Electromagnetics Research Symposium
October 2003, Honolulu, Hawaii

“Spatial Filtering Using Indefinite Media.”

DARPA Negative Index Metamaterials Workshop
May 2003, Arlington, VA

Patents

“Ambipolar media, wave propagation in media having indefinite permittivity and permeability tensors, and extension and uses of effective left handed media.”

U.S. Provisional Application No. 60/406,773
Filed 29 August 2002

“Indefinite Materials”

European Union Patent No. 0321.66867PCT
Filed 29 August 2003

“Self-adjusting assembly and method for close tolerance spacing”

United States Patent 6,784,663
Issued 31 August 2004

Professional Development

Spintronics: A Spin Transport Electronics Summer School
August 1998, South Lake Tahoe, CA

Professional Experience

Staff **Tristan Technologies Inc** (2000-2002)
physicist Product development of SQUID measurement systems.

Research **Lawrence Berkeley Lab** (1989-1991)
associate Pulse laser, photoacoustic spectroscopy. Nano- and pico-second pulsed laser
interaction with solid materials.

References

Professor David Smith
Duke University
ECE Department
Box 90291
Durham NC 27708
drsmith@duke.edu

Professor John B. Pendry
Imperial College
The Blackett Lab
London, SW7, 2BZ
United Kingdom
j.pendry@ic.ac.uk

Professor Dimitri Basov
UC San Diego
Physics Department, 0319
9500 Gilman Drive
La Jolla, CA 92093
dbasov@ucsd.edu

Professor Costas Soukoulis
Iowa State University
Physics Department
Ames, Iowa 50011
soukoulis@ameslab.gov

Teaching/Mentoring Reference

Professor Alan Schneider
UC San Diego
Mechanical & Aerospace Engineering, 0411
9500 Gilman Drive
La Jolla, CA 92093
ams@mae.ucsd.edu

Professor Ulf Leonhardt
School of Physics & Astronomy
University of St Andrews
North Haugh
St Andrews KY16 9SS
Scotland, UK
ulf@st-andrews.ac.uk

Professor Xiang Zhang
UC Berkeley
Mechanical Engineering
5130 Etcheverry Hall, Mail Stop 1740
Berkeley, CA 94720-1740
xzhang@me.berkeley.edu

Dr. Minas Tanielian
Microsystems & Electronics Technology
Boeing Phantom Works
P.O. Box 3999, MC 3W-81
Seattle, WA 98124-2499
minas.h.tanielian@boeing.com

Dr. Anthony Starr, President
SensorMetrix Inc.
5965 Pacific Center Boulevard, Suite 701
San Diego, CA 92121
astarr@sensormetrix.com

Professor Steve Cummer
Duke University
ECE Department
Box 90291
Durham NC 27708
cummer@ee.duke.edu

Professor Willie Padilla
Boston College
Physics Department
Chestnut Hill, MA 02467
Willie.Padilla@bc.edu