

Scott Crittenden

University of South Carolina
Department of Physics & Astronomy
712 Main Street, Room 404
Columbia, SC 29208

Phone: (803) 777-7607
Fax: (803) 777-3065

crittenden@physics.sc.edu

Education

- 2004 Ph.D. Physics, Purdue University
 Thesis: *Scanning Force Microscopy as a Tool for Bioelectronics*
 Major professor: Ron Reifenger
- 1997 B.S. Mathematics, University of Nevada, Reno

Professional Experience

- 2007—present Assistant Professor, Department of Physics & Astronomy, University of South Carolina, Columbia, SC.
- 2004—2007 Postdoctoral Fellow at the U.S. Army Research Laboratory. Studying the electrogenic properties of various anaerobic bacteria for use as microbial fuel cells. And investigating the extraction of complete tip-sample interaction potentials from amplitude-feedback Scanning Force Microscopy (SFM).
- 2000—2004 Research Assistant, Physics Department, Purdue University. Investigation of the properties of bacteriorhodopsin, in the form of purple membranes, with the SFM.
- 1997—2000 Teaching Assistant, Physics Department, Purdue University. Taught various recitation/laboratory sessions for Freshman and Sophomore level physics courses.
- 1992—1997 Co-founder, co-owner and co-operator, InterComm Internet Services, Inc., a local Internet Service Provider in Reno, NV. Primarily responsible for system and network administration (maintenance of all servers, networking routers, extensive configuration and programming, etc.). Shared responsibility for day-to-day business operations (management, accounting, sales, etc.).

Research Interests

Scanning Probe Microscopy, molecular conduction, electrogenic bacteria, bacterial evolution, the physics of life, complex systems, nonequilibrium thermodynamics.

Publications

9. *Effect of electron mediators on current generation and fermentation in a microbial fuel cell*, C. Sund, S. McMasters, S. Crittenden, L. Harrell, J. Sumner, Applied Microbiology and Biotechnology **76** (2007), 561.
8. *Mediating Electron Transfer from Bacteria to a Gold Electrode via a Self-Assembled Monolayer*, S. Crittenden, C. Sund, J. Sumner, Langmuir **22** (2006), 9473
7. *Probing Attractive Forces at the Nanoscale Using Higher Harmonic Dynamic Force Microscopy*, S. Crittenden, A. Raman, and R. Reifenger. Phys. Rev. B **72**, (2005), 235422

6. *Soft Lithography Based Micron-scale Electrophoretic Patterning of Purple Membrane*, S. Crittenden, J. Hillebrecht, D. Inerowicz, F. Regnier, R. Birge, and R. Reifenger. *J. Micromech. Microeng.* **15** (2005), 1494-1497
5. *Scanning Force Microscopy as a Tool for Bioelectronics*, S. Crittenden, Ph.D. Thesis 2004
4. *Enhanced Mass Sensing Using Torsional and Lateral Resonances in Microcantilevers*, L. B. Sharos, A. Raman, S. Crittenden, and R. Reifenger. *Applied Physics Letters* **84** (2004), 4638-4640.
3. *Force Constancy and its Role on Haptic Perception of Virtual Surfaces*, ACM Transactions on Applied Perception, S. Choi, L. Walker, H. Tan, S. Crittenden, and R. Reifenger. *Applied Perception* **2** (2005) 89-105.
2. *Humidity Dependent Open-Circuit Photovoltage from a BR/ITO Bioelectronic Heterostructure*, S. Crittenden, S. Howell, R. Reifenger, J. Hillebrecht, and R. Birge. *Nanotechnology* **14** (2003), 562-565.
1. *Correlating the Location of Structural Defects with the Electrical Failure of Multiwalled Carbon Nanotubes*, P. J. de Pablo, S. Howell, S. Crittenden, B. Walsh, E. Graugnard, and R. Reifenger. *Applied Physics Letters* **75** (1999), 3941.

Presentations, Proceedings, & Posters

24. *Electrogenic Bacteria: Microbial Fuel Cells & Chemoelectric Biosensors*, Molecular Conduction Workshop, Purdue University, July 2007, **S. Crittenden**, J. Sumner, C. Sund. Invited talk.
23. *Electrogenic Bacteria & Nonlinear Scanning Force Microscopy Cantilever Dynamics*, Northwestern University, March 2007, **S. Crittenden**.
22. *Electrogenic Bacteria & Nonlinear Scanning Force Microscopy Cantilever Dynamics*, Kansas State University, February 2007, **S. Crittenden**.
21. *Electrogenic Bacteria & Nonlinear Scanning Force Microscopy Cantilever Dynamics*, Southern Illinois University, February, March 2007, **S. Crittenden**.
20. *Electrogenic Bacteria & Nonlinear Scanning Force Microscopy Cantilever Dynamics*, Michigan Technological University, February 2007, **S. Crittenden**.
19. *Electrogenic Bacteria & Nonlinear Scanning Force Microscopy Cantilever Dynamics*, University of South Carolina, January, March 2007, **S. Crittenden**.
18. *Optical System Harmonic Distortion in Scanning Force Microscopes* (poster), Frontiers in Scanning Probe Microscopy Workshop, Purdue University, October 2006, **S. Crittenden**.
17. *Rapid Screening of Microbial Fuel Cell Components*, 42nd Power Sources Conference, June 2006, **S. Crittenden**, J. Sumner, C. Sund.
16. *Rapid Screening of Microbial Fuel Cell Components*, Electrochemical Society Annual Conference, May 2006, **S. Crittenden**, J. Sumner, C. Sund.
15. *Biomaterials & Scanning Force Microscopy*, Materials Science Department, University of North Texas, May 2006, **S. Crittenden**. (Invited talk)
14. *Intrinsic Harmonic Distortion of Atomic Force Microscopy Cantilever Position Detection Methods*, ASME International Mechanical Engineering Congress and Exposition, November 2005, **S. Crittenden**. (Invited talk and proceedings paper)

13. *Microbial Fuel Cells: A Biotechnological Approach to Power Generation*, American Chemical Society National Meeting, December 2005, **J. Sumner**, S. Crittenden.
12. *Van der Waals and Electrostatic Force Imaging with Higher Harmonic Noncontact Scanning Force Microscopy*, MRS Fall Meeting, November, 2004, **S. Crittenden**, A. Raman, and R. Reifenger.
11. *Van der Waals and Electrostatic Force Imaging with Higher Harmonic Noncontact Scanning Force Microscopy*, Workshop on Advanced Dynamic AFM Methods, October, 2004, Tres Cantos, Spain, **R. Reifenger**, S. Crittenden, A. Raman.
10. *Imaging at Higher Harmonics & Bending Modes with a Scanning Force Microscope*, Purdue University, February 16, 2004, **S. Crittenden**, S. Hu, A. Raman, R. Reifenger.
9. *Investigating Issues in Biomolecular/Semiconductor Device Applications*, Army Research Laboratory, November 2003, **S. Crittenden**, R. Reifenger.
8. *Investigating Issues in Biomolecular/Semiconductor Device Applications* (Poster), International Symposium on Clusters and Nano-Assemblies, November 2003, **S. Crittenden**, J. Hillebrecht, S. Hu, A. Raman, R. Birge, R. Reifenger.
7. *Protein-Based Bioelectronic Heterostructures*, Wake Forest University, October 2003, **S. Crittenden**, R. Reifenger.
6. *Protein-Based Bioelectronic Heterostructures*, University of Ohio, Akron, October 2003, **S. Crittenden**, R. Reifenger.
5. *Protein-Based Bioelectronic Heterostructures* (Poster), Trends in Nanotechnology 2003, November 2003, **S. Crittenden**, S. Hu, A. Raman, R. Reifenger.
4. *Effects of Internal Resonance on the Nonlinear Dynamics of Tapping Mode AFM Microcantilevers*, American Control Conference, June 2003, **S. Hu**, A. Raman, S. Crittenden, R. Reifenger.
3. *Patterned Electrophoretic Deposition of Purple Membrane*, American Physical Society, March 2003, **S. Crittenden**, S. Howell, J. Hillebrecht, R. Birge, R. Reifenger.
2. *Bacteriorhodopsin for Hybrid Biological-Semiconductor Devices* (Poster), Nanotech 2003, **S. Crittenden**, S. Howell, J. Hillebrecht, R. Reifenger, R. Birge.
1. *Bacteriorhodopsin as an Active Component in Hybrid Biomolecular-Semiconductor Electronics* (Poster), Nanobiology 2001, **S. Crittenden**, S. Budy, K. Wise, R. Reifenger, R. Birge.

Awards

ORAU Postdoctoral Fellowship

ASEE Postdoctoral Fellowship

Outstanding Poster, Trends in Nanotechnology
2003

Professional Societies

American Association for the Advancement of
Science

American Chemical Society

American Physical Society

American Society of Microbiology

Biophysical Society

Electrochemical Society

Materials Research Society