

Alia Sabur

Personal

Birthdate: February 22, 1989 Birth Place: NYC

Employment

- Spring 2008 – 2009 Konkuk University, Seoul, S. Korea
International Professor as Research Liaison with Stony Brook University
Department of Advanced Technology Fusion
- Spring 2008 Southern University at New Orleans
Assistant Professor of Mathematics and Physics
Courses: College Algebra, Pre-Calculus, Physics I and II

Education

Ph.D. Materials Science Engineering, Drexel University, Philadelphia, PA (ABD)

- Concentrations: Surface-enhanced Raman spectroscopy, Plasmonics
- Advisor: Dr. Selcuk Guceri

M.S. Materials Science Engineering, Drexel University, Philadelphia, PA, 2006

B.S. Applied Mathematics, Stony Brook University, N.Y., Summa Cum Laude, 2003

- Concentrations: Physics, Music

Fellowships/Awards

- Guinness World Record as Youngest Professor
- Accepted: NDSEG (Dept. of Defense) Fellowship, Dean's Fellowship, 2004
- Awarded: GAANN, NASA, NSF (hon. mention)
- Golden Key International Honour Society, Scholarship, awarded to one senior, 2003
- AFRL, Edwards Air Force Base, research rotation, 2004

Research Interests

- Modeling and experimental measurements of the optical and electromagnetic response of helical, tapered and coaxial metamaterials.
 - Finite Difference Time Domain (FDTD) modeling of plasmonic structures
 - Optimization of SERS substrates for trace detection of biological materials
 - Stochastic calculus and derivatives pricing
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Experience/Skills/Analytical Techniques:

- Visible and UV Raman Spectroscopy Superuser
- Infrared Spectroscopy
- Lumerical FDTD software
- Malvern Zetasizer
- Atomic Force Microscopy

Publications

- Sabur, A.; Havel, M.; Gogotsi, Y., SERS intensity optimization by controlling the synthesis of faceted gold nanoparticles. *J. Raman Spect.* **2008**, 39, 61-67.
- Sabur, A.; Surface Enhanced Raman Spectroscopy Carbon Nanotube Based Cellular Probes. *AZojono* **2007**, 3.
- Sabur, A.; Staii, C.; Garipcan, B.; Nonnenmann, S.; Nabet, B.; Spanier, J.E., Excitation of Local Field Enhancement on Silicon Nanowires and Nanocones. *In preparation*.
- Sabur, A.; Spanier, J: Finite-Difference Time-Domain Study of Field Enhancement from Plasmonic Lenses. *In preparation*.
- Mattia, D.; Korneva, G.; Sabur, A.; Friedman, G.; Gogotsi, Y., Multifunctional carbon nanotubes with nanoparticles embedded in their walls. *Nanotechnology* **2007**, (18), 155305.
- Layton, B.; D'Souza, A.; Zeiger, A.; Sabur, A.; Dampier, W.; Does collagen's triglycine repeat length explain an interdomain transfer event from a eukaryote into *Trichodesmium erythraeum*? *Journal of Molecular Evolution*. *Accepted*.

Conference presentations/posters

- Sabur, A.; Havel, M.; Korneva, G.; Mattia, D.; Guceri, S.; Gogotsi, Y.; Optimization of Faceted Metal Nanoparticles for Surface-Enhanced Raman Spectroscopy, MRS Fall Meeting, Boston MA, 2006
 - Sabur, A.; Gogotsi, Y., SERS intensity optimization by controlling the synthesis of faceted gold nanoparticles, OSA Fall Meeting, Rochester NY, 2006
 - Mattia, D.; Korneva, G.; Sabur, A.; Friedman, G.; Gogotsi, Y., Embedding Nanoparticles in the Walls of Carbon Nanotubes, MRS Fall Meeting, Boston MA, 2006.
 - Mattia, D.; Sabur, A.; Gogotsi, Y.; Surface Functionalization to Control the Wetting Behavior of Nanostructured Carbons, 231st ACS National Meeting, Atlanta GA, 2006
 - Sabur, A.; Laim, L.; McGuckin, T.; Garipcan, B.; Cao, L.; Atchison, J.; Leaffer, O.; Martin, R.; Gallo, E.; Nonnenmann, S.; Nabet, B.; Spanier, J., On the near-field electromagnetic scattering from functionalized silicon nanocones and nanowires. Drexel Research Day 2007, ASM Philadelphia Chapter Poster Session 2007
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Outreach Activities

- Panelist, *Women in Science and Engineering Symposium* at the FIRST Robotics Championship, Atlanta, 2005
- Invited talk, K-12 STEM Education “*Integrating Physics and Music in K-12 Curriculum*”
- Served as Panelist, *Graduate Fellowship Workshop*, Drexel University
- Invited talk, Drexel Materials Characterization Facility opening: *SERS in Nanotechnology*
- Served as mentor to *RoboWhizards*, a middle school robotics team.
- Numerous lab talks and tours including: Drexel MSE two-day course, ASM Materials Camp, REU, Drexel HS Outreach Programs
- Charter member, National Children’s Museum
- Member, Board of Directors, American Red Cross, 2004

Undergraduate Research/Activities/Awards

- Celebration of Undergraduate Achievements, presentations, 2000, 2001, 2002, 2003
 - Applied Math and Statistics, Theory and Computation of Protein Folding 2002-2003
 - Physics, Using Coherent Fiber Optic Cables to Produce Hollow Beams 2000-2001
 - Neurobiology, Chromosome Structure and Function 1999
- Tutor, Math Learning Center: calculus, linear algebra, complex analysis
- Awarded VIGRE research grant and Presidential Scholarship
- Representative, Undergraduate Studies Committee, Music Department, 2002

Featured Articles, Media Appearances and Public Performances

Print: Philadelphia Inquirer, New York Times, New York Post, Newsday, Star Ledger, Glamour, Teen People, Washington Post, El Diario, N.Y. Times Upfront, Spot On, Time Out N.Y., Time for Kids, AP, NY Daily News, La Nacion, ASEE, NSPE, Innovation Philadelphia.

TV: Jimmy Kimmel Live, Today Show, Fox and Friends, Fox News, CNN, Headline News, NewsNight with Aaron Brown, Lou Dobbs Tonight, Today in New York, Good Morning America, The View, Inside Edition, Deborah Norville Tonight, Japan TV, Teen Kid News, Montel Show, Rosie O’Donnell Show

Additional numerous national articles, appearances and performances on local television.

Research Statement

My current research effort is focused on improving and optimizing nanoparticle-functionalized nanomaterials for chemical identification via Raman spectroscopy. I have developed a number of improved structures, including silicon nanowires, faceted nanoparticles, plasmonic lenses and nanotube-based cellular probes. These have an extremely broad range of applications including high capacity data storage, near-field microscopy and biological sensors. The main scientific thread in my work is the coupling of electromagnetic radiation to dielectric and metallic media. Typically metallic structures are used to create an enhanced electric field using surface plasmon resonances (SPR), which can enhance absorption, elastic and inelastic scattering. However, metal-semiconductor nanostructures can allow greater efficiency in the enhancement. I endeavored to leverage the combined value of metal nanoparticles and the connectivity and other benefits of nanowires and nanotubes in the development of surface-enhanced Raman spectroscopy (SERS) materials, with unexpected performance and enhanced functionality.

Teaching Philosophy

My goal as a teacher is to bring a true understanding to the students. Classes in the sciences are often taught in a rote way with entirely passive learning, turning them off to these subjects. In addition, students with non-traditional backgrounds are often insecure about their abilities to learn subjects in the sciences. Students focus on memorization, which does not allow them to take their knowledge and apply it in other situations. Often even high-scoring students cannot verbalize clearly what it is they have learned in a particular class, or forget it quickly after the class has ended. I believe that only through a synergy of classwork, math, and lab work can the students gain a real understanding that will stay with them in whatever field they choose to pursue. Because I am closer in age to undergraduate students, I can understand better what they may find interesting, or difficult. I find that I have an intuitive understanding and ability to help students gain the confidence and knowledge that they will be able to retain.
