

Babak Sanii

Lawrence Berkeley National Laboratory
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- EDUCATION University of California, Davis October 2004 - June 2008
Ph.D. Applied Science, mentor: Atul N. Parikh, 2008 Davis, California
'Manipulating Molecular Films: Directing Lipid Assembly With Topography and Surface-Energy.'
6 publications in 3.5 years, 3 more in preparation. Mentored 8 students. 3.9 GPA.
M.S. Applied Science, 2007
- Cornell University August 1995 - December 1999
M.Eng. Applied Physics, December, 1999 Ithaca, New York
B.S. Engineering Physics, May, 1999
- PROFESSIONAL APPOINTMENTS Lawrence Berkeley National Laboratory, The Molecular Foundry August, 2008 - Present
Post-doc in the Imaging and Manipulation of Nanostructures group Berkeley, California
Developing a novel AFM probe/detection scheme for imaging soft, living matter in fluids.
Also investigating lipid films as fluid substrates.
Mentors: Paul Ashby and Miquel Salmeron
- Pixar Animation Studios, Color Science and Output October, 2001 - October, 2004
Lead Research Engineer Emeryville, California
Led the team that developed the color pipeline, image mastering software and optical systems used to produce the feature films, *Finding Nemo* and *The Incredibles*. Consultant while at UC Davis.
- NASA / Jet Propulsion Lab, Optical Communications Group 1997, 1998, 2000-2001
Optical Communications Engineer Pasadena, California
Developed and field-tested space-based laser communication systems.
- Corning Fiber, Measurement Development Engineering Summer/Fall 1999
Instrumentation Engineer (summer intern / part-time while at Cornell) Corning, New York
- TEACHING EXPERIENCE University of California, Davis
Guest seminars in the following undergraduate courses March 2006 - Present
Introduction to Biophotonics (Lipid Spreading), Introduction to Optics (Fluorescence), Fourier Optics (Holography), Optics II (Holography), Introduction to Computational Science (Color Theory), How Things Work (Special Relativity, Optics).
- Teaching Assistant** EAD 108A and B, Optics I and II October 2004 - March, 2005
Designed and taught weekly hands-on laboratory experiments covering topics such as holography, diffraction and interferometers; graded homework assignments and lab reports; held office hours.
- San Quentin Prison / Patten College
Section Instructor for Math 50B Precalculus 2003
Reviewed pre-college mathematics with inmates in the college program.
- Cornell University
Teaching Assistant, ENGR110 Lasers and its applications 1998 - 1999
Taught weekly labs on laser applications and design; held office hours; graded lab reports.

SERVICE IN ACADEMIA	Journal referee for <u>JACS</u> and <u>Langmuir</u> Recruitment advisory committees: Provost/Vice-Chancellor ; Vice-Provost of IT	Engineering dean's advisory committee Course management tools subcommittee Chancellor's Fall conference on graduate study
HONORS AND AWARDS	Graduate research and education in adaptive bio-technology fellowship (UC) Big Bang business plan competition finalist and audience award winner (UC Davis) Graduate summer fellow (UC Davis)	Post teaching fellowship (Cornell) Hoffman masters fellowship (Cornell) NASA certificate of recognition (JPL) Eagle-eye award (Pixar) Brass-shim award (Pixar)
MENTORSHIP	Shari Williams, Contra Costa Community College (<i>diffusion analysis of lipids and S-layer proteins</i>) Phuong Dang and Jasmine Nazari, UCD (<i>lipids on silicon nitride for electron microscopy</i>) Kathy Nguyen, UCD optical science undergraduate (<i>thin film collisions</i>) Sarah Hsia, UCD optical science undergraduate (<i>a user-interface for FRAP analysis software</i>) Stephen Sasaki, Fresno high school student (<i>quantitative fluorescence analysis spreadsheet</i>) Josh Hanson, NMT physics undergraduate (<i>UV imaging device</i>) Derek Fung, UCD optical science undergraduate (<i>building a drop-shape analyzer</i>) Cori Jackson, UCD optical science undergraduate (<i>designing a drop-shape analyzer</i>) Jameson Freethy and Max Josephson, Vacaville highschool students (<i>interferometric photo-bleaching</i>)	
RELATED SKILLS	Wet lab Surface preparations such as etching, self-assembled monolayers (SAM), UV lithography, elastomer PDMS wrinkling, lipid deposition (vesicle-fusion/spreading) and protein insertion. Instrumentation Fluorescence microscopy (confocal and TIRF), Imaging ellipsometry, Atomic force microscopy (Veeco and Asylum AFMs), SEM, FIB, Dichroic Fourier-transform infrared spectroscopy (Bruker FTIR), Drop shape analysis and Dynamic light scattering (DLS particle sizing). Computing C++, C, Objective-C, Python, Matlab, LaTeX, MediaWiki, Subversion and Perforce. Languages English, French and Farsi.	
PRESS	B. Sanii and P.D. Ashby. Imaging soft materials in fluids by nanowire detection. <u>SPIE Newsroom</u> , 2009. A. Biswas, B. Sanii , M. Wright and N.A. Page. Multi-Beam Beacon Assembly. <u>NASA Tech Briefs</u> NPO 21119, 2001.	
PUBLICATIONS	B. Sanii and P.D. Ashby. High sensitivity deflection detection of nanowires. [in review] 2009. B. Sanii , A.W. Szmodis, D.A. Bricarello, A.E. Oliver and A.N. Parikh. Frustrated phase transformations in supported, interdigitating lipid bilayers. [in review] 2009. B. Sanii , K. Nguyen, J.O. Rädler and A.N. Parikh. Evidence of Interleaflet Slip in Self-Spreading Membranes. <u>ChemPhysChem</u> , 2009. A.E. Oliver, V. Ngassam, P. Dang, B. Sanii , H. Wu, C.K. Yee, Y. Yeh, and A.N. Parikh. Cell Attachment Behavior on Solid and Fluid Substrates Exhibiting Spatial Patterns of Physical Properties. <u>Langmuir</u> , 2009. B. Sanii and A.N. Parikh. Patterning fluid and elastomeric surfaces using short-wavelength UV radiation and photo-generated reactive oxygen species. <u>Ann. Rev. of Phys. Chem.</u> , 2008. A.E. Oliver, E.L. Kendall, M.C. Howland, B. Sanii , A.P. Shreeve and A.N. Parikh. Protecting, Patterning, and Scaffolding Supported Lipid Membranes Using Carbohydrate Glasses. <u>Lab on a Chip</u> 2008. B. Sanii , A.M. Smith, R. Butti, A.M. Brozell and A.N. Parikh. Bending Membranes on Demand: Fluid Phospholipid Bilayers on Topographically Deformable Substrates. <u>Nano Letters</u> 2008. B. Sanii and A.N. Parikh. Surface-energy dependent spreading of lipid monolayers and bilayers. <u>Soft Matter Communication</u> (Cover, Hot article), 2007. M.C. Howland, A.W. Szmodis, B. Sanii , and A.N. Parikh. Characterization of Physical Properties of Supported Phospholipid Membranes Using Imaging Ellipsometry at Optical Wavelengths. <u>Biophys. J.</u> (Cover), 2007.	

A. Brozell, M. Muha, **B. Sanii** and A.N. Parikh. A New Class of Supported Membranes: Formation of Fluid Phospholipid Bilayers on Photonic Band-Gap Colloidal Crystals J. Am. Chem. Soc. Communication, 2006.

RESEARCH
PROPOSALS

Forced permeation of ions through model lipid membranes: in situ X-ray spectroscopy under electrochemical control, 2009 (ALS Beamtime)
G.R.E.A.T. Training Grant, University of California, 2006-2008 (*Awarded \$100k*)
Atmospheric Visibility Monitoring System, NASA, 2000 (*Awarded \$170k*)
Near Earth Optical Acquisition and Communication Exploration, NASA, 2000 (*Awarded \$20k*)

PATENT
APPLICATIONS

A nanowire AFM probe for imaging soft materials (*LBL, Application # 61150307*)
Two-dimensional array spectroscopy method and apparatus (*Pixar, U.S.P.# 7,366,349*)
Anamorphic recording method and apparatus (*Pixar, U.S.P.# 10981307*)
Flat panel image to film transfer method and apparatus (*Pixar, U.S.P.# 7,463,821*)
Flat panel digital film recorder and method (*Pixar, U.S.P.# 10698985*)
Multibeam beacon laser assembly for optical communications (*JPL, U.S.P.# 6922430*)
Method and Apparatus for Measuring Refractive Index (*Corning, WO2001048460*)

PUBLISHED
ABSTRACTS AND
CONFERENCE
PROCEEDINGS

J. Townsend, **B. Sanii**, A. Lehman, A. Do, S. Dixon, A. Parikh, and K. Lam. 3-nitro-tyrosine as an internal quencher of autofluorescence enhances the compatibility of fluorescence based screening of OBOC combinatorial libraries. *American Peptide Symposium*, Bloomington, IN, 2009.

B. Sanii and P.A. Ashby. Nanowires as AFM Cantilevers: A detection scheme to improve imaging soft matter in fluids. *Linz Winter Workshop*, Linz, Austria, 2009.

T. Laue, K. Nguyen, **B. Sanii**, M. Xu, C. Franx, H. Fuchs, A.N. Parikh, S. Lenhart. pH dependent formation of spread supported lipid bilayer arrays formed by multiplexed lipid dip-pen nanolithography. *Linz Winter Workshop*, Linz, Austria, 2009.

B. Sanii and A.N. Parikh. Mechanisms of Lipid Spreading at Hydrophobic and Hydrophilic Surfaces. *Biomembrane Frontiers*, Davis, CA, 2008.

A.E. Oliver, E.L. Kendall, M.C. Howland, **B. Sanii**, A.M. Brozell and A.N. Parikh. Sugar Glasses Aid Deposition of Supported Membranes as Micro-arrays or Over Technologically Attractive Lipophobic Substrates. *Biomembrane Frontiers*, Davis, CA, 2008.

A.M. Brozell, M. Muha, A. Abed-Amoli, D. Bricarello, **B. Sanii**, S. Inaba, E.L. Kendall, A.O. Oliver and A.N. Parikh. Functionalized Silica Colloidal Crystal Substrates for Lipid Biomembranes. *Biomembrane Frontiers*, Davis, CA, 2008.

B. Sanii, A.M. Smith, R. Butti, A.M. Brozell and A.N. Parikh. Bending Membranes on Demand: Fluid Phospholipid Bilayers on Topographically Deformable Substrates. *Biophysical Society Meeting*, Long Beach, CA, 2008.

B. Sanii, S. Hsia and A.N. Parikh. A FRAP Diffusion Analysis Program for Patterned and Anisotropic Samples. *Biophysical Society Meeting*, Long Beach, CA, 2008.

B. Sanii, A.M. Smith, A.M. Brozell and A.N. Parikh. Curvature-Dynamics Interplay in Fluid Lipid Membranes. *DOE Molecular Contractor's Meeting*, Warrenton, CA, 2007.

B. Sanii and A.N. Parikh. Mechanisms of Monolayer and Bilayer Spreading on Hydrophobic and Hydrophilic Surfaces. *Novel Model Systems for Bimolecular Lipid Membranes*, Schloss Ringberg, Germany, 2007.

K, Nguyen, **B. Sanii**, and A.N. Parikh. Optical Evidence for Self-Healing in Fluid Membranes. *Undergraduate Research Conference*, UC Davis 2007.

B. Sanii and A.N. Parikh. Mechanisms of Monolayer and Bilayer Spreading on Hydrophobic and Hydrophilic Surfaces. *Biophysical Society Meeting*, Baltimore, MD, 2007.

B. Sanii, and A.N. Parikh. Mechanisms of Monolayer and Bilayer Spreading on Hydrophobic and Hydrophilic Substrates. *ACS National Meeting*, San Francisco, California, September, 2006. [Speaker]

- B. Sanii** and A.N. Parikh. Spontaneous Spreading of Phospholipids on Low Energy Hydrophobic Solids. *ACS Colloid and Surface Science Symposium* Boulder, Colorado, June, 2006. [**Speaker**]
- H. Hemmati, M. Wright, **B. Sanii** et al. Multigigabit Data-rate Optical Communication Depicting LEO-to-GEO and GEO-to-ground Links. Proceedings of SPIE, Free-Space Laser Communication Technologies XIV, G. Stephen Mecherle; Ed. 2002.
- B. Sanii**. Calibrating Surface Weather Observations to Atmospheric Attenuation Measurements. Proceedings of SPIE, Free-Space Laser Communication Technologies XIII, G.Stephen Mecherle; Ed. July 2001. [**Speaker**]
- A. Biswas, **B. Sanii** and M. Wright. 45km Horizontal-path Optical Link Experiment. Proceedings of SPIE, Free-Space Laser Communication Technologies XIII, G. Stephen Mecherle; Ed. 2001.

INVITED TALKS

- A Simplified FRAP Algorithm for Measuring Diffusion on Patterned, Anisotropic or Sloppy Samples. *MAG Bio-systems / Photometrics*, Pleasanton, CA, 2008.
- Membrane Dynamics at the Solid-Liquid Interface: Spreading, Interdigitation and Domain Gellation. *Forschungszentrum Karlsruhe*, Eggenstein-Leopoldshafen, Germany, 2007.