

**CONTACT
INFORMATION**

Institute for Collaborative Biotechnologies
University of California, Santa Barbara
Santa Barbara, CA 93106-5100
USA

Voice: (805) 617-3545
Fax: (805) 202-4213
E-mail: bdp@piorek.net
Web: <http://www.piorek.net>

**RESEARCH
INTERESTS**

Microfluidics, multiphase transport processes, chemical analysis system design, micro/nanoscale reactor design, surface chemistry, DNA chemistry, electrochemistry, cell-free systems

**ACADEMIC
EXPERIENCE**

University of California, Santa Barbara, Santa Barbara, California USA

Project Scientist,

Institute for Collaborative Biotechnologies

November 2009 to Present

- Working with Prof. Carl Meinhart and Prof. Martin Moskovits
- Fundamental research towards multiphase micro/nanoscale chemical and biomolecular processes

Graduate Student,

Department of Mechanical Engineering

September 2004 to December 2008

- Committee: Prof. Carl D. Meinhart, Prof. Sanjoy Banerjee, Prof. Martin Moskovits, Prof. Tom Soh
- Co-invented and investigated Free Surface Microfluidics
- Developed MEMS-based detector of vapors emanated from explosive compounds and narcotics at room temperature and co-founded the startup company SpectraFluidics, Inc. to commercialize the technology
- Awarded *Best Ph.D. Dissertation Award, 2008-2009* by department faculty

Postgraduate Researcher,

Department of Chemical Engineering

July 2002 to September 2004

- Investigated fluid shear stresses with nanoscale resolution using Atomic Force Microscopy (AFM)
- Investigated microtubule dynamics using AFM and microfluidic cell-free systems
 - Designed/conducted AFM experiments relating microtubule self-assembly dynamics to chemotherapeutic agent concentration for protein structure/function analysis and efficacy studies
 - Designed/fabricated microfluidic systems for in vitro AFM studies of microtubule dynamics
 - Designed/implemented custom AFM automation software and algorithms including machine vision

Undergraduate Researcher,

Department of Chemical Engineering

September 2000 to July 2002

- Investigated microbreaking phenomena in macro-scale open channel flows
 - Designed gas/liquid transport experiments and experimental equipment
 - Conducted gas/liquid transport experiments and analyzed data
 - Designed and implemented custom PIV analysis software

Undergraduate Student,

Department of Chemical Engineering

September 1999 to June 2002

- Undergraduate Scholarships

- Robert Medley Memorial Chemistry Department Scholarship
- Major William C. Carr Engineering Memorial Scholarship

EDUCATION

University of California, Santa Barbara, Santa Barbara, California USA

Ph.D., Mechanical Engineering, December 2008

- Advisor: Prof. Carl D. Meinhart
- Thesis Topic: Transport Processes in Free Surface Microfluidics
- Area of Study: MEMS, Fluid Dynamics, Chemistry/Biochemistry, Design of chemical detection systems

B.S., Chemical Engineering, June 2002

- Advisor: Prof. Sanjoy Banerjee
- Completed specialty track in Materials Science
- Completed specialty track in Mathematics and Process Control

PROFESSIONAL EXPERIENCE

Co-founder and Vice President of Research and Development, SpectraFluidics, Inc. **November 2008 to Present**
 Supervisor: Dr. Carl Meinhart, CTO

Technical Consultant, Gas Reaction Technologies, Inc. **July 2004 to Present**
 Supervisor: Dr. Daniel Auerbach, CTO

PUBLICATIONS

Changsong Ding, Gaurav Soni, Payam Bozorgi, Brian D. Piorek, Carl D. Meinhart, Noel C. MacDonald, "A Flat Heat Pipe Architecture Based on Nanostructured Titania". *J. MEMS* (2010) **99** 1-7

Seung Joon Lee, Brian D. Piorek, Carl D. Meinhart and Martin Moskovits, "Photoreduction at a Distance: Facile, Nonlocal Photoreduction of Ag Ions in Solution by Plasmon-Mediated Photoemitted Electrons". *Nano Lett.* (2010) **10** 4 1329-1334.

Brian D. Piorek, Seung Joon Lee, Juan G. Santiago, Martin Moskovits, Sanjoy Banerjee and Carl D. Meinhart, "Free-surface microfluidic control of surface-enhanced Raman spectroscopy for the optimized detection of airborne molecules". *Proc. Natl. Acad. Sci. USA* (2007) **104** 48 18898-18901.

Patrick E. Freudenthal, Matt Pommer, Carl D. Meinhart and Brian D. Piorek, "Quantum nanospheres for sub-micron particle image velocimetry". *Exp. Fluids* (2007) **43** 525-533.

Brian Piorek, Adam Mechler, Ratnesh Lal, Patrick Freudenthal, Carl Meinhart and Sanjoy Banerjee, "Nanoscale resolution microchannel flow velocimetry by atomic force microscopy". *Appl. Phys. Lett.* (2006) **89** 153123-153125.

Yi Xiao, Brian D. Piorek, Kevin W. Plaxco and Alan J. Heeger, "A Reagentless Signal-On Architecture for Electronic, Aptamer-Based Sensors via Target-Induced Strand Displacement". *J. Am. Chem. Soc.* (2005) **127** 51 17990-17991.

Adam Mechler, Brian Piorek, Ratnesh Lal and Sanjoy Banerjee, "Nanoscale velocity-drag force relationship in thin liquid layers measured by atomic force microscopy". *Appl. Phys. Lett.* (2004) **85** 17 3881-3883.

CONFERENCE PRESENTATIONS Brian Piorek*, Carl Meinhart, Seung Joon Lee, Sanjoy Banerjee and Martin Moskovits, "Free Surface Microfluidics for Explosives Detection". *XXII International Congress of Theoretical and Applied Mechanics*, August 28, 2008.

 Brian Piorek*, Seung Joon Lee, Juan Santiago, Martin Moskovits, Sanjoy Banerjee and Carl Meinhart, "Detection of Gas-Phase Species by a Microfluidic SERS Apparatus". *2006 Annual Meeting, American Institute of Chemical Engineers*, November 13, 2006.

CONFERENCE PAPERS Changsong Ding, Gaurav Soni, Payam Bozorgi, Brian Piorek, Carl D. Meinhart, and Noel C. MacDonald, "A Titanium Based Flat Heat Pipe". *Proceedings of IMECE2008, #IMECE2008-68967, ASME International Mechanical Engineering Congress and Exposition*, October 31–November 6, 2008, Boston, MA, USA.

 Ira Leifer, Brian Piorek, Walter Smith and Sanjoy Banerjee, "Large-Scale Turbulence Generation and Microbreaking Waves". *Third International Symposium on Turbulence and Shear Flow Phenomena*, 2003, Sendai, Japan.

PATENTS February 2010: 5 patents submitted, 3 in preparation in the fields of MEMS and chemical detection.

PERSONAL REFERENCES Ph.D. Advisor: Prof. Carl D. Meinhart (meinhart@engineering.ucsb.edu)
 Additional references available upon request

CITIZENSHIP USA