

# Sean Branagan

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## Current

*Postdoctoral Research Associate*, April 2012 – present

University of Notre Dame, Notre Dame IN

### Responsibilities:

- Lead technical development of research projects related to mass-limited chemical analysis and infectious disease diagnostics
- Coordinate research activities within a team of graduate/undergraduate students addressing problems within this general area
- Present scientific findings at grant review panels and national and international meetings

## Education

### University of Notre Dame

- Ph.D. Chemical and Biomolecular Engineering, April 2012
- M.S. Chemical and Biomolecular Engineering, May 2010

### Cornell University

- B.S. Chemical and Biomolecular Engineering, May 2006

## Research Experience

*Ph.D. Candidate*, Chemical and Biomolecular Engineering

University of Notre Dame

Advisor: Paul W. Bohn

2006 – 2012

Dissertation: “Nanoporous Metallic Films in Micro-nanofluidic Structures”

### Results:

- Developed new methods for disease detection based on integrated micro-nanofluidic structures
- Proficiency with many state-of-the-art analytical techniques: FTIR, electrochemistry, SPR, spectroscopic techniques
- Collaborated with diverse teams on multiple research projects resulting in peer reviewed publications addressing mass transport, chemical reactivity, and nanoscale sample processing.

## Professional Experience

*Intern*, Process Development and Scale-up

Mylan Technologies, St. Albans, Vermont

2003 – 2006 (summer and winter breaks)

### Results:

- Transitioned new pharmaceutical products from late stage formulation through pilot scale production, under the supervision of senior engineers & management
- Designed, developed, and transferred operational parameters from pilot scale to manufacturing-scale processing
- Sourced, evaluated, and procured new process equipment for transdermal pharmaceutical production
- Authored or edited operating procedures and qualification protocols for new production equipment

## Transferrable Skills

### Leadership:

- Supervised teams of graduate and undergraduate students to develop independent research projects

### Problem solving:

- Led a committee of 3 colleagues charged with moving the entire lab to a new building on campus (3,000 square feet of lab space and ~\$3M insured value of equipment).

### Technical writing:

- Authored or edited grant proposals to the NSF, DOE, and DARPA. Requested budgets ranged from \$0.1M - \$2M (3 out of 4 were completely or partially funded).

### **Publications**

- Branagan, S.P.**, and P.W. Bohn (2012) “Plasmonic Response Of Electrified Metal-Liquid Interfaces During Faradaic And Non-Faradaic Reactions By Enhanced Optical Transmission.” *Analyst* 137: 3932-3939
- Gibson, L., **Branagan, S.P.**, and P.W. Bohn. (2012) “Convective Delivery of Electroactive Species to Annular Nanoband Electrodes Embedded in Nanocapillary-Array Membranes.” *Small* (doi: 10.1002/sml.201200237)
- Branagan, S.P.**, Contento, N., and P.W. Bohn. (2012) “Enhanced Mass Transport of Electroactive Species to Annular Nanoband Electrodes Embedded in Nanocapillary Array Membranes.” *Journal of the American Chemical Society* 134 (20): 8617–8624
- Zhao, J. **Branagan, S.** and P.W. Bohn. (2012) “Single Molecule Enzyme Dynamics of Monomeric Sarcosine Oxidase in a Au-Based Zero-Mode Waveguide”. *Applied Spectroscopy* 66(2):163-169.
- Contento, N., **Branagan, S.P.**, and P.W. Bohn. (2011) “Electrolysis in Nanochannels for *in situ* Reagent Generation in Confined Geometries.” *Lab on a Chip* 11(21): 3634-41.
- Piruska, A., **Branagan, S.P.**, Minnis, A. B., Wang, Z. Cropek, D.M., Sweedler, J.V., and P.W. Bohn. (2010). "Electrokinetic Control Of Fluid Transport In Gold-Coated Nanocapillary Array Membranes In Hybrid Nanofluidic-Microfluidic Devices." *Lab on a Chip* 10(10): 1237-1244.
- Branagan, S. P.** and P. W. Bohn (2009). "Wavevector-Resolved Monochromatic Spectral Imaging Of Extraordinary Optical Transmission Through Subwavelength Aperture Arrays." *Optics Express* 17(21): 18995-19005.
- Wang, Z., King, T., **Branagan, S.**, Cropek, D., Sweedler, J. and P.W. Bohn (2009). "Enzymatic Activity Of Surface-Immobilized Horseradish Peroxidase Confined To Micrometer- To Nanometer-Scale Structures In Nanocapillary Array Membranes." *Analyst* 134(5): 851-859.
- Piruska, A., **Branagan, S.**, and P.W. Bohn (2008). "Electrokinetically Driven Fluidic Transport In Integrated Three-Dimensional Microfluidic Devices Incorporating Gold-Coated Nanocapillary Array Membranes." *Lab on a Chip* 8(10): 1625-1631.

### **Conferences & Awards**

- Branagan, S.P.** (January 15, 2010) “Developing a futuristic chemical sensor” University of Notre Dame Graduate Student Union 2010 Graduate Research Symposium. **1st place.**
- Branagan, S.P.** (September 29, 2010) “Optical Measurement of the Electrochemical Double Layer by Enhanced Optical Transmission” Annual Meeting of the International Society of Electrochemistry, Nice, France.
- Branagan, S.P.** (October 21, 2009) “Flow-Through Plasmonic Nanosensors for Intelligent Chemical Processing”, Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Louisville KY
- Branagan, S.P.** (October 4, 2008) “Metallic Nanocapillary Array Membranes – A Dual Mode Application” Turkey Run Analytical Chemistry Conference, Marshall IN.

### **Intellectual Property**

- Branagan, S.P.**, Contento, N. and P.W. Bohn (2011) “Method and Apparatus for the Generation and Use of Reagents.” USPTO 61/518,107