

Dane Ashton Grismer, Ph.D.

Postdoctoral Research Scholar

*Department of Chemical and Biomolecular Engineering
North Carolina State University
Campus Box 7905
Raleigh, NC 27695-7905*

Phone: **704-219-8734**

E-mail: **dagrisme@ncsu.edu**

LinkedIn: **www.linkedin.com/in/danegrismer**

RESEARCH INTERESTS

Biotechnology, nanoscience, process optimization, experimental apparatus and method development, interfacial phenomena, molecular spectroscopy, biosensing, assay development, micro-/nanofabrication, correlation analysis

EDUCATION

Ph.D. in Chemical Engineering *(defended Aug. 15) - Jan. 2016*

University of Notre Dame, Notre Dame, IN—Advisor: Paul W. Bohn

Dissertation title: “Single-Molecule Spectroelectrochemical Investigation of Freely Diffusing Redox-Active Fluorophores in Zero-Mode Waveguides”

M.S. in Chemical Engineering

May 2012

University of Notre Dame, Notre Dame, IN—Advisor: Paul W. Bohn

B.S. in Chemical Engineering, *summa cum laude*

May 2009

B.S. in Paper Science and Engineering, *summa cum laude*

May 2009

North Carolina State University, Raleigh, NC

RESEARCH EXPERIENCE

Postdoctoral Research Scholar Aug. 2015-present

North Carolina State University, Raleigh, NC

Project title: “Understanding and Controlling the Role of Particulate Matter in Commercial Bioreactor

Performance,” Advisor: Orlin D. Velev

- Collaborating with Biogen pilot plant scientists and engineers to conduct targeted investigations of the role of biomass accumulation, antifoam addition, and process operational variables on the formation and stabilization of foam during mammalian cell culture for recombinant protein production in 5, 200, and 315 L bioreactors.
- Maintaining multiple Chinese hamster ovary (CHO) cell lines through passaging and cell banking to serve as reliable baselines for several projects.
- Devising experimental schemes to isolate, test, and analyze the effects of bioparticle type and concentration on foam stabilization in a system modelling commercial bioreactors.
- Mentoring an Undergraduate Research Assistant to advance techniques that replicate bioreactor foams.

Graduate Research Assistant

Nov. 2009-Aug. 2015

University of Notre Dame, Notre Dame, IN

Dissertation: “Single-Molecule Spectroelectrochemical Investigation of Freely Diffusing Redox-Active Fluorophores in Zero-Mode Waveguides,” Advisor: Paul W. Bohn

- Designed, constructed, calibrated, and optimized a confocal Fluorescence Correlation Spectroscopy system for observation of single-molecule diffusion and ultra-confined molecular reactions with picosecond temporal resolution.
- Devised and conducted diffusion experiments on confined macromolecules in nanopores.

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- Coordinated a team of fellow graduate students in exploratory experiments for glucose-based selective detection of DNA aptamers.
- Analyzed and interpreted SEM micrographs of nanowires produced by etching of a III-V semiconductor.

Undergraduate Research Assistant

Jan. 2008-May 2009

Pulp and Paper Laboratories, NC State University, Raleigh, NC

Project: "Characterization of Starch Microcellular Foam Particle Formation," Advisor: Joel J. Pawlak

- Developed test methods for quantifying starch foaming processes.
- Devised iterative algorithm to calculate complex concentration profiles of sample constituents.

Technology and Product Development Co-op Intern

Sept. 2007-Jan. 2008

National Gypsum Company—Technology Innovation Center, Charlotte, NC

Jan. 2006-May 2006

- Developed, wrote, and refined test methods to evaluate interfacial properties of polymer solutions.
- Experimentally evaluated vendor-supplied instrumentation and chemical coating formulations.
- Directed product testing efforts of five interns to qualify a paper plant for production.

Oil and Gas Technologies Intern

June 2007-Aug. 2007

Hercules, Inc.—Research Center, Wilmington, DE

- Evaluated rheological properties of formulations of cellulose-based polymers in high-density brines.
- Analyzed and compiled data for technical data sheets for customer use.

HONORS AND AWARDS

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| Professional Development Award for Postdocs —The Graduate School and Office of Postdoctoral Affairs, NC State University | 2016 |
| Richard and Peggy Notebaert Premier Fellowship —University of Notre Dame <i>Most selective University-wide graduate fellowship</i> | 2009-2015 |
| 1st Place Poster Award, Graduate Student Engineering Division —7 th Annual Graduate Student Union Research Symposium, University of Notre Dame | Apr. 2015 |
| Professional Development Award —Graduate School, University of Notre Dame | June 2014 |
| Conference Presentation Grant —Graduate Student Union, University of Notre Dame | Mar. 2014 |
| Tau Beta Pi Fellowship —Tau Beta Pi, The Engineering Honor Society | 2009-2010 |
| Phi Kappa Phi Fellowship —The Honor Society of Phi Kappa Phi | 2009-2010 |
| Outstanding Senior Award for Leadership —College of Engineering, NC State University | May 2009 |
| Pulp and Paper Foundation Merit Scholarships | 2005-2009 |
| TAPPI William L. Cullison Scholarship | 2007-2008 |
| TAPPI Coating and Graphic Arts Division Scholarship | 2006, 2007 |
| TAPPI Coating and Graphic Arts Division Scholarship | 2006 |
| Engineering Foundation Merit Annual Scholarships —College of Engineering, NC State University | 2004 |
| Dean's Merit Scholarship —College of Engineering, NC State University | 2004 |
| Thomas Jackson Merit Scholarship —College of Engineering, NC State University | 2004 |
| Eagle Scout Rank —Boy Scouts of America | 2002 |

SCHOLARSHIP

Publications

Zaino III, L. P.*; **Grismer D.A.***; Han, D.; Crouch, G. M.; Bohn, P. W. "Single Occupancy Spectroelectrochemistry of Freely Diffusing Flavin Mononucleotide in Zero-Dimensional Nanophotonic Structures." *Faraday Discuss.* 2015, 184, 101-115. (*equal contribution)

Geng, X.; Duan, B. K.; **Grismer, D. A.**; Zhao, L.; Bohn, P. W. "Catalyst and Processing Effects on Metal-Assisted Chemical Etching for the Production of Highly Porous GaN." *Semicond. Sci. Technol.* 2013, 28, 065001.

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Geng, X.; Duan, B. K.; **Grismer, D. A.**; Zhao, L.; Bohn, P. W. "Monodisperse GaN Nanowires Prepared by Metal-Assisted Chemical Etching with In Situ Catalyst Deposition," *Electrochem. Comm.* 2012, 19, 39-42.

Carpino, F.; Gibson II, L. R.; **Grismer, D. A.**; Bohn, P. W. "Electrokinetic Fluid Flow in Nanostructures." *Encyclopedia of Nanotechnology*. B. Bhushan, Ed., Springer, 2012, 710-718.

Presentations

Grismer, D. A.; Zaino III, L. P.; Han, D.; Bohn, P. W. "Spectroelectrochemically Probing Single-Molecule Behavior in Zero-Dimensional Structures." 1st Annual Chemical and Biomolecular Engineering Graduate Student Symposium, Notre Dame, IN, Mar., 2015.

Grismer, D. A.; Polisetti, S.; Zaino III, L. P.; Bohn, P. W. "Investigation of Varying Modes and Degrees of Nanoconfinement Studied by Fluorescence Correlation Spectroscopy." Pittcon 2014, Chicago, IL, Mar., 2014.

Grismer, D. A.; Polisetti, S.; Bohn, P. W. "Fluorescence Correlation Spectroscopy Used to Study Confinement-Induced Anomalous Macromolecular Transport in Nanochannels." The Great Scientific eXchange (SciX 2015), Oct., Milwaukee, WI, 2013.

Grismer, D. A.; Bohn, P. W. "Effects of Confinement on Macromolecular Transport in Nanochannels Studied by Fluorescence Correlation Spectroscopy." Pittcon 2013, Philadelphia, PA, Mar., 2013.

Grismer, D. A.; Bohn, P. W. "Effects of Confinement on Macromolecular Transport in Nanochannels Studied by Fluorescence Correlation Spectroscopy." The Great Scientific eXchange (SciX 2012), Kansas City, MO, Oct., 2012.

Posters

Grismer, D. A.; Gregg, C.; Ferguson, R.; Chang, K.; Osborne, D.; Velev, O. D. "Characterization of Bioparticle-Based Pickering Foams." 8th Annual Triangle Soft Matter Workshop, Durham, NC, May, 2016.

Grismer, D. A.; Zaino III, L. P.; Han, D.; Bohn, P. W. "Spectroelectrochemically Probing Single-Molecule Behavior in Zero-Dimensional Structures." 7th Annual Graduate Student Union Research Symposium, Notre Dame, IN, Apr., 2015.

Grismer, D. A.; Zaino III, L. P.; Han, D.; Bohn, P. W. "Spectroelectrochemically Probing Single-Molecule Behavior in Zero-Dimensional Structures." 1st Annual Chemical and Biomolecular Engineering Graduate Student Symposium, Notre Dame, IN, Mar., 2015.

Grismer, D. A.; Zaino III, L. P.; Polisetti, S.; Bohn, P. W. "Spectroelectrochemically Probing Single-Molecule Behavior at High Concentrations." Bioanalytical Sensors Gordon Research Conference, Newport, RI, June, 2014.

Grismer, D. A.; Polisetti, S.; Bohn, P. W. "Fluorescence Correlation Spectroscopy Used to Study Confinement-Induced Anomalous Macromolecular Transport in Nanochannels." 62nd Annual Midwest Universities Analytical Chemistry Conference (MUACC), Notre Dame, IN, Oct., 2013.

Grismer, D. A.; Polisetti, S.; Bohn, P. W. "Effects of Confinement on Macromolecular Transport in Nanochannels Studied by Fluorescence Correlation Spectroscopy." Advances in Microfluidics and Nanofluidics 2013 (AMN2013), Notre Dame, IN, May, 2013.

Grismer, D. A.; Bohn, P. W. "Application of Advanced Spectroscopy in Nanochannels to Study the Effects of Confinement on Macromolecular Reactions." Turkey Run Analytical Chemistry Conference, Marshall, IN, Nov., 2010.

PROFESSIONAL MEMBERSHIPS AND HONOR SOCIETIES

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| Society for Biological Engineering (SBE) | 2016-present |
| American Institute of Chemical Engineers (AIChE) | 2005-present |
| American Chemical Society (ACS) , Analytical Chemistry Division | 2012-present |
| Society for Applied Spectroscopy (SAS) Student Ambassador (2014) | 2012-2016 |

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| Technical Association of the Pulp and Paper Industry (TAPPI) National Student Summits (2006, 2007, 2008), Papermakers Conference (2006), Publicity Chair (2006) | 2005-2009 |
| Tau Beta Pi , The Engineering Honor Society | <i>inducted</i> 2008 |
| The Honor Society of Phi Kappa Phi | <i>inducted</i> 2006 |
| Omega Chi Epsilon , The National Honor Society for Chemical Engineering | <i>inducted</i> 2006 |
| Order of the Arrow , National Honor Society of Scouting | <i>inducted</i> 1999 |

PROFESSIONAL EXPERIENCE

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| Engineering Intern , North Carolina Board of Examiners for Engineers and Surveyors | June 2009 |
| Cooperative Education Twelve-Month Certificate , NC State University | May 2009 |
| Paper International Experience , Concepcion—Chile | May 2009 |
| <ul style="list-style-type: none">• Toured four state-of-the-art papermaking and integrated wood processing mills.• Participated in active discussions with faculty at University of Concepcion.• Served as co-editor-in-chief and graphic designer of student report. | |
| Paper International Experience , Shanghai, Nanjing, Beijing—China | May 2007 |
| <ul style="list-style-type: none">• Toured five state-of-the-art papermaking and water treatment facilities.• Participated in active discussions with students at Nanjing Forestry University.• Served as editor-in-chief and graphic designer of student report detailing lessons learned on the trip about the state of the global pulp and paper industry. | |

LEADERSHIP AND SERVICE

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| Tau Beta Pi, The Engineering Honor Society Graduate Student Advisor, Indiana Gamma Chapter (2012-2015) | 2008-present |
| Catholic Graduate Community, University of Notre Dame President (2011-2013), Vice-President (2010-2011), Co-Founder (2010) | 2010-2015 |
| College of Natural Resources Student Ambassador (2005-2009), <i>The Pinetum</i> Student Journal Co-Editor (2008) | 2005-2009 |
| Center for Student Leadership, Ethics, and Public Service, NC State University Visionary Leadership Certificate (2009), Service NC State (2004-2008), Service Raleigh (2004-2006), LeaderShape Institute (2005), Emerging Leaders Program (2005) | 2004-2009 |
| Catholic Campus Ministry, NC State University Outreach Intern (2008-2009), Catholic HEART Workcamp Staff (2008, 2009), Knights of Columbus (2007-2009), Public Relations Adviser (2007-2008) | 2004-2009 |