

Paul Johns

<http://pauljohns.org>

<http://linkedin.com/in/pauljohns1>

pjohns@alumni.nd.edu

EDUCATION

- UNIVERSITY OF NOTRE DAME Notre Dame, IN
Doctor of Philosophy, Physical Chemistry May 2017
Dissertation: *Surface Plasmon Polaritons in Gold Nanostructures: Conversion, Coupling, and Confinement*
Advisor: Gregory V. Hartland
- THE CATHOLIC UNIVERSITY OF AMERICA Washington, DC
Masters of Divinity credits
- SAINT FRANCIS UNIVERSITY Loretto, PA
Bachelor of Science in Chemistry, minors in Mathematics and Physics May 2007
Graduated *Magna Cum Laude*, Honors Program Graduate
Thesis: *Quantum Mechanical/Molecular Mechanical Simulations of the Fluorescence Quenching of H-Type Homodimers of Fluorescein and Tetramethyl Rhodamine*
Advisor: Pedro L. Muno

TEACHING EXPERIENCE

- UNIVERSITY OF NOTRE DAME Notre Dame, IN
- Instructor, Physical Chemistry II**, Spring 2014
Lesson composition and instruction, homework composition, and exam composition focusing on statistical mechanics, thermodynamics and kinetics, 3 students, chemistry majors who were returning from a semester abroad
- Teaching Assistant, Introduction to Chemical Principles Tutorial**, Fall 2013
Discussion sessions based on homework problems, 3 sections, approximately 30 students each, non-chemistry science majors
- Teaching Assistant, Chemistry Across the Periodic Table**, Spring 2013
Laboratory, emphasis on inorganic synthesis, 2 sections, approximately 20 students each, non-chemistry science majors
- Teaching Assistant, Chemistry Across the Periodic Table**, Spring 2008
Laboratory, emphasis on inorganic synthesis, nanoscience, and kinetics, 1 section, approximately 20 students, chemistry majors
- Teaching Assistant, Analytical Chemistry**, Fall 2007
Laboratory, emphasis on use of instrumentation and analytical techniques, 3 sections, approximately 30 students each, chemistry majors
- Curriculum Developer, Analytical Chemistry**, Summer 2007
Assisted in redesigning the laboratory activities for the analytical lab
- SAINT FRANCIS UNIVERSITY Loretto, PA
- Instructor, Organic Chemistry II**, Spring 2012
Laboratory, emphasis on synthetic chemistry, 2 sections, 10 and 12 students, chemistry majors and other science majors
- Instructor, Chemical Principles II**, Spring 2012
Laboratory, emphasis on basic lab technique, maintaining lab records, and exposure to a variety of chemical methods, 1 section, 15 students, chemistry majors and other science majors

Instructor, Organic Chemistry I, Fall 2011

Laboratory, emphasis on basic lab techniques in synthesis and characterization, 1 section, 13 students, chemistry majors and other science majors

Instructor, Physical Chemistry I, Fall 2011

Laboratory, emphasis on thermodynamics and kinetics, 2 sections, 9 engineering majors, 10 chemistry majors

Substitute Lecturer, Fall 2009–Spring 2010

Lecture, substitute for Instrumental Analysis, Human Chemistry I, and Human Chemistry II (chemistry for health science majors)

Undergraduate Teaching Assistant, Human Chemistry I & II, Fall 2004–Spring 2007

Laboratory, emphasis on basic lab technique, synthesis, and analysis, 6 semesters, 2 sections of 15 per semester

Physics Review Session Leader, Fall 2005–Spring 2007

Tutorial section, general two semester physics course for science majors, assisted students with homework problems, explained concepts, proctored exams

WORKSHOPS AND CONFERENCES ATTENDED

TEACHING

Reading Group: *Teaching and Learning STEM: A Practical Guide* by Richard Felder and Rebecca Brent,

University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2017

Concept Mapping with VUE, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2015

Improving Teaching and Learning One Step at a Time, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2015

Fundamentals of Course Design IV: Lesson Planning, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2015

Fundamentals of Course Design III: Assessment and Exam Design, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2015

Fundamentals of Course Design II: Writing a Syllabus, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2015

Fundamentals of Course Design I: Developing Learning Goals, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2015

Presentation Zen, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2015

Mentoring Undergraduate Research in STEM Disciplines, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2014

Effective Lecture Strategies, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2014

Teaching and Evaluating Oral Communication, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2014

Reading Group: *What the Best College Teachers Do* by Ken Bain, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2014

Developing Your Classroom Presence, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2014

Gathering Early Semester Student Feedback, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2014

Motivating Students: The Surprising Truth about What Works, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2014

Developing a Teaching Statement, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2013

Helping Students in Distress: Tips for Faculty and TAs, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2013

TA Orientation: Succeeding as a TA in Lab and Tutorial Settings, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2013

TA Orientation: Navigating Difficult Classroom Situations, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN

TA Orientation: Approaching the 1st Day of Class and Setting the Tone for the Semester, University of Notre Dame, Kaneb Center for Teaching and Learning, Notre Dame, IN, 2013

Biennial Conference on Chemical Education, Pennsylvania State University, State College, PA, 2012

RESEARCH CONFERENCES

256th American Chemical Society National Meeting, Boston, MA, 2018

IEEE Annual Mini-symposium on Electron Devices and Photonics, University of Notre Dame, 2015

IEEE Annual Mini-symposium on Electron Devices and Photonics, University of Notre Dame, 2014

The 51st Biophysical Society Annual Meeting, Baltimore, MD, 2007

Pittcon Conference & Expo, Orlando, FL, 2005

PROFESSIONAL EXPERIENCE

US Naval Research Laboratory Washington, DC
Postdoctoral Researcher October 2017–present

Designed and conducted transient absorption spectroscopy experiments to understand the ultrafast dynamics of laser induced welding of gold nanorod dimers

Modeled gold nanorod absorption cross sections in various environments

University of Notre Dame Notre Dame, IN
Postdoctoral Researcher May 2017–September 2017

Continued finite element calculations to model electromagnetic phenomena including interference effects of surface plasmon polaritons in gold nanoplates

University of Notre Dame Notre Dame, IN
Doctoral Researcher, Physical Chemistry September 2007–May 2008; January 2013–May 2017

Developed procedures to model surface plasmon propagation in nanostructures in two-dimensional and three-dimensional models using the finite element program COMSOL Multiphysics

Utilized a pump/probe technique with a galvo scanning mirror to directly image plasmon propagation in nanostructures

Wrote programs in LabVIEW, Igor Pro, MATLAB, Python, and Java to automate data acquisition and processing

Saint Francis University Loretto, PA
Undergraduate Researcher, Chemistry September 2004–May 2007

Continued investigating the quenching mechanisms of dimers of fluorescent dyes resulting in a conference presentation and Honors Thesis topic

Montana State University Bozeman, MT
Research Experience for Undergraduates, Chemistry Summer 2006

Investigated the quenching mechanisms of dimers of fluorescent dyes using molecular dynamics software

Validated CI Print Macroscopic Chemical Imaging System™ for detection of latent and patent fingerprints

Assisted in developing a Raman chemical database for identification purposes which was incorporated into the Falcon Molecular Chemical Imaging System™ database

PUBLICATIONS

10. Beane, G.; Brown, B.S.; Johns, P.; Devkota, T.; Hartland, G.V. "Strong Exciton-Plasmon Coupling in Silver Nanowire Nanocavities." *J. Phys. Chem. Lett.*, **2018**, *9*, 1676–1681
9. Beane, G.; Yu, K.; Devkota, T.; Johns, P.; Brown, B.; Wang, G.P.; Hartland, G. "Surface Plasmon Polariton Interference in Gold Nanoplates." *J. Phys. Chem. Lett.*, **2017**, *8*, 4935–4941
8. Hartland, G.V.; Besteiro, L.; Johns, P.; Govorov, A.O. "What's so Hot about Electrons in Metal Nanoparticles?" *ACS Energy Lett.*, **2017**, *2*, 1641–1653.
7. Zeng, Z.-C.; Wang, H.; Johns, P.; Hartland, G.V.; Schultz, Z.D. "Photothermal Microscopy of Coupled Nanostructures and the Impact of Nanoscale Heating in Surface-Enhanced Raman Spectroscopy." *J. Phys. Chem. C*, **2017**, *121*, 11623–11631.
6. Johns, P.; Beane, G.A.; Yu, K.; Hartland, G.V. "Dynamics of Surface Plasmon Polaritons in Metal Nanowires." *J. Phys. Chem. C*, **2017**, *121*, 5445–5459.
5. Johns, P.; Yu, K.; Devadas, M.S.; Hartland, G.V. "Role of Resonances in the Transmission of Surface Plasmon Polaritons between Nanostructures." *ACS Nano*, **2016**, *10*, 3375–3381.
4. Devadas, M.S.; Devkota, M.; Johns, P.; Li, Z.; Lo, S.S.; Yu, K.; Huang, L.; Hartland, G.V. "Imaging Nano-Objects by Linear and Nonlinear Optical Absorption Microscopies." *Nanotechnology*, **2015**, *26*, 354001.
3. Johns, P.; Devadas, M.S.; Hartland, G.V. "Transient absorption microscopy studies of single metal and semiconductor nanostructures." *Proc. SPIE*, **2015**, *9549*, Physical Chemistry of Interfaces and Nanomaterials XIV, 954914.
2. Johns, P.*; Yu, K.*; Devadas, M.S.; Li, Z.; Major, T.A.; Hartland, G.V. "Effect of substrate discontinuities on the propagating surface plasmon polariton modes in gold nanobars." *Nanoscale*, **2014**, *6*, 14289–14296. *These authors contributed equally to this work
1. Devadas, M.; Li, Z.; Major, T.; Lo, S.; Havard, N.; Yu, K.; Johns, P.; Hartland, G. "Detection of Single Gold Nanoparticles Using Spatial Modulation Spectroscopy Implemented with a Galvo-Scanning Mirror System." *Applied Optics*, **2013**, *52*, 7806–7811.

PRESENTATIONS

(* indicates presenting author)

7. Johns, P.*; Suess, R.; Naciri, J.; Charipar, N.A.; Fontana, J. "Ultrafast gold nanorod welding mechanisms: Fabricating high aspect ratio nanorods." 256th National Meeting of the American Chemical Society, Boston, MA, 2018.
6. Suess, R.J.*; Johns, P.; Naciri, J.; Charipar, N.A.; Fontana, J. "Welding Dynamics of Plasmonic Gold Nanorods Under Femtosecond Laser Excitation." Conference on Lasers and Electro-Optics, San Jose, CA, 2018.
5. Johns, P.*; Yu, K.; Devadas, M.S.; Hartland, G.V. "Understanding Surface Plasmon Propagation in Cut Waveguides." IEEE Annual Mini-symposium on Electron Devices and Photonics, University of Notre Dame, 2015.
4. Johns, P.*; Yu, K.; Devadas, M.S.; Li, Z.; Major, T.A.; Hartland, G.V. "Effects of Localized Dielectric Substrate Discontinuities on Surface Plasmon Polariton Modes in Gold Nanobars." IEEE Annual Mini-symposium on Electron Devices and Photonics, University of Notre Dame, 2014.
3. Major, T.A.; Lo, S.S.; Devadas, M.S.; Li, Z.; Johns, P.*; Yu, K. "Plasmonic Materials for Energy Applications: The Hartland Group" Energy Week, University of Notre Dame, 2014.

2. Johns, P.*; Callis, P.; Muíño, P. "Quantum Mechanical/Molecular Mechanical Simulations of the Fluorescence Quenching of *H*-Type Homodimers of Fluorescein and Tetramethyl Rhodamine." 51st Biophysical Society Annual Meeting, Baltimore, MD, 2007.
1. Schuler, R.*; Exline, D.; Powers, T.; Johns, P.; Treado, P. "Validation of the CI Print Macroscopic Chemical Imaging System for the Analysis of Latent Fingerprints." American Academy of Forensic Sciences 57th Annual National Meeting, New Orleans, LA, 2004.

TECHNICAL SKILLS

Pump/probe spectroscopy, transient absorption spectroscopy, class 100 cleanroom training, Airco FC-1800 electron-beam evaporator for metal deposition, lasers, oscilloscopes, photodetectors, instrument maintenance, general optics, ultrafast optics, plasmonics, finite element modeling, COMSOL Multiphysics, LabVIEW, MATLAB, Mathematica, Igor Pro, OriginPro, Python, Java, Microsoft Office, L^AT_EX, data processing, data analysis

SELECTED AWARDS AND HONORS

Graduate Assistance in Areas of National Need (GAANN) Teaching Fellow, University of Notre Dame, 2014–present

Advanced Teaching Scholar, Kaneb Center for Teaching and Learning, University of Notre Dame, 2015

Statement of Accomplishment with Distinction: An Introduction to Evidence-Based Undergraduate STEM Teaching, MOOC. Offered by Vanderbilt University through Coursera, 2014

Striving for Excellence in College and University Teaching, Kaneb Center for Teaching and Learning, University of Notre Dame, 2014

Outstanding Graduate Student Teacher Award for Excellence in Teaching, Kaneb Center for Teaching and Learning, University of Notre Dame, 2008

Barry M. Goldwater Scholar, Barry M. Goldwater Scholarship and Excellence in Education Program, 2006

PROFESSIONAL ORGANIZATIONS

American Chemical Society , Member	2005–present
SPIE—The International Society for Optical Engineering , Graduate Student Member	2015–2016
American Association for the Advancement of Science , Member	2007–present
Biophysical Society , Student Member	2007

LEADERSHIP AND SERVICE

Science Fair Judge, Northern Indiana Regional Science & Engineering Fair, Elementary Physical Sciences Committee/Junior Physical Science Committee, 2013–2014, 2016, 2017

Science Day Presenter, 11th, 18th and 19th Annual Science Day, Saint Francis University, 2004, 2011–2012

Peer Reviewer, *Spectrum*, the self-published journal of Saint Francis University, 2010–2011

Organizer Physical Science Lessons, Penn Mont Montessori School, Hollidaysburg, PA, students from Physical Chemistry I created and led the lessons and experiments, 2011.

Trigonometry Tutor, Archbishop Carroll High School, Washington, DC, 2010–2011

Event Leader, Rural Outreach Chemistry for Kids, Saint Francis University, led and demonstrated science experiments with area elementary, middle, and high school students, 2003–2009

Science Fair Judge, Pennsylvania Junior Academy of Science, 2005