

Rob Johns

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Education:

University of California: Berkeley
PhD candidate in physical chemistry
Advisor: Delia Milliron
Committee Chair: Tanja Cuk

Aug 2012 - present
GPA: 3.9

University of Washington: Seattle

Aug 2008 - March 2012

BS with honors in Chemistry
Thesis: "A DFT approach to understanding intraband transitions in n-type and charged semiconductor nanocrystals"
Advisor: Daniel Gamelin

Research Experience

Lawrence Berkeley National Laboratory: Molecular Foundry & The Advanced Light Source Berkeley, CA
Advisor: Delia Milliron Sep 2012 - present

Studying: dopant distributions within nanocrystals through plasmonic resonances in transparent conducting oxide materials

Skills Acquired: atomic force microscopy, synchrotron near field optical spectroscopy, high resolution transmission electron microscopy (TEM), nanocrystal thin films preparation, focused ion beam etching

Politecnico di Milano

Milan, Italy

Advisor: Francesco Scotognella

May-July 2014

Studied ultrafast transient absorption spectroscopy of the localized surface plasmon resonance in Cs:WO₃ to understand electron-phonon coupling dynamics in doped oxide nanocrystals

Skills Acquired: Advanced optics use, optical parametric amplifications, pump probe spectroscopy

University of Geneva

Geneva, Switzerland

Advisor: Andreas Hauser

April-July 2012

Studied energy migration within [Ru(bpy)₃][NaCr(ox)₃] network nanocrystals

Skills Acquired: low temperature (1.4K) spectroscopy, synthesis of nanoscale inorganic network crystals, Fluorescence line narrowing (FLN), powder X-ray diffraction (XRD)

University of Washington

Seattle, WA

Advisor: Daniel Gamelin, Xiaosong Li

March 2010-March 2012

Studied spectroscopy, modeling, and synthesis of quantum dots in order to measure effects of charging upon the electronic structure of semiconductors with quantum confined excitons

Skills Acquired: Time dependent density functional theory (TDDFT), air-free synthesis of materials, room-temperature fluorescence and absorbance measurements, photoelectrochemical charging of quantum dots, glove box techniques, ligand exchange and surface treatment of nanomaterials, electron paramagnetic resonance spectroscopy (EPR).

University of Wisconsin: REU in Nanotechnology

Madison, WI

Advisor: Song Jin

June-Aug 2011

Studied nanoscale semiconductor heterostructures of Fe₂O₃ nanowires and PbSe quantum dots for solar energy conversion

Skills Acquired: Scanning electron microscopy (SEM), crystallographic indexing, materials synthesis

Work and Teaching

University of California: Berkeley

Fall semester 2012, Spring semester 2014

Graduate Student Instructor

Course: Chemistry 1A Lab

Teaching focuses included scientific writing and applying green chemistry to introductory labs

University of Washington CLUE Tutoring Center

Sep 2010-June 2011

Chemistry tutor

Teaching focuses included developing technique in introductory chemistry calculations. Work was primarily based on 1-1 tutoring but also included leading large test review lectures

University of Washington Housing and Food Services

April 2008-June 2009

Resident Advisor

Main work responsibilities included operating as a safety coordinator and creating an inclusive environment. Training for this job included focus on conflict mediation, emergency response, leadership techniques, and sensitivity to minority groups

Awards & Honors

ACS Division of Inorganic Chemistry travel award	2015
Advanced Light Source doctoral fellow in residence	2014-2015
ACS Undergraduate Award in Inorganic Chemistry	2012
NSF Leadership Travel Award	2012
ACS Undergraduate Award in Analytical Chemistry	2011
H.K. Benson chemistry scholarship	2011
Puget Sound ACS section scholarship	2011
Notre Dame connect nanotechnology research competition - 2nd Place.	Oct 2011

Publications

R. W. Johns, H. A. Bechtel, E. L. Runnerstrom, A. Agrawal, S. D. Lounis, and D. J. Milliron, "Direct observation of narrow mid-infrared plasmon linewidths of single metal oxide nanocrystals," *Nat Commun*, vol. 7, p. 11583, 2016.

E. L. Runnerstrom, A. Bergerud, A. Agrawal, R. W. Johns, C. J. Dahlman, A. Singh, S. M. Selbach, and D. J. Milliron, "Defect Engineering in Plasmonic Metal Oxide Nanocrystals," *Nano Lett.*, vol. 16, no. 5, pp. 3390-3398, 2016.

J. J. Goings, A. M. Schimpf, J. W. May, R. W. Johns, D. R. Gamelin, and X. Li, "Theoretical Characterization of Conduction-Band Electrons in Photodoped and Aluminum-Doped Zinc Oxide (AZO) Quantum Dots," *J. Phys. Chem. C*, vol. 118, no. 46, pp. 26584-26590, 2014

E. Previtera, A. Tissot, R. W. Johns, and A. Hauser, "Directional Energy Migration in Nanoparticles of Crystalline Metal Complexes," *Adv. Mater.*, vol 27 pp. 1832-1836, 2015

Presentations

8th International Workshop on Infrared Microscopy and Spectroscopy using Accelerator

Based Sources - Riverhead, NY

2015

Talk: Direct Observation of Narrow mid-Infrared Plasmon Linewidths of Single Metal Oxide Nanocrystals

ACS Fall Conference - Boston, MA

2015

Talk: Direct Observation of Narrow mid-Infrared Plasmon Linewidths of Single Metal Oxide Nanocrystals

Gordon Research Conference on colloidal semiconductor nanocrystals - Smithfield, RI

2014

Poster: Assessing heterogeneity of localized surface plasmon resonances of doped oxides with single nanocrystal FTIR measurements

International conference on Quantum dots - Pisa, Italy	2014
Talk: Probing localized surface plasmon resonances of single doped oxide nanocrystals with synchrotron s-SNOM	
ACS Spring Conference - New Orleans, LA	2013
Talk: Energy migration within [Ru(bpy) ₃][NaCr(ox) ₃] network nanocrystals	
ACS Spring Conference - San Diego, CA	2012
Poster: Nanoscale Semiconductor Heterostructures for Solar Energy Conversion	