Mark Daniel Straub

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EDUCATION

University of California, Berkeley *August 2015-Present*
Ph.D. in Inorganic Chemistry (Expected December 2020)

- Cumulative GPA: 3.93
- Nuclear Science and Security Fellowship

Rensselaer Polytechnic Institute *August 2011-December 2014*
B.S. in Chemistry (Magna cum laude)

- Cumulative GPA: 3.79

RESEARCH AND PROFESSIONAL EXPERIENCE

Graduate Student Researcher *August 2015-Present*
University of California, Berkeley and Lawrence Berkeley National Laboratory
Advisors: Dr. John Arnold and Dr. Stefan Minasian

- Developed new methods to synthesize actinide materials used to model next-generation nuclear fuels
- Established a new collaboration with the University of Cologne; results published in *Angew. Chem.*
- Invented new processes to synthesize air-sensitive uranium nanoparticles
- Trained 1 postdoc, 2 graduate students, and 1 undergraduate student to perform air-free synthesis
- Synthesized and characterized 23 new uranium complexes and 9 new thorium complexes
- Taught classes and developed new curricula for the Radiochemistry and General Chemistry courses

GW Boot Camp on Nuclear Security Policy *June 2019*
George Washington University
Program Lead: Dr. Allison MacFarlane

- Led panel discussions and round-table exercises on nuclear forensics and radioactive waste disposal
- Engaged in talks on nuclear security policy with scientists, lawyers, and Congressional staff members

NSSC-LANL Keepin Nonproliferation Science Summer Program *June 2017-August 2017*
Los Alamos National Laboratory
Advisors: Dr. Jaqueline Kiplinger and Dr. Julianna Fessenden

- Interviewed world experts on the role of inorganic and materials chemistry in modern nuclear forensics
- Participated in lectures and tours hosted by leaders in nuclear forensics and nonproliferation

Undergraduate Research Assistant *January 2013-December 2014*
Rensselaer Polytechnic Institute
Advisor: Dr. Peter Dinolfo

- Synthesized new organic compounds for reversible proton-coupled electron transfer (PCET)
- Developed a new host-guest system to study PCET processes
- Characterized molecules with UV-vis, NMR, IR spectroscopy and cyclic voltammetry

Summer Undergraduate Research Assistant *June 2014-August 2014*
University of California, Berkeley
Advisor: Dr. Stephen Leone

- Performed transient extreme ultraviolet (XUV) spectroscopy experiments on small molecules
- Determined molecular dynamics of photodissociation using femtosecond XUV pulses
- Modeled x-ray absorption spectra using spectral simulation software

PUBLICATIONS

- Straub, M. D.; Leduc, J.; Frank, M.; Raauf, A.; Lohrey, T. D.; Minasian, S. G.; Arnold, J. "Chemical Vapor Deposition of Phase-Pure Uranium Dioxide Thin Films from Uranium(IV) Amidate Precursors." *Angew. Chem. Int. Ed.,* **2019***, 58,* 5749-5753*.*

- Straub, M. D.; Hohloch, S.; Minasian, S. G.; Arnold, J. "Homoleptic U(III) and U(IV) Amidate Complexes." *Dalton Trans.,* **2018***, 47,* 1772-1776*.*

PRESENTATIONS

- "New Routes to Nanostructured Actinide Reference Materials." *Presentation at the NNSA University Program Review, 2019, Raleigh, NC.*

- "Molecular Precursors to Uranium Oxide Nanomaterials." *Presentation at the Schubert Radiochemistry Review, 2018, Las Vegas, NV.*

- "Designing Molecular Precursors to Uranium Nanomaterials." *Presentation at the LANL Inorganic, Isotope, and Actinide Chemistry Division, 2017, Los Alamos, CA.*

- "Synthesis of Molecular Precursors to Uranium Nanomaterials." *Presentation at the 253rd ACS National Meeting and Exposition, 2017, San Francisco, CA.*

- "Femtosecond XUV Transient Absorption Spectroscopy of $TiCl_4$." *Presentation at the Extreme Ultraviolet Engineering Research Center, 2014, Berkeley, CA.*

TEACHING EXPERIENCE

Radiochemical Methods in Nuclear Technology and Forensics (2 semesters)

- Developed new curricula and interfaced with Radiation Safety personnel to provide a safe and engaging environment for students to work with radioactive materials
- Taught lectures and labs on radioactive decay, alpha and gamma spectroscopy, electrodeposition of uranium, chromatography, radionuclide separation, neutron activation, and nuclear forensic analysis

General Chemistry with Laboratory

- Led two discussion sections and one lab section; developed and presented lectures on general chemistry
- Taught lectures and labs on chemical reactions, stoichiometry, thermodynamics, quantum models of particles and atoms, molecular orbital theory, acid-base titrations and green chemistry

SKILLS

- Performing scientific research effectively in both team and independent settings
- Clear communication of written and visual information to technical and general audiences
- Developing course curricula and leading lectures and discussions
- Synthesis and purification of inorganic and organic molecules and nanomaterials
- Characterization of air-sensitive compounds using NMR, IR, UV-vis, and XRD
- Imaging of nanomaterials using electron microscopy (TEM)
- Maintenance of laboratory equipment including gloveboxes and high vacuum components
- Data collection and analysis using MestReNova, Shelx, Mercury, Chemdraw, and Excel

LEADERSHIP AND OUTREACH

Nuclear Science and Security Consortium- Graduate Fellow *January 2016-Present*

- Developed and presented interdisciplinary research pertaining to nuclear nonproliferation and forensics

UC Berkeley GOLD Science Fair- Mentor *July 2017-January 2020*

- Guided high school students from Nanjing to perform experiments for a science fair (students won 1st and 3rd place in 2019)

Rensselaer Chemistry Society- Vice President *September 2011-December 2014*

- Brought in funding for yearly budget, performed science demos in local middle schools, tutored undergraduate students in chemistry

Chemistry Mentorship Program- Founding Member *September 2014-December 2014*

- Prepared and delivered supplemental lectures to help struggling students in a one-on-one environment

Boy Scouts of America- Eagle Scout *October 2005-December 2010*

- Constructed a new climbing access trail, organized community outreach, led the Scout Troop for two years