

# Robinson Flaig

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## Education

**University of California, Berkeley; Berkeley, CA** 2014-2019

*Anticipated: Doctor of Philosophy in Chemistry*

**University of Wisconsin - Platteville; Platteville, WI** 2010-2014

*Bachelors of Science in Chemistry with minor in Microsystems and Nanotechnology*

- Overall GPA: 4.00.
- Graduated with Valedictorian and Summa Cum Laude Honors.

## Research Experience

**Research in Reticular Chemistry for CO<sub>2</sub> Capture** June 2014-Present

*Advisor: Prof. Omar M. Yaghi, University of California, Berkeley*

**Incorporation of Chemical Techniques to Nanotechnology** June 2010-May 2014

*Advisor: Prof. James P. Hamilton, University of Wisconsin – Platteville, NCCRD*

**Investigation of Silicon Nanomembrane Properties** September 2013 – May 2014

*Advisor: Prof. Gokul Gopalakrishnan, University of Wisconsin – Platteville*

**Exploration of Organometallic Compound Molecular Dynamics** May 2013-August 2013

*Advisor: Prof. Travis J. Williams, University of Southern California*

**Application of Nanochemistry to Biological Systems** May 2012-August 2012

*Advisor: Prof. Jeunghoon Lee, Boise State University*

## Industrial Experience

**Manufacturing and Technical Sales** June 2010-May 2014

*Photonic Cleaning Technologies, LLC., Platteville, WI*

## Publications

- Flaig, R. W.; Osborn Popp, T. M.; Fracaroli, A. M.; Kapustin, E. A.; Kalmutzki, M. J.; Altamimi, R. M.; Fathieh, F.; Reimer, J. A.; Yaghi, O. M. The Chemistry of CO<sub>2</sub> Capture in an Amine-Functionalized Metal-Organic Framework Under Dry and Humid Conditions. *J. Am. Chem. Soc.*, **2017**, 139, 12125-12128.
- Celaje, J. A.; Pennington-Boggio, M. R.; Flaig, R. W.; Richmond, M. G.; Williams, T. J. Synthesis and Characterization of Dimethylbis(2-pyridyl)borate Nickel(II) Complexes: Unimolecular Square-Planar to Square-Planar Rotation around Nickel(II). *Organometallics*. **2014**, 33, 2019-2026.
- Gronski, K.; Flaig, R. W.; Camacho, J.; Wu, Y.; Hamilton, J. P. Crystallinity and Mechanical Properties of Polypropylene-based Graphene Nanocomposites Studied with Atomic Force Microscopy and Raman Spectroscopy. *MRS Online Proceedings Library Archive*. **2013**, DOI : 10.1557/opl.2013.1107.

## Presentations and Lectures

1. Flaig, R. W.; Osborn Popp, T. M.; Fracaroli, A. M.; Kapustin, E. A.; Kalmutzki, M. J.; Altamimi, R. M.; Fathieh, F.; Reimer, J. A.; Yaghi, O. M. The Chemistry of CO<sub>2</sub> Capture in an Amine-Functionalized Metal-Organic Framework Under Dry and Humid Conditions. (Oral) Presented at The Center for Gas Separations All-Hands Meeting, Berkeley, CA, December 4, 2017.
2. Flaig, R. W.; Cordova, K. E.; Yaghi, O. M.; Superacids and their Applications. (Lecture) Presented to Students of the Laboratory Research Experience, LRE, Program, Berkeley, CA, July 24, 2017.
3. Flaig, R. W.; Osborn Popp, T. M.; Fracaroli, A. M.; Reimer, J. A.; Yaghi, O. M.; Selective Carbon Dioxide Capture in the Presence of Water using Metal-Organic Frameworks Covalently Functionalized with Primary Amines. (Poster) Presented at The Center for Gas Separations All-Hands Meeting, Berkeley, CA, November 8, 2016.
4. Flaig, R. W.; Osborn Popp, T. M.; Fracaroli, A. M.; Reimer, J. A.; Yaghi, O. M.; Strategies for Selective Carbon Dioxide Capture using Metal-Organic Frameworks with Primary Amine-functionalized Struts. (Oral) Presented at The Center for Gas Separations June Nanoporous Materials Seminar, Berkeley, CA, June 24, 2016.
5. Fracaroli, A. M.; Flaig, R. W.; Simon, P.; Nagib, D.; Suzuki, M.; Furukawa, H.; Toste, F. D.; Yaghi, O. M.; A Metal-Organic Framework with Enzyme-Like Complexity. (Poster) Presented at California Research Alliance Enzyme Workshop, Berkeley, CA, April 25, 2016.
6. Flaig, R. W.; Fracaroli, A. M.; Furukawa, H.; Suzuki, M.; Dodd, M.; Okajima, S.; Gándara, F.; Reimer, J. A.; Yaghi, O. M. Metal-Organic Frameworks with Precisely Designed Interior for Carbon Dioxide Capture in the Presence of Water. (Poster) Presented at The Center for Gas Separations All-Hands Meeting, Berkeley, CA, November 16, 2015.
7. Flaig, R. W.; Fracaroli, A. M.; Yaghi, O. M.; Custom-Designed MTV-IRMOF-74-III for NMR Signal Amplification. (Oral) Presented at College of Chemistry – Departmental Graduate Research Seminar, Berkeley, CA, October 1, 2015.
8. Flaig, R. W.; Wu, Y.; McElhinny, K. M.; Evans, P. G.; Gopalakrishnan, G. Elastic Properties of Silicon Nanomembranes. (Poster) Presented at The National Conference on Undergraduate Research, Lexington, KY, April 4, 2014.
9. Flaig, R. W.; Celaje, J. A.; Pennington-Boggio, M. R.; Richmond, M. G.; Williams, T. J. Unimolecular Square Planar to Square Planar Rotation in a Nickel(II) Complex. (Poster) Presented at CUR Conference of Research Experiences for Undergraduates Student Scholarship, Arlington, VA, October 27, 2013.
10. Flaig, R. W.; Hamilton, J. P. A Systematic Study of Thermodynamic Stability of Titanium (IV) Oxide Nanoparticles in an Organic Solvent System. (Poster) Presented at The National Conference on Undergraduate Research, LaCrosse, WI, April 12, 2013.
11. Flaig, R. W.; Lawrence, B.; Lee, J. DNA Functionalization of CdSe/CdS Core/Shell Quantum Dots with Applications in Biosensing and DNA Origami. (Poster) Presented at The Idaho INBRE Conference, Pocatello, ID, August 3, 2012.
12. Flaig, R. W.; Lampert, L. F.; Camacho, J.; Hamilton, J. P. Precision Optical Bandgap Control of Titanium Dioxide Nanoparticles by Ultrasonication. (Poster) Presented at The American Physical Society's March Meeting, Dallas, TX, March 21, 2011.

## Selected Awards, Recognition, & Service

- NSF Graduate Research Fellowship Program (GRFP), fellowship, 2015-2018.
- UC-Berkeley Outstanding Graduate Student Instructor Award, 2015.
- Student Liaison, UW-Platteville Chemistry Department Search and Screen Committee for Faculty Inorganic Chemistry Professor, Spring 2014.
- President of UW-Platteville Alchemist Club (Local ACS Chapter), 2013-2014.
- Phi Kappa Phi membership, Spring 2013.
- UW-Platteville Analytical Chemistry Award, Spring 2012.

## Teaching, Mentoring, and Tutoring Experience

- Research Guidance Towards State Science Fair Presentation** **Berkeley, September 2016 - Present**
- Developed a research project involving CAS9 protein modification with a high school student.
  - Supervised experimentation, data collection, analysis and presentation preparation.
- Graduate Student Instructor** **Berkeley, January 2017 - May 2017**
- Held two recitation sections of general chemistry, weekly laboratory classes and office hours.
  - Assessed student work, prepared lesson plans.
- Laboratory Research Experience Program** **Berkeley, June 2017 - July 2017**
- Developed extensive laboratory manual delineating two research-level reticular chemistry experiments for advanced undergraduate students.
  - Presented background lessons on reticular chemistry: synthesis, characterization, and reactivity.
  - Imparted knowledge on effective scientific communication.
  - Assessed students' posters and articles for scientific merit and presentation.
- Graduate Student Mentoring** **Berkeley, June 2017 - August 2017**
- Mentored a student one-on-one in research in state-of-the-art reticular chemistry.
  - Discussed project ideas and delineated techniques related to synthesis, characterization, and application of metal-organic frameworks.
- Summer Youth Intensive Program** **Berkeley, October 2016 - July 2017**
- Remotely coached international high school students for 9 months.
  - Developed lessons and assignments on state-of-the-art research at UC-Berkeley.
  - Guided students through in-depth research techniques in-person for 4 weeks.
- Head Graduate Student Instructor** **Berkeley, January 2016 - May 2016**
- Developed curriculum, designed quizzes, exams, worksheets, and demonstrations.
  - Held weekly review sessions open to all students.
  - Gave formal lectures on multiple occasions.
  - Administered exams, assessed student work.
- Tutor in Chemistry** **Berkeley, December 2015 - May 2016**
- Instructed a student one-on-one in general and organic chemistry.
  - Learned to easily and clearly explain difficult topics to young scholars.
- Graduate Student Instructor** **Berkeley, September 2014 - December 2014**
- Held two recitation sections of general chemistry, weekly laboratory classes and office hours.
  - Assessed student work, prepared lesson plans.
- Tutor in Elementary French** **Platteville, 2011 - 2014**
- Instructed a student one-on-one in French vocabulary and grammar.