

# Ryan Ash

ryanta2@illinois.edu | (970) 231-7196

## Education

---

PhD, Physical Chemistry 12/2020  
University of Illinois Urbana-Champaign  
Research Advisor: Professor Josh Vura-Weis

BS, Chemistry, *cum laude* 05/2015  
Colorado State University  
Thesis Advisor: Professor Chuck Henry

## Research Experience

---

Graduate Research Assistant 10/2016 - Present

- Study photoinduced spin-crossover of 1<sup>st</sup> row transition metal complexes using ultrafast M-edge and optical transient-absorption spectroscopy
- Maintain and improve femtosecond extreme-ultraviolet and optical transient absorption systems.
- Experience with pulse characterization (FROG), NOPA alignment/tuning (TOPAS White) and pump-probe experiments
- Design and build ultrahigh vacuum chambers for spectroscopic and imaging experiments
- Analyze and interpret data through global analysis and ligand field multiplet / DFT calculations
- Write Python scripts for data processing and analysis
- Design cryostat, sample holders and other instrumentation required for laser experiments using CAD software and machine several cryostat components
- Prepare sample thin films by spin-coating and vacuum sublimation for laser experiments

Undergraduate Research Assistant 01/2014 – 05/2015

- Designed, developed and produced paper-based analytic devices to quantify glucose and ethanol using colorimetric and distance-based methods

## Teaching Experience

---

Teaching Assistant, Physical Principles Lab I 01/2017 – 5/2018

- Taught students fundamental physical chemistry principles in EPR, XRD, FTIR, Raman, FTICR and NMR experiments
- Maintained instrumentation and optimized experimental procedures for each lab
- Graded lab reports and other submitted assignments for two sections of 20 students each

Teaching Assistant, Accelerated Chemistry I 08/2016 – 12/2016

- Led small discussion sections designed for students to internalize material learned in lecture
- Answered questions about homework and material covered in lecture, graded homework and exams for 4 sections of 10-20 students each

## Professional Experience

- 
- |   |                   |
|---|-------------------|
| Chemist, Access Sensors Technology LLC  | 02/2016 – 07/2016 |
| <ul style="list-style-type: none"> <li>Developed quantitative paper-based tests for determination of Lead and Nickel in water samples</li> <li>Characterized deposition of reagents on paper using inkjet printing and determined methods to control deposition mass</li> </ul> |                   |
| QC Analyst, TOLMAR Pharmaceuticals, Inc.  | 05/2015 – 02/2016 |
| <ul style="list-style-type: none"> <li>Analyzed raw materials used for pharmaceutical manufacturing, reporting results in compliance with the USP and cGMP</li> <li>Reviewed data from other analysts to ensure accuracy and regulatory compliance</li> </ul>                   |                   |

## Honors and Awards

---

Drickamer Research Fellowship	University of Illinois	Fall 2019
Tsao-Yu Memorial Student Travel Award	University of Illinois	Spring 2019
Lester and Kathleen Coleman Fellowship	University of Illinois	Fall 2018
Teaching Excellence Fellowship	University of Illinois	Fall 2018
TA Ranked as Excellent	University of Illinois	Fall 2016, Spring 2017
Dean's List	Colorado State University	Fall 2013-2015
University Honor Scholar	Colorado State University	2012-2015

## Publications

- 
- Ash, R.**; Zhang, K.; Vura-Weis, J. Photoinduced Valence Tautomerism of a Cobalt-Dioxolene Complex Revealed with Femtosecond M-Edge XANES. *J. Chem. Phys.* **2019**, *151* (10), 104201.
  - Zhang, K. †; **Ash, R.** †; Girolami, G. S.; Vura-Weis, J. Tracking the Metal-Centered Triplet in Photoinduced Spin Crossover of Fe(Phen)<sub>3</sub><sup>2+</sup> with Tabletop Femtosecond M-Edge X-Ray Absorption Near-Edge Structure Spectroscopy. *J. Am. Chem. Soc.* **2019**, *141* (43), 17180–17188. († denotes co-first authorship)
  - Ash, R.**; Zhang, K.; Vura-Weis, J. Design of a Cryostat Compatible with Thin-Film Samples for Transient M-edge XANES. (manuscript in preparation)
  - Ash, R.**; Zhang, K.; Vura-Weis, J. M-edge XANES of First-Row Transition Metal Complexes: Analysis of 3d<sup>n</sup> Octahedral Spectra (manuscript in preparation)

## Presentations

- 
- Ash, R.**; Zhang, K.; Vura-Weis, J.; "Characterization of photoinduced valence tautomerism in a cobalt dioxolene complex by femtosecond M-edge spectroscopy." International Symposium of Molecular Spectroscopy, University of Illinois Urbana-Champaign, Urbana, IL, June 19, 2019.
  - Ash, R.**; Zhang, K.; Vura-Weis, J.; "Characterization of photoinduced valence tautomerism in a cobalt dioxolene complex by femtosecond M-edge spectroscopy." ACS Great Lakes Regional Meeting, Lisle, IL, May 1, 2019.
  - Ash, R.**; Zhang, K.; Vura-Weis, J.; "Tracking Spin and Nuclear Dynamics During Spin-Crossover." Collaborative Research Center Conference on Ultrafast Spin Dynamics, Berlin, Feb 9, 2021.