

# ALEC A. BEATON

## Ph.D. Candidate

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## RESEARCH EXPERIENCE

### Graduate Researcher

#### Syracuse University

August 2017 – Ongoing   Syracuse, New York, USA

Principal Investigator: John Franck

- Built 15 MHz NMR spectrometer
- Implemented advanced liquid state NMR and EPR experiments
- Developed algorithms for processing low- and high-field relaxation data
- Studied quenching of translational motion in confined environments
- Performed basic cell culture techniques for exploring in-cell ODNP
- Conducted rudimentary MD simulations of materials systems

### Graduate Researcher

#### New York University

January 2017 – May 2017   New York, New York, USA

Principal Investigator: Tianning Diao

- Carried out DFT calculations on organometallic complexes in collaboration with Yingkai Zhang Lab

### Undergraduate Research Assistant

#### Syracuse University

September 2015 – August 2016   Syracuse, New York, USA

Principal Investigator: Bruce Hudson

- Synthesized deuterated cycloalkanes for NMR experiments on isotope shifts
- Carried out DFT calculations on cycloalkanes using Gaussian software

### DAAD RISE Summer Research Assistant

#### Universität Paderborn

June 2015 – August 2015   Paderborn, Germany

Principal Investigator: Dirk Kuckling

- Synthesized green catalysts for polymerization reactions

### Undergraduate Research Assistant

#### Syracuse University

June 2014 – May 2015   Syracuse, New York, USA

Principal Investigator: Daniel Clark

- Synthesized precursors for Ruthenium-based catalysis utilizing Schlenk technique
- Performed  $^1\text{H}$  and  $^{13}\text{C}$  NMR characterization of products

## EDUCATION

### Ph.D. in Physical Chemistry

#### Syracuse University

Aug 2017 – Jun 2023 [anticipated]

Supervisor: John Franck

### B.Sc. in Chemistry

#### Syracuse University

Sept 2013 – May 2016

with Renée Crown University Honors

GPA: 4.00/4.00

## PROGRAMMING SKILLS

Python

Github

Bash

C

Latex

Java

Fortran



## TECHNICAL SKILLS

Liquid state NMR and EPR

Bruker Spectrometer pulse and AU programming

Low Field NMR Hardware

Rf circuit design

NMR Data Processing

MD Simulations

Serial and API programming of instruments

## AFFILIATIONS

- International EPR (ESR) Society
- International Society of Magnetic Resonance
- Phi Beta Kappa Honors Society
- Alpha Chi Sigma, Professional Chemistry Fraternity
- American Chemical Society

## HONORS AND AWARDS

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- 2022, Graduate School Summer Dissertation Fellowship, Syracuse University, College of Arts and Sciences
- 2022, Student Travel Stipend, 63<sup>rd</sup> Experimental NMR Conference (ENC)
- 2021, Graduate Student Summer Fellowship, Syracuse University, College of Arts and Sciences
- 2020, Student Travel Stipend, 61<sup>st</sup> Experimental NMR Conference
- 2019, Student Travel Stipend, Rocky Mountain Conference on Magnetic Resonance
- 2016, Overall Excellence in Chemistry, Undergraduate Major Award, Syracuse University
- 2015, DAAD RISE Internship in Science and Engineering
- 2015, Willem Prins Award for Exceptional Performance in Physical Chemistry, Syracuse University
- 2014, George Wiley Award for Exceptional Performance in Organic Chemistry, Syracuse University

## PUBLICATIONS

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1. **Beaton, A.A.**; Guinness, A.; Franck, J.M. "A Robust, Modern Strategy for Treating Coherence Pathways in Unstable and Inhomogeneous Magnetic Resonance Experiments" *arXiv:2202.03313*, 2022.
2. **Beaton, A.A.**; Guinness, A.; Betts, S.M.; Franck, J.M. "A Roadmap for Modular NMR Spectrometer Design." *In Preparation*, 2022.
3. **Beaton, A.A.**; Guinness, A.; Franck, J.M. "A Technique for Rapidly Screening Rotational Mobility and Hydrogen Bonding Strength of Reverse Micellar Water Pools." *In Preparation*, 2022.

## RESEARCH PRESENTATIONS

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1. **Beaton, A.A.**; Guinness, A.; Franck, J.M. "The Inside Story: Characterizing Water Pools within Reverse Micelles Using Relaxometry Techniques" *63<sup>rd</sup> Experimental NMR Conference, Orlando, FL. April 26, 2022. Oral Presentation.*
2. **Beaton, A.A.**; Guinness, A.; Franck, J.M. "A New View on Coherence Pathways" *63<sup>rd</sup> Experimental NMR Conference, Orlando, FL. Apr 25-28, 2022. Poster Presentation.*
3. **Beaton, A.A.**; Guinness, A.; Ackerman, K.; Rhodes, S.; Sahagian, M.; Franck, J.M. "Overcoming Obstacles in ODNP: Studying Hydration Water of New Chemical System via an Adaptable NMR Spectrometer" *Syracuse University Chemistry Department Admitted Graduate Student Visitation Day, Syracuse, NY. Mar. 20, 2021. Poster Presentation, virtual.*
4. **Beaton, A.A.**; Franck, J.M. "Overcoming Obstacles in ODNP: Studying Hydration Water of New Chemical System via an Adaptable NMR Spectrometer" *61<sup>st</sup> Experimental NMR Conference, Baltimore, MD. Mar 11, 2020. Oral Presentation.*
5. **Beaton, A.A.**; Guinness, A.; Ackerman, K.; Rhodes, S.; Sahagian, M.; Franck, J.M. "Overcoming Obstacles in ODNP: Studying Hydration Water of New Chemical System via an Adaptable NMR Spectrometer" *61<sup>st</sup> Experimental NMR Conference, Baltimore, MD. Mar 9-13, 2020. Poster Presentation.*

## TEACHING EXPERIENCE

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- Physical Chemistry I (Lecture and Lab), Teaching Assistant (Syracuse University)**  
*Aug 2021 - Dec 2021, Aug 2020 - Dec 2020*
- *Designed experiments* for upper-level undergraduates focused on thermodynamic applications
  - Led laboratory sections of 10-20 students to carry out experiments
  - Graded lab reports, proctored exams, held office hours
  - Adapted lab course content for remote learning during 2020 semester

- Physical Chemistry II (Lecture and Lab), Teaching Assistant (Syracuse University)**  
*Jan 2021 - May 2021, Jan 2020 - May 2020, Jan 2018 - May 2018*
- *Designed experiments* for upper-level undergraduates focused on applications to quantum mechanics and spectroscopy
  - Supervised laboratory sections of approximately 7 students to carry out experiments
  - Graded lab reports and held office hours
  - Adapted lab course content for remote learning during 2020 semester

- General Chemistry I & II (Lecture), Teaching Assistant (Syracuse University)**  
*Aug 2019 - Dec 2019, Jan 2019 - May 2019, Aug 2018 - Dec 2018, Aug 2017 - Dec 2017*
- Led recitations (15-30 students) and held office hours
  - Co-proctored large (200 student) exam sections and graded exams

- Chemistry in the Environment Lab and Lecture, Teaching Assistant (New York University)**  
*Jan 2017 - May 2017*
- Supervised laboratory sections (10-15 students)
  - Co-proctored large (200 student) exam sections and graded exams

- Physical Chemistry Lab, Teaching Assistant (New York University)**  
*Jan 2017 - May 2017*
- Supervised laboratory sections (10-15 students) and graded lab reports

6. **Beaton, A.A.**; Ackerman, K.; Rhodes, S.; Sahagian, M.; Franck, J.M. "A Closer Look at Confined Water: Use of Overhauser Dynamic Nuclear Polarization to Study Nanoscale Water Dynamics in Aerosol-OT Reverse Micelle Model Systems" *Rocky Mountain Conference on Magnetic Resonance, Denver, CO. July 22-25, 2019. Poster Presentation.*
7. **Beaton, A.A.**; Rhodes, S.; Sahagian, M.; Franck, J.M. "Investigating Interfacial Water in AOT Reverse Micelles via Overhauser Dynamic Nuclear Polarization" *Syracuse University Chemistry Department Admitted Graduate Student Visitation Day, Syracuse, NY. Mar 16, 2019. Poster Presentation.*
8. **Beaton, A.A.**; Franck, J.M. "A Nuts and Bolts Approach to NMR: Design and Theory" *Syracuse University Chemistry Department Admitted Graduate Student Visitation Day, Syracuse, NY. Mar 3, 2018. Poster Presentation.*

## MENTORING EXPERIENCE

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**Warren Kincaid** Nov 2021 - present

Graduate student, Franck Lab

**Dr. Farhana Syed** Sep 2019 - present

Post-doc, Franck Lab

**Alexandria Guinness** Jan 2019 - present

Graduate student, Franck Lab

**Katie Ackerman** June-Aug 2019

Summer Research Undergraduate, Franck Lab

**Michelle Sahagian** Sep 2018-May 2019

Undergraduate Researcher, Franck Lab

**Soliloquy Rhodes** Sep 2018-May 2019

Undergraduate Researcher, Franck Lab

## SERVICE

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- American Chemical Society
  - Secretary (CNY Section), 2022-Ongoing
  - Delegate (CNY Section), 2014-2021
- Alpha Chi Sigma, Professional Chemistry Fraternity
  - President (Pi chapter), 2015-2016
  - Service Chair (Pi chapter), 2014-2016
  - Webmaster (Pi chapter), 2014-2015