

Brandon Makana McMurtry

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EDUCATION

August 2016 – Present

Columbia University in the City of New York

Ph.D Candidate in Chemistry, Expected Summer 2021
M.Phil in Chemistry, January 2020
M.A. in Chemistry, May 2018
Research Advisor: *Jonathan S. Owen*

August 2012 – May 2016

University of Hawai'i at Mānoa

B.S., *summa cum laude*, Chemistry with Honors
Research Advisors: *Ralf I. Kaiser, Matthew F. Cain*

PUBLICATIONS

3. **McMurtry, B.M.**; Qian, K.; Teglassi, J.K.; Swarnakar, A.K.; De Roo, J.; Owen, J.S. Continuous Nucleation and Size Dependent Growth Kinetics of Indium Phosphide Nanocrystals, *Chemistry of Materials*, **2020**, 32, 4358.
2. **McMurtry, B.M.**; Saito, S.E.; Turner, A.M.; Chakravarty, H.K.; Kaiser, R.I. On the Formation of Benzoic Acid and Higher Order Benzene Carboxylic Acids in Interstellar Model Ice Grains, *The Astrophysical Journal*, **2016**, 81, 174.
1. **McMurtry, B.M.**; Turner, A.M.; Saito, S.E.; Kaiser, R.I. On the Formation of Niacin (Vitamin B3) and Pyridine Carboxylic Acids in Interstellar Model Ices. *Chemical Physics*, **2016**, 472, 173.

PRESENTATIONS

- Control over InP Nanocrystal Size Using Aminophosphine Derivatives with Tunable Reactivity: Continuous Nucleation and Size Dependent Growth Kinetics. *Abstracts of 259th National Meeting of the American Chemical Society, Philadelphia, PA*; March 22–26, 2020. (Poster)
- Control over InP Nanocrystal Size Using Aminophosphine Derivatives with Tunable Reactivity: Continuous Nucleation and Size Dependent Growth Kinetics. *nanoGe Fall Meeting 2019, Berlin, DE*; November 4–8, 2019. (Poster)
- Tunable library of aminophosphines provides mechanistic insights on InP nanocrystal nucleation and growth. *258th National Meeting of the American Chemical Society, San Diego, CA*; August 25–29, 2019.
- On the Formation of Niacin (Vitamin B3) and Pyridine Carboxylic Acids in Interstellar Model Ices. *Natural Sciences Oral Presentation at the Spring Undergraduate Showcase, University of Hawai'i at Mānoa*; May 6, 2016.
- On the Formation of Niacin (Vitamin B3) and Pyridine Carboxylic Acids in Interstellar Model Ices. *Natural Sciences Oral Presentation at the Fall Undergraduate Showcase, University of Hawai'i at Mānoa*; December 11, 2015.

RESEARCH EXPERIENCE

Graduate Student Researcher (Prof. Jonathan S. Owen)

July 2016 – Present

Columbia University

- Studied the mechanism of nucleation and growth in InP nanocrystals using a library of novel aminophosphine precursors.
- Developed syntheses of novel $\text{In}_x\text{Ga}_{1-x}\text{P}$ heterostructures for integration in LEDs.
- Developed a methodology for obtaining $\text{In}_x\text{Ga}_{1-x}\text{P}$ nanocrystals via cation exchange of Cd_3P_2 and Zn_3P_2 .
- Synthesized a series of phosphoenol complexes and used them as metal phosphide nanocrystal precursors.

Undergraduate Research Assistant (Prof. Ralf I. Kaiser)

Feb. 2013 – May 2016

University of Hawai'i at Mānoa

- Studied the formation of benzene and pyridine carboxylic acids in modeled interstellar ices. Reaction mechanisms were elucidated with *in situ* Fourier-transform infrared spectroscopy and mass spectrometry.
- Analyzed the mass spectra of irradiated methane ices collected using a reflectron time-of-flight mass spectrometer coupled to a photon ionization light source.

Undergraduate Research Assistant (Prof. Matthew F. Cain)

May 2015 – Sep. 2015

University of Hawai'i at Mānoa

- Investigated the synthesis of a chiral hybrid phosphine-phosphaalkene ligand derived from the chiral pool starting material, (–)-myrtenal.
- Investigated the synthesis of a flexible hybrid phosphine-phosphaalkene ligand of either a three or four carbon spacer between phosphorus units.

TEACHING & MENTORING EXPERIENCE

Undergraduate and High School Student Mentorship

Jan. 2018 – Present

Columbia University

- Mentored three students in nanocrystal synthesis, two of whom are co-authors on one or more peer-reviewed publications.

General Chemistry Lecture Course

Sep. 2016 – May 2019

Columbia University

- Teaching assistant for ~70 undergraduate and postbaccalaureate students. Wrote and graded quizzes and planned weekly lessons to review/discuss concepts covered within lecture. (5 Semesters)

Inorganic Chemistry Lecture Course

Sep. 2017 – Dec. 2017

Columbia University

- Sole teaching assistant for a class of ~20 graduate and undergraduate students. Wrote and graded homework assignments and exams. (1 Semester)

General Chemistry Lab Course

July 2016 – Aug. 2016

Columbia University

- Teaching assistant for ~20 undergraduate and postbaccalaureate students. Led twice-weekly lab sections and graded assignments and lab reports. (1 Semester)

Physical Chemistry II Lecture Course

Jan. 2016 – May 2016

University of Hawai'i at Mānoa

- Sole teaching assistant for a class of ~20 undergraduate students. Graded homework, midterms, and final exam and conducted problem sessions to review homework and prepare students for exams. (1 Semester)

College Physics I/II Lecture Course

Jan. 2015 – Dec. 2015

University of Hawai'i at Mānoa

- Sole teaching assistant for a class of ~150 undergraduate students. Assisted professor in conducting demonstrations and provided assistance to students with in-class assignments. (2 Semesters)

LEADERSHIP & OUTREACH EXPERIENCE

- Graduate Student Volunteer, *Sci4NY* Mar. 2020 – Present
- Researched and wrote memos for NYC agencies on the long-term impact and fiscal viability of several environmental initiatives.
 - Assisted the NYC Panel on Climate Change with public surveys for its upcoming report.
 - Helped develop a science policy course for candidates in the 2021 NYC city council election.
 - Participated in canvassing campaign to provide science consulting to 2021 NYC city elections candidates.
- Volunteer Lecturer, *Skype a Scientist* Sep. 2018 – Present
- Presented to and spoke with elementary, intermediate, and high school students across the U.S. and internationally about quantum dot chemistry and graduate student life.
 - Promoted STEM education and career access to groups of students from a wide range of backgrounds.
- Safety Officer, *Owen Laboratory* July 2018 – Present
- Responsible for the safety of all lab members by controlling for and consulting on physical and chemical hazards. Served as liaison between the lab members and Columbia University EH&S.
- Experiment Leader, *Girls Science Day at Columbia* Mar. 2017 – Present
- Designed and led demonstrations for local middle school student at annual events.
- Coordinator, *Columbia Synthesis Symposium* Aug. 2018 – May 2019
- Organized a department-wide organic and inorganic synthesis-focused lecture series by graduate students, post-docs, and professors.
- Volunteer, *One Fair Wage* Mar. 2020 – Present
- Helped process applications by phone for the One Fair Wage Emergency Fund. The fund has distributed millions of dollars to low-waged, tipped workers in response to the COVID-19 pandemic.

AWARDS & HONORS

- Jack Miller Award (excellence in teaching by a graduate student) May 2018
- National Science Foundation Graduate Research Fellowship, Honorable Mention Mar. 2017
- Magistad Award, *University of Hawai'i at Mānoa Chemistry Department* May 2016
- Giichi Fujimoto Scholar Award, *University of Hawai'i at Mānoa Chemistry Department* May 2015
- Chemistry Departmental Merit Scholarship, *University of Hawai'i at Mānoa* 2014 – 2016
- University of Hawai'i Regents Scholarship (merit-based, full tuition and a yearly stipend) 2012 – 2016
- Dean's List (7 Semesters), *University of Hawai'i at Mānoa* 2012 – 2016
- Honors Program, *University of Hawai'i at Mānoa* 2012 – 2016
- Marching Band Scholarship, *University of Hawai'i* 2012 – 2016

PROFESSIONAL AFFILIATIONS

- Member, *Phi Beta Kappa Honor Society* 2016 – Present
- Student Member, *American Chemical Society* 2015 – Present
- Member, *Golden Key International Honour Society* 2013 – Present

RELEVANT SKILLS

- Experience analyzing and collecting ^1H , ^{13}C , ^{19}F , ^{31}P , and ^{125}Te NMR; FT-IR; MS; Photoluminescence; PL Quantum Yield; PXRD; Raman; TEM; and UV-VIS; measurements
- Familiar with standard air-free Schlenk line and glove box techniques
- Expertise in working with ultra-high vacuum (UHV) systems
- Experience using ChemDraw, Adobe Illustrator, Python, and Microsoft Excel