Ryan A. **Beck**

Postdoctoral Researcher

Seattle, WA

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Education

University of Washington — *Seattle, WA*

Ph.D. in Chemistry — *Sept. 2016 - Aug. 2021*

Advisor: Prof. Xiaosong Li

GPA: 3.54 / 4.0

York College of Pennsylvanya — *York, PA*

B.S. in Chemistry, *Magna Cum Laude*. Minors in Computer Science and Mathematics — *Aug. 2012 - May 2016*

GPA: 3.89 / 4.0

Experience

University of Washington — *Seattle, WA*

Postdoctoral Researcher — *Sept. 2021 - Current*

- Computational chemistry researcher with the Molecular Engineering Materials Center
- Computational chemistry researcher with the Ion Dynamics in Radioactive Environments and Materials
- Familarity with common electronic-structure software packages (Gaussian, VASP, Quantum Espresso)
- Lecturer and design of CHEM 565, "Computational Chemistry"
- Lecturer and design for UW Clean Energy Institute "Introduction to using HPC for Chemistry" tutorial

University of Washington — *Seattle, WA*

PhD Student — *Sept. 2016 - 2021*

- Computational chemistry researcher with the Molecular Engineering Materials Center
- Familarity with common electronic-structure software packages (Gaussian, VASP)

University of Washington — *Seattle, WA*

DIRECT Trainee — *Mar. - June 2019*

- Machine-learning collaboration with Maria Chan at Argonne national lab investigating material properties given geometric and elemental properties
- Used python ML packages to attempt to refine search for important descriptors

York College of Pennsylvania — *Seattle, WA*

Organic and Physical Chemistry Laboratory Preparation — *Aug. 2014 to May 2016*

- Responsibilities include preparing and monitoring chemicals and supplies used during labs.

York College of Pennsylvania — *Seattle, WA*

Lab Assistant — *Jan. 2013 to May 2016*

- Responsibilities include monitoring students to ensure safe and time efficient behaviors.

Honors & Awards

2025	**Student and Postdoc Team Science Award,** 2025 EFRC-Hub-CMS-CCS Principal Investigators Meeting	*Bathesda, Md*
2019 - 2020	**Graduate Student Merit Fellowship,** University of Washington	*Seattle, WA*
2018 - 2019	**Data Intensive Research Enabling Clean Technologies (DIRECT) Fellowship,** University of Washington	*Seattle, WA*
2016	**Excellence in Chemistry Graduate Fellowhip Award,** University of Washington	*Seattle, WA*
2016	**South Eastern Pennsylvania Section of the American Chemical Society Outstanding Chemist,** York College of Pennsylvania	*York, PA*
2015 - 2016	**Alpha Chi Honor Society,** Pennsylvania Delta Chapter	*York, PA*

Publications

15. Finch, K.; **Beck, R. A.**; Li, X; Pho, N.; Zhu, X. Computational Skills Training for Undergraduate Researchers in Molecular Engineering. *J. Comp. Sci. Ed.*, **2025**, 16, 50-56. DOI: 10.22369/issn.2153-4136/16/1/10.

14. Sandeno S. F.; Krajewski, S. M.; **Beck, R. A.**; Kaminsky, W.; Li, X.; Cossairt, B. M. Synthesis and Single Crystal X-ray Diffraction Structure of an Indium Arsenide Nanocluster. *ACS Cent. Sci.*, **2024**, 10, 744-751. DOI: 10.1021/acscentsci.3c01451.

13. Sandeno S. F.; Schnitzenbaumer, K. J.; Krajewski, S. M.; **Beck, R. A.**; Ladd, D. M.; Levine, K. R.; Dayton, D.; Toney, M. F.; Kaminsky, W.; Li, X.; Cossairt, B. M. Ligand Steric Profile Tunes the Reactivity of Indium Phosphide Clusters. *J. Am. Chem. Soc.*, **2024**, 146, 3102-3113. DOI: 10.1021/jacs.3c10203.

12. Eagle, F. W.; Harvey, S.; **Beck, R. A.**; Li, X.; Gamelin, D. R.; Cossairt, B. M. Enhanced Charge Transfer from Coinage Metal Doped InP Quantum Dots. *ACS Nanosci. Au*, **2023**, 6, 451-461. DOI: 10.1021/acsnanoscienceau.3c00029.

11. Park, N.; **Beck, R. A.**; Hoang, K. K.; Ladd, D. M.; Abramson, J. E.; Rivera-Maldonado, R. A.; Nguyen, H. A.; Monahan, M.; Seidler, G. T.; Toney, M. F.; Li, X.; Cossairt, B. M. Colloidal, Room-Temperature Growth of Metal Oxide Shells on InP Quantum Dots. *Inorg. Chem*, **2023**, 62, 6674-6687. DOI: 10.1021/acs.inorgchem.3c00161.

10. **Beck, R. A.***; Huang, Y.*; Petrone, A.; Abbott, J. W.; Pauzauskie, P. J.; Li, X. Electronic Structures and Spectroscopic Signatures of Noble-Gas-Doped Nanodiamonds. *ACS Phys. Chem. Au*, **2023**, 3, 299-310. DOI: 10.1021/acsphyschemau.2c00072.

9. **Beck, R. A.**; Sun, S.; Xu, X.; Gamelin, D. R.; Cao, T.; Li, X., Understanding Exterrnal Pressure Effects and Interlayer Orbital Exchange Pathways in the Two-Dimensional Magnet-Chromium Triiodide. *J. Phys. Chem*, **2022**, 126, 19327-19335. DOI: 10.1021/acs.jpcc.2c03884.

8. Park, N.; Eagle, F. W.; DeLarme, A. J.; Monahan, M.; LoCurto, T.; **Beck, R. A.**; Li, X.; Cossairt, B. M., Tuning the Interfacial Stoichiometry of InP Core and InP/ZnSe Core/Shell Quantum Dots. *J. Chem. Phys.*, **2021**, 155, 084701. DOI: 10.1063/5.0060462.

7. **Beck, R.A.**; Lu, L.; Sushko, P. V.; Xu, X.; Li, X., Defect-Induced Magnetic Skyrmion in a Two-Dimensional Chromium Triiodide Monolayer. *JACS Au.*, **2021**. DOI: 10.1021/jacsau.1c00142.

6. **Beck, R.A.**; Lu, L.; Petrone, A.; Ong, A.C.; Pauzauskie, P.; Li, X., Spectroscopic Signatures of the B and H_4 Polyatomic Nitrogen Aggregates in Nanodiamond. *J. Phys. Chem. C*, **2020**, 124, 18275-18283. DOI: 10.1021/acs.jpcc.0c03106.

5. Sun, S.; **Beck, R.A.**; Williams-Young, D.B.; Li, X., Simulating Magnetic Circular Dichroism Spectra with Real-Time Time-Dependent Density Functional Theory in Gauge Including Atomic Orbitals. *J. Chem. Theory Comput.*, **2019**, 15, 6824-6831. DOI: 10.1021/acs.jctc.9b00632.

4. Crane, M.; Petrone, A.; **Beck, R.A.**; Lim, M.; Zhou, X.; Li, X.; Stroud, R.M.; Pauzauskie, P., High Pressure, High Temperature Molecular Doping of Nanodiamond. *Sci. Adv.*, **2019**, 5, eaau6073. DOI: 10.1126/sciadv.aau6073.

3. Leger, J.; Friedfeld, M.; **Beck, R.A.**; Gaynor, J.; Petrone, A.; Li, X.; Cossairt, B.; Khalil, M., Carboxylate Anchors Act as Exciton Reporters in 1.3 nm Indium Phosphide Nanoclusters. *Phys. Chem. Lett.*, **2019**, 10, 1833-1839. DOI: 10.1021/acs.jpclett.9b00602.

2. Petrone, A.*; **Beck, R.A.***; Kasper, J.M.; Huang, Y.; Crane, M.; Pauzauskie, P.; Li, X., Electronic Structures and Spectroscopic Signatures of Silicon-Vacancy Containing Nanodiamonds. *Phys. Rev. B*, **2018**, 98, 205405. DOI: 10.1103/PhysRevB.98.205405.

1. **Beck, R.A.***; Petrone, A.*; Kasper, J.M.; Crane, M.; Pauzauskie, P.; Li, X., Effect of Surface Passivation on Nanodiamond Crystallinity. *J. Phys. Chem. C.*, **2018**, 122, 8573-8580. DOI: 10.1021/acs.jpcc.8b00354.
*__Co-First Authors__

Presentations

August 2025	**Beck, R.**; Paul, S.; Bedar, A.; Felsted, G. *Understanding How Radiation Uniquely Transforms the Physiochemical Properties of Electrolytes.* (Oral Presentation) 2025 EFRC-Hub-CMS-CCS Principal Investigators Meeting	*Bathesda MD.*
September 2023	**Beck, R.A.**; Li, X., *Structural Modification of Electronic and Magnetic Properties.* (Oral Presentation) Quantum Information Science Center.	*Georgia Institute of Technology*
July 2023	**Beck, R.A.**; Shumilov, K.; Snoeren, T.; Gamelin, D.R.; Li, X., *Covalency of Yb-X in Yb^{3+}:CrX_3.* (Poster) Materials Research Science and Engineering Center.	*University of Washington*
June 2023	**Beck, R.A.**; Li, X., *Computational Study of Nanodiamond Defects Influencing Experimental Design*. (Oral Presentation) Nanomaterials: Computation, Theory, Machine Learning and Experiment	*Telluride, CO*
Aug. 2020	**Beck, R.A.**; Sushko, P.; Xu, X; Li, X., *Investigation of Chromium Iodide Skyrmionic Structures*. (Oral Presentation) Materials Research Science and Engineering Center.	*University of Washington*
Oct. 2019	**Beck, R.A.**; Sun, S.; Liu, H.; Li, X., *Investigation of Layered Chromium Iodide Structures*. (Oral Presentation) Materials Research Science and Engineering Center.	*University of Washington*
Sept. 2019	**Beck, R.A.**; Lu, L.; Petrone, A.; Ong, A.C.; Pauzauskie, P.; Li, X., *Spectroscopic Signatures of the Nitrogen B and H_4 Aggregates in Nanodiamonds*. (Poster) European Summerschool in Quantum Chemistry.	*Sicily, Italy*
June 2019	**Beck, R.A.**; Sun, S.; Liu, H.; Li, X., *Investigation of Magnetic Properties of a Two-Dimensional Chromium Iodide Material*. (Oral Presentation) Northwest Theoretical Chemistry Conference.	*Pullman, WA*
Sept. 2018	**Beck, R.A.**; Petrone, A.; Li, X., *Examination of Spectroscopic Signatures of Nanodiamond Defects*. (Oral Presentation) Materials Research Science and Engineering Center.	*University of Washington*
Oct. 2017	**Beck, R.A.**; Petrone, A.; Li, X., *Spectroscopic Response to the Loss of Nanodiamond Surface Crystallinity*. (Poster) Northwest Theoretical Chemistry Conference	*Richland, WA*
Oct. 2017	**Beck, R.A.**; Petrone, A.; Li, X., *Spectroscopic Signatures of Surface Reconstructions of Nanodiamond*. (Oral Presentation) Materials Research Science and Engineering Center.	*University of Washington*
Mar. 2016	Esmeralda, L.; **Beck, R.A.**; Halligan, K., *Crosslinking of the Antibody Anti-Human IL-13R Alpha 2 Peptide IgY to FITC via PDPH*. (Poster) 251st ACS National Meeting	*San Diego, CA*

Research Interests

Theory

- Electronic structure of quantum dots for green and spintronic applications
- Material identification and evaluation with x-ray absorption spectroscopy
- Energetic pathways and material design for electron transfer

Extracurricular Activity

MEMC Outreach *University of Washington*

- Facilitate demonstrations on superconductivity and magnetism.
- Assist ”MEMC NanoCamp” lithography demonstrations.
- Assist ”MEMC NanoCamp” CD spectrometer demonstrations.

REU Graduate Student Mentor *University of Washington*

- Mentorship for recent high-school graduates (UW ALVA) and for current undergraduate (MEM-C REU) students.
- Have mentored nine students in computational chemistry applications from 2017-2025.
- Introduce students to high-performance computing.
- Introduce students to electronic structure methods and semiconducting nanomaterials.

Clean Energy Institute Ambassadors *University of Washington*

- Solar cell demonstration at MESA Day
- Solar car derby at Thorton Creek Elementary
- Solar car derby at Engineering Discovery Days

York College Chemistry Society *York College of Pennsylvania*

- Chemistry Society secretary (2015-2016)
- Organization and facilitation of chemistry demonstrations to York Suburban High School
- Organization and facilitation of chemistry demonstrations for ”Perspective Student” and ”New Student” activities