

# Ryan A. Beck

POSTDOCTORAL RESEARCHER

Seattle, WA

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## Education

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### 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 Pennsylvania

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

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### University of Washington

Seattle, WA

POSTDOCTORAL RESEARCHER

Sept. 2021 - Current

- Computational chemistry researcher with the Molecular Engineering Materials Center
- Familiarity with common electronic-structure software packages (Gaussian, VASP, Quantum Espresso)
- Lecturer and design of CHEM 565, "Computational Chemistry"

### 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

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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 Fellowship 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

2012 - 2016 **Dean's List**, York College of Pennsylvania

York, PA

2012 **Eagle Scout**, Boy Scouts of America Troop 26

Wrightsville, PA

## Publications

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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/acspyschemau.2c00072.
9. **Beck, R. A.**; Sun, S.; Xu, X.; Gamelin, D. R.; Cao, T.; Li, X., Understanding External 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<sub>4</sub> 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.jpcllett.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

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September 2023	<b>Beck, R.A.;</b> Li, X., <i>Structural Modification of Electronic and Magnetic Properties.</i> (Oral Presentation) Quantum Information Science Center.	Georgia Institute of Technology
July 2023	<b>Beck, R.A.;</b> Shumilov, K.; Snoeren, T.; Gamelin, D.R.; Li, X., <i>Covalency of Yb-X in Yb<sup>3+</sup>:CrX<sub>3</sub>.</i> (Poster) Materials Research Science and Engineering Center.	University of Washington
June 2023	<b>Beck, R.A.;</b> Li, X., <i>Computational Study of Nanodiamond Defects Influencing Experimental Design.</i> (Oral Presentation) Nanomaterials: Computation, Theory, Machine Learning and Experiment	Telluride, CO
Aug. 2020	<b>Beck, R.A.;</b> Sushko, P.; Xu, X; Li, X., <i>Investigation of Chromium Iodide Skyrmionic Structures.</i> (Oral Presentation) Materials Research Science and Engineering Center.	University of Washington
Oct. 2019	<b>Beck, R.A.;</b> Sun, S.; Liu, H.; Li, X., <i>Investigation of Layered Chromium Iodide Structures.</i> (Oral Presentation) Materials Research Science and Engineering Center.	University of Washington
Sept. 2019	<b>Beck, R.A.;</b> Lu, L.; Petrone, A.; Ong, A.C.; Pauzauskie, P.; Li, X., <i>Spectroscopic Signatures of the Nitrogen B and H<sub>4</sub> Aggregates in Nanodiamonds.</i> (Poster) European Summerschool in Quantum Chemistry.	Sicily, Italy
June 2019	<b>Beck, R.A.;</b> Sun, S.; Liu, H.; Li, X., <i>Investigation of Magnetic Properties of a Two-Dimensional Chromium Iodide Material.</i> (Oral Presentation) Northwest Theoretical Chemistry Conference.	Pullman, WA
Sept. 2018	<b>Beck, R.A.;</b> Petrone, A.; Li, X., <i>Examination of Spectroscopic Signatures of Nanodiamond Defects.</i> (Oral Presentation) Materials Research Science and Engineering Center.	University of Washington
Oct. 2017	<b>Beck, R.A.;</b> Petrone, A.; Li, X., <i>Spectroscopic Response to the Loss of Nanodiamond Surface Crystallinity.</i> (Poster) Northwest Theoretical Chemistry Conference	Richland, WA
Oct. 2017	<b>Beck, R.A.;</b> Petrone, A.; Li, X., <i>Spectroscopic Signatures of Surface Reconstructions of Nanodiamond.</i> (Oral Presentation) Materials Research Science and Engineering Center.	University of Washington
Mar. 2016	Esmeralda, L.; <b>Beck, R.A.;</b> Halligan, K., <i>Crosslinking of the Antibody Anti-Human IL-13R Alpha 2 Peptide IgY to FITC via PDPH.</i> (Poster) 251 <sup>st</sup> ACS National Meeting	San Diego, CA

## Extracurricular Activity

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### 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 2017-2024.
- 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