

Peter Aaron Defnet, Ph.D.

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Education

University of Washington, Seattle	Ph.D. – Analytical Chemistry	Aug. 2021
Juniata College	B.S. – Chemistry	May 2015

Technical Experience

Graduate Research Assistant – *Bo Zhang Lab, Dept. of Chemistry, UW Seattle* Sep. 2015 – Aug. 2021

- Led independent chemical research to discover new nanoscale electrochemical mechanisms related to single nanoparticle quantitation and redox mapping. Exhibited learning agility and ambition by contributing to 10 peer-reviewed publications with over 250 citations.
- Acquired hands-on, publication-quality expertise in laboratory methods including Electroanalysis (cyclic voltammetry, chronoamperometry), Optical Microscopy (fluorescence, electrochemiluminescence, TIRF), Nanofabrication (Electrodeposition, ALD), Nanomaterials Synthesis (nanoparticles, nanopores, nano/microelectrodes), and Light Scattering (DLS, NTA).
- Fostered strong scientific programming skills, demonstrated by writing Python scripts that saved well over 1,000 hours in tedious manual analysis. (See detailed examples at: peterdefnet.github.io)
- Mentored 6 graduate/undergraduate students by teaching lab techniques, aiding in experimental design, and interpreting results.

Graduate Teaching Assistant – *Dept. of Chemistry, UW Seattle* Sep. 2015 – Aug. 2021

- Served as a teaching assistant for 16 quarters of undergraduate chemistry courses including General Chemistry, Organic Chemistry Lab, and Electrochemistry.
- Lead 1-hour review sessions, 3-hour lab sessions, and graded coursework for over 500 students total.
- Promoted by teaching faculty to Lead TA for 4 quarters, with increased course management responsibilities.

Machine Learning Engineer – *Multi-University Collaboration* Jul. 2020 – Jun. 2021

- Volunteered as a machine learning engineer beginning during the COVID-19 lockdown with a team of geologists and museum curators from Yale, The Smithsonian, and NCSU.
- Built predictive models using SVM and PLSDA with Scikit-Learn in Python to identify classes of internationally-sourced garnet gemstones using 12,000-dimensional chemical data.
- Published a first-author paper in 'Minerals', a well-known scientific journal for geological studies.

Applications Intern – *Applied Spectra Inc. Fremont, CA.* May 2013 – Aug. 2013

- Interned at a Silicon Valley startup lead by Lawrence Berkeley National Lab scientists.
- Used laser-induced breakdown spectroscopy (LIBS) to discriminate forensic automobile paint samples based on their layered elemental composition.

Undergraduate Research Assistant – *Dept. of Chemistry, Juniata College* Feb. 2012 – May 2015

- Conducted over 2,000 hours of chemical research in the fields of spectroscopy, machine learning, inorganic synthesis, and electrochemistry.

Publications

Most Recent Updates and Citation Count on [Google Scholar](#)

1. **Defnet, P.A.**; Zhang, B. Collision, Adhesion, and Oxidation of Single Ag Nanoparticles on a Polysulfide-Modified Microelectrode. *Journal of the American Chemical Society*. **2021**. ASAP. [Link](#)
2. Anderson, T. J.; **Defnet, P.A.**; Cheung, R.A.; Zhang, B. Electrocatalyst Screening on a Massive Array of Closed-Bipolar Electrodes. *Journal of the Electrochemical Society*. **2021**. Accepted. [Link](#)
3. **Defnet, P.A.**; Wise, M.A.; Harmon, R.S.; Hark, R.R.; Hilferding, K. Analysis of Garnet by Laser-Induced Breakdown Spectroscopy – Two Practical Applications. *Minerals*. **2021**, 11, 705. [Link](#)
4. **Defnet, P.A.**; Anderson, T.J.; Zhang, B. Stochastic Collision Electrochemistry of Single Silver Nanoparticles. *Current Opinion in Electrochemistry*. **2020**, 22, 129-135. [Link](#)
5. Anderson, T.J.*; **Defnet, P.A.***; (co-first author) Zhang, B. Electrochemiluminescence (ECL)-Based Bipolar Electrochemical Imaging using a Massive Array of Carbon Ultramicroelectrodes. *Analytical Chemistry*. **2020**, 92, 6748-6755. [Link](#)
6. **Defnet, P.A.**; Zhang, B. Detection of Transient Nanoparticle Collision Events using Electrochemiluminescence on a Closed-Bipolar Microelectrode. *ChemElectroChem*. **2020**, 7, 252-259. [Link](#)
7. Wong, J.; Gong, A.T.; **Defnet, P.A.**; Meabe, L.; Beauchamp, B.; Sweet, R.M.; Sardon, H.; Cobb, C.L.; Nelson, A. 3D Printing Ionogel Auxetic Framework for Stretchable Sensors. *Advanced Materials Technologies*. **2019**, 4, 1900452. [Link](#)
8. **Defnet, P.A.**; Han, C.; Zhang, B. Temporally-Resolved Ultrafast Hydrogen Adsorption and Evolution across Single Platinum Nanoparticles. *Analytical Chemistry*. **2019**, 91, 4023-4030. [Link](#)
9. Barlow, S.T.; Louie, M.; Hao, R.; **Defnet, P.A.**; Zhang, B. Electrodeposited Gold on Carbon-Fiber Microelectrodes for Enhancing Amperometric Detection of Dopamine Release from Pheochromocytoma Cells. *Analytical Chemistry*. **2018**, 90, 10049-10055. [Link](#)
10. Zhang, F; **Defnet, P.A.**; Fan, Y.; Hao, R.; Zhang, B. Transient Electrocatalytic Water Oxidation in Single-Nanoparticle Collision. *The Journal of Physical Chemistry C*. **2018**, 122, 6447-6455. [Link](#)
11. Oja, S.M.; Fan, Y.; Armstrong, C.M.; **Defnet, P.A.**; Zhang, B. Nanoscale Electrochemistry Revisited. *Analytical Chemistry*. **2016**, 88, 414-430. [Link](#)

Oral Presentations

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| ▪ Pittsburgh Conference (Pittcon). Chicago, IL | Mar. 2020 |
| ▪ Pittsburgh Conference (Pittcon). Philadelphia, PA | Mar. 2019 |

Poster Presentations

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| ▪ Pittsburgh Conference (Pittcon). Chicago, IL | Mar. 2020 |
| ▪ Society of Western Analytical Professors Meeting. Seattle, WA | Feb. 2018 |
| ▪ 249 th ACS National Meeting, Anyl. Division. Denver, CO | Mar. 2015 |
| ▪ Central PA ACS Fall Undergraduate Research Symposium. University Park, PA | Sep. 2014 |
| ▪ Landmark Conference Summer Research Symposium. Huntingdon, PA | Jul. 2014 |
| ▪ 1 st Annual LIBS Research and Teaching Symposium. Huntingdon, PA | Nov. 2013 |
| ▪ 245 th ACS National Meeting, Anyl. Division. New Orleans, LA | Apr. 2013 |
| ▪ Landmark Conference Summer Research Symposium. Bethlehem, PA | Jul. 2012 |

Fellowships, Scholarships, Honors, & Awards

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| ▪ UW Chemistry Graduate Merit Fellowship (\$500) | May 2020 |
| ▪ UW Chemistry Alma Mater Travel Award (\$750) | Nov. 2019 |
| ▪ UW Chemistry Shain, Irving and Mildred Graduate Fellowship (\$500) | Apr. 2019 |
| ▪ UW Chemistry Graduate Student Conference Travel Award (\$300) | Feb. 2019 |
| ▪ Juniata College Donald M. Rockwell Endowed Chemistry Scholarship (\$500) | May 2014 |
| ▪ ACS Division of Analytical Chemistry Undergraduate Award | Apr. 2014 |
| ▪ II-VI Foundation Student Scholarship (\$10,000) | Aug. 2013 |

Leadership & Service

Peer Reviewer – *Elsevier* Jul. 2020 – Present

- Selected as an expert peer reviewer for the following scientific journals: *Trends in Analytical Chemistry*, *Journal of Electroanalytical Chemistry*.

Founding Committee Member – *SEAC* May 2021 – Present

- Co-organized monthly online networking events serving the Society for Electroanalytical Chemistry (SEAC) graduate students. Led advertising efforts resulting in over 50 registrations.

Social Chair – *UW Chemistry Graduate Student Club* Sep. 2018 – Aug. 2019

- Elected by peers to co-organize quarterly departmental social events serving 200+ graduate students and postdocs. Created a data-driven solution to optimize spending with a limited purchasing budget.