# Stephen J. Proctor, Ph.D.

https://www.linkedin.com/in/stephen-proctor-862817137/

## Education

- **Ph.D. in Chemistry** (Inorganic), University of California Riverside, Riverside, CA. July 2026
  - TA positions: 17 quarters of general, organic, & inorganic chemistry labs & discussions
  - Graduate Student Mentorship Program: Peer Mentor Level II, 2020 – 2025
- **Master of Science**, **Chemistry** (Inorganic), University of California Riverside, Riverside, CA. March 2022
- **Bachelor of Science**, **Chemistry**, California State University Chico, Chico, CA. May 2020
  - Supplemental Instruction (SI) Leader: 3 years, Master Tutor Levell III, 2017 – 2020
  - Master Tutor: Level III (EDUC 508, CSU Chico, 2020)

## Awards

1. Dissertation Completion Fellowship (UCR, 2026): $24,000
2. Richard R. Schrock Graduate Student Award (UCR, 2025): $2,500
3. ORISE Participant within the DOE / SCGSR (National Renewable Energy Lab - NREL, 4 month research project, 2025): $14,000
4. Science of Sustainability Fellowship (UCR, 2022): $15,000
5. Dean's Distinguished Fellowship (UCR, 2020): $7,500
6. Kappa Sigma Fraternity Outstanding Scholar (CSUC, 2019): $300
7. Casa Grande High School Entrepreneurship New Business Idea, 1st Place (2016): $250

## Publications

1. Beyond the Hawthorne Reaction: $Li^+$ Induced Thermal Dehydrocoupling of *closo*-10-vertex Carborane Anions. S. Proctor, P. Farias, V. Carta, and V. Lavallo*. *Inorg. Chem.*, **2025**, 64, 1, 757 – 760. DOI: 10.1021/acs.inorgchem.4c04644
2. Combustion Resistant Borohydrides and Their Chemical Interactions with Li Metal Surfaces: An Experimental and Theoretical Study. A. W. Tomich*, S. Proctor, M. Y. Yang, J. Chen, Y. Zhao, E. Chen, T. Das, B. Merinov, W. A. Goddard III*, J. Guo*, and V. Lavallo*. *ACS Cent. Sci.* **2025**, 11, 5, 734 – 741. DOI: 10.1021/acscentsci.5c00043
3. Searching for the Truth: Elemental Analysis – A Powerful but Often Poorly Executed Technique. S. Proctor, S. O. Lovera, A. W. Tomich, V. Lavallo*. *ACS Cent. Sci.*, **2022**, 8, 7, 874 –876 (Invited). DOI: 10.1021/acscentsci.2c00761

## Conferences & Workshops

- ACS Spring 2025, *oral presentation*, San Diego Convention Center, March 2025.
- UC Chemical Symposium, *oral presentation*, UCLA Lake Arrowhead Conf. Center, April 2024.
- SoCal Organometallics, University of California, Riverside. June 2023 and May 2025.
- VIPEr IONiC Summer Workshop, *oral presentation*, Cal Poly, Pomona. June 2022.
- This Way to Sustainability, *oral presentation*, California State University, Chico. April 2020.
- Student Leadership Conference (SI), *rep.*, California State University, Chico. May 2019

## Research Projects & Internships

- **Ph.D. Dissertation Research:** Synthesis and Application of Weakly Coordinating Carborane Anions into Next Generation $Li^+$ and $Al^{3+}$ Ion Rechargeable Batteries, University of California, Riverside. Advisor: Dr. Vincent Lavallo. October 2020 – present.

**Unpublished / Ongoing Graduate Research Projects:**

1. DOE / SCGSR / ORISE Fellowship: Elucidating SEI Formation Between Si Anodes and Carborane-Based Electrolytes, National Laboratory of the Rockies (NLR), Golden, CO, June – October 2025. Advisor: Dr. Mike Carroll.
2. A Free Aluminum Ion: Synthesis and Lewis Acidic Properties of an Unbound $Al^{3+}$ Cation
3. Carbon Linked Dianionic Carboranes: Characterization of New Weakly Coordinating Anions
4. The Synthesis and Reactivity of Novel Iodonium Biscarboranes and Hetero-Biscarboranes
5. *Closo*-carborate Based Ionic Liquids as Burn Rate Modifiers for Fuels and Propellants. *Collaboration with The Aerospace Corporation®.*

- Undergraduate Research: Application of Acidic Deep Eutectic Solvents in Undergraduate Chemistry Laboratory Experiments, California State University, Chico, Supervised by Dr. Lisa Ott. August – December 2019.
- Internships: Bausch Health Companies Inc., Petaluma location, Supervised by Dr. Gene Shen, June 2018 – Aug 2018, June 2019 – Aug 2019.
    1. Developed methods to detect and quantify formaldehyde in a drug vehicle using high pressure liquid chromatography (HPLC)

## Technical Skills

- Synthetic Inorganic Chemistry, Glovebox, Schlenk Line, Air-Free & Wet Chemistry Techniques
- Instrumentation:
    - Electrochemical Techniques: using MACCOR® and Biologic® protocols: Electrochemical Impedance Spectroscopy, Cyclic Voltammetry, Potentiometry, Coin cell assembly
    - Spectroscopy: Nuclear Magnetic Resonance (NMR), UV-Vis, Infrared (FTIR), Energy Dispersive X-Ray spectroscopy (EDS)
    - Materials Characterization:
        - Mass Spectrometry (MS), Scanning Electron Microscope (SEM), X-Ray Diffraction (XRD), High-Pressure Liquid Chromatography (HPLC),
        - Thin Film Deposition (Spin Coater), Viscometry, Conductivity & pH determination, Karl Fischer Water Concentration Titration
- Software: TopSpin & MestreNova NMR Data Analysis, MACCOR, Mercury, Microsoft Office Suite, Python (data analysis and visualization: Jupyter Notebook, Anaconda), Gaussian Computational (basic WebMO and Avogadro Modeling), Google Sites
- Trained and proficient in current good manufacturing and laboratory practices (cGMP, cGLP) and use of official laboratory notebooks in a controlled setting. *Bausch Health Inc.*
- Lavallo Lab Duties: safety officer, ordering and maintaining chemical reagents, website design

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## Course Projects

Graduate (UCR):

- PhD Candidacy Exam: Original Project Proposal: $CO_2$ Capture via Designer Hydrogen-Bonded Organic Framework. Advisor: Dr. Vincent Lavallo, November 2022
- Research Proposal: Protecting the Al Anode in an Aluminum-Ion Battery – One Solution for Two Problems. Chem 211B – *Organometallics*. Dr. Matthew Conley, March 2021

Undergraduate (CSU, Chico):

- HPLC and GC/MS Analysis of Fermented Mosaic Hops, Integrated Lab Experience, California State University, Chico campus, Supervised by Dr. Lisa Ott, Jan – May 2020
- Fabrication and Characterization of Perovskite Solar Cells, Integrated Lab Experience, California State University, Chico campus, Supervised by Dr. Monica So, Apr – May 2019
- Computational Analysis of the Conformations of Bromocyclohexanones via WebMO, Integrated Lab Experience, California State University, Chico campus, Supervised by Dr. Randy Miller and Dr. Daniel Everson, Jan – Mar 2018

## Associated Organizations & Positions

- Materials Research Society, Co-Vice President 2019 – 2020
- Kappa Sigma International Fraternity, Scholarship Chair, 2018 – 2020

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## References

**1. Dr. Vincent Lavallo,** University of California, Riverside
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**2. Dr. Mike Carroll,** National Renewable Energy Lab
Materials Science
mike.carroll@nrel.gov

**3. Dr. William A. Goddard III**, California Institute of Technology, Pasadena, CA
Materials and Process Simulations Center
wag@caltech.edu

**4. Dr. Lisa Ott,** California State University, Chico
Chemistry & Biochemistry Department
530-898-6563
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**5. Dr. Randy Miller,** California State University, Chico
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**6. Dr. Gene Shen,** Bausch Health Companies, Inc.
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