

# Raul A. Marquez-Montes

As of February 2, 2026

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## PROFESSIONAL APPOINTMENTS

Postdoctoral Fellow

*The University of Texas at Austin*

Host: Prof. Joaquin Resasco

September **2025** – Present

Research focus: Interfacial reactivity in thermochemical and electrochemical reactions

## EDUCATION

Ph.D. in Chemistry, Analytical Chemistry

*The University of Texas at Austin*

Advisor: Prof. C. Buddie Mullins

August **2025**

*Thesis:* Effects of the reaction environment on the performance of electrocatalysts for alkaline water electrolysis

M.S. in Chemistry, *Suma Cum Laude*

*Universidad Autónoma de Chihuahua*

Advisor: Prof. Víctor Hugo Ramos-Sánchez

June **2020**

*Thesis:* Evaluating and Optimizing Sulfite Electrooxidation in a Parallel-plate Reactor

B.S. in Chemical Engineering, *Suma Cum Laude*

*Universidad Autónoma de Chihuahua*

Advisor: Prof. Víctor Hugo Ramos-Sánchez

November **2017**

*Thesis:* Electrochemical Membrane Reactor for the Hybrid Thermochemical Sulfur-Ammonia Cycle

## SCIENTIFIC PUBLICATIONS

[Google Scholar page](#)

### Completed as a Postdoctoral Fellow at UT-Austin:

29. **Marquez, R.A.**, Nielander, A., Resasco, J., Jaramillo, T.F., Mullins, C.B. Electrochemical Ocean-based Carbon Capture: Roadblocks to Scale Up. *ACS Energy Letters*, **2026**, In Press. [Link](#).

### Completed as a Ph.D. student at UT-Austin:

28. **Marquez, R.A.**, Bender, J.T., Aleman, A., Kalokowski, E., Le, T.V., Williamson, C., Frederiksen, M.L., Kawashima, K., Chukwuneke, C., Dolocan, A., Milliron, D.J., Resasco, J., Jaramillo, T.F., Mullins, C.B. Insights into Catalyst Degradation During Alkaline Water Electrolysis Under Variable Operation. *Energy & Environmental Science*, **2025**, 18, 7170-7187. [Link](#)
27. **Marquez, R.A.**, Bender, J.T., da Cunha, S., Aleman, A., Sahu, A., Ganesan, V., Milliron, D.J., Resasco, J., Jaramillo, T.F., Mullins, C.B. Tracking Local pH Dynamics During Water Electrolysis via In-line Continuous Flow Raman Spectroscopy. *ACS Energy Letters*, **2025**, 10, 4, 2075–2083. [Link](#)
26. López-Cervantes, V.B., Obeso, J.L., Flores, J.G., Gutiérrez-Alejandre, A., **Marquez, R.A.**, De los Reyes, J.A., Flores, C.V., Portillo-Vélez, N.S., Marín Rosas, P., Celaya, C.A., González-Zamora, E., Solis-Ibarra, D., Peralta, R.A., Ibarra, I.A. Formation of polysulfides as a smart strategy to selectively detect H<sub>2</sub>S in a Bi(iii)-based MOF material. *Chemical Science*, **2025**, 16, 5483-5492. [Link](#)
25. Kawashima, K., Milton, A.E.F., Archer, J., Collins, D., Lorenzo Serrat, N., Chukwuneke, C., **Marquez, R.A.**, Smith, L.A., Mullins, C.B. Incidental and Intentional Transformation: Transition Metal Pnictide and Chalcogenide Electrocatalysts for Alkaline Hydrogen Evolution. *ACS Energy Letters*, **2024**, 9, 6126–6143. [Link](#)
24. **Marquez, R.A.**, Kalokowski, E., Espinosa, M., Ramos-Sánchez, V.H., Rodríguez-Pacheco, L.C., Valenzuela-De la Rosa, F., Mullins, C.B. Teaching Electrochemical Energy Conversion and Storage Through Active Learning: Insights from Science Workshops. *Journal of Chemical Education*, **2024**, 101, 8, 3333–3343. [Link](#)
23. Smith, L.A., Kawashima, K., **Marquez, R.A.**, Mullins, C.B. A Perspective on Protective Carbon Shells for Improved Stability of Alkaline Water Oxidation Electrocatalysts. *ACS Materials Letters*, **2024**, 6, 3190–3201. [Link](#)

22. **Marquez, R.A.**, Obeso, J.L., Vaidyula, R.R., López-Cervantes, V.B., Peralta, R.A., Marín Rosas, P., De los Reyes, J.A., Mullins, C.B., Ibarra, I.A. From Pollution to Energy Storage: Leveraging Hydrogen Sulfide with SU-101 Cathodes in Lithium-Sulfur Batteries. *Journal of Materials Chemistry A*, **2024**, 12, 32735-32744. [Link](#)
21. **Marquez, R.A.**, Oefelein, E.E., Le, T.V., Kawashima, K., Le, T.V., Smith, L.A., Mullins, C.B. Redefining the Stability of Water Oxidation Electrocatalysts: Insights from Materials Databases and Machine Learning. *ACS Materials Letters*, **2024**, 6, 7, 2905–2918. [Link](#)
20. **Marquez, R.A.**, Espinosa, M., Kalokowski, E., Son, Y.J., Kawashima, K., Le, T.V., Chukwuneke, C.E., Mullins, C.B. A Guide to Electrocatalyst Stability Using Lab-Scale Alkaline Water Electrolyzers. *ACS Energy Letters*, **2024**, 9, 2, 547–555. [Link](#)
19. **Marquez, R.A.**, Kalokowski, E., Espinosa, M., Bender, J.T., Son, Y.J., Kawashima, K., Chukwuneke, C., Smith, L.A., Celio, H., Dolocan, A., Zhan, X., Miller, N.R., Milliron, D.J., Resasco, J., Mullins, C.B. Transition metal incorporation: electrochemical, structure, and chemical effects on nickel oxyhydroxide oxygen-evolution electrocatalysts. *Energy & Environmental Science*, **2024**, 17, 2028-2045. [Link](#)
18. Kawashima, K.,\* **Marquez, R.A.**,\* Smith, L.A., Vaidyula, R.R., Carrasco-Jaim, O.A., Wang, Z., Son, Y.J., Cao, C.L., Mullins, C.B. A Review of Transition Metal Boride, Carbide, Pnictide, and Chalcogenide Water Oxidation Electrocatalysts. *Chemical Reviews*, **2023**, 123, 23, 12795–13208. [Link](#) \*Equal contributors.
17. Chukwuneke, C., Kawashima, K., Li, H., **Marquez, R.A.**, Son, Y.J., Celio, H., Henkelman, G., Mullins, C.B. Electrochemically Engineered Domain: Nickel–Hydroxide/Nickel Nitride Composite for Alkaline HER Electrocatalysis. *Journal of Materials Chemistry A*, **2023**, 12, 1654-1661. [Link](#)
16. Son, Y.J., **Marquez, R.A.**, Kawashima, K., Smith, L.A., Chukwuneke, C., Babauta, J., Mullins, C.B. Navigating *iR* Compensation: Practical Considerations for Accurate Study of Oxygen Evolution Catalytic Electrodes. *ACS Energy Letters*, **2023**, 8, 10, 4323–4329. [Link](#)
15. **Marquez, R.A.**, Kawashima, K., Son, Y.J., Castelino, G., Miller, N.R., Smith, L.A., Chukwuneke, C., Mullins, C.B. Getting the Basics Right: Preparing Alkaline Electrolytes for Electrochemical Applications. *ACS Energy Letters*, **2023**, 8, 2, 1141–1146. [Link](#)
14. Kawashima, K., **Marquez, R.A.**, Son, Y.J., Guo, C., Vaidyula, R.R., Smith, L.A., Chukwuneke, C., Mullins, C.B. Accurate Potentials of Hg/HgO Electrodes: Practical Parameters for Reporting Alkaline Water Electrolysis Overpotentials. *ACS Catalysis*, **2023**, 13, 3, 1893–1898. [Link](#)
13. Son, Y.J., Kawashima, K., **Marquez, R.A.**, Smith, L.A., Chukwuneke, C., Mullins, C.B. Key concepts for understanding alkaline oxygen evolution reaction at the atomic/molecular scale. *Current Opinion in Electrochemistry*, **2023**, 39, 101298. [Link](#)
12. Wang, Z., Diao, J., Kawashima, K., Weeks, J.A., Vaidyula, R.R., **Marquez, R.A.**, Miller, N.R., Henkelman, G., Mullins, C.B. Unveiling the reaction mechanism of capacity reactivation in silver vanadate cathodes for aqueous zinc-ion batteries. *Journal of Materials Chemistry A*, **2023**, 11, 35, 18881-18892. [Link](#)
11. **Marquez, R.A.**, Kawashima, K., Son, Y.J., Rose, R., Smith, L.A., Miller, N.R., Carrasco-Jaim, O.A., Celio, H., Mullins, C.B. Tailoring 3D-Printed Electrodes for Enhanced Water Splitting. *ACS Applied Materials & Interfaces*, **2022**, 14, 37, 42153–42170. [Link](#)
10. Son, Y.J., Kim, S., Leung, V., Kawashima, K., Noh, J., Kim, K., **Marquez, R.A.**, Carrasco-Jaim, O.A., Smith, L.A., Celio, H., Milliron, D.J., Korgel, B.A., Mullins, C.B. Effects of Electrochemical Conditioning on Nickel-Based Oxygen Evolution Electrocatalysts. *ACS Catalysis*, **2022**, 12, 16, 10384–10399. [Link](#)
9. Kawashima, K., **Marquez-Montes, R.A.**, Li, H., Shin, K., Cao, C.L., Vo, K.M., Mullins, C.B. Electrochemical behavior of a Ni<sub>3</sub>N OER precatalyst in Fe-purified alkaline media: the impact of self-oxidation and Fe incorporation. *Materials Advances*, **2021**, 2, 7, 2299-2309. [Link](#)
8. **Marquez-Montes, R.A.**, Kawashima, K., Son, Y.J., Weeks, J.A., Sun, H.H., Celio, H., Mullins, C.B. Mass transport-enhanced electrodeposition of Ni–S–P–O films on nickel foam for electrochemical water splitting. *Journal of Materials Chemistry A*, **2021**, 9, 12, 7736-7749. [Link](#)

7. **Marquez-Montes, R.A.**, Kawashima, K., Vo, K.M., Chávez-Flores, D., Collins-Martínez, V.H., Mullins, C.B., Ramos-Sánchez, V.H. Simultaneous sulfite electrolysis and hydrogen production using Ni foam-based three-dimensional electrodes. *Environmental Science & Technology*, **2020**, 54, 19, 12511-12520. [Link](#)
6. Kawashima, K., Cao, C.L., Li, H., **Marquez-Montes, R.A.**, Wygant, B.R., Son, Y.J., Mullins, C.B. Evaluation of a  $V_8C_7$  Anode for Oxygen Evolution in Alkaline Media: Unusual Morphological Behavior. *ACS Sustainable Chemistry & Engineering*, **2020**, 8, 37, 14101-14108. [Link](#)

#### Papers Prior to Attendance at UT-Austin

5. Orozco-Mena, R.E., **Marquez, R.A.**, Mora-Domínguez, K.I., Collins-Martínez, V.H., Herrera-Peraza, E.F., Pérez-Vega, S.B., Ramos-Sánchez, V.H. Implementing a sustainable photochemical step to produce value-added products in flue gas desulfurization. *Chemical Engineering Journal*, **2020**, 430, 133072. [Link](#)
4. Sánchez-Hernández, L.J., Ramírez-Romero, P., Rodríguez-González, F., Ramos-Sánchez, V.H., **Marquez-Montes, R.A.**, Romero-Paredes Rubio, H., Jonathan, M.P. Seasonal evidences of microplastics in environmental matrices of a tourist dominated urban estuary in Gulf of Mexico, Mexico. *Chemosphere*, **2021**, 277, 130261. [Link](#)
3. **Marquez-Montes, R.A.**, Orozco-Mena, R.E., Camacho-Dávila, A.A., Pérez-Vega, S., Collins-Martínez, V.H., Ramos-Sánchez, V.H. Optimization of the electrooxidation of aqueous ammonium sulfite for hydrogen production at near-neutral pH using response surface methodology. *International Journal of Hydrogen Energy*, **2020**, 45, 27, 13821-13831. [Link](#)
2. **Marquez-Montes, R.A.**, Collins-Martínez, V.H., Pérez-Reyes, I., Chávez-Flores, D., Graeve, O.A., Ramos Sánchez, V.H. Electrochemical engineering assessment of a novel 3D-printed filter-press electrochemical reactor for multipurpose laboratory applications. *ACS Sustainable Chemistry & Engineering*, **2020**, 8, 9, 3896-3905. [Link](#)
1. **Marquez-Montes, R.A.**, Orozco-Mena, R.E., Lardizábal-Gutiérrez, D., Chávez-Flores, D., López-Ortíz, A., Ramos-Sánchez, V.H. Sulfur dioxide exploitation by electrochemical oxidation of sulfite in near-neutral pH electrolytes: A kinetics and mechanistic study. *Electrochemistry Communications*, **2019**, 104, 106481. [Link](#)

#### Manuscripts submitted

**Marquez, R.A.**, Resasco, J., Brownell, M., Reza-Amaro, D., Kawashima, K., Mullins, C.B. A Guide to Experimental Practices in Electrocatalysis Research. In review, submitted to *Chemical Reviews*.

Bender, J.T., **Marquez, R.A.**, Uvodich, A.K., Valles, A.E., Milliron, D.J., Resasco, J. Surface Charge Predicts the Presence of Cation Effects in Electrocatalysis. Invited article, submitted to *ACS Energy Letters*.

#### Manuscripts in preparation

Bender, J.T., McGregor, J-M., **Marquez, R.A.**, Brennecke, J.F., Waegle, M., McCrum, I.T., Resasco, J. Electrolyte Effects in Electrocatalysis. Proposal accepted by *Chemical Reviews*.

#### AWARDS AND HONORS

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- 2025** CAS Future Leaders 2025, The American Chemical Society
  - 2025** CATL Division Poster Award, The American Chemical Society
  - 2025** NAM29 Kokes Award, The North American Catalysis Society
  - 2025** Energy Technology Division Graduate Student Award, The Electrochemical Society
  - 2025** Ethel Gene Kahmer Endowed Presidential Fellowship, UT-Austin
  - 2025** Schmidt Science Fellows (Finalist)
  - 2025** Stanford Energy Postdoctoral Fellowship (Finalist)
  - 2024** CATL-ChemCatBio Graduate Student Travel Award, The American Chemical Society
  - 2024** Edward G. Weston Summer Fellowship, The Electrochemical Society
  - 2024** Jeff Byers Memorial Graduate Award in Chemistry and Chemical Engineering, UT-Austin
  - 2024** #RSCPoster competition 2024 (1<sup>st</sup> place, Energy category), The Royal Society of Chemistry

- 2024** #RSCPosterPitch Award 2024, The Royal Society of Chemistry
- 2024** Chemistry Department Service Award 2024, UT-Austin
- 2023** ECS Texas Section Travel Award, 244<sup>th</sup> ECS Meeting, The Electrochemical Society
- 2023** General Student Poster Session Award (1<sup>st</sup>), 243<sup>rd</sup> ECS Meeting, The Electrochemical Society
- 2023** ECS Texas Section Travel Award, 243<sup>rd</sup> ECS Meeting, The Electrochemical Society
- 2023** Morton Share Trust Graduate Fellowship
- 2022** Master Thesis Competition (1<sup>st</sup> place), Mexican Hydrogen Society
- 2021** Faraday 2021 Teaching Award, UT-Austin
- 2021** Henze 2021 Teaching Award, UT-Austin
- 2021** Chemistry Department Service Award 2021, UT-Austin
- 2021** International Doctoral Fellowship Program, CONAHCyT
- 2020** Provost's Graduate Excellence Fellowship, UT-Austin
- 2020** Royston M. Roberts Fellowship in Chemistry
- 2020** Maddin Endowed Scholarship in Chemistry
- 2019** Matías Romero Visiting Scholars Fellowship
- 2017** Harry West Student Poster Award (1<sup>st</sup> place), AIChE Annual Meeting

## GRANTS AND FELLOWSHIPS

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- 2024** **Edward G. Weston Summer Fellowship**, The Electrochemical Society  
Proposal: Understanding the Effects of Intermittent Water Electrolysis on Transition Metal (Oxy)hydroxide Oxygen Evolution Electrocatalysts  
Research Fellowship | US\$5,000
- 2021** **International Doctoral Fellowship**, CONAHCyT / University of Texas System  
Proposal: 3D printing Approaches for Electrochemical Water Splitting: Incorporating Advanced Features into Water Electrolysis Technologies  
Graduate Research Fellowship | US\$132,000 for over four years
- 2020** **Provost's Graduate Excellence Fellowship**, The University of Texas at Austin  
Graduate Research Fellowship | US\$130,000 for over five years

### Travel Awards (Totaling US\$2,900)

- 2025** College of Natural Sciences Professional Development Award (UT Austin)
- 2025** NAM29 Kokes Travel Award, The North American Catalysis Society
- 2024** CATL-ChemCatBio Graduate Student Travel Award
- 2024** ECS Texas Section Travel Award (245<sup>th</sup> ECS Meeting)
- 2024** Chemistry Department Professional Development Travel Award (UT Austin)
- 2024** Center for Electrochemistry Travel Grant
- 2023** ECS Texas Section Travel Award (244<sup>th</sup> ECS Meeting)
- 2023** ECS Texas Section Travel Award (243<sup>rd</sup> ECS Meeting)

## PROFESSIONAL ACTIVITIES AND AFFILIATIONS

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- Peer Reviewer:** Materials Horizons, Journal of the Electrochemical Society, International Journal of Hydrogen Energy, Journal of Physical Chemistry, Chemistry of the Materials
- Materials Horizons Community Board Member**, Royal Society of Chemistry (2023–Present)
- CAS Future Leaders**, Chemical Abstract Service, The American Chemical Society
- Secretary**, UT-Austin ECS Student Chapter (2023–Present)

**Instructor and Ambassador**, Clubes de Ciencia MX (2023–Present)

**Memberships:** Royal Society of Chemistry, American Chemical Society, American Institute of Chemical Engineers, Society of Hispanic Professional Engineers, Electrochemical Society.

## INVITED TALKS

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- 2025 Electro catalysis Rigor & Reproducibility Workshop**, Seattle, WA  
Getting the Basics Right: Electrolyte Essentials for Electrocatalysis.
- 2025 247<sup>th</sup> ECS Meeting**, Montreal, Canada  
Intermittency Intensifies Catalyst Transformations and Degradation in Liquid Alkaline Water Electrolysis (ETD Graduate Student Award sponsored by BioLogic).
- 2024 PRiME 2024**, Honolulu, HI  
Active Learning Strategies for Teaching Electrochemical Energy Conversion and Storage: Insights from Science Clubs.
- 2024 Fall Seminar Series, Chemistry Department at UACH**, Chihuahua, Mexico  
The Devil is in the Impurities: Understanding the Influence of Transition Metal Impurities.
- 2023 Electrochemistry Chalk Talks Series, UT-Austin ECS Chapter**, Austin, TX  
Mastering the Art of Composing Scientific Graphics. [Recording](#)
- 2023 Fall Seminar Series, Chemistry Department at UNAM**, Mexico City, Mexico  
The Devil is in the Impurities: Understanding the Influence of Transition Metal Impurities.
- 2023 Chemistry Recruitment 2023, UNAM / UAM / IPN / UANL**, Mexico City, Mexico  
The Road to Grad School. A Guide to Joining the PhD Program in Chemistry.
- 2023 Electrochemistry Chalk Talks Series, UT-Austin ECS Chapter**, Austin, TX  
Understanding Electrochemical Double Layer Capacitance Measurements. [Recording](#)
- 2023 Hispanic Engineers Leadership Series, AIChE Chapter at UANL**, Monterrey, Mexico  
Splitting Water with Electrons: Powering a Safer and Greener Future. Plenary Speaker.
- 2020 Energy and Society Virtual Plenary Session, UABC**, Zoom (Online)  
Unraveling Electrochemical Water Splitting: Are Electrocatalysts Truly Stable? [Recording](#)
- 2020 ECS Monthly Webinars Plenary Session, UT-Austin**, Zoom (Online)  
Hydrogen from Sulfite Electrolysis: Toward the Rational Design and Optimization of Practical Electrochemical Flow Cell Systems.

## TALKS PRESENTED AT CONFERENCES

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- 2025 AIChE Annual Meeting 2025**, Boston, MA  
Active Learning Strategies for Teaching Electrochemical Energy Conversion and Storage.
- 2025 248<sup>th</sup> ECS Meeting**, Chicago, IL  
Quantifying Interfacial pH Changes during Water Electrolysis with in-Line Continuous Flow Raman Spectroscopy.
- 2025 248<sup>th</sup> ECS Meeting**, Chicago, IL  
Active Learning Strategies for Teaching Electrochemical Energy Conversion and Storage: Updates from Science Clubs.
- 2025 ACS Fall 2025**, Washington D.C.  
Tracking local pH dynamics during water electrolysis via in-line continuous flow Raman spectroscopy.
- 2025 29<sup>th</sup> North American Catalysis Society Meeting**, Atlanta, GA

Intermittency accelerates catalyst transformations and degradation during water electrolysis.

- 2024 AIChE Annual Meeting 2024**, San Diego, CA  
Reconstruction of Transition Metal (Oxy)Hydroxide Electrocatalysts Induced By Intermittent Water Electrolysis.
- 2024 PRiME 2024**, Honolulu, HI  
Reconstruction and Dissolution of Transition Metal (Oxy)Hydroxide Electrocatalysts Induced By Intermittent Water Electrolysis.
- 2024 PRiME 2024**, Honolulu, HI  
Incorporation of Trace Metals through in situ Cation Exchange Reactions: Electrochemical and Structural Effects on Nickel Oxyhydroxide Electrocatalysts.
- 2024 ACS Fall 2024**, Denver, CO  
Incorporation of trace metals in situ through cation exchange: Electrochemical and structural effects on nickel oxyhydroxides.
- 2024 ACS Fall 2024**, Denver, CO  
Teaching electrochemical energy conversion and storage through active learning: Insights from summer science clubs.
- 2024 245<sup>th</sup> ECS meeting**, San Francisco, CA  
Dynamic Activity and Stability of Transition Metal (oxy)Hydroxide Oxygen Evolution Electrocatalysts Under Steady and Intermittent Operation.
- 2023 244<sup>th</sup> ECS meeting**, Gothenburg, Sweden  
Understanding the Effects of Transition Metal Impurities on Nickel (oxy)hydroxide Electrocatalysts.
- 2022 ChemE Future Faculty Diversity Seminar Series**, Zoom (Online)  
Taking the Next Step in Electrocatalysis: Closing Gaps Between Lab-scale Electrochemistry and Electrochemical Engineering.
- 2019 14<sup>th</sup> HYPOTHESIS International Symposium**, Foz do Iguaçu, Brazil  
Sulfur dioxide exploitation by electrochemical oxidation of sulfite in near-neutral pH *via* the S-NH<sub>3</sub> Cycle.
- 2017 AIChE Annual Meeting**, AIChE, Minneapolis, Minnesota  
Design of an Electrochemical Reactor for Hydrogen Production *via* the Sulfur-Ammonia Cycle.
- 2016 Young Researchers Symposium**, CONACyT, Guanajuato, Mexico  
Design of an Ion-Exchange Membrane Electrochemical Reactor for Hydrogen Production *via* the S-NH<sub>3</sub> Cycle

## POSTERS PRESENTED AT CONFERENCES

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- 2026 Gordon Research Conference on Electrochemistry**, Ventura, CA  
Effects of the Reaction Environment on Liquid Alkaline Water Electrolysis.
- 2026 Gordon Research Seminar on Electrochemistry**, Ventura, CA  
Tracking local pH dynamics during water electrolysis via in-line continuous flow Raman spectroscopy.
- 2025 248<sup>th</sup> ECS Meeting**, Chicago, IL  
Intermittency Strikes Back! How Dynamic Environments Reshape Liquid Alkaline Water Electrolysis.
- 2025 ACS Fall 2025**, Washington D.C.

Variable operation accelerates catalyst degradation during water electrolysis.

- 2025 CAS Future Leaders Program, Columbus, OH**  
Variable operation accelerates catalyst degradation during water electrolysis.
- 2025 2025 Bard CEC Workshop on Electrochemistry, Austin, TX**  
Trace Metal Incorporation through in Situ Cation Exchange: Effects on Energy Conversion and Storage Properties.
- 2024 2024 AIChE Annual Meeting, San Diego, CA**  
Trace Metal Incorporation through in Situ Cation Exchange: Effects on Energy Conversion and Storage Properties (Meet the Faculty and Post-Doc Candidates Poster Session).
- 2024 PRiME 2024, Honolulu, HI**  
Benchmarking Electrocatalyst Stability Tests Using Lab-Scale Alkaline Water Electrolyzers.
- 2024 ACS Fall 2024, Denver, CO**  
Testing electrocatalyst stability using lab-scale alkaline water electrolyzers: A guide to experimental practices.
- 2024 245<sup>th</sup> ECS meeting, San Francisco, CA**  
A Guide to Electrocatalyst Stability Using Lab-Scale Alkaline Water Electrolyzers.
- 2024 #RSCPoster competition, LinkedIn (Online) [Poster Pitch](#)**  
Trace Metal Incorporation Through In Situ Cation Exchange: Effects on Energy Conversion and Storage Properties.
- 2023 243<sup>rd</sup> ECS meeting with SOFC-XVIII, Boston, MA**  
Six Practices to Improve Alkaline Electrolyte Preparation. General Student Poster Session Award.
- 2023 CEC Annual Workshop on Electrochemistry, UT-Austin, Austin, TX**  
Six Steps to Prepare Alkaline Electrolytes for Electrochemical Applications.
- 2022 LatinXChem 2022 Virtual Poster Session, LatinXChem, Twitter (Online)**  
Tailoring 3D-Printed Electrodes for Enhanced Water Splitting.
- 2021 ACS Southwest Regional Meeting Poster Session, ACS, Austin, TX**  
Flow Cell-Assisted Electrodeposition of Ni-S-P-O Films for Electrochemical Water Splitting.
- 2021 LatinXChem 2021 Virtual Poster Session, LatinXChem, Twitter (Online)**  
Flow Cell-Assisted Electrodeposition of Ni-S-P-O Films on Nickel Foam for Electrochemical Water Splitting. [Poster Pitch](#)
- 2020 CEC Annual Workshop on Electrochemistry, UT-Austin, Austin, TX**  
Simultaneous sulfite electrolysis and hydrogen production in a 3D-printed electrochemical reactor.
- 2019 CEC Annual Workshop on Electrochemistry, UT-Austin, Austin, TX**  
Electrochemical Oxidation of Sulfite in Near-Neutral pH Electrolytes: A Kinetics Study.
- 2017 Annual AIChE Student Conference, AIChE, Minneapolis, MN**  
Design of a Novel Electrochemical Membrane Reactor for Hydrogen Production via the Sulfur-Ammonia Water-Splitting Cycle.
- 2016 Green & Sustainable Chemistry Conference, Elsevier, Berlin, Germany**  
Design of an Ion-Exchange Membrane Electrochemical Reactor for Hydrogen Production

## RESEARCH EXPERIENCE

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**Postdoctoral Researcher, The University of Texas at Austin** September **2025- Present**  
Investigated the heterogeneous-homogeneous bifunctionality of Pd catalysts for alcohol and aldehyde oxidation.

Studied the effects of electrolyte effects on Pt, Pd, Au, and Ag electrodes.

**Graduate Research Assistant**, The University of Texas at Austin August 2020- 2025

Investigated the effects of intermittent water electrolysis on catalytic stability.

Studied the effects of metal impurity incorporation into water oxidation catalysts.

Developed protocols to test electrocatalyst stability and purify alkaline electrolytes.

Authored a review on water oxidation catalysis from over 890 peer-reviewed reports.

Employed statistical and machine learning methods to analyze catalyst databases.

Designed and built 12+ custom electrochemical cells for *in situ* and *operando* characterization.

Implemented flexible automation to accelerate the electrodeposition of catalytic thin films.

Studied the impact of electrode architecture on bubble growth and detachment.

Collaborated with Mexican researchers to use SU-101 MOFs in lithium-sulfur batteries.

**Visiting Scholar**, The University of Texas at Austin Fall 2019

Characterized Pd and Ni catalysts for sulfite electrooxidation.

Synthesized transition metal nitride water-splitting electrocatalysts.

**Graduate Research Assistant**, UACH August 2018-June 2020

Designed an electrochemical flow cell for sulfite electrooxidation.

Designed and built 6+ flow cells using 3D printing.

Investigated hydrodynamics and mass transfer properties of electrochemical flow cells.

Studied the kinetics of sulfite ion electrooxidation on Pd electrocatalysts.

**Undergraduate Research Assistant**, Universidad Autonoma de Chihuahua August 2015-June 2017

Formulated a proof-of-concept process for sulfite electrooxidation.

Simulated a flue gas desulfurization plant to capture sulfur dioxide.

## TEACHING EXPERIENCE

**International Instructor**, Clubes de Ciencia MX Summer 2022, Summer 2023, Winter 2025

Designed and taught two workshops on electrochemical energy technologies. [Referred publication](#)

**Teaching Assistant**, UT-Austin Fall 2020-Spring 2021

Taught two terms of Introduction to Chemical Practice and received two teaching awards.

**GRS 097: Fundamentals for Teaching Assistants**, UT-Austin Fall 2020

Completed a semester-long pedagogy course for graduate teaching assistants.

**Teaching Assistant**, UACH Fall 2017-Spring 2018

Taught undergraduate Physical Chemistry and graduate Instrumental Analysis courses.

## DEPARTMENTAL SERVICE

**Graduate Recruiter and Student Host**, Department of Chemistry, UT-Austin 2021-2024

Hosted eight visiting students and delivered six recruiting seminars at the top Mexican universities.

Mentored 10+ applicants and offered 40+ hours of practice for the TOEFL and IELTS exams.

## VOLUNTEERING

[Full description](#)

**Ambassador**, Clubes de Ciencia MX 2024-Present

**Secretary**, UT-Austin ECS Student Chapter 2023-Present

**Young leader**, Mexican Red Cross 2009-2013

## ENTREPRENEURIAL ACTIVITIES

[Full description](#)

**Mentor**, VirtAgro 2021

<b>Entrepreneurship Training</b> , UNAM/Santander	<b>2019</b>
<b>Entrepreneur Leader</b> , H24U, National Science Foundation / CONACyT Received training from the NSF I-Corps program.	<b>2019</b>

## SCIENCE COMMUNICATION

[Full description](#)

### Catalastic! [YouTube Channel](#)

<b>Energy Across Living Oceans</b> , Clubes de Ciencia MX	Winter <b>2025</b>
<b>Bright Spikes! Electrifying Chemical Reactions</b> , Clubes de Ciencia MX	Summer <b>2023</b>
<b>Electrochemistry: How Do We Transport Energy?</b> Clubes de Ciencia MX	Summer <b>2022</b>
<b>Quantum Chemistry for Kids</b> , UACH	<b>2019</b>
<b>From Photons to Electrons</b> , Clubes de Ciencia MX	<b>2018</b>
<b>Science Podcasts and Talk Shows</b> , UACH	<b>2016</b>

## STUDENTS MENTORED

<b>Alyssa Uvodich</b> , Undergraduate student, Chemical Engineering, UT-Austin (2025-Present)
<b>Chloe Williamson</b> , Undergraduate student, Chemical Engineering, UT-Austin (2024-Present)
<b>Thuy Vy Le</b> , Undergraduate student, Chemistry, UT-Austin (2023-2024)
<b>Daniel Y. Ko</b> , Undergraduate student, Chemical Engineering, UT-Austin (2023)
<b>Michael Espinosa</b> , Undergraduate student, Chemistry, UT-Austin (2023-Present)
<b>Emma Kalokowski</b> , Undergraduate student, Chemistry, UT-Austin (2022-Present)
<b>Grace Castellino</b> , Undergraduate student, Chemistry, UT-Austin (2022)
<b>Grayson Constantine</b> , Undergraduate student, Chemistry, UT-Austin (2022)
<b>Sergio Ochoa</b> , Undergraduate student, Chemical Engineering, UACH (2023-Present)

## CERTIFICATIONS

<b>2023</b> IOP Peer Review Excellence, IOP Publishing
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