

Sasha Elena Alden

Phone: +1(425)-647-0814 | Email: sealden@tamu.edu

Texas A&M University, Department of Chemistry, 580 Ross St, College Station, TX 77843

EDUCATION

Ph.D. Candidate (Analytical), Texas A&M University College Station, TX *Jan. 2022 – Present

Ph.D. Candidate (Analytical), Indiana University Bloomington, IN Aug. 2018 – Dec. 2021*

B.S. Chemistry, Western Washington University, WA Sep. 2014 – June 2018

*Moved with PI from IU to TAMU

RESEARCH EXPERIENCE

Graduate Research Assistant, Department of Chemistry, Texas A&M University & Indiana University Bloomington

Advisor: Prof. Lane A. Baker

Aug. 2018 – Present

Research Project #1: *Development of the Array Microcell Method (AMCM) for Serial Electroanalysis*

- Instrumentation development of electrochemical scanning droplet method for micro/nanoscale, high-throughput electroanalysis at micro/nanoelectrodes. Microfabrication of nano and microelectrode arrays for analysis via lithography, deposition, and etching methods was conducted. Electrodeposition of facet-controlled particles, single-entity catalysis, and full instrumentation characterization via finite-element simulations (COMSOL Multi-Physics), electrochemistry, microscopy and atomic force microscopy were utilized.

Research Project #2: *High-Throughput Particle Collision Analysis via AMCM*

- Collected thousands of single-entities particle collision events utilizing AMCM in a short amount of time (~5 days) at different electrode geometries to probe the changing edge effects on collision magnitude. Fabricated SiN_x defined Au microelectrode disk arrays with diameters of 1.2 μm and 5.0 μm for polystyrene particle blocking event experiments. Machine learning was used for high-throughput data analysis of thousands of events at one time.

Undergraduate Researcher, Western Washington University, WA

Advisor: Prof. David A. Rider

Jan. 2016 – June 2018

Research Project: *Highly Active Cuprous Oxide Photocatalysts for Efficient Fuels Production*

- Developed titania stabilized cuprous oxide photocatalysis for the electrochemical reduction of hydrogen and carbon dioxide. Devices were fabricated by electrodeposition of CuO₂ on polymer templated Au particles followed by sol-gel synthesis of TiO₂. Full characterization of materials was carried out by electrochemistry, SEM, XRD, and ICP-MS as an undergraduate researcher.

PUBLICATIONS

1. Alanis, K.; **Alden, S.E.**; Baker, L.A.; Satheesan, A.E.; Jetmore, H.D.; Shen, M.) Chapter 17: Micro and Nanopipettes for Electrochemical Imaging and Measurement. *Scanning Electrochemical Microscopy* (3rd ed.); Bard, A.J.; Mirkin, M.V.; Eds.; CRC Press. Boca Raton, 2022; pp 419-479.
2. Sieser, N.P.; Choi, M.; **Alden, S.E.**; Baker, L.A. Single-Entity Electrocatalysis at Electrode Ensembles Prepared by Template Synthesis **2021** *J. Electrochem. Soc.*, 168, 126526.

3. **Alden, S.E.**; Siepser, N.P.; Patterson, J.A.; Jagdale, G.S.; Choi, M.; Baker, L.A. Array Microcell Method (AMCM) for Serial Electroanalysis *ChemElectroChem*, **2020**, 7, 1084.
4. Butler, T.; **Alden, S.E.**; Taylor, M.; Deese, S.; Rider, D. A.; Laskoski, M. Oligomeric Phthalonitriles and Tetrakis(Phenylethynyl)Benzene Blend with Improved Processing and Thermal Properties. *J. Polym. Sci., Part A: Polym. Chem.* **2018**, 56, 2630-2640.
5. Curtis, T.; Taylor, A. K.; **Alden, S.E.**; Swanson, C.; Lo, J.; Knight, L.; Gates, B. D.; Emory, S. R.; and Rider, D. A. Synthesis and Characterization of Tunable, pH-Responsive Nanoparticle-Microgel Composites for Surface-Enhanced Raman Scattering Detection. *ACS Omega*. **2018**, 3, 10572-10588.

AWARDS & FELLOWSHIPS HONORS

- 2020 Society of Electroanalytical Chemists (SEAC) Travel Award
- 2017 Outstanding Poster Award WWU Scholars Week Symposium
- 2017 Verna Alexander Price Scholarship for Academic Merit and Continuation in Chemistry
- 2017 WWU Research for Undergraduates Experience Summer Internal Student (NSF-REU)
- 2017 WWU RSP Creative Opportunities Research Grant
- 2016 WWU RSP Creative Opportunities Research Grant

CONFERENCES & PRESENTATIONS

Oral (*Invited):

1. *"High-Throughput Nanoelectrochemistry: Individual Nanoelectrodes Investigated via the Array Microcell Method (AMCM)" **Alden, S.E.**; Zhang, L.; Lavrik, N.V.; Wang, Y.; Baker, L.A. Society for Electroanalytical Chemists (SEAC) Student Session, Pittcon Conference, Online. 2022.
2. "Array Microcell Method Coupled with Microfluidic Cell Traps for Single-Cell Quantification". **Alden, S.E.**; Lavrik, N.V.; Baker, L.A. Pittcon Conference, Online. 2021.

Posters:

1. Practical Considerations for Scanning Micropipette Techniques: Instrumentation Advancements for the Array Microcell Method (AMCM) at Nano and Microelectrode Arrays. **Alden, S.E.**; Thorgaard, S.N.; Zhang, L.; Lavrik, N.V.; Wang, Y.; Baker, L.A. Electrochemistry Gordon Research Conference, Ventura, CA. 2022.
2. High-Throughput Nanoelectrochemistry: Individual Nanoelectrodes Investigated via the Array Microcell Method (AMCM). **Alden, S.E.**; Zhang, L.; Lavrik, N.V.; Wang, Y.; Baker, L.A. Faraday Discussion: Nanoelectrochemistry, Online. 2021.
3. Array Microcell Method (AMCM) for Serial Electroanalysis. **Alden, S.E.**; Siepser, N.P.; Patterson, J.A.; Jagdale, G.S.; Choi, M.; Baker, L.A. 71st Annual Meeting of the International Society of Electrochemistry, Belgrade. 2020.
4. Micropipettes for Serial Electrochemical Array Analysis **Alden, S.E.**; Siepser, N.P.; Patterson, J.A.; Jagdale, G.S.; Choi, M.; Baker, L.A. Pittcon Conference, Chicago, IL. 2020.
5. Micropipettes for Serial Electrochemical Array Analysis. **Alden, S.E.**; Siepser, N.P.; Patterson, J.A.; Baker, L.A. Turkey Run Analytical Chemistry Conference, Marshall, IN. 2019.
6. Pyrolyzed Photoresist Film Microelectrode Arrays as Substrates to Probe Catalytic Activity. **S.E. Alden**, N.P. Siepser, J.A. Patterson, L.A. Baker. 6th Annual Materials Research Symposium, Indiana University Bloomington. 2019.
7. Titania Stabilized Cuprous Oxide Photocatalyst for the Reduction of Carbon Dioxide. **Alden S.E.**; Rider, D.A. 255th ACS National Conference in New Orleans, LA. 2018.

8. Highly Active Cuprous Oxide Photocathode for the Selective Photoelectrochemical Reduction of Carbon Dioxide: The Development of a Stable Nano Catalyst for Water Splitting.” **Alden S.E.**; Rider, D.A. 253rd ACS National Conference in San Francisco, CA. 2017.

PROFESSIONAL ACTIVITIES

2021 – Present	Committee Member – SEAC Student Group
2020 – Present	Member – International Society of Electrochemistry
2018 – Present	Member – Electrochemical Society
2021 – 2022	Secretary – IU Student Chapter of the Electrochemical Society
2019 – 2020	Member – American Heart Association (AHS)
2016 – 2019	Member – American Chemical Society

TEACHING EXPERIENCE

Fall 2019	Head Associate Instructor: C414 Analytical Chemistry Lab
2019 Spring	Associate instructor: C127 General Chemistry Lab
2018 Fall & 2020 Spring	Associate instructor: C343 Organic Chemistry Lab