Kathleen Bailey

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EDUCATION

Doctor of Philosophy, Chemistry **July 2023 – Present**
Texas A&M University, College Station, Texas

- PhD Candidate May 2025

Bachelor of Science, Chemistry **May 2023**
Texas State University, San Marcos, Texas

- ***GPA 3.71***
- Biology Minor
- **Magna Cum Laude**

RESEARCH EXPERIENCE

Graduate Research Assistant **July 2023 – Present**
Texas A&M University, College Station, Texas
Advisor: Prof. Lane A. Baker
Project Title: Selective Deposition and Analysis of Metallic Nanocrystals

- Fabrication of optically transparent carbon electrode array via photolithography
- Spatial control of deposition or electrochemical dissolution of particles on arrayed substrates
- Mass spectrometric analysis of electrocatalytic reactions on arrays

Project Title: Nitrate Reduction for Urea Synthesis

- Electrospray deposition of nanocrystals onto substrate
- Single-particle analysis via electrochemical scanned probes (SECCM) and optical microscopy
- Structure/function studies of copper and alloyed copper nanocrystals for electrochemical reduction of nitrate towards urea

Naval Research Enterprise Internship Program (NREIP) **June 2025 – August 2025**
U.S. Naval Research Laboratory, Washinton D.C.
Advisor: Dr. Debra R. Rolison
Project Title: Engineering Electrolytes for MnO_2 Deposition and Dissolution

- Electrolyte formulation for MnO_2 deposition & dissolution with high columbic efficiency on planar and 3D architected carbon electrodes
- Electrochemical Micro Quartz Balance (EQCM) and Galvanostatic (GV) analysis of formulated electrolytes

Undergraduate Research Assistant **August 2021 – May 2023**
Texas State University, San Marcos, Texas
Advisor: Prof. Christopher P. Rhodes
Project Title: Metal Substituted Ruthenium Oxides: Surface Electronic Structure, Oxygen Evolution Activity and Stability

- Synthesis of catalytic materials to be used for proton exchange membrane electrolyzer, electrochemical testing of synthesized catalyst, catalyst surface characterization
- Partnership for Research and Education in Materials (PREM) student advisory council chair

Research Experience for Undergraduates (REU) **June 2021 – August 2021**
Texas State University, San Marcos, Texas
Advisor: Prof. Christopher P. Rhodes

Project Title: Analysis of Surface Structure of Ruthenium -Titanium Oxide Oxygen Evolution Electrocatalyst using X-ray Photoelectron Spectroscopy

- Synthesis of Ruthenium based catalysts, material characterization, learn various laboratory techniques, presentation of research conducted

TEACHING EXPERIENCE

Teaching Assistant **August 2023 – December 2024**

Texas A&M University, College Station, Texas

- General Chemistry 2, Instrumental Analysis
- Manage students through complex chemistry laboratory, facilitated students in appropriate lab safety and performance skills.
- Host weekly office hours to systematically and collaboratively assist students through class materials.
- Punctually graded and submitted all assignments to department for streamlined student-teacher communication.

Instructional Assistant **August 2020 – May 2023**

Texas State University, San Marcos, Texas

- General Chemistry 2, Quantitative Analysis, Physical Chemistry
- Supervise and mentor several students, as well as having additional knowledge to better assist their success, proper disposal of chemicals, enforce proper safety protocols.

Supplemental Instruction Leader **January 2020 – May 2020**

Texas State University, San Marcos, Texas

- Facilitate weekly group study sessions for general chemistry 2
- Create collaborative and engaging lesson plans to supplement student understanding of complex concepts

PUBLICATIONS

8. **Bailey, K. O.**; Ford, H. O.; Lamberty, Z. D.; Ridenour, J.A.; Nuwayhid, R. B.; Kalu, E. E.; Rolison, D. R.; Long, J. W. Optimizing manganese oxide electrodeposition and stripping at pyrolytic carbon electrodes in aqueous electrolyte. ***In preparation.***
7. Ito, I.; **Bailey, K. O.**; De Leon, J.; Harvey, N. F.; Zhang, L.; Baker, L. A. Immersion-Controlled Nanoparticle Electrodeposition on a Patterned Pyrolyzed Photoresist Film Electrode for Single-Entity Electrochemistry Studies Using Scanning Electrochemical Cell Microscopy. *Langmuir* **2026**, 42 (40), 29987-29995. https://doi.org/10.1021/acs.langmuir.6c03912
6. James, V. K.; Stover, L.; Bahramimoghaddam, H.; Khandelwal, T.; Chang, J.-Y.; Downing, J.; Scott, E.; **Bailey, K. O.**; Russell, D. H.; Baker, L. A.; Laganowsky, A. Time-Resolved Native Mass Spectrometry for Direct Measurement of Biomolecular Kinetics. *Journal of the American Chemical Society* **2026**, 148 (19), 19567–19577. DOI:10.1021/jacs.5c21842.
5. Alden, S. E.; Wahab, O. J.; Zhang, L.; Vernon, K. L.; Zhu, B.; **Bailey, K. O**.; Ye, X.; Baker, L. A. Optically Transparent Carbon–Silicon Nitride Windows for Correlative Structural and Electrochemical Analysis of Nanomaterials. *Analytical Chemistry* **2025**, 97 (22), 11798–11805. https://doi.org/10.1021/acs.analchem.5c01403
4. Adame-Solorio, J.; Kimmel, S.W.; **Bailey, K.O.**; Rhodes,C.P. Chromium Substitution Within Ruthenium Oxide Aerogels Enables High Activity Oxygen Evolution Electrocatalyst for Water Splitting. *Crystals* **2025**. 15 (2), 116. https://doi.org/10.3390/cryst15020116
3. Vernon, K. L.; Pungsrisai, T.; Wahab, O. J.; Alden, S. E.; Zhong, Y.; Choi, M.-H.; Verma, E.; Bentley, A. K.; **Bailey, K. O**.; Skrabalak, S. E.; Ye, X.; Willets, K. A.; Baker, L. A. Optically Transparent Carbon Electrodes for Single Entity Electrochemistry. *ACS Electrochemistry* **2024**, 1 (1), 93–102. https://doi.org/10.1021/acselectrochem.4c00048

2. Ospina-Acevedo, F.; Albiter, L. A.; **Bailey, K. O**.; Godínez-Salomón, J. F.; Rhodes, C. P.; Balbuena, P. B. Catalytic Activity and Electrochemical Stability of $Ru_{1-x}M_xO_2$ (M = Zr, Nb, Ta): Computational and Experimental Study of the Oxygen Evolution Reaction. *ACS Applied Materials & Interfaces* **2024**, 16 (13), 16373–16398. https://doi.org/10.1021/acsami.4c01408
1. Godínez-Salomón, J. F.; Ospina-Acevedo, F.; Albiter, L. A.; **Bailey, K. O**.; Naymik, Z. G.; Mendoza-Cruz, R.; Balbuena, P. B.; Rhodes, C. P. Titanium Substitution Effects on the Structure, Activity, and Stability of Nanoscale Ruthenium Oxide Oxygen Evolution Electrocatalysts: Experimental and Computational Study. *ACS Applied Nano Materials* **2022**, *5* (8), 11752–11775. https://doi.org/10.1021/acsanm.2c02760

PRESENTATIONS

Oral

- **Bailey, K.O.**, Ford, H., Lamberty, Z., Ridenour, J. A., Nuwayhid, R. B., Kalu, E.E. Rolison, R., Long, J. Engineering Electrolytes for Deposition and Stripping of Energy-Storing Manganese Dioxide. 2026 Pittcon (Session: Advances in Batteries and Electrochemical Technologies for Energy) San Antonio, TX, March 8th, 2026
- **Bailey, K.O.**; Albiter, L.; Godínez-Salomón, J.F.; Rhodes, C.P. Evaluation of Metal Substituents on Surface Structure of Ruthenium Oxides using Photoelectron Spectroscopy. CheMIE REU Presentation, Texas State University, San Marcos, TX, July 7, 2021.

Posters

- **Bailey, K.O.**, Zhu, B., Ye, X., Baker, L. Copper Catalyzed Nitrate Reduction via Scanning Electrochemical Cell Microscopy (SECCM). 2026 Pittcon (Session: Society for Electroanalytical Chemistry (SEAC)) San Antonio, TX, March 10th, 2026
- **Bailey, K.O**.; Albiter, L.A.; Godínez-Salomón, J.F.; Rhodes, C.P. Structural Analysis of Ruthenium-Titanium Oxide Oxygen Evolution Electrocatalysts using X-ray Photoelectron Spectroscopy. 2023 Materials Research Society Spring Meeting & Exhibit (Symposium CH01: Advanced Characterization Techniques for Electrochemistry—Accelerating Research and Development of Energy Materials), San Francisco, California, April 10-14, 2023
- **Bailey, K.O**.; Albiter, L.A.; Godínez-Salomón, J.F.; Rhodes, C.P. Metal Substituted Ruthenium Oxides: Surface Electronic Structure, Oxygen Evolution Activity and Stability. 2023 Texas Partnerships for Research and Education in Materials (PREM) Conference, San Marcos, TX, March 31, 2023.
- **Bailey, K.O.**; Albiter, L.A.; Godínez-Salomón, J.F.; Rhodes, C.P. Analysis of Structure of Ruthenium Titanium Oxide Oxygen Evolution Electrocatalysts using X-ray Photoelectron Spectroscopy, Texas State PREM Center for Intelligent Materials Assembly (CIMA) Annual Meeting, Texas State University, San Marcos, TX, September 30, 2022.
- Urena, M.; **Bailey, K.O.**; Rhodes, C.P. Metal-Substituted RuO2 for High Activity and Improved Stability Water Electrolyzers, High Energy X-ray Techniques (HEXT) Workshop 2022, Cornell University, Ithaca, NY, May 17-18, 2022.

HONORS & AWARDS

- Material Research Society PREM Symposium Poster Presentation Award, May 2023
- Easter Endowed Scholarship, Texas State University, February 2023
- Larry Herwig Research Scholarship, Texas State University, April 2022
- First Place REU Oral Presentation, Texas State University, August 2021

PROFESSIONAL AFFILIATIONS

- American Chemical Society (ACS)
- Electrochemical Society (ECS) Texas A&M Charter

REFERENCES

Letters available upon request