

Kathleen Bailey

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EDUCATION

Doctor of Philosophy, Chemistry

July 2023 – Present

Texas A&M University, College Station, Texas

Bachelor of Science, Chemistry

May 2023

Texas State University, San Marcos, Texas

- Biology Minor
- Magna Cum Laude

RESEARCH EXPERIENCE

Graduate Research Assistant

July 2023 – Present

Texas A&M University, College Station, Texas

Advisor: Prof. Lane Baker

Project Title: Quantitative Deposition of Nanomaterials and Proteins at Electrode Arrays

- Use of electric fields to manipulate particles onto microelectronic devices
- COMSOL modeling of optimization of design and parameterization of electrochemical devices
- Scanning electrochemical cell microscopy (SECCM) for spatially and electrochemically resolved measurements

Project Title: Selective Deposition and Analysis of Metallic Nanocrystals

- Fabrication of optically transparent carbon electrode array
- 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 and optical microscopy
- Structure/function studies of copper and alloyed copper nanocrystals for electrochemical reduction of nitrate towards urea

Undergraduate Research Assistant

August 2021 – May 2023

Texas State University, San Marcos, Texas

Advisor: Dr. 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

REU Summer Program

June 2021 – August 2021

Texas State University, San Marcos, Texas

Advisor: Dr. 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 – Present

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

PRESENTATIONS

- Material Research Society (MRS) Poster Presentation, San Francisco, CA, April 2023
- Partnership for Research and Education in Materials (PREM) Poster Presentation, Texas State University, September 2022
- High Energy X-Ray Techniques (HEXT) Workshop Poster Presentation, Cornell University, May 2022
- Research Experience for Undergraduate (REU) Oral Presentation, Texas State University, August 2021

PUBLICATIONS

3. Vernon, Kelly; Pungsrissai, Tipsiri; Wahab, Oluwasegun; Alden, Sasha; Zhong, Yaxu; Choi, Myunghoon; Verma, Ekta; Bentley, Anne; **Bailey, Kathleen**; Skrabalak, Sara; Ye, Xingchen; Willets, Katherine; Baker, Lane. Optically Transparent Carbon Electrodes for Single Entity Electrochemistry. *ACS Electrochemistry* 2024, *Accepted*
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_xO₂ (M = Zr, Nb, Ta): Computational and Experimental Study of the Oxygen Evolution Reaction. *ACS Applied Materials & Interfaces* **2024**, *16* (13), 16373–16398.
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.

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

REFERENCES

Letters available upon request