David W. White

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Education

Expected October 2022

PhD - Chemistry, Emory University

Thesis Title: "I. Exploration of the Hidden Biocatalytic Potential of the Old Yellow Enzyme Superfamily. II. Light-Triggered Spectroscopic Investigation of [NiFe] Carbon Monoxide Dehydrogenase and [FeFe] Hydrogenase."
Advisor: Dr. R. Brian Dyer
Committee Members: Dr. Christine Dunham, Dr. Vince Conticello

May 2017

Bachelor of Science - Chemistry, Troy University

Minor - Biology
Graduated Summa Cum Laude

Research Experience

April 2020 - Present

Graduate research assistant, Emory University

Laboratory of Dr. R. Brian Dyer

- Utilized metalloenzymes, [NiFe] carbon monoxide dehydrogenase and [FeFe] hydrogenase, to convert solar energy into low carbon fuels.
- Developed and optimized a hybrid photo-enzymatic system for CO_2 reduction.
- Investigated the mechanism of metalloenzymes using time-resolved infrared spectroscopy.
- Synthesized semiconductor nanomaterials and small molecule redox mediators.
- Operated and repaired various instruments including UV-vis spectrometer and GC.
- Mentored and trained graduate and undergraduate students in their research projects.

December 2017 – March 2020

Graduate research assistant, Emory University

Laboratory of Dr. Stefan Lutz

- Discovered and characterized novel biocatalysts for asymmetric hydrogenation from the 'Old Yellow Enzyme' superfamily.
- Utilized various bioinformatic techniques to select a diverse panel of enzymes for screening.
- Developed and implemented an expression/screening platform for biocatalyst discovery.
- Analyzed and characterized identified unique enzymes using kinetic and spectroscopic techniques.
- Modelled biocatalyst candidates using computational tools to rationalize observed activity.
- Operated and repaired various lab equipment including anoxic chamber and GC/MS.

January 2016 – May 2017

Undergraduate research assistant, Troy University

Laboratory of Dr. Shaoyang Liu

- Developed a standard operating procedure for rapid screening of contaminated plastic.
- Extracted and analyzed volatile compounds from recycled plastic using GC/MS.

August 2015 – May 2017

Undergraduate research assistant, Troy University

Laboratory of Dr. Zhiyong Wang

- Synthesized and characterized various polymers derived from DNA base pairs.
- Utilized general synthetic lab techniques.

June 2016 – August 2016

Undergraduate research assistant, University of Alabama

Laboratory of Dr. Michael K. Bowman

- Examined the temperature dependence of binding for cytochrome P450's and drug molecules.
- Analyzed data using MATLAB to simulate EPR spectrum.

Publications

David W. White, Samantha Iamurri, Parisa Keshavarz-Joud, Tamra Blue, Nobuhiko Tokuriki, Janine Copp, and Stefan Lutz. **"Exploration of the hidden biocatalytic potential of the Old Yellow Enzyme family."** *Manuscript in preparation.*

David W. White, Daniel Esckilsen, Seung Kyu Lee, Stephen W. Ragsdale and R. Brian Dyer. **"Efficient, Light-driven Reduction of CO_2 to CO by a Carbon Monoxide Dehydrogenase-CdSe/CdS Nanorod Photosystem."** *J. Phys. Chem. Lett.* **2022**, 13, 24, 5553–5556

Jon Fuller, **David White**, Huijun Yi, Jason Colley, Zane Vickery, and Shaoyang Liu**. "Analysis of Volatile Compounds Causing Undesirable Odors in Recycled Plastic Resin with Solid-Phase Microextraction."** *Chemosphere.* **2020,** 260, 127589.

Presentations

David W. White, et al**.** (June 2022) **"Efficient, Light-driven Reduction of CO_2 to CO by a Carbon Monoxide Dehydrogenase-CdSe/CdS Nanorod Photosystem."** Metallocofactors - Gordon Research Conference. Newport, Rhode Island.

David W. White. (February 2022) **"Light-Driven Activation of Metalloenzymes to Convert Solar Energy into Chemical Fuels."** Invited speaker at Troy University. Troy, Alabama.

David W. White, et al. (April 2021) **"The Hidden Biocatalytic Potential of the Old Yellow Enzyme Family."** Poster presentation at 11th Southeast Enzyme Conference, Virtual. ***Discussion Leader***.

David W. White. (October 2018) **"Old Yellow Enzyme Superfamily: Exploring Heterologous Expression and Native Function."** Oral presentation at Atlanta Flavin Meeting, Emory University. Atlanta, Georgia.

David W. White et al. (April 2017) **"Temperature Annealing Studies on Cytochrome P450s using EPR."** Poster presentation at 253rd National American Chemical Society Meeting, San Francisco, California.

David W. White et al. (February 2017) **"Investigation of the Unpleasant Odor of Recycled Plastic Resin Using HS-SPME and GC/MS."** Oral presentation at Troy University Research Symposium, Troy University. Troy, Alabama.

Molly M. Lockart, **David W. White** et al. (October 2016) **"Ligand Dynamics in Cytochrome P450."** Poster presentation at 45th Southeastern Magnetic Resonance Conference, Emory University. Atlanta, Georgia. ***Best Poster Award***.

Technical Skills

- **Expertise general biochemical and chemical laboratory skills.**
- **Proficient in bacterial culture techniques for protein or DNA production.**
- **Protein expression and purification – FPLC operation and purification methodology.**
- **Experienced in recombinant DNA cloning, PCR, and site-directed mutagenesis.**
- **Enzyme and photochemical assay development and optimization for screening and kinetics.**
- **Skilled in bioinformatics – sequence alignment, phylogeny, and sequence similarity networks.**
- **Familiarity with protein modelling and ligand docking via Rosetta and Foldit.**
- **Analytical chromatography techniques – GC and GC/MS method development and analysis.**
- **Knowledgeable in UV-visible, infrared, and fluorescent spectroscopic techniques.**
- **Competent in the synthesis of nanocrystalline semiconductors and (limited) small molecules.**
- **Meticulous documentation and record keeping of experiments, procedures, and analysis.**
- **Skilled in Microsoft Office, Igor, Cytoscape, Pymol, Labview, ChemDraw and limited Python and R.**

Teaching Experience

August 2021 – December 2021

Graduate teaching assistant, Emory University

Biophysical chemistry

- Organized and oversaw a weekly problem set review session for students.
- Taught a lecture on current spectroscopic research towards metalloenzymes.

January 2018 – May 2018

Graduate student instructor, Emory University

General chemistry Lab

- Led and taught students in basic laboratory techniques and safety protocols.
- Coordinated with other instructors on best teaching practices for material.

August 2017 – December 2017

Graduate teaching assistant, Emory University

Biochemistry

- Developed and graded weekly comprehensive quizzes for students.
- Led weekly study sessions for student discussion topics on difficult concepts.

Leadership Experience

October 2020 – Present

Biosafety Officer, Laboratory of Dr. R. Brian Dyer

- Oversaw and maintained safe practices for the handling of biological materials.
- Presented brief, regular safety talks on safe laboratory practices and techniques.
- Conducted self-inspections of biological safety equipment.

May 2018 – May 2019

VP of Communications, Pi Alpha Chemical Society

- Orchestrated all communications from the organization to members and general public.
- Coordinated with other officers towards event planning and organization progress

October 2016 – April 2017

President/Refounder, Troy University Chemical Society

- Rewrote bylaws/constitution, reorganized group structure and reestablished campus presence.
- Oversaw general operations for the promotion of chemistry on campus.

December 2016 – December 2017

President, Lamba Zeta Chapter, Tau Kappa Epsilon.

- Led and mentored chapter membership in daily operations and scholarship.

Awards and Honors

- **Omicron Delta Kappa (2017)**
- **Chancellor's Fellowship (2016)**
- **Order of Omega (2017)**
- **Alpha Lambda Delta Honor Society (2014)**