

Rebekah Ann Duke

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RESEARCH EXPERIENCE

D3TaLES: Data-enabled Discovery and Design to Transform Liquid-based Energy Storage

JAN 2021 – Present

Graduate Work at UNIVERSITY OF KENTUCKY for Dr. Chad Risko

- Developed a curated database of computational, experimental, and literature-reported data on redox-active organic molecules
- Built an intuitive web interface for community data access
- Designed and implemented a high-throughput computational workflow using density functional theory
- Constructed data upload and processing tools that extract, transform, and load relevant data from raw computation or experimental data files

A Systematic Examination of Factors Impacting Dihedral Angle Rotation to Enlighten Materials Design

MAY 2020 – Present

Graduate Work at UNIVERSITY OF KENTUCKY for Dr. Chad Risko

- Systematically examined the effects of various ring chemistries, ortho-positioned substituents, and oligomer length on the rotation of two rings in the center of the system
- Analyzed multi-dimensional data to find trends and categorize data

Computational Analysis of Polymer-Gas Interactions

MAY 2019 – AUG 2019

Chemistry REU at UNIVERSITY OF TENNESSEE, KNOXVILLE
for Dr. Konstantinos Vogiatzis

- Developed a model to predict polymer gas permeabilities using electronic structure theory and machine learning
- Attained basic computational chemistry skill in TURBOMOLE using bash/vim/python
- Acquired experience with machine and deep learning

Organic Synthesis of Potential Schizophrenia Drugs

MAY 2018 – MAY 2019

Langford Yates Fellowship at LIPSCOMB UNIVERSITY
for Dr. Kent Clinger

- Synthesized five novel dimethoxy/dihydroxy nitro phenylalanine derivatives which show potential for a schizophrenia drug
- Maximized yields and produced compounds as lab manager
- Operated a chemistry microwave, LCMS, NMR, HPLC, and GC
- Trained another undergraduate to continue the research

TEACHING EXPERIENCE

University of Kentucky Chemistry Teacher's Assistant	AUG 2020 – DEC 2020
<ul style="list-style-type: none"> Instruct students in a General Chemistry laboratory Develop and deliver weekly pre-laboratory lecture Maintain and promote lab safety 	
Lipscomb Chemistry Teacher's Assistant	AUG 2018 – DEC 2019
<ul style="list-style-type: none"> Instruct students in a General Chemistry laboratory Maintain and promote lab safety 	
Chemistry, Math, and Physics Tutor	AUG 2018 – Present
Lipscomb Academic Success Center, University of Kentucky, & Private Tutor	

EDUCATION

University of Kentucky – LEXINGTON, KY	Expected MAY 2025
Chemistry Graduate student, GPA: 4.0	
Lipscomb University – NASHVILLE, TN	MAY 2020
Major: Professional Chemistry, Minors: Math, Philosophy, GPA: 4.0	
Study Abroad: Santiago, Chile	JAN – APRIL 2018

PRESENTATIONS

Oral Presentations:

<i>Towards the autonomous Design of redox-active materials for flow batteries</i> University of Kentucky GRAPH conference, Lexington, KY	AUGUST 2021
<i>Data-Guided Permeability Estimations for Polymeric Membranes:</i> University of Tennessee Chemistry REU Symposium, Knoxville, TN	AUGUST 2019
<i>Synthesis of Potential Therapeutic Agents for Schizophrenia:</i> Alpha Chi 2019 National Convention, Cleveland, OH	APRIL 2019
	APRIL 2019
<i>A Critique of Utilitarian Consequentialism in the Context of Moral Decision-Making:</i> Lipscomb 2019 Student Scholars Symposium	APRIL 2019

Poster Presentations:

<i>A Systematic Examination of Factors Impacting Dihedral Angle Rotation to Enlighten Materials Design:</i> Naff Symposium, Lexington, KY	APRIL 2022
American Chemical Society Spring 2022, San Diego, CA	MARCH 2022
<i>Data-Guided Permeability Estimations for Polymeric Membranes:</i> Southeastern Regional Meeting of the ACS, Savannah, GA	OCTOBER 2019
University of Tennessee Chemistry REU Symposium, Knoxville, TN	AUGUST 2019
2020 Posters on the Hill, Washington D.C. moved to Twitter	APRIL 2020

HONORS and AWARDS

Naff Symposium 1 st Place Poster Presentation	APRIL 2022
Acceleration Consortium Hackathon 3 rd Place	OCTOBER 2021
Physical Chemistry Award – BEST SCORE FOR THE YEAR	APRIL 2020
Student Scholars Symposium Best Oral Presentation	APRIL 2019

Biochemistry Award – BEST SCORE FOR THE YEAR	APRIL 2019
Inorganic Chemistry Award – BEST SCORE FOR THE YEAR	APRIL 2019
Analytical Chemistry Award – BEST SCORE FOR THE YEAR	APRIL 2019
Organic Chemistry Award – BEST LIPSCOMB ACS EXAM SCORE	MAY 2018
Instrumental Methods of Analysis Award – BEST SCORE FOR THE YEAR	MAY 2018

COLLIGATE LEADERSHIP

UK Graduate Student Association	AUG 2021 – Present
Outreach Coordinator	
<ul style="list-style-type: none"> Coordinate outreach to other student and community organizations Organize community engagement events 	
Lipscomb American Chemical Society (ACS) chapter	AUG 2018 – MAY 2020
President; Events Director	
<ul style="list-style-type: none"> Organize meetings, speakers, tours, and social gatherings Establish and implement vision for the ACS chapter 	
Lipscomb Student Government Association	MAY 2019 – MAY 2020
Senior Senator; Facilities and Sustainability Committee Chair	
<ul style="list-style-type: none"> Vote and serve on committees to distribute student funds; voice student needs to administration; organize and run campus events Facilitate committee meetings; evaluate potential facilities projects 	
Lipscomb Honors College Student Council	AUG 2017 – JAN 2019
Social Officer	
<ul style="list-style-type: none"> Collaborate with peers, the Honors Director, and other universities to organize campus and intercampus events 	

SERVICE

Friends Of Wolf Run	SPRING 2021
<ul style="list-style-type: none"> Clean and maintain creeks around Lexington 	
Data Analysis for <i>Shower the People's</i> nonprofit	SPRING 2020
<ul style="list-style-type: none"> Statistically analyzed homeless population data 	
Creek Water Analysis for Middle TN Parks	FALL 2018
<ul style="list-style-type: none"> Analyzed ion concentration in creeks 	
Room in the Inn, Nashville, TN	2017 - 2018
<ul style="list-style-type: none"> Volunteer to prepare beds, serve meals, and clean laundry for homeless guests spending winter nights at Lipscomb 	
Pi Kappa Sigma / Sigma Pi Beta Service Clubs	AUG 2016 – MAY 2019
Dickson County School System Class Schedule Change	SPRING 2016
<ul style="list-style-type: none"> Researched and presented a modern class schedule system to the county school board with a student group; schedule later adopted 	

SKILLS

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| <ul style="list-style-type: none"> Coding: python, bash, vim, entry level HTML and JavaScript Database development and management | <ul style="list-style-type: none"> Laboratory Instrument Operation (IR, LCMS, GCMS, uv/vis, NMR) ScienceDirect, SciFinder, NCBI databases data collection and research |
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MEMBERSHIPS

American Chemical Society

JAN 2017 – PRESENT

Sigma Xi Research Society

APRIL 2019 – PRESENT

Alpha Chi Honor Society

JAN 2018 – MAY 2020

International Justice Mission

AUG 2018 – MAY 2020