Tyler-Rayne Nero

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Education

Temple University — Bachelor of Science in Chemistry
College of Science & Technology — Expected Graduation: December 2022
Philadelphia, PA

Research Experience

Undergraduate Research Chemist — **Sept 2021 – Present**
Temple University, Philadelphia PA
Principal Investigator – Dr. Eric Borguet

- Study kinetics and catalysis between 3-D porous materials and organophosphates
- Perform hydrolysis experiments using metal-organic frameworks (MOFs) and their precursors to degrade dimethyl nitrophenyl phosphate
- Learn basics in coding and analyze data in IGOR

NSF REU – Undergraduate Research Chemist — **June 2022 – Aug 2022**
University of Rochester, Rochester NY
Principal Investigator – Dr. Michael Neidig

- Investigate methods to expand and isolate the oxidation state for terbium to +IV
- Study non-precious metal catalysis using synthetic and spectroscopic methods to identify active catalytic species and significant intermediates
- Experience using ^{57}Fe Mössbauer, EPR, SC-XRD, and MCD

Undergraduate Research Chemist — **Jan 2020 – March 2020**
Interrupted by COVID-19
Temple University, Philadelphia PA
Principal Investigator – Dr. Graham Doberiener

- Collaborated with principal investigator and other lab members to develop innovative paths to advance the lab's mission in creation of homogenous catalysts and polymeric materials
- Developed metalo-salen catalysts ligated with spiroligomer segments
- Synthesized polyketones using carbon monoxide and olefin with a palladium catalyst to distinguish trends of the effects of counter anions
- Handled moisture- and air-sensitive materials in a glove box and Schlenk line

Publications

1. Role of pH and Lewis Acidic Metal Oxyhydroxides on the Catalytic Hydrolysis of Organophosphorus Nerve Agents. Nero, T.,†, Devulapalli, V.S.D.†, Borguet, E. Manuscript in Preparation.

Poster Presentations

1. Presentation: “Impact of Lewis Acidity of Metal-Oxyhydroxides on Catalytic Hydrolysis of Chemical Warfare Simulants,” *URP Symposium*. Temple University, Philadelphia, PA, November 2021.
2. Presentation: "Role of pH and Metal Oxyhydroxides in the Degradation of Chemical Warfare Agent Simulants," *Symposium for Undergraduate Research and Creativity*. Temple University, Philadelphia, PA, April 2022.
3. Presentation: "Study Towards the Synthesis of Homoleptic Bisamide Tb(IV) Complexes," *David T. Kearns Center Summer Research Symposium*. University of Rochester, Rochester, NY, July 2022.

Oral Presentations

1. Presentation: “Role of pH and Lewis Acidity of Metal Oxyhydroxides on the Degradation of Nerve Agents,” *Intercollegiate Student Chemists Convention*. Franklin & Marshall College, Lancaster, PA, April 2022.
2. Presentation: “Effect of pH and Lewis Acidic Metal Oxyhydroxides on the Catalytic Hydrolysis of Organophosphorus Nerve Agents,” *Eastern Analytical Symposium Virtual Student Symposium*. May 2022.
3. Presentation: “Developing Methods to Oxidize Tb(III) and Synthesize Tb(IV) Complexes,” *REU Research Talks*. University of Rochester, Rochester, NY. August 2022.

Internships

IT Helpdesk Intern **Aug 2020 – Present**

Ikon Business Group, New York, NY (remote)

- Diagnose, troubleshoot, and problem solve software and hardware issues
- Evaluate, organize, and analyze data using ConnectWise, IT Glue, and IT Boost
- Designed and developed user friendly website to optimize clientele interaction using CloudRadial

Servant Leader Intern **June 2021 – Aug 2021**

Sankofa Freedom Academy, Philadelphia, PA

- Demonstrated leadership and flexibility as a science, math, and reading teacher
- Created engaging science experiments that correlate with daily lesson plans
- Educated students with safe laboratory skills and helped with science experiments

Outreach

Volunteer **Feb 2022 – Present**
The Wagner Free Institute of Science, Philadelphia, PA

- Greet and inform visitors about the museum's national history and 100,000 specimens
- Organize and coordinated a Chemistry event open to the North Philadelphia community developed to educate the public on plastic awareness
- Contribute to the museum's mission to provide free public education in science by teaching children's lessons

Undergraduate Research Ambassador **Sept 2021 – Present**
Temple University, Philadelphia, PA

- Find effective ways to engage undergraduate students in research
- Mentor undergraduate student researchers and undergraduates seeking research
- Represent the undergraduate student researcher perspective

Science Mentor – Steppingstone Scholars **Sept 2018 – May 2019**
Dr. Tanner G. Duckrey Public School, Philadelphia, PA

- Helped scholars identify and complete research projects for a science fair
- Tutored individual scholars to strengthen their understanding in science and math
- Worked effectively with scholars with diverse learning needs and cultural backgrounds

Volunteer – Boo at the Zoo **Oct 2018**
Philadelphia Zoo, Philadelphia, PA

- Set up and break down materials required for the event
- Handed out candies for a Halloween event at the Philadelphia Zoo

Volunteer – Autism Speaks Run **Oct 2018**
Citizens Bank Park, Philadelphia, PA

- Cheered and motivated participants during the run
- Directed cars where to park for the event

Volunteer – Phillies RedGoesGreen **Sept 2018**
Citizens Bank Park, Philadelphia, PA

- Developed and organized method to have a cleaner stadium during baseball games
- Collected recyclables during the Phillies baseball game

Coach – Girls On The Run **Aug 2015 – June 2018**
Stroudsburg Middle School, Philadelphia, PA

- Trained girls during Fall and Spring season to prepare for a seasonal 5K
- Taught girls about mental health, communication skills, puberty, and physical health

Laboratory Techniques

- Distillation: Fractional, Simple
- Polymer Synthesis: small molecule synthesis, one step synthesis
- Purification: extraction (solid-liquid/ liquid-liquid), column chromatography, crystallization (layering, vapor diffusion, slow evaporation), recrystallization
- Analysis: TLC, Gel permeation chromatography (GPC), ^{1}H NMR, ^{13}C NMR, UV/VIS, ICP-OES, Fluorescence, GCMS, HPLC, FTIR, ^{57}Fe Mössbauer, EPR, SC-XRD, MCD
- Software: ChemDraw, IGOR, MestReNova, Spartan-Molecular Modelling

Professional Activities

Member of NOBCChE	Dec 2022 – Present
ACS GSRPD Bootcamp	Nov 2021 – Jan 2022
Member of American Chemical Society (ACS)	Dec 2019 – Present
Chapter Historian for Temple University Chemical Society	Aug 2017 - Present
Member of Black Student Union	Aug 2017 - Present

Certificates

Johns Hopkins University— *COVID-19 Contact Tracing*	May 2020
Hubspot Academy— *Marketing Software Certified*	January 2020

Scholarships

John Bruce Dunlop Memorial Scholarship
Isaacs Family Scholarship
Burke Family Scholarship

Awards

Temple University Chemical Society (TUCS) Honorary Membership Award
ACS Bridge Travel and Professional Development Award