

Nichole O'Neill, Ph.D.

Cell: (856)-332-6766 Email: Nichole.S.Oneill@Gmail.com Website: <https://thecuriouschemist.blog/>

Education

Ph.D. Physical Chemistry, Drexel University	2024
B.S. Chemistry, Drexel University	2019
Mathematics and Chemistry, Rowan College of South Jersey	2014 – 2016

Research Experience

Alvarez Research Group, Materials Science Laboratory

Research Assistant, Drexel University, April 2020-current

- Design, validate, and implement research experiments and material studies to probe the self-assembly and hydrogelation (colloids) of aromatic tripeptides monomers.
- Analyze prospective candidates for hydrophobic drug adsorption, measure drug loading capacities of gels using optical spectroscopy and UHPLC chromatography (Waters/Empower software).
- The bulk properties of the materials are characterized by small amplitude oscillatory shear rheology (SAOSR). Particle sizes were probed using dynamic light scattering.
- Weekly PowerPoint presentations are prepared to facilitate communication of results to advisors and our multidisciplinary team.
- Findings are published in peer-reviewed journals.

Schweitzer-Stenner Research Group, Biospectroscopy Laboratory

Research Assistant, Drexel University, April 2020-current

- Investigating the self-assembly and aggregation of tripeptides through spectroscopic techniques. The nanostructures of fibrils are investigated using vibrational spectroscopy (FTIR, VCD, and Raman) and powder x-ray diffraction (PXRD).
- Crystal structures and fibril axes are validated using self-built vibrational spectra programs that simulate the structure sensitive amide I dispersion patterns using a floating oscillator model and transition dipole coupling calculations.
- Polarized light spectroscopy is routinely used to investigate the orientation of the peptides' fibril axes (VCD, Raman) and the thermodynamic parameters of the gel and sol states (UVCD).
- NMR spectroscopy is used to provide insight into the aggregation of the aromatic peptides by analyzing the frequency shifts due to shielding effects. Kinetics of the gel states dissolution over time are also determined through NMR time study experiments.
- Findings are published in peer reviewed journals.

Scepaniak Research Group, Inorganic Chemistry Laboratory

Research Assistant, Drexel University, August 2019-April 2020

- Strengthened synthetic techniques including Schlenk line and glovebox work. Primarily worked on azide-alkyne cycloadditions using a Cu (II) catalyst.

Undergraduate Researcher, Drexel University, September 2018-June 2019

- Synthesized first-row transition metal complexes that had potential to act as paraCEST contrasting agents for MRI.
- Characterized metal complexes using proton NMR, solution state magnetic moment measurements, and cyclic voltammetry. Crystallization was also required to obtain single crystals for x-ray diffractometry.
- Performed stability studies towards biological relevant ions.

Realm Therapeutics, Research and Development

Research Assistant, Malvern, PA September 2017-September 2018

- Aided CMC team in the development and evaluation of testing methods (method development) for setting specification and acceptance criteria for raw materials (including API) according to the USP monograph. Analyzed, and communicated results in a written report.

Nichole O'Neill, Ph.D.

Cell: (856)-332-6766 Email: Nichole.S.Oneill@Gmail.com Website: <https://thecuriouschemist.blog/>

- Worked closely with formulation chemist on proprietary ocular and dermal products to increase chemical stability. Matrix stability of the chemical formulation was investigated using a Design of Experiment approach.
- Primary researcher for production and manufacturing of drug products. Batches were prepared using temperature control (cold manufacturing) with the vehicle gel manufacturing required handling of industrial size mixers.
- Monitored the daily performance of lab and performed quality control testing of the API and raw materials. Daily characterization of research samples, raw materials, vehicles, and API included measurement of the pH, conductivity, density, concentration (iodometric titrations), and viscosity.
- Material studies included investigating packaging (e.g. vials, tubes, packets) and production equipment such as tubing and metals for manufacturing of API (e.g. pitting of different stainless-steel grades in the presence of API, integrity of fluorinated vs non-fluorinated tubing and their effects on API concentration, tubing material and size effects on API manufacturing).
- The AFC content was measured using Karl Fischer titration or iodometric titrations using a Mettler Toledo T50 or by hand (for higher concentrations). Viscosity measurements were carried out using a Brookfield DV-E Viscometer.
- Independent research was also conducted on published data and existing laboratories.

Chemistry Lab Technician (Internship), April 2017-September 2017

- Helped set-up the laboratory in the initial phase of start-up. Built SOPs and documents for testing methods and instrumentation.
- Worked within the R&D team to increase the stability of the products (ophthalmic and dermal) by implementing a Design of Experiments approach. Daily responsibilities included stability testing using Karl Fischer titration, and viscometry, recording and reporting results in laboratory notebook in compliance with USP standards.

Teaching Experience

Drexel Graduate Women in Science and Engineering Program

Graduate Student Mentor, Drexel University, September 2023-May 2024

- Currently mentoring a first year female PhD student in science/engineering.
- Providing insight into international opportunities along with general knowledge regarding graduate education at Drexel University.

Chemistry Teaching Assistant

Graduate Teaching Fellow, Drexel University, April 2020-December 2021

- Mentored 50-180 students per academic quarter and was in charge of delivering lectures and supervising practical labs weekly.
- Recitations were prepared weekly and included immersive learning tools such as Nearpod, Padlet, ect.
- Classes taught include General Chemistry (I-III), Health Chemistry, Inorganic Chemistry Lab, Physical Chemistry Lab, Thermodynamics and Kinetics.

General Chemistry Tutor

Drexel University, September 2019-March 2024

Marynoff Program

Student Researcher Mentor, June-September 2021, June-Summer 2022

- Summer program which students receive chemistry research experience. Conducted interviews and selected 1 student per program. Helped students gather and report data daily. Final results were presented at a symposium where students gave a 15-minute oral presentation on their research.

Nichole O'Neill, Ph.D.

Cell: (856)-332-6766 Email: Nichole.S.Oneill@Gmail.com Website: <https://thecuriouschemist.blog/>

Peer Reviewed Publications (** indicates first author)

*Tuning the Thermostability of GHG gels by Salts at Different Positions on the Hofmeister Scale***
Under Review, 2024

*Determining the Nanostructure and Main Axis of Gly-His-Gly Fibrils Using the Amide I' Bands in FTIR, VCD, and Raman Spectra***

Spectrochimica Acta Part A, October 2023

doi: [10.1016/j.saa.2023.123584](https://doi.org/10.1016/j.saa.2023.123584)

Conformational Manifold Sampled by Two Short Linear Motif Segments Probed by Circular Dichroism, Vibrational and NMR Spectroscopy

Biochemistry, August 2023, doi: [10.1021/acs.biochem.3c00212](https://doi.org/10.1021/acs.biochem.3c00212)

Influence of Central Sidechain on Self-Assembly of Glycine-x-Glycine Peptides

Soft Matter, November 2022, doi: [10.1039/D2SM01082H](https://doi.org/10.1039/D2SM01082H)

*Forbidden Secondary Structure Found in Gel-Forming Fibrils of Glycylphenylalanylglycine***

The Journal of Physical Chemistry B, October 2022, doi: [10.1021/acs.jpcc.2c05010](https://doi.org/10.1021/acs.jpcc.2c05010)

Repeating Aspartic Acid Residues Prefer Turn-like Conformations in the Unfolded State: Implications for Early Protein Folding

The Journal of Physical Chemistry B, October 2021, doi: [10.1021/acs.jpcc.1c06472](https://doi.org/10.1021/acs.jpcc.1c06472)

Drexel University Service Committees

Associate Dean for Graduate Education Search Committee, College of Arts and Sciences

Dean Appointed Member, 2023

Diversity, Equity, Inclusion, and Belonging Committee, Chemistry Department

Graduate Student Representative, 2023-current

Scientific Talks

Biophysical Society Annual Meeting, 2022

Biomaterials and Nanotechnology Platform, San Francisco, CA, USA

International Conference Poster Presentations

International Conference on Materials Chemistry, 2023, Dublin, IE

1) *Approaches to Material Design and Discovery*

2) *Materials for Life*

Vibrational Optical Activity Conference, 2022

Edmonton, AB, CA

Awards and Grants

BioTools Poster Awards

7th Vibrational Optical Activity Conference Committee, August 2022

Award for best scientific research poster presentation at the International VOA conference in Edmonton, Alberta, CA.

Nichole O'Neill, Ph.D.

Cell: (856)-332-6766 Email: Nichole.S.Oneill@Gmail.com Website: <https://thecuriouschemist.blog/>

Global Engagement Funding Award

Drexel University, August 2022

Travel award for presenting at the international VOA conference in Edmonton, Alberta, CA.

Teck-Kah Lim Graduate Student Domestic Travel Subsidy Award

Drexel University, February 2022

Travel award for speaking at the 2022 National Biophysical Society Meeting in San Francisco, CA.

Rosenbaum Graduate Teaching Assistant Award

Drexel University, January 2020

Awarded to a chemistry teaching assistance that has demonstrated excellence in teaching.

Kornilew Award

Drexel University, January 2019

Chemistry award given to a student who has conducted unusual fundamental research.

Professional Workshops/Seminars

LC Separation Modes and Column Chemistries, Waters Corporation, 2023

Acquity Advanced Polymer Chromatography System Theory and Practical Applications, Waters Corporation, 2023

Volunteer Work

US National Chemistry Olympiad, Proctor, 2021
Philadelphia Science Festival, Activity Tent, 2019

Competitions

New Jersey's Undergraduate Mathematics
Competition
Competitor, 2016
Competitor, 2015

Organizations

Chemistry Graduate Student Association, Drexel University, PA
Vice President, 2022
Event Coordinator, 2021

Mathematics Club, Rowan College of South Jersey, NJ
President, 2016

Mathematics Honor Society, Mu Alpha Theta, Rowan College of South Jersey, NJ
Member, Inducted 2015