Nolan Petrich

Cell: (267) 408 – 0880 | **Email:** nolan.petrich@colorado.edu | **LinkedIn:** linkedin.com/in/nolanpetrich

EDUCATION

University of Colorado Boulder — **Boulder, CO**
Doctor of Philosophy in Chemical Engineering — *In Progress*

University of Delaware — **Newark, DE**
Bachelor of Science in Chemical Engineering (Honors with Distinction) — *May 2022*

AWARDS AND HONORS

National Science Foundation Graduate Research Fellowship — *September 2025*
University of Colorado Boulder Dean's Graduate Fellowship — *August 2024*
Vanderbilt University Russell G. Hamilton Scholar University Graduate Fellowship — *August 2022*
AIChE 2nd Place Poster Competition in Materials Engineering and Sciences Division — *November 2021*
University of Delaware General Honors Award — *November 2020*
University of Delaware Dean's List — *Fall 2018-Spring 2019, Spring 2020-Spring 2021, Spring 2022*
Four Year University of Delaware Trustee Scholarship — *August 2018*

RESEARCH EXPERIENCE

University of Colorado Boulder — **Boulder, CO**
Graduate Research Assistant, Kristi Anseth Group — *August 2024 – Present*

- Engineering and culturing 3D intestinal organoids in light-responsive hydrogels to study how mechanical and biochemical cues influence stem cell behavior
- Using light sheet and confocal microscopy to study organoid structure and protein expression patterns in high-resolution, time-lapse 3D imaging datasets

University of Delaware — **Newark, DE**
Peptide Synthesis and Instrumentation Specialist, Peptide–Protein Materials Center — *June 2023 – August 2024*

- Optimized the scale-up of multiple peptide sequences while operating CEM Liberty Blue Microwave Peptide Synthesizer, Gyros Protein Technologies PurePep Chorus Peptide Synthesizer, UPLC/XEVO Mass Spectrometer, High Performance Liquid Chromatography Preparative System, and Lyophilizer for synthesis and purification
- Designed and implemented a peptide synthesis request process that determines monetary and time costs
- Restructured and streamlined instrument usage within the Peptide–Protein Materials Center with the initiation of a website and the design of training modules and protocols

University of Delaware — **Newark, DE**
Research Assistant, Christopher Kloxin Lab — *February 2020 – August 2022*

- Assessed coiled-coil peptide stability in various solvent conditions for nanostructure assembly applications
- Examined structural stability of coiled-coil peptides using Circular Dichroism spectrometry

Air Gas — **Plumsteadville, PA**
Engineering Intern — *June 2017 – August 2018*

- Collaborated with PhD level chemical engineers to increase formaldehyde yields and production efficiency, working cross-functionally for design and analysis of a pilot system, resulting in a patented device and process
- Analyzed gas mixtures with FT-IR, FID Gas Chromatograph, and Ion Chromatograph devices to confirm customer requests

PUBLICATIONS

- **Petrich, N.**; Bera, K.; Kirkpatrick, B.; Young, M.; Dempsey, P.; Anseth, K. "Photo-Tunable Materials Reveal Dynamic Role of YAP Mediated Mechano-Transduction During Intestinal Crypt Fission." In Preparation.
- **Petrich, N.**; Yendamuri, T.; Kirkpatrick, B.; Bera, K.; Dash, A.; Dempsey, P.; Anseth, K. "Deterministic Programming of Organoid Morphogenesis Via PEG-in-Matrigel Photopatterning." In Preparation.
- Blatchley, M.; Bera, K.; **Petrich, N.**; Kirkpatrick, B.; Yavitt, F.; McGrath, P.; Dempsey, P.; Anseth, K. "Spatiotemporally Controlled Matrix Softening Facilitates Deterministic Crypt Formation in Human Intestinal Organoids." *PNAS*. In Review.
- Bera, K.; McNally, D.; Kirkpatrick, B.; **Petrich, N.**; Yavitt, F.; Coulombe, M.; Quintero, M.; Skillin, N.; Khang, A.; McGrath, P.; Samuelson, L.; Lele, T.; Dempsey, P.; Anseth, K. "Nuclei Sense Complex Tissue Shape and Direct Intestinal Stem Cell Fate." *Nature Cell Biology*. In Review.

- McNally, D.; Bera, K.; **Petrich, N.**; Khang, A.; Dempsey, P.; Anseth, K. "Photo Tunable Hydrogel-Based Model to Study Intestinal Crypt Fission Dynamics in-vitro." In Preparation.
- Young, M.; **Petrich, N.**; Kirkpatrick, B.; Dempsey, P.; Anseth, K. "Photoinduced Tissue Curvature Drives in vitro Intestinal Epithelial Morphogenesis and Crypt-Villi Compartmentalization." In Preparation.
- Meisenhelter, J.; **Petrich, N.**; Blum, J.; Weisen, A.; Guo, R.; Saven, J.; Pochan, D.; Kloxin, C. "Impact of Peptide Length and Solution Conditions on Tetrameric Coiled Coil Formation." *Biomacromolecules*, 2024, 25 (6), 3775-3783.
- **Petrich, N.** "Characterizing Stability Conditions for Coiled-Coil Formation and Design." Senior Thesis, University of Delaware, 2022. UDSPACE.

PATENTS

- Grasmeder, R.; Miller, S.; **Petrich, N.** 2018. *Apparatus for Generating Formaldehyde Monomer Vapor*. U. S. Patent 10,112,165 B1, filed September 20, 2017, and issued January 26, 2018.
- Grasmeder, R.; Miller, S.; **Petrich, N.** 2018. *Method for Generating Formaldehyde Monomer Vapor*. U. S. Patent 10,179,318 B1, filed September 20, 2017, and issued January 26, 2018.

RESEARCH PRESENTATIONS

- *Photo-Tunable Materials Reveal Dynamic Role of YAP Mechanotransduction During Intestinal Crypt Formation*. Society for Biomaterials 2026 Annual Meeting and Exposition. Hyatt Regency, Atlanta, GA, 26. Mar. 2026. Oral Presentation.
- *Shining Light on Intestinal Development and Maintenance Using Tunable Biomaterials*. 2026 Organoid Frontier Symposium. University of Colorado Anschutz Medical Campus, Aurora, CO, 02. Feb. 2026. Oral Presentation.
- *Light-Responsive Hydrogels to Control Intestinal Organoid Morphogenesis*. 2025 Photopolymerization Fundamentals Meeting. University of Colorado Boulder Sustainability, Energy, and Environment Complex, Boulder, CO, 17-18. Sep. 2025. Poster Presentation.
- *University of Delaware Peptide–Protein Materials Center Capabilities and Future Directions*. CHARM IRG1 Meeting. Ammon Pinizzotto Biopharmaceutical Innovation Center, Newark, DE, 30. Jan. 2024. Oral Presentation.
- *Characterizing Stability Conditions for Coiled-Coil Formation and Design*. Senior Thesis Defense. University of Delaware, Newark, DE, 09. May. 2022. Oral Presentation.
- *Characterizing Stability Conditions for Coiled-Coil Formation*. AIChE Annual Student Conference. John B. Hynes Veterans Memorial Convention Center, Boston, MA, 08. Nov. 2021. Poster Presentation.
- *Characterizing Stability Conditions for Coiled-Coil Formation*. CHARM Summer Symposium. University of Delaware, Newark, DE, 12. Aug. 2021. Poster Presentation.
- *Peptide Sequence Database Design*. Summer Scholars Poster Symposium. University of Delaware, Newark, DE, 13. Aug. 2020. Poster Presentation.

MENTORSHIP

University of Colorado Boulder — **Boulder, CO**

- James Baker, Chemical Engineering Graduate Student — January 2026 – Present
- Tvishi Yendamuri, Biochemistry Undergraduate — May 2025 – Present
- Aahana Dash, Chemical Engineering Undergraduate at Johns Hopkins University — June 2025 – August 2025

OUTREACH

University of Delaware — **Newark, DE**

HighRise High School Research Experience — *August 2024*

- Planned, led, and implemented new research experience program for Black, LatinX, and low-income high school students
- Designed professional development workshops, symposia, and laboratory activities to prepare students for STEM education
- Designed presentation material and student handouts and worksheets to set up continued implementation of the program

LEADERSHIP

University of Delaware — **Newark, DE**

American Institute of Chemical Engineers (AIChE) Recruitment Committee Member — *August 2020 – May 2022*

- Introduced prospective students to the department through monthly recruitment events
- Completed 30-minute tours to groups of five to increase student interest in the program

University of Delaware **Newark, DE**
Resident Assistant *August 2019 – May 2022*

- Enforced University and Residence Life & Housing rules and regulations, resulting in a safe, orderly, and pleasant living and learning environment for 31 first-year undergraduate students from diverse backgrounds
- Organized and coordinated monthly floor meetings and conducted frequent room check-ins to discuss events, classes, and concerns

University of Delaware **Newark, DE**
Blue Hen Ambassador *December 2018 – May 2022*

- Represented the University of Delaware student body for prospective college students and families
- Communicated with both large and small groups, providing two 90-minute tours each week around campus

SKILLS

- **Software:** Aspen Plus; BioRender; ChemDraw; ChimeraX; Inkscape; Microsoft Office Suite; Origin; SimScale
- **Programming Languages:** R; Python; MATLAB; Simulink
- **Laboratory:** Data Analysis; Cell Culture; Chromatography; Circular Dichroism; Confocal Microscopy; Light Sheet Microscopy; Mass Spectrometry; NMR Spectroscopy; Nuclear Segmentation; Peptide Synthesis; Polymer Synthesis; SDS PAGE