Benjamin R. Nelson

PhD student, University of Colorado

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Education

University of Colorado Boulder

2021–Present	PhD student, Chemical Engineering Advisors: Dr. Chris Bowman, Dr. Kristi Anseth

Luther College

2017–21	Bachelor of Arts, Summa Cum Laude, Chemistry Minors in Physics and Mathematics

Research Experience

2021	Research Assistant, Bio-Techne, Minneapolis Investigated the use of alginate hydrogels in bulk and microgel form for the start of a tissue culture program.
2021	Visiting Scholar, University of Leoben, Austria Developed elastomeric networks using new orthogonal polymerization chemistries which allowed the material properties to by modified post-polymerization with irradiation by a different wavelength of light.
2018–21	Research Assistant, Wilker Research Group, Luther College Investigated the impact of CdSe Nanocrystal shape on optical, vibrational, and heterostructure deposition properties.
2020	Volunteer Research Assistant, Bio-Techne, Minneapolis Completed two biosensor projects for the development of a peptide-capped silver nanoparticle assay for the detection of trypsin and the development of novel detection reagents for use in high sensitivity ELISA.
2019	Research Assistant, NSF REU, Bowman & RPM Research Groups, CU Boulder Synthesized a novel hybrid thiol-ene/acrylate network to improve the uniformity of liquid crystal elastomers.

Honors and Awards

2023	University of Colorado Chemical Engineering Masters Bypass Outstanding Poster
2023	CSU Polymer Day 1st Place Outstanding Poster
2020–21	Adrian M. Docken Scholarship for Chemistry, Luther College
2020–21	Herbert J. Rebassoo Scholarship for Mathematics and Science, Luther College
2020–21	Emerson Family Scholarship for Mathematics, Luther College
2019–21	Dr. Herman Ellingson Scholarship for Mathematics and Physical Sciences, Luther College
2019–20	Stephen W. & Kari M. Noltner Scholarship for Physical Chemistry, Luther College
2019–20	R.J. McElroy Trust Research Fund Grant Recipient, Iowa Colleges Foundation
2018–21	Academic All-Conference Football, American Rivers Conference
2017–21	Fall and Spring Semester Dean's List, Luther College

Teaching Activities

2023	Advanced Teaching Assistant, CHEN 4450/5450: Polymer Chemistry, 2024 Spring Semester

Dr. Chris Bowman, Primary Instructor
Developed and instructed the lab component of the class, wrote homework and quiz questions, taught three lectures.

2022 Teaching Assistant, CHEN 3200: Fluids, 2022 Spring Semester
Dr. Dan Schwartz, Primary Instructor

Publications

Google Scholar [link]

Peer reviewed papers
*Indicates equal contribution

3. "Facile Physicochemical Reprogramming of PEG-Dithiolane Microgels"
BR Nelson, BE Kirkpatrick, NP Skillin, N Di Caprio, JS Lee, LP Hibbard, GK Hach, A Khang, TJ White, JA Burdick, CN Bowman, KS Anseth, Advanced Healthcare Materials, e2302925, **2023**.
2. "Stiffness anisotropy coordinates supracellular contractility driving long-range myotube-ECM alignment"
NP Skillin, BE Kirkpatrick, KM Herbert, **BR Nelson**, GK Hach, KA Gunay, RM Khan, FW DelRio, TJ White, KS Anseth, bioRxiv, PMC10441277, **2023**
1. "Photoinduced Dithiolane Crosslinking for Multiresponsive Dynamic Hydrogels"
BR Nelson*, BE Kirkpatrick*, CE Miksch, MD Davidson, NP Skillin, GK Hach, A Khang, SN Hummel, BD Fairbanks, JA Burdick, CN Bowman, KS Anseth, Advanced Materials, e2211209, **2023**

Undergraduate Thesis

1. "Influence of Shape on Optical and Heterostructure Deposition Properties of CdSe Semiconductor Nanocrystals"
BR Nelson, Luther College, 2021

Presentations

Academic Talks

2. "Dithiolane-Based Dynamic Hydrogels for Photoinduced Crosslinking, Exchange, and Depolymerization"
BR Nelson, BE Kirkpatrick, CE Miksch, MD Davidson, NP Skillin, GK Hach, BD Fairbanks, JA Burdick, CN Bowman, KS Anseth, 2023 Society for Biomaterials Annual Meeting
1. "Novel Streptavidin Conjugated Dendrimers for Use in High Sensitivity ELISA"
BR Nelson, 2020 Undergraduate Research Symposium in the Physical Sciences, Mathematics and Computer Science, Midstates Consortium

Posters
*Indicates poster presented by undergraduate mentee
(co-authored posters presented by graduate students or postdocs are not included)

9. "Photocrosslinking of highly reconfigurable dynamic materials using 1,2-dithiolanes"
BR Nelson, BE Kirkpatrick, MT Lemon, KS Anseth, CN Bowman, Photopolymerizations Fundamentals 2023
8. "1,2-dithiolanes for photocrosslinking of highly reconfigurable dynamic hydrogels"
BR Nelson, BE Kirkpatrick, CE Miksch, MD Davidson, NP Skillin, GK Hach, A Khang, SN Hummel, BD Fairbanks, JA Burdick, CN Bowman, KS Anseth, Colorado State University Polymer Day 2023
BR Nelson received 1st place poster award
7. "Highly Reconfigurable Hydrogels Photocrosslinked by 1,2-Dithiolanes"

BR Nelson, BE Kirkpatrick, CE Miksch, MD Davidson, NP Skillin, GK Hach, A Khang, SN Hummel, BD Fairbanks, JA Burdick, CN Bowman, KS Anseth, Rocky Mountain Biomaterials Day 2023

6.* "Photoinduced Dithiolane Crosslinking, Exchange, and Depolymerization for Dynamic Hydrogels"
SN Hummel, **BR Nelson**, BE Kirkpatrick, GK Hatch, CN Bowman, KS Anseth, AIChE Annual Student Conference 2022
SN Hummel received 2nd place poster in Food, Pharma, and Biotech

5. "Dynamic Photoadaptable Dithiolane Crosslinking for PEG Hydrogels"
BR Nelson, BE Kirkpatrick, CN Bowman, KS Anseth, International School of Soft Matter, Summer 2022

4. "Influence of Shape on Optical and Heterostructure Deposition Properties of CdSe Semiconductor Nanocrystals"
BR Nelson, MB Wilker, Luther College Undergraduate Research Symposium

3. "Synthesis of a Hybrid Thiol-ene/Acrylate Network for Improving the Uniformity of Liquid Crystal Elastomers"
BR Nelson, MK McBride, BR Donovan, TJ White, CN Bowman, REU Symposia

2. "Influence of CdSe Nanocrystal Shape on Optical and Vibrational Spectra"
BR Nelson, BD Nottleson, EA Reasoner, MB Wilker, ACS Spring 2019

1. "Influence of CdSe Nanocrystal Shape on Vibrational Spectra"
BR Nelson, BD Nottleson, EA Reasoner, MB Wilker, ACS Midwest Regional Meeting, Fall 2018

Mentorship

Mentees

2023-24	Jaxon Cione, Chemical Engineering undergraduate at the University of Colorado
2022	Sydney Hummel, Chemical Engineering undergraduate at Purdue University Sydney received the 2nd place poster award in Food, Pharma, and Biotech at the AIChE Student Conference 2022 presenting work from her time at CU

Selected Activities

2023-24	Vice President, University of Colorado Lutheran Campus Ministries Board
2022	Participant, International School of Soft Matter, Summer 2022
2017–21	Student Athlete, Luther College Norse Football, Varsity Letters 2018-21

Professional Affiliations

American Chemical Society
Phi Mu Epsilon Math Honor Society
Chi Alpha Sigma National College Athlete Honor Society
European Symposium of Photopolymer Science
Society for Biomaterials