

Bruce Edward Kirkpatrick

University of Colorado

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Education

- 2018-2027 **MD-PhD student, Medical Scientist Training Program**
University of Colorado Anschutz Medical Campus
- 2020-2025 **PhD student, Biological Engineering**
University of Colorado Boulder
Advisor: Kristi S. Anseth; thesis topic: photoresponsive hydrogel biomaterials
- 2013-2017 **BS, Chemical and Biological Engineering** with honors
University of Colorado Boulder
Minor in Business Analytics
Leeds School of Business

Professional Experience

- 2017-2018 **Professional research assistant, iC42 Clinical Research and Development**, CU Anschutz
Investigated metabolomic signatures of aging, injury, drug toxicity, and transplant function.
- 2016-2017 **Undergraduate research assistant, Jeerage lab** (material measurement), NIST
Developed a non-destructive assay for quantification of gold nanoparticle uptake in live cells.
- 2014-2016 **Undergraduate research assistant, Goodwin lab** (polymer science), CU Boulder
Synthesized novel anthraquinone derivatives for mechanically responsive polymeric materials.
- 2015 **Undergraduate research assistant, Weiser-Evans lab** (nephrology), CU Anschutz
Studied effects of PTEN loss on smooth muscle actin expression in atherosclerotic lesions.
- 2014-2015 **Undergraduate research assistant, Moulton lab** (cardiology), CU Anschutz
Treated single cells and mice with Nrp2-targeted gold nanorods and analyzed biodistribution.

Publications

Academic writing

^opreprint only, *denotes equal contribution, total citations = 1061, h-index = 13 ([Google Scholar](#))

32. "Linear and network-forming acetal polymerization of multifunctional alcohols with dichloromethane for degradable and recyclable materials"
JT Kamps*, **BE Kirkpatrick***, SP Keyser, CE Miksch, BR Nelson, JF Rynk, BD Fairbanks, KS Anseth, CN Bowman
Macromolecules, doi:10.1021/acs.macromol.4c03078, 1/2025
31. "Photodegradable polyacrylamide tangleformers enable spatiotemporal control over chain lengthening in high-strength and low-hysteresis hydrogels"
JS Lee*, **BE Kirkpatrick***, AP Dhand, LP Hibbard, BR Nelson, NP Skillin, MC Johnson, D Batan, BD Fairbanks, TJ White, CN Bowman, JA Burdick, KS Anseth
Journal of Materials Chemistry B, doi:10.1039/D4TB02149E, 12/2024
30. "Synthetic photoresponsive hydrogels enable *in situ* control over murine intestinal monolayer differentiation and crypt formation"
MW Young, CE Oroke, **BE Kirkpatrick**, MR Blatchley, PJ Dempsey, KS Anseth
Advanced Functional Materials, doi:10.1002/adfm.202413778, 11/2024
29. "Diverse reactivity of maleimides in polymer science and beyond"
BE Kirkpatrick, KS Anseth, TS Hebner
Polymer International, doi:10.1002/pi.6715, 11/2024
28. "2D co-culture model reveals a biophysical interplay between activated fibroblasts and cancer cells"
ARMP Santos, **BE Kirkpatrick**, KS Anseth, Y Park
Acta Biomaterialia, doi:10.1016/j.actbio.2024.10.031, 10/2024; *Acta Materialia First Look*, 6/2024
27. "Ligand presentation controls collective MSC response to matrix stress relaxation in hybrid PEG-HA hydrogels"
AN Borelli, CL Schultze, MW Young, **BE Kirkpatrick**, KS Anseth
Bioactive Materials, doi:10.1016/j.bioactmat.2024.10.007, 10/2024

26. "Photochemical Control of Network Topology in PEG Hydrogels"
BE Kirkpatrick, GK Hach*, BR Nelson*, NP Skillin, JS Lee, LP Hibbard, AP Dhand, HS Grotheer, CE Miksch, V Salazar, TS Hebner, SP Keyser, JT Kamps, J Sinha, LJ Macdougall, BD Fairbanks, JA Burdick, TJ White, CN Bowman, KS Anseth
Advanced Materials, 2409603, 9/2024
- 25.° "Fully synthetic hydrogels promote robust crypt formation in intestinal organoids"
 EA Hushka, MR Blatchley, LJ Macdougall, FM Yavitt, **BE Kirkpatrick**, K Bera, PJ Dempsey, KS Anseth
bioRxiv, doi:10.1101/2024.07.06.602364, 7/2024
- 24.° "PTEN regulates myofibroblast activation in valvular interstitial cells based on subcellular localization"
 D Batan, G Tseropoulos, C Bishop, **BE Kirkpatrick**, K Bera, A Khang, MCM Weiser-Evans, KS Anseth
bioRxiv, PMC11244890, 7/2024
23. "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
Science Advances, 10 (22), eadn0235, 5/2024; *bioRxiv*, PMC10441277, 8/2023
22. "Nonlinear elastic bottlebrush polymer hydrogels modulate actomyosin mediated protrusion formation in mesenchymal stromal cells"
 ML Ohnsorg, KM Mash, A Khang, VV Rao, **BE Kirkpatrick**, K Bera, KS Anseth
Advanced Materials, 2403198, 4/2024; *bioRxiv*, doi:10.1101/2024.03.08.584195, 3/2024
21. "Radical-mediated degradation of thiol-maleimide hydrogels"
 TS Hebner, **BE Kirkpatrick**, BD Fairbanks, CN Bowman, KS Anseth, DSW Benoit
Advanced Science, 2402191, 3/2024
20. "Photothermal actuation of thick 3D-printed liquid crystalline elastomer nanocomposites"
 NP Skillin, GE Bauman, **BE Kirkpatrick**, JM McCracken, K Park, RA Vaia, KS Anseth, TJ White
Advanced Materials, 2313745, 3/2024
19. "Engineering native biological complexity from the inside-out and outside-in"
 CA DeForest, **BE Kirkpatrick**, KS Anseth
Nature Chemical Engineering, 1 (1), 2-5, 1/2024
18. "Reversible intracellular gelation of MCF10A cells enables programmable control over 3D spheroid growth"
 DL McNally*, LJ Macdougall*, **BE Kirkpatrick***, CV Maduka, TE Hoffman, BD Fairbanks, CN Bowman, SL Spencer, KS Anseth
Advanced Healthcare Materials, 2302528, 12/2023
17. "Adaptable networks with semiorthogonal two-stage polymerizations enabled by sequential photoinitiated thiol-ene and disulfide-ene reactions"
 Y Hu, SM Soars, **BE Kirkpatrick**, M Podgórski, N Bongiardina, BD Fairbanks, KS Anseth, CN Bowman
Macromolecules, 56 (23), 9778-9786, 11/2023
16. "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, 11/2023
15. "Light-based vat-polymerization bioprinting"
 R Levato, O Dudaryeva, CE Garciamendez-Mijares, **BE Kirkpatrick**, R Rizzo, J Schimelman, KS Anseth, S Chen, M Zenobi-Wong, YS Zhang
Nature Reviews Methods Primers, 3:47, 1-19, 6/2023
14. "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, 1/2023
13. "In situ modulation of intestinal organoid epithelial curvature through photoinduced viscoelasticity directs crypt morphogenesis"
 FM Yavitt, **BE Kirkpatrick**, MR Blatchley, KF Speckl, E Mohagheghian, R Moldovan, N Wang, PJ Dempsey, KS Anseth
Science Advances, 9 (3), eadd5668, 1/2023
12. "Surface-enforced alignment of reprogrammable liquid crystalline elastomers"
 TS Hebner, **BE Kirkpatrick**, KS Anseth, CN Bowman, TJ White
Advanced Science, 2204003, 8/2022
11. "4D printing of extrudable and degradable poly(ethylene glycol) microgel scaffolds for multidimensional cell culture"

- CE Miksch, NP Skillin*, **BE Kirkpatrick***, GK Hach, VV Rao, TJ White, KS Anseth
Small, 2200951, 6/2022
10. "Osteopontin activity modulates sex-specific calcification in engineered valve tissue mimics"
ME Schroeder, D Batan, A Gonzalez Rodriguez, KF Speckl, DK Peters, **BE Kirkpatrick**, GK Hach, CJ Walker, JC Grim, BA Aguado, RM Weiss, KS Anseth
Bioengineering & Translational Medicine, e10358, 6/2022
 9. "Intracellular crowding by bio-orthogonal hydrogel formation induces reversible molecular stasis"
LJ Macdougall, TE Hoffman, **BE Kirkpatrick**, BD Fairbanks, CN Bowman, SL Spencer, KS Anseth
Advanced Materials, 2202882, 6/2022
 8. "Granular PEG hydrogels mediate osteoporotic MSC clustering via N-cadherin influencing the pro-resorptive bias of their secretory profile"
VV Rao, ME Wechsler, E Cravens, SJ Wojda, AS Caldwell, **BE Kirkpatrick**, SW Donahue, KS Anseth
Acta Biomaterialia, 145, 77-87, 6/2022
 7. "Stress relaxation and composition of hydrazone-crosslinked hybrid biopolymer-synthetic hydrogels determine spreading and secretory properties of MSCs"
AN Borelli, MW Young, **BE Kirkpatrick**, MW Jaeschke, S Mellett, S Porter, MR Blatchley, VV Rao, BV Sridhar, KS Anseth
Advanced Healthcare Materials, 2200393, 5/2022
 6. "4D materials with photoadaptable properties instruct and enhance intestinal organoid development"
FM Yavitt, **BE Kirkpatrick**, MR Blatchley, KS Anseth
ACS Biomaterials Science & Engineering, 8 (11), 4634-4638, 3/2022
 5. "Synthesis, selective decoration, and photocrosslinking of self-immolative poly(thioester)-PEG hydrogels"
SM Soars, **BE Kirkpatrick**, BD Fairbanks, JT Kamps, KS Anseth, CN Bowman
Polymer International, doi:10.1002/pi.6388, 3/2022
 4. "Photoclick chemistry: a bright idea"
BD Fairbanks, LJ Macdougall, S Mavila, J Sinha, **BE Kirkpatrick**, KS Anseth, CN Bowman
Chemical Reviews, 121 (12), 6915-6990, 4/2021
 3. "Toward stimuli-responsive dynamic thermosets through continuous development and improvements in covalent adaptable networks (CANs)"
M Podgórski, BD Fairbanks, **BE Kirkpatrick**, M McBride, A Martinez, A Dobson, NJ Bongiardina, CN Bowman
Advanced Materials, 32 (20), 1906876, 2/2020
 2. "Cyclophilin D knockout protects the mouse kidney against cyclosporin A-induced oxidative stress"
Je Klawitter, Jo Klawitter, AT Pennington, **BE Kirkpatrick**, GF Roda, NC Kotecha, JM Thurman, U Christians
AJP Renal, 371 (3), F683-694, 9/2019
 1. "PTEN deficiency promotes pathological vascular remodeling of human coronary arteries"
KS Moulton, M Li, K Strand, S Burgett, P McClatchey, R Tucker, SB Furgeson, S Lu, **BE Kirkpatrick**, JC Cleveland, RA Nemenoff, AV Ambardekar, MCM Weiser-Evans
JCI Insight, 3 (4), e97228, 2/2018

Other writing

2. "70 years ago, physicians used a heart defect to fix blue babies."
BE Kirkpatrick, massivesci.com, 5/2019
1. "Frequent flyer: why isn't dad dead yet?"
BE Kirkpatrick, *Journal* 2020, 5, 31-38, 4/2017

Peer review activity (assisting Dr. Kristi Anseth)

Acta Biomaterialia, *Advanced Materials*, *Advanced Functional Materials*, *Advanced Healthcare Materials*, *Angewandte Chemie*, *Chemical Reviews*, *Journal of the American Chemical Society*, *Nature Communications*, *Nature Materials*, *Science Advances*, *Small*

Presentations

Academic talks

17. "Photochemical modulation of hydrogel network topology"
Rising Stars in Soft and Biological Matter Symposium, virtual, 12/2024
16. "Inducing synthetic cryptobiosis in mammalian cells via reversible intracellular hydrogelation"
ACS Fall Meeting, Denver, CO, 8/2024
also presented as rapid-fire talk/poster at SFB Rocky Mountain Biomaterials Day, Aurora, CO, 9/2024
15. "Photoinduced transformations in extracellular matrix properties drive intestinal organoid morphogenesis in synthetic hydrogels"
6th Annual CU MSTP Retreat, Aurora, CO, 4/2024
14. "Expanding the hydrogel photochemistry toolbox"
Excellence in Graduate Polymer Research Symposium
ACS Spring Meeting, New Orleans, LA, 3/2024
13. "Novel stability and trajectory analysis of engineered muscle tissue development"
MSTP Special Topics, Aurora, CO, 10/2023
12. "Induced epithelial curvature in photopatterned intestinal organoids regulates symmetry breaking via pre-transcriptional changes in membrane tension and resting potential"
SFB Annual Meeting, San Diego, CA, 4/2023
11. "Controlling and mapping intestinal organoid morphodynamics: bioelectric patterning and topological data analysis"
MSTP Special Topics, Aurora, CO, 9/2022
10. "Characterization of radical-mediated and [2+2] cycloaddition photocrosslinking of maleimide monomers and macromers"
MRS Spring Meeting, Honolulu, HI, 5/2022
9. "Spatiotemporal control of cell function by photoreversible macromolecular crowding"
SFB Anschutz Chapter Meeting, Aurora, CO, 4/2022
8. "Intracellular crowding by bio-orthogonal hydrogelation induces reversible molecular stasis"
4th Annual CU MSTP Retreat, Aurora, CO, 2/2022
7. "Macromolecular crowding by bio-orthogonal hydrogelation and its effect on intracellular diffusion and cellular function"
Best presentation award
Rocky Mountain Biomaterials Day, Aurora, CO, 10/2021
6. "On macromolecular crowding and its effect on cell cycle"
3rd Annual CU MSTP Retreat, Aurora, CO, 2/2021
5. "Developing synthetic networks for biological preservation"
MSTP Special Topics, Aurora, CO, 9/2020
4. "Implementing covalent adaptable networks for biomedical applications"
2nd Annual CU MSTP Retreat, Aurora, CO, 2/2020
3. "Synthesizing novel monomers towards self-immolative gels"
MSTP Special Topics, Aurora, CO, 11/2019
2. "Bioprinting modular granular hydrogels"
MSTP Special Topics, Aurora, CO, 12/2018
1. "Non-destructive quantitation of gold nanorod uptake by microplate reader absorbance analysis"
NIST Summer Undergraduate Research Colloquium, Boulder, CO, 7/2016

Outreach talks

8. "Complex organoid models: bottom-up and top-down compartmentalization in microphysiological systems"
Anseth group undergraduate research lecture, 10/2023
7. "How to think like a scientist, no matter what you do in life"
CU STEM Scholars summer program, 7/2022
Slides courtesy of GD Kirkpatrick, MD, PhD
6. "Dual-degree training programs: becoming a physician-scientist"
Introduction to Chemical Engineering, CU Boulder, Boulder, CO, 11/2021, 11/2022, 11/2024
also presented at CU STEM Scholars summer program, 7/2022
5. "How to read (and review) a paper"
Undergraduate Mentorship Program for Physician Scientists, Aurora, CO, 7/2021
4. "Deciding between MD, PhD, and MD-PhD programs" (panelist)
Undergraduate Mentorship Program for Physician Scientists, Aurora, CO, 7/2021

3. "The science of sutures"
Biotechnology and Medical Research STEM Academy, Boulder, CO, 6/2021
also presented at CU STEM Scholars summer program, 7/2022
2. "Anatomy of the larynx and pharynx"
Knowledge Base (teaching first-year CU medical students), Aurora, CO, 8/2020
1. "Surviving human body block and graduate core"
MSTP Special Topics, Aurora, CO, 8/2019

Posters

*indicates that poster was presented by an undergraduate mentee
(co-authored posters presented by graduate students or postdocs are not included)

- 12.* "Photopolymerizable dual-crosslinked boronate ester hydrogels to study cellular responses to rapid stress relaxation"
Hibbard, **Kirkpatrick**, Dhand, Bera, Nelson, Lee, Blatchley, Bowman, Burdick, Anseth
SFB Rocky Mountain Biomaterials Day, Aurora, CO, 9/2024
- 11.* "Photodegradable polyacrylamide tanglelers"
Lee, **Kirkpatrick**, Dhand, Hibbard, Nelson, Skillin, Johnson, Batan, Fairbanks, White, Bowman, Burdick, Anseth
SFB Rocky Mountain Biomaterials Day, Aurora, CO, 9/2024
- 10.* "Reversible intracellular gelation reduces MCF10A spheroid growth"
McNally, Macdougall, **Kirkpatrick**, Maduka, Fairbanks, Bowman, Anseth
2nd Prize Award; Food, Pharmaceutical, and Biotechnology Session
AIChE Annual Meeting, Orlando, FL, 11/2023
also presented at SFB Rocky Mountain Biomaterials Day, Aurora, CO, 9/2024
- 9.* "Colorimetric quantification of PEG hydrogel mass loss"
Hach, **Kirkpatrick**, Anseth
ACS Spring Meeting, Indianapolis, IN, 3/2023
8. "Photochemical control of hydrogel network topology"
Kirkpatrick, Nelson, Hach, Skillin, Anseth
SFB Rocky Mountain Biomaterials Day, Aurora, CO, 3/2023
also presented at Photopolymerization Fundamentals, Boulder, CO, 9/2023
- 7.* "Photoinduced dithiolane crosslinking, exchange, and depolymerization for dynamic hydrogels"
Hummel, Nelson, **Kirkpatrick**, Hach, Bowman, Anseth
2nd Prize Award; Food, Pharmaceutical, and Biotechnology Session
AIChE Annual Meeting, Phoenix, AZ, 11/2022
6. "Redshifted tetrazole-ene PEG networks for self-reporting fluorogenic hydrogelation"
Kirkpatrick, Kamps, Hach, Macdougall, Anseth
ACS Fall Meeting, virtual due to COVID-19, 8/2021
also presented at 5th Annual CU MSTP Retreat, Aurora, CO, 2/2023
5. "Bioprinting modular granular hydrogels"
Kirkpatrick, Miksch, Anseth
1st Annual CU MSTP Retreat, Aurora, CO, 3/2019
4. "Cyclophilin D knockout protects the mouse kidney against cyclosporin A-induced oxidative stress and DNA hypomethylation"
Kirkpatrick, Jo Klawitter, Pennington, Thurman, Kotecha, Christians, Je Klawitter
Annual Anesthesiology Research Conference, Aurora, CO, 10/2018
3. "Effect of 1,8-dihydroxyanthraquinone on *Drosophila melanogaster* development"
Kirkpatrick, Moon
CU Boulder Clinical Undergraduate Research Symposium, Boulder, CO, 4/2017
2. "Neuropilin 2-targeted nanoparticles bind selectively to plaque neovascularization in atherosclerotic arteries"
Kirkpatrick, Li, Tian, Wang, Ranville, Tudor, Boyes, Moulton
International Vascular Biology Meeting (NAVBO), Boston, MA, 11/2016
1. "Molecular zipcodes of vasa vasorum neovascularization in atherosclerosis and diabetes"
Li, Jones, **Kirkpatrick**, Chaudhary, Demos-Davies, Tudor, Taylor, Boyes, Moulton
Colorado Clinical and Translational Sciences Institute Summit, Aurora, CO, 8/2014

Video essays

2. "Re-recording the record: pseudotranslation and pseudotranscription in media and reality" [\[link\]](#) 5/2017
1. "Don't trust your ears: physical and digital sound manipulation" [\[link\]](#) 12/2015
received CU Boulder Mackison writing award, featured in hometown newspaper

Research Mentees

(middle school mentees not included)

Graduate students

1. Benjamin R. Nelson, CU Boulder Chemical Engineering PhD student, Fall 2021-present

Undergraduate students

12. Jaxon Cione, CU Boulder undergraduate student, Fall 2024-present
11. Carly Fox, CU Boulder undergraduate student, Fall 2024-present
10. Abe Fairbanks, CU Boulder undergraduate student, Summer 2024
9. Makayla Johnson, Rose-Hulman Institute of Technology undergraduate student, Summer 2024
funded by NSF-REU
8. Tvishi Yendamuri, CU Boulder undergraduate student, Spring 2024-present
awarded academic year funding through CU Boulder UROP
7. Henry Grotheer, CU Boulder undergraduate student, Fall 2023-Spring 2024
6. Lea Pearl Hibbard, CU Boulder undergraduate student, Spring 2023-Summer 2024
now Biological Engineering PhD student, CU Boulder
5. Joshua Lee, CU Boulder undergraduate student, Spring 2023-present
awarded summer and academic year funding through CU Boulder initiatives (UROP/YSSRP)
4. Violeta Salazar, CU Boulder undergraduate student, Spring 2023
3. Sydney Hummel, Purdue University undergraduate student, Summer 2022, funded by NSF-REU
now Master's in Medical Sciences student, Churchill Scholarship, University of Cambridge
2. Declan Gore, CU Boulder undergraduate student, Fall 2021
1. Grace Hach, CU Boulder undergraduate student, Summer 2021-Spring 2024
awarded summer (x2) and academic year funding (x2) through CU Boulder initiatives (UROP/BSI)
now Master's in Bioinformatics and Genomics student, Knight Campus Graduate Internship Program,
University of Oregon

High school students

3. Tessa N. Fox, Boulder High School student, Fall 2022-Spring 2023
2. Anastasia Diener, Fairview High School student, Spring 2022,
awarded First Place, Senior Division Chemistry & Biochemistry, Colorado State Science Fair
1. Shannon McCallan, Peak to Peak High School student, Summer 2016 (NIST),
now PhD student at Georg-August-Universität Göttingen, Göttingen, Germany

Honors and Awards

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| 2024 | Rising Stars in Soft and Biological Matter Symposium
hosted by the UChicago and UCSD MRSECs |
| 2024 | Ramirez Graduate Student Award for excellence in scholarship and research
CU Boulder Department of Chemical and Biological Engineering |
| 2024 | Selected talk, Excellence in Graduate Polymer Research Award Symposium,
ACS Division of Polymer Chemistry |
| 2024 | Graduate School Travel Grant, CU Boulder Department of Chemical and Biological Engineering |
| 2021 | Best Presentation, SFB Rocky Mountain Biomaterials Day, Aurora, CO |
| 2018-2020 | National Institutes of Health T32 Predoctoral Training Grant (MSTP), Aurora, CO |
| 2019 | First Prize, CU Anschutz Bioethics Case Competition, Aurora, CO |
| 2018 | First Prize, CU Anschutz Bioethics Case Competition, Aurora, CO |
| 2013-2017 | Joseph A. Sewall Award, CU Boulder, Boulder, CO |
| 2017 | Finalist, CESR Business Ethics Case Competition, Boulder, CO |
| 2016 | NIST Summer Undergraduate Research Fellowship, Boulder, CO |

2016 Mackison Writing Award, CU Boulder, Boulder, CO
 2016 Outstanding Delegate, National Model United Nations, New York, NY
 2015 American Heart Association Summer Undergraduate Research Fellowship, Aurora, CO
 2014 Clinical Undergraduate Research Experience Fellowship, Aurora, CO

Selected Activities

2024 Proposal reviewer, Undergraduate Research Opportunities Program, CU Boulder
 2021-present Undergraduate coordinator, Anseth research group
 2021 Host, Anseth research group undergraduate symposiums
 Organized and moderated a semester-long twice-weekly virtual journal club and lecture series
 2021 Mentor, Anschutz Medical Campus undergraduate mentorship program
 2021 Conference planner, national MD-PhD student conference
 Coordinated talks by Robert Langer (keynote) and Jean-luc Doumont (data viz workshop)
 Organized and moderated 'Evidence-Based Wellness' session featuring panel of scientists
 2020-present Webmaster, Anseth research group
 2019-present Planning committee, CU MSTP Annual Retreat
 Tech support and web services (mstp-retreat.co) for six day-long annual retreats
 2019-present Mentor, Bryant-Webster Dual Language School "STEM scholars" program
 Annual one-on-one mentorship program for underserved 7th-graders
 2019-2021 Project lead, CU MSTP logo redesign
 Designed and sold ~\$10K of jackets emblazoned with new CU MSTP logo
 2019 Mentor, VistaPEAK High School senior design class
 2019 Mentor, Think Like A Scientist
 After-school program for underserved 3rd-graders interested in science
 2018-present MSTP student council, 2018 class representative
 2018-2020 1st trumpet, viola, Anschutz Medical Campus Orchestra
 2018 Teacher, Bricks for Kids
 LEGO-themed after-school science education program for elementary school students
 2017 Volunteer, Denver Health Emergency Department and Adult Urgent Care
 2014-2017 Tutor, CU Boulder
 Mentored 10+ CU students in 12+ courses (engineering, mathematics, humanities)
 2013-2015 1st trumpet, 4th trumpet, CU Boulder Thompson Jazz Studies Program Big Bands
 2013 Best brass instrument performance (trumpet), Clark College Jazz Festival, Vancouver, WA
 2012-2013 1st, 3rd trumpet, Lower Columbia College Jazz Orchestra and Pep Band
 and Northwest Jazz Orchestra, Longview, WA
 2012 1st, 2nd violin, 2nd trumpet, Brevard Music Festival, Brevard, NC
 2011 2nd violin, Brevard Music Festival, Brevard, NC
 2010 1st violin, Icicle Creek Musical Festival, Leavenworth, WA

Professional Affiliations

American Association for the Advancement of Science
 American Chemical Society
 American Institute of Chemical Engineers
 American Medical Association
 Biomedical Engineering Society
 Colorado Medical Society
 Materials Research Society
 Regenerative Engineering Society
 Society for Biological Engineering
 Society for Biomaterials