C. Wyatt Shields IV

Department of Chemical and Biological Engineering
Biomedical Engineering Program | Materials Science and Engineering Program | Robotics Program
University of Colorado Cancer Center (Full Member)
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ACADEMIC APPOINTMENTS

04/2025–Present **Thomas F. Austin Endowed Assistant Professor, University of Colorado Boulder**
Department of Chemical and Biological Engineering

01/2020–03/2025 **Assistant Professor, University of Colorado Boulder**
Department of Chemical and Biological Engineering

EDUCATION AND TRAINING

2018 **Harvard University**, Cambridge, MA
Postdoctoral Fellow, Bioengineering
Advisor: Prof. Samir Mitragotri

2017 **North Carolina State University,** Raleigh, NC
Postdoctoral Associate, Chemical and Biological Engineering
Advisor: Prof. Orlin D. Velev

2016 **Duke University**, Durham, NC
Ph.D., Biomedical Engineering
Dissertation: Acoustic and magnetic isolation and analysis of cells in microfluidic platforms
Advisor: Prof. Gabriel P. López

2011 **University of Virginia**, Charlottesville, VA
B.S. with High Distinction, Biomedical Engineering
Advisors: Prof. Jeffrey J. Saucerman & Prof. William F. Walker

HONORS AND AWARDS

2025 Outstanding Junior Faculty Award, Department of Chemical and Biological Engineering
2024 Camille Dreyfus Teacher-Scholar Award
2024 Emerging Investigator, Nanoscale Journal
2024 Dean's Faculty Fellowship, University of Colorado Boulder College of Engineering
2023 Outstanding Junior Faculty Award, Department of Chemical and Biological Engineering
2023 Frontiers of Engineering Participant, National Academy of Engineering (NAE)
2022 Packard Foundation Fellowship in Science and Engineering
2022 NIH Maximizing Investigators' Research Award (MIRA)
2022 Pew Scholar in the Biomedical Sciences
2022 Outreach Partner of the Year, Northglenn High School
2022 ONR Young Investigator Program Award
2022 NSF CAREER Award
2021 Beckman Young Investigator Award Finalist
2020 Best On-Demand Talk, Controlled Release Society

2016 Dean's Award for Excellence in Mentoring, Duke University
2015 Exceptional Student Award, ISAC (international award to 1 Ph.D. student annually)
2014 NSF Graduate Research Opportunities Worldwide Award (to study in Lund, Sweden)
2013 Exceptional Student Award**,** ISAC (international award to 1 Ph.D. student annually)
2012 NSF Graduate Research Fellowship
2011 NSF Research Triangle MRSEC Fellowship
2011 Undergraduate Research & Design Symposium Finalist
2011 The Raven Society, UVA
2010 Tau Beta Pi Engineering Honor Society

PUBLICATIONS

From the University of Colorado Boulder *(†corresponding author)*

69. Lee, JG; Jeon, SJ; Duarte, AR; Ticknor, M; Minnis, MB; Hayward, RC;† Shields IV, CW.† "Shape-morphing active particles with invertible effective polarizability for configurable locomotion and steering" ***Nature Communications*** 2026 (in press).
68. Kreienbrink, KM; Shields IV, CW.† "Translating active particles: Challenges and opportunities in fabrication and adoption" ***ACS Materials Letters*** 2025 (in press).
67. Raj, RR; Day, NB; Loomis, NE; Cutting, E; Gupta, A; Shields IV, CW.† "Transport of adoptive cell transfers with magnetic helical microrobots" ***Small*** 2025. 21(*42*): e05946.
66. Kwan, MMC; Day, NB; Konigsberg, IR; Thoresen, E; Busch, CE; Harrell, AG; Davidson, E; Yang, IV; Shields IV, CW.† "Particle shape modulates the function of adoptive macrophage transfers" ***Advanced Healthcare Materials*** 2025. 14(*31*): e01348.
65. Day, NB; Orear, CR; Hunter, AN; Kwan, MMC; Hamadani, CM; d'Auvergne, A; Guo, J; Tanner, EEL; Shields IV, CW.† "Ionic liquid-mediated delivery of ruxolitinib to skin using an adhesive topical hydrogel system" ***Advanced Healthcare Materials*** 2025. 14(*27*): e01838.
64. Lee, JG; Petraccione, J; Trese, KA; Hughes, AC; Ausec, TR; Salzmann-Sullivan, M; Su, LJ; Kim, MT; Goodwin, AP; Feng, FX; Flaig, TW; Shields IV, CW.† "Soft extrudable dendritic particles with nanostructured tendrils for local adhesion and drug release to bladder cancers" ***Advanced Materials*** 2025. 37(*38*): 2505231.
63. Kreienbrink, KM; Cruse, ZA; Kumari, A; Shields IV, CW.† "Precise surface patches on active particles of arbitrary shape through microstenciling" ***Nature Communications*** 2025. 16(*1*): 6062.
62. Kemper, CC; Kreienbrink, KM; Tomazin, H; Hawkins, KE; Schwartz, DK; Shields IV, CW.† "Rapid discovery of sequence-encoded magnetically reconfigurable microrobots using Monte Carlo simulations" ***Advanced Intelligent Systems*** 2025. 7(*11*): 2500222.
61. Ju, X; Chen, C; Oral, CM;… Shields IV, CW… Pané, S; Zhang, Li; Shahsavan, H; He, Q; Kim, IL; Wang, J; Pumera, M (101 authors). "Technology roadmap of micro/nanorobots" ***ACS Nano*** 2025. 19(*27*): 24174-24334.
60. Nelson, BR; Cione, JT; Kirkpatrick, BE; Kreienbrink, KM; Dhand, AP; Burdick, JA; Shields IV, CW; Anseth, KS; Bowman, CN. "Multifunctional dithiolane monomers for multi-scale recyclable light-driven additive manufacturing" ***Polymer Chemistry*** 2025. 16(*18*): 2108-2116.
59. Duarte, AR;* Thome, CP;* Hoertdoerfer, WS; Praetzel, CR; Pellicciotti, A; Gupta, A; Bevan, MA; Shields IV, CW.† "Dielectrophoretic polarizability of surface-modified particles for studying induced-charge electroosmotic flows" ***Advanced Functional Materials*** 2025. 35(*29*): 2424557.
58. Thome, CP; Tisdale, CT; Shields IV, CW.† "Siphon-based multichannel acoustofluidic separator for rapid and multiplexed biomolecule detection" ***Device (Cell Press)*** 2025. 3(*7*): 100727.
57. Li, J; Gong, G; Zhang, Y; Zheng, Y; He, Y; Chen, M; He, X; Zheng, X; Gong, X; Liu, L; Zhou, K; Zhao, Z; Shields IV, CW; Hua, Y; Li, Y; Guo, J. "Polyphenol-nanoengineered monocyte biohybrids for targeted cardiac repair and immunomodulation" ***Advanced Healthcare Materials*** 2025. 14(*2*): 2403595.
56. Rhodes, ER;* Day, NB;* Aldrich, EC; Shields IV, CW;† Sprenger, KG.† "Elucidating the role of carrier proteins in cytokine stabilization within double emulsion-based polymeric nanoparticles" ***Bioengineering & Translational Medicine*** 2025. 1(*10*): e10722.

55. Thome, CP; Fowle, JP; McDonnell, P; Zultak, J; Jayaram, K; Neumann, AK; López, GP; Shields IV, CW.† "Acoustic pipette and biofunctional elastomeric microparticle system for rapid picomolar-level biomolecule detection in whole blood" ***Science Advances*** 2024. 10(*42*): eado9018.
54. Ausec, TR; Carr, LL; Alina, TB; Day, NB; Goodwin, AP;† Shields IV, CW.† "Combination of chemical and mechanical tumor immunomodulation using cavitating mesoporous silica nanoparticles" ***ACS Applied Nano Materials*** 2024. 7(*16*): 19109–19117.
53. Harrell, AG; Thom, SR; Shields IV, CW.† "Dissolved gases from pressure changes in the lungs elicit an immune response in human peripheral blood" ***Bioengineering & Translational Medicine*** 2024. 9(*5*): e10657.
52. Day, NB; Orear, CR; Velazquez-Albino, A; Good, HJ; Melnyk, A; Rinaldi-Ramos, C; Shields IV, CW.† "Magnetic cellular backpacks for spatial targeting, imaging, and immunotherapy" ***ACS Applied Bio Materials*** 2024. 7(*8*) 4843–4855.
51. Raj, RR; Ganguly, A; Becker, C; Shields IV, CW; Gupta, A. "Motion of an active bent-rod with an articulating hinge: Exploring mechanical and chemical modes of swimming" ***Frontiers in Physics*** 2023. 11: 1307691.
50. Lee, JG;* Thome, CP;* Cruse, ZA; Ganguly, A; Gupta, A; Shields IV, CW.† "Magnetically locked Janus particle clusters with orientation-dependent motion in AC electric fields" ***Nanoscale*** 2023. 40(*15*): 16268–16276. #Emerging Investigator Special Issue
49. Lee, JG;* Raj, RR;* Day, NB;* Shields IV, CW.† "Microrobots for biomedicine: Unsolved challenges and opportunities for translation" ***ACS Nano*** 2023. 17(*15*): 14196–14204.
48. Alina, TB; Kirkpatrick, HB; Ausec, TR; Mueller, EN; Shields IV, CW; Cha, JN; Goodwin, AP. "Effect of phospholipid structure on the acoustic cavitation of functionalized silica mesoporous nanoparticles" ***ACS Applied Nano Materials*** 2023. 6(*14*): 13720–13729.
47. Shields IV, CW.† "Biohybrid microrobots for enhancing adoptive cell transfers" ***Accounts of Materials Research*** 2023. 4(*7*): 566–569.
46. Abedini-Nassab, R; Sadeghidelouei, N; Shields IV, CW. "Magnetophoretic circuits: A review of device designs and implementation for precise single-cell manipulation" ***Analytica Chimica Acta*** 2023. 1272: 341425.
45. Lee, JG; Raj, RR; Thome, CP; Day, NB; Martinez, P; Bottenus, N; Gupta, A; Shields IV, CW.† "Bubble-based microrobots with rapid circular motions for epithelial pinning and drug delivery" ***Small*** 2023. 19(*32*): 2300409.
44. Liao, X; Gong, G; Dai, M; Xiang, Z; Pan, J; Shang, J; Blocki, AM; Zhao, Z; Shields IV, CW; Guo, J. "Systemic tumor suppression via macrophage-driven automated homing of metal-phenolic-gated nanosponges for metastatic melanoma" ***Advanced Science*** 2023. 10(*18*): 2207488.
43. Thome, CP; Hoertdoerfer, WS; Bendorf, J; Lee, JG; Shields IV, CW.† "Electrokinetic active particles for motion-based biomolecule detection" ***Nano Letters*** 2023. 23(*6*): 2379–2387.
42. Raj, RR; Shields IV, CW; Gupta, A. "Two-dimensional diffusiophoretic colloidal banding: Optimizing the spatial and temporal design of solute sinks and sources" ***Soft Matter*** 2023. 19(*5*): 892–904.
41. Day, NB; Dalhuisen, R; Loomis, NE; Adzema, SG; Prakash, J; Shields IV, CW.† "Tissue-adhesive hydrogel for multimodal drug release to immune cells in skin" ***Acta Biomaterialia*** 2022. 150: 211–220.
40. Tanjeem, N; Minnis, MB; Hayward, RC; Shields IV, CW.† "Shape-changing particles: From materials design and mechanisms to implementation" ***Advanced Materials*** 2022. 3(*34*): 2105758.
39. Day, NB; Wixson, WC; Shields IV, CW.† "Magnetic systems for cancer immunotherapy" ***Acta Pharmaceutica Sinica B*** 2021. 11(*8*): 2172–2196.
38. Sallam, MA; Prakash, S; Kumbhojkar, N; Shields IV, CW; Mitragotri, S. "Formulation-based approaches for dermal delivery of macromolecules: Recent advances and future perspectives" ***Bioengineering & Translational Medicine*** 2021. 6(*3*): e10215.

From Previous Institutions *(†corresponding author; *co-first author)*

37. Li, L; Shields IV, CW;† Huang, J; Zhang, Y; Ohiri, KA; Yellen, BB; Chilkoti, A; López, GP. "Rapid capture of biomolecules from blood via stimuli-responsive elastomeric particles for acoustofluidic separation" ***Analyst*** 2021. 145(*24*): 8087–8096.

36. Shields IV, CW;* Kim, YK;* Han, K; Murphy, AC; Scott, AJ; Abbot, NL; Velev, OD. "Control of the folding dynamics of self-reconfiguring magnetic microbots by using liquid crystallinity" ***Advanced Intelligent Systems*** 2020. 2(*2*): 1900114. **Editor's Choice
35. Han, K; Shields IV, CW; Bharti, B; Arratia, PE; Velev, OD. "Active reversible swimming of magnetically assembled "microscallops" in non-Newtonian fluids" ***Langmuir*** 2020. 36(*25*): 7148–7154.
34. Sallam, MA; Shields IV, CW; Prakash, S; Kim, J; Pan, DC; Mitragotri, S. "A dual macrophage polarizer conjugate for synergistic melanoma therapy" ***Journal of Controlled Release*** 2021. 335: 333–344.
33. Zhao, Z; Pan, DC; Qi QM; Kim, J; Kapate, N; Sun, T; Shields IV, CW; Wang, LW; Wu, D; Kwon, CJ; He, W; Guo, J; Mitragotri, S. "Engineering of living cells with polyphenol-functionalized biologically active nanocomplexes" ***Advanced Materials*** 2020. 32(*49*): 2003492.
32. Shields IV, CW; Evans, MA; Wang, LLW; Baugh, N; Iyer, S; Wu, D; Zhao, Z; Pusuluri, A; Ukidve, A; Pan, D; Mitragotri, S. "Cellular backpacks for macrophage immunotherapy" ***Science Advances*** 2020. 6(*18*): eaaz6579.
31. Shields IV, CW;† Wang, LW; Evans, MA; Mitragotri, S. "Materials for immunotherapy" ***Advanced Materials*** 2020. 32(*13*): 1901633.
30. Wu, D; Pusuluri, A; Vogus, D; Krishnan, V; Shields IV, CW; Kim, J; Razmi, A; Mitragotri. "Design principles of drug combinations for chemotherapy" ***Journal of Controlled Release*** 2020. 323: 36–46.
29. Evans, MA; Shields IV, CW; Krishnan, V; Wang, LW; Zhao, Z; Ukidve, A; Lewandowski, M; Gao, Y; Mitragotri, S. "Macrophage-mediated delivery of hypoxia-activated prodrug nanoparticles" ***Advanced Therapeutics*** 2020. 3(*2*): 1900162.
28. Timmermann, M; Lukat, N; Schneider, LP; Shields IV, CW; López, GP; Selhuber-Unkel, C. "Migration of microparticle-containing amoebae through constricted environments" ***ACS Biomaterials Science & Engineering*** 2020. 6(*2*): 889–897.
27. He, W; Kapate, N; Shields IV, CW; Mitragotri, S. "Drug delivery to macrophages: A review of targeting drugs and drug carriers to macrophages for inflammatory diseases" ***Advanced Drug Delivery Reviews*** 2020. 165-166: 15–40.
26. Pusuluri, A; Krishnan, V; Wu, D; Shields IV, CW; Wang, LW; Mitragotri, S. "Role of synergy and immunostimulation in design of chemotherapy combinations: An analysis of doxorubicin and camptothecin" ***Bioengineering & Translational Medicine*** 2019. 4(*2*): e10129.
25. Ohiri, U; Han, K; Shields IV, CW; Velev, OD; Jokerst, N. "Propulsion and assembly of remotely powered p-type silicon microparticles" ***APL Materials*** 2018. 6(*12*): 121102.
24. Shields IV, CW; Han, K; Ma, F; Miloh, T; Yossifon, G; Velev, OD. "Supercolloidal spinners: Complex active particles for electrically powered and switchable rotation" ***Advanced Functional Materials*** 2018. 28(*35*): 1803465.
23. Ohiri, U; Shields IV, CW; Han, K; Tyler, T; Velev, OD; Jokerst, N. "Reconfigurable engineered motile semiconductor microparticles" ***Nature Communications*** 2018. 9(*1*): 1791.
22. Reyes, C; Fu, L; Suthanthiraraj, PPA; Owens, CE; Shields IV, CW; López, GP; Charbonneau, P; Wiley, B. "The limits of primary radiation force in bulk acoustic standing waves for concentrating nanoparticles" ***Particle & Particle Systems Characterization*** 2018. 35(*7*): 1700470.
21. Shields IV, CW;† White, JP; Osta, EG; Patel, J; Rajkumar, S; Kirby, N; Therrien, JP; Zauscher, S. "Encapsulation and controlled release of retinol from silicone particles for topical delivery" ***Journal of Controlled Release*** 2018. 278: 37–48.
20. Han, K; Shields IV, CW; Velev, OD. "Engineering of self-propelling microbots and microdevices powered by magnetic and electric fields" ***Advanced Functional Materials*** 2018. 28(*25*): 1705953.
19. Shields IV, CW; Velev, OD. "The evolution of active particles: Towards externally powered self-propelling and self-reconfiguring particle systems" ***Chem*** 2017. 3(*4*): 539–559.
18. Han, K; Shields IV, CW; Diwakar, NM; Bharti, B; López, GP; Velev, OD. "Sequence-encoded colloidal origami and microbot assemblies from patchy magnetic cubes" ***Science Advances*** 2017. 3(*8*). e1701108.
17. Fu, L; Bian, C; Shields IV, CW; Cruz, D; López, GP; Charbonneau, P. "Assembly of hard spheres in a cylinder: a computational and experimental study" ***Soft Matter*** 2017. 13(*18*): 3296–3306.
16. Shields IV, CW; Ohiri, KA; Szott, LM; López, GP. "Translating microfluidics: Cell separation technologies and their barriers to commercialization" ***Cytometry Part B*** 2017. 92(*2*): 115–125.

15. Ohiri, KA; Evans, BA; Shields IV, CW; Gutiérrez, RA; Carroll, NJ; Yellen, BB; López, GP. "Magnetically responsive negative acoustic contrast microparticles for bioanalytical applications" ***ACS Applied Materials and Interfaces*** 2016. 8(*23*): 25030–25035.
14. Shields IV, CW; Wang, JL; Ohiri, KA; Essoyan, ED; Yellen, BB; Armstrong, AJ; López, GP. "Magnetic separation of acoustically focused cancer cells from blood for magnetographic templating and analysis" ***Lab on a Chip*** 2016. 16(*19*): 3833–3844.
13. Johnson, KA; Vormohr, HR; Doinikov, AA; Bouakaz, A; Shields IV, CW; López, GP; Dayton, PA. "Experimental verification of theoretical equations for acoustic radiation force on compressible spherical particles in traveling waves" ***Physical Review E*** 2016. 93*(5)*: 053109.
12. Shields IV, CW; Cruz, DF; Ohiri, KA; Yellen, BB; López, GP. "Fabrication and operation of acoustofluidic devices supporting bulk acoustic standing waves for sheathless focusing of particles" ***Journal of Visualized Experiments*** 2016. *(109)*: e53861.
11. Wang, PY;* Shields IV, CW;* Zhao, T; Jami, H; López, GP; Kingshott, P. "Rapid self-assembly of shaped microtiles into large, close-packed crystalline monolayers on a solid surface" ***Small*** 2016. 12*(2)*: 1309–1314.
10. Owens, CE; Shields IV, CW; Cruz, DF; Charbonneau, P; López, GP. "Highly parallel acoustic assembly of microparticles into well-ordered colloidal crystallites" ***Soft Matter*** 2016. 12*(3)*: 717–728.
9. Shields IV, CW; Reyes, C.; López, GP. "Microfluidic cell sorting: A review of the advances in the separation of cells from debulking to rare cell isolation" ***Lab on a Chip*** 2015. 15*(5)*: 1230–1249.
8. Gao, L; Shields IV, CW; Johnson, LM; Graves, SW; Yellen, BB; López, GP. "Two-dimensional spatial manipulation of microparticles in continuous flows in acoustofluidic systems" ***Biomicrofluidics*** 2015. 9*(1)*: 014105.
7. Shields IV, CW; Livingston, CE; Yellen, BB; López, GP; Murdoch, DM. "Magnetographic array for the capture and enumeration of single cells and cell pairs" ***Biomicrofluidics*** 2014. 8*(4)*: 041101.
6. Shields IV, CW; Sun, D; Johnson, K; Duval, K; Rodriguez, AV; Gao, L; Dayton, PA; López, GP. "Nucleation and growth synthesis of functional, monodisperse and acoustically programmable particles" ***Angewandte Chemie International Edition*** 2014. 53*(31)*: 8070–8073.
5. Shields IV, CW; Johnson, LM; Gao, L; López, GP. "Elastomeric negative acoustic contrast particles for capture, acoustophoretic transport, and confinement of cells in microfluidic systems" ***Langmuir*** 2014. 30*(14)*: 3923–3927.
4. Yang, JH; Polanowska-Grabowska, RK; Smith, JS; Shields IV, CW; Saucerman, JJ. "PKA catalytic subunit compartmentation regulates contractile and hypertropic responses to β-adrenergic signaling" ***Journal of Molecular and Cellular Cardiology*** 2014. 66: 83–93.
3. Liu, J; Shields IV, CW; Omofoye, O; López, GP. "Programmable anisotropic microparticles for self-assembly applications" ***Materials Research Society Symposium Proceedings*** 2014. 1622: 1–6.
2. Shields IV, CW; Zhu, S; Yang, Y; Bharti, B; Liu, J; Yellen, BB; Velev, OD; López, GP. "Field-directed assembly of patchy anisotropic microparticles with defined shape" ***Soft Matter*** 2013. 9*(38)*: 9219–9229.
1. Johnson, LM; Gao, L; Shields IV, CW; Smith, M; Efimenko, K; Cushing, K; Genzer, J; López, GP. "Elastomeric microparticles for acoustic mediated bioseparations" ***Journal of Nanobiotechnology*** 2013. 11*(22)*: 1–19.

BOOK CHAPTERS

1. Trese, KA; Shields IV, CW† (2026). Chapter 29: Immune cell backpacks. Editors: D'Souza, A; Milane, L; Amiji, M. *Harnessing Endogenous Mechanisms for Targeted Drug Delivery* (pp. 797–812). Elsevier.

INTELLECTUAL PROPERTY

Issued Patents

12. Mitragotri, S; Evans, MA; Shields IV, CW. "Compositions and methods relating to macrophages and/or monocytes with adhered particles" U.S. Patent 12,414,999. Issued September 16, 2025.
11. Shields IV, CW; Kirby, N; López, GP. "Compositions, systems, and methods for the encapsulation and delivery of a substance" U.S. Patent 10,238,586. Issued March 26, 2019.
10. Johnson, LM; López, GP; Shields IV, CW; Gao, L. "Acoustically responsive particles" U.S. Patent 9,797,897. Issued October 24, 2017.

Patent or Provisional Patent Applications

9. Shields IV, CW; Lee, JG. "Biodegradable dendritic particles for sustained drug release" U.S. Patent App. No.: 19/165,113 (No.: PCT/US2024/020004). Filed September 13, 2025.
8. Shields IV, CW; Thome, CP. "Methods and compositions for functionalizing the surface of silicone particles" U.S. Patent App. No.: 19/162,389 (No.: PCT/US2024/018685). Filed September 5, 2025.
7. Bryant, SJ; Shields IV, CW; Santangelo, K; Afzali, M; Gangrade, A. "Particles for systemic and targeted delivery to joints for the treatment of inflammation and osteoarthritis". U.S. Provisional Patent App. No.: 63/863,407. Filed August 13, 2025.
6. Shields IV, CW; Trese, KA. "Programmable photocurable poly(beta-amino ester) particles for drug delivery and methods of use thereof" International Patent App.: PCT/US2025/041819. Filed August 13, 2025.
5. Shields IV, CW; de Melo Santana, B. "Biodegradable magnetic microrobots for gene and drug delivery". U.S. Provisional Patent App. No.: 63/845,247. Filed July 16, 2025.
4. Bailey, CA; Bitler, BG; Shields IV, CW. "Macrophage-mediated diagnostics and treatment for gynecologic applications". U.S. Provisional Patent App. No.: 63/843,519. Filed July 14, 2025.
3. Shields IV, CW; Thome, CP. "High-throughput gravity-based multichannel separation assembly" U.S. Provisional Patent App. No.: 63/664,140. Filed June 25, 2025.
2. Shields IV, CW. "Acoustic enrichment of adoptive cell transfers" U.S. Patent App. No.: 18/842,951 (No.: PCT/US23/014061). Filed June 5, 2025.
1. Shields IV, CW; Thome, CP. "Electrokinetic active particles for multimodal biosensing" U.S. Patent App. No.: 19/128,525 (No.: PCT/US23/079237). Filed May 8, 2025.

PODIUM PRESENTATIONS

Plenary Talks

1. Plenary Talk: Front Range Advanced Magnetics Symposium (FRAMS) Annual Meeting (Boulder, CO). July 2025. "Medical microrobots for drug and cell delivery".

Department Seminars

21. University of Colorado Anschutz Medical Campus. Department of Pharmacology. November 2025. Host: Prof. Jim Costello.
20. Ohio State University. William G. Lowrie Department of Chemical and Biomolecular Engineering. October 2025. Host: Prof. Blaise Kimmel.
19. University of Virginia. Department of Chemical Engineering. October 2025. Host: Prof. Steven Caliari.
18. University of Michigan. Department of Materials Science and Engineering. September 2025. Hosts: Profs. Abdon Pena-Francesch and Albert Liu.
17. University of Mississippi (Ole Miss). Department of Biomedical Engineering. April 2025. Hosts: Prof. Thomas Werfel and Kenneth Hulugalla.
16. Indiana University Bloomington. Materials Seminar hosted by the Department of Chemistry. March 2025. Host: Prof. Yan Yu.
15. University of Denver. Department of Chemistry. March 2025. Host: Prof. Brady Worrell.
14. University of Florida. Department of Chemical Engineering. February 2025. Host: Prof. Whitney Stoppel.
13. University of Southern California. USC Alfred E. Mann Department of Biomedical Engineering. January 2025. Host: Prof. Eun Ji Chung.
12. University of Oregon. Phil and Penny Knight Campus. Department of Bioengineering. December 2024. Host: Prof. Gabby Lindberg.
11. University of North Carolina / NC State University. Joint Department of Biomedical Engineering. November 2024. Host: Prof. Alon Greenbaum.
10. Rice University. Department of Chemical and Biomolecular Engineering. April 2024. Host: Prof. Sibani Lisa Biswal.
9. University of Colorado Denver. Department of Bioengineering. January 2024. Host: Prof. Keith Neeves.
8. University of Colorado Anschutz Medical Campus. Skaggs School of Pharmacy and Pharmaceutical Sciences. November 2023. Host: Prof. Dmitri Simberg.
7. University of Colorado Boulder. Biological Engineering Program. November 2022. Host: Prof. Alaa Ahmed.

6. University of New Mexico. Department of Pathology. November 2021. Host: Prof. Aaron Neumann.
5. University of Colorado Anschutz Medical Campus. Comprehensive Cancer Center (UCCC) Symposium. November 2021. Host: Prof. Eduardo Davila.
4. University of Texas at San Antonio. Department of Biomedical and Chemical Engineering. October 2021. Host: Prof. Marissa Wechsler.
3. Louisiana State University. Cain Department of Chemical Engineering. April 2021. Host: Prof. Bhuvnesh Bharti.
2. University of Colorado Boulder. Department of Chemical and Biological Engineering. February 2018. Host: Prof. Andrew Goodwin.
1. Colorado School of Mines. Department of Chemical and Biological Engineering. February 2018. Host. Prof. David Marr.

Invited Conference Talks

21. American Physical Society (APS), March Meeting (Denver, CO). March 2026. "The Electr(okinet)ic Slide: Bioinspired Fabrication for Steering Particles in AC Electric Fields by Shape-Morphing and Precise Metal Patches".
20. Colorado Shared Instrumentation in Nanofabrication and Characterization (COSINC) User Symposium (Boulder, CO). November 2025. "Microscale robotic systems for transport and therapy".
19. American Chemical Society (ACS), Fall National Meeting (Washington DC). August 2025. "Acoustically powered microrobots for transport in biomedicine".
18. American Institute of Chemical Engineers (AIChE) Annual Meeting (San Diego, CA). October 2024. "Macrophage-mediated delivery of active and responsive particles to tumors".
17. International Nanomedicine and Drug Delivery Symposium (22nd Annual NanoDDS2024; Orlando, FL). September 2024. "Macrophage-mediated delivery of active and responsive particles to tumors".
16. SFB Regional Meeting (Denver, CO). September 2024. "Biofunctionalization of silicone microparticles for picomolar-level acoustic biosensing".
15. Materials Science and Engineering Program Symposium at CU Boulder. August 2024. "Medical microrobots for drug and cell delivery".
14. ARPA-H NITRO-mBMAT Kickoff Event (Boulder, CO). June 2024. "Cellular backpacks for nanoparticle delivery to solid tumors".
13. Office of Naval Research (ONR) Undersea Medicine Program Review (Groton, CT). April 2024. "Mapping immune cell responses to dissolved gases from elevated pressures in decompression sickness".
12. Pew Biomedical Scholars Meeting (Tucson, AZ). March 2024. "Magnetically assembled microrobots for dexterous reconfiguration in biomedicine".
11. American Chemical Society (ACS), Spring 2024 Meeting (New Orleans, LA). March 2024. "Magnetic microrobots for macrophage transport, activation, and imaging".
10. Packard Fellows 35th Annual Reunion (Colorado Springs, CO). September 2023. "Magnetically assembled microrobots for dexterous reconfiguration".
9. System Chemistry Symposium (virtual). July 2023. "Active particles for biosensing and drug delivery".
8. Gordon Research Conference (GRC) on Colloidal, Macromolecular and Polyelectrolyte Solutions (Ventura, CA). November 2022. "Electrokinetic active particles for molecular biorecognition".
7. Biomedical Engineering Society (BMES), Annual Meeting (San Antonio, TX). October 2022. "Bubble-based acoustic propellers for sustained corticosteroid delivery in the bladder".
6. Acoustical Society of America (ASA), 182nd Meeting (Denver, CO). May 2022. "Bubble-based propulsion of engineered particles for drug delivery and immunotherapy".
5. Macrophage-Directed Therapies Summit, 2nd Annual Meeting (virtual). October 2020. "Backpacks: Disc-shaped particles to guide and sustain macrophage phenotypes for anti-tumor therapies".
4. Biophysics Supergroup Meeting (virtual). September 2020. "Macrophages under pressure and an overview of research projects in the Shields Lab".
3. American Chemical Society (ACS), 256th National Meeting (Boston, MA). August 2018. "Elastomeric particles for cell and biomarker isolation in acoustofluidic devices".
2. American Physical Society (APS), March Meeting (New Orleans, LA). March 2017. "Sonocrystallization: Application of radiation forces from acoustic standing waves for configurable assembly".

1. IBM Thomas J. Watson Research Center (White Plains, NY). November 2015. "Microfluidic cell sorting: Acoustic and magnetic methods for cell separation and analysis".

Contributed Talks

30. Hierarchically nano-branched particles for sustained adhesion and drug release to bladder tumors. AIChE Annual Meeting (San Diego, CA). October 2024.
29. Multichannel acoustic separator for high-throughput multiplexed biomolecule detection on soft biofunctional particles. AIChE Annual Meeting (San Diego, CA). October 2024.
28. Acoustically powered microrobots for sustained drug delivery by epithelial pinning. ACS Fall National Meeting (San Francisco, CA). August 2023.
27. Picomolar-level biosensing in an acoustic pipette via biospecific silicone microparticles. ACS Fall National Meeting (San Francisco, CA). August 2023.
26. Biospecific silicone microparticles for picomolar-level detections in a pipette. ACS Colloids (Raleigh, NC). June 2023.
25. Backpacks for guiding macrophage phenotypes in cancer immunotherapy. BMES Annual Meeting (virtual). October 2020.
24. Backpacks on macrophages: A general approach to regulate phenotypes of adoptive cell transfers. Controlled Release Society (CRS) Annual Meeting (virtual). June 2020.
23. Controlling cellular phenotypes via cytokine-releasing backpacks for cancer immunotherapy. AIChE Annual Meeting (Orlando, FL). November 2019.
22. Colloidal micromachines regulated by liquid crystals. APS March Meeting (Boston, MA). March 2019.
21. Encapsulation, protection and programmed release of retinol from silicone particles for topical applications. 256th ACS National Meeting (Boston, MA). August 2018.
20. Moving past simple shapes: Engineered active particle spinners and motors powered by AC electric fields. 2017 AIChE Annual Meeting (Minneapolis, MN). October 2017.
19. Rational design of active particles for programmed spinning and precession by AC electric fields. 2017 MRS International Materials Research Congress (Cancun, Mexico). August 2017.
18. A self-assembled microviscometer: Reconfigurable microdevices from patchy microcubes for investigating liquid crystals. 2017 MRS International Materials Research Congress (Cancun, Mexico). August 2017.
17. Encapsulation and controlled release of active ingredients from monodisperse, silicone particles. 2016 MRS Fall Meeting & Exhibit iMatSci (Boston, MA). November 2016.
16. Acoustic and magnetic methods for the isolation and analysis of biomarkers in microfluidic platforms. Acoustofluidics (Tech. Univ. of Denmark, Copenhagen). September 2016.
15. Promise of elastomeric particles: Bio- sequestration, separation and delivery. 90th Colloid & Surface Science Symposium (Harvard Univ., Boston, MA). June 2016.
14. Configurable assembly of microparticles via acoustic standing waves. 90th Colloid & Surface Science Symposium (Harvard Univ., Boston, MA). June 2016.
13. Acoustic radiation forces for the rapid and programmable assembly of microparticles and nanoparticles. 251st ACS National Meeting (San Diego, CA). March 2016.
12. Peptide-conjugated elastomeric particles for acoustic isolation of biomarkers from whole blood. 251st ACS National Meeting (San Diego, CA). March 2016.
11. Magnetic separation of acoustically focused cancer cells from blood for magnetographic templating and cellular analysis. 251st ACS National Meeting (San Diego, CA). March 2016.
10. Acoustic and magnetic methods for cell sorting and single cell analysis in a microfluidic device. 30th CYTO Meeting (Glasgow, Scotland). June 2015.
9. Functional, monodisperse and acoustically programmable silicone gel particles for bioanalytical acousto-fluidics. 88th Colloid & Surface Science Symposium (Univ. of Pennsylvania, Philadelphia, PA). June 2014.
8. Acoustically programmable, elastomeric particles. 2014 MRS Fall Meeting & Exhibit iMatSci (Boston, MA). November 2014.
7. Directed assembly of microactuators: Field-controlled folding and bending of chains of patchy microcubes. 88th Colloid & Surface Science Symposium (Univ. of Pennsylvania, Philadelphia, PA). June 2014.
6. Microfluidic systems for acoustic cell sorting. Prostate Cancer Research Forum at Duke Hospital (Durham, NC). May 2014.

5. Elastomeric particles for acoustophoretic bioseparations. Duke University Pratt Frontiers in Technology Translation (Durham, NC). May 2014.
4. Programmable microparticles synthesized from nucleation and growth for on-chip biosensing. 2nd IZON Science Symposium (Boston Univ., Boson, MA). October 2013.
3. Anisotropic-shaped microparticles for self-assembly applications. 5th Self-Assembled Soft Matter Nano-Structures at Interfaces Meeting (New Bern, NC). September 2013.
2. Acoustofluidic cell sorting via negative acoustic contrast capture colloids. 28th CYTO Meeting (San Diego, CA). May 2013.
1. Controlling cell decisions by manipulating subcellular signaling. Undergraduate Research and Design Symposium (U. of Virginia, Charlottesville). May 2011.

PERSONNEL SUPERVISED

Postdocs and Research Associates

3.	Xingrui Zhu, PhD	Chemical and Biological Engineering	Postdoc	04/2025 – Present
2.	Ankit Gangrade, PhD	Chemical and Biological Engineering	Research Associate	04/2024 – Present
1.	Jin Gyun Lee, PhD	Chemical and Biological Engineering	Postdoc	06/2021 – 04/2025

Graduate Students

17.	Caroline Rucker	Biological Engineering	PhD	01/2026 – Present
16.	Dylan McCuskey	Physics	PhD	10/2025 – Present
15.	Yu Hsuan Yang	Biomedical Engineering	PhD	04/2025 – Present
14.	Bianca Santana	Biological Engineering	PhD	01/2025 – Present
13.	Courtney Bailey	Biomedical Engineering (co-advised: B. Bitler)	PhD	08/2023 – Present
12.	Collin Kemper	Chemical Engineering	PhD	01/2023 – Present
11.	Leslie Radosevich	Chemical Engineering	MS	01/2023 – 05/2024
10.	Matthew Kwan	Materials Science and Engineering	PhD	01/2023 – Present
9.	Alanna Duarte	Chemical Engineering	MS	01/2023 – 09/2024
8.	Abby Harrell	Chemical Engineering	PhD	01/2023 – Present
7.	Katie Trese	Biological Engineering	PhD	01/2023 – Present
6.	Kendra Kreienbrink	Materials Science and Engineering / IQ Biology	PhD	05/2022 – Present
5.	Ritu Raj	Chemical Engineering (co-advised: A. Gupta)	PhD	01/2022 – Present
4.	Taylor Ausec	Biological Engineering (co-advised: A. Goodwin)	PhD	01/2022 – Present
3.	Montana Minnis	Chemical Engineering (co-advised: R. Hayward)	MS	01/2020 – 09/2022
2.	Cooper Thome	Biological Engineering	PhD	01/2020 – 11/2024
1.	Nicole Day	Biological Engineering	PhD	01/2020 – 10/2024

Visiting Scholars

2.	Stephanie Pater	Biomedical Engineering, University of Twente	MS	09/2023 – 02/2024
1.	Rianne Dalhuisen	Biomedical Engineering, University of Twente	MS	09/2021 – 02/2022

Undergraduate Students (40)

Ryan Seaberg (01/2026 – Present, BME), Kloe Taylor (01/2026 – Present, ChBE), Wesley Cheung (08/2025 – Present, ChBE), Beatrice Finch (08/2025 – Present, Chemistry), Lana Ulianova (08/2025 – Present, BME), Nghi Tran (08/2025 – Present, BME), Jessica Connell (08/2025 – Present, ChBE), Carlo Costigliola (06/2025 – 08/2025, JHU ChBE), Matthew Stelzner (05/2025 – Present, BME), Caitlin O'Neill (05/2025 – Present, ChBE), Joshua Smith (05/2025 – Present, BME), Cara Colwell (01/2025 – Present), Quinlyn Bray (01/2025 – 05/2025, ChBE), Samuel Law (06/2024 – 08/2024, Purdue ChE), Alisha Kumari (05/2024 – Present, BME), Vivian Nguyen (05/2024 – Present, BME), Creighton Tisdale (01/2024 – 12/2024, BME), Zoe Cruise (08/2023 – 05/2024, ChBE), Gavin Channell (08/2023 – 05/2025, BME), Celeste Busch (08/2023 – 05/2024, BME), Caroline Praetzel (05/2023 – 12/2023, Engineering Physics), Hayden Tomazin (05/2023 – 05/2025, BME), Luke Stinemetze (05/2023 – 05/2024, ChBE), Evan Thoresen (05/2023 – 05/2025, ChBE), Hunter Wiese (05/2023 – 08/2023, ChBE), Liz Cutting (09/2022 – 05/2025, ChBE), Kaleb Hawkins (09/2022 – 05/2024, ChBE), Matthew Kim (09/2022 – 05/2023, ChBE), Jackson Carter (05/2022 – 05/2025, ChBE), Alexandra Dalton (05/2022 – 08/2022, ChBE), Wren Hoertdoerfer (05/2022 – 05/2024, ChBE), Lisa Carr (01/2022 –

05/2023, ChBE), Nichole Loomis (08/2021 – 05/2024, ChBE), Sarah Adzema (05/2021 – 05/2023, ChBE), Chris Orear (05/2021 – 05/2024, BME), John Fowle (05/2021 – 05/2022, ChBE), Caitlin Soon (05/2021 – 12/2021, ChBE), Julia Bendorf (08/2020 – 05/2022, ChBE), Alex Evenchik (05/2020 – 08/2020, MIT MSE), William Wixson (01/2020 – 05/2021, ChBE)

High School Students (1)
Ishika Ganny (Fairview High School, 06/2022 – 08/2022)

FUNDING

Active Grants ($7.4M total costs raised since January 2020, excludes startup)
Extramural

19. ONR Standard Grant
    Award in Progress (Role: PI) 01/15/2026 – 01/14/2029
    Discovery and Disruption of Microparticle-Mediated Endothelial Activation Pathways in Human Lung Microphysiological Systems
    The goal of this project is to investigate the role of inflammatory microparticles on endothelial cell layers using human microphysiological systems.
    PI: Shields IV, CW

18. NSF CBET PMP Standard Grant
    CBET 2441639 (Role: Co-PI) 07/15/2025 – 06/14/2028
    Shape-Morphing Particles for Dynamically Reconfigurable Active Matter Systems
    The goal of this project is to develop a new class of active matter with complex collective behavior that can be modulated through shape changes of the constituent particles.
    PI: Hayward, RC

17. ONR Standard Grant
    N000142412746 (Role: Co-PI) 10/01/2024 – 09/30/2027
    HeMPI- Helium Impact on Microparticles (MPs) and Extracellular Vesicles (EVs) Release and Content
    The goal of this project is to understand the role of helium gas on diver immune physiology by studying immune responses in lung-on-a-chip devices, mice, and human divers.
    PI: Dugrenot, Emmanuel (Divers Alert Network)

16. Golfers Against Cancer Grant
    University of Colorado Cancer Center (Role: Co-PI) 10/01/2024 – 09/30/2026 NCE
    Backpack-Equipped Tumor Homing CAR T Cells: Bridging Chemotherapy to Tumors
    The goal of this project is to study the attachment of cellular backpacks containing MerTK inhibitors to modified CAR T cells to enhance treatment outcomes in sarcomas.
    PI: Verneris, Michael (CU Anschutz)

15. Camille Dreyfus Teacher-Scholar Award
    TC-24-080 (Role: PI) 07/01/2024 – 06/30/2029
    Synthetic and Living Microrobots for Directed Transport in Biomedicine
    The goal of this project is to apply new chemistries to create active particles that can propel in biological environments to transport drugs and living cells.
    PI: Shields IV, CW

14. ARPA-H NITRO
    1AY2AX000014 (Role: SI) 03/27/2024 – 02/28/2029
    A minimally invasive multimodal approach to tissue regeneration in OA
    The goal of this project is to develop novel treatments for osteoarthritis. My role as a Senior Investigator is to develop cell-adhesive biomaterials that traffic to inflamed joints and release therapeutic drugs.
    PI: Bryant, SJ

13. NIH / NIGMS MIRA Supplement
    R35GM147455 (Role: PI) 06/27/2023 – 06/30/2027

Administrative Supplement for a Real-Time In Vivo Imaging System
The goal of this project is to purchase a real-time imaging system that will enable bioluminescent imaging in live mice in real-time.
PI: Shields IV, CW

12. Packard Foundation Fellowship
#2022-74682 (Role: PI) 11/01/2022 – 10/31/2027
Magnetically Assembled Microrobots for Dexterous Reconfiguration and Transport
The goal of this project is to build microscale robots capable of dexterous folding motions and understand their behaviors in complex environments.
PI: Shields IV, CW

11. NIH / NIGMS MIRA
R35GM147455 (Role: PI) 09/01/2022 – 08/31/2027
Adoptive Macrophage Transfers for Nanoparticle Delivery
The goal of this project is to understand of the factors that govern macrophage-mediated transport of nanoparticles to inflamed tissues.
PI: Shields IV, CW

10. Pew Biomedical Scholar Award
#30081 (Role: PI) 08/01/2022 – 07/31/2026
Programmable Microscale Robotics for Precision Biomedicine
The goal of this project is to develop magnetically powered microscale robots to improve the delivery of drugs through thick mucosal barriers.
PI: Shields IV, CW

9. NSF CAREER / Biosensing Program
CBET 2143419 (Role: PI) 07/01/2022 – 06/30/2027
CAREER: Shape-Encoded Electrokinetic Particles for Multiplexed Biosensing
The goal of this project is to develop shape-encoded microparticles capable of detecting heterogenous biomarkers through induced charge electrophoresis.
PI: Shields IV, CW

8. ONR YIP / Undersea Medicine Program
N000142212541 (Role: PI) 07/01/2022 – 06/30/2026 NCE
Mapping Immune Cell Responses to High Pressures in Decompression Illness
The goal of this project is to develop a human lung-on-a-chip device to study the response of alveolar macrophages to gas compression and decompression encountered during deep sea diving.
PI: Shields IV, CW

Intramural

7. CU Boulder EEF
Engineering Excellence Fund (Role: Co-PI) 12/05/2025 – 11/30/2026
Support for Translational Undergraduate Research between CU Boulder and Anschutz
The goal of this project is to catalyze research collaboration between research labs at CU Boulder and CU Anschutz through intercampus logistical support.
PI: Shields IV, CW

6. Lab Venture Challenge
University of Colorado Boulder (Role: PI) 05/01/2023 – 02/28/2026 NCE
Acoustofluidic Purification of Immunomodulatory Complexes
The goal of this project is to investigate the commercial potential of acoustofluidic cell purification for cellular immunotherapy.
PI: Shields IV, CW

Completed Grants

5. NIH / NCI

1R21CA267608 (Role: MPI) 06/15/2022 – 05/31/2025 NCE
Macrophage-Mediated Delivery of Acoustically Propelled Nanoparticles for Sensitizing Immunologically Cold Tumors
The goal of this project is to study macrophage-mediated delivery of nanoparticles to solid tumors that elicit an immune response through ultrasound-triggered propulsion and drug release.
MPI: Goodwin, AP; Shields IV, CW

4. CU Boulder Core Facility Voucher Program
CU Boulder (Role: PI) 06/01/2021 – 05/31/2025
Engineered Microparticles for Immunomodulation and Biosensing
The goal of this project is to leverage user facilities at CU Boulder to manufacture particles for applications in biosensing and drug delivery.
PI: Shields IV, CW

3. NIH / NIAID
1R21AI154266 (Role: PI) 04/09/2021 – 03/31/2025 NCE
Acoustofluidic Pipette for Rapid Serodiagnosis of Candida Infection
The goal of this project is to develop a handheld acoustic pipette for rapid and effective isolation of fungal biomarkers for downstream quantification.
PI: Shields IV, CW

2. AB Nexus Program
University of Colorado Boulder (Role: Co-PI) 06/01/2022 – 06/30/2024 NCE
Immune Reprogramming of Myeloid Cells in Pancreatic Islets Using Engineered Particles
The goal of this project is to skew islet myeloid cells towards a phenotype that supports beta cell health and suppresses autoreactive T cells using particles that attach to myeloid cells and slowly release drugs.
PI: Friedman, RS

1. Cancer League of Colorado
#220571-AL (Role: MPI) 01/01/2022 – 06/30/2023 NCE
Assessment of Cell Types for Delivering MerTK Inhibitors to Sarcomas
The goal of this project is to study how different immune cell populations transport MerTK inhibitors to sarcomas in mice.
MPI: Lee-Sherick, AB; Shields IV, CW

TEACHING

University of Colorado Boulder

Term	Course No.	Course Title	Credits	Enrollment	Team Taught
2026 Spring	BMEN 2010 (001, 002)	Biomaterials	3.0	106	N
2025 Fall	BIEN 4838/5838 (001)	Drug Delivery	3.0	50	N
2025 Spring	CHEN 4836/5836 (001)	Nanomaterials	3.0	33	N
2024 Fall	CHEN 4838/5838 (001)	Drug Delivery	3.0	45	N
2023 Spring	BMEN 2010 (001, 002)	Biomaterials	3.0	64	Y
2022 Fall	CHEN 4836/5836 (001)	Nanomaterials	3.0	43	N
2022 Spring	BMEN 2010 (001, 002)	Biomaterials	3.0	70	Y
2020 Fall	CHEN 4836/5836 (001)	Nanomaterials	3.0	52	N
2020 Spring	CHEN 4836/5836 (001)	Nanomaterials	3.0	35	N

EXTERNAL SERVICE

Editorial Service

2023–Present Review Editor, *Frontiers in Acoustics*
2021–2023 Guest Associate Editor, *Bioengineering & Translational Medicine*

Proposal Reviewer

2025 European Research Council (ERC) Consolidator Grant Reviewer
2024–Present Alexander von Humboldt Foundation Reviewer
2024 Swiss National Science Foundation (NSF) Grant Reviewer
2024 NSF CBET Biosensing Grant Reviewer
2022 NIH Early Career Reviewer, Ad Hoc Reviewer for the NIH ZRG1 OTC1-A (80) S Study Section
2022 NSF CBET Biosensing Grant Reviewer
2022 NSF Reviewer (General)

Conferences and Symposia

2027 Co-Organizer: ACS Colloids Conference at CU Boulder in 2027
2025 Panelist: "Chats with Luminaries" at the Controlled Release Society (CRS) (Philadelphia, PA)
2025 Co-Chair: "Immuno Delivery" session at Controlled Release Society (CRS) (Philadelphia, PA)
2024–26 Vice Chair: Immunodelivery Focus Group, Controlled Release Society (CRS)
2024 Career Panelist: Navigating Starting a Career in Academia or Industry, SFB (Denver, CO)
2024 Oral and Poster Judge: SFB Western Symposium (Denver, CO)
2023 Reviewer: BMES Annual Meeting (Seattle, WA)
2023 Session Co-Organizer: "Active and Adaptive Matter" at ACS Colloids (Raleigh, NC)
2022–24 Secretary/Treasurer: Immunodelivery Focus Group, Controlled Release Society (CRS)
2022 Panelist: "Deconstructing Virtual Communications" session at BMES (San Antonio, TX)
2022 Session Co-Organizer: "Active Matter" at ACS Colloids (Golden, CO)
2021 Reviewer: BMES Annual Meeting (Orlando, FL)
2021 Chair: "Active and Responsive Colloidal Matter" session at ACS Colloids (virtual)
2020 Session Co-Organizer: "Wearable and Environmental Sensors" session at AIChE (virtual)
2020 Session Co-Organizer: "Application in Bio-Sensors" session at AIChE (virtual)
2019 Session Co-Organizer and Chair: "Sensors" poster session at AIChE (Orlando, FL)
2019 Chair: "Targeted, Responsive Drug Delivery Systems" session at BMES (Philadelphia, PA)
2019 Chair: "Self-Assembly I" session at the APS March Meeting (Boston, MA)
2018 Chair: "Engineering the Interface" session at the 256th ACS National Meeting (Boston, MA)

Journal Reviewer

Reviewed ~10 papers per year since 2016 in: *Science Robotics, Advanced Materials, Science Advances, Advanced Functional Materials, Nature Communications, ACS Nano, Advanced Science, Advanced Drug Delivery Reviews, Small, Proceedings of the National Academy of Sciences (PNAS), Advanced Healthcare Materials, Journal of Controlled Release, Nano Letters, ACS Applied Materials & Interfaces, Sensors and Actuators B: Chemical, Bioengineering & Translational Medicine, Current Opinion in Colloid & Interface Science, Journal of Materials Chemistry B, Lab on a Chip, ACS Biomaterials Science & Engineering, Analytica Chimica Acta, Drug Delivery and Translational Research, Journal of Materials Chemistry C, Colloids and Surfaces B: Biointerfaces, Biomolecules, ACS Applied Bio Materials, Colloid and Interface Science Communications, Journal of Molecular Biology, Nanomaterials, Robotics and Autonomous Systems, Molecules, Scientific Reports, Ultrasonics, Pharmaceutical Research, Sensors, Micromachines, IEEE Transactions on Electron Devices, PLOS One, Processes, The Journal of Magnetism and Magnetic Materials, Journal of Applied Physics, Particulate Science and Technology, Biointerphases, Journal of Immunology and Regenerative Medicine,* etc.