

# Nicole B. Day

Nicole.B.Day@colorado.edu • Lafayette, CO



## EDUCATION

- 2019 – Present     **Ph.D. Bioengineering**  
Thesis: Delivery of Cancer Immunotherapies Using Engineered Particle Systems  
Advisor: Dr. C. Wyatt Shields IV  
Defense scheduled October 2024  
Department of Chemical and Biological Engineering; University of Colorado Boulder; Boulder, CO
- 2015 – 2019     **Honors B.S. Bioengineering**  
Thesis: Role of P2Y<sub>12</sub> Inhibition in PAR1 Stimulated Platelet Dense Granule Release  
School of Chemical, Biological, and Environmental Engineering; Oregon State University; Corvallis, OR

## RESEARCH AND PROFESSIONAL EXPERIENCE

- Jan. 2020 – Present     **Graduate Research Assistant**, Bioengineering  
University of Colorado Boulder; Boulder, CO  
Advisor: Dr. C. Wyatt Shields IV
- Jan. 2022 – May 2022     **Teaching Assistant**, CHEN 1201: General Chemistry for Engineers  
University of Colorado Boulder; Boulder, CO  
Instructor: Dr. Ehsan Keyvani
- Aug. 2019 – Dec. 2019     **Teaching Assistant**, CHEN 4810: Biological Engineering Lab  
University of Colorado Boulder; Boulder, CO  
Instructor: Dr. Melissa Mahoney
- Nov. 2018 – Aug. 2019     **Research Assistant**, Public Health and Human Sciences  
Oregon State University; Corvallis, OR  
Advisor: Dr. Yumie Takata
- Jun. 2018 – Sept. 2018     **Bioprocess Research Intern**, Bioprocess Development  
SeaGen (now part of Pfizer); Bothell, WA  
Manager: Shane Nelson
- Jun. 2016 – Sept. 2016  
& Jun. 2017 – Sept. 2017     **Biomedical Engineering Researcher**, Department of Biomedical Engineering  
Oregon Health and Science University; Portland, OR  
Advisor: Dr. Owen McCarty

## AWARDS AND HONORS

- 2024     Best Poster Award; Front Range Engineering-Industry Symposium
- 2024     Immuno Delivery Focus Group Trainee Award; Controlled Release Society
- 2024     American Institute of Chemists Graduate Science Award; Department of Chemical and Biological Engineering, University of Colorado Boulder
- 2023     Best Poster Award; Controlled Release Society
- 2023     Acta Journal Student Award; Acta Biomaterialia
- 2022, 23     Recognition of Graduate Student Service to the Department for Improving the Departmental Community; Department of Chemical and Biological Engineering, University of Colorado Boulder
- 2021 – 23     Biophysics T32 Traineeship; National Institutes of Health
- 2022     STEM Partner of the Year; Northglenn High School

2021	Teets Family Endowed Doctoral Fellowship in Nanotechnology; College of Engineering and Applied Science, University of Colorado Boulder
2020 – 21	Soft Materials Graduate Student Assistantship in Areas of National Need; Department of Chemical and Biological Engineering, University of Colorado Boulder
2020	Graduate Research Fellowship Program (GRFP) Honorable Mention; National Science Foundation
2019	Outstanding Student Departmental Faculty Award; School of Chemical, Biological, and Environmental Engineering, Oregon State University
2015 – 19	Honor Roll; Oregon State University
2015 – 19	Finley Academic Excellence Award; Oregon State University
2016 – 17	Johnson Scholar; School of Chemical, Biological, and Environmental Engineering, Oregon State University

## PUBLICATIONS

9. Rhodes, E.R., \* **Day, N.B.**,\* Aldrich, E.C., Shields IV, C.W., Sprenger, K.G. (2024) Elucidating the role of carrier proteins in cytokine stabilization within double emulsion-based polymeric nanoparticles. *Bioengineering and Translational Medicine*. Accepted; in press. \*Co-first authors
8. Ausec, T.R., Carr, L., Alina, T.B., **Day, N.B.**, Goodwin, A.P., Shields IV, C.W. (2024) Combination chemical and mechanical tumor immunomodulation using cavitating mesoporous silica nanoparticles. *ACS Applied Nano Materials*, 7(16), 19109-19117.
7. **Day, N.B.**, Orear, C., Velazquez-Albino, A.C., Melnyk, A., Rinaldi-Ramos, C., Shields IV, C.W. (2023) Magnetic cellular backpacks for spatial targeting, imaging, and immunotherapy. *ACS Applied Bio Materials*, 7(8), 4843-4855.
6. Lee, J.G.,\* Raj, R.R.,\* **Day, N.B.**,\* Shields IV, C.W. (2023). Microrobots for biomedicine: Overlooked barriers and opportunities for translation. *ACS Nano*, 17(15), 14196–14204. \*Co-first authors
5. Lee, J.G., Raj, R.R., Thome, C.P., **Day, N.B.**, Martinez, P., Bottenus, N., Gupta, A., Shields IV, C.W. (2023). Bubble-based microrobots with asymmetric fins for sustained drug delivery. *Small*, 2300409.
4. **Day, N.B.**, Dalhuisen, R., Loomis, N.E., Adzema, S.G., Prakash, J., Shields IV, C.W. (2022). Tissue-adhesive hydrogel for multimodal drug release to immune cells in skin. *Acta Biomaterialia*, 150, 211-220.
3. **Day, N.B.**, Wixson, W.C., Shields IV, C.W. (2021). Magnetic systems for cancer immunotherapy. *Acta Pharmaceutica Sinica B*, 11(8), 2172-2196.
2. Moua, E.D., Hu, C., **Day, N.**, Hord, N. G., Takata, Y. (2020). Coffee consumption and c-reactive protein levels: A systematic review and meta-analysis. *Nutrients*, 12(5), 1349.
1. Mitrugno, A., Rigg, R. A., **Laschober, N.B.**, Ngo, A. T., Pang, J., Williams, C.D., Aslan, J.E., McCarty, O.J. (2018). Potentiation of TRAP-6-induced platelet dense granule release by blockade of P2Y12 signaling with MRS2395. *Platelets*, 29(4), 383-394.

## PUBLICATIONS IN PREPARATION

5. **Day, N.B.**, Orear, C., Hunter, A.N., Tanner, E.E.L., Shields IV, C.W. Ionic liquid-mediated delivery of ruxolitinib to skin using a transdermal hydrogel. Submission planned September 2024.
4. **Day, N.B.**, Navarro-Alvarez, N., Friedman, R., Shields IV, C.W. Enhancing therapeutic efficacy of hepatocellular carcinoma treatment through particle-mediated galectin-3 inhibition. Submission planned October 2024.

3. Kwan, M.M.C., **Day, N.B.**, Konigsberg, I.R., Thoresen, E., Busch, C.E., Harrell, A.G., Davidson, E.J., Yang, I.V., Shields IV, C.W. Particle shape modulates macrophage phenotype. Submission planned October 2024.
2. **Day, N.B.**,\* Raj, R.R.,\* Loomis, N.E., Cutting, E., Gupta, A., Shields IV, C.W. Helical particle-mediated macrophage transport and repolarization in biological systems. Submission planned November 2024. \*Co-first authors
1. Pater, S., **Day, N.B.**, Dalhuisen, R., van Bochove, J.B., Shields IV, C.W., Prakash, J. Temporal control over transdermal drug release for melanoma microenvironment immunomodulation. Submission planned December 2024.

## MENTORSHIP

### 8. Nichole Loomis, University of Colorado Boulder, Chemical Engineering Undergraduate Student

Sept. 2021 – May 2024

- Project: Investigating the interaction of macrophages and helical microparticles
- Award: Biological Sciences Initiative Scholar, September 2021  
Undergraduate Community Impact Award, March 2024
- Publication: Acta Biomaterialia, 2022
- Senior Thesis, August 2023 – May 2024

### 7. Christopher Orear, University of Colorado Boulder, Biomedical Engineering Undergraduate Student

Mar. 2021 – May 2024

- Projects: Development and characterization of superparamagnetic nanodiscs for magnetic trapping;  
Ionic liquid-mediated transdermal drug delivery for skin disease
- Awards: Biological Sciences Initiative Scholar, May 2021 & September 2021;  
Cancer Research Experience for Undergraduates, May 2022;  
Discovery Learning Apprenticeship Program, July 2023  
Undergraduate Student Research Award, March 2024  
College of Engineering Silver Medal Finalist, March 2024
- Publication: ACS Applied Bio Materials, 2023

### 6. Stephanie Pater, University of Twente, Biomedical Engineering Master's Student

Sept. 2023 – Feb. 2024

- Europe-Colorado Mobility Program Scholar
- M.S. Thesis: Temporal control over transdermal drug release for melanoma treatment

### 5. Sarah Adzema, University of Colorado Boulder, Chemical and Biological Engineering Undergraduate Student

May 2021 – May 2023

- Project: Elucidating the immunological responses of magnetic microactuators
- Awards: CU Summer Program for Undergraduate Research, May 2021;  
Undergraduate Student Research Award, March 2023
- Publication: Acta Biomaterialia, 2022
- Senior Thesis, August 2022 – May 2023

### 4. Emma Aldrich, University of Colorado Boulder, Interdisciplinary Quantitative Biology Graduate Student

Aug. 2022 – Dec. 2022

- Project: Heparin stabilization of IL-12 in PLGA nanoparticles for drug delivery

### 3. Rianne Dalhuisen, University of Twente, Biomedical Engineering Master's Student

Sept. 2021 – Feb. 2022

- Europe-Colorado Mobility Program Scholar
- M.S. Thesis: Microneedle application of hydrogel system for reduction of tumor stroma
- Award: 4<sup>th</sup> place CU Up Close Microscopy Challenge, December 2022
- Publication: Acta Biomaterialia, 2022

**2. Samuel Blackman**, University of Colorado Boulder, Chemical Engineering Graduate Student

Aug. 2020 – Dec. 2020

- Project: Optimization of polyhydroxyalkanoates for drug delivery

**1. William Wixson**, University of Colorado Boulder, Chemical Engineering Undergraduate Student

Jan. 2020 – May 2021

- Project: Shape-changing macrophage backpacks for cancer immunotherapy
- Awards: Biological Sciences Initiative Scholar, May 2020
- Publication: Acta Pharmaceutica Sinica B, 2021
- Senior Thesis, August 2020 – May 2021

## PRESENTATIONS

18. Magnetic biohybrid microrobots for macrophage transport, activation, and imaging. Society for Biomaterials Regional Symposia, *accepted oral presentation* (Denver, CO). September 2024. **Day, N.B.**, Raj, R., Orear, C., Loomis, N., C., Shields IV, C.W.
17. Ionic liquid-embedded adhesive hydrogel system for tunable transdermal drug delivery. Society for Biomaterials Regional Symposia, *accepted oral rapid fire presentation* (Denver, CO). September 2024. **Day, N.B.**, Orear, C., Hunter, A., Loomis, N., Adzema, S., Tanner, E., Shields IV, C.W.
16. Principles for enhancing the stability of cytokines in polymeric nanoparticle delivery platforms. Controlled Release Society 2024 Annual Meeting & Exposition, *oral presentation* (Bologna, Italy). July 2024. **Day, N.B.**, Rhodes, E.R., Aldrich, E.C., Sprenger, K.G., Shields IV, C.W.
15. Magnetic biohybrid microrobots for macrophage transport, activation, and imaging. Controlled Release Society 2024 Annual Meeting & Exposition, *oral presentation* (Bologna, Italy). July 2024. **Day, N.B.**, Raj, R., Orear, C., Loomis, N.E., Shields IV, C.W.
14. Polymer crosslinking regulates local, multimodal drug release to skin. 22<sup>nd</sup> Symposium on Thermophysical Properties, *oral presentation* (Boulder, CO). June 2024. **Day, N.B.**, Pater, S., Orear, C., Dalhuisen, R., Loomis, N.E., Adzema, S.G., Tanner, E., Prakash, J., Shields IV, C.W.
13. Tissue-adhesive hydrogel for multimodal drug release to immune cells in skin. The Minerals, Metals, and Materials Society Annual Meeting, *oral presentation* (Orlando, FL). March 2024. **Day, N.B.**, Dalhuisen, R., Loomis, N.E., Adzema, S.G., Prakash, J., Shields IV, C.W.
12. Magnetic nanodiscs for augmenting adoptive macrophage transfers. Controlled Release Society 2023 Annual Meeting & Exposition, *poster presentation* (Las Vegas, NV). July 2023. **Day, N.B.**, Orear, C., Velazquez-Albino, A.C., Melnyk, A., Rinaldi-Ramos, C., Shields IV, C.W.
11. Enhanced stabilization of cytokines in PLGA nanoparticles for improved delivery. Controlled Release Society 2023 Annual Meeting & Exposition, *poster presentation* (Las Vegas, NV). July 2023. **Day, N.B.**, Rhodes, E.R., Aldrich, E.C., Sprenger, K.G., Shields IV, C.W.
10. Magnetic discs for adoptive macrophage transfer. Mechanisms and Barriers in Nanomedicine Conference-Workshop, *poster presentation* (Golden, CO). May 2023. **Day, N.B.**, Orear, C., Velazquez-Albino, A.C., Melnyk, A., Rinaldi-Ramos, C., Shields IV, C.W.
9. Magnetic nanodisc-macrophage complexes for adoptive cell transfers. American Chemical Society Annual Meeting, *oral presentation* (Indianapolis, IN). March 2023. **Day, N.B.**, Orear, C., Rinaldi-Ramos, C., Shields IV, C.W.

8. Elucidating the immunological effects of magnetically reconfiguring microrobots. American Chemical Society Annual Meeting, *oral presentation* (Indianapolis, IN). March 2023. **Day, N.B.**, Adzema, S.G., Kreienbrink, K., Shields IV, C.W.
7. Tissue-adhesive hydrogel for multimodal drug release to immune cells in skin. American Chemical Society Annual Meeting, *oral presentation* (Indianapolis, IN). March 2023. **Day, N.B.**, Dalhuisen, R., Loomis, N.E., Adzema, S.G., Prakash, J., Shields IV, C.W.
6. Engineering immune cell responses using magnetic particles. West Linn-Wilsonville School District's 22nd Annual CREST-Jane Goodall Science Symposium, *invited keynote address* (Wilsonville, OR). February 2023. **Day, N.B.**, Shields IV, C.W.
5. Tissue-adhesive hydrogel for multimodal drug release to immune cells in skin. Graduate Chemical Engineering Research Symposium, *poster presentation* (Golden, CO). February 2023. **Day, N.B.**, Dalhuisen, R., Loomis, N.E., Adzema, S.G., Prakash, J., Shields IV, C.W.
4. Magnetically responsive nanodiscs for spatial control of cell-mediated immunotherapies. American Chemical Society Colloid and Surface Science Symposium, *oral presentation* (Golden, CO). July 2022. **Day, N.B.**, Orear, C., Wixson, W., Shields IV, C.W.
3. Differentially crosslinked silicone particle system for multimodal drug release to skin. American Chemical Society Colloid and Surface Science Symposium, *oral presentation* (Golden, CO). July 2022. **Day, N.B.**, Dalhuisen, R., Loomis, N.E., Adzema, S.G., Prakash, J., Shields IV, C.W.
2. Role of P2Y<sub>12</sub> inhibition in PAR1 stimulated platelet dense granule release. Oregon State University, *Honors Thesis Defense* (Corvallis, OR). May 2019. **Laschober, N.B.**
1. Role of Arp2/3 in fibrinogen binding and distribution in platelets. Biomedical Engineering Society National Meeting, *poster presentation* (Phoenix, AZ). October 2017. **Laschober, N.B.**, Mitrugno, A., Ngo, A.T., Pang, J., McCarty, O.J.

## CONTRIBUTED PRESENTATIONS

7. Transporting macrophages with magnetic helical microrobots. American Physical Society Division of Fluid Dynamics Annual Meeting, *poster presentation* (Washington, DC). November 2023. Raj, R.R., **Day, N.B.**, Loomis, N.E., Gupta, A., Shields IV, C.W.
6. Enhanced Stabilization of Cytokines for Nanoparticle Delivery Applications. American Institute of Chemical Engineers Annual Meeting, *oral presentation* (Orlando, FL). November 2023. Rhodes, E.R., **Day, N.B.**, Aldrich, E.C., Shields IV, C.W., Sprenger, K.G.
5. Bubble-based microrobots for epithelial pinning and drug delivery in the bladder. Controlled Release Society Annual Meeting and Expo, *poster presentation* (Las Vegas, NV). July 2023. Lee, J. G., Raj, R.R., Thome, C.P., **Day, N.B.**, Martinez, P., Bottenus, N., Gupta, A., Shields IV, C.W.
4. Helical microrobot-mediated transport of immune cells in rotating magnetic fields. American Chemical Society Colloid and Surface Science Symposium, *poster presentation* (Raleigh, NC). June 2023. Raj, R.R., **Day, N.B.**, Cutting, E., Loomis, N.E., Gupta, A., Shields IV, C.W.
3. Bubble-based microrobots for epithelial pinning and drug delivery in the bladder. American Chemical Society Colloid and Surface Science Symposium, *oral presentation* (Raleigh, NC). June 2023. Lee, J.G., Raj, R.R., Thome, C.P., **Day, N.B.**, Martinez, P., Bottenus, N., Gupta, A., Shields IV, C.W.
2. Magnetic trapping of nanodisc-macrophage complexes. American Chemical Society Colloid and Surface Science Symposium, *poster presentation* (Golden, CO). July 2022. Orear, C., **Day, N.B.**, Shields IV, C.W.

1. Kill Them with “Kine”Ness: Using MD Simulations to Guide the Design of Cytokine Drug Delivery Platforms for Cancer Therapy. American Institute of Chemical Engineers Annual Meeting, *poster presentation* (Phoenix, AZ). November 2022. Rhodes, E.R., **Day, N.B.**, Shields IV, C.W., Sprenger, K.G.

## **LEADERSHIP AND COMMUNITY SERVICE**

2021 – 23	Northglenn High School STEM Routes Senior Capstone Mentor
2021 – 23	Department of Chemical and Biological Engineering Graduate Recruiting Chair
2020 – 21, 23	CU Science Discovery K-12 STEM outreach
2019 – 20	McNair Scholar Program Graduate Mentor
2017 – 19	Society of Women Engineers (SWE) Officer and National Member
2015 – 16	Oregon State University K-12 STEM outreach