Laurel E. Hind

University of Colorado-Boulder
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RESEARCH OBJECTIVES

My research interests lie in understanding how the tissue microenvironment alters immune cell function. I am specifically interested in how diverse pathogens, the cells of the vasculature, tissue resident cells, and the physical properties of the infectious microenvironment modulate the functions of leukocytes during an infection. I am also interested in studying the functions of new and diverse immune cell populations during infection. By combining engineered devices and cutting-edge biological techniques, I aim to model the infectious microenvironment and investigate the signals that drive immune cell function.

APPOINTMENTS

01/20 – present **ASSISTANT PROFESSOR**
UNIVERISTY OF COLORADO-BOULDER
DEPARTMENT OF CHEMICAL AND BIOLOGICAL ENGINEERING

EDUCATION

UNIVERSITY OF PENNSYLVANIA
Doctor of Philosophy, Bioengineering, March 2015
Advisor: Professor Daniel A. Hammer

UNIVERSITY OF WISCONSIN-MADISON
Bachelor of Science, Chemical and Biological Engineering, August 2009
Advisor: Professor Sean Palecek

PROFESSIONAL EXPERIENCE

04/15 – 12/19 **POSTDOCTORAL RESEARCH FELLOW,** Supervised by Anna Huttenlocher
UNIVERSITY OF WISCONSIN-MADISON
DEPARTMENT OF MEDICAL MICROBIOLOGY AND IMMUNOLOGY

09/09 – 04/15 **GRADUATE STUDENT RESEARCHER,** Supervised by Daniel A. Hammer
UNIVERSITY OF PENNSYLVANIA
DEPARTMENT OF BIOENGINEERING

05/06 – 05/09 **MERCK UNDERGRADUATE RESEARCH SCHOLAR,** Supervised by Sean Palecek
UNIVERSITY OF WISCONSIN-MADISON
DEPARTMENT OF CHEMICAL AND BIOLOGICAL ENGINEERING

05/06-08/06 **INSTITUTES FOR DISCOVERY,** Supervised by James Thomson
UNIVERSITY OF WISCONSIN-MADISON

05/05-08/05 **ENGINEERING PHYSICS DEPARTMENT,** Supervised by Michael Litzgow
UNIVERSITY OF WISCONSIN-MADISON

HONORS AND AWARDS

2020 – 2023	Norviel Award
2019	AIChE Women's Initiatives Committee (WIC) Travel Award
2015 – 2017	T32 Training Grant in Hematology
2010 – 2013	National Science Foundation Graduate Research Fellowship
2007	Merck Corporation Scholar for Undergraduate Research
2007	Kimberly Clark Corporation Award for Undergraduate Research

PUBLICATIONS

17. Klemm LC, Denu RA, **Hind LE**, Rocha-Gregg BL, Burkard ME, Huttenlocher A. "Centriole and Golgi microtubule nucleation are dispensable for the migration of human neutrophil-like cells." Molecular Biology of the Cell, 2021 Aug 15;32(17):1545-1556.
16. Richardson IM, Calo CJ, **Hind LE**. "Microphysiological Systems for Studying Cellular Crosstalk During the Neutrophil Response to Infection," Frontiers in Immunology, 2021 Apr 27;12:661537.
15. Yu J, Piazza A, Sparks S, **Hind LE**, Niles DJ, Ingram PN, Huang W, Ricke WA, Jarrard DF, Huttenlocher A, Beebe DJ. "A reconfigurable microscale assay enables insights into cancer-associated fibroblast modulation of immune cell recruitment," Integrative Biology, 2021 Apr 20;13(4):87-97.
14. **Hind LE**, Giese MA, Schoen TJ, Keller NP, Beebe DJ, Huttenlocher A. "Immune Cell Paracrine Signaling Drives the Neutrophil Response to A. fumigatus in an Infection-on-a-Chip Model," Cellular and Molecular Bioengineering, 2020 Oct 13;14(2):133-145.
13. McMinn PH, **Hind LE**, Huttenlocher A, Beebe DJ. "Neutrophil trafficking on-a-chip: an in vitro, organotypic model for investigating neutrophil priming, extravasation, and migration with spatiotemporal control," Lab Chip, 2019 Nov 7;19(21):3697-3705.
12. Giese MA*, **Hind LE***, Huttenlocher A. "Neutrophil plasticity in the tumor microenvironment," Blood, 2019 May 16;133(20):2159-2167. *These authors contributed equally.
11. **Hind LE** and Huttenlocher A. "Neutrophil Reverse Migration and a Chemokinetic Resolution," Developmental Cell, 2018 Nov 19; 47(4):404-405.
10. **Hind LE**, Ingram PN, Beebe DJ, Huttenlocher A. "Interaction with an endothelial lumen increases neutrophil lifetime and motility in response to P. aeruginosa," Blood, 2018 Oct 25;132(17):1818-1828.
9. Ingram PN, **Hind LE**, Jiminez-Torres JA, Huttenlocher A, Beebe DJ. An Accessible Organotypic Microvessel Model using iPSC-Derived Endothelium. Advanced Healthcare Materials. 2018 Jan;7(2).
8. Powell D, Tauzin S, **Hind LE**, Deng Q, Beebe DJ, Huttenlocher A. "Chemokine Signaling and the Regulation of Bidirectional Leukocyte Migration in Interstitial Tissues," Cell Reports. 2017 May 23; 19(8): 1572-1585.
7. **Hind LE**, Lurier EB, Dembo M, Spiller KL, Hammer DA. "Effect of M1-M2 Polarization on the Motility and Traction Stresses of Primary Human Macrophages," Cellular and molecular bioengineering. 2016 September; 9(3):455-465.
6. **Hind LE**, Vincent WJ, Huttenlocher A. "Leading from the Back: The Role of the Uropod in Neutrophil Polarization and Migration," Developmental Cell. 2016 Jul 25;38(2):161-9.
5. Yamahashi Y*, Cavnar PJ*, **Hind LE***, Berthier E, Bennin DA, Beebe D, Huttenlocher A. "Integrin associated proteins differentially regulate neutrophil polarity and directed migration in 2D and 3D," Biomedical Microdevices. 2015 Oct;17(5):100. *These authors contributed equally.
4. **Hind LE**, Dembo M, Hammer DA, "Macrophage motility is driven by frontal-towing with a force magnitude dependent on substrate stiffness," Integrative Biology, 2015 Apr; 7(4):447-453.
3. **Hind LE**, MacKay JL, Cox D, Hammer, DA, "Two-dimensional motility of a macrophage cell line on microcontact-printed fibronectin," Cytoskeleton, 2014 Sep; 71(9):542-554.
2. Kamat NP, Liao Z, **Moses LE**, Rawson J, Therien MJ, Dmocjowski IJ, Hammer DA, "Sensing membrane stress with near IR-emissive porphyrins," Proc Natl Acad Sci, 2011 Aug 23; 108(34).

1. Mettallo CM, Azarin SM, **Moses LE**, Ji L, de Pablo JJ, Palecek SP. "Human embryonic stem cell-derived keratinocytes exhibit an epidermal transcription program and undergo epithelial morphogenesis in engineered tissue constructs," Tissue Engineering, Vol. A, (2009).

PROPOSALS

FUNDED, ACTIVE PROJECTS ($, MY CONTRIBUTION)

08/22 – 07/27	**MIRA (R35), Lead PI, NIH NIGMS (1R35GM146737-01)** "Reconstructing Cell-Cell Interactions in Diverse Inflammatory Environments"	$1,809,595
12/21 – 12/22	**ABNexus Research Award, Multi – PI, President's Office** "Combining Innovative Engineered In Vitro and In Vivo Models to Determine the Role of Myeloid Derived Suppressor Cells in Sepsis"	$35,000
07/21 – 12/22	**RIO Seed Grant, Lead PI, Research Innovation Office** "A CRISPR Understanding of Immune Cell Migration"	$50,000

ORAL PRESENTATIONS

INVITED PRESENTATIONS

3. "An Infection-on-a-Chip for Evaluating Immune Responses" Immunoengineering Gordon Research Conference, July 12th, 2022.
2. "Multicellular Interactions in the Neutrophil Response to Infection" Cell Migration Seminars, November 9th, 2021.
1. "Multicellular Interactions in the Neutrophil Response to Infection" University of South Florida, Department of Chemical, Biological, and Materials Engineering, Seminar, February 24th, 2021.

CONTRIBUTED PRESENTATIONS

13. Weppner H, **Hind LE**. *The Role of Myeloid Derived Suppressor Cells in the Immune Response to Infection.* American Institute of Chemical Engineers Annual Meeting, Phoenix, AZ, 2022.
12. Calo C, Richardson I, **Hind LE**. *Navigating the Matrix: How Neutrophils Interact with Their Microenvironment.* American Institute of Chemical Engineers Annual Meeting, Boston, MA, 2021.
11. **Hind LE**. *A Biologically Inspired Model for Studying Multicellular Interactions in the Neutrophil Response to Infection.* Neutrophil 2021, Online Conference, 2021.
10. **Hind LE**, Keller N, Beebe DJ, Huttenlocher A. *The presence of an Endothelial Lumen Drives Fungal Germination and Neutrophil Migration in a Physiologically Relevant in vitro Model of Infection.* American Institute of Chemical Engineers Annual Meeting, Orlando, FL, 2019.
9. **Hind LE.** *A physiologically relevant in vitro model for studying the neutrophil response to infection.* Immunology Work in Progress Seminar, Madison, WI 2019.
8. **Hind LE**. *The Role of the Microenvironment in Directing Innate Immune Cell Motility.* Medical Microbiology and Immunology Seminar, Madison, WI, 2018.
7. **Hind LE**, Ingram PN, Beebe DJ, Huttenlocher A. *Heterotypic Interactions with an Endothelial Lumen Increase Neutrophil Lifetime and Motility to* Pseudomonas Aeruginosa *via IL6 Signaling.* American Institute of Chemical Engineers Annual Meeting, Pittsburgh, PA, 2018.
6. **Hind LE**, Ingram PN, Beebe DJ, Huttenlocher A. *Heterotypic Interactions with an Endothelial Lumen Increase Neutrophil Lifetime and Motility to* Pseudomonas Aeruginosa *via IL6 Signaling.* Biomedical Engineering Society Annual Meeting, Atlanta, GA, 2018.
5. **Hind LE**, Ingram PN, Beebe DJ, Huttenlocher A. *Engineering Infection: Discovering a Novel Role for Blood Vessels in Immune Cell Function.* UW-Madison Postdoc Symposium, Madison, WI, 2018.
4. **Hind LE**, Lurier EB, Dembo M, Spiller KL, Hammer DA. *M1-M2 Polarization Alters the Motility and Force Generation of Primary Human Macrophages.* Biomedical Engineering Society Annual Meeting, Tampa, FL, 2015.
3. **Hind LE**, Dembo M, Hammer DA. *Force Generation of Migrating Macrophages on Compliant Surfaces.* Directed Cell Gordon Research Seminar, Galveston, TX, 2015.
2. **Hind LE**, Dembo M, Hammer DA. *The Biochemical and Biophysical Mechanisms of Macrophage Migration.* Bioengineering Graduate Research Symposium, Philadelphia, PA, 2015.

1. **Hind LE**, Cox D, Hammer DA. *Macrophage Chemokinesis on Microcontact Printed Surfaces and Force Generation.* Biomedical Engineering Society Annual Meeting, Seattle, WA, 2013.

POSTER PRESENTATIONS

11. **Hind LE**, Keller N, Beebe DJ, Huttenlocher A. *The presence of an Endothelial Lumen Drives Fungal Germination and Neutrophil Migration in a Physiologically Relevant in vitro Model of Infection.* Biomedical Engineering Society Annual Meeting, Philadelphia, PA, 2019.
10. **Hind LE**, Keller NJ, Beebe DJ, Huttenlocher A. *Interaction with an Endothelial Vessel Promotes Neutrophil Migration and Lifetime during Infection.* Directed Cell Migration Gordon Conference, Galveston, TX, 2019.
9. **Hind LE**, Ingram PN, Huttenlocher A, Beebe DJ. *The Role of Neutrophil-Endothelial Interactions in Neutrophil Extravasation and Migration using Organotypic Microvessels.* Biomedical Engineering Society Annual Meeting, Phoenix, AZ, 2017.
8. **Hind LE**, Bennin DA, Huttenlocher A. *PTP1B Plays an Important Role in Neutrophil Migration.* Directed Cell Migration Gordon Conference, Galveston, TX, 2017.
7. **Hind LE**, Bennin DA, Huttenlocher A. *Characterization of Human Stem Cell Derived Neutrophils.* Biomedical Engineering Society Annual Meeting, Minneapolis, MN, 2016.
6. **Hind LE**, Dembo M, Hammer DA. *Force Generation of Migrating Macrophages on Compliant Surfaces.* Directed Cell Migration Gordon Conference, Galveston, TX, 2015.
5. **Hind LE**, Dembo M, Hammer DA. *Traction Forces of Primary Human Macrophages on Compliant Surfaces.* Bioengineering Graduate Research Symposium, Philadelphia, PA, 2015.
4. **Hind LE**, Dembo M, Hammer DA. *Traction Forces of Primary Human Macrophages.* American Society for Cell Biology Annual Meeting, Philadelphia, PA, 2014.
3. **Hind LE**, Dembo M, Hammer DA. *Force Generation During Primary Human Macrophage Migration on Compliant Surfaces.* Biomedical Engineering Society Annual Meeting, San Antonio, TX, 2014.
2. **Hind LE**, Cox D, Hammer DA. *Macrophage Migration and the Roles of PI3K, WASp, and Cdc42.* Biophysical Society Meeting, Philadelphia, PA, 2013.
1. **Hind LE**, Cox D, Hammer DA. *Macrophage Chemokinesis on Microcontact Printed Fibronectin and the Roles of WASp, Cdc42, PI3K, and ROCK.* Directed Cell Migration Gordon Conference, Galveston, TX, 2013.

PROFESSIONAL DEVELOPMENT

Research Mentor Training for Postdocs, University of Wisconsin-Madison, Madison, WI (2018)
Research Ethics and Career Development, University of Wisconsin-Madison, Madison, WI (2016)
NextProf Fall Engineering Workshop, University of Michigan, Ann Arbor, MI (2015)

TEACHING

Undergraduate Courses	Date	Students
CHEN 3220 Separations	SS2020	147
CHEN 3220 Separations	SS2021	125
CHEN 4838/5838 Immunoengineering	FS2022	32
CHEN 3220 Separations	SS2023	90

Courses Developed
CHEN 4838/5838: Immunoengineering.

STUDENTS AND RESEARCHERS MENTORED

Graduate Students

Christopher Calo, Chemical Engineering PhD Student, University of Colorado-Boulder, Jan. 2020-present, 2020 GAANN Fellow, 2021 NSF GRF
Isaac Richardson, Chemical Engineering PhD Student, University of Colorado-Boulder, Jan. 2020-present
Hannah Weppner, Chemical Engineering PhD Student, University of Colorado-Boulder, Dec. 2020-present, GAANN Fellow
Tanisha Kaur, Biomedical Engineering MS Student, University of Colorado-Boulder, Sept. 2020 – Dec. 2021

Undergraduate Students
Itala Cueva, Undergraduate Student Researcher, University of Colorado – Boulder (2023 – present)
Nicola Wheeler, Undergraduate Student Researcher, University of Colorado – Boulder (2022-present)
Elise Niehaus, Undergraduate Student Researcher, University of Colorado – Boulder (2022-present)
Tanvi Patil, Undergraduate Student Researcher, University of Colorado – Boulder (2021-present)
Maya Singh, Undergraduate Student Researcher, University of Colorado – Boulder (2021-present)
Kayla Pacheco, Undergraduate Student Researcher, University of Colorado – Boulder (2021-2022)
Taylor Buechel, Undergraduate Student Researcher, University of Colorado – Boulder (2021-2022)
Sage Nelson, Undergraduate Student Researcher, University of Colorado – Boulder (2021-2022)
David Luzzio, Undergraduate Student Researcher, University of Wisconsin-Madison (2016-2017)
Amulya Surash, High School Researcher, University of Wisconsin-Madison (Summer 2016)
Kelsey Murphy, Undergraduate Student Researcher, University of Wisconsin-Madison (2015-2016)
Christina Hum, Undergraduate Student Researcher, University of Pennsylvania (2014-2015)
Ava Mennin, High School Researcher, University of Pennsylvania (Summer 2014)
Courtney Bender, Undergraduate Student Researcher, University of Pennsylvania (2012-2014)
Sarah Nims, Undergraduate Student Researcher, University of Pennsylvania (2012-2014)
Martha Wolnicki, High School Researcher, University of Pennsylvania (Summer 2013)
Dhruv Pillai, High School Researcher, University of Pennsylvania (Summer 2012)

PROFESSIONAL AFFILIATIONS
American Institute of Chemical Engineers, Participating member of University of Colorado Molecular Biophysics Program, Participating member of Medical Scientist Training Program University of Colorado School of Medicine

SERVICE
Departmental Service
CHBE Graduate Committee, January 2020 – present
CHBE Diversity and Inclusion Committee, August 2020 – August 2021

PhD Committee Member (12 total)
Graduated
Kristen Eller (ChBE) (2020-2021), Benjamin Carberry (ChBE) (2020-2021), Colleen McCollum (ChBE) (2020 – 2022), Stephanie Ellyse Schneider (ME) (2020 – 2022), Suzannah Miller (Biochemistry) (2021 – 2022)
Current
Ella Hushka (ChBE) (2020 – present), Mark Young (ChBE) (2021 – present), Alexandra Borelli (ChBE) (2021 – present), Dana Stamo (ChBE) (2021 – present), Nicole Day (ChBE) (2021 – present), Daisy Fuchs (2022 – present), Brittany Thompson (MSE) (2022 – present)

MS Thesis Committee Member (1 total)
Isabelle Strawn (ChBE, 2022)

Review for Journals
iScience
Cellular and Molecular Bioengineering
Journal of Cell Biology
JoVE
Biosensors and Bioelectronics

Society Service
15D/E These Co-Chair, American Institute of Chemical Engineers Annual Meeting, November 2022
Session Co-Chair, American Institute of Chemical Engineers Annual Meeting, November 2022
15D/E Theme Co-Chair, American Institute of Chemical Engineers Annual Meeting, November 2021

Session Co-Chair, American Institute of Chemical Engineers Annual Meeting, November 2020
Poster Judge, American Institute of Chemical Engineers Annual Meeting, November 2020

OUTREACH

Summer Academy in Science and Technology, Graduate Student Mentor, University of Pennsylvania (2010-2013)
PennGEMS (Girls in Engineering, Math, and Science), Counselor, University of Pennsylvania (Summer 2011)
PennGEMS (Girls in Engineering, Math, and Science), Instructor, University of Pennsylvania (Summer 2013 and 2014)