Curriculum Vitae

Hannah C. Zierden

hzierden@umd.edu

I. Education

University of Maryland School of Medicine	Postdoctoral Fellow September 2020 - Present
Johns Hopkins University	Ph.D. in Chemical and Biomolecular Engineering, August 2020
The Ohio State University	B.S. in Chemical and Biomolecular Engineering, May 2015 Honors in Engineering Honors Research Distinction Magna Cum Laude

II. Professional Experience

2022-Present	Assistant Professor University of Maryland Department of Chemical and Biomolecular Engineering
2020-2022	Postdoctoral Fellow; Advisor: Tracy Bale University of Maryland, School of Medicine
2015-2020	Graduate Research Assistant; Advisors: Laura Ensign and Justin Hanes Johns Hopkins University, Department of Chemical and Biomolecular Engineering *Thesis: Nanomedicine as a tool for the prevention and characterization of preterm birth*
2015	Chemical Engineering Intern Fives Surface Treatment Corporation *Performed engineering calculations for the selection of process equipment*
2013	Research Intern Technische Universität Kaiserslautern *Performed thermodynamic analysis of protein adsorption onto chromatographic resins*
2012-2015	Undergraduate Research Assistant; Advisors: David Wood The Ohio State University, Department of Chemical and Biomolecular Engineering *Thesis: Protein purification via self-cleaving intein methods*

III. Honors and Awards

2021	University of Maryland Postdoctoral Professional Development Award
2021	American Institute of Chemical Engineers Women's Initiatives Committee Travel Award
2021	MIT Chemical Engineering Rising Star
2021	Keystone Symposia on The Microbiome: From Mother to Child –Travel Award
2020	Whiting School of Engineering Research Trainee Award
2019	American Institute of Chemical Engineers Women's Initiatives Committee Travel Award
2019	Society of Women Engineers Ada I. Pressman Memorial Award
2019	Controlled Release Society Patrick Couvreur Travel Award
2019	Controlled Release Society Transdermal and Mucosal Drug Delivery Research Award
2019	Society for Reproductive Investigation NIH Career Development Travel Award
2018	Johns Hopkins Graduate Representative Organization Travel Award
2018	American Institute of Chemical Engineers Women's Initiatives Committee Travel Award
2018	Controlled Release Society Kinam Park Travel Award
2017-2019	National Science Foundation Graduate Research Fellowship
2015	American Institute of Chemical Engineers Outstanding Student Award
2014	Lumley Honors Research in Engineering Award, The Ohio State University
2013	DAAD Research Internship in Science and Engineering
2012	Shell Oil Top Academic Award, The Ohio State University

2012 Women in Engineering Outstanding Freshman Award, The Ohio State University
2011-2015 Engineering Dean's List, The Ohio State University

IV. Memberships

Society for Neuroscience
Controlled Release Society
Society of Women Engineers
Graduate Women in Science
Society for Reproductive Investigation
American Society for Reproductive Immunology
American Institute of Chemical Engineers
Tau Beta Pi Engineering National Honor Society
Phi Kappa Phi National Honor Society
Alpha Lambda Delta and Phi Eta Sigma Honor Society

V. Publications [IF = Impact Factor]

1. Hoang TM, **Zierden HC**, Date A, Ortiz J, Anders N, He P, Hanes J, Mahendroo M, Ensign LM. Journal of Controlled Release: Development of a mucoinert progesterone nanosuspension for safer and more effective prevention of preterm birth. 2018 Dec; 295:74-86. [IF: 7.877]
2. Date AA, Halpert G, Babu T, Ortiz J, Kanvinde P, Dimitrion P, Narayan J, **Zierden H**, Betageri K, Musmanno O, Wiegand H, Huang X, Gumber S, Hanes J, Ensign LM. Biomaterials: Mucus-penetrating budesonide nanolususpension enema for local treatment of inflammatory bowel disease. 2018 Dec; 185:97-105. [IF: 10.317]
3. Kevin DeLong, Sabrine Bensouda, Fareeha Zulfiqar, **Hannah C Zierden**, Thuy M Hoang, Alison G Abraham, Jenell S Coleman, Richard A Cone, Patti E Gravitt, Craig Walter Hendrix, Edward J Fuchs, Charlotte A Gaydos, Ethel D Weld, Laura M Ensign. Conceptual Design of a Universal Donor Screening Approach for Vaginal Microbiota Transplant. *Front Cell Infect Microbiol*. 2019 Aug 28;9:306. [IF: 4.123]
4. **Zierden HC**, Ortiz Ortiz JI, Dimitrion P, Laney V, Bensouda S, DeLong K, Hanes J, Ensign LM. *Am J Pathol*. Characterization of an adapted murine model of intrauterine inflammation-induced preterm birth. 2020; 190(2):295–305. [IF: 4.069]
5. Hoang TM, Toler E, DeLong K, Mafunda NA, Bloom SM, **Zierden HC**, Moench TR, Coleman JS, Hanes J, Kwon DS, Lai SK, Cone RA, Ensign LM. *PLOS Pathogens*. The cervicovaginal mucus barrier to HIV-1 is diminished in bacterial vaginosis. 2020;16(1):e1008236. [IF: 6.218]
6. **Zierden HC**, Ortiz Ortiz JI, DeLong K, Yu J, Li G, Dimitrion P, Bensouda S, Laney V, Bailey A, Anders NM, Scardina M, Mahendroo M, Mesiano S, Burd I, Wagner G, Hanes J, Ensign LM. Enhanced drug delivery to the reproductive tract using nanomedicine reveals therapeutic options for prevention of preterm birth, *Science Translational Medicine* 13 Jan 2021: Vol. 13, Issue 576, eabc6245. [IF: 16.304]
7. **Zierden HC**, Josyula A, Shapiro RL, Hsueh HT, Hanes J, Ensign LM. Avoiding a sticky situation: bypassing the mucus barrier for improved local drug delivery, *Trends in Molecular Medicine.* [IF: 11.099]
8. **Zierden HC**, Shapiro RL, DeLong K, Carter D, Ensign LM. Next generation strategies for preventing preterm birth, *Advanced Drug Delivery Reviews* July 2021: Vol. 174, 190-209. [IF: 13.300]

In preparation

1. **Zierden HC**, DeLong K, Zulfiqar F, Laney V, Bensouda S, Ortiz Ortiz JI, Hoang TM, Hanes J, Ensign LM. Analysis of cervicovaginal mucus changes during pregnancy, *in preparation*.
2. Zou Y, Maziarz J, **Zierden HC**, Romero R, Ensign LM, Wagner G. Histone deacetylase inhibitor as prolongs murine gestation in a model of dystocia, *in preparation*.
3. Diniz CP, **Zierden HC**, DeLong K, Ensign LM, Coleman JS. Role of vaginal microbiota on STI/HIV risk among US adolescent girls and young women, *in preparation*.

VI. Conference Abstracts and Proceedings

Oral Presentations

1. **Hannah Zierden**, Jairo I. Ortiz, Kevin DeLong, Gaoshan Li, Jingqi Yu, Justin Hanes, Laura Ensign. (2020) Targeting drug delivery to the female reproductive tract via vaginal administration. Controlled Release Society: Las Vegas, NV *virtual platform due to COVID-19.
2. **Hannah Zierden**, Jairo I. Ortiz, Kevin DeLong, Gaoshan Li, Jingqi Yu, Justin Hanes, Laura Ensign. (2020) Vaginally Administered Nanoparticles for Maintaining Uterine Quiescence in the Presence of Pro-Inflammatory Stimuli. Society for Reproductive Investigation: Vancouver, Canada. *cancelled due to COVID-19
3. **Hannah Zierden**, Jairo I. Ortiz, Kevin DeLong, Peter Dimitrion, Victoria Laney, Sabrine Bensouda, Justin Hanes, Laura Ensign. (2019) Engineering Muco-Inert Nanoparticles for Improved Vaginal Drug Delivery During Pregnancy. American Institute of Chemical Engineers: Orlando, FL.
4. **Hannah C Zierden**, Thuy Hoang, Abhijit Date, Jairo I Ortiz, Nicole Anders, Ping He, Justin Hanes, Mala Mahendroo, Laura Ensign. (2019) Engineering a vaginally delivered, mucoinert progesterone nanosuspension for safer and more effective prevention of preterm birth. Controlled Release Society: Valencia, Spain.
5. **Zierden HC**, Ortiz Ortiz JI, Laney V, Bensouda S, DeLong K, Zulfiqar F, Hoang TM, Zou Y, Maziarz J, Mahendroo M, Wagner G, Hanes J, Ensign LM. (2018) Nanoparticle Optimization for Improved Vaginal Drug Delivery During Pregnancy. American Institute of Chemical Engineers: Pittsburgh, PA.
6. **Zierden HC**, Ortiz Ortiz JI, Laney V, Bensouda S, DeLong K, Zulfiqar F, Hoang TM, Zou Y, Maziarz J, Mahendroo M, Wagner G, Hanes J, Ensign LM. (2018) Nanoparticle-based Vaginal Combination Therapy for The Prevention of Inflammation-induced Preterm Birth. Controlled Release Society: New York, NY.
7. Diniz CP, **Zierden HC**, DeLong K, Ensign LM, Coleman JS. (2018) Role of vaginal microbiota on STI/HIV risk among US adolescent girls and young women. 8th International Workshop on HIV & Women. Boston, MA.

Poster Presentations

1. **Hannah C Zierden**, Kathleen E. Morrison, Bridget M. Nugent, and Tracy L. Bale. (2021) Extracellular vesicles as stress signals altering placental and fetal development. American Institute for Chemical Engineers Annual Meeting. Boston, MA, USA.
2. **Hannah C Zierden**, Kathleen E. Morrison, Bridget M. Nugent, and Tracy L. Bale. (2021) Extracellular vesicles as stress signals altering placental and fetal development. Society for Neuroscience Annual Meeting. Virtual.
3. **Hannah C Zierden**, Kathleen E. Morrison, Bridget M. Nugent, and Tracy L. Bale. (2021) Extracellular vesicles as potentiators of stress signals to alter placental and fetal development. Society for Neuroscience: Virtual Connectome.
4. **Hannah C Zierden**, Jairo I Ortiz, Kevin DeLong, Nemah-Allah Saleh, Jingqi Yu, Sabrine Bensouda, Victoria Laney, Nicole Anders, Thuy Hoang, Fareeha Zulfiqar, Justin Hanes, Laura Ensign. (2019) Formulation of an Estradiol Nanosuspension for Improved Vaginal Absorption. Controlled Release Society: Valencia, Spain.
5. **Zierden HC**, Ortiz Ortiz JI, Dimitrion P, Laney V, Bensouda S, DeLong K, Hanes J, Ensign LM. (2019) A novel murine model for inflammation-induced preterm birth. Wilmer Research Day: Baltimore, MD.
6. **Zierden HC**, Ortiz Ortiz JI, Laney V, Bensouda S, Dimitrion P, DeLong K, Zulfiqar F, Zou Y, Maziarz J, Mahendroo M, Wagner G, Hanes J, Ensign LM. (2019) Combination of progesterone and trichostatin A as novel therapeutic for the prevention of inflammation-induced preterm birth. Wilmer Research Day: Johns Hopkins University, Baltimore, MD
7. **Zierden HC**, Ortiz Ortiz JI, Laney V, Bensouda S, Dimitrion P, DeLong K, Zulfiqar F, Zou Y, Maziarz J, Mahendroo M, Wagner G, Hanes J, Ensign LM. (2019) Combination of progesterone and trichostatin A as novel therapeutic for the prevention of inflammation-induced preterm birth. Women in STEM: Johns Hopkins University, Baltimore, MD
8. Hernández N, **Zierden HC**, Ensign LM. (2019) Investigating the effect of vaginal gel formulation on cervicovaginal mucus barrier properties. Day of Research in Engineering, Arts, Medicine and Science: Johns Hopkins University, Baltimore, MD
9. **Zierden HC**, Ortiz Ortiz JI, Dimitrion P, Laney V, Bensouda S, DeLong K, Hanes J, Ensign LM. (2019) Comparison of two murine models of inflammation-induced preterm birth. Society for Reproductive Investigation: Paris, France.

10. **Zierden HC**, Ortiz Ortiz JI, Laney V, Bensouda S, Dimitrion P, DeLong K, Zulfiqar F, Zou Y, Maziarz J, Mahendroo M, Wagner G, Hanes J, Ensign LM. (2019) Combination of progesterone and trichostatin A as novel therapeutic for the prevention of inflammation-induced preterm birth. Society for Reproductive Investigation: Paris, France.
11. Laney V, **Zierden HC**, Hernández N, Bensouda S, Ensign LM. (2018) Rheological Properties of Thermoreversible Nanoparticle Hydrogels for Vaginal Drug Delivery. Annual Biomedical Research Conference for Minority Students: Indianapolis, IN.
12. **Zierden HC**, Ortiz Ortiz JI, Laney V, Bensouda S, DeLong K, Zulfiqar F, Hoang TM, Zou Y, Maziarz J, Mahendroo M, Wagner G, Hanes J, Ensign LM. (2018) Nanoparticle-based Vaginal Combination Therapy for The Prevention of Inflammation-induced Preterm Birth. Controlled Release Society: New York, NY.
13. **Zierden HC**, Ortiz Ortiz JI, DeLong K, Hoang TM, Hanes J, Ensign LM. (2018) Characterization of cervicovaginal mucus changes during pregnancy. Women in STEM: Johns Hopkins University, Baltimore, MD
14. **Zierden HC**, Ortiz Ortiz JI, DeLong K, Hoang TM, Hanes J, Ensign LM. (2018) Characterization of cervicovaginal mucus changes during pregnancy. Women's Health Symposium: Johns Hopkins University, Baltimore, MD
15. **Zierden HC**, Ortiz Ortiz JI, DeLong K, Hoang TM, Hanes J, Ensign LM. (2018) Characterization of cervicovaginal mucus changes during pregnancy. Society for Reproductive Investigation: San Diego, CA.
16. **Zierden HC**, Ortiz Ortiz JI, DeLong K, Hoang TM, Hanes J, Ensign LM. (2018) Investigating cervicovaginal mucus barrier properties. Doctoral Engineering Research Showcase. American Society for Engineering Education: Washington D.C.
17. Zierden HC, Ortiz Ortiz JI, DeLong K, Hoang TM, Hanes J, Ensign LM. (2017) Characterization of cervicovaginal mucus changes during pregnancy. American Society for Reproductive Immunology: Chicago, IL.
18. Hoang TM, **Zierden HC**, Date A, Ortiz J, Anders N, He P, Hanes J, Mahendroo M, Ensign LM. (2017) Progesterone supplementation for prevention of preterm birth. American Society for Reproductive Immunology: Chicago, IL.
19. Hoang TM, **Zierden HC**, Date A, Ortiz J, Anders N, He P, Hanes J, Mahendroo M, Ensign LM. (2016) Nanomedicine for preterm birth. Annual Bayview Research Symposium: Baltimore, MD.
20. Hoang TM, **Zierden HC**, Date A, Ortiz J, Anders N, He P, Hanes J, Mahendroo M, Ensign LM. (2016) Progesterone supplementation for prevention of preterm birth. International Nanomedicine and Drug Delivery Symposium Annual Meeting: Baltimore, MD.
21. Harper KA, **Zierden HC**, Wegman KR, Kajfez RL, Kecskemety KM. (2015) Teaching Assistant Professional Development Through Design: Why They Participate and How They Benefit. American Society of Engineering Education Annual Conference and Exposition: Seattle, WA
22. **Zierden HC**, Shakalli MT, Wood DW. (2015) Protein Purification via Intein Self-Cleaving. Denman Undergraduate Research Symposium: Columbus, OH.
23. **Zierden HC**, Shakalli MT, Coolbaugh MJ, Lease RA, Wood DW. (2014) Purification of Maltose Binding Protein by Starch Precipitation. American Institute of Chemical Engineers Annual Meeting: Atlanta, GA
24. Shakalli MT, Coolbaugh MJ, Wensing RT, **Zierden HC**, Lease RA, Wood DW. (2014) Elastin-like Polypeptide Tag Length Effect on Protein Expression and Purification. American Institute of Chemical Engineers Annual Meeting: Atlanta, GA

VII. Teaching Experience

Spring 2019	Lecturer and Course Designer: MATLAB Made Easy Johns Hopkins University, Department of Chemical and Biomolecular Engineering
January 2019	Instructor and Course Designer: Bootcamp MATLAB, Whiting School of Engineering Johns Hopkins University
May 2018	Participant: Johns Hopkins Teaching Institute
Spring 2018	Lecturer and Course Designer: MATLAB Made Easy Johns Hopkins University, Department of Chemical and Biomolecular Engineering
Spring 2017	Lecturer: MATLAB Made Easy Johns Hopkins University, Department of Chemical and Biomolecular Engineering

Spring 2017	Teaching Assistant: Kinetic Processes Johns Hopkins University, Department of Chemical and Biomolecular Engineering
Spring 2016	Teaching Assistant: Kinetic Processes Johns Hopkins University, Department of Chemical and Biomolecular Engineering
Spring 2015	Teaching Assistant: Fundamentals of Engineering for Honors The Ohio State University, Engineering Education and Innovation Center
Spring 2015	Teaching Assistant: Mass Transfer The Ohio State University, Department of Chemical and Biomolecular Engineering
Autumn 2014	Teaching Assistant: Thermodynamics The Ohio State University, Department of Chemical and Biomolecular Engineering
Spring 2014	Teaching Assistant: Fundamentals of Engineering for Honors The Ohio State University, Engineering Education and Innovation Center
Autumn 2013	Teaching Assistant: Fundamentals of Engineering for Honors The Ohio State University, Engineering Education and Innovation Center
Spring 2013	Teaching Assistant: Fundamentals of Engineering for Honors The Ohio State University, Engineering Education and Innovation Center
Autumn 2012	Teaching Assistant: Fundamentals of Engineering for Honors The Ohio State University, Engineering Education and Innovation Center

VIII. Research Supervision

Graduate Students

1. Rachel Shapiro (1/20-8/20); Ph.D. in Chemical & Biomolecular Engineering (expected 2025)
2. Sam Curtis (01/20-4/20); Ph.D. in Pharmacology and Molecular Sciences (rotation project)
3. Gaoshan Li (08/18-05/20); M.S. in Chemical & Biomolecular Engineering
4. Jingqi Yu (08/18-05/20); M.S. in Biomedical Engineering
5. Nemah-Allah Saleh (08/18-10/18); Ph.D. in Pharmacology and Molecular Sciences (rotation project)
6. Victoria Laney (08/17-05/19); M.S. in Chemical & Biomolecular Engineering
7. Sabrine Bensouda (07/17-05/19); Post-baccalaureate researcher, Doctoral Diversity Program

Undergraduate Research Assistants

1. Phoebe Chu (09/19-05/20); B.S. in Chemical & Biomolecular Engineering
2. Kennedy Gray (05/19-09-19); B.S. in Molecular and Cellular Biology
   2019 Center for AIDS Research - Baltimore Scholar
3. Nicole Hernández (05/17-05/19); B.S. in Chemical & Biomolecular Engineering
   2018 Provost's Undergraduate Research Award Participant
   2018 Irini J. Maroulis Engineering Outreach Finalist
4. Anna Bailey (06/18-05/19); B.S. in Biomedical Engineering
5. Brittany Zak (09/17-05/18); B.S. in Biomedical Engineering
6. Victoria Chen (09/17-05/18); B.S. in Biomedical Engineering
7. Laboni Hassan (09/17-12/18); B.S. in Biomedical Engineering

High School Students

1. Sophia Kunisaki, Bryn Mawr School (MD), 06/19-08/19
2. Cassie Gong, Bryn Mawr School (MD), 06/19-08/19
3. Matthew Ensign, Towson High School (MD), 06/18-08/18, 06/19-08/19
4. Esha Gupta, Bryn Mawr School (MD), 06/18-08/18
5. Ligia Mardari, Towson High School (MD), 06/18-08/18
6. Maria Aversano, Bryn Mawr School (MD), 06/18-08/18
7. Anne Noon, Bryn Mawr School (MD), 06/18-08/18
8. Barrett Crawford, Gilman School (MD), 06/17-08/17
9. Anjali Bhusal, Bryn Mawr School (MD), 06/17-08/17

IX. Service Activities

2021-Present	American Institute for Chemical Engineers Women in ChemE Member at Large
2022	Controlled Release Society Annual Meeting Planning Committee Member
2021	Big10 Neuroscience Virtual Seminar Series Organizer

2021	BioTM Reviewer
2020-2022	Controlled Release Society Young Scientist Committee, Sponsorship Chair
2019-2022	Controlled Release Society Young Scientist Committee, Member
2019-2020	Wilmer Eye Institute Research Development Seminar Organizer
2017-19	Team member/fundraiser, Cystic Fibrosis Foundation, Johns Hopkins University
2017	Volunteer, Girls in Engineering Day, Maryland Science Center
2016-18	Summer Science Mentor, Bryn Mawr High School, Johns Hopkins University
2016	Team member/fundraiser, Cystic Fibrosis Foundation, Johns Hopkins University
2015-2020	Instructor, STEM Outreach at Hampden Recreational Center, Johns Hopkins University
2015-2017	Ministry Volunteer, Saints Philip and James Catholic Church, Baltimore, MD
2015	Member, SPHINX Senior Honor Society, The Ohio State University
2013-2015	Order of the Engineer Chair, Tau Beta Pi Honor Society, The Ohio State University
2013-2015	Tour guide, College of Engineering, The Ohio State University
2013	President, Junior Class Honor Society, The Ohio State University
2012	President, Sophomore Class Honor Society, The Ohio State University
2012-2014	Hospital volunteer, The Ohio State University James Cancer Hospital
2012-2015	Student leader, Women in Engineering Program, The Ohio State University

X. References

Tracy Bale, Ph.D.
Professor of Pharmacology with Joint Appointment in Psychiatry
Director, Center for Epigenetic Research in Child Health & Brain Development
tbale@som.umaryland.edu
(410) 706-5816

Laura Ensign, Ph.D.
Marcella E. Woll Professor in Ophthalmology
Associate Professor of Ophthalmology with Joint Appointment in Chemical and Biomolecular Engineering
Johns Hopkins Medical Institutions
lensign1@jhu.edu
(410) 614-9854

Justin Hanes, Ph.D.
Lewis J. Ort Professor of Ophthalmology with Joint Appointment in Chemical and Biomolecular Engineering
Johns Hopkins Medical Institutions
hanes@jhmi.edu
(443) 287-7921

Mala Mahendroo, Ph.D.
Professor
Department of Obstetrics and Gynecology
The University of Texas Southwestern Medical Center
mala.mahendroo@utsouthwestern.edu
(214) 648-3091

Michael Paulaitis, Ph.D.
Professor Emeritus
Chemical and Biomolecular Engineering
The Ohio State University
paulaitis.1@osu.edu
(614) 247-8847