Haylie R. Helms

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Education

2021 – Present **PhD Candidate, Biomedical Engineering,** Oregon Health and Science University
- Dissertation: Engineering Spatially Resolved Tumor Microenvironments through Single-Cell Bioprinting to Uncover Early Cancer Biology
- PhD Advisor: Luiz E. Bertassoni, DDS PhD
- Exchange Advisor: Rebecca C. Fitzgerald, OBE FRS HonFREng FMedSci FRCP EMBO. Director, Early Cancer Institute, University of Cambridge
- Dissertation Advisory Committee: Summer L. Gibbs, PhD, Michelle (Shelley) C. Barton, PhD, and Ellen M. Langer, PhD

2017 – 2019 **MS, Modern Human Anatomy**, University of Colorado – Anschutz Medical Campus
- Capstone Project: Generation of Cardiac Organoids Using Cardiomyocytes, Endothelial Cells, Epicardial Cells, and Cardiac Fibroblasts Derived from Human Induced Pluripotent Stem Cells
- Advisor: Jeffrey G. Jacot, PhD
- Exam Committee: John H. Caldwell, PhD and Louis S. Stodieck, PhD

2013 – 2017 **BA, Biology, Society and Environment**, University of Minnesota – Twin Cities
- Minor: History of Science, Technology, and Medicine
- Capstone Project: Recellularization of Decellularized Lung Matrix Using Definitive Endoderm Cells Derived from Human Induced Pluripotent Stem Cells
- Advisor: Angela Panoskaltsis-Mortari, PhD

Research Experience

2021 – Present **Graduate Researcher,** Bertassoni Lab/Knight Cancer Precision Biofabrication Hub, Oregon Health and Science University
- Developed a novel biofabrication method to single-cell bioprint heterogenous tissues matching native cellular organization at subcellular resolution
- Developed a workflow to make 2D single-cell bioprinted tissues compatible with single cell spatial transcriptomics without embedding or sectioning
- Investigating cellular spatial dynamics on tumor evolution within the ductal carcinoma in situ tumor microenvironment using single-cell bioprinting and spatial transcriptomics

2024 – 2024 **Visiting Scholar**, Fitzgerald Lab, Early Cancer Institute
University of Cambridge, UK
- 3-month skills exchange: Patient biopsy dissociation, cell sorting, and expansion in both 2D cultures and 3D patient derived organoids

2019 – 2021 **Researcher 5** - **Manager of the 3D Bioprinting Core Facility & Mortari Lab**
University of Minnesota – Twin Cities
- Developed 3D bioprinted tumor models to study the effects of altered metabolic pathways on tumor growth
- Created a novel method for 3D bioprinting arteriovenous grafts
- Investigated the use of an intrapulmonary aerosol generating device to regenerate damaged segments of the airways by delivering new, healthy cells
- Examined the role of extracellular matrix composition and mechanical properties in cell differentiation of bioprinted constructs

2018 – 2019 **Graduate Researcher**, Jacot Lab, Department of Bioengineering
University of Colorado – Anschutz Medical Campus

- Developed a protocol to generate and characterize cardiac organoids from a single human induced pluripotent stem cell source
- Developed digital heart models that were 3D printed and imported into virtual reality for cardiac vasculature and coronary artery disease education
- Data acquisition, mill maintenance, segmentation, and 3D anatomical model generation for the Visible Human Project. Work featured in National Geographic

2015 – 2017 **Undergraduate Researcher**, Mortari Lab, Department of Pediatrics
University of Minnesota – Twin Cities

- Studied the effects of ex vivo lung perfusion and ventilation on the inflammatory cascade of transplanted lungs using TransMedics "OCS™ LUNG" This work contributed to the device receiving FDA approval
- Decellularized mouse lungs and recellularized with human induced pluripotent stem cell derived definitive endoderm cells and custom bioreactors

2015 – 2017 **Research Assistant,** Loor Lab, Department of Surgery
University of Minnesota – Twin Cities

- Investigated factors from the Intensive Care Unit which may be particularly stressful leading to mental illness following lung transplantation
- Worked with and among the hospital and clinic staff to administer surveys to lung transplant patients
- Database entry of patients' ICU stay using Epic electronic medical records

2013 – 2015 **Research Assistant**, TrialNet, Department of Pediatrics
University of Minnesota – Twin Cities

- Provided clinic and administrative support during clinical trials aimed at prevention, delaying onset, and treatment of type 1 diabetes
- Met with patients and their families at the University of Minnesota Pediatric Specialty Care Clinic for clinical trial recruitment
- Assisted during clinical trials by doing blood draws, processing samples, maintaining visit reports, and biobank management

Research Funding

2024 *Development of a Patient Tumor Avatar using Single-Cell Bioprinting and Patient Derived Organoids for the Investigation of Esophageal Cancer Initiation, Progression, and Therapy Response.* Skills Exchange and Development Award awarded by Cancer Research United Kingdom (CRUK), University of Cambridge. **Principal Investigator**, mentored by Rebecca Fitzgerald (Cambridge) and Luiz Bertassoni (Oregon Health and Science University).

2023-2024 2D *Single-Cell Bioprinting for the Systematic Assessment of Spatial Dynamics on Tumor Evolution.* Full Project 2023-1745 awarded by the Cancer Early Detection Advanced Research (CEDAR) Center, Oregon Health and Science University. **Co-Principal Investigator** with Luiz Bertassoni, DDS PhD.

2023-2024 *Development and Validation of a Single-Cell Bioprinting Platform for the 3D Fabrication of Complex Tissues and Tumor Models.* Full Project 2023-1719 awarded by the Cancer Early Detection Advanced Research (CEDAR) Center, Oregon Health and Science University. Role: **Contributor** - submitted the proposal I wrote for my PhD qualifying exam. PI: Luiz Bertassoni, DDS, PhD.

2023-2024 *Combining Bioprinting and Agent-Based Modeling for Simulating Biological Systems.* Quantitative and Systems Biology Award, Oregon Health and Science University. **Co-Principal Investigator** with Eric Cramer, MD/PhD Student and Ashley Anderson, MD/PhD Student.

2023-2024 *RUNX1 Effects on Neoplastic-Immune Hybrid Cell Migration and Tumor Microenvironment Cell-Cell Communication Using Single-Cell Bioprinting.* Pilot Grant awarded by Knight Cancer Institute Scientific Operations, Oregon Health and Science University. **Co-Principal Investigator** with Ashley Anderson, MD/PhD Student.

2024 *Equipment Grant for the Formation of the Knight Cancer Precision Biofabrication Hub.* M.J. Murdock Charitable Trust. Role: **Contributor** – significant written contributions including needs assessment, equipment descriptions focused on biological applications (scientific significance) and intended project proposals from our group as well as for collaborators based on their research missions. PI: Luiz Bertassoni, DDS, PhD.

Training Grants, Fellowships, and Scholarships

2024-2024 International Alliance for Cancer Early Detection (ACED) Skills Exchange and Development Travel Award. 3 months

2022-2026 International Alliance for Cancer Early Detection (ACED) Pre-Doctoral Scholar. Full Tuition and Stipend Coverage for 4 years

2021-2022 NIH/NIDCR T90DE030859, Portland Oral Health Research Training Program. Full Tuition and Stipend Coverage for 3 years. Terminated early for cancer fellowship

2021-2024 Achievement Awards for College Scientists (ARCS) Scholar, Oregon Chapter. Room and Board supplement for 3 years

2021-2022 Douglas Strain Fellowship, OHSU Department of Biomedical Engineering. Full Tuition and Stipend Coverage for 1 year

2016-2017 Waller Scholarship, University of Minnesota Twin Cities

2015-2016 Harrington Scholarship, University of Minnesota Twin Cities

2015 Cancer Research, Education, and Training Experience (CREATE) Internship, Masonic Cancer Center, University of Minnesota Twin Cities

2014-2015 Charles & Myrtle Stroud Scholarship, University of Minnesota Twin Cities

Awards and Honors

2025 1st Place Graduate Student Poster Presentation, OHSU School of Medicine Research Forum. *Bioprinting 3D Spatially Resolved Tumor Avatars to Mimic the Native Tumor Microenvironment*

2025 Selected Speaker, Cancer Engineering: The Convergence of Engineering and Health to Advance Cancer Research and Care: A Workshop, National Academies of Sciences, Engineering, and Medicine

2025 Travel Award Recipient, National Cancer Policy Forum - Cancer Engineering Workshop, National Academies of Sciences, Engineering, and Medicine

2025 Featured in BioTechniques's *Pick of the posters: AACR 2025*

2025 Excellence in Research Award. OHSU Flame Awards. All-Hill Student Council

2024 Invited Visiting Scholar, Rebecca Fitzgerald Lab, Early Cancer Institute, University of Cambridge. 3 months fully funded

2023 1st Place Poster Presentation, Oregon Bioengineering Symposium. *Bioprinting the Tumor Microenvironment with Single-Cell Resolution to Model the Spatial Dynamics of Tumor Evolution in Breast Cancer*

2023 Research Featured in Oregon Public Broadcasting's *All Science. No Fiction.* Series

2022 1st Place PhD Student Poster Presentation, OHSU School of Dentistry Research Day. *Single Cell Bioprinted Cell Circuits for the Systematic Assessment of Cell-Cell Communication in the Early Tumor Microenvironment*

2022 1st Place Poster Presentation, Department of Biomedical Engineering Research Retreat. *Development of a Single-Cell Bioprinting Platform for the Systematic Assessment of Cell-Cell Communication Effects in the Early Tumor Microenvironmen.*

2022 1st Place Graduate Student Poster Presentation, Oregon Bioengineering Symposium. *Development of a Single-Cell Bioprinting Platform for Systematic Assessment of Cell-Cell Communication*

2019 Visible Human Project featured in National Geographic's *The Future of Medicine* Special Issue

2019 2nd Place Poster Presentation in the Engineering, Technology, and Math Division at the Research and Creative Arts Symposium, University of Colorado Denver

2017 Community Engagement Scholar Distinction, University of Minnesota Twin Cities

2017 College of Liberal Arts Exceptional Student, University of Minnesota Twin Cities

2016 College of Liberal Arts Exceptional Student, University of Minnesota Twin Cities

2016 College of Liberal Arts Fall Deans List, University of Minnesota Twin Cities

2015 College of Liberal Arts Exceptional Student, University of Minnesota Twin Cities

2013 Valedictorian, Kerkhoven-Murdock-Sunburg High School

Publications

1. **Helms HR,** Davies AE, Schutt CE, Langer EM, Duhen R, Sinawang PD, Akin D, Esener S, Demirci U, Fitzgerald RC, Bertassoni LE. Engineering and Biofabrication of Early Cancer Models. *Nature Reviews Bioengineering.* 2025. In press.
2. **Helms HR** and Bertassoni LE. Single-cell spatial transcriptomic profiling of cultured cells and engineered tissues without embedding or sectioning. *STAR Protocols.* 2025. DOI: 10.1016/j.xpro.2025.104074
3. **Helms HR**, Oyama KA, Ware JP, Ibsen SD, Bertassoni LE. Multiplex Single-Cell Bioprinting for Engineering of Heterogeneous Tissue Constructs with Subcellular Spatial Resolution. *bioRxiv.* 2024. DOI: 10.1101/2024.02.01.578499
4. Visalakshan RM, Lowrey MK, Sousa MGC, **Helms HR**, Samiea A, Schutt CE, Moreau JM, Bertassoni LE. Opportunities and Challenges to Engineer 3D Models of Tumor-Adaptive Immune Interactions. *Front. Immunol.* 2023. DOI: 10.3389/fimmu.2023.1162905
5. Galliger Z, Vogt CD, **Helms HR**, Panoskaltsis-Mortari A. Extracellular Matrix Microparticles Improve GelMA Bioink Resolution for 3D Bioprinting at Ambient Temperature. *Macromo. Mater. Eng.* 2022. DOI: 10.1002/mame.202200196
6. Tan YH*, **Helms HR***, Nakayama KH. Decellularization Strategies for Regenerating Cardiac and Skeletal Muscle Tissues. *Front Bioeng Biotechnol.* 2022. DOI: 10.3389/fbioe.2022.831300 *Co-first authors
7. Spratt JR, Mattison LM, Iaizzo PA, Brown RZ, **Helms H**, Iles T, Howard BT, Panoskaltsis-Mortari A, Loor G. An Experimental Study of the Recovery of Injured Porcine Lungs with Prolonged Normothermic Cellular Ex Vivo Lung Perfusion Following Donation after Circulatory Death. *Transplant Int.* 2017. DOI: 10.1111/tri.12981
8. Spratt JR, Loor G, Mattison L, Meyer C, Ehrhardt M, **Helms H**, Panoskaltsis-Mortari A. In Vitro Analysis of RBC-Mediated Lung Injury in Prolonged Ex Vivo Lung Perfusion. *J. Heart Lung Transplantation.* 2017. DOI: 10.1016/j.healun.2017.01.1507
9. Loor G, Howard BT, Spratt JR, Mattison LM, Panoskaltsis-Mortari A, Iles TL, Meyer CM, **Helms HR**, Price A, Iaizzo PA. Prolonged EVLP using OCS Lung: Cellular and Acellular Perfusates. *Transplantation*. 2017. DOI: 10.1097/TP.0000000000001616

10. **Helms H**. The Sphygmomanometer and its Impact on Clinical Practice. *Recommended Dose. Bulletin of the History of Medicine.* 2016.

Conference Proceedings

1. **Helms HR,** Tahayeri A, Davies AE, Langer EM, Bertassoni LE. Bioprinting 3D spatially resolved tumor avatars to mimic the native tumor microenvironment. *Cancer Research*. 2025. DOI: 10.1158/1538-7445.AM2025-LB161
2. **Helms HR,** Oyama KA, Davies AE, Langer EM, Bertassoni LE. An Engineered Breast Tumor Microenvironment Model, with Single-Cell Spatial Resolution, to Assess Spatial Dynamics of Tumor Evolution. *Cancer Research*. 2024. DOI:10.1158/1538-7445.AM2024-4217
3. **Helms HR**, Davies AE, Duhen R, Moreau JM, Langer EM, Bertassoni LE. Single Cell Bioprinted Cell Circuits for the Systematic Assessment of Cell-Cell Communication in the Early Tumor Microenvironment*. Cancer Research.* 2023. DOI: 10.1158/1538-7445.AM2023-LB161
4. Alfonzo D, Tucker A, Rothweiler P, Galliger Z, **Helms H**, Erdman A, Panoskaltsis-Mortari A. The Process Implementation of Micro Manufactured SLA Printed Nasopharyngeal Swabs. *Proceedings of the 2021 Design of Medical Devices Conference. American Society of Mechanical Engineers.* 2021. DOI: 10.1115/DMD2021-1079
5. **Helms HR**, Jarrell DK, Jacot JG. Generation of Cardiac Organoids Using Cardiomyocytes, Endothelial Cells, Epicardial Cells, and Cardiac Fibroblasts Derived from Human Induced Pluripotent Stem Cells. *The FASEB Journal.* 2019. DOI:10.1096/fasebj.2019.33.1_supplement.lb170

Oral Presentations

1. **Helms HR,** Tahayeri A, Davies AE, Langer EM, Bertassoni LE. *Bioprinted Tumor Avatars with Native Cellular Resolution and Heterogeneity as a Platform for Spatial Cancer Biology.* Knight Research Day, Knight Cancer Institute, Oregon Health and Science University. Portland, OR. Sept 4, 2025.
2. **Helms HR,** Tahayeri A, Davies AE, Langer EM, Bertassoni LE. *Engineering High-Fidelity Early Cancer Models: Single-Cell Bioprinting in 2D and 3D to Mimic the Native Tumor Microenvironment.* The National Academies of Sciences, Engineering, and Medicine Workshop on Cancer Engineering: The Convergence of Engineering and Health to Advance Cancer Research and Care. Washington DC. May 20-21, 2025.
3. **Helms HR** and Bertassoni LE. *Dissecting Tumor Microenvironment Crosstalk using Spatial Transcriptomics and Precision Engineered Tumor Avatars.* Cancer Early Detection Advanced Research (CEDAR) Center All Team Meeting, Knight Cancer Institute, Oregon Health and Science University. Portland, OR. May 13, 2025.
4. **Helms HR** and Bertassoni LE. *Spatial Transcriptomics for Engineered Tissues*. Knight Cancer Institute, Precision Biofabrication Hub Work in Progress Series. Oregon Health and Science University. Portland, OR. March 14, 2025.
5. **Helms HR,** Tahayeri A, Bertassoni LE. *Building Tumor Microenvironment Avatars One Cell at a Time*. Cancer Early Detection Advanced Research (CEDAR) Center Scientific Advisory Board Meeting. Knight Cancer Institute, Oregon Health and Science University. Portland, OR. October 29, 2024.
6. **Helms HR**. *Cancer Early Detection and Precision Biofabrication.* Invited. Sacred Heart Lions Club. Sacred Heart, MN. September 6, 2024.
7. **Helms HR**, Tahayeri A, Bertassoni LE. *Engineering Designer Organoids with Controlled Spatial Resolution.* Cancer Early Detection Advanced Research (CEDAR) Center All Team Meeting, Knight Cancer Institute, Oregon Health and Science University. Portland, OR. August 27, 2024.
8. **Helms HR**, Oyama KA, Ware JP, Bertassoni LE. *Single-Cell Bioprinting for Engineering Heterogeneous Tissues with Subcellular Spatial Precision.* The 7th Tissue Engineering Regenerative Medicine International Society (TERMIS) World Congress. Multicellular Models of the Tumor Microenvironment. Seattle, WA. June 26, 2024.
9. **Helms HR**, Oyama KA, Davies AE, Langer EM, Bertassoni LE. *Building Tumor Models with Single Cell Spatial Resolution Using Microfluidic Bioprinting.* Department of Biomedical Engineering Seminar Series, Oregon Health and Science University. Portland, OR. December 1, 2023.

10. **Helms HR**, Oyama KA, Davies AE, Langer EM, Bertassoni LE. *Building Tumor Models with Single Cell Spatial Resolution Using Microfluidic Bioprinting.* The 5th Annual Australian Bioprinting Workshop for Tissue Engineering and Regenerative Medicine. Sydney, Australia. November 20, 2023.
11. **Helms HR**, Oyama KA, Davies AE, Moreau JM, Langer EM, Bertassoni LE. *Building Tissues with Single Cell Spatial Resolution Using Microfluidic Bioprinting.* Oregon Bioengineering Symposium. Eugene, OR. November 3, 2023.
12. **Helms HR**, Oyama KA, Davies AE, Moreau JM, Langer EM, Bertassoni LE. *Building Tissues with Single Cell Spatial Resolution Using Microfluidic Bioprinting.* Biomedical Engineering Department Seminar Series, Oregon Health and Science University. Portland, OR. August 11, 2023.
13. **Helms HR** and Bertassoni LE. *Single Cell Bioprinted Cell Circuits for the Systematic Assessment of Cell-Cell Communication in the Early Tumor Microenvironment.* Oregon Health and Science University Research Week. Portland, OR. May 3, 2023.
14. **Helms HR**, Tahayeri A, Bertassoni LE. *Precision Biofabrication: Microfluidic Single Cell Bioprinting.* Oregon Health and Science University Research Week. Portland, OR. May 3, 2022.
15. **Helms HR**, Tahayeri A, Sousa M, Bertassoni LE. *Precision Biofabrication: Microfluidic Single Cell Bioprinting.* Oregon Health and Science University School of Dentistry Research Day. Portland, OR. March 3, 2022.
16. **Helms HR**. *Bioprinting and Regenerative Medicine Research at the University of Minnesota's Bioprinting Core Facility.* Invited Speaker. Sacred Heart Lions Club Monthly Meeting. Sacred Heart, MN. March 1, 2021.
17. **Helms HR**, Jarrell DK, Jacot JG. *Generation of Cardiac Organoids Using Induced Pluripotent Stem Cells, 3D Culture, and Simulated Microgravity*. Modern Human Anatomy Seminar Series, University of Colorado Anschutz Medical Campus. Aurora, CO. December 6, 2018.

Poster Presentations

1. **Helms HR,** Tahayeri A, Davies AE, Langer EM, Bertassoni LE. *Engineering High-Fidelity Early Cancer Models: Single-Cell Bioprinting in 2D and 3D to Mimic the Native Tumor Microenvironment.* The National Academies of Sciences, Engineering, and Medicine Workshop on Cancer Engineering: The Convergence of Engineering and Health to Advance Cancer Research and Care. Washington DC. May 20-21, 2025.
2. **Helms HR,** Tahayeri A, Davies AE, Langer EM, Bertassoni LE. *Bioprinting 3D Spatially Resolved Tumor Avatars to Mimic the Native Tumor Microenvironment.* American Association for Cancer Research (AACR) Annual Meeting. Chicago, IL. April 28, 2025.
3. **Helms HR**, Oyama KA, Davies AE, Langer EM, Bertassoni LE. *An Engineered Breast Tumor Microenvironment Model, with Single-Cell Spatial Resolution, to Assess Spatial Dynamics of Tumor Evolution*. American Association for Cancer Research (AACR) Annual Meeting. San Diego, CA. April 9, 2024.
4. **Helms HR**, Oyama KA, Davies AE, Moreau JM, Langer EM, Bertassoni LE. *Building Tissues with Single Cell Spatial Resolution Using Microfluidic Bioprinting.* Oregon Bioengineering Symposium. Eugene, OR. November 3, 2023.
5. **Helms HR**, Oyama KA, Davies AE, Moreau JM, Langer EM, Bertassoni LE. *Bioprinting the Tumor Microenvironment with Single-Cell Resolution to Model the Spatial Dynamics of Tumor Evolution in Breast Cancer.* Early Detection of Cancer Conference 2023. London, UK. October 10, 2023.
6. **Helms HR**, Oyama KA, Tahayeri A, Singh NK, Mishra A, Davies AE, Moreau JM, Langer EM, Bertassoni LE. *Bioprinting the Tumor Microenvironment with Single-Cell Resolution to Model the Spatial Dynamics of Tumor Evolution in Breast Cancer.* National Cancer Institute Patient-Derived Models of Cancer and Cancer Tissue Engineering Collective Joint Annual Meeting. Portland, OR. August 31, 2023.
7. **Helms HR**, Davies AE, Duhen R, Moreau JM, Langer EM, Bertassoni LE. *Single Cell Bioprinting: a Novel Tool for the Systematic Assessment of Single Cell Spatial Dynamics.* Spatial Biology USA 2023, Oxford Global. Boston, MA. June 8, 2023.

8. **Helms HR**, Davies AE, Duhen R, Moreau JM, Langer EM, Bertassoni LE. *Single Cell Bioprinting: a Novel Tool for the Systematic Assessment of Single Cell Spatial Dynamics on Tumor Evolution.* Single-Cell Spatial Analysis of Cancer Mini-Symposium. Portland, OR. May 15, 2023.
9. **Helms HR**, Davies AE, Duhen R, Moreau JM, Langer EM, Bertassoni LE. *Single Cell Bioprinted Cell Circuits for the Systematic Assessment of Cell-Cell Communication in the Early Tumor Microenvironment.* American Association for Cancer Research (AACR) Annual Meeting. Orlando, FL. April 17, 2023.
10. **Helms HR**, Davies AE, Duhen R, Moreau JM, Langer EM, Bertassoni LE. *Single Cell Bioprinted Cell Circuits for the Systematic Assessment of Cell-Cell Communication in the Early Tumor Microenvironment.* School of Dentistry Research Day. Portland, OR. March 2, 2023.
11. **Helms HR** and Bertassoni LE. *Development of a Single-Cell Bioprinting Platform for the Systematic Assessment of Cell-Cell Communication Effects in the Early Tumor Microenvironment.* Oregon Health and Science University Department of Biomedical Engineering Research Retreat. Portland, OR. December 12, 2022.
12. **Helms HR** and Bertassoni LE. *Development of a Single-Cell Bioprinting Platform for the Systematic Assessment of Cell-Cell Communication Effects in the Early Tumor Microenvironment. Knight to Knight Biofabrication Retreat,* University of Oregon Knight Campus and Oregon Health and Science University Knight Cancer Institute. Portland, OR. November 18, 2022.
13. **Helms HR** and Bertassoni LE. *Development of a Single-Cell Bioprinting Platform for the Systematic Assessment of Cell-Cell Communication Effects in the Early Tumor Microenvironment.* Cancer Early Detection Conference. Portland, OR. October 18-20, 2022.
14. **Helms HR** and Bertassoni LE. *Development of a Single-Cell Bioprinting Platform for Systematic Assessment of Cell-Cell Communication.* Oregon Bioengineering Symposium 2022. Corvallis, OR. October 6, 2022.
15. **Helms HR**, Spitzer VM. *Visualization of Coronary Artery Disease Using 3D Printed Models.* Modern Human Anatomy 3D Printing Group Spring Meeting 2019. Aurora, CO. May 14, 2019.
16. **Helms HR**, Spitzer VM. *A Shocking Presentation of Coronary Artery Disease: An Inside Look from the Susan Potter Dataset.* Exhibit Presentation. Research and Creative Arts Symposium. Denver, CO. April 26, 2019.
17. **Helms HR**, Jarrell DK, Jacot JG. *Generation of Cardiac Organoids Using Cardiomyocytes, Endothelial Cells, Epicardial Cells, and Cardiac Fibroblasts Derived from Human Induced Pluripotent Stem Cells.* Modern Human Anatomy Capstone Project Symposium. Aurora, CO. April 22, 2019.
18. **Helms HR**, Jarrell DK, Jacot JG. *Generation of Cardiac Organoids Using Cardiomyocytes, Endothelial Cells, Epicardial Cells, and Cardiac Fibroblasts Derived from Human Induced Pluripotent Stem Cells.* Regenerative Medicine, Stem Cells, Wound Healing and Bioengineering Poster Session. American Association for Anatomy Annual Meeting at Experimental Biology 2019. Orlando, FL. April 9, 2019.
19. **Helms H**, Meyer CM, Panoskaltsis-Mortari A. *Recellularization of Decellularized Lung Matrix Using Definitive Endoderm Cells Derived from Induced Pluripotent Stem Cells.* University of Minnesota - Twin Cities Undergraduate Research Symposium. Minneapolis, MN. April 20, 2017.

In the News

2025 *A research revolution: multiomic and spatial techniques in cancer biology.* BioTechniques. https://www.biotechniques.com/cancer-research/a-research-revolution-multiomic-and-spatial-techniques-in-cancer-biology/

2025 *Pick of the posters: AACR 2025.* BioTechniques. https://www.biotechniques.com/cancer-research/pick-of-the-posters-aacr-2025/

2024 *What if we could 3D print new organs?* The Lund Report. https://www.thelundreport.org/content/what-if-we-could-3d-print-new-organs

2023 *Oregon scientists are 3D printing their way to a healthier future for us all*. Oregon Public Broadcasting. https://www.opb.org/article/2023/02/14/oregon-scientists-are-3d-printing-their-way-to-a-healthier-future-for-us-all/

2023 *What if we could 3D print new organs?* PBS All Science. No Fiction. https://www.pbs.org/video/what-if-we-could-3d-print-new-organs-cnkp85/

Teaching Experience

Summer 2025	**Guest Lecture**, Biomedical & Bioinformatics Research Internship and Training Experience (B-BRITE) Lecture Series. Engineering and Biofabrication of Cancer Models: 3D Printing, Organoids, and Organs-on-a-Chip. Oregon Health and Science University
Fall 2020	**Lab Instructor**, BMEn 5361: 3D Bioprinting University of Minnesota – Twin Cities
Fall 2019	**Lab Instructor**, BMEn 5361: 3D Bioprinting University of Minnesota – Twin Cities
Fall 2018	**Teaching Assistant**, Medical School Human Body Block University of Colorado – Anschutz Medical Campus

Leadership and Service Activities

2025	Outreach Volunteer, Lab demonstrations of robotics in tissue engineering and biofabrication.
2025	Poster Judge, Biomedical & Bioinformatics Research Internship and Training Experience (B-BRITE) Symposium, Knight Cancer Institute, OHSU
2025	Speaker, How to Design a Successful Biomedical & Bioinformatics Research Internship and Training Experience (B-BRITE) Internship Information Session, Knight Cancer Institute, OHSU
2025	Admissions Committee, Biomedical & Bioinformatics Research Internship and Training Experience (B-BRITE), Knight Cancer Institute, OHSU
2024	Ad hoc Journal Reviewer, Advanced Materials, under Luiz Bertassoni's direction (2 articles)
2024	Poster Judge, Biomedical & Bioinformatics Research Internship and Training Experience (B-BRITE) Symposium, Knight Cancer Institute, OHSU
2024	Mentor, Undergraduate Student, Biomedical & Bioinformatics Research Internship and Training Experience (B-BRITE) Summer Internship, Knight Cancer Institute, OHSU
2024	Poster Judge, Partnership for Scientific Inquiry, OHSU
2024	Mentor, High School Student, Partnership for Scientific Inquiry, OHSU
2024	Outreach Volunteer, NOVA Program - Cub Scouts Pack 254, Introduction to Tissue Engineering Lab Tours, OHSU
2023	Mentor, Undergraduate Student, Cell, Developmental, and Cancer Biology (CDCB), Knight Cancer Institute Summer Internship, OHSU
2023	Ad hoc Journal Reviewer, Biomicrofluidics, under Luiz Bertassoni's direction (1 article)
2023	Outreach Volunteer, Eureka! STEM Magnet Program for 8-12 grade youth, Meet a Biomedical Scientist Day, Hosted by Woman in Science PDX x BMES, OHSU
2023	Mentor, High School Student, Partnership for Scientific Inquiry, OHSU
2023	Mentor, High School Student, Summer Volunteer
2023	Interviewer, Biomedical Engineering PhD Program Admissions, OHSU
2022	Mentor, High School Student, Summer Volunteer
2022 – 2023	Treasurer, Biomedical Engineering Society (BMES) Executive Board, OHSU Chapter
2022 – 2023	Liaison, Biomedical Engineering graduate program liaison for OHSU's Graduate Student Organization (GSO)
2019	Interviewer, Modern Human Anatomy MS Program Admissions, CU Anschutz.

2018 – 2019	GED Instructor, Denver Rescue Mission, Denver, CO
2018 – 2019	K-12 Tutor, Denver Rescue Mission, Denver, CO
2016 – 2017	Youth Coach, 13U Basketball and 13U Softball, Minneapolis Parks and Recreation
2016	Co-President, Global Medical and Dental Brigades, University of Minnesota
2015 – 2016	K-12 Tutor, Safe Place Homework Help, Minneapolis, MN
2014 – 2017	Volunteer, Medical Reserve Corps, University of Minnesota
2014 – 2016	Volunteer, Global Medical and Dental Brigades, University of Minnesota

Professional Experience

2018 – 2019	**Anatomical Segmentation and 3D Modeling Specialist** Touch of Life Technologies, Aurora, CO
2018 – 2019	**Medical Scribe** University of Colorado Emergency Department, Aurora, CO
2018	**Anatomy Tutor**, School of Medicine University of Colorado – Anschutz Medical Campus

Professional Membership

2023 – Present	American Association for Cancer Research (AACR)
2023 – 2024	Biomedical Engineering Society (BMES)
2022 – Present	International Alliance for Cancer Early Detection (ACED)
2021 – 2024	International Society for Stem Cell Research (ISSCR)
2019	American Association of Anatomists (AAA)

Technical Skills

3D Printing/Bioprinting	Microfluidic Single-Cell, Two Photon, Laser Induced Forward Transfer, Extrusion, Stereolithography/Digital Light Processing
Tissue Engineering	Decellularization, recellularization, custom bioreactor development, GelMA synthesis, bioink cytocompatibility testing, cytotoxicity screening
Patient Derived Organoids	Esophageal: Barrett's, adenocarcinoma, and radiation resistant adenocarcinoma
Primary Cell Isolation	Human: esophageal epithelial cells, esophageal fibroblasts, and T cells (from whole blood) Mouse: bone marrow-MSC and aortic endothelial cells
Cell Differentiation	hiPSC derived: cardiac fibroblasts, cardiomyocytes, definitive endoderm cells, endothelial cells, and epicardial cells MSC-BM derived: adipocytes, chondrocytes, and osteoblasts THP-1 derived: macrophages
Histology/Microscopy	Paraffin and fresh frozen sample preparation, microtome and cryostat sectioning, immunohistochemistry, immunofluorescence, bright field microscopy, fluorescent microscopy, confocal microscopy, live cell imaging
Molecular Biology	Spatial transcriptomics, RNA extraction, cDNA synthesis, quantitative real-time PCR, cloning, bacterial culture, plasmid isolation and purification, gel electrophoresis, Sanger sequencing, transfection, transduction, flow cytometry
Computational Biology	Sequencing alignment: SpaceRanger Pipeline by 10x Genomics

	Visium HD spatial transcriptomic analysis: Seurat in R and MuSpAn in Python
Human Cell Culture	A2780 (ovarian cancer), A549 (lung cancer), Adventitial fibroblasts (arterial), Aortic smooth muscle cells, Blood outgrowth endothelial cells, Breast cancer associated fibroblasts, Bronchial epithelial cells, CPA (Barrett's esophagus epithelial line), CWR-r1 (prostate cancer), Dermal fibroblasts, DLD1 (colorectal cancer), Epidermal keratinocytes, Esophageal epithelial cells, Esophageal fibroblasts, Esophageal smooth muscle cells, FL0-1 (esophageal cancer), H522 (lung cancer), HCC1143 (breast cancer), HCT116 (colorectal cancer), Induced pluripotent stem cells, Lung fibroblasts, Macrophages, Mammary epithelial cells, Mammary fibroblasts, Mammary myoepithelial cells, MCF7 (breast cancer), MCF10A (mammary epithelial), MDA-MB-231 (breast cancer), M4A4 (melanoma), MA148 (ovarian cancer), macrophages, microvascular endothelial cells, Mesenchymal stem/stromal cells, osteoblasts, OVCAR5 (ovarian cancer), PC3 (prostate cancer), SH-SY5Y (neuronal), SKOV-3 (ovarian cancer), SUM149PT (breast cancer), THP-1 (monocytes), Umbilical vein endothelial cells (HUVEC), 239T (embryonic kidney)
In Vivo Models	Mouse and porcine intramuscular injections, intravascular injections, sedation, euthanasia, dissection
Modeling & Segmentation	Solidworks, Fusion 360, MAYA, CloudCompare, Slicer, Blender, SketchFab, VHD Segmentor
3D Animation	MAYA
Lab Management	Trainee mentorship, inventory, ordering, waste management, equipment maintenance, external consulting, billing (core facility usage and consulting)