

1. Personal Information

William J. Polacheck
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2. Education

Ph.D.	2013	Massachusetts Institute of Technology, Mechanical Engineering
S.M.	2010	Massachusetts Institute of Technology, Mechanical Engineering
B.S.	2008	Cornell University, Biological and Environmental Engineering

3. Professional Experience

3.1 Employment History

- **Assistant Professor** in the Joint Department of Biomedical Engineering at the University of North Carolina at Chapel Hill and North Carolina State University, 2018 – Present
- **NIH/NHLBI Post-Doctoral Fellow** at the Wyss Institute for Biologically Inspired Engineering, Harvard University (PI Christopher Chen), 2016 – 2018.
- **NIH/NBIB Training Fellow** in Organ Design and Engineering, Harvard University (PI Christopher Chen), 2015 – 2018.
- **NSF Graduate Research Assistant** in the Department of Biomedical Engineering at M.I.T. (PI Roger Kamm), 2008 – 2013.

3.2 Appointments at Hospitals/Affiliated Institutions

- Member, Blood Research Center, University of North Carolina at Chapel Hill, 2021 – present
- Adjunct Assistant Professor, Department of Cell Biology and Physiology, University of North Carolina at Chapel Hill, 2020 – present
- Member, McAllister Heart Institute, University of North Carolina at Chapel Hill, 2020 - present
- Member, Cancer Cell Biology Program, Lineberger Comprehensive Cancer Center, University of North Carolina at Chapel Hill, 2018 – present
- Member, Functional Tissue Engineering Program, Comparative Medicine Institute, North Carolina State University, 2018 – present
- NSF Center for Engineering Mechanobiology, Affiliate Member, 2018 - present

4. Honors

- Cellular and Molecular Bioengineering Young Innovator Award, Biomedical Engineering Society, 2024
- Biomedical Engineering Department Teaching and Mentoring Award, 2022
- NIH Maximizing Investigator's Research Activities Award (MIRA), 2021
- Career Development Award, American Heart Association, 2021
- Wallace H. Coulter Translational Partnership award for translational research, 2018
- Editor's Choice Paper, Science Signaling, 2017
- NIH/NHLBI National Research Service Award, 2016
- Faculty of 1000 Associate Member of Cell Biology, 2016
- Student Paper Competition, ASME Summer Bioengineering Conference, 2010
- Graduate Research Fellowship, National Science Foundation, 2008
- James E. Rice Jr. Award for Excellence in Expository Writing, John S. Knight Institute for Writing in the Disciplines, Cornell University, 2007

5. Bibliography and Products of Scholarship

5.1 Books and Book Chapters

1. Du, Y., **Polacheck, W.J.**, Wells, R.G. 2021 “Bile Duct-On-a-Chip” in “Organ-On-a-Chip: Methods and Protocols.” Springer Nature (Ed. Rasponi, M.).
2. Ruhi, M.K., Rickard, B.P., **Polacheck, W.J.**, Rizvi, I.R. 2022 “Integrins in Ovarian Cancer: Survival Pathways, Malignant Ascites and Targeted Photochemistry” in “Recent Advances, New Perspectives and Applications in the Treatment of Ovarian Cancer.” IntechOpen (Ed. Friedrich, M.).

5.2 Refereed Articles

h-index: 27 Citations: 5,082

Google Scholar (April 2024)

ORCID: [0000-0003-2728-0746](https://orcid.org/0000-0003-2728-0746)

5.2.1 Refereed Articles with UNC Affiliation

1. Farber, G., Qiaozi, W., Rathod, M.L., Wang, H., Dixit, M., Keepers, B., Xie, Y., Butz, K., **Polacheck, W.J.**, Liu, J., Qian, L* Direct conversion of cardiac fibroblasts into endothelial-like cells using Sox17 and Erg. *Nature Communications* (In press).
2. Doherty, E.L., Krohn, G., Warren, E.C., Patton, A., Whitworth, C.P., Rathod, M., Biehl, A., Aw, W.Y., Freytes, D.O., **Polacheck, W.J.*** Human cell-derived matrix composite hydrogels with diverse composition for use in vasculature-on-chip models. *Advanced Healthcare Materials* (In press).
3. Rathod, M., Aw, W.Y., Huang, S.A., Lu, J., Doherty, E.L., Whitworth, C.P., Xi, G., Roy-Chaudhury, P., **Polacheck, W.J.*** (2024), Engineered blood vessels for predicting cardiovascular risk in chronic kidney disease. *Small*, 2307901. PMID pending (NIHMSID: 1969128).
4. Whitworth, C.P. and **Polacheck, W.J.*** (2024), Patient-derived vascular organs-on-chip: technologies to transform drug discovery and disease modeling. *Expert Opinions on Drug Discovery* 19(3): 339-351. PMID: PMC10922379
5. Rich, M.J., Burnash, S., Krishnan, R.R., Chubinskaya, S., Loeser, R.F., **Polacheck, W.J.**, Diekman, B.O.* (2023), Use of a novel magnetically actuated compression system to study axial and lateral strain and recovery in human osteochondral explants. *Journal of Biomechanics* 162: 11187. PMID: PMC10872462.
6. Du, Y., Jong, I.E.M., Gupta, K., Waisbourd-Zinman, O., Har-Zahav, A., Soroka, C.J., Boyer, J.L., Llewellyn, J., Liu, C., Naji., A., **Polacheck, W.J.**, Wells, R.G.* (2023) Human vascularized bile duct-on-a-chip: a multi-cellular microphysiological system for studying primary sclerosing cholangitis. *Biofabrication* 16(1): 15004. PMID: PMC10587873.
7. Wang, H., Aw, W.Y., Rathod, M., Huang, S.A., **Polacheck, W.J.** (2023) “A facile fluid pressure system reveals differential cellular response to interstitial pressure gradients and flow.” *Biomicrofluidics* 17(5):054103. PMID: PMC10539030.
8. Doherty, E.L, Aw, W.Y., Warren, E.C., Hockenberry, M., Krohn, G., Howell, S., Diekman, B.O., Legant, R.L., Nia, H.T., Hickey, A.J., **Polacheck, W.J.*** (2023) Patient-derived extracellular matrix demonstrates role of COL3A1 in blood vessel mechanics. *Acta Biomaterialia* Aug;166: 346-359. PMID: PMC10330735.
9. Aw, W.Y., Cho, C., Wang, H., Cooper, A.H., Doherty, E.L., Rocco, D., Huang, S.A., Kubik, S., Whitworth, C.P., Armstrong, R., Hickey, A.J., Griffith, B., Kutys, M.L., Blatt, J., **Polacheck, W.J.*** (2023) Microphysiological model of PIK3CA-driven vascular malformations reveals a role

of dysregulated Rac1 and mTORC1/2 in PIK3CA-driven lesion formation. *Science Advances* 9(7): eade8939. PMID: PMC9931220.

a. Covered in a UNC School of Medicine press release entitled, “How a new blood-vessel-on-a-chip can help researchers further understand vascular malformations.” [Link](#).

10. Conrad, C., Moore, K., **Polacheck, W.J.**, Rizvi, I.R., Scarcelli, G.* (2022) Water transport regulates nucleus volume, cell density, Young’s modulus, and E-cadherin expression in tumor spheroids. *European Journal of Cell Biology* 101(4): 151278.
11. Chhabra, A., Song, H.H., Grzelak, K.A., **Polacheck, W.J.**, Fleming, H.E., Chen, C.S., Bhatia, S.N. (2022) A vascularized model of the human liver mimics regenerative responses. *Proc. Nat. Acad. Sci. USA*. 119(28)e2115867119. PMID: PMC9282349.
12. Lee, G., Huang, S.A., Aw, W.Y., Rathod, M.L., Cho, C., Ligler, F.S., **Polacheck, W.J.*** (2022) Multilayer microfluidic platform for the study of luminal, transmural, and interstitial flow. *Biofabrication* 14(2022) 025007. PMID: PMC8867496.
13. Pérez-Rodríguez, S., Huang, S.A., Borau, C., García-Aznar, **Polacheck, W.J.*** (2021) Microfluidic model of monocyte extravasation reveals the role of hemodynamics and subendothelial matrix mechanics in regulating endothelial integrity. *Biomicrofluidics* 15(15), 054102. PMID: PMC8443302.
14. Wang, W.Y., Kent, R.N., Huang, S.A., Jarman, E.H., Shikanov, E.H., Davidson, C.D., Hiraki, H.L., Lin, D., Wall, M.A., Shin, J., **Polacheck, W.J.**, Shikanov, A., Baker, B.M.* (2021) Direct comparison of angiogenesis in natural and synthetic biomaterials reveals matrix porosity regulates endothelial cell invasion speed and sprout diameter. *Acta Biomaterialia*. S1742-7061(21)00571-7. PMID: PMC8595798.
15. Rickard, B.P., Conrad, C., Sorrin, A.J., Ruhi, M.K., Reader, J.C., Huang, S.A., Franco, W., Scarcelli, G., **Polacheck, W.J.**, Roque, D.M., del Carmen, M.G., Huang, H.C., Demirci, U., Rizvi, I.* (2021) Malignant ascites in ovarian cancer: cellular, acellular, and biophysical determinants of molecular characteristics and therapy response. *Cancers* 13(17):4318. PMID: PMC8430600.
16. Liu, J., Long, H., Zeuschner, D., Rader, A.F.B., **Polacheck, W.J.**, Kessler, H., Sorokin, L., Trappmann, B.* (2021) Synthetic extracellular matrices with tailored adhesiveness and degradability support lumen formation during angiogenic sprouting. *Nature Communications* 12(1), 3402. PMID: PMC8184799.
17. Thomas, K., Henley, T., Rossi, S., Costello, J., **Polacheck, W.J.**, Griffith, B., Bressan, M.* (2021) Adherens junction engagement regulates functional patterning of the cardiac pacemaker cell lineage. *Developmental Cell* 56(10):1498-1511.e7. PMID: PMC8137639.
18. Conrad, C., Moore, K., **Polacheck, W.J.**, Rizvi, I.R., Scarcelli, G.* (2021) Mechanical modulation of tumor nodules under flow. *IEEE Transactions in Biomedical Engineering* 69(1): 294-301. PMID: PMC8750319.
19. Doherty, E.L.* , Aw, W.Y.* , Hickey, A.J., **Polacheck, W.J.*** (2021) Microfluidic and organ-on-a-chip approaches to investigate cellular and microenvironmental contributions to cardiovascular function and pathology. *Frontiers in Bioengineering and Biotechnology* 9:624435. PMID: PMC7890362.
20. Kutys, M.L.^, **Polacheck, W.J.^**, Welch, M.K., Gagnon, K., Koorman, T., Kim, S, Li, L., McClatchey, A.I., Chen, C.S.* (2020) Uncovering mutation-specific morphogenic phenotypes

and paracrine-mediated vessel dysfunction in a biomimetic vascularized mammary duct platform. *Nature Communications* 11:3377. PMID: PMC7338408.

21. Griffith, C.M.[^], Huang, S.A.[^], Cho, C., Khare, T.M., Rich, M., Lee, G., Ligler, F.S., Diekman, B.O., **Polacheck, W.J.*** (2020) Microfluidics for the study of mechanotransduction. *J. Physics Part D. Applied Physics* 53(22):224004. PMID: PMC8034607.
22. Wang, W.Y., Lin, D., Jarman, E.H., **Polacheck, W.J.**, Baker, B.M.* (2020) Functional angiogenesis requires microenvironmental cues balancing endothelial cell migration and proliferation. *Lab on a Chip* 20(6):1153-1166. PMID: PMC7328820.
23. Waldeland, J.O., **Polacheck, W.J.**, Evje, S.* (2020) Collective tumor cell migration in the presence of fibroblasts. *Journal of Biomechanics* 100:109568. PMID: PMC9215121.
24. Sorrin, A.J., Ruhi, M.K., Ferlic, N., Karimnia, V., **Polacheck, W.J.**, Celli, J.P., Huang, H.C., Rizvi, I.R.* (2020) Photodynamic Therapy and the Biophysics of the Tumor Microenvironment. *Photochemistry and Photobiology* 96(2), 232-259. PMID: PMC7138751.
25. Du, Y., Khandekar, G., Llewellyn, J., **Polacheck, W.J.**, Chen, C.S., Wells, R.G.* (2020) A bile duct-on-a-chip with organ-level functions. *Hepatology* 71(4):1350-1363. PMID: PMC7048662.
26. **Polacheck, W.J.**, Kutys, M.L., Tefft, J.B., Chen, C.S.* (2019) Microfabricated blood vessels for modeling the vascular transport barrier. *Nature Protocols* 14, 1425-1454. PMID: PMC7046311.
 - a. Featured on the cover.

5.2.2 Refereed Articles Prior to UNC

27. Lee, E.L, **Polacheck, W.J.**, Kwak, S., Wen, A., Nguyen, D.H.T., Kutys, M.L., Alimperti, S.A., Eyckmans, J., Bielenberg, D.R., Chen, H., Chen, C.S.* (2023) A biomimetic lymphatics-on-chip reveals ROCK2 as a therapeutic target for lymphedema. *Proc. Nat. Acad. Sciences USA*. 120(41): e2038941120. PMID: PMC10576061.
28. Benhamouche-Trouillet, S., O'Loughlin, E., Liu, C., **Polacheck, W.J.**, Fitament, J., El-Bardeesy, N., Chen, C.S., McClatchey, A.I.* (2018) Proliferation-independent role of NF2 (merlin) in limiting biliary morphogenesis. *Development* 145(9), 1-11. PMID: PMC6421364
29. Chopra, A. Kutys, M.L., Zhang, K., **Polacheck, W.J.**, Sheng, C., Eyckmans, J., Seidman, J.G., Seidman, C.E., Hinson, J.T., Chen, C.S. (2018) Force generation via β -cardiac myosin, titin, and α -actinin drives cardiac sarcomere assembly from focal adhesions. *Developmental Cell* 44(1), 87-96. PMID: PMC6421364.
30. **Polacheck, W.J.**[^], Kutys, M.L.[^], Yang, J., Eyckmans, J.E., Wu, Y., Vasavada, H., Hirschi, K.K., Chen, C.S.* (2017) A non-canonical Notch signaling complex regulates adherens junctions and endothelial barrier function. *Nature* 552(7684):258-262. PMID: PMC5730479.
 - a. Featured in a Current Biology dispatch: Fischer, A., and Braga, V.M.M. (2018) Vascular permeability: Flow-mediated non-canonical Notch signaling promotes barrier integrity. *Current Biology* 28(3):R119-R121. PMID: 29408259.
 - b. Featured as a spotlight in Trends in Cell Biology: Lagendijk, A.K., Yap, A.S., and Hogan, B.M. (2018) Notching a new pathway in vascular flow sensing. *Trends Cell Biol.* 28(3): 173-175. PMID: 29305160.
 - c. Highlighted in *Science Signaling* editor's choice – cell and molecular signaling.

31. Trappmann, B., Baker, B.M., **Polacheck, W.J.**, Choi, C.K., Burdick, J.A., Chen, C.S.* (2017) "Matrix degradability controls multicellularity of 3D cell migration." *Nature Communications* 8(1):371. PMID: PMC5575316.
32. Alimperti, S., Mirabella, T., Bajaj, V., **Polacheck, W.J.**, Ward, D., Duffield, J.D., Assoian, R., Chen, C.S. (2017) Three-dimensional biomimetic vascular model reveals a RhoA, Rac1, and N-cadherin balance in mural cell-endothelial cell-regulated barrier function. *Proc. Nat. Acad. Sciences. USA.* 114(33):8758-8763. PMID: PMC5565405.
33. McCurley, A., Alimperti, S., Campos-Bilderback, S.B., Sandoval, R.M., Calvino, J.E., Reynolds, T.L., Quigley, C., Mugford, J., **Polacheck, W.J.**, Dovey, J., Marsh, G., Huang, A., Qian, F., Wienreb, P.H., Dolinski, B.M., Moore, S., Duffield, J.S., Chen, C.S., Molitoris, B.A., Violette, S.M., Crackower, M.A.* (2017) Inhibition of $\alpha v \beta 5$ integrin leads to a pericyte-dependent attenuation of vascular permeability and protects against renal ischemia reperfusion injury. *J. Am. Soc. Nephrol.* 28(6):1741-1752. PMID: PMC5461783.
34. Abbas, Y., Oefner, C.M., **Polacheck, W.J.**, Gardner, L., Farrell, L., Sharkey, A., Kamm, R.D., Moffett, A., Oyen, M.L.* (2017) A microfluidics assay to study invasion of human placental trophoblast cells. *J. R. Soc. Interface* 14(13): 20170131. PMID: PMC454302.
35. **Polacheck, W.J.** and Chen, C.S.* (2016) Measuring cell-generated forces: a guide to the available tools. *Nature Methods* 13(5): 415-423. PMID: PMC5474291.
36. Scarcelli, G., **Polacheck, W.J.**, Nia, H.T., Grodzinsky, A.J., Kamm, R.D., Yun, S.H.* (2015) Noncontact three-dimensional mapping of intracellular hydro-mechanical properties by Brillouin microscopy. *Nature Methods* 12(12): 1132-1134. PMID: PMC4666809.
37. Hinson, J.T.[^], Chopra, A.C.[^], Nafissi, N., **Polacheck, W.J.**, Benson, C.C., Swist, S., Gorham, J., Yang, L., Schafer, S., Hubner, N., Church, G., Cook, S.A., Linke, W.A., Chen, C.S., Seidman, J.G., Seidman, C.E.* (2015) Sarcomere insufficiency in an iPS model of dilated cardiomyopathy from titin mutations. *Science* 349 (6251): 982-986. PMID: PMC4618316.
38. **Polacheck, W.J.** and Kamm, R.D.* (2014) "Responsible research in an international laboratory: personal perspectives from a lab member and principal investigator." *Journal of Philosophy, Science and Law* 14:13-31.
39. **Polacheck, W.J.**, German, A.E., Mammoto, A., Ingber, D.E., and Kamm, R.D.* (2014) Mechanotransduction of fluid stresses governs 3D cell migration. *Proc. Nat. Acad. Sciences USA.* 111(7): 2447-2452. PMID: PMC3932905.
40. Borau, C., **Polacheck, W.J.**, Kamm, R.D., Garcia-Aznar, J.M.* (2014) Probabilistic voxel-FE model for single cell motility in 3D. *In Silico Cell and Tissue Science* 1 (1), 2. PMID: PMC4538854
41. **Polacheck, W.J.**, Zervantonakis, I.K., and Kamm, R.D. (2013) Tumor cell migration through complex microenvironments. *Cell Mol. Life Sci.* 70(8): 1335-1356. PMID: PMC3557537.
 - a. Featured on the cover.
42. **Polacheck, W.J.**, Li, R., Uzel, S.U., and Kamm, R.D.* (2013) Microfluidic platforms for mechanobiology. *Lab on a Chip* 13(12):2252-2267. PMID: PMC3714214.
43. Chan, J.M., Zervantonakis, I.K., Rimchala, T., **Polacheck, W.J.**, Whisler, J., and Kamm, R.D.* (2012) Engineering of In Vitro 3D Capillary Beds by Self-Directed Angiogenic Sprouting. *PLoS ONE* 7(12): e508. PMID: PMC3514279.
 - a. Featured in *Lab on a Chip* Research Highlights February 2013 (DOI:

10.1039/c3lc90013d)

44. Chandler, E.M., Berglund, C.M., Lee, J.S., **Polacheck, W.J.**, Gleghorn, J.P., Kirby, B.J., and Fischbach, C.* (2011) Stiffness of Photocrosslinked RGD-Alginate Gels Regulates Adipose Progenitor Cell Behavior. *Biotechnology and Bioengineering* 108(7): 1683-1692. PMID: 21328324
45. **Polacheck, W.J.**, Charest, J.L., and Kamm, R.D.* (2011) Interstitial flow influences tumor cell migration through competing mechanisms. *Proc. Nat. Acad. Sciences USA*. 108(27): 11115-11120. PMCID: PMC3131352
46. Rouillard, A.D., Tsui, Y., **Polacheck, W.J.**, Lee, J.Y., Bonassar, L.J., and Kirby, B.J.* (2010) Control of the Electromechanical Properties of Alginate Tissue Scaffolds via Ionic and Covalent Crosslinking and Microparticle Doping. *Biomacromolecules* 11(8): 2184-2189. PMID: 20690725
47. Rouillard, A.D., Berglund, C.M., Lee, J.Y., **Polacheck, W.J.**, Tsui, Y., Bonassar, L.J., and Kirby, B.J.* (2010) Methods for photocrosslinking alginate hydrogel scaffolds with high cell viability. *Tissue Engineering Part C: Methods* 17(2): 173-179. PMID: 20704471

5.3 Refereed Articles with UNC Affiliation Submitted

1. Whitworth, C.P., Aw, W.Y., Doherty, E.L., Handler, C., Ambekar, Y., Sawhney, A., Scarcelli, G., **Polacheck, W.J.*** P300 modulates endothelial mechanotransduction of fluid shear stress. *Cellular and Molecular Bioengineering*.
2. Surendran, V., Safarulla, S., Ali, R., Griffith, C., Madan, A., **Polacheck, W.J.**, Chandrasekaran, A.* A Magnetically integrated Tumor-Vascular Interface System to mimic Pro-angiogenic Endothelial Dysregulations for On-Chip Drug Testing. *ACS Applied Materials & Interfaces*.
3. Moiseiwitsch, N., Pandit, S., Zwennes, N., Nellenbach, K., Sheridan, A., LeGrand, J., Chee, E., Ozawa, S., Troan, B., Aw, W.Y., **Polacheck, W.J.**, Haider, M., Brown, A.* Colloidal-fibrillar composite gels demonstrate structural reinforcement, secondary fibrillar alignment, and improved vascular healing outcomes. *Communications Engineering*.
4. Nidhi, Kubik, **Polacheck, W.J.**, Trappmann, B.*

*Corresponding Author

^Equal contributions

5.4 Conference Abstracts

1. Stack, R.N., Doherty, E.L., and **Polacheck, W.J.** Development of a scalable, microcarrier-based approach to produce human cell-derived matrix hydrogels. BMES, Baltimore, MD, 2024.
2. Kubik, S.E., Doherty, E.L., Whitworth, C.P., and **Polacheck, W.J.** Cell-derived extracellular matrix substrate modulates endothelial cell response to fluid shear stress. BMES, Baltimore, MD, 2024.
3. Sawhney, A., Aw, W., and **Polacheck, W.J.** Single cell mechanical properties of *PIK3CA* activated mutant endothelial cells contribute to altered mechanotransduction under fluid shear stress. BMES, Baltimore, MD, 2024.
4. Aw, W. and **Polacheck, W.J.** Dysfunctional mechanotransduction regulates progression of vascular malformations. BMES, Baltimore, MD, 2024.

5. Whitworth, C.P. and **Polacheck, W.J.** P300 modulates endothelial mechanotransduction of fluid shear stress. McAllister Heart Institute Symposium, Chapel Hill, NC, 2024.
6. Rathod, M., Xi, G., Roy-Chaudhury, P., **Polacheck, W.J.** A microfluidic approach for cardiovascular risk stratification in CKD and ESKD patients. ASN, Philadelphia, PA, 2023.
7. Whitworth, C.P., **Polacheck, W.J.** P300 modulates cytoskeletal dynamics in vascular endothelial cells. BMES, Seattle, WA, 2023.
8. Rathod, M., Aw, W.Y., Huang, S., Lu, J., Doherty, E., Xi, G., Roy-Chaudhury, P., **Polacheck, W.J.** Human serum perfused engineered microvessel on a chip: a test bed to assess microvascular integrity to uremic toxins. BMES, Seattle, WA, 2023.
9. Kubik, S., Doherty, E.L., Whitworth, C.P., **Polacheck, W.J.** Cell-derived extracellular matrix modulates response to fluid shear stress. BMES, Seattle, WA, 2023.
10. Doherty, E.L., Krohn, G., Warren, E.C., Patton, A., Whitworth, C.P., Rathod, M., Aw, W.Y., Biehl, A., Freytes, D.O., **Polacheck, W.J.** Cell-derived matrix hydrogels allow for generation of human vessel-on-chip system. BMES, Seattle, WA, 2023.
11. Aw, W.Y., Cho, C., Wang, H., Cooper, A.H., Doherty, E.L., Rocco, D., Huang, S.A., Kubik, S., Whitworth, C.P., Armstrong, R., Hickey, A.J., Griffith, B., Kutys, M.L., Blatt, J., **Polacheck, W.J.** Microphysiological model of PIK3CA-driven vascular malformations reveals a role of dysregulated Rac1 and mTORC1/2 in lesion formation. Angiogenesis Gordon Research Conference, Newport, RI, 2023.
12. Meehan, S.M., Huang, S.A., Kubik, S., **Polacheck, W.J.** Versatile fabrication of perfusable human microvessels with a commercially available 3D printer. BMES, San Antonio, TX, 2022.
13. Kubik, S., Lee, G., Ligler, F.L., **Polacheck, W.J.** 3D printed cone rheometer for high-throughput characterization of fluid mechanotransduction. BMES, San Antonio, TX, 2022.
14. Rathod, M., Doherty, E.L., Huang, S.A., Aw, W.Y., Roy-Chaudhury, P. **Polacheck, W.J.** A comparative study on the application of human plasma and serum as a culture media for endothelial cells. BMES, San Antonio, TX, 2022.
15. Doherty, E.L., Warren, E.C., Krohn, G., Howell, S., Aw, W.Y., Diekman, B., Hickey, A.J., Nia, H.T., **Polacheck, W.J.** Vascular Ehlers-Danlos syndrome cell-derived-matrix elucidates role of COL3A1 mutations in ECM mechanics. International Vascular Biology Meeting, San Francisco, CA, 2022.
16. Whitworth, C. Doherty, E.L., Huang, S.A., Aw, W.Y., **Polacheck, W.J.** Blood outgrowth endothelial cells for engineering the vasculature. International Vascular Biology Meeting, San Francisco, CA, 2022.
17. Huang, S. **Polacheck, W.J.** Microfluidic approach for quantifying interstitial transport in the presence of transmural flow. Summer Biomechanics, Bioengineering, and Biotransport Conference. Cambridge, MD, 2022.
18. Warren, E.C., Doherty, E.L., Aw, W.Y., **Polacheck, W.J.** Characterizing extracellular matrix structure and assembly in vascular Ehlers-Danlos syndrome. BMES, Orlando, FL, 2021.
19. Huang, S.A., **Polacheck, W.J.** Microfluidic approach for quantifying vascular permeability in the presence of transmural flow. BMES, Orlando, FL, 2021.
20. Lee, G.L., Huang, S.A., Ligler, F.S., **Polacheck, W.J.** Multilayer microfluidic platform for the study of transmural and interstitial flow. BMES, Orlando, FL, 2021.

21. Doherty, E.L., Warren, E.C., Aw, W.Y., Howell, S., Hickey, A.J., **Polacheck, W.J.** Vascular Ehlers-Danlos Syndrome cell-derived-matrix elucidates role of collagen III in ECM mechanics. BMES, Orlando, FL, 2021.
22. Cho, C., Lee, G., Doherty, E.L., Antczak, L.M., Heise, R.L., **Polacheck, W.J.** Human derived 3D microvessels to study pulmonary vascular barrier function. Society for Biomaterials Annual Meeting, 2021.
23. Doherty, E.L., Aw, W.Y., Howell, S., Hickey, A.J., **Polacheck, W.J.** Extracellular matrix variability in vascular Ehlers-Danlos Syndrome. DEFY VEDS Scientific Meeting, Remote International Meeting 2021.
24. Cho, C., Huang, S.A., **Polacheck, W.J.** Engineering microvascular networks for the study of anastomosis. BMES, Virtual, 2020.
25. Young, Z., Henry, L., Golbasi, N., Stanley, M.E., Rizvi, I., **Polacheck, W.J.** Substrate stiffness and cell culture media formulation govern adhesion and spreading of ovarian cancer cells. BMES, Virtual, 2020.
26. Snyder-Mounts, E.L., Aw, W.Y., Hickey, A., **Polacheck, W.J.** Defining the role of extracellular matrix mechanics in vascular Ehlers-Danlos syndrome. BMES, Virtual, 2020.
27. Gagnon, K., Kutys, M.L., **Polacheck, W.J.**, McClatchey, A., Chen, C.S. In vitro model to assess structural and functional consequences of common breast cancer mutations. BMES, Virtual, 2020.
28. Griffith, C.M., **Polacheck, W.J.** Control of vascular barrier function through endothelial mechanotransduction. Cellular and Molecular Bioengineering Conference, Puerto Rico, 2020.
29. Wang, W.Y., Lin, D., Jarman, E.H., **Polacheck, W.J.**, Baker, B.M. Functional angiogenesis requires microenvironmental cues balancing endothelial cell migration and proliferation. Cellular and Molecular Bioengineering Conference, Puerto Rico, 2020.
30. Chhabra, A., Song, H.G., **Polacheck, W.J.**, Fleming, H.E., Chen, C.S. Regeneration on a chip: microfluidic vascularized human hepatic ensembles. BMES, Philadelphia, PA, 2019.
31. Wang, W.Y., Lin, D., Jarman, E.H., **Polacheck, W.J.**, Baker, B.M. Functional angiogenesis requires microenvironmental balancing of endothelial cell migration and proliferation. BMES, Philadelphia, PA, 2019.
32. Huang, S.A., **Polacheck, W.J.** Microfluidics for flow-driven angiogenesis. Triangle Cytoskeleton Meeting, Raleigh, NC, 2019.
33. **Polacheck, W.J.**, Kutys, M.L., Chen, C.S. Hemodynamic Shear Stress Regulates Assembly of the Notch Mechanosensory Complex to Modulate Vascular Barrier Function. BMES, Atlanta, GA, 2018.
34. **Polacheck, W.J.**, Kutys, M.L., Yang, J., Eyckmans, J.E., Wu, Y., Hirschi, K.K., Chen, C.S. A Novel Mechanism for Shear Mechanotransduction and Regulation of Barrier Function in 3D Biomimetic Microvessels. BMES, Phoenix, AZ, 2017.
35. **Polacheck, W.J.**, Kutys, M.L., Yang, J., Eyckmans, J.E., Wu, Y., Hirschi, K.K., Chen, C.S. A Biomimetic Vascular Platform Reveals a Non-Canonical Notch Signaling Complex that Regulates Endothelial Mechanotransduction. Angiogenesis Gordon Research Conference, Newport, RI, 2017.

36. Alimperti, S., Mirabella, T., Bajaj, V., **Polacheck, W.J.**, Eyckmans, J., Chen, C.S. 3D bi-cellular biomimetic model of vasculitis reveals a RhoA, Rac, and N-cadherin balance in pericyte-regulated barrier function. BMES, Phoenix, AZ, 2017.
37. Alimperti, S., Mirabella, T., Bajaj, V., **Polacheck, W.J.**, Eyckmans, J., Chen, C.S. A 3D Bicellular Biomimetic Model of Vasculitis Reveals New Insights into Vascular Barrier Function. American Institute of Chemical Engineers, Minneapolis, MN, 2017.
38. Chopra, A., Kutys, M.L., Zhang, K., **Polacheck, W.J.**, Seidman, J.G., Seidman, C., Hinson, J.T., Chen, C.S. Dissecting the mechanisms of genetic cardiomyopathy using in vitro engineered disease models. BMES, Minneapolis, MN, 2016.
39. Lee, E., **Polacheck, W.J.**, Nguyen, D.H., Alimperti, S.A., Chen, C.S. A biomimetic on-chip model to reconstitute lymphedema. BMES, Minneapolis, MN, 2016.
40. **Polacheck, W.J.**, Kutys, M.L., Chen, C.S. A biomimetic platform reveals novel mechanisms for regulation of microvascular function via hemodynamic shear stress. BMES, Minneapolis, MN, 2016.
41. Rajagopal, V., Pavesi, A., **Polacheck, W.J.**, and Kamm, R.D. Quantification of the spatial distribution of cytoskeletal proteins and adhesion of MDA-MB-231 breast cancer cells embedded inside 3D collagen matrices. World Congress of Biomechanics, Boston, MA, 2014.
42. Oefner, C.M., **Polacheck, W.J.**, Kamm, R.D., Oyen, M., and Moffett, A. Microfluidic devices for the study of human trophoblast invasion. World Congress of Biomechanics. Boston, MA, 2014.
43. **Polacheck, W.J.**, and Kamm, R.D. Mechanotransduction of interstitial fluid stresses induces upstream protrusion formation and cell migration. BMES, Seattle, WA, 2013.
44. **Polacheck, W.J.**, and Kamm, R.D. Mechanotransduction of interstitial fluid stresses by tumor cells within 3D collagen gels. Biophysical Society Meeting, Philadelphia, PA, 2013.
45. Borau, C., **Polacheck, W.J.**, Kamm, R.D., and Garcia-Aznar. Computational model of 3D single cell migration: a mechano-chemical approach. 18th Congress of European Biomechanics. Lisbon, Portugal, 2011.
46. **Polacheck, W.J.** and Kamm, R.D. Interstitial flow influences tumor cell migration through competing mechanisms. BMES, Hartford, CT, 2011.
47. Kamm, R.D., Vickerman, V.V., and **Polacheck, W.J.** Going against the flow: mechanotransduction in the interstitium. BMES, Hartford, CT, 2011.
48. **Polacheck, W.J.** and Kamm, R.D. Interstitial flow and effects on tumor cell migration. American Society of Mechanical Engineering Summer Bioengineering Conference, Naples, FL, 2010.
49. Zervantonakis, Y.K., **Polacheck, W.J.**, Charest, J., and Kamm, R.D. Using microfluidics for real-time studies of tumor cell behavior under flow or interacting with an intact endothelium. BMES, Austin, TX, 2009.
50. Zervantonakis, Y.K., Sudo, R., Rimchala, T., **Polacheck, W.J.**, Chung, S., Kamm, R.D. A physiologically relevant 3D in vitro model of cancer cell invasion and interactions with the endothelium. Annual American Cancer Research Society Meeting, Denver, CO, 2009.
51. Chung, S., Vickerman, V., Sudo, R., Zervantonakis, I., **Polacheck, W.J.**, Kamm, R.D. On the Importance of Interstitial Flow on Cell Behavior in Tissue Constructs Formed in a Microfluidic System. Regenerative Medicine Conference, Hilton Head, SC, 2009.

52. Rouillard, A.D., Tsui, Y., **Polacheck, W.J.**, Lee, J.Y., Bonassar, L.J., and Kirby, B.J. Micropatterned hydrogel tissue scaffolds with controlled electrokinetic properties for investigation of chondrocyte mechanotransduction. MicroTAS, Paris, France, 2007.
53. Rouillard, A.D., Tsui, Y., **Polacheck, W.J.**, Lee, J.Y., Bonassar, L.J., and Kirby, B.J. Control of the electromechanical properties of alginate tissue scaffolds via ionic and covalent crosslinking and microparticle doping, BMES, Los Angeles, CA, 2007.

5.5 Invited Talks

1. P300 governs endothelial mechanotransduction. Biomedical Engineering Society, Cell and Molecular Bioengineering Young Innovator Special Session. Baltimore, MD. October 2024.
2. Title TBD. Department of Biomedical Engineering Seminar Series. Wake Forest University. Winston-Salem, NC. October 2024.
3. Title TBD. Slovenian Genetics Society Annual Meeting. Portorož, Slovenia. September, 2024.
4. Engineered models of vascular malformations. International Conference on Complex Lymphatic Anomalies. Dallas, TX. September 2023.
5. Engineering fluid-structure interactions in the vascular endothelium. Materials Science and Engineering Seminar, Boston University. Boston, MA. April 2023.
6. Engineering fluid-structure interactions in the vascular endothelium. Biomedical Engineering Association at The Chinese University of Hong Kong-Shenzhen. Hong Kong (virtual). January 2023.
7. Patient-derived matrix reveals roles of collagen III in ECM assembly and mechanics. Society for Engineering Science. College Station, TX. October 2022.
8. Microphysiological model reveals a role for mechanotransduction in vascular malformations. World Congress of Biomechanics. July 2022. Taipei, Taiwan.
9. Microfluidics for mechanobiology. NSF Center for Engineering Mechanobiology Summer Bootcamp. St. Louis, MO. July 2022.
10. Tissue engineered biophysical models for inherited vascular disease. Cardiovascular Biology Center Seminar, University of Washington. Seattle, WA. June 2022.
11. Engineered models of vascular malformations. Complex Lymphatic Anomalies Seminar, University of Texas Southwestern. Dallas, TX. August 2021.
12. Biophysical models of microvascular disease. Biophysics Seminar, University of Maryland. College Park, MD. May 2021.
13. Microfluidic models of vascular malformations. Pediatrics Grand Rounds, University of North Carolina at Chapel Hill. Chapel Hill, NC. November 2020.
14. Engineered microvessels derived from human lymphatic endothelium as an in vitro model for drug repurposing for lymphatic malformations. Rare Drug Development Symposium. Philadelphia, PA. June 2020.
15. Biomimetic Microvascular Platforms Reveal a Role for the Notch Family Receptors in Vascular Mechanotransduction. International Bio-fluid Mechanics and Vascular Mechano-biology Symposium. Tuscon, AZ. February 2020.
16. Tools for modeling the cellular fluidic microenvironment. Applied Mathematics Seminar Series, University of North Carolina at Chapel Hill. Chapel Hill, NC. May 2019.

17. Multi-scale fluid mechanotransduction. Biomedical Engineering Seminar Series, Virginia Commonwealth University. Richmond, VA. March 2019.
18. Microfabrication for mechanotransduction. Engineering Seminar Series, Eastern Carolina University. Greenville, NC. February 2019.
19. Fluid mechanotransduction in the tumor microenvironment. Physics of Cancer Gordon Conference. Galveston, TX. February 2019.
20. Microfluidic models for vascular mechanotransduction. Hemostasis and Thrombosis Research Program, University of North Carolina at Chapel Hill. Chapel Hill, NC. January 2019.
21. Mechanotransduction in the regulation of vascular permeability. McAllister Heart Institute Seminar, University of North Carolina at Chapel Hill. Chapel Hill, NC. October 2018.
22. A perfused vessel-on-chip model reveals flow regulation of adherens junctions and endothelial barrier function. Biological Design Center Kickoff Symposium, Boston University. Boston, MA. May 2017.
23. Biomimetic platforms for mechanobiology in 3D. Biomedical Engineering Seminar Series, Northeastern University. Boston, MA. February 2017.
24. Biomimetic platforms for mechanobiology in 3D. Biomedical Engineering Seminar Series, University of Maryland. College Park, MD. February 2017.
25. Microfluidics for 3D mechanobiology. Biomedical Engineering Seminar Series, Joint Department of Biomedical Engineering, University of North Carolina at Chapel Hill and North Carolina State University. Chapel Hill, NC. January 2017.
26. Microfluidic models for investigating cellular mechanotransduction in 3D. Center for Excellence in Vascular Biology, Brigham and Women's Hospital. Boston, MA. April 2015.
27. Defining the role of hemodynamic shear stress in microvascular homeostasis. Vascular Biology Work in Progress, Boston Children's Hospital. November 2015. Boston, MA.
28. Tension in cell-matrix adhesions directs 3D cell migration in response to interstitial flow. World Congress of Biomechanics. Boston, MA. June 2014.
29. Forces and flows in cell migration. Wellman Center for Photomedicine, Massachusetts General Hospital. August 2013. Boston, MA.
30. Interstitial flow and cell migration. Mechanical Forces in Development, Harvard University and Massachusetts Institute of Technology. Cambridge, MA. October 2012.
31. Mechanobiology as a tool for the development of biological machines. Experimental Biology Meeting. San Diego, CA. April 2012.

5.6 Intellectual Property

1. Human cell derived microfluidic devices, systems, and methods (PCT/US2023/019672)

6. Teaching Activities

6.1 Courses taught

- BMME 315, Biotransport, University of North Carolina at Chapel Hill, Spring 2024 (35 students)
- BMME 802/890, Biomedical Engineering Graduate Seminar, University of North Carolina at Chapel Hill, Fall 2023 (100 students)
- BMME 315, Biotransport, University of North Carolina at Chapel Hill, Spring 2023 (45 students)

- BMME 455, Biofluid Mechanics, University of North Carolina at Chapel Hill, Fall 2022 (23 students)
- BMME 315, Biotransport, University of North Carolina at Chapel Hill, Spring 2022 (29 students)
- BMME 490/890, Bioinspired Engineering, University of North Carolina at Chapel Hill, Fall 2021 (490: 17 students / 890 1 student)
- BMME 315, Biotransport, University of North Carolina at Chapel Hill, Spring 2021 (43 students)
- BMME 490/890, Bioinspired Engineering, University of North Carolina at Chapel Hill, Fall 2020 (490: 15 students / 890 2 students)
- BMME 315, Biotransport, University of North Carolina at Chapel Hill, Spring 2020 (27 students)
- BMME 490/890, Microphysiological Systems, University of North Carolina at Chapel Hill, Fall 2019 (490: 2 students / 890 4 students)
- BMME 315, Biotransport, University of North Carolina at Chapel Hill, Spring 2019 (9 students)

6.2 Mentored research faculty

- Wen Yih Aw, Ph.D., Research Assistant Professor, Fall 2022 – Present

6.3 Mentored post-doctoral associates

- Mitesh Rathod, Ph.D., Fall 2022– Present
- Wen Yih Aw, Ph.D., Summer 2021 – Fall 2022 (Currently: Research Assistant Professor, University of North Carolina at Chapel Hill)
- Gihun Lee, Ph.D., Fall 2019 – Spring 2022 (Currently: R&D Engineer, Seegene Technology)

6.4 Mentored doctoral students

- Ryan Stack, UNC-NC State BME, Fall 2023 – Present
- Sarah Kubik, UNC-NC State BME, Fall 2022 – Present
- Chloe Whitworth, UNC Genetics and Molecular Biology, Spring 2022 – Present
- Elizabeth Doherty, UNC-NC State BME, “Cell-derived matrix platforms for microphysiological disease modeling of vascular Ehlers-Danlos syndrome”, Fall 2019 – Spring 2024. (Currently: Post-doctoral Associate, UNC-NC State BME)

6.5 Mentored master’s students

- Stephanie Huang, UNC-NC State BME, “Microfluidic model to characterize hydraulic conductivity and its impact on endothelial function.” Fall 2019 – Spring 2023. (Currently: Research Scientist at Triangle Biotechnology Inc.)
- Christian Griffith, UNC-NC State BME, “Microsphere-based local delivery of Notch ligand to endothelial monolayers.” Fall 2018 – Spring 2020. (Currently: Analyst II at BioAgilytix)
- Tanmay Khare, NC State Mechanical Engineering, “Computational modeling of fluid mechanical forces on vascular endothelial cells and ultrasound characterization of vascular networks.” (Currently: Ph.D. candidate Georgia Institute of Technology Department of Mechanical Engineering)

6.7 Mentored visiting scholars

- Yun-zen Wu, National Cheng Kung University, Taiwan, Fall 2023 – Spring 2024
- Iva Šantek, Institute of Oncology Ljubljana, Slovenia, Fall 2023
- Jingming Lu,
- Bram van Steen, Amsterdam UMC, The Netherlands, Summer 2022
- Lanette Kempers, Amsterdam UMC, The Netherlands, Summer 2022
- Jahn Otto Waldeland, University of Stavanger, Norway, Fall 2019

- Sandra Perez, Universidad Zaragoza, Spain, Fall 2019

6.8 Graduate committees

- Ethan Madden, University of North Carolina at Chapel Hill, Department of Genetics and Molecular Biology (Ph.D.), Spring 2024 – Present (PI: Strahl)
- Anna Phillips, University of North Carolina at Chapel Hill and North Carolina State University, Joint Department of Biomedical Engineering (Ph.D.), Spring 2024 – Present (PI: Gallippi)
- David Rocco, University of North Carolina at Chapel Hill, Department of Cell Biology and Physiology (Ph.D.), Spring 2022 – Present (PI: Bergmeier)
- Max Hockenberry, University of North Carolina at Chapel Hill, Department of Cell Biology and Physiology (Ph.D.), Spring 2022 – Present (PI: Legant)
- Danica Dy, University of North Carolina at Chapel Hill, Department of Cell Biology and Physiology (Ph.D.), Spring 2022 – Present (PI: Wirka)
- Jack Twiddy, University of North Carolina at Chapel Hill and North Carolina State University, Joint Department of Biomedical Engineering (Ph.D.), Spring 2022 – Present (PI: Daniele)
- Sandra Stangeland-Molo, University of North Carolina at Chapel Hill and North Carolina State University, Joint Department of Biomedical Engineering (Ph.D.), Spring 2020 – Present (PI: Cole)
- Marshall Davey, University of North Carolina at Chapel Hill, Department of Bioinformatics and Computational Biology, Spring 2021 – Fall 2023 (PI: Griffith)
- Nina Moiseiwitsch, University of North Carolina at Chapel Hill, Department of Cell Biology and Physiology (M.D. Ph.D.), Spring 2022 – Fall 2023 (PI: Brown)
- Micheala Copp, University of North Carolina at Chapel Hill and North Carolina State University, Joint Department of Biomedical Engineering (Ph.D.), Fall 2021 – Spring 2023 (PI: Diekman)
- Matthew Rich, University of North Carolina at Chapel Hill and North Carolina State University, Joint Department of Biomedical Engineering (Ph.D.), Spring 2020 – Spring 2023 (PI: Diekman)
- Christina Fonseca, Universidade de Lisboa, Portugal, Instituto de Medicina Molecular (Ph.D.), Spring 2021 – Spring 2022 (PI: Franco)
- Meryem Ok, University of North Carolina at Chapel Hill, Department of Cell Biology and Physiology (M.D. Ph.D.), Spring 2019 – Fall 2022 (PI: Magness)
- Jarrett Bliton, University of North Carolina at Chapel Hill and North Carolina State University, Joint Department of Biomedical Engineering (Ph.D.), Fall 2020 – Fall 2022 (PI: Magness)
- Andreea Badileanu, University of North Carolina at Chapel Hill and North Carolina State University, Joint Department of Biomedical Engineering (Ph.D.), Spring 2020 – Fall 2022 (PI: Freytes)
- Eunice Chee, University of North Carolina at Chapel Hill and North Carolina State University, Joint Department of Biomedical Engineering (Ph.D.), Spring 2020 – Spring 2022 (PI: Brown)
- Keon Ho Kim, University of North Carolina at Chapel Hill, Department of Mathematics (Ph.D.), Spring 2020 – Spring 2022 (PI: Griffith)
- Sandra Perez, University of Zaragoza, Spain, Department of Mechanical Engineering (Ph.D.), Fall 2018 – Fall 2021 (PI: Garcia-Aznar)
- Emily Mihalko, University of North Carolina at Chapel Hill and North Carolina State University, Joint Department of Biomedical Engineering (Ph.D.), Spring 2019 – Spring 2021 (PI: Brown)
- Emily Ozpinar (Wrona), University of North Carolina at Chapel Hill and North Carolina State University, Joint Department of Biomedical Engineering (Ph.D.), Fall 2018 – Spring 2021 (PI: Freytes)
- Christina Conrad, University of Maryland, Department of Biomedical Engineering (Ph.D.), Fall 2018 – Spring 2021 (PI: Scarcelli)

- Jahn Otto Waldeland, University of Stravanger, Norway, Department of Mathematics (Ph.D.), Fall 2018 – Fall 2019 (PI: Evje)

6.9 Mentored undergraduate researchers

2024:	??, NCSU AHA REU undergraduate.
2024:	Ethan C. Lin, University of Arizona BME, Amgen Scholar undergraduate
2024:	Akash Bhomwik, UNC Mathematics, MHI AHA REU undergraduate.
2023 – 2024:	Alexandra Patton, UNC/NCSU BME, Abrams Scholar undergraduate research.
2023 – 2024:	Abel Abraham, UNC/NCSU BME, Abrams Scholar undergraduate research. Currently Fulbright Scholar and PhD candidate at MIT.
2021 – 2024:	Grace Krohn, UNC/NCSU BME, Lucas Scholar undergraduate research
2021 – 2024:	Harry Wang, UNC/NCSU BME undergraduate research volunteer. Currently PhD candidate at CalTech.
2020 – 2022:	Emily Warren, UNC/NCSU BME, Abrams Scholar undergraduate research. Currently PhD candidate at Duke.
2020 – 2022:	Anne Hope Cooper, UNC/NCSU BME, Abrams Scholar undergraduate research
2018 – 2020:	Nuran Golbasi, UNC/NCSU BME, Abrams Scholar undergraduate research.
2019 – 2020:	Xin Lu (Sandy) Lin, UNC/NCSU BME, Lucas Scholar undergraduate research.
2019 – 2020:	Zachary Young, UNC Biology, summer opportunity for research fellowship. Currently Laboratory Technician and Molecular Biologist at Mako Medical.
2019 – 2020:	Ryan Armstrong, UNC Physics, honors thesis co-advisor. Currently research scientist at IBM.
2019 – 2020:	Linda Henry, UNC/NCSU BME, Abrams Scholar for undergraduate research. Currently a PhD candidate at Boston University.
2019 – 2020:	Joanna McDonald, UNC/NCSU BME, BMME-295 research for credit, and BME Abrams Scholar. Currently a research technician at Massachusetts General Hospital.

7. GRANTS

7.1 Current

Duration	Sponsor	Project Title	Amount (Effort)
2021-2026	National Institutes of Health (R35GM142944)	Integrative approaches for the study of the cellular fluidic microenvironment	Total: \$1.88M / Direct: \$1.25M (PI, 51%)
2022-2026	United Therapeutics Corp. (ISS-2021-11187)	Bioengineered approaches to model drug delivery and transport in PAH	Total: \$279K / Direct: \$179K (PI, 8%)
2022-2024	Lymphatic Malformation Institute	Development of an inducible tissue engineered model for understanding cellular dynamics in GLA	Total: \$50K / Direct: \$50K (PI, 1.3%)
2021-2024	American Heart Association (CDA857738)	The role of the Notch mechanosensory complex in the vascular endothelium	Total: \$250K / Direct: \$250K (PI, 10%)

2024-2025	University of North Carolina at Chapel Hill School of Medicine (Neruospark)	A void in the noid: vascularizing patient-derived organoids	Total: \$25K / Direct: \$25K (Co-PI)
2024-2026	University of North Carolina at Chapel Hill Institute for Convergent Science (AGILE award)	Engineered human microvessels for patient stratification	Total: \$100K / Direct: \$100K (PI)
2021-2027	National Institutes of Health (R01CA258451)	Tumor endothelial cell regulation of pro-metastatic fibrin matrices	Total: \$3.28M / Direct: \$2.20 (Co-I, 8%)
2022-2027	National Institutes of Health (R25DK131344)	Transforming kidney care through skill and workforce development: the North Carolina Kidney Technology Incubator (NC-KTI)	Total: \$533K / Direct: \$342K (Co-I, 2.5%)

7.2 Completed

Duration	Sponsor	Project Title	Amount (Effort)
2021-2022	North Carolina Biotechnology Center (2021-FLG-3814)	Microfabricated blood vessels for risk stratification of COVID-19 patients	\$20K (PI, 0%)
2020-2021	Lymphatic Malformation Institute	Engineered microvessels derived from human lymphatic endothelium as an in vitro model for drug repurposing for lymphatic malformations	\$68K (PI, 0%)
2019-2021	North Carolina Translational and Clinical Sciences Institute (550KR211928)	Identifying targetable mechanotransduction mechanisms of flow-induced chemoresistance in ovarian cancer	\$50K (Co-PI, 0%)
2019-2021	University of North Carolina Computational Medicine Institute	Computation-enabled design of engineered vascular tissue for ischemic disease	\$50K (Co-PI, 0%)
2016-2018	National Institutes of Health (F32HL129733)	Modulation of vascular permeability by shear stress via Notch signaling	\$116K (PI/NIH Trainee)

2015-2016	National Institutes of Health (T32EB16652)	Organ Design and Engineering Training Program	\$58K (PI/NIH Trainee)
2008-2011	National Science Foundation Graduate Research Fellowship	Hydrogel tissue scaffold for elucidation of cellular response in a tendon network	\$90K (PI/NSF GRFP Fellow)

7.4 Faculty Sponsored Student/Post-Doc Research Awards

Duration	Sponsor	Project Title	Role
2024-2026	American Heart Association (24PRE1192185). PI: Ms. Chloe Whitworth	Investigating mechanical modulators of cortical Notch signaling in the vascular endothelium	Sponsor
2022-2025	National Institutes of Health (F31HL162462). PI: Mrs. Elizabeth Doherty	Defining the role of extracellular matrix mechanics in vascular Ehlers-Danlos syndrome	Sponsor
2022-2023	CLOVES Syndrome Community Development Grant. PI: Dr. Wen Yih Aw	Non-canonical PI3K signaling and therapeutic targets for vascular anomalies in CLOVES	Sponsor

8. Professional Service

8.1 To the discipline

- Conference Advisory Committee, Advances in Smart Materials, Chemical, and Biochemical Engineering, Rourkela, India, 2022
- Abstract Review Committee, Summer Biomechanics, Bioengineering, and Biotransport Conference, 2022
- Session Chair, Microfluidics and Fluid Technology Track, Summer Biomechanics, Bioengineering, and Biotransport Conference, 2022
- Editorial Board Member, Biomechanics, Frontiers in Bioengineering and Biotechnology, 2022 – Present
- Abstract Review Committee, World Congress of Biomechanics, 2022
- Track Chair, Mechanobiology, Adhesion & Migration of Cells, World Congress of Biomechanics, 2022
- External Examiner (Ph.D. Thesis), Universidade de Lisboa, Portugal, Instituto de Medicina Molecular, Spring 2018

Biomedical Engineering Society:

- Abstract Review Committee, Annual Meeting, Annually, 2018 – Present
- Session Chair, Annual Meeting:

- 2020 (Mechanotransduction, Biomechanics and Mechanobiology Track)
- 2019 (Biomechanics of Biomaterials, Biomaterials Track)
- 2018 (Biomechanics of Biomaterials, Biomaterials Track)

Manuscript Reviewer for:

- ACS Applied Materials & Interfaces
- ACS Biomaterials
- ACS Pharmacology and Translational Science
- APL Bioengineering
- Acta Biomaterialia
- Advanced Materials
- Advanced Science
- Bioengineering
- Biomicrofluidics
- Biofabrication
- Biomaterials
- Biomechanical Engineering
- Biomechanics and Modeling in Mechanobiology
- Biotechnology Journal
- Cancers (Basel)
- Cancer Research
- Cell Stem Cell
- Communications Biology
- Computational Physics Communications
- eLife
- Hepatology
- Journal of Biomechanics
- Journal of Biomechanical Engineering
- Journal of Biomedical Optics
- Journal of Clinical Investigations Insight
- Journal of Orthopedic Research
- Journal of Visualized Experiments
- Lab-on-a-Chip
- Nano Letters
- Nature Communications
- Nature Biomedical Engineering
- Photochemistry and Photobiology
- Science Advances
- Scientific Reports

Grant Reviewer:

- American Heart Association, Transformational Program Award Reviewer, 2022
- ZonMw (The Netherlands Organisation for Health Research and Development) – Open committee grant reviewer, 2022
- Human Frontiers Science Program, Postdoctoral Fellowships, 2022
- NASA, Postdoctoral Fellowships, 2022
- American Society for Nephrology & US HHS, KidneyX Artificial Kidney Prize, 2021

- NIH Special Emphasis Panel, Physical Sciences-Oncology Network Projects, 2021
- NIH Study Section, Intercellular Interactions, 2021
- Agence Nationale de la Recherche (French National Research Academy), CE18 – Innovation biomedicine, 2021
- National Science Foundation, Graduate Research Fellowship Program (GRFP) Reviewer, 2020-2023
- European Research Council, Advanced Grant, 2017

8.2 UNC Chapel Hill

- Advisory Board Member, Chapel Hill Analytical and Nanofabrication Laboratory (CHANL), 2020 – Present
- Natural Sciences Subcommittee, SURF Program, Spring 2023

8.3 Joint Department of Biomedical Engineering, UNC Chapel Hill and NC State

- Member, Open Rank Tenure-Track Faculty Search Committee, Spring 2024
- Pharmacoengineering Undergraduate Curriculum Committee, Spring 2024
- Chair, Teaching Assistant Professor Search Committee, Fall 2023
- Abram's Scholar Committee, 2020 – Present
- Service Award Selection Committee, 2023
- Faculty Peer Advising Planning Committee, Spring 2020

8.4 School of Medicine, UNC Chapel Hill

- Interviewer, M.D./Ph.D. Program Admissions, 2019 – Present
- Interviewer, BBSP Ph.D. Program Admissions, 2019 – Present

8.5 Society Memberships

- American Heart Association
- American Society of Mechanical Engineers
- Biomedical Engineering Society
- North American Vascular Biology Organization
- Society for Matrix Biology