CURRICULUM VITAE

Raleigh M. Linville

CONTACT INFORMATION

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CAREER STATEMENT

Upon completing my PhD, I will pursue a post-doctoral position in a neuroscience laboratory specializing in neurodegenerative disease. Ultimately, I hope to become a faculty member in a department of Biomedical Engineering. Building on my expertise in tissue engineering, stem cell technology, and microfluidics, my research will aim to develop next-generation tissue engineered models of the cerebrovasculature and brain. These models will address fundamental and translational issues towards diagnosis and treatment of brain disease.

EDUCATION

2016 – present	Johns Hopkins University, Baltimore, MD Ph.D. Candidate, Biomedical Engineering *Expected graduation:* March 2021 *Dissertation title:* "Tissue-engineered models of the human blood-brain barrier during health and neurodegenerative disease" *Advisor:* Prof. Peter Searson
2012 – 2016	Boston University, Boston, MA B.S., Biomedical Engineering, m*agna cum laude*

RSEARCH POSITIONS

2016 - present	Ph.D. Candidate Searson Group, Johns Hopkins Institute of Nanobiotechnology *Advisor*: Prof. Peter Searson (searson@jhu.edu) *Research*: Developing *in vitro* 3D models of the blood-brain barrier (BBB) to: (1) mimic human brain vascular physiology, (2) develop novel drug delivery approaches, and (3) elucidate mechanisms of neurodegenerative disease and brain cancer.
2014 – 2016	Undergraduate Researcher Tien Group, Boston University Department of Biomedical Engineering *Advisor*: Prof. Joe Tien (jtien@bu.edu)

Research: Studied biomaterial vascularization. Developed a novel method to rapidly generate capillaries for applications towards vascularized tissue constructs.

Spring 2014 — Undergraduate Researcher
Lim Laboratory, Universidad Autónoma de Madrid
Advisor: Prof. Filip Lim (filip.lim@uam.es)

Research: Studied molecular mechanisms of neuronal lesion and repair using gene therapy. Increased viral titer in preparation for clinical trials of viral vectors to deliver whole genes for spinal cord regeneration.

2011 – 2014 — Technical Aide
The Johns Hopkins University School of Medicine, Division of Neuropathology
Advisor: Dr. Leyan Xu (lxu9@jhmi.edu)

Research: Studied traumatic brain injury using a mouse model. Characterized neuropathology of blast-induced neurotrauma with and without protective gear.

PUBLICATIONS (* denotes equal contribution)

13. **Linville, R.M**., DeStefano, J.G., Nerenberg, R., Grifno, G.N., Ye, R., Gallagher, E., Searson, P.C., "Long-term cryopreservation preserves blood-brain barrier phenotype of iPSC-derived brain microvascular endothelial cells and three-dimensional microvessels." *Molecular Pharmaceuticals* (online ahead of print) (2020).
12. **Linville, R.M**., Arevalo, D., Maressa, J.C., Zhao, N., Searson, P.C., "Three-dimensional induced pluripotent stem-cell models of human brain angiogenesis." *Microvascular Research* (online ahead of print) (2020).
11. Silvestri, V.L., Henriet, E., **Linville, R.M**., Wong, A.D., Searson, P.C., Ewald, A.J., "A tissue-engineered 3D microvessel model reveals the dynamics of mosaic vessel formation in breast cancer." *Cancer Research* (online ahead of print) (2020).
10. Chu, C., Jablonska, A., Lesniaka, W.G., Thomas, A.M., Lan, X., **Linville, R.M.**, Li, S., Searson, P.C., Liu, G., Pearl, M., Pomper, M.G., Janowski, M., Magnus, T., Walczak, P., "Optimization of osmotic blood-brain barrier opening to enable intravital microscopy studies on drug delivery in mouse cortex." *Journal of Controlled Release* 317, 312-321 (2020).
9. Grifno, G.*, Farrell, A.*, **Linville, R.M.***, Arevalo, D., Kim, J.H., Gu, L., Searson, P.C., "Three-dimensional in vitro blood-brain barrier microvessels via directed differentiation of fluorescently-tagged induced pluripotent stem cells." *Scientific Reports* 9 (1), 1-13 (2019).
8. Jamieson, J.J., **Linville, R.M.**, Yuan, Y., Searson, P.C., Gerecht S., "Role of iPSC-derived pericytes on barrier function of iPSC-derived brain microvascular endothelial cells in 2D and 3D." *Fluids and Barriers of the CNS* 16, 15 (2019).
7. **Linville, R.M.**, DeStefano J.G., Sklar, M.B., Chu, C., Walczak, P., Searson, P.C., "Modeling hyperosmotic blood-brain barrier opening within human tissue-engineered in vitro brain microvessels." *Journal of Cerebral Blood Flow & Metabolism* 40 (7), 1517-1532 (2019).
6. **Linville, R.M.**, DeStefano J.G., Sklar, M.B., Xu, Z., Farrell, A.M., Bogorad, M.I., Chu,

C., Walczak, P., Cheng, L., Mahairaki, V., Whartenby, K.A., Calabresi, P.A., Searson, P.C., "Human iPSC-derived blood-brain barrier microvessels: validation of barrier function and endothelial cell behavior." *Biomaterials* 190, 24-37 (2019).

5. Bogorad, M.I.*, DeStefano J.*, **Linville, R.M.***, Wong, A.*, Searson, P.C., "Cerebrovascular plasticity: processes that lead to changes in the cerebrovascular architecture." *Journal of Cerebral Blood Flow & Metabolism* 39 (8), 1413-1432 (2019).
4. Katt, M., **Linville, R.M.**, Mayo, L.N., Xu, Z., Searson, P.C., "Functional brain-specific microvessels from iPSC-derived human brain microvascular endothelial cells: the role of matrix composition on monolayer formation." *Fluids and Barriers of the CNS* 15, 7 (2018).
3. DeStefano J.*, Jamieson, J.J.*, **Linville, R.M.***, Searson, P.C., "Benchmarking in vitro tissue-engineered blood–brain barrier models." *Fluids and Barriers of the CNS* 15, 32 (2018).
2. Xu, L., Schaefer M.L., **Linville, R.M.**, Aggarwal A., Mbuguiro W., Wester B.A., Koliatsos V.E., Neuroinflammation in primary blast neurotrauma: time course and prevention by torso shielding." *Experimental Neurology* 277, 268-274 (2016).
1. **Linville, R.M.**, Boland, N.F., Covarrubias, G., Price, G.M., Tien, J., "Physical and chemical signals that promote vascularization of capillary-scale channels." *Cellular and Molecular Bioengineering* 9, 73-84 (2016).

PUBLICATIONS UNDER REVIEW / IN PREPARATION (* denotes equal contribution)

1. **Linville, R.M**.*, Komin, A.*, Lan, X.*, DeStefano, J.G., Chu, C., Liu, G., Walczak, P., Hristova, K., Searson, P.C., "Reversible blood-brain barrier opening utilizing membrane active peptide." (under review at *Nature Communications*)
2. Tien, J., Li, X., **Linville, R.M**., Feldman, E., "Mapping vascular permeability by blind deconvolution of time-lapse imaging data." (under review at *Microvascular Research*)
3. **Linville, R.M.**, Nerenberg, R., Grifno, G.N., Arevalo, D., Searson, P.C., "CAG-induced blood-brain barrier dysfunction in an isogenic iPSC model of juvenile-onset Huntington's disease." (in preparation for *Fluids and Barriers of the CNS*)
4. **Linville, R.M.**, Grifno, G.N., Nerenberg, R., Sklar, M., Farrell, A., Jamieson, J.J., DeStefano, J.G., Zhao, N., Gerecht, S., Searson, P.C., "Isogenic fluorescently-tagged family of blood-brain barrier models via media volume-enhanced iPSC differentiation of brain microvascular endothelial cells." (in preparation for *Stem Cell Reports*)
5. **Linville, R.M.**, Guo, Z., Maressa, J.C., Farrell, A., Searson, P.C., "Three-dimensional model of the blood-tumor barrier during metastatic brain cancer." (in preparation for *Cancer Research*)
6. Garcia, F.J., **Linville, R.M.**, Lee, H., Pineda, S., Godlewski, B., Kellis, M., Searson, P.C., Sahin, M., Heiman, M., "Single-nuclei transcriptomics identifies conserved and unique molecular signatures of the human blood-brain barrier."

Total number of citations (ISI): 221
Hirsch index: 7

PRESENTATIONS

1. Linville, R.M., Boland, N.F., Covarrubias, G. & Tien, J., "Vascularization of capillary-scale channels in type I collagen gels" [talk], 41st Annual Northeast Bioengineering Conference (Troy, NY; 2015).
2. Linville, R.M., Boland, N.F., Covarrubias, G. & Tien, J., "Generation of capillaries in patterned type I collagen gels in vitro" [poster], Biomedical Engineering Society 2015 Annual Meeting (Tampa, FL; 2015).
3. Linville, R.M., Katt, M., Searson, P.C., "Tissue-engineering of iPSC-derived brain-specific microvessels" [poster], Biomedical Engineering Society 2017 Annual Meeting (Phoenix, AZ; 2017).
4. Linville, R.M., DeStefano J., Sklar, M., Farrell, A., Chu, C., Walczak, P., Searson, P.C., "Human iPSC-derived three dimensional microvessels for study of hyperosmolar blood-brain barrier opening" [poster], Johns Hopkins Department of Medicine Research Retreat (Baltimore, MD; 2018).
5. Linville, R.M., DeStefano, J., Chu, C., Walczak, P., Searson, P.C., "Human iPSC-derived three-dimensional microvessels for study of hyperosmolar blood-brain barrier opening" [poster], Barriers of the CNS Gordon Research Conference (New London, NH; 2018).
6. Linville, R.M., DeStefano, J., Komin, A., Chu, C., Hristova, K., Walczak, P., Searson, P.C., "Modeling hyperosmotic and peptide-induced blood-brain barrier opening within tissue-engineered in vitro human brain microvessels" [talk], 2nd meeting of the Society for Image Guided Neurointerventions (SIGN) (Baltimore, MD; 2019).
7. Linville, R.M., DeStefano, J., Komin, A., Chu, C., Hristova, K., Walczak, P., Searson, P.C., "Three-dimensional tissue-engineered iPSC-derived blood-brain barrier microvessels for studies of blood-brain barrier opening" [poster], Cerebral Vascular Biology Conference (Miami, FL; 2019).
8. Linville, R.M., "Applications of blood-brain barrier microvessels" [invited seminar], Boston University – Tien Group seminar (Boston, MA; 2019)
9. Linville, R.M., "Tissue-engineered models of the human blood-brain barrier during neurodegenerative disease" [invited seminar], Massachusetts Institute of Technology – Heiman Lab seminar (Boston, MA; 2019)
10. Linville, R.M., Nerenberg, R.F., Grifno, G.N., Searson, P.C., "CAG-induced blood-brain barrier dysfunction in an isogenic iPSC model of juvenile-onset Huntington's disease" [poster], International Ataxia Research Conference (Washington, DC; 2019).
11. Linville, R.M., "Tissue-engineered models of blood-brain barrier tight junctions during health and disease" [talk], Columbia University's Trainee Symposium on Organoids & Organs-on-a-Chip (virtual; 2020)

GRADUATE LEADERSHIP AND ACTIVITIES

Activity	Years	Description
STEM Achievement in Baltimore Elementary Schools (SABES), Team Leader	2016 – present	Team Leader for SABES after-school STEM education program for three consecutive years, 75+ volunteer hours
Pathways in Technology Early College High School (P-TECH),	2016 – 2019	Mentor for P-TECH program providing career and life mentorship to Baltimore high school students

Mentor		pursuing careers in medicine
Searson Group, Lab Captain	2019 – present	Manage daily lab operations; promote strong communication and community among lab members; organized virtual journal club series during COVID19 pandemic
Manuscript reviewer	2020 – present	Independent reviewer for journal *Biomaterials*
Summer Undergraduate Virtual Research Experience (SURVE), Organizer and Presenter	2020 – present	Founding organizer and presenter for SURVE program, a weekly engagement series for Hopkins undergraduate researchers during COVID19 pandemic sponsored by Hopkins Office for Undergraduate Research.

GRADUATE HONORS

• National Science Foundation Graduate Fellow (2018-2021)

• Johns Hopkins Department of Medicine Research Retreat – Whiting School of Engineering Basic Research Trainee Award finalist (2018)

• Society for Image Guided Neurointerventions (SIGN) – Third place Early Stage Investigator Award (2019)

MENTORING

Student	**Years**	**Current status**
Matt Sklar[#]	2016 – 2020	Clinical research coordinator, Stanford Hospital
Alanna Farrell[#]	2017 – 2020	PhD student, Biomedical Engineering, Boston University
Gabrielle Grifno[#]	2017 – 2020	PhD student, Biomedical Engineering, Boston University
Diego Arevalo[#]	2017 – 2020	Research data coordinator, JHU Center for Clinical Trials and Evidence Synthesis
Joanna Maressa[#]	2018 – current	Sophomore, Material Science & Engineering
Renee Nerenberg[#]	2018 – current	Sophomore, Biomedical Engineering
Robert Ye[#]	2019 – current	Sophomore, Applied Mathematics and Statistics
Ria Jha	2019 – current	Freshman, Biomedical Engineering
Justin Zhou	2019 – current	Freshman, Biomedical Engineering

[#] co-author on published manuscripts

TEACHING EXPERIENCE

Role	**Semesters**	**Class and Instructors**
Instructor	Intersession 2019, Intersession 2020	EN.580.137 (1 credit), Tissue Engineering Blood Vessels
Co-Instructor *(five-course module)*	Spring 2019, Spring 2020	EN.510.610 (3 credits), Fundamentals of Biomaterials (instructor: Prof. Peter Searson)
Teaching Assistant	Fall 2018	EN.580.442/642, Tissue Engineering (3 credits) (instructors: Prof. Warren Grayson and Prof. Jennifer

		Elisseeff)
Lab Instructor *(one-week module)*	Spring 2019	EN.510.430, Biomaterials Lab (instructor: Prof. Kalina Hristova)
Certificate of Completion	March 2020	Johns Hopkins University Teaching Academy