Jacob H. Hines, Ph.D.

Current Position

Associate Professor
Winona State University
Biology Department

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Academic Training

2011 –2014 Postdoctoral Research
University of Colorado – Anschutz Medical Campus
Department of Cell and Developmental Biology
Postdoctoral Advisor: Bruce Appel

2005 –2011, Ph.D. in Biomedical Sciences
Mayo Graduate School, Cell Biology and Genetics
Advisor: John Henley

2000 – 2005, B.S. with honors; Biomedical Science, Biochemistry majors
University of Wisconsin - La Crosse
Advisor: Brad Seebach

Professional Activities and Science Outreach

NSF Grant Review Panelist (2016, 2019)
Ad hoc reviewer for Multiple Sclerosis Research (Australia) and Einstein Foundation Berlin
Reviewer for multiple peer-reviewed journals
Winona State Biology Assessment Committee (Chair, 2015 – current)
Winona State BioMaPS site coordinator (piloting site for NSF-funded project, 2016-2017)
Winona State Biology Curriculum Committee (2016 – current)
Winona State Biology Recruitment Committee (2017-2018)
Winona State University Grade Appeals Committee (2015 – 2019)
Faculty Advisor to Winona State Pre-Physician Assistant Club (2017 – 2019)
Winona State University Grants Task Force (2017)
Winona State University Bicycle Task Force (2015)
Founder/Organizer of Winona Community Science Peer Mentoring Program

Extramural Funding

2019-2024. CAREER: Mechanisms of Adaptive Myelination. National Science Foundation – Integrated Organismal Systems.

2017-2019. The role of axon caliber in the selective myelination of nerve axons. National Multiple Sclerosis Society.

2014-2017. Activity-dependent regulation of oligodendrocyte gene expression and myelination. National Multiple Sclerosis Society.

2013. National Institutes of Health (NRSA) F32 Postdoctoral Fellowship (NS083216-01).

2011-2013. National Institutes of Health (NIMH) T32 MH015442. Postdoctoral Training Grant Fellowship, Developmental Psychobiology, University of Colorado School of Medicine.

Teaching Experience

Assistant (2014-2019) **and Associate** (2019-current) **Professor, Winona State University**

Biol 309 Developmental Biology (2014-current)

Biol 310 Genetics (2014-2016)

Biol 307 Cell Biology Laboratory (2014-current)

Biol 308 Cell Biology (2015-current)

Biol 427 Experimental Embryology (2016)

Biol 495 Evolutionary Development (2018)

Affiliate Faculty, Metropolitan State University of Denver, Department of Biology

Bio 3600 General Genetics (2013, 2014)

Guest Lecturer or Lab Instructor

NS 495 Senior Seminar on Neuroglia (2013, Regis College; Denver, CO; undergraduate), BIO 4820 Developmental Biology Laboratory (2012, Metropolitan State University of Denver; undergraduate), BIO 4820 Developmental Biology Lecture (2012, Metropolitan State University of Denver' undergraduate), IDPT 7813 Building a Cell: Cell Structure and Function (2011 and 2012, University of Colorado School of Medicine; graduate-level course), NRSC 7615 Developmental Neuroscience (2011, 2012, 2013, University of Colorado School of Medicine; graduate-level course),BIO 465 Neurophysiology (2010, University of Wisconsin-La Crosse; undergraduate), BMB 5400 Developmental Biology (2009, 2010, Mayo Graduate School).

Advanced Training

2016 NSF Vision and Change PULSE Midwest and Great Plains Regional Network Conference/Workshop; St. Louis, MO.

2014 Developmental Biology Teaching Workshop, Walpole, ME.

2011 Woods Hole Embryology Course. Marine Biological Laboratory, Woods Hole, MA.

2010 Developmental Neurobiology Course. Okinawa Institute for Science and Technology, Onna Village, Okinawa, Japan.

Professional Societies

Society for Developmental Biology (SDB)

Society for Neuroscience (SFN)

American Society for Cell Biology (ASCB)

Faculty for Undergraduate Neuroscience (FUN)

Society for the Advancement of Biology Education Research (SABER)

Selected Presentations

Invited Academic Seminars

Luther College Colloquium Series, Decorah, IA. Investigating mechanisms of neuron-glia interactions, myelination, and myelin evolution using zebrafish embryos. 11/21/2019.

Mayo Clinic, Molecular Pharmacology and Experimental Therapeutics, Rochester, MN. Mechanisms of myelin sheath targeting. 10/11/2019.

The Hormel Institute / University of Minnesota, Austin, MN. The CNS myelin landscape: mechanisms of axon recognition and initial myelin sheath formation. 8/30/2018.

Sanford Research Center (Sanford Health), Sioux Falls, SD. The paradox of differential myelination: mechanisms of axon selection. 5/2/2018.

Minnesota State – Mankato, Mankato, MN. Neuron-glia interactions and myelination in transgenic zebrafish larvae. 4/7/2017.

Carleton College, Northfield, MN. Neuron-glia interactions and myelination in transgenic zebrafish larvae. 2/22/2016.

Society Meeting Presentations and Posters **indicates undergraduate student*

2019 Society for Neuroscience Meeting, Chicago, IL. October 19-23, 2019

*Gronseth JR, *Mallon TA, *Martell MR, *Duxbury BB, *Treichel AJ, *Menges ES, Helson HN, **Hines JH**. Regulation of oligodendrocyte exploratory behavior and sampling of axons by neural activity

2018 American Society for Cell Biology – European Molecular Biology Organization Joint Meeting, San Diego, CA. December 8-12, 2018.

*****Menges E, *****Henke J, *****Mallon T, *****Gronseth J, **Hines J**. MAG regulates pre-myelinating oligodendrocyte-axon interactions and promotes axon subtype-selective myelination

2017 Society for Developmental Biology Meeting, Minneapolis, MN. July 13-17, 2017.

*****E. Dankert, *****H. Nelson, *****S. Lang, *****M. Martell, *****A.J. Treichel, **J. Hines**. Axon determination of subtype specific myelin ensheathment and pruning

*****A.J. Treichel and **J.H. Hines**. Primary OPC-Neuron Co-Culture Development in Zebrafish

2015 Society for Neuroscience Meeting, Chicago, IL. October 17-21, 2015.

*****A.J. Treichel, *****M.M. Martell, *****A.J. Kaiser, *****A.G. Trudel, *****B.B. Duxbury, and **J.H. Hines**. Dynamic and Local Remodeling of Axon Caliber During Initial Myelin Ensheathment

2014 Society for the Advancement of Biology Education Research. Minneapolis, MN. Poster session. **J. Hines** and A. Ravanelli. "Development of an inquiry-based genome editing project for an undergraduate genetics classroom.

2013 Southwest Regional Meeting of the Society of Developmental Biology. Salt Lake City, UT. Poster session. **J. Hines**, B. Appel. "Electrical activity modulates myelin gene expression but is not required for the initiation of axon wrapping."

2011 American Society of Neurochemistry Meeting. St. Louis, MO**.** Oral Symposium**.** "Neuronal Membrane Remodeling in Neurite Extension, Neuroprotection, and CNS Repair (S04)." Title: "Dynamic membrane remodeling during the extension of nerve growth cones."

2009 Society for Neuroscience. Chicago, IL. Oral Nanosymposium in "Axon Guidance: Molecular Mechanisms" session. Title: "Polarized trafficking of beta-1 integrin mediates growth cone repulsion by myelin-associated glycoprotein."

Publications

Nelson HN, Treichel AJ, Eggum EN, Martell MR, Kaiser AJ, Trudel AG, Gronseth JR, Maas ST, Bergen S, **Hines JH**. 2019. Individual neuronal subtypes control initial myelin sheath growth and stabilization. In revision; bioRxiv pre-print available at https://doi.org/10.1101/809996

Yergert KM, **Hines JH**, Appel B. 2019. Neuronal activity enhances mRNA localization to myelin sheaths during development. In review; bioRxiv pre-print available at https://doi.org/10.1101/654616

Ravanelli AM, Kearns CA, Powers RK, Wang Y, **Hines JH**, Donaldson MJ, Appel B. Sequential specification of oligodendrocyte lineage cells by distinct levels of Hedgehog and Notch signaling. 2018. Dev Biol 444(2):93-106.

Treichel, AJ and **Hines JH.** 2018. Development of an embryonic zebrafish oligodendrocyte-neuron mixed co-culture system. Zebrafish 15(6): 586-596. https://doi.org/10.1089/zeb.2018.1625.

Hines JH, Ravanelli AM, Schwindt R, Scott E, Appel B. Neuronal activity biases axon selection for myelination in vivo. 2015. Nature Neuroscience 18(5):683-689.

Mathews E, Mawdsley D, Walker M, **Hines JH**, Pozzoli M, Appel B. Mutation in Hmg-CoA Synthase I reveals requirements for isoprenoid and cholesterol synthesis in oligodendrocyte migration arrest, axon wrapping, and myelin gene expression. 2014. Journal of Neuroscience 26;34(9):3402-12.

Hines JH, Henle SJ, Carlstrom LP, Abu-Rub M, Henley JR. Single vesicle imaging indicates distinct modes of rapid membrane retrieval during nerve growth. 2012. BMC Biology 10:4.

Carlstrom LP, **Hines JH**, Henle SJ, Henley JR. Bidirectional remodeling of beta1-integrin adhesions during chemotropic regulation of nerve growth. 2011. BMC Biology 9:82.

Tojima T, **Hines JH**, Henley JR, Kamiguchi H. Second messengers and membrane trafficking: director and organizer of growth cone steering. 2011. Nature Reviews Neuroscience, 12(4):191.

Hines JH, Abu-Rub M, Henley JR. Asymmetric endocytosis and remodeling of beta1-integrin adhesions during growth cone chemorepulsion by MAG. 2010. Nature Neuroscience 13(7):829.

Dachsel JC, Taylor JP, Mok SS, Ross OA, Hinkle KM, Bailey RM, **Hines JH**, Szutu J, Madden B, Petrucelli L, Farrer M. Identification of potential protein interactors of Lrrk2. 2007. Parkinsonism Related Disorders 13(7):382.