

Shawn Mikula

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Education, Research Experience

2014-present	Project Leader Whole mouse brain volume electron microscopy. Max Planck Institute of Neurobiology, Martinsried, Germany
2009-2014	Scientist (Postdoctoral fellow) Max Planck Institute for Medical Research, Heidelberg, Germany, Laboratory of Dr. Winfried Denk. Development of whole mouse brain staining and serial block-face electron microscopy techniques for circuit reconstruction.
2005-2009	Scientist (Postdoctoral fellow) University of California, Davis, CA, USA, Laboratory of the late Dr. Ted Jones. Development of internet-enabled multi-resolution histochemical, immunocytochemical and connectional brain atlases.
1998-2005	PhD thesis Johns Hopkins University, Baltimore, MD, USA, Laboratory of Dr. Ernst Niebur. Simulation and derivation of exact solutions for firing rate and synchrony in feedforward and recurrent networks of model neurons.
1994-1998	BS (honors), Biochemistry, Physics & Math University of Texas, Austin, TX, USA

Teaching Experience

2009	Lecturer in <i>Neuroinformatics</i> , Cold Spring Harbor Laboratory
2000	Teaching assistant for graduate <i>Neuroscience A</i> course, Johns Hopkins University

Scholarship, Awards

1999-2001	Visual Neuroscience Training Grant
1998-1999	Behavior and Neuroscience Training Grant

Professional Activities

- 2015-present Associate Editor for *Frontiers in Neuroanatomy*
- 2004-present Peer reviewer for *Frontiers in Neural Circuits*, *Frontiers in Neuroinformatics*, *NeuroImage*, *Physics in Medicine and Biology* and *Neural Computation*
- 2003-present Member of the Society for Neuroscience.

Invited Talks

- 07/2016 *FENS Forum of Neuroscience*. Whole-Brain Electron Microscopic Circuit Reconstruction.
- 11/2014 *Bodian Seminar*, Johns Hopkins Univ., Baltimore, MD.
- 11/2014 NIH, Bethesda, MD. "High-Resolution Whole-Brain Staining for Electron Microscopic Circuit Reconstruction".
- 10/2014 *Neural Circuit Reconstruction Conference*, MPI, Berlin, Germany
- 06/2013 *Sixth International Neural Microcircuit Conference*, Okazaki, Japan. "Enhanced Staining for Whole Mouse Brain Circuit Reconstruction".
- 03/2013 Janelia Farm Research Campus, HHMI
- 11/2012 *Whole-Brain Circuit Reconstruction satellite symposium*, SFN, New Orleans, LA. "Mapping the Whole Mouse Brain with Electron Microscopy".
- 02/2012 Bernstein Center for Computational Neuroscience, Berlin. "Towards Mapping the Whole Mouse Brain using Serial Block-face Electron Microscopy".
- 10/2006 *Aperio Visions Conference*, San Diego, CA. "Virtual Microscopy in Neurology".

Publications

Research Articles submitted/in preparation

Mikula, S. Automated Myelinated Axon Segmentation for Serial Block-face Electron Microscopy (*in preparation*).

Research Articles

Mikula, S. & Denk, W. (2015) High-Resolution Whole-Brain Staining for Electron Microscopic Circuit Reconstruction. *Nature Method.* 12:6, 541-6.

Kemen, T., Malloy, M., Thiel, B., Mikula, S., Denk, W., Dellemann, G., Zeidler, D. (2015) Further Advancing the Throughput of a Multibeam SEM. *SPIE Advanced Lithography*. doi:10.1117/12.2188560.

- Eberle, A.L., Mikula, S., Schalek, R., Lichtman, J., Knothe Tate, M., and Zeidler, D. (2015) High-Resolution, High-Throughput Imaging with a Multi-Beam Scanning Electron Microscope. *Journal of Microscopy*.
- Tek, B.F., Kroeger, T., Mikula, S., Hamprecht, F.A. (2014) Automated Cell Nuclei Detection for Large-Volume Electron Microscopy of Neural Tissue. *IEEE International Symposium on Biomedical Imaging*.
- Kroeger, T., Mikula, S., Denk, W., Koethe, U., Hamprecht, F.A. (2013) Learning to Segment Neurons with Non-Local Quality Measures. *Med Image Comput Comput Assist Interv*. 16(Pt 2): 419-27.
- Binding, J., Mikula, S., Denk, W. (2013) Low-Dosage Maximum-a-Posteriori Focusing and Stigmation. *Microscopy and Microanalysis*. 19(1): 38-55.
- Mikula, S., Binding, J., Denk, W. (2012) Staining and Embedding the Whole Mouse Brain for Electron Microscopy. *Nature Methods*. 9, 1198–1201.
- Speer, C.M., Mikula, S., Huberman, A.D., Chapman, B. (2010) The Developmental Remodeling of Eye-Specific Afferents in the Ferret Dorsal Lateral Geniculate Nucleus. *Anat Rec (Hoboken)*. 293(1): 1-24.
- Mikula, S., Parrish, S.K., Trimmer, J.S., Jones, E.G. (2009) Complete 3D visualization of primate striosomes by KCHIP1 immunostaining. *J Comp Neurol*. 514(5): 507-17.
- Bohland, J.W., Wu, C., Barbas, H., Bokil, H., Cline, H.T., Freed, P.J., Greenspan, R.J., Haber, S.N., Hawrylycz, M., Herrera, D.G., Hilgetag, C.C., Huang, Z.J., Jones, A., Jones, E.G., Karten, H.J., Kleinfeld, D., Kotter, R., Lester, H.A., Lin, J.M., Mikula, S., Panksepp, J., Safdieh, J., Saper, C.B., Schiff, N.D., Svoboda, K., Swanson, L.W., Toga, A.W., Watson, J.D., & Mitra, P.P. (2009) A Proposal for a Coordinated Effort for the Determination of Brain Wide Neuroanatomical Connectivity in Model Organisms at a Mesoscopic Scale. *PLoS Comput Biol*. 5(3): e1000334.
- Mikula, S., Manger, P.R., and Jones, E.G. (2008) The Thalamus of the Monotremes: Cyto- and Myeloarchitecture and Chemical Neuroanatomy. *Philos Trans R Soc Lond B Biol Sci*. 363(1502): 2415-40
- Mikula, S., Stone, J.M., and Jones, E.G. (2008) BrainMaps.org - Interactive High-Resolution Digital Brain Atlases and Virtual Microscopy. *Brains, Minds & Media*, Vol.3, bmm1426, in: Lorenz S, Egelhaaf M (eds): Interactive Educational Media for the Neural and Cognitive Sciences, Brains, Minds & Media, 2008.
- Mikula, S. and Niebur, E. (2008) Exact Solutions for Rate and Synchrony in Recurrent Networks. *Neural Computation*. 20(11): 2637-61. (Cover article)
- Trotts, I., Mikula, S., and Jones, E.G. (2007) Interactive Visualization of Multiresolution Image Stacks in 3D. *NeuroImage*. 35(3): 1038-43
- Mikula, S., Trotts, I., Stone, J., and Jones, E.G. (2007) Internet-Enabled High-Resolution Brain Mapping and Virtual Microscopy. *NeuroImage*. 35(1): 9-15. (Cover article)

Mikula, S. and Niebur, E. (2006) A Novel Method for Visualizing Functional Connectivity using Principal Component Analysis. *Int J Neurosci.* 116(4): 419-29.

Mikula, S. and Niebur, E. (2005) Rate and Synchrony in Feedforward Networks of Coincidence Detectors: Analytical Solution. *Neural Computation.* 17(4): 881-902.

Mikula, S. and Niebur, E. (2004) Correlated Inhibitory and Excitatory Inputs to the Coincidence Detector: Analytical Solution. *IEEE Transactions on Neural Networks.* 15(5): 957-62.

Mikula, S. and Niebur, E. (2003) Synaptic Depression leads to Nonmonotonic Frequency Dependence in the Coincidence Detector. *Neural Computation.* 15(10): 2339-58

Mikula, S. and Niebur, E. (2003) The Effects of Input Rate and Synchrony on a Coincidence Detector: Analytical Solution. *Neural Computation.* 15(3): 539-47.

Book Chapter

Mikula, S. (2014) "Scanning Electron Microscopy." *Encyclopedia of Computational Neuroscience.* Springer. Editors, Dieter Jaeger and Ranu Jung.