

Erik B. Bloss

Curriculum Vitae, June 2023

Present Position

Assistant Professor, The Jackson Laboratory
600 Main Street, Bar Harbor, ME 04609
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[Lab website](#); [Google Scholar](#)

Research Interests

We use experimental approaches to study how adaptive, goal directed behaviors are supported by cortical circuits, cell types, and synapses. Our current work is focused on investigating these features within the mouse frontal cortex using a variety of high-resolution approaches. An additional focus is how these same cortical circuits are vulnerable to decline during aging and in Alzheimer's disease.

Education

2007-2012 Icahn School of Medicine at Mt. Sinai; Ph.D., Department of Neuroscience
Advisor: Dr. John Morrison

2001-2005 University of Colorado-Boulder. B.A., Psychology/Biology

Positions

2019-Present Assistant Professor, The Jackson Laboratory, Bar Harbor, ME

2019-2021 Visiting Scientist at Janelia Research Campus/HHMI

2015-2019 Research Scientist, Janelia Research Campus/HHMI, Ashburn, VA
Advisor: Dr. Nelson Spruston

2012-2015 Postdoctoral Fellow, Janelia Research Campus/HHMI, Ashburn, VA
Advisor: Dr. Nelson Spruston

2011 Lecturer, Department of Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY

2010 Teaching Assistant, Department of Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY

2005-2007 Research Technician, The Rockefeller University, New York, NY
Advisor: Dr. Bruce McEwen

2004-2005 Undergraduate Research Assistant, University of Colorado Boulder, Department of Psychology and Center for Neuroscience, Boulder, CO
Advisor: Dr. Linda Watkins

Fellowships, Awards, and Research Funding

2023-Present Director's Innovation Award from The Jackson Laboratory – A Multimodal Interrogation for Tau Mutations on Neural Circuit Function (Principal Investigator)

2023-Present Deconstruction of a Hypothalamic Exercise-Responsive Circuit for Neuroprotection, NIH/NIA (Principal Investigator)

2022-Present Disease Modeling Project, NIH/NIA (Co-Investigator)

2022-Present Modeling the Genetic Interaction Between Klotho and APOE Alleles in Alzheimer's Disease, NIH/NIA (Co-Investigator)

2022-Present Scientific Services Innovation Fund from The Jackson Laboratory – A GRIN Lens Approach for Analyses of Activity Across Multiple Cell Types (Principal Investigator)

2021-Present Director's Innovation Award from The Jackson Laboratory -- Development of Patch-Seq at JAX: Morphological, Electrophysiological, and Transcriptional Characterization of Single Neurons (Co-Investigator)

- 2021-Present Discovery of Addiction-Related Genes with Advance Mouse Resources, NIH/NIDA (Co-Investigator)
- 2021-Present Director's Innovation Award from The Jackson Laboratory – Neurobehavioral Dynamics of Addiction (PI: Chesler)
- 2012-2019 Internally funded by HHMI; Janelia Research Campus does not allow funding from outside sources.
- 2010-2011 Awarded Phillip Hausfeld Memorial Scholarship Award in the Neurosciences
- 2009-2012 Ruth L. Kirschstein National Research Service Awards F31 Predoctoral Fellowship from the National Institute of Aging (AG034794) at Icahn School of Medicine at Mount Sinai, New York, NY
- 2004-2005 Awarded Undergraduate Research Opportunities Program Fellowship via HHMI at CU-Boulder

Teaching Activities

- 2021 Lecturer, University of Maine Graduate Program, Orono, ME
- 2020 Lecturer, Neuroscience Department at the Tufts University School of Medicine, Boston, MA
- 2011 Lecturer, Department of Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY
- 2010 Teaching Assistant, Department of Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY

Professional Activities and Affiliations

Invited Talks:

- 2022 MDI Biological Laboratory
- 2022 Neuroscience Department at the Tufts University School of Medicine
- 2017 European Institute for Theoretical Neuroscience
- 2017 Society for Neuroscience Nanosymposium
- 2017 Gordon Research Conference
- 2016 Society for Neuroscience Minisymposium

Program Review:

- 2015-Present Ad Hoc Reviewer, Cerebral Cortex
- Ad Hoc Reviewer, eLife
- Ad Hoc Reviewer, Endocrinology
- Ad Hoc Reviewer, eNeuro
- Ad Hoc Reviewer, Frontiers in Neuroscience
- Ad Hoc Reviewer, Journal of Comparative Neurology
- Ad Hoc Reviewer, Journal of Neuroscience
- Ad Hoc Reviewer, Nature Neuroscience
- Ad Hoc Reviewer, Neurobiology of Aging
- Ad Hoc Reviewer, Neuroendocrinology

Mentorship at The Jackson Laboratory:

- 2022-Present Emily Nickerson, PhD Student
- 2022 Grace O'Brien, JAX Summer Student
- 2020-Present Dr. Kourtney Graham, Postdoc

Thesis Committees:

- 2022-Present Brianna Gurdon, University of Maine
- 2021-Present Yehya Barakat, Tufts University
- 2021-Present Sarah Heuer, Tufts University
- 2020-Present Andrew Ouellette, University of Maine
- 2020-Present Tionna Ouellette, Tufts University

Memberships:

2019-Present Associate Member, The Jackson Laboratory Center for Aging and Alzheimer's Disease

2019-Present Associate Member, The Jackson Laboratory Center for Addiction Biology

2005-Present Member, Society for Neuroscience

Publications

1. Heuer SE, Keezer KJ, Hewes AA, Onos KD, Graham KC, Howell GR, **Bloss EB**. Genetic context controls early microglia-synaptic interactions in mouse models of Alzheimer's disease. bioRxiv. 2023 Apr 29:2023.04.28.538728. doi: 10.1101/2023.04.28.538728. Preprint.PMID: 37162819
2. Virga DM, Hamilton S, Osei B, Morgan A, Zamponi E, Park NJ, Hewitt VL, Zhang D, Gonzalez KC, **Bloss E**, Polleux F, Lewis TL. Activity-dependent subcellular compartmentalization of dendritic mitochondria structure in CA1 pyramidal neurons.bioRxiv. 2023 Mar 26;. doi: 10.1101/2023.03.25.534233. PubMed PMID: 36993655; PubMed Central PMCID: PMC10055421.
3. Graham KG, Spruston N, **Bloss EB**. Hippocampal and thalamic afferents form distinct synaptic microcircuits in the mouse infralimbic frontal cortex. *Cell Rep*, 2021 Oct 19;37(3):109837, 2021
4. **Bloss EB**, Hunt DL. Revealing the synaptic hodology of mammalian neural circuits with multiscale neurocartography. *Frontiers of Neuroinformatics*, 2019 Jul 30;13:52. doi: 10.3389/fninf.2019.00052. eCollection 2019.
5. **Bloss EB**, Cembrowski MS, Karsh B, Colonell J, Fetter RD, Spruston N. Single excitatory axons form clustered synapses onto CA1 pyramidal cell dendrites. *Nature Neuroscience*, Mar;21(3):353-363, 2018.
6. **Bloss EB**, Cembrowski MS, Karsh B, Colonell J, Fetter R, and Spruston N. Structured dendritic inhibition supports branch-selective integration in CA1 pyramidal cells. *Neuron*, 89(5):1016-30, 2016.
7. Milstein AD, **Bloss EB**, Dilly GA, Zemelman BV, and Magee JC. Inhibitory Gating of Input Comparison in the CA1 Microcircuit. *Neuron*, 87(6):1274-89, 2015. 87(6):1274-89, 2015.
8. Viswanathan S, Williams ME, **Bloss EB**, Stasevich TJ, Speer CM, Nern A, Pfeiffer BD, Hooks BM, Li WP, English BP, Tian T, Henry GL, Macklin JJ, Patel R, Gerfen CR, Zhuang X, Wang Y, Rubin GM, and Looger LL. High-performance probes for light and electron microscopy. *Nature Methods*, 12(6):568-76, 2015. *Faculty of 1000-recommended article
9. McCall T, Weil ZM, Nacher J, **Bloss EB**, El Maarouf A., Rutishauser U, McEwen BS. Depletion of polysialic acid from neural cell adhesion molecule (PSA-NCAM) increases CA3 dendritic arborization and increases vulnerability to excitotoxicity. *Exp Neurol*. 241:5-122013
10. Graves AR, Moore SJ, **Bloss EB**, Mensch B, Kath WL, and Spruston N. Hippocampal pyramidal neurons comprise two distinct cell types that are countermodulated by metabotropic receptors. *Neuron*, 76(4):776-89, 2012. *Faculty of 1000-recommended article
11. Ohm DT*, **Bloss EB***, Janssen WG, Dietz KC, Wadsworth S, Lou W, Gee NA, Lasley BL, Rapp PR, and Morrison JH. Clinically relevant hormone treatments fail to induce spinogenesis in prefrontal cortex of aged female rhesus monkeys. *J Neurosci* 32(34):11700-11705, 2012. (*co-first authors).
12. **Bloss EB**, Puri R, Yuk FJ, Punsoni M, Hara Y, Janssen WG, McEwen BS, and Morrison JH. Morphological and molecular changes in aging rat prelimbic prefrontal cortical synapses. *Neurobiology of Aging*, 34(1):200-210, 2012.
13. **Bloss EB**, Janssen WG, Ohm DT, Yuk FJ, Wadsworth S, Saardi KM, McEwen BS, and Morrison JH. Evidence for reduced experience-dependent dendritic spine plasticity in the aging prefrontal cortex. *J Neurosci*, 31(21):7831-9, 2011.
14. Karatsoreos IN, Bhagat SM, **Bloss EB**, Morrison JH, McEwen BS. Disruption of circadian clocks has ramifications for metabolism, brain and behavior. *Proc. Natl. Acad. Sci. USA*, 108(4):1657-62, 2011. *Faculty of 1000-recommended article
15. Bozdagi O, Wang XB, Nikitczuk JS, Anderson TR, **Bloss EB**, Radice GL, Zhou Q, Benson DL, Huntley GW. Persistence of coordinated long-term potentiation and dendritic spine enlargement at mature hippocampal CA1 synapses requires N-cadherin. *J Neurosci*. 28 (30):9984-9, 2010.
16. **Bloss EB**, Hunter RG. Hippocampal kainate receptors. *Vitam Horm*. 82:167-84, 2010.
17. **Bloss EB**, Janssen WG, McEwen BS, and Morrison JH. Interactive effects of stress and aging on

- structural plasticity in the prefrontal cortex. *J Neurosci*, 30(19): 6726-6731, 2010.
18. Hains LE, Loram LC, Weiseler JL, Frank MG, **Bloss EB**, Sholar P, Taylor FR, Harrison JA, Martin TJ, Eisenach JC, Maier SF, Watkins LR. Pain intensity and duration can be enhanced by prior challenge: initial evidence suggestive of a role of microglial priming. *J Pain*. 11(10):1004-14, 2010.
 19. Hunter RG, **Bloss EB**, McCarthy KJ, McEwen BS. Regulation of the nicotinic receptor alpha7 subunit by chronic stress and corticosteroids. *Brain Res*. 1325:141-6, 2010.
 20. Zhang M, Poplawski M, Yen K, Cheng H, **Bloss E**, Zhu X, Patel H, Mobbs CV. Role of CBP and SATB-1 in aging, dietary restriction, and insulin-like signaling. *PLoS Biol*. 7(11):e1000245, 2009.
 21. Goldwater DS, Pavlides C, Hunter RG, **Bloss EB**, Hof PR, McEwen BS, Morrison JH. Structural and functional alterations to rat medial prefrontal cortex following chronic restraint stress and recovery. *Neuroscience*.164(2):798-808, 2009.
 22. Hunter RG, Bellani R, **Bloss E**, Costa A, McCarthy K, McEwen BS. Regulation of kainate receptor subunit mRNA by stress and corticosteroids in the rat hippocampus. *PLoS One*. 4(1):e4328, 2009.
 23. **Bloss EB**, Hunter RG, Waters EM, Munoz C, Bernard K, McEwen BS. Behavioral and biological effects of chronic S18986, a positive AMPA receptor modulator, during aging. *Exp Neurol*. 210(1):109-17, 2008.
 24. Hunter RG, Bellani R, **Bloss E**, Costa A, Romeo RD, McEwen BS. Regulation of CART mRNA by stress and corticosteroids in the hippocampus and amygdala. *Brain Res*. 1152:234-40, 2007.

Book Chapters

Bloss EB, Morrison JH, McEwen BS. Stress and Aging: A Question of Resilience with Implications for Disease. From *The Handbook of Stress: Neuropsychological Effects on the Brain*, 349-366, Wiley-Blackwell Publishing, 2011.