

# Arpiar Bruce Saunders

48 Glen St., Malden, MA 02148  
arpiar.saunders@gmail.com  
www.arpiarsaunderslab.org

## EDUCATION

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<b>PhD in Neuroscience</b>	<b>Harvard Medical School, MA</b>	<b>2008–2014</b>
<b>BA in Biology and Linguistics</b>	<b>Swarthmore College, PA</b> <i>High Honors, 3.76 GPA</i>	<b>2002–2006</b>
<b>Additional Education</b>	<b>Marine Biological Laboratories, MA</b> <i>Methods in Computational Neuroscience</i>	<b>2012</b>
	<b>University of Michigan Armenian Language Institute, Armenia</b>	<b>2002</b>

## RESEARCH EXPERIENCE

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<b>Postdoctoral Fellow</b>	<b>PI: Steven McCarroll</b> <i>Harvard Medical School, Dept. of Genetics</i> <i>Broad Institute, Stanley Center for Psychiatric Research</i> Single-cell transcriptomics of brain in relation to psychiatric disease	<b>2014–present</b>
<b>Graduate Student</b>	<b>PI: Bernardo Sabatini</b> <i>Harvard Medical School, Dept. of Neurobiology</i> Investigating brain circuits of the basal ganglia using transgenic mice, whole-cell patch clamp physiology, 2-photon imaging and recombinant viruses.	<b>2009–2014</b>
<b>Postbachelor Researcher</b>	<b>PI: Lila Fishman</b> <i>University of Montana, Dept. of Biological Sciences</i> Genetic, bioinformatic and cytogenetic (FISH) analysis of centromere-associated meiotic drive	<b>2006–2008</b>
<b>Summer Researcher</b>	<b>PI: Kelley Thomas</b> <i>University of New Hampshire, Hubbard Center for Genome Studies</i> Constructed BAC/Fosmid libraries for <i>Daphnia magna</i> ; analyzed genome micro-synteny between <i>D.magna</i> and <i>D.pulex</i> .	<b>2006</b>
<b>Undergraduate Researcher</b>	<b>PI: Kathleen Siwicki</b> <i>Swarthmore College, Dept. of Biology</i> Used <i>Drosophila</i> neurogenetics to dissect the role of gustation in an associative learning paradigm (BA Thesis)	<b>2004–2006</b>

**Undergraduate Researcher**                      **PI: Søren Wichmann**                      **2005**  
*Max Planck Institute, Dept. of Linguistics*  
Adapted methods of biological phylogenetics for lexical and structural linguistic data (BA Thesis)

## AWARDS

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**Helen Hay Whitney Post-Doc Fellow**                      **2016–2019**

**Richard J. Herrnstein Prize**                      Dissertation Prize, Harvard GSAS                      **2014–2015**

**F31 Pre Doctoral Fellowship**                      National Institute of Health                      **2011–2014**

**Shapiro Research Fellow**                      Dept. of Neurobiology, Harvard Medical School                      **2011**

**Ryan Research Fellow**                      Dept. of Neurobiology, Harvard Medical School                      **2011**

**FIBR Summer Research Award**                      University of New Hampshire                      **2006**

**Best Thesis in Applied Linguistics**                      Dept. of Linguistics, Swarthmore College                      **2006**

**Leo Leva Prize**                      Dept. of Biology, Swarthmore College                      **2006**

**Undergraduate Summer Research Award**                      Howard Hughes Medical Institute                      **2004**

## TEACHING EXPERIENCE

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**Teaching Assistant**                      **Harvard Medical School**                      **2013**  
*Neuroscience (Cellular Physiology)*

**Laboratory Teaching Assistant**                      **Swarthmore College**                      **2004–2005**  
*Molecular and Cellular Biology, Neurobiology*

## LANGUAGES

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English, German, Western Armenian (introductory)

## PUBLICATIONS

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**In Review (Nature)**                      Innovations in Primate Interneuron Repertoire                      **2019**  
bioRxiv 76:86–51  
Krienen FM, Goldman M, Zhang Q, del Rosario R, Florio M, Machold R, **Saunders A** et al.

<b>Immunity</b>	<p>Single-cell RNA sequencing of Microglia throughout the Mouse Lifespan and in the Injured Brain Reveals Complex Cell-State Changes</p> <p>Hammond TR, Dufort C, Dissing-Olesen L, Giera S, Young A, Wysoker A, Walker AJ, Gergits F, Segel M, Nemesh J, Marsh SE, <b>Saunders A</b>, Macosko E, Ginhoux F, Chen J, Franklin RJM, Piao X, McCarroll SA, Stevens BF</p>	<b>2019</b>
<b>Cell</b>	<p>Molecular Diversity and Specializations among the Cells of the Adult Mouse Brain</p> <p><b>Saunders A*</b>, Macosko E*, Wysoker A, Goldman M, Krienen F, de Rivera H, Bien E, Baum M, Wang S, Goeva A, Nemesh J, Kamitaki N, Brumbaugh S, Kulp D, McCarroll SA</p>	<b>2018</b>
<b>Nature Genetics</b>	<p>Heritability enrichment of specifically expressed genes identifies disease-relevant tissues and cell types</p> <p>Finucane HK, Reshef YA, Anttila V, Slowikowski K, Gusev A, Byrnes A, Gazal S, Loh PR, Lareau C, Shores N, Genovese G, <b>Saunders A</b>, Macosko E, Pollack S; Brainstorm Consortium, Perry JRB, Buenrostro JD, Bernstein BE, Raychaudhuri S, McCarroll S, Neale BM, Price AL</p>	<b>2018</b>
<b>Neuron</b>	<p>Genetically Distinct Parallel Pathways in the Entopeduncular Nucleus for Limbic and Sensorimotor Output of the Basal Ganglia</p> <p>Wallace ML, <b>Saunders A</b>, Huang KW, Philson AC, Goldman M, Macosko EZ, McCarroll SA, Sabatini BL</p>	<b>2016</b>
<b>Neuropharmacology</b>	<p>Cotransmission of Acetylcholine and GABA</p> <p>Granger AJ, Mulder N, <b>Saunders A</b>, Sabatini BL</p>	<b>2016</b>
<b>PLoS ONE</b>	<p>Globus pallidus externus neurons expressing parvalbumin interconnect the subthalamic nucleus and striatal interneurons</p> <p><b>Saunders, A.</b>, Huang, K.W. &amp; Sabatini, B.L.</p>	<b>2016</b>
<b>Molecular Evolution</b>	<p>Duplication and adaptive evolution of a key centromeric protein in <i>Mimulus</i>, a genus with centromere-associated female meiotic drive</p> <p>Finseth, F.R. Dong, Y., <b>Saunders, A.</b> &amp; Fishman, L.</p>	<b>2015</b>
<b>Current Protocols in Neuroscience</b>	<p>Cre activated and inactivated recombinant adeno-associated viral vectors for neuronal anatomical tracing or activity manipulation</p> <p><b>Saunders, A.</b> &amp; Sabatini, B.L.</p>	<b>2015</b>

<b>Nature</b>	A direct GABAergic output from the basal ganglia to frontal cortex <b>Saunders, A.</b> , Oldenburg, I.A., Berezovskii, V.K., Johnson, C.A., Kingery, N.D., Elliott, H.L., Xie, T., Gerfen, C.R. & Sabatini, B.L.	<b>2015</b>
<b>eLife</b>	Corelease of GABA and acetylcholine from cholinergic forebrain neurons <b>Saunders, A.*</b> , Granger, A* & Sabatini, B.L.	<b>2015</b>
<b>Frontiers in Neural Circuits</b>	Vesicular stomatitis virus with the rabies virus glycoprotein directs retrograde transsynaptic transport amongst neurons in vivo Beier, K.T., <b>Saunders, A.</b> Oldenburg, I.A., Sabatini, B.L., and Cepko, C.L.	<b>2012</b>
<b>Frontiers in Neural Circuits</b>	Novel recombinant adeno-associated viruses for Cre activated and inactivated transgene expression <b>Saunders, A.</b> , Johnson, C. and Sabatini, B.L.	<b>2012</b>
<b>Nature</b>	Recurrent network activity drives striatal synaptogenesis Kozorovitskiy, Y.*, <b>Saunders, A.*</b> , Johnson, C., Lowell, B.B. & Sabatini, B.L.	<b>2012</b>
<b>Neuron</b>	Fasting Activation of AgRP Neurons Requires NMDA Receptors and Involves Spinogenesis and Increased Excitatory Tone Liu, T., Kong, D., Shah, B., Ye, C., Koda, S. <b>Saunders, A.</b> , Ding, J., Yang, Z., Sabatini, B. and Lowell, B.	<b>2012</b>
<b>PNAS</b>	Anterograde or retrograde transsynaptic labeling of CNS neurons with vesicular stomatitis virus vectors Beier, K.T., <b>Saunders, A.</b> , Oldenburg, I., Miyamichi, K., Akhtar, N., Luo, L., Whelan, S., Sabatini, B. and Cepko, C.	<b>2011</b>
<b>Science</b>	Centromere-associated female meiotic drive entails male fitness costs in Monkeyflowers Fishman, L. and <b>Saunders, A.</b>	<b>2008</b>
<b>Diachronica</b>	How to use typological databases in historical linguistic research Wichmann, S. and <b>Saunders, A.</b>	<b>2007</b>

(\* = equal contribution)

## PRESENTATIONS

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<b>Stanley Center Advisory Board Meeting</b>	Broad Institute, Boston MA*	<b>2019</b>
<b>New York University (SPINES seminar)</b>	NY, NY*	<b>2019</b>
<b>University of Frankfurt (invited seminar)</b>	Frankfurt, Germany*	<b>2019</b>
<b>Swarthmore College (invited seminar)</b>	Swarthmore, PA*	<b>2018</b>
<b>Current Applications in Single-Cell Genomics (Illumina Retreat)</b>	Cambridge, MA*	<b>2018</b>
<b>Basal Ganglia GRC</b>	Ventura, CA*	<b>2018</b>
<b>Winter qBio</b>	Maui, Hawaii	<b>2018</b>
<b>Broad Institute Retreat</b>	Boston MA*	<b>2018</b>
<b>MGH CSIBD Summer Course, Current Techniques in Molecular Genetics</b>	Boston MA	<b>2017</b>
<b>Stanley Center Advisory Board Meeting</b>	Broad Institute, Boston MA*	<b>2017</b>
<b>Board of Scientific Counselors Meeting</b>	Broad Institute, Boston, MA*	<b>2017</b>
<b>MPI for Ornithology</b>	Seewiesen, Germany*	<b>2016</b>
<b>COSYNE12</b>	Salt Lake City, Utah	<b>2012</b>
<b>Young Scientists Forum, Ludwig Maximilian University</b>	Munich, Germany*	<b>2011</b>
<b>HHMI Science Meeting</b>	Janelia Farm, Ashburn, VA	<b>2010</b>
<b>Smith Family Biomedical Meeting</b>	Boston, MA	<b>2010</b>
<b>Evo-WIBO</b>	Port Angeles, WA	<b>2008</b>
<b>Mimulus Meeting</b>	National Evolutionary Synthesis Center, Durham, NC*	<b>2007</b>
<b>Ecological Genomics Symposium</b>	Kansas City, MO	<b>2007</b>
<b>FIBR Summer Research Symposium</b>	University of Indiana, Bloomington, IN*	<b>2006</b>

<b>International Conference on Austronesian Linguistics</b>	Luzon, Philippines	<b>2005</b>
<b>Nerve Net, Marine Biological Laboratories</b>	Woods Hole, MA*	<b>2005</b>
<b>Sigma Xi Research Symposium</b>	Swarthmore College	<b>2005</b>
<b>Undergraduate Research Symposium</b>	Haverford College	<b>2005</b>
<b>Dept. of Linguistics, MPI for Evolutionary Anthropology</b>	Leipzig, Germany	<b>2005</b>

(\* denotes oral presentation, all first authorship)