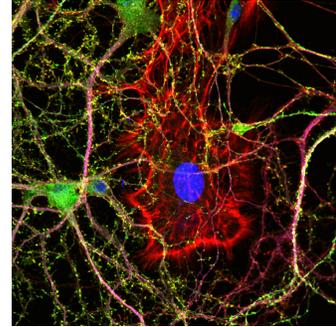


Curriculum Vitae – Jason D. Shepherd

Current Address

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Personal Information

- Citizenship: New Zealand, USA permanent resident

Positions

January 2013 – Present. **Assistant Professor, Department of Neurobiology and Anatomy. The University of Utah, School of Medicine.** Salt Lake City, UT. USA.

July 2013 – Present. **Adjunct Assistant Professor of Ophthalmology and Visual Sciences. The University of Utah, School of Medicine.** Salt Lake City, UT. USA.

April 2015 – Present. **Adjunct Assistant Professor of Biochemistry. The University of Utah, School of Medicine.** Salt Lake City, UT. USA.

April 2011 – December 2012. **Postdoctoral Fellow (K99 award). The Picower Institute for Learning and Memory, Massachusetts Institute of Technology.** Cambridge, MA. USA.

June 2007- April 2011. **Howard Hughes Medical Institute Postdoctoral Fellow. The Picower Institute for Learning and Memory, Massachusetts Institute of Technology.** Cambridge, MA. USA.

Education

Jan 2003 – May 2007. **Cellular and Molecular Medicine Graduate Program (Ph.D). The Johns Hopkins School of Medicine.** Baltimore, MD. USA.

Jan-Oct 2002. **One year in the Neurobiology and Behavior Graduate Program as an Exchange Abroad Scholar (counted towards undergraduate degree) University of California, Irvine.** Irvine, CA. USA.

1999 – 2002. **Bachelor of Science with First Class Honours in Neuroscience. University of Otago.** Dunedin, New Zealand

1998. **American Field Scholar (AFS) Intercultural Exchange in Switzerland, Kantonschule Trogen.** Trogen, Appenzellerland. Switzerland.

Academic Awards

NIH Collaborative Development Award, CHEETAH, 2017

Kavli Fellow. Frontiers in Science, National Academy of Sciences, 2016

E. Matilda Ziegler Foundation for the Blind, Young Investigator Award, 2016

Angelman Syndrome Foundation Research Grant, 2013

NIH Pathway to Independence (PI) Award (K99/R00) from NINDS, April 2011

International Society for Neurochemistry Young Investigator Award, 2011

Peter and Patricia Gruber International Research Award in Neuroscience, 2010

Keystone NIH Symposia Scholarship, 2010

Swiss Society for Neuroscience FENS Travel Fellowship, 2008

Howard Hughes Medical Institute Postdoctoral Fellowship, 2007

The Paul Erlich Young Investigator Award, Johns Hopkins University School of Medicine, 2006

Grass Foundation Fellowship in Neuroscience. Marine Biological Laboratory, Woods Hole. Summer 2006

Glenn/AFAR Scholarship for Research in the Biology of Aging, 2003

Howard Hughes Predoctoral Fellowship, Honourable Mention, 2003

University of Otago Neuroscience Prize, 2002 - awarded for the top Honours research thesis in the undergraduate neuroscience program

University of Otago Science Honours Scholarship, 2002 – awarded to the top ten Honours theses in the Division of Science.

Exchange Abroad Scholarship, University of Otago/University of California Irvine, 2002

Summer Research Fellowship, Research School of Biological Sciences, Australian National University, 2001

Summer Research Scholarship, School of Biological Sciences, University of Auckland, 2000

Research Experience

July 2007- December 2012. **Postdoctoral Research.** Laboratory of Dr Mark Bear. *Investigating the in vivo role of Arc in visual cortex plasticity.* The Picower Institute for Learning and Memory, Massachusetts Institute of Technology. Cambridge, MA.

Summer 2009. **Imaging Structure and Function in the Nervous System course.** Cold Spring Harbor Laboratory, NY.

Summer 2006. **Independent Research, Marine Biological Laboratory.** *The role of BCL-2 family proteins and mitochondrial function in post-synaptic transmission and plasticity.* In collaboration with Elizabeth Jonas and Len Kaczmarek (Yale University). Woods Hole, MA.

Jan 2003 – May 2007. **Doctoral Research.** Laboratories of Dr Richard Huganir and Dr. Paul Worley. *Investigation into the physiological function of the immediate early gene Arc and its role in AMPA receptor trafficking and synaptic dysfunction.* Department of Neuroscience. Johns Hopkins School of Medicine. Baltimore, MD.

March-Oct 2002. **Undergraduate Honours Thesis Research.** Laboratory of Dr. Frank Laferla. *Synaptic plasticity in novel transgenic models of neurodegeneration.* Department of Neurobiology and Behavior, University of California. Irvine, CA.

Jan-March 2002. **Undergraduate Research Assistant.** Laboratory of Dr. Oswald Steward. *Cloning of the Dendrin 3' UTR region for mRNA localization studies in neurons.* Department of Neurobiology and Behavior, University of California. Irvine, CA.

Nov-Dec 2001. **Undergraduate Summer Research Scholarship.** Laboratory of Dr. Ryszard Maleszka. *RNA interference in cultured honeybee neurons.* Research School of Biological Sciences, Australian National University. Canberra, Australia.

Nov 2000 – Feb 2001. **Undergraduate Summer Research Scholarship.** Laboratory of Dr. Garth Cooper. *New therapies for Diabetic cardiomyopathy in streptozotocin rats.* School of Biological Sciences, University of Auckland. Auckland, New Zealand.

March- August 2000. **Undergraduate Research Assistant.** Laboratory of Dr Mike Colombo. *The involvement of the hippocampus in visual contextual memory in pigeons.* Department of Psychology, University of Otago. Dunedin, New Zealand.

Publications – Under Submission

Wall M.J., Collins D.R., Chery S.L., Allen Z.D., Pastuzyn E.D., Nikolova V.D., Moy S.S., Philpot B.D., **Shepherd J.D.**, Ehlers M.D., Mabb A.M., Corrêa S.A.L. The temporal dynamics of Arc expression regulates cognitive flexibility. *Neuron, In Revision.*

Soto R., D. Brown G., Worne C, Pastuzyn E.D., Bell R., Petersen C., Buhrke K., Fujinami R., O'Connell R.M., Stephens W.Z., **Shepherd J.D.**, Lane T.E. and Round J.L.. Early life exposure to gut bacterial products prime microglia to protect from viral-induced neurologic disease. *Nature Immunology, In Revision.*

Publications - Published

Pastuzyn E.D., Day C.E., Kearns R., Kyrke-Smith M., Taibi A.V., McCormick J., Belnap D., Yoder N., Erlendsson S., Morado D.R., Briggs J.A.G., Feschotte C. and **Shepherd J.D.** The Neuronal Gene *Arc* Encodes a Repurposed Retrotransposon Gag Protein that Mediates Trans-cellular RNA Transfer. *Cell, In Press.*

Shepherd J.D. Arc - An endogenous neuronal retrovirus? *Semin Cell Dev Biol.* 2017 Sep 24. pii: S1084-9521(17)30471-8.

Jenks K.R., Kim T., Pastuzyn E.D., Okuno H., Taibi A.V., Bito H., Bear M.F., **Shepherd J.D.** Arc restores juvenile plasticity in adult mouse visual cortex. *PNAS*, 2017 Aug 22;114(34):9182-9187.

Pastuzyn E.D. and **Shepherd J.D.** Arc-dependent Homeostatic Synaptic Plasticity Is Altered in Angelman Syndrome Model Mice. *Frontiers in Molecular Neuroscience*, 2017 Jul 28;10:234.

Kim G., Nagarajan N., Pastuzyn E.D., Jenks K.R., Capecchi M., **Shepherd J.D.**, Menon R. Deep-brain imaging via epi-fluorescence Computational Cannula Microscopy. *Sci Rep.* 2017 Mar 20;7:44791. doi: 10.1038/srep44791.

Day C., **Shepherd J.D.** Arc: building a bridge from viruses to memory. *Biochem J.* 2015 Jul 1;469(1):e1-3. doi: 10.1042/BJ20150487

Gee J.M., Smith N.A., Fernandez F.R., Economo M.N., Brunert D., Rothermel M., Morris S.C., Talbot A., Palumbos S., Ichida J., **Shepherd J.D.**, West P.J., Wachowiak M., Capecchi M.R., Wilcox K.S., White J.A., Tvrdik P. Imaging Activity in Neurons and Glia with a Polr2a-based and Cre-dependent GCaMP5G-IRES-tdTomato Reporter Mouse. *Neuron* 2014 Sep 3;83(5):1058-72.

Uzunova G., Hollander E., **Shepherd J.D.** The Role of Ionotropic Glutamate Receptors in Childhood Neurodevelopmental Disorders: Autism Spectrum Disorders and Fragile X Syndrome. *Current Neuropharmacology*, 2014 Jan;12(1):71-98.

Shepherd J.D. Memory, plasticity and sleep - A role for calcium permeable AMPA receptors? *Frontiers in Molecular Neuroscience*. 2012 Apr 11;5:49.

Wu J., Petralia R.S., Kurushima H., Patel H., Jung M., Volk L., Chowdhury S., **Shepherd J.D.**, Dehoff M., Li Y., Kuhl D., Haganir R.L., Price D.L., Scannevin R., Troncoso J.C., Wong P.C., Worley P.F. Arc/Arg3.1 Regulates an Endosomal Pathway Essential for Activity-Dependent β -Amyloid Generation. *Cell*. 2011 Oct 27;147(3):615-628.

Shepherd J.D. and Bear M.F. New views of Arc, a master regulator of synaptic plasticity. *Nature Neuroscience*. 2011 March; 14(3): 279–284.

Smith-Hicks C., Xiao B., Deng R., Ji Y., Zhao X., **Shepherd J.D.**, Posern G., Kuhl D., Haganir R.L., Ginty D.D., Worley P.F., Linden D.J. SRF binding to SRE 6.9 in the arc promoter is essential for the late phase of LTD in cultured cerebellar purkinje cells. *Nature Neuroscience* 2010 Sep;13(9):1082-9.

McCurry C*, **Shepherd J.D.***, Tropea D., Wang K., Bear M.F., Sur M. Loss of Arc renders the visual cortex impervious to the effects of sensory experience or deprivation. *Nature Neuroscience*. 2010 Apr;13(4):450-7.

Park S., Park J.M., Kim S., Kim J.A., **Shepherd J.D.**, Smith-Hicks C.L., Chowdhury S., Kaufmann W., Kuhl D., Ryazanov A.G., Haganir R.L., Linden D.J., Worley P.F. (2008). Eukaryotic elongation factor 2 and fragile X mental retardation protein control the dynamic translation of Arc essential for mGluR-LTD. *Neuron* 2008 Jul 10;59(1):70-83.

Shepherd J.D., Haganir R.L. The cell biology of synaptic plasticity: AMPA receptor trafficking. *Annual Review of Cell and Developmental Biology*. 2007 Nov Vol. 23: 613-643.

Shepherd J.D.*, Rumbaugh G*, Wu J. Chowdhury S., Plath N., Kuhl D., Haganir R.L., Worley P.F. Arc/Arg3.1 Mediates synaptic scaling of AMPA receptors. *Neuron*. 2006 Nov 9;52(3):475-84.

Chowdhury S.* **Shepherd J.D.***, Ojuno H., Lyford G., Petralia R., Plath N., Kuhl D., Haganir R.L., Worley P.F. Arc/Arg3.1 interacts with the endocytic machinery to regulate AMPA receptor trafficking. *Neuron*. 2006 Nov 9;52(3):445-59.

Oddo S., Caccamo A*, **Shepherd J.D.***, Murphy M.P., Golde T.E., Kaye R., Metherate R., Mattson M.P., Akbari Y., LaFerla F.M. Triple-transgenic model of Alzheimer's disease with plaques and tangles: intracellular Abeta and synaptic dysfunction. *Neuron*. 2003 Jul 31;39(3):409-21.

*Equal contribution

Invited Lectures

- Brandeis University, Department of Biology, 2017.
- Panel Chair, Winter Conference on Brain Research, Big Sky Resort, 2017.
- University of Massachusetts Medical School, Department of Neurobiology, 2017.

- Gordon Research Conference, Excitatory Synapses and Brain Function – Switzerland, 2017.
- Center for the Neurobiology of Learning and Memory, University of California – Irvine, 2016.
- National Academy of Sciences - Kavli Frontiers in Science Symposium, Newport CA, 2016.
- Stanford University, Department of Molecular and Cellular Physiology, 2016.
- Gordon Research Conference on Synaptic Transmission, August 2016.
- University of Colorado Medical School, Department of Pharmacology Seminar Series. February, 2016.
- Keynote Speaker: The Cellular and Molecular Medicine Graduate Program Retreat, Johns Hopkins University. October, 2015.
- The Long and Winding Road: Neuronal Trafficking in Physiology and Disease. HHMI conference, Janelia Farms. May, 2015.
- Panel Chair, Winter Conference on Brain Research, Big Sky Resort. January 2015.
- Hospital for Sick Children, Neurosciences & Mental Health program. Toronto. July 2014.
- Keynote Speaker: University of Auckland, Centre for Brain Research Retreat. Oct 2013.
- University of Arizona, Evelyn McKnight Institute. Tucson, June 2013.
- Spring Hippocampus Meeting. Taormina, Italy. June 2013.
- University of Texas Southwestern Medical School, Department of Psychiatry. February 2012.
- Winter Conference on Brain Research, Snowbird Resort. Utah, January 2012.
- University of Utah, Department of Neurobiology and Anatomy. Utah, January 2012.
- Rutgers University, Department of Cell Biology and Neuroscience. NJ, January 2012.
- Baylor College of Medicine, Department of Neuroscience/NRI. Houston, November 2011.
- Mount Sinai School of Medicine, Department of Neuroscience. NY, October 2011.
- Florey Neuroscience Institute, Melbourne University. Melbourne, September 2011.
- ISN Young Investigator Lectureship, ISN-ESN Biennial Meeting. Athens, Greece. August 2011.
- University of Ottawa, Neuroscience Seminar series. Ottawa, Canada. August 2011.
- University of Michigan, Molecular and Behavioral Neuroscience Institute. March 2011.
- Tufts University School of Medicine, Department of Neuroscience. February 2011.
- Northwestern University, Department of Physiology. October 2010.
- Angelman Foundation Symposium, Chapel Hill. April, 2010.
- University of Auckland, School of Medicine seminar series. December, 2009.
- The Synaptic Basis of Disease Conference, Geneva. July 2008.
- Albert Einstein College of Medicine, Department of Neuroscience Seminar Series. April 2007.
- University of Maryland, Program in Cognitive Sciences Seminar Series. February 2007.
- Winter Conference in Neural Plasticity, Tahiti. February 2007.
- University of Cambridge, MRC Laboratory of Molecular Biology, November 2006.
- The 16th Neuropharmacology Conference, Atlanta. USA . October 2006.

Teaching Experience

- NEUSC 6040. Molecular and Cellular Neuroscience. Lecturer. University of Utah, 2013 –
- NEUSC 6040: Course Director. 2015 –
- Course Instructor, Course 7.347 Advanced Seminar in the Cell Biology of the Synapse. MIT, 2009.
- Teaching Assistant: MCB 80 (Sanes and Lichtman) – The Neurobiology of Behavior, Harvard University, 2009.
- Teaching Assistant: Neuroscience for medical students (Lab and discussion groups), Johns Hopkins School of Medicine, 2004-06

Professional Activities

- Associate Editor: Frontiers in Molecular Neuroscience
- Review Editor: Frontiers in Synaptic Neuroscience
- Journal Reviewer: Journal of Neurophysiology, Journal of Physiology, Neurobiology of Learning and Memory, Journal of Neuroscience, Frontiers in Neuroscience, Science Signaling, Translational

Psychiatry, Cellular and Molecular Life Sciences, Molecular Autism, Neural Plasticity, Journal of Visualized Experiments (JoVE), Journal of Clinical Investigation.

- Grant reviewer: Fragile X Research Foundation, Angelman Syndrome Foundation, Wellcome Trust Foundation, The Netherlands Organisation for Health Research and Development, The Florida Department of Public Health – Florida Alzheimer’s Disease Research Program.
- Graduate admissions committee: University of Utah Neuroscience Graduate Program 2013 –
- Faculty search committee, Department of Neurobiology and Anatomy - University of Utah 2013/14.
- Member of the Society for Neuroscience 2003 -
- Vice-President of MIT Rugby Football Club 2008 – 2012.
- USA Rugby certified referee
- REDDIT Science AMA Session, 2014.
- TEDxSaltLakeCity – Steering Committee Member. 2014 – 2017.

Current Funding

PI: Jason Shepherd

Project Title: Investigating the mechanisms of Arc-dependent synaptic plasticity

Source of support: NIMH - R01MH112766

Award Period: 7/1/2017-6/31/2022

PI: Jason Shepherd

Project Title: Investigating the molecular mechanisms of critical period plasticity in the mouse visual cortex.

Source of support: E. Matilda Ziegler Foundation for the Blind

Award Period: 12/1/2016 – 11/31/2019

PI: Jason Shepherd

Project Title: Determining whether the neuronal gene Arc encodes a repurposed Gag protein

Source of support: NIGMS - P50GM082545

Award Period: 12/1/2017 – 11/31/2019

Co-PI: Jason Shepherd, Rajesh Menon, Erik Jorgensen.

Project title: Imaging synaptic activity deep in the brain using super-resolution cannula microscopy

Source of support: NSF, NCS-FO – 1533611

Award Period: 9/1/2015 – 8/30/2019

Student NRSA: Kyle Jenks

Project title: The role of Arc in the experience-dependent development of the visual cortex

Source of support: NIMH - F31MH112326

Award Period: 9/1/2016 – 8/30/2019

Completed Funding

PI: Jason Shepherd

Project Title: Investigating the casual role of Arc in Angelman Syndrome pathogenesis

Source of Support: Angelman Syndrome Foundation

Award Period: 09/01/2013-08/31/2015

PI: Jason Shepherd

Project Title: Role of Arc in synaptic/experience-dependent plasticity in mouse visual cortex

Source of Support: K99/R00 NIH - National Institute of Neurological Disorders

Award Period: 08/01/2013-07/31/2016

Co-PI: Jason Shepherd, Erik Jorgensen

Project Title: Tracking Arc by super-resolution microscopy in living synapses

Source of Support: University of Utah Neuroscience Initiative Collaborative Pilot Award

Award Period: 08/01/2015-07/31/2016