

**Elissa D. Pastuzyn**  
**Curriculum Vitae**

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**Education**

**PhD, University of Utah, Salt Lake City, UT** **2008-2014**

- Interdepartmental Program in Neuroscience
- Research title: Striatal learning and memory after methamphetamine-induced neurotoxicity and subsequent restoration of striatal function
- Mentor: Dr. Kristen Keefe, PhD
- GPA: 3.89

**Bachelor of Science, Michigan State University, East Lansing, MI** **2005-2008**

- Zoology / Animal Behavior and Neurobiology
- Graduated with High Honor and from the Honors College in May 2008
- GPA: 3.88
- Dean's Lists: Lyman Briggs School of Science 2005-2007; College of Natural Science 2005-2008

**Biology and Disorders of Learning and Memory Course, Cold Spring Harbor Laboratory, Banbury Center, Lloyd Harbor, NY** **July 20-August 2, 2013**

- Course instructors: Dr. Robert Froemke, Dr. Audrey Duarte, Dr. Kelsey Martin, and Dr. Jennifer Raymond

**Completed Funding**

**NIH NICHD 5T32 HD00749117** **February 1, 2014-January 31, 2016**

Trainee—postdoctoral fellow

University of Utah's Institutional Developmental Biology Training Grant

**NIH NIDA F31 DA032502** **September 30, 2011-January 31, 2014**

PI

\$30,339

"*Arc*, phasic dopamine, and methamphetamine-induced striatal learning deficits"

**NIH NIDCD 5T32 DC008553** **July 1, 2009-June 30, 2010**

Trainee—predoctoral fellow

University of Utah's Interdepartmental Program in Neuroscience Institutional Training Grant

**Publications**

**Pastuzyn, E.D.**, Day, C.D., Kearns, R.B., Kyrke-Smith, M., Taibi, A.V., McCormick, J., Yoder, N., Belnap, D.M., Erlendsson, S., Morado, D.R., Briggs, J.A.G., Feschotte, C., and Shepherd, J.D. (2018). The neuronal gene *Arc* encodes a repurposed retrotransposon Gag protein that mediates intercellular RNA transfer. *Cell* (172), 275-288.

**Pastuzyn, E.D.** and Shepherd, J.D. (2017). Activity-dependent Arc expression and homeostatic synaptic plasticity are altered in neurons from a mouse model of Angelman syndrome. *Frontiers in Molecular Neuroscience* (10), 234. PMID: PMC5532393.

Jenks, K.R.\*, Kim, T.\*, **Pastuzyn, E.D.\***, Okuno, H., Taibi, A.V., Bitto, H., Bear, M.F., and Shepherd, J.D. (2017). Arc restores juvenile plasticity in adult mouse visual cortex. *Proceedings of the National Academy of Sciences USA* (114)34, 9182-9187. PMID: PMC5576785.

Kim, G., Nagarajan, N., **Pastuzyn, E.**, Jenks, K., Capecchi, M., Shepherd, J., and Menon, R. (2017). Deep-brain imaging via epi-fluorescence computational cannula microscopy. *Scientific Reports* (7), 44791. PMID: PMC5357895.

**Pastuzyn, E.D.** and Keefe, K.A. (2014). Changes in neural circuitry regulating response-reversal learning and Arc-mediated consolidation of learning in rats with methamphetamine-induced partial monoamine loss. *Neuropsychopharmacology* (39)4, 963-972. PMID: PMC3924530.

Robinson, J.D., Howard, C.D., **Pastuzyn, E.D.**, Byers, D.L., Keefe, K.A., and Garris, P.A. (2014). Methamphetamine-induced neurotoxicity disrupts pharmacologically evoked dopamine transients in the dorsomedial and dorsolateral striatum. *Neurotoxicity Research* (26)2, 152-167. PMID: PMC4071119.

Howard, C.D.\*, **Pastuzyn, E.D.\***, Barker-Haliski, M.L., Garris, P.A., and Keefe, K.A. (2013). Phasic-like stimulation of the medial forebrain bundle augments striatal gene expression despite methamphetamine-induced partial dopamine denervation. *Journal of Neurochemistry* (125)4, 555-565. PMID: 3640634.

Barker-Haliski, M.L., **Pastuzyn, E.D.**, and Keefe, K.A. (2012). Expression of the core exon-junction complex factor eukaryotic initiation factor 4A3 is increased during spatial exploration and striatally-mediated learning. *Neuroscience* (226), 51-61. PMID: PMC3490057.

**Pastuzyn, E.D.**, Chapman, D.E., Wilcox, K.S., and Keefe, K.A. (2012). Altered learning and Arc-regulated consolidation of learning in striatum by methamphetamine-induced neurotoxicity. *Neuropsychopharmacology* (37)4, 885-895. PMID: PMC3280660.

## Research Experience

### **Shepherd Laboratory**

**February 2014-present**

- University of Utah, Salt Lake City, UT
- Mentor: Dr. Jason Shepherd, PhD
- Position: Postdoctoral fellow

### **Keefe Laboratory**

**Fall 2008; March 2009-January 2014**

- University of Utah, Salt Lake City, UT
- Mentor: Dr. Kristen Keefe, PhD
- Position: Graduate student

### **Garris Laboratory**

**June-July 2012**

- Illinois State University, Normal, IL
  - Mentor: Dr. Paul Garris, PhD
  - Position: Graduate student—collaborative project
- Taha Laboratory** **Spring 2009**
- University of Utah, Salt Lake City, UT
  - Mentor: Dr. Sharif Taha, PhD
  - Position: Graduate student—lab rotation
- White Laboratory** **Fall 2008**
- University of Utah, Salt Lake City, UT
  - Mentor: Dr. John White, PhD
  - Position: Graduate student—lab rotation
- Kesner Laboratory** **Summer 2008**
- University of Utah, Salt Lake City, UT
  - Mentor: Dr. Ray Kesner, PhD
  - Position: Graduate student—lab rotation
- Smale Laboratory** **2006-2008**
- Michigan State University, East Lansing, MI
  - Mentor: Dr. Laura Smale, PhD
  - Position: undergraduate lab / research assistant
- Laboratory for Comparative Orthopedic Research** **2005-2006**
- Michigan State University, East Lansing, MI
  - Mentor: Dr. Steven Arnoczky, DVM
  - Position: undergraduate lab / research assistant
- Invited Talks**
- Translational Social Hour** **2017**
- University of Utah
  - “Arc as a viral mediator of memory”
- Mood and Behavior Disorders Symposium** **2015**
- University of Utah
  - “Mechanisms of synaptic dysfunction in Angelman syndrome”
- Developmental Biology Retreat** **2015**
- Deer Valley Resort, Park City, UT
  - “Role of Arc in plasticity deficits in Angelman syndrome”
- Utah Autism Mini Symposium** **2014**
- University of Utah
  - “Mechanisms of synaptic dysfunction in Angelman syndrome”
- Developmental Biology Retreat** **2014**
- Deer Valley Resort, Park City, UT
  - “Role of Arc in synaptic plasticity during normal aging and disease”

- Neuroscience Student Symposium** **2013**
- University of Utah
  - “Striatal learning, memory, and function after methamphetamine-induced neurotoxicity”
- Neuroscience Student Retreat** **2012**
- University of Utah
  - “Pharmacological restoration of striatal function after methamphetamine-induced partial dopamine loss”
- Neuroscience Student Symposium** **2011**
- University of Utah
  - “Partial dopamine loss induced by methamphetamine alters *Arc*-regulated striatal learning”
- Neuropsychiatric Movement and Associated Disorders Seminar** **2011**
- University of Utah
  - “Pharmacological restoration of striatal function after methamphetamine-induced neurotoxicity”
- Snowbird Neuroscience Symposium** **2009**
- Snowbird Ski and Summer Resort, UT
  - “Effect of methamphetamine neurotoxicity on a striatally-mediated reversal learning task”

### **Posters**

**Pastuzyn, E.D.,** Day, C.D., Kearns, R.B., and Shepherd, J.D. The neuronal protein *Arc* acts as a repurposed viral Gag that mediates cell-to-cell transfer of RNA and protein. Poster session presented at: Annual Snowbird Neuroscience Symposium, 2017 Oct 27; Snowbird, UT.

**Pastuzyn, E.D.** and Shepherd, J.D. Role of *Arc* in plasticity deficits associated with Angelman syndrome. Poster session presented at: Annual Snowbird Neuroscience Symposium, 2015 Oct 30; Snowbird, UT.

**Pastuzyn, E.D.** and Shepherd, J.D. Role of *Arc* in plasticity deficits associated with Angelman syndrome. Poster session presented at: 45<sup>th</sup> Annual Conference of the Society for Neuroscience, 2015 Oct 17-21; San Diego, CA.

**Pastuzyn, E.D.** and Shepherd, J.D. Role of *Arc* in plasticity deficits associated with Angelman syndrome. Poster session presented at: Gordon Research Conference on Excitatory Synapses and Brain Function, 2015 Jun 7-12; Newport, RI.

**Pastuzyn, E.D.,** Howard, C.D., Garris, P.A., and Keefe, K.A. Methamphetamine-induced impairment in phasic dopamine signaling, *Arc*, and basal ganglia-mediated

learning and memory functions. Poster session presented at: 43<sup>rd</sup> Annual Conference of the Society for Neuroscience, 2013 Nov 9-13; San Diego, CA.

Howard, C.D., Daberkow, D.P., **Pastuzyn, E.D.**, Keefe, K.A., and Garris, P.A. Acute methamphetamine administration activates phasic dopamine signaling disrupted by methamphetamine-induced neurotoxicity. Poster session presented at: 43<sup>rd</sup> Annual Conference of the Society for Neuroscience, 2013 Nov 9-13; San Diego, CA.

**Pastuzyn, E.D.**, Howard, C.D., Garris, P.A., and Keefe, K.A. Methamphetamine-induced impairment in phasic dopamine signaling, *Arc*, and basal ganglia-mediated learning and memory functions. Poster session presented at: 12<sup>th</sup> Annual Meeting of the Molecular and Cellular Cognition Society, 2013 Nov 7; San Diego, CA.

**Pastuzyn, E.D.** and Keefe, K.A. Partial methamphetamine-induced striatal dopamine loss causes a change in circuitry mediating *Arc*-regulated response reversal learning. Poster session presented at: Annual Snowbird Neuroscience Symposium, 2012 Nov 2, Snowbird, UT.

Keefe, K.A., **Pastuzyn, E.D.**, Oldenburger, K., Pelton, B., and Barker-Haliski, M.L. L-DOPA treatment restores impaired basal ganglia gene expression in rats with methamphetamine-induced neurotoxicity. Poster session presented at: 42<sup>nd</sup> Annual Conference of the Society for Neuroscience, 2012 Oct 13-17; New Orleans, LA.

**Pastuzyn, E.D.** and Keefe, K.A. Partial methamphetamine-induced striatal dopamine loss causes a change in circuitry mediating *Arc*-regulated response reversal learning. Poster session presented at: 42<sup>nd</sup> Annual Conference of the Society for Neuroscience, 2012 Oct 13-17; New Orleans, LA.

**Pastuzyn, E.D.** and Keefe, K.A. Partial methamphetamine-induced striatal dopamine loss causes a change in circuitry mediating *Arc*-regulated response reversal learning. Poster session presented at: 11<sup>th</sup> Annual Meeting of the Molecular and Cellular Cognition Society, 2012 Oct 11; New Orleans, LA.

**Pastuzyn, E.D.** and Keefe, K.A. Partial methamphetamine-induced striatal dopamine loss causes a change in circuitry mediating *Arc*-regulated response reversal learning. Poster session presented at: Annual University of Utah Biosciences Symposium, 2012 Sept 25; Salt Lake City, UT.

**Pastuzyn, E.D.** and Keefe, K.A. Partial methamphetamine-induced striatal dopamine loss causes a change in circuitry mediating *Arc*-regulated response reversal learning. Poster session presented at: 45<sup>th</sup> Annual Winter Conference on Brain Research, 2012 Jan 21-27; Snowbird, UT.

Keefe, K.A., Oldenburger, K., **Pastuzyn, E.D.**, and Barker-Haliski, M.L. L-DOPA treatment restores impaired basal ganglia gene expression in rats with methamphetamine-induced neurotoxicity. Poster session presented at: 45<sup>th</sup> Annual Winter Conference on Brain Research, 2012 Jan 21-27; Snowbird, UT.

**Pastuzyn, E.D.**, Howard, C.D., Garris, P.A., and Keefe, K.A. Effect of partial dopamine loss induced by methamphetamine on *Arc*-regulated striatal learning and stimulation-induced striatal gene expression. Poster session presented at: Annual Snowbird Neuroscience Symposium, 2011 Oct 21; Snowbird, UT.

Oldenburger, K., **Pastuzyn, E.D.**, Barker-Haliski, M.L., and Keefe, K.A. Chronic L-DOPA treatment restores impaired basal ganglia gene expression in rats with methamphetamine-induced neurotoxicity. Poster session presented at: Annual Snowbird Neuroscience Symposium, 2011 Oct 21; Snowbird, UT.

**Pastuzyn, E.D.**, Howard, C.D., Garris, P.A., and Keefe, K.A. Effect of partial dopamine loss induced by methamphetamine on *Arc*-regulated striatal learning and stimulation-induced striatal gene expression. Poster session presented at: Annual University of Utah Biosciences Symposium, 2011 Sept 27; Salt Lake City, UT.

**Pastuzyn, E.D.**, Howard, C.D., Garris, P.A., and Keefe, K.A. Effect of partial dopamine loss induced by methamphetamine on *Arc*-regulated striatal learning and stimulation-induced striatal gene expression. Poster session presented at: 80<sup>th</sup> Biennial Gordon Research Conference on Catecholamines; 2011 Aug 7-12; Lewiston, ME.

**Pastuzyn, E.D.**, Howard, C.D., Garris, P.A., and Keefe, K.A. Effect of partial dopamine loss induced by methamphetamine on *Arc*-regulated striatal learning and stimulation-induced striatal gene expression. Poster session presented at: Gordon Research Seminar on Catecholamines; 2011 Aug 6-7; Lewiston, ME.

**Pastuzyn, E.D.** and Keefe, K.A. Impact of partial dopamine loss induced by methamphetamine on *arc*-mediated, striatally-based learning. Poster session presented at: 40<sup>th</sup> Annual Conference of the Society for Neuroscience; 2010 Nov 13-17; San Diego, CA.

**Pastuzyn, E.D.** and Keefe, K.A. Impact of partial dopamine loss induced by methamphetamine on *arc*-mediated, striatally-based learning. Poster session presented at: 9<sup>th</sup> Annual Meeting of the Molecular and Cellular Cognition Society; 2010 Nov 11-12; San Diego, CA.

**Pastuzyn, E.D.** and Keefe, K.A. Impact of partial dopamine loss by methamphetamine on *arc*-mediated, striatally-based learning. Poster session presented at: Annual Snowbird Neuroscience Symposium, 2010 Oct 22; Snowbird, UT.

**Pastuzyn, E.D.** and Keefe, K.A. Impact of partial dopamine loss by methamphetamine on *arc*-mediated, striatally-based learning. Poster session presented at: Annual University of Utah Biosciences Symposium, 2010 Sept 28; Salt Lake City, UT.

**Pastuzyn, E.D.** and Keefe, K.A. Impact of partial dopamine loss by methamphetamine on *arc*-mediated, striatally-based learning. Poster session presented at: 1<sup>st</sup> Translational Research on Methamphetamine Addiction Conference; 2010 July 19-21; Pray, MT.

**Pastuzyn, E.D.** and Keefe, K.A. Impact of partial dopamine loss by methamphetamine on *arc*-mediated, striatally-based learning. Poster session presented at: 10<sup>th</sup> Triennial Conference of the International Basal Ganglia Society; 2010 June 20-24; Long Branch, NJ.

**Pastuzyn, E.D.** and Keefe, K.A. Effect of methamphetamine neurotoxicity on a striatally-mediated reversal learning task. Poster session presented at: 39<sup>th</sup> Annual Conference of the Society for Neuroscience; 2009 Oct 17-21; Chicago, IL.

**Pastuzyn, E.D.** Using immunocytochemistry to visualize proteins in the brain. Poster session presented at: Annual Michigan State University Undergraduate Research and Arts Forum; 2007 Apr 13; East Lansing, MI.

**Pastuzyn, E.** and Arnoczky, S.P. Developing an *in vivo* model of tendinopathy. Poster session presented at: Annual Michigan State University Undergraduate Research and Arts Forum; 2006 Apr 14; East Lansing, MI.

## Teaching

### **PH TX 7270 Biochemical Basis of Neuropharmacology**

- University of Utah, Salt Lake City, UT
- Lecture: "Catecholamines" (2 hr); spring semester 2011 and 2012
- Lecture / discussion leader: "Neuropharmacology of Drug Addiction" (2 hr); spring semester 2012

### **Teaching Assistant for NEUSC 6050 Systems Neuroscience Spring 2010**

- University of Utah, Salt Lake City, UT
- Professor: Dr. Greg Clark, PhD
- Helped my professor grade weekly homework assignments, held review sessions for exams, and moderated some of the weekly in-class discussions about journal articles.

### **Teaching Assistant for ZOL 402 Neurobiology Fall 2007**

- Michigan State University, East Lansing, MI
- Professor: Dr. Heather Eisthen, PhD
- Helped my professor lead a weekly journal club as part of the class, graded homework and exams, and wrote study guides and part of the exams

## Professional Societies

<b>Society for Neuroscience</b>	<b>2009-</b>
<b>Molecular and Cellular Cognition Society</b>	<b>2010-</b>
<b>International Basal Ganglia Society</b>	<b>2010-2013</b>

## Awards

<b>NIH NICHD 5T32 HD00749117</b>	<b>February 1, 2014-January 31, 2016</b>
<b>Society for Neuroscience "Hot Topic"</b>	<b>2013</b>

**Stipend Award for Cold Spring Harbor Learning and Memory Course** 2013  
NIH NIDA F31 DA032502 September 30, 2011-January 31, 2014  
NIH NIDCD 5T32 DC008553 July 1, 2009-June 30, 2010