

Jacob M Olson  
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## **Education**

**PhD – Cognitive Science – *In progress*** **University of California, San Diego**  
**Working dissertation title – “Neural Navigation Implementation:** **San Diego, CA**  
**Transformation of Spatial Representations to Planned Motor Action**  
**In The Freely Behaving Rat”** **Expected completion: March 2017**  
**Chair:** Douglas A Nitz  
**Committee:** Andrea Chiba, Robert Clark, Virginia De Sa,  
Takaki Komiyama, Jeffrey Krichmar, Eran Mukamel.

**MS – Cognitive Science** **University of California, San Diego**  
Awarded December 2011 **San Diego, CA**

**BS – Computer Engineering** **University of Kansas**  
Awarded May 2009 **Lawrence, KS**

## **Research Grants Awarded**

**Kavli Institute for Brain and Mind Innovative Research Grant PI.** UC San Diego. 2015.

## **Publications**

**Olson JM, Tongprasearth K, Nitz DA.** (2016) Subiculum neurons map the current axis of travel. *Nat Neuro.* (In Press)  
**Olson JM, Nitz DA.** Medial precentral cortex action and planning representations are spatially influenced. (In Prep).  
**Olson JM, Tao E, Nitz DA.** Functional analogy in the dorsal subiculum. (In Prep).  
**Olson JM, Tongprasearth K, Nitz DA.** Phase precession of axis-tuned neurons in subiculum. (In Prep).

## **Select Awards**

**Graduate Student Association Travel Award.** UC San Diego, 2016.  
**Cognitive Science Travel Award.** UC San Diego, 2015, 2016.  
**Excellence in Teaching Award.** Neurobiology of Cognition. Cognitive Science UC San Diego. 2015.  
**Summer Graduate Teaching Scholarship.** UC San Diego. 2015.  
**Graduate Summer School Scholarship: Probabilistic Models of Cognition.** UCLA. July 2011.  
**Graduate Excellence Award,** Cognitive Science, UC San Diego. 2011.  
**Central European University School Scholarship - Beliefs and Decisions: of Minds and Machines.** Budapest, Hungary. July 2010.

## **Presentations**

### **Lectures**

- Olson JM.** (September 2016). Unique Features of Spatial Representations in Dorsal Subiculum. *Buzsaki Lab Meeting Invited Lecture*. NYU Neuroscience Institute, New York, NY, USA.
- Olson JM.** (May 2016). Axis and Analogy in the Subiculum. *KIBM Symposium on Innovative Research*. UC San Diego, La Jolla, CA, USA.
- Olson JM.** (April 2016). A Systems Neuroscience Perspective on Spatial Cognition. Invited lecture for *Introduction to Cognitive Science* (Instructor: Steve Barrera). UC San Diego.
- Olson JM.** (March 2016). Systems Neuroscience and Spatial Cognition. Invited lecture for *Introduction to Cognitive Science* (Instructor: Mary Boyle). UC San Diego.
- Olson JM.** (January 2015). Brain Research Techniques. Invited lecture for *Neurobiology of Cognition* (Instructor: Chris Johnson). UC San Diego.
- Olson JM.** (October 2014). Using Generalized Linear Models for Neural Data Modeling. Invited lecture for *Modeling and Data Analysis* (Instructor: He ‘Crane’ Huang). UC San Diego.
- Olson JM.** (June 2013). Spatial Navigation: From Cognitive Map to Action. *Cognitive Science Departmental Research Presentations*. UC San Diego, La Jolla, CA, USA.
- Olson JM.** (September 2012). Introduction to Probability. Invited lecture for *IGERT Graduate Student Orientation* (Prof. Virginia de Sa). UC San Diego.
- Olson JM.** (February 2012). Decision Making: A Principled Investigation from Information Acquisition to Action. *IGERT Mini-Symposium*. UC San Diego, La Jolla, CA, USA.
- Olson JM.** (September 2011). Introduction to Machine Learning. Invited lecture for *IGERT Graduate Student Orientation* (Prof. Virginia de Sa). UC San Diego.
- Olson JM.** (June 2011). Investigating Temporal Integration of Sensory Evidence with a Novel Perceptual Decision-Making Task. *Cognitive Science Departmental Research Presentations*. UC San Diego, La Jolla, CA, USA.

### **Conference Posters**

- Olson JM, Tongprasearth K, Tao EL, Wooten A, Lo HC, Nitz DA.** (November 2016). Dorsal subiculum encodes functionally analogous path locations. *Neuroscience 2016*. San Diego, CA.
- Tongprasearth K, Olson JM, Tao EL, Nitz DA.** (November 2016). Phase precession in subicular axis cells modulates with field size within individual neurons. *Neuroscience 2016*. San Diego, CA.
- Olson JM, Tao EL, Tongprasearth K, Nitz DA.** (July 2016). Axis and Analogy in the dorsal subiculum of the navigating rat. *FENS Forum of Neuroscience*, Copenhagen, Denmark.
- Olson JM, Tao EL, Tongprasearth K, Nitz DA.** (June 2016). The Subiculum Maps Current Axis of Travel in the Navigating Rat. *Interdisciplinary Navigation Symposium*, Bad Gastein, Austria.
- Olson JM, Li JK, Tongprasearth K, Tao EL, Nitz DA.** (April 2016). Axis, analogy, and planning in the dorsal subiculum maps path components to environmental space. *International Cognitive Science Conference*. San Diego, CA, USA.
- Olson JM, Li JK, Tongprasearth K, Tao EL, Nitz DA.** (October 2015). Axis, analogy, and planning in the dorsal subiculum maps path components to environmental space. *Neuroscience 2015*. Chicago, IL, USA.

**Olson JM, Li JK, Nitz DA.** (November 2014). Encoding of actions, action planning, and position in the medial precentral cortex. *Neuroscience 2014*. Washington, DC, USA.

Nitz DA, **Olson JM**, Kappel A, Overoye A, Montgomery S. (May 2014). Medial precentral cortex neurons mediate the transformation of spatial information into action and planning. *Joint Symposium on Neural Computation*. Irvine, CA.

Nitz DA, **Olson JM**, Kappel A, Overoye A, Montgomery S. (November 2013). Medial precentral cortex neurons mediate the transformation of spatial information into action and planning. *Neuroscience 2013*. San Diego, CA.

**Olson JM, Yu AJ.** (November 2011). Investigating temporal integration of sensory evidence with a novel perceptual decision-making task. *Neuroscience 2011*. Washington, DC, USA.

**Olson JM, Yu AJ.** (July 2011). Investigating temporal integration of sensory evidence with a novel perceptual decision-making task. *UCLA IPAM Summer School*. Los Angeles, CA.

**Teaching Experience**

**Instructor**

**UC San Diego**

Modeling and Data Analysis (Fall 2016, Summer 2016, Summer 2015)

**SGTS Peer Mentor**

**UC San Diego  
Summer 2016**

During the summer session I mentored two graduate students who were instructors-of-record for the first time. In this role, I gave feedback and advice on curriculum planning, student engagement, and presentation style through multiple in-person meetings and classroom observations.

**Teaching Assistant**

**UC San Diego**

Intro. to Cognitive Science (Instructor: Mary Boyle, 2013; Ben Amsel, 2014; Steve Barrera, 2016)  
 Intro. to Research Methods (Instructor: Federico Rossano, 2016)  
 Neurobiology of Cognition (Instructor: Chris Johnson, 2015)  
 Modeling and Data Analysis (Instructor: He ‘Crane’ Huang, 2014)  
 Systems Neuroscience (Instructor: Doug Nitz, 2014)  
 Intro. to Programming for Cognitive Science (Instructor: Rik Belew, 2011)  
 Neuroanatomy & Physiology (Instructor: Jaime Pineda, 2010)  
 Learning, Memory, and Attention (Instructor: Sarah Creel, 2010, 2011)  
 Language (Instructor: Rafael Núñez, 2010)

**Professional Outreach**

**Science Pen Pal Partnership (2013-2016)**

Participation in a pen pal program that matches students at middle schools with local underrepresented populations in college with graduate students.

### **San Diego Brain Bee (2010-2012)**

The Bee is an international neuroscience competition for high school students with local bees nationwide. The goal of the Bee is to expose students to a subject they might not otherwise get at the high school level and encourage them to think about careers in science. More than 30% of students participating in the San Diego Brain Bee are minority or economically disadvantaged students. My main tasks were to write questions and evaluate results.

### **Professional Service**

**Cowriter of the Cognitive Science Department Advising Grant Application.** UC San Diego. 2015.

**Organizer of the “Wa” Speaker Series.** Cognitive Science, UC San Diego. 2010-2011.

**Departmental Graduate Student Representative.** Cognitive Science, UC San Diego. 2010-2011.

### **Professional Memberships**

Society for Neuroscience (2010-present)

Cognitive Science Society (2010-2011)

### **Professional Conferences Attended**

**Society for Neuroscience Annual Meeting**

November 12-16, 2016

**San Diego, CA, USA**

**FENS Forum of Neuroscience**

July 2-6, 2016

**Copenhagen, Denmark**

**International Navigation Symposium**

June 26-30, 2016

**Bad Gastein, Austria**

**KIBM Symposium on Innovative Research**

May 7, 2016

**San Diego, CA, USA**

**Society for Neuroscience Annual Meeting**

October 17-21, 2015

**Washington, DC, USA**

**KIBM Symposium on Innovative Research**

May 9, 2015

**San Diego, CA, USA**

**Society for Neuroscience Annual Meeting**

November 15-19, 2014

**Washington, DC, USA**

**Joint Symposium on Neural Computation**

May 17, 2014

**Irvine, CA, USA**

**KIBM Symposium on Innovative Research**

May 10, 2014

**San Diego, CA, USA**

**Society for Neuroscience Annual Meeting**

November 9-13, 2013

**San Diego, CA, USA**

**Society for Neuroscience Annual Meeting**

November 11-17, 2011

**Washington, DC, USA**

**Temporal Dynamics of Learning All Hands Meeting**

January 21-23, 2010

La Jolla, CA, USA

**Cognitive Science Society Annual Meeting**

August 11-14, 2010.

Portland, OR, USA

**Society for Neuroscience Annual Meeting**

November 13-17, 2010.

San Diego, CA, USA

**Mentoring Experience**

**Graduate student advisor for Undergraduate Honors Project**

**2014-2015**

**Mentee:** Jamie K Li.

**Title:** *Characterizing the Role of Posterior Parietal Cortex Efferents During Navigation.*

**Graduate student advisor for Undergraduate Grant & Award Winners**

**2015-2016**

**Mentee:** Kanyanat Tongprasearth

**Award:** 2015 UCSD NEW Scholars Program (Non-traditional Experiential Work)

**Presentation Title:** Neural activity of the subiculum in navigating rats

**Award:** 2016 UCSD NEW Scholars Program (Non-traditional Experiential Work)

**Presentation Title:** Subiculum axis-tuned neurons exhibit theta phase precession

**Award:** Warren College Undergraduate Research Scholarship

**Mentee:** Emily Tao

**Award:** 2016 UCSD Ledell Family Scholarship

**Title:** Encoding of analogous path segments in subiculum and CA1 of hippocampus

**Undergraduate Research Advisor**

**2009 - Present**

**Mentees:** Emily Casiello, Chelsea Pattee, Winny Huang, Michelle Widjaja, Rebecca Roseman, Anton Zadorozhny, Garrett Kono, Chase Reuter, Jason O'Connor, Eliene Bao, Jamie Li, Nicholas Woo-VonHoogenstyn, Elias Wagner, Natalie Tongprasearth, Emily Tao, Alex Wooten, Hannah Lo, Lillian Chang, Siyuan Gao.

**Additional Awards**

**University Honors Graduate.** University of Kansas. May 2009.

**National Society of Collegiate Scholars member.** 2009.

**Summerfield Scholarship.** University of Kansas. 2005-2009.

**School of Engineering Dean's Scholarship.** Univ. of Kansas School of Engineering. 2005-2009.

**Computer Engineering Departmental Scholarship.** University of Kansas. 2005-2009.

**Dane G. Hansen Honors Scholar.** Dane G. Hansen Foundation. 2005-2006.

**Additional Training**

**UC San Diego Center for Teaching Development**

**La Jolla, CA, USA**

## **The College Classroom**

**January-March, 2015**

The College Classroom is a 15-hour, seminar-style course which, following the mission and goals of the Center for the Integration of Research, Teaching and Learning (CIRTL) Network, prepares graduate students and postdocs at the CIRTL Associate\* level for a positive teaching experience as a future faculty member by developing their expertise in evidence-based teaching practices that support student learning. \* see [www.cirtl.net/associate](http://www.cirtl.net/associate)

## **UCLA Institute for Pure & Applied Mathematics Summer School Probabilistic Models of Cognition**

**Los Angeles, CA, USA**

**July 6-16, 2011**

Summer school on how machine learning and artificial intelligence concepts and techniques are being applied in cognitive modeling.

## **CEU Summer University**

**Budapest, Hungary**

### **Beliefs and Decisions: of Minds and Machines**

**July 5-9, 2010**

Summer school on probability and decision theory as a unifying framework for understanding representation of uncertainty and belief states, learning of internal models, and decision-making in humans and machines.

## **Other Experience**

### **Web Developer - Quark Studios**

**Kansas City, KS, USA**

**July 2012 – September 2014**

Independent contractor web developer designing and implementing websites using the principles of progressive enhancement and responsive design.

### **Graduate Student Researcher - University of California, San Diego**

**La Jolla, CA, USA**

**September 2009 - June 2012 (PhD Advisor: Angela Yu)**

Perceptual decision making using Bayesian probability theory. Focus on temporal influences and representations in decision-making.

### **Research Assistant - University of Kansas**

**Lawrence, KS, USA**

**August 2008 - April 2009 (Stephen Ilardi)**

Undergraduate research assistant on psychology study of happiness from an evolutionist perspective. Experience administering study participants, data collection, and analysis.

**August 2008 - March 2009 (Erik Perrins)**

**Lawrence, KS, USA**

Undergraduate research assistant on efficient hardware implementation of iterative forward error correcting decoders project. MATLAB programming to analyze performance using simulation.

### **Technology Research Intern - ICOP Digital, Inc.**

**Lenexa, KS, USA**

**May 2007 - August 2008**

Design and implementation of procedures for testing new surveillance technologies.

## **Select Skills**

**Animal Behavior (Rat)** - Handling and training for track running with varying reward contingencies, behavioral scoring, novel behavioral task design.

**In Vivo Electrophysiology** - Microdrive construction and design for simultaneous multiple brain region targeting, surgical microdrive implantation, single unit recordings in awake and behaving rats (Plexon SortClient), spike sorting (Plexon Offline Sorter).

**Specific Data Analysis Techniques** - Circular Statistical Analysis and Modeling, Information Analyses, Bayesian Modeling.

**Programming Experience** - Matlab, HTML5, CSS, Javascript, PHP, C++, Python.

**Miscellaneous** - Tissue slicing and preparation, Nissl Staining, psychophysical paradigms for human subjects.

## **References**

*References are available upon request.*