

BRETT D. ROADS | CURRICULUM VITAE

CONTACT

Department Experimental Psychology
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RESEARCH INTERESTS

My goal is to boost human learning and performance by developing and applying formal models of cognition. I am interested in producing software that enables individuals to learn and perform tasks efficiently and effortlessly. My approach draws on methods from machine learning and theories from cognitive science in order to construct robust psychological models that characterize the computational challenges faced by an individual attempting to complete a task. My research lies at the interface of human learning, machine learning, and computer-assisted decision making.

EDUCATION

Ph.D., Computer Science and Cognitive Science, 2017
University of Colorado Boulder, Boulder, CO
Advisor: Michael C. Mozer
Relevant Coursework: high-dimensional data analysis

M.S., Computer Science, 2013
University of Colorado Boulder, Boulder, CO
Advisor: Michael C. Mozer
Relevant Coursework: non-symbolic AI; Bayesian statistics; computational neuroscience

B.S., Engineering Physics, 2011
University of Colorado Boulder, Boulder, CO
Relevant Coursework: linear algebra, multivariate calculus

RESEARCH EXPERIENCE

Post-Doctoral Research Associate University College London
Supervisor: Brad C. Love, Ph.D. 2018 – present

Post-Doctoral Research Assistant University of Colorado Boulder
Supervisor: Michael C. Mozer, Ph.D. 2017 – 2018

Graduate Student Researcher University of Colorado Boulder
Supervisor: Michael C. Mozer, Ph.D. 2011 – 2017

PUBLICATIONS

Roads, B. D., & Mozer, M. C. (in preparation). Using human-surrogate models to optimize training sequences during visual category training.

Roads, B. D., Mozer, M. C. (in preparation). Using enriched training environments for visual category training.

Roads, B. D., & Mozer, M. C. (in preparation). Predicting the Difficulty of Human Category Learning Using Exemplar-Based Neural Networks.

Roads, B. D., & Mozer, M. C. (in preparation). Obtaining psychological embeddings through joint kernel and metric learning.

Roads, B. D., Xu, B., Robinson, J. K., & Tanaka, J. W. (2018). The easy-to-hard training advantage with real-world medical images. *Cognitive Research: Principles and Implications*, 3(38). doi: 10.1186/s41235-018-0131-6

Snell, J., Ridgeway, K., Liao, R., Roads, B. D., Mozer, M. C., & Zemel, R. S. (2017). Learning to generate images with perceptual similarity metrics. Accepted for publication in IEEE

International Conference on Image Processing. arXiv:1511.06409v3

Roads, B. D., & Mozer, M. C. (2017). Improving human-machine cooperative classification via cognitive theories of similarity. *Cognitive Science: A Multidisciplinary Journal*, 41, 1394-1411. DOI: 10.1111/cogs.12400.

Khajah, M., Roads, B. D., Lindsey, R. V., Liu, Y.-E., & Mozer, M. C. (2016). Designing engaging games using Bayesian optimization. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 5571-5582). New York: ACM.

Roads, B. D., Mozer, M. C., & Busey, T. A. (2016). Using highlighting to train attentional expertise. *PLoS ONE* 11(1): e0146266. doi:10.1371/journal.pone.0146266.

**CONFERENCE
PARTICIPATION**

2017 Vision Science Society

Attended and presented a poster.

Roads, B. D., Xu, B., Robinson, J. K., Tanaka, J. W. (2017) The Easy-to-Hard Advantage with Real-World Visual Categories. Poster session presented at: Vision Science Society; 2017 May 19-24; St Pete Beach, FL.

2016 Vision Science Society

Attended and presented a poster.

Roads, B. D., Mozer M. C. (2016). Improving Categorization Training with Structure-Sensitive Scheduling. Poster session presented at: Vision Science Society; 2016 May 13-18; St Pete Beach, FL.

PEN XXXII Workshop

Attend and presented a 20-minute talk.

Roads, B. D., Mozer, M. C. (2016). Scheduling Visual Category Training with a Parameter-Free Model. Talk presented at PEN XXXII Workshop; 2016 April 15-16; Nashville, TN.

2016 Temporal Dynamics of Learning Center (TDLC) All-Hands Meeting

Attended and presented a poster.

Roads, B. D., Mozer, M. C. (2016). Visual Category Training Using Structure-Sensitive Scheduling. Poster session presented at: Temporal Dynamics of Learning Center, All Hands Meeting; 2016 January 21-23; UC San Diego, La Jolla, CA.

PEN XXXI Workshop

Attend and presented a 15-minute talk.

Roads, B. D., Mozer, M. C. (2015). Visual Category Training Using Structure-Sensitive Scheduling. Talk presented at PEN XXXI Workshop; 2015 November 12-13; New Orleans, LA.

2015 Vision Science Society

Attended and presented a poster.

Roads, B. D., Mozer, M. C. (2015). Visual Classification Expertise without Training. Poster session presented at: Vision Science Society; 2015 May 15-20; St Pete Beach, FL.

2015 Temporal Dynamics of Learning Center (TDLC) All-Hands Meeting

Attended and presented a demo of visual category learning environment. February 27-28; San Diego, CA.

2014 Temporal Dynamics of Learning Center (TDLC) All-Hands Meeting

Attended and presented a 15-minute talk.

Roads, B. D., Mozer M. C. (2014). Using Expert-Based Highlighting to Boost Learning. Talk presented at: TDLC All Hands Meeting; 2014 February 6-9; San Diego, CA.

See: <http://thesciencenetwork.org/programs/tdlc-all-hands-meeting-2014/using-expert-based-highlighting-to-boost-learning>

2013 Learning to Attend, Attending to Learn: Neurological, Behavioral, and Computational Perspectives

Attended and presented a poster.

Roads, B. D., Mozer M. C. (2013). Using Attentional Highlighting to Train Novices to Exhibit Expert Gaze Behavior. Poster session presented at: Learning to Attend, Attending to Learn: Neurological, Behavioral, and Computational Perspectives; 2013 November 6-7; San Diego, CA.

2013 Inter-Science of Learning Center (iSLC) Conference

Attended and presented a poster.

Roads, B. D., Mozer M. C. (2013). Using Attentional Highlighting to Train Novices to Exhibit Expert Gaze Behavior. Poster session presented at: NSF's Sixth Annual Inter-Science of Learning Center Conference; 2013 February 21-23; Philadelphia, PA.

2013 Temporal Dynamics of Learning Center (TDLC) All-Hands Meeting

Attended and presented a poster.

Roads, B. D., Mozer M. C. (2013). Using Attentional Highlighting to Train Novices to Exhibit Expert Gaze Behavior. Poster session presented at: The Seventh Annual Temporal Dynamics of Learning Center All-Hands Meeting; 2013 February 7-10; San Diego, CA.

2012 Inter-Science of Learning Center (iSLC) Conference

Attended and presented a poster.

Roads, B. D., Mozer M. C.. Modeling the Temporal Dynamics of Novice and Expert Fingerprint Analysts. Poster session presented at: NSF's Fifth Annual Inter-Science of Learning Center Conference; 2012 April 21-23; San Diego, CA.

2011 Temporal Dynamics of Learning Center (TDLC) All-Hands Meeting

Attended and presented a poster.

Roads, B. D., Mozer M. C.. Modeling Visual Saliency of Novice and Expert Fingerprint Analysts. Poster session presented at: The Sixth Annual Temporal Dynamics of Learning Center All-Hands Meeting; 2012 Jan 26-28; San Diego, CA.

AWARDS

Institute of Cognitive Science Research Award

July 28, 2017

Decision Support for Visual Categorization.

Amount: \$500

Institute of Cognitive Science Research Award

November 11, 2016

Enriched Visual Category Learning Environments.

Amount: \$500

CS Department Outstanding Research Award

May 3, 2016

Cash Prize: \$700

Institute of Cognitive Science Travel Award

February 29, 2016

Amount: \$500

Institute of Cognitive Science Research Award

November 9, 2015

Towards a Generalized Scheduling Procedure for Visual Category Learning.

Amount: \$500

Department Travel Award

April 30, 2015

Amount: \$300

Institute of Cognitive Science Research Award February 27, 2014
Using Human-Machine Cooperation to Amplify Human Visual Category Learning.
Amount: \$500

Research Community Development Award October 23, 2013
Amount: \$1,850

United Government of Graduate Students (UGGS) Travel Grant Award October 2, 2013
Amount: \$300

**PROFESSIONAL
ACTIVITIES**

Reviewer
Journal of Experimental Psychology: General 2016-present

Membership
Vision Science Society 2015-present

**2015-2016 Interdisciplinary Graduate Training in Cognitive Science Advisory Board
Member**

Provided advice and guidance on course topics, syllabus and readings for an introductory, graduate-level, cognitive science course. Gave two guest lectures on readings and topics I recommended. Mentored a project team in completing a mock NSF proposal.

2014-2015 Institute of Cognitive Science Executive Committee and Search Committee
Student Representative on the Executive Committee and Search Committee.

2013 Inter-Science of Learning Center (iSLC) Conference 2012-2013
Assisted in organizing an NSF sponsored conference for graduate students and post-docs hosted in Philadelphia, PA. Responsibilities included soliciting and reviewing applications and handling logistical issues.
See: <http://nsf-islc.org/>

**EXTERNAL
COURSE
WORK**

Machine Learning Summer School Summer 2012
Two-week program at University of California, Santa Cruz focusing on supervised machine learning techniques. I was awarded a \$675 financial aid scholarship to attend.
See: <http://mlss.soe.ucsc.edu/>

TDLC Summer Fellows Institute Summer 2012
Rigorous two-week NSF Temporal Dynamics of Learning Center program at the University of California, San Diego focusing on basic and current research in cognitive science.
See: <http://tdlc.ucsd.edu/events/sfi-2012-main.html>

SKILLS

Mathematics: linear algebra, multivariate calculus, Bayesian statistics
Programming: MATLAB, Python, Javascript, PHP, HTML, CSS

**OTHER
AWARDS**

Boy Scouts of America, Eagle Scout May 9, 2006

CITIZENSHIP

United States of America