Michael C. Mozer

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University of Colorado
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BIRTHDATE November 20, 1958

CITIZENSHIP USA

RESEARCH INTERESTS

I am committed to *human-centric artificial intelligence (AI)*—AI that mimics and enhances human capabilities, understands and anticipates an individual's needs, and acts in synergistic coordination with individuals. My work explores the topics of:

- *Cognitively informed artificial intelligence*: Incorporating insights from human perception and cognition into the design of AI architectures and machine learning methods. For example, I have proposed recurrent neural network models motivated by properties of human long-term memory.
- *Human optimization*: Developing software tools to improve how people learn, remember, and make decisions. Much of my present work is aimed at determining the most effective means of teaching and the manner in which to best present information for human consumption. For example, we created the Colorado Optimized Language Tutor, which helps students learn facts (e.g., foreign language vocabulary) by scheduling review to promote long-term retention.
- *Cognitive modeling*: Building psychologically grounded models of human cognition that allow us to predict and understand behavior. I have worked in the areas of selective attention, awareness, memory, learning, executive control, decision making, and neuropsychological disorders.
- *Intelligent environments*: Designing computer interfaces that are smarter, anticipatory, and easier to use. A past project that achieved some notoriety was the *adaptive house*, a control system that learns to manage energy resources (air heat, water heat, lighting, and ventilation) in an actual residence to to maximize the satisfaction of the inhabitants and minimize energy consumption.

EDUCATION

Ph.D. University of California, San Diego (Psychology and Cognitive Science)	1987
M.A. University of California, San Diego (Psychology)	1982
B.A. Brown University (Computer Science)	1980

ACADEMIC HONORS AND AWARDS

Fellow, Cognitive Science Society	2017
Educational Data Mining Society, Best Paper Award	2016
Educational Data Mining Society. Best Paper Award	2014
Cognitive Science Society, Computational Modeling Prize	2013
Faculty Fellowship, University of Colorado, Boulder	2009–2010
Distinguished Cognitive Scientist Award, Glushko-Samuelson Foundation, UC Merced	2010
Faculty Fellowship, University of Colorado, Boulder	1995–1996
Presidential Young Investigator Award, National Science Foundation	1990
Junior Faculty Development Award, University of Colorado, Boulder	1989
IBM Graduate Fellowship	1985–1987
Institute for Cognitive Science SDF Graduate Fellowship, UCSD	1981–1985
Sigma Xi (honorary scientific society), Brown University chapter	1980
Phi Beta Kappa, Brown University chapter	1980
B.A. degree *summa cum laude*, Brown University	1980

PROFESSIONAL EXPERIENCE

Visiting Faculty Researcher, Google Brain, Mountain View, CA	2018–present
Professor, Department of Computer Science and Institute of Cognitive Science, University of Colorado, Boulder	2001–present
Associate Professor, Department of Computer Science and Institute of Cognitive Science, University of Colorado, Boulder	1992–2001
Assistant Professor, Department of Computer Science and Institute of Cognitive Science, University of Colorado, Boulder	1988–1992
Lecturer, Department of Psychology, University of Toronto	1987–1988
Postdoctoral Fellow, Departments of Psychology and Computer Science, University of Toronto, Dr. Geoffrey Hinton, Supervisor	1987–1988

PROFESSIONAL ACTIVITIES

Advisory Board, WootMath (educational software), Boulder, CO	2018–present
Advisory Board, NSF/Cyberlearning project on "Software for using Collaborative, Dynamic, Personalized Experimentation to Investigate & Enhance Education", Worcester Polytechnic Institute	2018–present
Technical Advisory Board, Drop (AI assisted food preparation), San Francisco, CA	2018–present
Advisory Board, NSF/Cyberlearning project on "Modeling perceptual fluency with visual representations in an intelligent tutoring system for undergraduate chemistry", University of Wisconsin	2016–present
Advisory Board, NSF/Integrative Strategies project on "Using computational cognitive neuroscience to predict and optimize memory", New York University	2016–present
Editorial Board, Springer series on *Applied Machine Learning*	2016–present
Technical Advisory Board, Imagen Technologies (medical imagery analysis), New York	2015–present
Editorial Board, *Neural Computation*	2015–present
Technical Advisory Board, AnswerOn (churn prediction), Longmont, CO	2001–present
Board Member and Secretary, Neural Information Processing Systems Foundation	1995–present
Co-Founder and Technical Advisory Board Member, Sensory Inc. (embedded speech and vision technology), Sunnyvale CA	1992–present
Technical Advisory Board, Open Table, San Francisco, CA	2016–2018
Workshop Co-organizer. *Cognitively Informed Artificial Intelligence: Lessons from Natural Intelligence.* Neural Information Processing Systems. Long Beach, CA	Dec 2017
Faculty, *International Summer School on Deep Learning*, Bilbao, Spain	Jul 2017
Symposium Co-organizer, *Enhancing Education Through Cognitive Psychology*. Psychonomics 2015. Chicago, IL	Nov 2015
Workshop Co-organizer, *Machine Learning For Education*. ICML 2015. Lille, France	Jul 2015
Technical Advisory Board, Cognilytics, Inc., Denver, CO	2011–2015
Workshop Co-organizer, *Human Propelled Machine Learning*. NIPS 2014. Montreal, Canada	Dec 2014
Workshop Co-organizer, *Approaching Twenty Years of Knowledge Tracing: Lessons Learned, Open Challenges, and Promising Developments.* EDM 2014. London, UK	Jul 2014
Workshop Co-organizer, *Personalizing Education With Machine Learning*, NIPS 2012. Lake Tahoe, CA	Dec 2012
Faculty, International Summer School in Cognitive Science, Sofia, Bulgaria	Jul 2012
Technical Advisory Board, J.D. Powers and Associates, Web Intelligence Division (formerly Umbria Communications), Boulder, CO	2003–2010
Editorial Board, *Machine Learning*	
Chair, Finance Committee, Cognitive Science Society	2005–2009
Board of Governors, Cognitive Science Society	1998–2008
Technical Advisory Board, Green Planet Software	2001–2008
Executive Committee, Cognitive Science Society	2005–2008
Conference Liaison, Cognitive Science Society	2008
Chair, Cognitive Science Society	2006–2007
Symposium Co-Organizer, *Emergent Cognitive Control*, Cognitive Neuroscience Conference	Nov 2006
Editorial Board, *Consciousness and Cognition*	1998–2005
Advisory Board, Series on Natural Computing, Springer-Verlag	1998–2005
Editorial Board, *Visual Cognition*	1992–2004
Faculty, International Summer School in Cognitive Science, Sofia, Bulgaria	Jul 2002
Editorial Board, *Neural Networks*	1994–2001

Symposium Co-organizer, *Computational Neuropsychology*, Neural Information Processing Systems Conference — Dec 2001
Chief Scientist, Athene Software, Boulder, CO — 1998–2001
Tutorials Chair, Neural Information Processing Systems Conference — Dec 2000
Symposium Co-organizer, *Bayesian approaches to cognitive modeling*, Cognitive Science Conference — Aug 2000
Editorial Board, *Cognitive Science* — 1999–2000
Advisory Board, *Connectionist Surveys* — 1996–2000
Symposium Organizer, *Principles of computation in the brain*, Cognitive Neuroscience Conference — Apr 1998
Workshop Co-organizer, *Interfacing models of language*, Neural Information Processing Systems — Dec 1997
Co-Editor, Special issue of *Neurocomputing* on recurrent networks, — 1997
Consultant, Lifestyle Technologies, Los Angeles, California, — 1995–1997
General Chair, Neural Information Processing Systems Conference — Dec 1996
Program Chair, Neural Information Processing Systems Conference — Nov 1995
Faculty, James S. McDonnell Foundation Summer Institute in Cognitive Neuroscience, — Jul 1995
Workshop Chair, Neural Information Processing Systems — Nov 1993
Co-Organizer, Connectionist Models Summer School — Jun 1993
Local Arrangements Chair, Neural Information Processing Systems Conference — Nov 1991
Faculty, James S. McDonnell Foundation Summer Institute in Cognitive Neuroscience — Jul 1991
Participant, James S. McDonnell Foundation Summer Institute in Cognitive Neuroscience — Jun 1988
Research Assistant, Cognitive Science Laboratory, UCSD — 1981–1987
Teaching Assistant, Department of Psychology, UCSD — 1981–1987
Programmer/Research Assistant, Electronic Speech Systems, Santa Clara, California — 1975–1987
Participant, Connectionist Models Summer School — Jun 1986
Visiting Scholar, Department of Computer Science, Carnegie-Mellon University — 1984–1985
Editorial Assistant to Diana Deutsch, Editor, *Music Perception* — 1983–1984
Teaching Assistant, Department of Computer Science, Brown University — 1977–1980
Occasional Reviewer for *Proceedings of the National Academy of Sciences*, *Neural Information Processing Systems Conference*, *Cognitive Science Society Conference*, *Journal of Cognitive Neuroscience*, *IEEE Transactions on Neural Networks*, *Neural Computation*, *Connection Science*, *Artificial Intelligence*, *Cognitive Science*, *Cognitive Psychology*, *Cognitive Neuropsychology*, *Psychological Science*, *Consciousness and Cognition*, *Neurocomputing*, *Neuropsychologia*, *Neural Networks*, *Psychological Review*, *Journal of Experimental Psychology*, *Canadian Journal of Psychology*, *Quarterly Journal of Experimental Psychology*, *Psychological Research*, NSF, AFOSR, NSERC

SPONSORED RESEARCH

"Predictive models of human memory", Unnamed Corporate Sponsor,$209,000 — 2018–2019
"Operationalizing students' textbook annotations to improve comprehension and long-term retention", NSF IIS (NCS-FO), $1,000,000 (my share $300,000) — 2016–2020
"Bayesian optimization for exploratory experimentation in the behavioral sciences", NSF SES, $400,000 — 2015–2019
REU Supplement, NSF IIS, $7,200 — 2017–2018
REU Supplement, NSF SES, $2,500 — 2016
"Aphasia rehabilitation: Modulating cues, feedback, and practice conditions" (L. Cherney and S. Van Vuuren, PIs), NIH, $3.1M (my share $50,000) — 2011–2016
"Temporal dynamics of human learning and memory" (Garrison Cottrell, PI), TDLC Science of Learning Center, National Science Foundation, $15M (my share ~$500k) — 2006–2016
"Context-Award Music Recommendation", Samsung, $11,400 — 2014–2015
"Improving memory retention via spacing of practice: Computational and empirical investigations" (Harold Pashler, co-PI), National Science Foundation, BCS, $450,000 total (my share $224,977) — 2007–2010
"Understanding the performance of modern systems" (Amer Diwan, PI), National Science Foundation, SMA, $400,000 total (my share $200,000) — 2005–2009
"Control and adaptation of attentional processing: Empirical and computational investigations" (Shaun Vecera, Co-PI), National Science Foundation, Human and Social Dynamics Program, $430,000 total (my share $240,000) — 2004–2008

"Enhancing learning through testing: Theoretical and practical issues" (subcontract to University of Colorado, Michael Mozer, PI; Harold Pashler, overall PI), National Institute of Health, $450,000 total (my share $119,510) 2000–2004

"Discrete representations in working memory: Developmental, neuropsychological, and computational investigations" (Randy O'Reilly, Yuko Munakata, Akira Miyake, Co-PIs), National Science Foundation, Knowledge and Distributed Intelligence Program, $800,000 total (my share $200,000) 1998–2002

"Temporal dynamics of cognition in a modular cortical architecture", McDonnell-Pew Program in Cognitive Neuroscience, $105,000 1997–2000

"Artificial Intelligence and Home Automation", Lifestyle Technologies, $40,000 1997

"Rapid Behavioral Tuning to Task Demands: Computational Modeling of Empirical Data" (Clark Fagot, Co-PI), McDonnell-Pew Program in Cognitive Neuroscience, $90,000 1994–1996

REU Supplement, National Science Foundation, $23,000 1993–1995

"Connectionist Modeling and Cognitive Neuroscience", James S. McDonnell Foundation, $187,500 1990–1995

Presidential Young Investigator Award, National Science Foundation, $312,500 1990–1995

"Connectionist Models Summer School", American Association for Artificial Intelligence, National Science Foundation, and Siemens Research Center, $45,000 1993

CRCW Grant In Aid, University of Colorado, $3,000 1992

Digital Equipment Corporation External Research Grant, $45,750 1991

Junior Faculty Development Award, University of Colorado, $5,000 1989

"Connectionist Models of Selective Attention and Object Recognition", James S. McDonnell Foundation, $9,000 1988–1989

U.S. PATENTS

"A Speech Recognition Apparatus For Consumer Electronic Applications", Forrest Mozer, Michael Mozer, and Todd Mozer. Submitted September 1994; issued August 4, 1998. US Patent 5,790,754.

"Speech Recognition in Consumer Electronic Products", Todd Mozer, Michael Mozer, and Forrest Mozer. Issued February 1, 2000. US Patent 6,021,387.

GRADUATE STUDENTS SUPERVISED

Adam Winchell, Ph.D. 2020 (expected)

Camden Elliott-Williams, Ph.D. 2020 (expected)

Shirly Montero Quesada, Ph.D. 2019 (expected)

Tyler Scott, M.S. 2019 (expected)

Matt Maierhofer, M. S. 2019. *Lifetime limited memory networks*

Karl Ridgeway, Ph.D. 2018. *Content-style decomposition: Representation discovery and applications*

Denis Kazakov, M.S. 2018. *State-denoised recurrent neural networks*

Brennan McConnell, M.S. 2018. *A calibration loss for neural networks*

Aditya Thyagarajan, M.S. 2018. *Convolutional attractor networks for superresolution.*

Brett Roads, Ph.D., 2017. *Accelerating human visual concept learning and boosting performance via computational models of perception and cognition*

Shruthi Sukumar, M.S. 2017. *Analysis and solution of Markov decision problems with a continuous, stochastic state component*

Mohammad Khajah, Ph.D. 2017. *Optimizing game engagement via nonparametric models and manipulations of difficulty, tension, and perceived performance*

Ron Kneusel, Ph.D. 2015. *Improving hybrid human-machine search through soft highlighting*

Robert Lindsey, Ph.D. 2014. *Probabilistic models of student learning and forgetting*

Karl Ridgeway, M.S. 2014. *Forgetting of foreign language skills: A corpus based analysis of Rosetta Stone®*

Ahbishek Jainantilil, Ph.D. 2013. *Feature selection via iterative reweighting: An exploration of algorithms for linear models and random forests*

Brett Roads, M.S. 2013. *Using attentional highlighting to train visual expertise.*

Matthew Wilder, Ph.D. 2012. *Probabilistic modeling of sequential effects in human behavior: Theory and practical applications.*

Daniel Knights, Ph.D. 2012. *Predictive modeling of metagenomes* (co-advised with Robin Knights, received College of Engineering Outstanding Dissertation Award, #1 of 390)

Benjamin Link, M.S. 2011. *Modeling the effect of recent experience on judgments.*

Karthik Venkatesh, M.S. 2010 (Electrical and Computer Engineering). *Experience guided search: A theory of attentional control.*

Owen Lewis, M.S. 2010 (Applied Math). *A review of mathematical techniques in machine learning*.

Samuel Reid, Ph.D. 2010. *Model combination in multiclass classification*.

Adrian Fan, M.S. 2008. *A synthesis of theoretical and empirical perspectives on repetition suppression*.

Scott Richardson, M.S. 2007. *Discovering the runtime structure of software with probabilistic generative models*.

Thomas Borchert, M.S. 2007. *Computational correlates of access consciousness*.

Brian Loughery, M.S. 2003. *Learning working memory tasks by reward prediction in the basal ganglia and prefrontal cortex* (co-advisor with Randall O'Reilly)

Michael Colagrosso, Ph.D. 2003. *A rational theory of skilled performance and practice: Modeling long-term repetition priming*.

David Nix, Ph.D. 1998. *Machine learning methods for inferring vocal-tract articulation from speech acoustics*

Torleif Mohling, M.S., 1998. *Predicting human performance on anagram solving: A computational model*

Donald Mathis, Ph.D., 1997. *A computational theory of consciousness in cognition*

Srecko Vidmar, M.S., 1997. *Optimal control of home heating systems*

Kelvin Fedrick, M.S., 1996. *A decompositional approach to time series forecasting*

Debra Miller, M.S., 1995. *Adaptive lighting control*

Kevin Markey, Ph.D., 1994. *The sensorimotor foundations of phonology: A computational model of early childhood articulatory and phonetic development*

Sreerupa Das, Ph.D., 1994. *Connectionist models of language induction incorporating symbolic constraints*

John Allison, M.S., 1994. *Explorations of Bayesian input relevance determination for neural networks*

Jay Alexander, M.S., 1993. *Template-based procedures for neural network interpretation*

Ken Parker, M.S., 1993. *Selecting regression estimators for the generalized ensemble method*

Clayton McMillan, Ph.D., 1992. *Rule induction in a neural network through integrated symbolic and subsymbolic processing*

Stefanie Lindstaedt, M.S., 1992. *Comparison of unsupervised neural network models for redundancy reduction*

BOOKS AND EDITED VOLUMES

Mozer, M. C. (1991). *The perception of multiple objects: A connectionist approach*. Cambridge, MA: MIT Press/Bradford Books.

Mozer, M. C., Smolensky, P., Touretzky, D. S., Elman, J. L., & Weigend, A. S. (Eds.). (1994). *Proceedings of the 1993 Connectionist Models Summer School.* Hillsdale, NJ: Erlbaum.

Smolensky, P., Mozer, M. C., & Rumelhart, D. E. (Eds.). (1996). *Mathematical perspectives on neural networks*. Hillsdale, NJ: Erlbaum.

Touretzky, D. S., Mozer, M. C., & Hasselmo, M. (Eds.). (1996). *Neural Information Processing Systems 8*. Cambridge, MA: MIT Press.

Mozer, M. C., Jordan, M. I., & Petsche, T. (Eds.). (1997). *Neural Information Processing Systems 9*. Cambridge, MA: MIT Press.

REFEREED JOURNAL PUBLICATIONS

Mozer, M. C. (1983). Letter migration in word perception. *Journal of Experimental Psychology: Human Perception and Performance, 9*, 531–546.

McClelland, J. L., & Mozer, M. C. (1986). Perceptual interactions in multi-word displays: Familiarity and similarity effects. *Journal of Experimental Psychology: Human Perception and Performance, 12*, 18–35.

Mozer, M. C. (1989). Types and tokens in visual letter perception. *Journal of Experimental Psychology: Human Perception and Performance, 15*, 287–303.

Mozer, M. C. (1989). A focused back-propagation algorithm for temporal sequence recognition. *Complex Systems, 3*, 349–381.

Mozer, M. C., & Smolensky, P. (1989). Using relevance to reduce network size automatically. *Connection Science, 1*, 3–16.

Mozer, M. C., & Behrmann, M. (1990). On the interaction of spatial attention and lexical knowledge: A connectionist account of neglect dyslexia. *Cognitive Neuroscience, 2*, 96–123.

Behrmann, M., Moscovitch, M., Black, S. E., & Mozer, M. C. (1990). Perceptual and conceptual mechanisms in neglect dyslexia: Two contrasting case studies. *Brain, 113*, 1163–1183.

Mozer, M. C., & Bachrach, J. (1990). Discovering the structure of a reactive environment by exploration. *Neural Computation*, *2*, 447–457.

Behrmann, M., Moscovitch, M., & Mozer, M. C. (1991). Directing attention to words and nonwords in normal subjects and in a computational model: Implications for neglect dyslexia. *Cognitive Neuropsychology*, *8*, 213–248.

Mozer, M. C., & Bachrach, J. (1991). SLUG: A connectionist architecture for inferring the structure of finite-state environments. *Machine Learning*, *7*, 139–160.

Behrmann, M., & Mozer, M. C. (1992). A connectionist account of neglect dyslexia. *Journal of Clinical and Experimental Neuropsychology*, *14*, 48–49.

Mozer, M. C., Zemel, R. S., Behrmann, M., & Williams, C. K. I. (1992). Learning to segment images using dynamic feature binding. *Neural Computation*, *4*, 650–665.

Dodier, R. H., Lukianow, D., Ries, J., & Mozer, M. C. (1994). Comparison of neural net and conventional techniques for lighting control. *Applied Mathematics and Computer Science*, *4*, 447–462.

Mozer, M. C. (1994). Neural network music composition by prediction: Exploring the benefits of psychophysical constraints and multiscale processing. *Connection Science*, *6*, 247–280.

Zemel, R. S., Williams, C. K. I., & Mozer, M. C. (1995). Lending direction to neural networks. *Neural Networks*, *8*, 503–512.

Mozer, M. C. (1996). Neural network speech processing for toys and consumer electronics. *IEEE Expert*, *11*, 4–5.

Calder, B., Grunwald, D., Jones, M., Lindsay, D., Martin, J., Mozer, M., & Zorn, B. (1997). Evidence-based static branch prediction using machine learning. *Transactions on Programming Languages and Systems*, *19*, 188–222. [Authorship order is alphabetical.]

Mozer, M. C., Halligan, P. W., Marshall, J. C. (1997). The end of the line for a brain-damaged model of unilateral neglect. *Journal of Cognitive Neuroscience*, *9*, 171–190.

Das, S., & Mozer, M. C. (1998). Dynamic on-line clustering and state extraction: An approach to symbolic learning. *Neural Networks*, *11*, 53–64.

Behrmann, M., Zemel, R. S., and Mozer, M. C. (1998). Object-based attention and occlusion: Evidence from normal subjects and a computational model. *Journal of Experimental Psychology: Human Perception and Performance*, *24*, 1011–1036.

Alexander, J. A., & Mozer, M. C. (1999). Template-based procedures for neural network interpretation. *Neural Networks*, *12*, 479–498.

Mozer, M. C. (1999). An intelligent environment should be adaptive. *IEEE Intelligent Systems and their Applications*, *14(2)*, 11–13.

Behrmann, M., Zemel, R. S., & Mozer, M. C. (2000). Occlusion, symmetry, and object-based attention: Reply to Saiki (1999). *Journal of Experimental Psychology: Human Perception and Performance*, *26*, 1497–1505.

Mozer, M. C., Wolniewicz, R., Grimes, D., Johnson, E., & Kaushansky, H. (2000). Maximizing revenue by predicting and addressing customer dissatisfaction. *IEEE Transactions on Neural Networks*, *11*, 690–696.

Sitton, M., Mozer, M. C., & Farah, M. J. (2000). Superadditive effects of multiple lesions in a connectionist architecture: Implications for the neuropsychology of optic aphasia. *Psychological Review*, *107*, 709–734.

Zemel, R. S., & Mozer, M. C. (2001). Localist attractor networks. *Neural Computation*, *13*, 1045–1064.

Mozer, M. C. (2002). Frames of reference in unilateral neglect and visual perception: A computational perspective. *Psychological Review*, *109*, 156–185.

Pashler, H., Mozer, M. C., & Harris, C. R. (2002). Mating strategies in a Darwinian microworld: Simulating the consequences of female reproductive refractoriness. *Adaptive Behavior*, *9*, 5–15.

Zemel, R. S., Behrmann, M., & Mozer, M. C. (2002). Experience-dependent perceptual grouping and object-based attention. *Journal of Experimental Psychology: Human Perception and Performance*, *28*, 202–217.

Kinoshita, S., & Mozer, M. C. (2006). How lexical decision is affected by recent experience: Symmetric versus asymmetric frequency blocking effects. *Memory and Cognition*, *34*, 726–742.

Bohte, S.M., & Mozer, M. C. (2007). Reducing the variability of neural responses: A computational theory of spike-timing dependent plasticity. *Neural Computation, 19*, 371–403.

Kinoshita, S., Forster, K. I., & Mozer, M. C. (2008). Unconscious cognition isn't that smart: Modulation of masked repetition priming effect in the word naming task. *Cognition, 107*, 623–649.

Mozer, M. C., & Fan, A. (2008). Top-down modulation of neural responses in visual perception: A computational exploration. *Natural Computing, 7*, 45–55.

Mozer, M. C., Pashler, H., & Homaei, H. (2008). Optimal predictions in everyday cognition: The wisdom of individuals or crowds? *Cognitive Science: A Multidisciplinary Journal, 32*, 1133–1147.

Cepeda, N. J., Coburn, N., Rohrer, D., Wixted, J. T., Mozer, M. C., & Pashler, H. (2009). Optimizing distributed practice: Theoretical analysis and practical implications. *Experimental Psychology, 56*, 236–246.

Lee, H., Mozer, M. C., & Vecera, S. (2009). Mechanisms of priming of pop out: Stored representations or feature gain modulations? *Attention, Perception, & Psychophysics, 71*, 1059–71.

Kang, S. H. K., Pashler, H., Cepeda, N. J., Rohrer, D., Carpenter, S. K., & Mozer, M. C. (2011). Does incorrect guessing impair fact learning? *Journal of Educational Psychology, 103*, 48–59.

Kinoshita, S., Mozer, M. C., & Forster, K. I. (2011). Dynamic adaptation to history of trial difficulty explains the effect of congruency proportion on masked priming. *Journal of Experimental Psychology: General, 140*, 622–636.

Knights, D., Kuczynski, J., Charlson, E., Zaneveld, J., Collman, R. G., Mozer, M. C., Bushman, F. D., Knight, R., & Kelley, S. T. (2011). Bayesian community-wide culture-independent microbial source tracking. *Nature Methods, 8*, 761–763.

Wilder, M. H., Mozer, M. C., & Wickens, C. D. (2011). An integrative experience-based theory of attentional control. *Journal of Vision, 11*, 1–30.

Doshi, A., Tran, C., Wilder, M., Mozer, M. C., & Trivedi, M. (2012). Sequential effects in driving. *Cognitive Science, 36*, 948–963.

Lee, H., Mozer, M. C., Kramer, A. F., & Vecera, S. P. (2012). Object-based control of attention is sensitive to recent experience. *Journal of Experimental Psychology: Human Perception and Performance, 38*, 314–325.

Chukoskie, L., Snider, J., Mozer, M. C., Krauzlis, R. J., & Sejnowski, T. J. (2013). Learning where to look: An empirical, computational, and theoretical account of hidden target search performance. *Proceedings of the National Academy of Sciences, 110*, 10438–10445.

Jones, M., Curran, T., Mozer, M. C., & Wilder, M. H. (2013). Sequential effects in response time reveal learning mechanisms and event representations. *Psychological Review, 120*, 628–666.

Pashler, H. Kang, S., & Mozer, M. C. (2013). Reviewing erroneous information facilitates memory updating. *Cognition, 128*(3), 424–430.

Pashler, H., & Mozer, M. C. (2013). When does fading help perceptual category learning? *Journal of Experimental Psychology: Learning, Memory, and Cognition, 39*, 1162–73.

Wilder, M. H., Jones, M., Ahmed A. A., Curran, T., & Mozer, M. C. (2013). The persistent impact of incidental experience. *Psychonomic Bulletin and Review, 20*, 1221–1231.

Khajah, M. M., Lindsey, R. V., & Mozer, M. C. (2014). Maximizing students' retention via spaced review: Practical guidance from computational models of memory. *Topics in Cognitive Science, 6*, 157–169.

Lindsey, R., Shroyer, J., Pashler, H., & Mozer, M. C. (2014). Improving long-term knowledge retention through personalized review. *Psychological Science, 25, 639–647. doi: 10.1177/0956797613504302.*

Kang, S. H. K., Lindsey, R. V., Mozer, M. C., & Pashler, H. (2014). Retrieval practice over the long term: Should spacing be expanding or equal-interval? *Psychonomic Bulletin & Review, 21*, 1544–50.

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

Ridgeway, K., Mozer, M. C., & Bowles, A. (2017). Forgetting of foreign language skills: A corpus-based analysis of online tutoring software. *Cognitive Science: A Multidisciplinary Journal, 41*, 924–949. *doi:10.1111/cogs.12385.*

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

Kneusel, R. T., & Mozer, M. C. (2017). Improving human-machine cooperative visual search with soft highlighting. *ACM Transactions on Applied Perception, 15*, 3:1–3:21. Also arXiv:1612.08117 [cs.HC]

Vatterott, D. B., Mozer, M. C., & Vecera, S. P. (2018). Rejecting salient distractors: Generalization from experience. *Attention, Perception, & Psychophysics, 80*, 485–499. DOI:10.3758/s13414-017-1465-8.

Lindsey, R., Daluski, A., Chopra, S., Lachapelle, A., Mozer, M. C., Sicular, S., Hanel, D., Gardner, M., Gupta, A., Hotchkiss, R., & Potter, H. (2018). A deep neural network improves fracture detection by clinicians. *Proceedings of the National Academy of Sciences, 115*, 11591–11596.

Mozer, M. C., Pashler, H., Lindsey, R. V., & Jones, J. (Submitted). Efficient training of visual search via attentional highlighting. Submitted for publication.

Mozer, M. C., Sukumar, S., Elliott-Williams, C., Hakimi, S., & Ward, A. F. (Submitted). Overcoming temptation: Incentive design for intertemporal choice. Submitted for publication.

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

Roads, B. D., & Mozer, M. C. (Submitted). Predicting the ease of human category learning using radial basis function networks. Submitted for publication.

REFEREED CONFERENCE PUBLICATIONS

Mozer, M. C. (1987). Early parallel processes in reading: A connectionist approach. In M. Coltheart (Ed.), *Attention and performance XII: The psychology of reading* (pp. 83–104). Hillsdale, NJ: Erlbaum.

Mozer, M. C. (1987). RAMBOT: A connectionist expert system that learns by example. In M. Caudillo & C. Butler (Eds.), *Proceedings of the IEEE First Annual International Conference on Neural Networks* (pp. 693–700). San Diego: IEEE Publishing Services.

Mozer, M. C. (1988). A connectionist model of selective attention in visual perception. *Proceedings of the Tenth Annual Conference of the Cognitive Science Society* (pp. 195–201). Hillsdale, NJ: Erlbaum.

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Mozer, M. C. (2009). Attractor networks. In T. Bayne, A. Cleeremans, & P. Wilken (Eds.), *Oxford Companion to Consciousness* (pp. 86–89). Oxford, UK: Oxford U. Press.

Mozer, M. C., & Lindsey, R. V. (2017). Predicting and improving memory retention: Psychological theory matters in the big data era. In M. Jones (Ed.), *Big Data in Cognitive Science* (pp. 34–64). New York: Routledge.

OTHER BOOK CHAPTERS

Anderson, J. A., & Mozer, M. C. (1981). Categorization and selective neurons. In G. E. Hinton & J. A. Anderson (Eds.), *Parallel models of associative memory* (pp. 213–236). Hillsdale, NJ: Erlbaum Associates.

Mozer, M. C., & Gross, H. (1986). An architecture for experiential learning. In T. M. Mitchell, J. G. Carbonell, & R. S. Michalski (Eds.), *Machine learning: A guide to current research* (pp. 219–226). Boston: Kluwer Academic Publishers.

Mozer, M. C. (1991). Connectionist music composition based on melodic, stylistic, and psychophysical constraints. In P. M. Todd & D. G. Loy (Eds.), *Music and connectionism* (pp. 195–211). Cambridge, MA: MIT Press/Bradford Books.

Mozer, M. C., & Behrmann, M. (1992). Reading with attentional impairments: A brain-damaged model of neglect and attentional dyslexias. In R. G. Reilly & N. E. Sharkey (Eds.), *Connectionist approaches to natural language processing* (pp. 409–460). Hillsdale, NJ: Erlbaum Associates.

Bachrach, J., & Mozer, M. C. (1995). Modeling and controlling finite-state systems. In Y. Chauvin & D. E. Rumelhart (Eds.), *Back propagation: Theory, architectures, and applications* (pp. 351–388). Hillsdale, NJ: Erlbaum.

Mozer, M. C. (1995). A focused back-propagation algorithm for temporal sequence recognition. In Y. Chauvin & D. E. Rumelhart (Eds.), *Back propagation: Theory, architectures, and applications* (pp. 137–170). Hillsdale, NJ: Erlbaum.

Mozer, M. C., Dodier, R. H., Anderson, M., Vidmar, L., Cruickshank III, R. F., Miller, D. (1995). The neural network house: An overview. In L. Niklasson & M. Boden (Eds.), *Current trends in connectionism* (pp. 371–380). Hillsdale, NJ: Erlbaum.

Mozer, M. C., & Sitton, M. (1998). Computational modeling of spatial attention. In H. Pashler (Ed.), *Attention* (pp. 341–393). London: UCL Press.

Mozer, M. C., & Miller, D. (1998). Parsing the stream of time: The value of event-based segmentation in a complex, real-world control problem. In C. L. Giles & M. Gori (Eds.), *Adaptive processing of temporal sequences and data structures* (pp. 370–388). Berlin: Springer Verlag.

Mozer, M. C. (1999). Explaining object-based deficits in unilateral neglect without object-based frames of reference. In J. Reggia, E. Ruppin, & D. Glanzman (Eds.), *Disorders of brain, behavior, and cognition: The neurocomputational perspective* (pp. 99–119). New York: Elsevier.

Tsoi, A. C., Back, A., Principe, J., & Mozer, M. C. (2001). Memory kernels. In J. F. Kolen & S. C. Kremer (Eds.), *A field guide to dynamical recurrent networks* (pp. 39–54). Piscataway, NJ: IEEE Press.

Mozer, M. C. (2001). Object recognition. In N. J. Smelser & P. B. Baltes (Eds.), *Encyclopedia of the Social and Behavioral Sciences, Vol. 16* (pp. 10781–10784). Oxford, UK: Elsevier Science.

Mozer, M. C., & Vecera, S. P. (2005). Space- and object-based attention. In L. Itti, G. Rees, & J. Tsotsos (Eds.), *Neurobiology of attention* (pp. 130–134). Academic Press / Elsevier.

Mozer, M. C. (2006). Rational models of cognitive control. In C. Calude et al. (Eds.), *Unconventional Computation: Fifth International Conference* (pp. 20–25). Berlin: Springer-Verlag

Hochreiter, S., & Mozer, M. C. (2007). Monaural speech separation by support vector machines: Bridging the divide between supervised and unsupervised learning methods. In S. Makino, T.-W. Lee, & H. Sawada (Eds.), *Blind signal separation* (pp. 405–421). Berlin: Springer-Verlag.

Mozer, M. C., & Wilder, M. H. (2009). A unified theory of exogenous and endogenous attentional control. In D. Heinke & E. Mavritsaki (Eds.), *Computational modeling in behavioral neuroscience: Closing the gap between neurophysiology and behaviour* (pp. 245–265). London: Psychology Press.

Knights, D., Mozer, M. C., & Nicolov, N. (2009). Detecting topic drift. *Recent Advances in Natural Language Processing V (a.k.a. Current Issues in Linguistic Theory)* (pp. 113–130). Amsterdam & Philadelphia: John Benjamins.

TECHNICAL REPORTS

Mozer, M. C. (1983). *Principal component analysis using parallel computation* (ICS Progress Report, First Quarter). La Jolla: University of California, San Diego, Institute for Cognitive Science.

Mozer, M. C. (1984). *Inductive information retrieval using parallel distributed computation* (ICS Technical Report 8406). La Jolla: University of California, San Diego, Institute for Cognitive Science.

Mozer, M. C., Pashler, H., & Miyata, Y. (1991). *Recovering the "where" from the "what": A connectionist mechanism to direct attention to objects.* Unpublished manuscript.

Rickard, T. C., Mozer, M. C., & Bourne, L. E. Jr. (1993). An interactive activation model of arithmetic fact retrieval. Technical Report 92-15. Boulder, Colorado: Institute of Cognitive Science, University of Colorado.

Mozer, M. C., Zemel, R. S., & Hungerford, M. (2003). Optimal adaptation of neural codes. An account of reptition suppression. Unpublished Manuscript.

Mozer, M. C., Mytkowicz, T., & Zemel, R. S. (2004). Achieving robust neural representations: An account of repetition suppression.

Richardson, S., Otte, M., Mozer, M. C., Diwan, A., Sweeney, P., & Connors, D. (2009). Discovering the runtime structure of software with probabilistic generative models.

Reid, S., & Mozer, M. C. (2011). Probabilistic pairwise classification.

Lindsey, R. V., & Mozer, M. C. (2013). Predicting individual differences in student learning via collaborative filtering.

Lindsey, R., Polsdofer, E., Mozer, M.C., Kang, S., H., K., & Pashler, H. (2013). Long-term recency is nothing more than ordinary forgetting.

SELECTED INVITED PRESENTATIONS

Invited Participant, Attention and Performance XII, England. July, 1986.

Colloquium, Department of Psychology, University of Guelph. Guelph, Ontario. March 1988.

Tutorial Speaker, Rocky Mountain Artificial Intelligence Conference, Denver, CO. June 1989.

Invited Participant, Symposium on Cognitive Neuroscience. The Eleventh Annual Conference of the Cognitive Science Society. Ann Arbor, MI. August 1989.

Colloquium, Department of Psychology, University of Michigan. Ann Arbor, MI. January 1991.

Colloquium, Department of Music, University of Washington. Seattle, WA. February 1991.

Colloquium, Department of Computer Science, University of Massachusetts at Amherst. May 1991.

Colloquium, International Computer Science Institute. Berkeley, CA. June 1991.

Faculty Lecturer, James S. McDonnell Summer Institute in Cognitive Neuroscience. Dartmouth, NH. July 1991.

Colloquium, Program in Cognitive Science, Princeton University. Princeton, NJ. September 1991.

Invited Speaker, Fourth International Conference of the Society for Computer Science (Gesellschaft fuer Informatik). Munich, Germany. October 1991.

Colloquium, Siemens Nixdorf. Munich, Germany. October 1991.

Colloquium, Department of Psychology, University of Braunschweig. Braunschweig, Germany. October 1991.

Invited Speaker, Workshop in Time Series Analysis and Prediction. Santa Fe Institute for Nonlinear Studies, Santa Fe, NM. May 1992.

Colloquium, Xerox Palo Alto Research Center, September 1992.

Colloquium, Psychology Department, University of Denver, December 1992.

Colloquium, Department of Psychology, Carnegie-Mellon University. Pittsburgh, PA. February 1993.

Colloquium, Department of Computer Science and Engineering, Oregon Graduate Institute. Portland, OR. March 1993.

Colloquium, Department of Mathematics and Computer Science, Colorado School of Mines. Golden, CO. April 1993.

Invited Speaker, Connectionist Models Summer School. Boulder, CO. June 1993.

Colloquium, Department of Computer Science, University of Hamburg. Hamburg Germany, July 1993.

Faculty Lecturer, Summer School in Cognitive Neuroscience. Trieste, Italy. July 1993.

Colloquium, Department of Psychology, Oxford University. Oxford, England. February 1994.

Colloquium, Department of Psychology, University of California at San Diego. La Jolla, CA. June 1994.

Invited Speaker, Neural Information Processing Systems. November 1994.

Colloquium, Department of Computer Science, Colorado State University. Fort Collins, CO. January 1995.

Invited Speaker, Swedish Conference on Connectionism. Skovde, Sweden. February 1995.

Invited Symposium Speaker, Cognitive Neuroscience Society. San Francisco, CA. March 1995.

Colloquium, Santa Fe Institute. Santa Fe, NM. May 1995.

Faculty Lecturer, James S. McDonnell Summer Institute in Cognitive Neuroscience. Davis, CA. July 1995.

Invited Speaker, Lifestyle Technologies. Los Angeles, CA. August 1995.

Seminar, Department of Psychology, University of Toronto. Toronto, Ontario. October 1995.

Colloquium, Department of Psychology, McMaster University. Hamilton, Ontario. October 1995.

Colloquium, Department of Computer Science, Oregon Graduate Institute. Portland, OR. March 1996.

Invited Speaker, Apple Computer. Cupertino, CA. March 1996.

Invited Speaker, Conference on Neural Networks for Computing. Snowbird, UT. April 1996.

Invited Speaker, Montreal Workshop on Neural Networks. Montreal, Quebec. April, 1996.

Invited Speaker, Interval Research. San Jose, CA. May 1996.

Invited Speaker, Siemens Corporate Research. Princeton, NJ. June 1996.

Colloquium, Department of Cognitive Science, Johns Hopkins University. Baltimore, MD. June 1996.

Colloquium, Center for the Neural Bases of Cognition, Carnegie Mellon University. Pittsburgh, PA. March 1997.

Invited Speaker, Summer School on Adaptive Processing of Temporal Information. Vietri sul Mar, Italy. September 1997.

Colloquium, Institute for Research in Cognitive Science, University of Pennsylvania. Philadelphia, PA. October 1997.

Colloquium, Department of Psychology, University of Arizona. October 1997.

Colloquium, Systems Engineering, University of Pennsylvania. Philadelphia, PA. February 1998.

Invited Speaker, Neural Modeling of Brain and Cognitive Disorders Workshop, College Park, MD. June 1998.

Invited Participant. McDonnell Pew Program in Cognitive Neuroscience Annual Meeting, Montreal, PQ. June 1998.

Colloquium, Broadband Telecommunications Center, Georgia Institute of Technology. January 1999.

Colloquium, Department of Computer Science, University of Arizona. January 1999.

Colloquium, Department of Psychology, University of Iowa. March, 1999.

Colloquium, Department of Cognitive Science, University of California, Irvine. April, 1999.

Colloquium, AT&T Research Labs, Florham Park, NJ. June 1999.

Invited Participant. McDonnell-Pew Program in Cognitive Neuroscience Annual Meeting, San Diego, CA. June 1999.

Invited Speaker, International Joint Conference on Neural Networks. Washington, DC. July, 1999.

Colloquium, Department of Psychology, University of Pennsylvania. October, 1999.

Colloquium, Santa Fe Institute. Santa Fe, NM. February, 2000.

Colloquium, Department of Computer Science, University of Toronto. March, 2000.

Colloquium, Lucent Laboratories, Murray Hill, NJ. March 2000.

Invited Speaker, Fourth International Conference on Cognitive and Neural Systems, Boston, MA. May 2000.

Invited Speaker, Symposium on *Bayesian Models of Human Cognition*, Cognitive Science Society Conference, Philadelphia, PA. August 2000.

Invited Speaker, Workshop on *Network Models of Brain Function*, Banbury Center, NY. September 2000.

Invited Speaker, ESource Members' Forum (Energy Industry Conference), Colorado Springs, November 2000.

Colloquium, Department of Psychology, McMaster University. November, 2000.

Colloquium, Microsoft Research, Seattle. January, 2001.

Lecturer, *Complex Systems Summer School*, Santa Fe Institute. June, 2001.

Invited Participant, NSF KDI Workshop, New Orleans, LA. April 2002.

Colloquium, Department of Computer Science, UC San Diego, June 2002.

Lecturer, *Ninth International Summer School in Cognitive Science*, New Bulgaria University, Sofia. July, 2002.

Invited Visitor, Center for Cognitive Science, Macquarie University, Sydney, Australia. September-October 2002.

Colloquium, Department of Psychology, University of New South Wales, October 2002.

Invited Speaker, ESource Members' Forum (Energy Industry Conference), Colorado Springs, November 2002.

Invited Speaker, *International Neuroscience Summit 2002*, Berlin, Germany. November 2002.

Invited Speaker, *American Neuropsychiatric Association*, Bal Harbor, FL. February 2004.

Keynote Speaker, *International Conference on Cognitive Modeling*, Pittsburgh, PA. July 2004.

Colloquium, Intel Research, Berkeley, CA. February 2005.

Invited Speaker, *Modeling Integrated Cognitive Systems* (AFOSR workshop), Troy, NY. March 2005.

Invited Speaker, *Computation in Neural and Machine Vision Systems*, Toronto, ON. June 2005.

Keynote Speaker, *Intelligent Environments '05.* Colchester, UK. June 2005.

Colloquium, Department of Psychology, Macquarie University, Sydney. July 2005.

Invited Speaker, Psychology Department, UCSD. January 2006.

Keynote Speaker, *Unconventional Computing '06*. York University, UK. September 2006.

Invited Speaker, Department of Cognitive Science (COGS200). University of California, San Diego. May 2007.

Invited Speaker, Workshop on *Closing the gab between neurophysiology and behavior: A computational modeling approach.* University of Birmingham, UK. June 2007.

Colloquium, Department of Computer Science, University of Nevada, Reno. October 2007.

Invited Speaker, Department of Cognitive Science (COGS200), University of California, San Diego. November 2007.

Invited Speaker, Temporal Dynamics of Learning Center Annual Meeting, University of California, San Diego, February 2009.
Colloquium, Department of Psychology, Indiana University, October 2009.
Colloquium, School of Informatics, Indiana University, October 2009.
Colloquium, Department of Brain and Cognitive Sciences, University of Rochester, March 2010.
Colloquium, Department of Cognitive Science, University of California Merced, March 2010.
Colloquium, Department of Cognitive Science, University of California Irvine, April 2010.
Invited Speaker, Temporal Dynamics of Learning Center Annual Meeting, University of California, San Diego, January 2011.
Invited Speaker, Department of Cognitive Science (COGS200), University of California, San Diego, April 2011.
Invited Speaker, Temporal Dynamics of Learning Center Annual Meeting, University of California, San Diego, January 2012.
Invited Speaker, *Workshop on Optimal Teaching*, San Diego, May 2012.
Invited Lecturer, *European Summer School in Cognitive Science*, Sofia, Bulgaria, July 2012.
Invited Speaker, *Summer Symposium on Visual Search and Selective Attention*, Munich, Germany, July 2012.
Invited Speaker, *NSF Workshop on Computational Cognitive Modeling*, Arlington, VA, May 2013.
Cognitive Brownbag, Department of Psychology, UCSD, May 2013.
Colloquium, Google Brain, Mountain View, CA, October 2013.
Invited Speaker, Temporal Dynamics of Learning Center Annual Meeting, University of California, San Diego, February 2014.
Invited Speaker, Reasoning Minds, Houston TX, February 2014.
Invited Speaker, *Personalized Learning Workshop*, Houston TX, April 2014.
Invited Speaker, Temporal Dynamics of Learning Center Annual Meeting, University of California, San DIego, February 2015.
Invited Speaker, Machine Learning Group, Department of Computer Science, University of Toronto, June 2015.
Invited Speaker, *NIPS Workshop on Reasoning, Attention, and Memory.* Montreal, December 2015.
Invited Speaker, ICML Workshop on *Machine Learning for Digital Education and Assessment Systems*. New York, NY, June 2016.
Invited Speaker, *NIPS Symposium on Recurrent Neural Networks*, December 2016.
Invited Speaker, *NIPS Workshop on Machine Learning for Education*, December 2016.
Invited Speaker, *NIPS Workshop on Future of Interactive Learning Machines*, December 2016.
Invited Speaker, CogSci 200, Department of Cognitive Science, UCSD, February 2017.
Invited Speaker, Openstax Foundation, February 2017.
Invited Speaker, ECE Seminar Series, Rice University, February 2017.
Invited Speaker, Intelligent Systems Program, University of Pittsburgh, March 2017.
Cognitive Brownbag, Department of Psychology, UCSD, May 2017.
Keynote Speaker, *Learning Understanding Cognition Intelligence Data Science (LUCID) Conference*, Madison, WI, August 2017.
Invited Speaker, *Symposium on Deep Learning and Big Data, Society for Computers in Psychology*, Vancouver, BC, November 2017.
Invited Speaker, Oculus Research, Seattle WA, June 2018.
Invited Speaker, MPI-SWS Distinguished Lecture Series, Max Planck Institute, Kaiserslautern, Germany, June 2018.
Colloquium, Department of Computer Science, University of Montreal, Quebec, September 2018.

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