

# Itamar Lerner

## CURRICULUM VITAE

University of Texas at San Antonio, Department of Psychology

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## EDUCATION

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**The Hebrew University of Jerusalem, Jerusalem, IL**

Doctor of Philosophy in Brain Sciences: Computation and Information Processing, 2013

Advisors: Dr. Shlomo Bentin, Dr. Oren Shriki

Thesis: *Semantic Priming in Typical and Schizophrenics Individuals: An Attractor Network Model with Latching Dynamics*

**The Hebrew University of Jerusalem, Jerusalem, IL**

Bachelor of Science in Psychobiology, 2002

*Magna Cum Laude*

## ACADEMIC APPOINTMENTS

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Assistant Professor

January 2020 – Present

**University of Texas at San Antonio**

Department of Psychology

Research Associate

December 2016 – December 2019

**Rutgers University**

Center for Molecular and Behavioral Neuroscience

Research Director: Dr. Mark A. Gluck

Postdoctoral Fellow

February 2013 – December 2016

**Rutgers University**

Center for Molecular and Behavioral Neuroscience

Research Director: Dr. Mark A. Gluck

## RESEARCH GRANTS

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2019 – 2020

NIH/NIMH 1R21MH119020-01A1 (Lerner, Co-PI)

\$140,302

Enhancing the Efficiency of Non-REM Sleep Temporal Dynamics to Improve Insight Learning

- 2015 – 2019**            **NSF/BCS 1461009 (Lerner, Co-PI)**            **\$586,326**  
Neurocognitive Studies of Sleep and the Generalization of Emotional Learning and Threat Detection.
- 2016 – 2018**            **DoD W911NF-16-C-0018 (Lerner, Co-PI)**            **\$465,435**  
IMPACTS: Improving Memory Performance by Augmenting Consolidation with Transcranial Stimulation.
- 2012 – 2016**            **NSF/SHB:EXP 1231515 \***            **\$552,307**  
Long-Term Mobile Monitoring and Analysis of Sleep-Cognition Relationship.

\* Due to my non-faculty status at Rutgers during submission of this grant, I was not officially listed as PI or Co-PI. However, I was the effective Co-PI with respect to: (1) Co-authoring the proposal, (2) Heading the ongoing research, (3) Authorizing distribution of funds, and (4) dealing with cognizant agency program officers.

## AWARDS AND HONORS

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- 2010**                    **Robert J. Glushko & Pamela Samuelson Student Travel Grant**  
For quality of submission to the 32nd Annual Conference of the Cognitive Science Society, Portland, Oregon.
- 2010**                    **Israel Foundation Trustees (IFT)**  
Competitive grant for PhD Students.
- 2007-2010**            **Rector's Fellowship**  
For excellence in Ph.D studies, the Hebrew university of Jerusalem.

## PUBLICATIONS

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### REFEREED JOURNAL PUBLICATIONS

Praveen, P.K., Skorheim, S.W, Hubbard, R.J., Ketz, N.A., Roach, S.M., **Lerner, I.**, Jones, A.P., Bradley, R., Bryant, N.B., Hartholt, A., Mullins, T.S., Choe, J., Clark, V.P., Howard, M.D. (2020). One-Shot Tagging During Wake and Cueing During Sleep With Spatiotemporal Patterns of Transcranial Electrical Stimulation Can Boost Long-Term Metamemory of Individual Episodes in Humans. *Frontiers in Neuroscience*, 16:1416.  
doi:10.3389/fnins.2019.01416  
<https://www.frontiersin.org/articles/10.3389/fnins.2019.01416/full>

- Lerner, I., Kerbaj, T., & Gluck, M.A. (2019).** When Sleep-Dependent Gist Extraction Goes Awry: False Composite Memories are Facilitated by Slow Wave Sleep. In A.K. Goel, C.M. Seifert, & C. Freksa (Eds.), *Proceedings of the 41st Annual Conference of the Cognitive Science Society* (pp. 2119-2124). Montreal, QB: Cognitive Science Society.  
<https://mindmodeling.org/cogsci2019/papers/0370/0370.pdf>
- Lerner, I., Gluck, M.A. (2019).** Sleep and the Extraction of Hidden Regularities: A Systematic Review and the Importance of Temporal Rules. *Sleep Medicine Reviews*, 47, 39-50.  
<https://doi.org/10.1016/j.smrv.2019.05.00>
- Lerner, I., Ketz, N.A., Jones, A.P., Bryant, N.B., Robert, B., Skorheim, S.W., Hartholt, A., Rizzo, A.S., Gluck, M.A., Clark, V.P., Pilly, P.K. (2019).** Transcranial Current Stimulation During Sleep Facilitates Insight into Temporal Rules, but does not Consolidate Memories of Individual Sequential Experiences. *Scientific Reports*, 9, 1516. doi: 10.1038/s41598-018-36107-7  
<https://www.nature.com/articles/s41598-018-36107-7>
- Lerner, I., Sojitra, R., Gluck, M.A. (2018).** How age affects reinforcement learning. *Aging (Albany NY)*. 10 (12), 3630-3631.  
<https://doi.org/10.18632/aging.101649>
- Lerner, I. & Gluck, M.A. (2018).** Individual Differences in Slow-Wave-Sleep Predict Acquisition of Full Cognitive Maps. *Frontiers in Human Neuroscience* 12, 404 (as part of *Research Topic: Learning & Memory*). doi: 10.3389/fnhum.2018.00404  
<https://www.frontiersin.org/articles/10.3389/fnhum.2018.00404/full>
- Sojitra, R. \*, **Lerner, I. \***, Petok, J.R., & Gluck, M.A. (2018). Age Affects Reinforcement Learning Through Dopamine-Based Learning Imbalance and High Decision Noise – Not Through Parkinsonian Mechanisms. *Neurobiology of Aging*. 68, 102-113.  
<https://www.sciencedirect.com/science/article/pii/S0197458018301283>
- \* *Authors contributed equally to this manuscript*
- Lerner, I., Lupkin, S.M., Sinha, N., Tsai, A., & Gluck, M.A. (2017).** Baseline Levels of Rapid-eye-Movement Sleep May Protect Against Excessive Activity in Fear-Related Neural Circuits. *Journal of Neuroscience*, 37 (46), 11233-11244.  
<http://www.jneurosci.org/content/jneuro/37/46/11233.full.pdf>  
➤ *Paper chosen for press promotion by the Society for Neuroscience and featured in Time, the Atlantic, Huffington Post, CTV and others. See Selected Media Coverage.*
- Lerner, I. (2017).** Unsupervised Temporal Learning during Sleep Supports Insight. *Conference on Cognitive Computational Neuroscience (CCN) 2017*. Archived at:  
<https://www2.securecms.com/CCNeuro/docs-0/5928daeb68ed3f7a4e8a2571.pdf>
- Lerner, I., Lupkin, S.M., Corter, J.E., Peters, S.E., Cannella, L., & Gluck, M.A. (2016).** The influence of sleep on emotional and cognitive processing is primarily trait- (but not state-) dependent. *Neurobiology of Learning and Memory*. 134, 275-286.

<http://www.sciencedirect.com/science/article/pii/S1074742716301320>

**Lerner, I.,** Armstrong, B.C., & Frost, R. (2014). What can we learn from learning models about sensitivity to letter-order in visual word recognition? *Journal of Memory and Language*, 77, 4-58.

<http://www.sciencedirect.com/science/article/pii/S0749596X14001041>

**Lerner, I.,** Bentin, S., & Shriki, O. (2014). Integrating the Automatic and the Controlled: Strategies in Semantic Priming in an Attractor Network with Latching Dynamics. *Cognitive Science*, 38(8), 1562-1603.

<http://onlinelibrary.wiley.com/doi/10.1111/cogs.12133/full>

**Lerner, I.,** & Shriki, O. (2014). Internally- and externally-driven network transitions as a basis for automatic and strategic processes in semantic priming: theory and experimental validation. *Frontiers in Psychology* 5, 314. doi: 10.3389/fpsyg.2014.00314

<https://www.frontiersin.org/articles/10.3389/fpsyg.2014.00314/full>

**Lerner, I.,** Bentin, S., & Shriki, O. (2012). Spreading Activation in an Attractor Network with Latching Dynamics: Automatic Semantic Priming Revisited. *Cognitive Science*, 36 (8), 1339-1382.

<http://onlinelibrary.wiley.com/doi/10.1111/cogs.12007/abstract>

**Lerner, I.,** Bentin, S., & Shriki, O. (2012). Excessive Attractor Instability Accounts for Semantic Priming in Schizophrenia. *PLoS One*, 7 (7): e40663. doi:10.1371/journal.pone.0040663

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0040663>

**Lerner, I.,** Bentin, S., & Shriki, O. (2010). Automatic and controlled processes in semantic priming: an attractor neural network model with latching dynamics. In S. Ohlsson & R. Catrambone (Eds.) *Proceedings of the 32rd Annual Conference of the Cognitive Science Society*, (pp 1112-1117). Mahwah, NJ: Lawrence Erlbaum.

<https://escholarship.org/uc/item/6b83k8mt>

## **BOOK CHAPTERS**

**Lerner, I.** (2017). Sleep is for the brain: Contemporary computational approaches in the study of sleep and memory and a Novel ‘Temporal Scaffolding’ Hypothesis. In: A. Moustafa (Ed), *Computational Models of Brain and Behavior* (pp. 245-256). Hoboken, NJ: Wiley.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/9781119159193.ch18>

## **MANUSCRIPTS IN PREPERATION OR SUBMITTED**

**Lerner, I.,** Lupkin, S.M., Tsai, A. & Gluck, M.A. Sleep to Remember, Sleep to Forget: Opposite Effects of Rapid Eye Movement Sleep on Recall and Discrimination of Fear Memories. *Under Review*.

**Lerner, I.** & Gluck, M.A. Slow Wave Sleep Creates False Compound Memories. *In Preparation.*

## **CONFERENCE PROCEEDINGS**

### **International conferences**

#### *Oral presentations*

**Lerner, I.**, Lupkin, S.M., Sinha, N., Tsai, A., & Gluck, M.A. *Baseline levels of Rapid-Eye-Movement sleep may protect against excessive fear learning.* The 2018 International Conference on Learning and Memory, Huntington Beach, CA, April, 2018.

**Lerner I.**, Sojitra, R., Petok, J.R., & Gluck, M.A. *Reinforcement learning in healthy aging: Similar behavior to Parkinson's disease, opposite mechanisms?* The 47th Annual Meeting of the Society for Neuroscience (SfN), Washington, DC, November 2017.

**Lerner I.**, Armstrong B., Frost R. *Letter-Position Sensitivity is Modulated by the Linguistic Environment: Evidence From an Elementary Learning Model.* The 54th Annual meeting of the Psychonomic Society, Toronto, Ontario, Canada, November 2013.

**Lerner I.**, Bentin S., Shriki O. *Automatic and controlled processes in semantic priming: an attractor neural network model with latching dynamics.* The 32nd Annual Conference of the Cognitive Science Society. Portland, USA, August, 2010.

#### *Poster presentations*

**Lerner I.**, Gluck, M.A. *When Sleep-Dependent Gist Extraction Goes Awry: False Composite Memories are Facilitated by Slow Wave Sleep.* The 41st Annual Conference of the Cognitive Science Society. Montreal, Canada, July, 2019.

**Lerner I.** *Unsupervised Temporal Learning During Sleep Supports Insight.* Cognitive Computational Neuroscience (CCN) 2017. New-York, NY, September 2017.

Lupkin, S.M., **Lerner, I.**, Sinha, N., Tsai, A., & Gluck, A.M. *Trait-like variations in rapid-eye-movement sleep modulate hippocampus-amygdala connectivity during fear conditioning.* The 2016 Annual Meeting of the Pavlovian Society, Jersey City, NJ, October 2016.

Sojitra, R., Petok, J.R., Gluck, M.A., & **Lerner, I.** *Reinforcement learning model reveals adult age group differences in cognitive strategies for probabilistic categorization.* The 15<sup>th</sup> Neural Computation and Psychology Workshop, Philadelphia, PA, August 2016.

Lupkin, S.M., **Lerner, I.**, Tsai A., Gluck M.A. *Sleep Facilitates Rule Learning through "Temporal Scaffolding."* The 2016 Annual Meeting of the Cognitive Neuroscience Society (CNS), New York, NY, April 2016.

**Lerner, I.**, Peters, S.E., Lupkin S.M., Cannella, L., Gluck, M.A. *Trait-like individuals differences in sleep affect cognitive and emotional processing*. The 29<sup>th</sup> Annual Meeting of the Associated Professional Sleep Societies (APSS), Seattle, WA, June 2015.

**Lerner, I.**, Lupkin S.M., Peters, S.E., Cannella, L., Gluck, M.A. *Consumer-based mobile sleep monitoring devices reveal trait-like effects of sleep on the evaluation of facial expressions in a multiple-night study*. The 2015 Annual Convention of the Association for Psychological Science (APS), New York, NY, May 2015.

**Lerner, I.**, & Gluck, M.A. *A neurocomputational model of how memory replay during slow-wave sleep inspires insight*. The 44th Annual Meeting of the Society for Neuroscience (SfN), Washington, DC, November 2014.

Cannella, L., **Lerner, I.**, Ohloma, D., & Gluck, M.A. *Sleep Inspires Temporal Insight but not Categorical Insight*. The 44th Annual Meeting of the Society for Neuroscience (SfN), Washington, DC, November 2014.

**Lerner, I.**, & Gluck, M.A. (2014). *Sleep facilitates memory by providing 'temporal scaffolding' of experience: A network model*. The 28<sup>th</sup> Annual Meeting of the Associated Professional Sleep Societies (APSS), Minneapolis, MN, June 2014.

### **Other presentations**

**Lerner I.**, Sojitra, R., Petok, J.R., & Gluck, M.A. *Reinforcement learning in healthy aging: Similar behavior to Parkinson's disease, opposite mechanisms?* Oral Presentation at the Neuroscience Mini-Symposium at the Center for Molecular and Behavioral Neuroscience, Rutgers University. Newark, NJ, November 2017.

**Lerner I.** *Semantic priming in Schizophrenia: An attractor network model with attractor instability*. Oral Presentation at the Annual meeting of the Interdisciplinary Center for Neural Computation. Ein-Gedi, Israel, January 2011.

**Lerner I.** *Automatic and Controlled Processes in Semantic Priming: An Attractor Neural Network Model*. Oral Presentation at the weekly colloquium of the Psychology department at the Hebrew University. Jerusalem, Israel, December 2009.

**Lerner I.**, Bentin S., Shriki O. *Aberrant Semantic Priming in Schizophrenia: A network model with accelerated latching dynamics*. Poster presented at the Annual meeting of the Interdisciplinary Center for Neural Computation. Ein-Gedi, Israel, January 2009.

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## **INVITED LECTURES**

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*Effects of sleep on insight learning is explained by a 'temporal scaffolding' mechanism based on compressed memory-replay*. Park City Conference on the Neurobiology of Learning and Memory, Park City, UT, January 2017.

*Novel Approaches to Study Long-Term Sleep Effects and Sleep-Dependent Insight Learning.*  
DARPA Sleep Workshop, Arlington, VA, April 2015.

## **TEACHING EXPERIENCE**

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### **COURSES TAUGHT**

**University of Texas at San Antonio, San-antonio, TX**

*Lecturer*, “Cognitive Psychology” undergraduate course. January 2020 – present.

**Center for Molecular and Behavioral Neuroscience, Rutgers University, Newark ,NJ**

*Lecturer*, “Foundations in Neuroscience” graduate course, April 2018.

**Center for Molecular and Behavioral Neuroscience, Rutgers University, Newark ,NJ**

*Guest Lecturer*. “Critical Thinking” graduate course, March 2016.

**Center for Molecular and Behavioral Neuroscience, Rutgers University, Newark ,NJ**

*Lecturer*. “Learning and Memory” graduate course, May 2013.

**Center for Brain Sciences (ELSC), The Hebrew University of Jerusalem, Jerusalem, IL**

*Lecturer*, “Cognitive Psychology” graduate course. October 2009 – June 2012.

**Center for Brain Sciences (ELSC), The Hebrew University of Jerusalem, Jerusalem, IL**

*Teaching Assistant*. “Computation and Cognition” undergraduate course. October 2005 – September 2009.

**Department of Cognitive Sciences, The Hebrew University of Jerusalem, Jerusalem, IL**

*Lecturer*, “Introduction to Matlab” undergraduate course. November 2005.

**Center for Brain Sciences (ELSC), The Hebrew University of Jerusalem, Jerusalem, IL**

*Teaching Assistant*, “Theory of Neural Networks 2” graduate course. October 2004 - June 2006.

### **MENTORING**

#### *Undergraduate*

Saharsh Patel (2019)

Kerbaj Tony (2016 – 2019)

Alan Tsai (2015 – 2019)

Donald Ohioma (2013 –2014)

#### *Graduate and Post-Baccalaureate*

Anosha Khawaja (2017-2018)

Shira Lupkin (2014 –2017)

Lee Anne Cannella (2013 – 2014).

*Thesis: Individual trait-like differences in long-term sleep patterns modulate emotional and cognitive processing*

## SELECTED MEDIA COVERAGE

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**CTV.** A Better Sleep Can Tame Your Fears. *Live TV interview.*  
<http://www.ctvnews.ca/video?playlistId=1.3646566>

**Time.** Why Dreaming May Be Important for Your Health.  
<http://time.com/4970767/rem-sleep-dreams-health/>

**The Atlantic.** Better Sleep Can Build Emotional Resilience.  
<https://www.theatlantic.com/health/archive/2017/10/rem-and-trauma/543573/>

**Newsweek.** Getting a Full Night's Rest Means You're Probably More Resilient Than Everyone Else.  
<http://www.newsweek.com/getting-full-nights-rest-means-youre-probably-more-resilient-everyone-else-690701>.

**Huffington Post.** The Sleep Phase Where You Dream May Make You Less Prone to Fear.  
[https://www.huffingtonpost.com/entry/rem-sleep-fear\\_us\\_59f749fce4b077d8dfcb3ea1](https://www.huffingtonpost.com/entry/rem-sleep-fear_us_59f749fce4b077d8dfcb3ea1)

**Daily Mail.** Poor Sleep Makes You Fearful – and Can Increase a Soldier's risk of PTSD.  
<http://www.dailymail.co.uk/health/article-5009483/Poor-sleep-makes-FEARFUL-increase-risk-PTSD.html>

**The Naked Scientists.** Sleep Reduces Fear Learning Activity in the Brain. *Podcast Interview.*  
<https://www.thenakedscientists.com/articles/science-news/sleep-reduces-fear-learning-activity-brain>

## ADDITIONAL PROFESSIONAL EXPERIENCE

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### Research-Related

**ConicIT Ltd:** Petah-Tikva, IL.  
*Research Consultant.* 2011- 2012.

**Advanced Course in Computational Neuroscience (ACCN),** Freiburg, Germany  
 Summer-school for graduate students, August, 2008.

**Department of Psychiatry, Columbia University,** New York, NY (work done mostly from Israel).  
*Research assistant (under Dr. Bruce Dohrenwend).* January 2003 - August 2004.

**The Institute of Life Sciences, The Hebrew University of Jerusalem,** Jerusalem, IL  
*Research assistant (under Dr. Ariel Darvasi).* March 2002 - January 2003.



**Department of Psychology**, The Hebrew University of Jerusalem, Jerusalem, IL  
*Research assistant* (under Dr. *Yehuda Shavit*). October 2001 - July 2002.

**Falk Institute for Mental Health and Behavioral Studies**, Jerusalem, IL.  
*Research assistant*, 2001 -2002.

### **Military Service**

**Nuclear Research Center - Negev**: 1997-1999.

**Preparation course in nuclear physics and radiation**: 1996.

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## **MEMBERSHIP IN PROFESSIONAL SOCIETIES**

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**Society for Neuroscience**

**The Cognitive Science Society**

**Sleep Research Society**

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## **AD HOC REVIEWER**

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**Cognitive Neurodynamics**

**Journal of Cognitive Psychology**

**Journal of Computational Neuroscience**

**Frontiers in Human Neuroscience**

**Memory and Cognition**

**Neurobiology of Learning and Memory**

**PLoS One**

**Scientific Studies of Reading**

**Sleep**

**The 33rd Annual Conference of the Cognitive Science Society (CogSci 2011)**