

Marcelo G. Mattar

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Employment

Princeton University

POSTDOCTORAL RESEARCH ASSOCIATE

- Department: Princeton Neuroscience Institute
- Advisor: Nathaniel Daw

Princeton, NJ, USA

Sep. 2016 - Present

Education

University of Pennsylvania

PH.D. PSYCHOLOGY

- Advisors: Danielle S Bassett, Geoffrey K Aguirre, Sharon L Thompson-Schill
- Dissertation: *Visual adaptation as it varies across timescales, neural populations, and individuals*

Philadelphia, PA, USA

Sep. 2011 - Aug. 2016

University of Pennsylvania

M.A. STATISTICS

- Thesis: *Nonparametric approaches for statistical inference in multislice network models*

Philadelphia, PA, USA

Sep. 2013 - Aug. 2016

University of Pennsylvania

M.A. PSYCHOLOGY

- Rotation advisors: Michael K Kahana, Geoffrey K Aguirre, Russell A Epstein

Philadelphia, PA, USA

Sep. 2010 - Aug. 2011

Aeronautics Institute of Technology

B.A. ELECTRONICS ENGINEERING

Sao Jose dos Campos, SP, Brazil

Jan. 2004 - Dec. 2009

Additional training

Marine Biological Laboratory

METHODS IN COMPUTATIONAL NEUROSCIENCE

University of California, Santa Barbara

SUMMER INSTITUTE IN COGNITIVE NEUROSCIENCE

University of Jena

REPETITION SUPPRESSION SUMMER SCHOOL

University of Pennsylvania

COMPUTATIONAL NEUROSCIENCE SUMMER SCHOOL

Massachusetts Institute of Technology

VISITING STUDENT - BRAIN AND COGNITIVE SCIENCES

Woods Hole, MA, USA

Summer 2016

Santa Barbara, CA, USA

Summer 2015

Jena, Germany

Summer 2014

Philadelphia, PA, USA

Summer 2009

Cambridge, MA, USA

Fall 2009

Awards & Achievements

2018	Travel grant , Cosyne 2018	Denver, CO, USA
2015	Fellowship , Summer Institute in Cognitive Neuroscience	Santa Barbara, CA, USA
2014	Best poster award , Repetition Suppression Summer School	Jena, Germany
2014	Scholarship , Repetition Suppression Summer School	Jena, Germany
2011	Scholarship , The Brain Fund	Sao Paulo, SP, Brazil
2010	Fellowship , Fundacao Estudar	Sao Paulo, SP, Brazil
2010	Fellowship , Benjamin Franklin	Philadelphia, PA, USA
2008	Scholarship , Computational Neuroscience Summer School	Philadelphia, PA, USA

Peer-review contribution

GUEST EDITOR

- PLoS Computational Biology

AD HOC REVIEWER

- Neuroimage
- PLoS Computational Biology
- Cerebral Cortex
- Nature Scientific Reports
- Neuropsychologia
- Human Brain Mapping
- Biomedical Signal Processing Control

Invited talks

Jul 25, 2018	Cognitive Science Society (CogSci 2018)	Madison, WI, USA
Jan 25, 2018	University College London	London, UK
Jun 2, 2017	Manhattan Area Memory Meeting (MAMM)	New York, NJ, USA
May 16, 2017	Princeton Neuroscience Institute Retreat	Avalon, NJ, USA
Mar 24, 2017	International Convention of Psychological Science	Vienna, Austria
Mar 11, 2016	Princeton University	Princeton, NJ, USA
Feb 29, 2016	Max Planck UCL Centre	London, UK
Feb 17, 2016	Harvard University	Cambridge, MA, USA

Publications

SUBMITTED MANUSCRIPTS

- [1] ***Mattar, Marcelo G**, *Olkkonen, Maria, Epstein, Russell A, and Aguirre, Geoffrey K. Adaptation decorrelates shape representations. *bioRxiv*, page 249045, 2018.
- [2] **Mattar, Marcelo G** and Daw, Nathaniel D. Prioritized memory access explains planning and hippocampal replay. *bioRxiv*, page 225664, 2018.
- [3] **Mattar, Marcelo G**, Carter, Marie V, Zebrowitz, Marc S, Thompson-Schill, Sharon, and Aguirre, Geoffrey K. Individual differences in response precision correlate with adaptation bias. *bioRxiv*, page 285973, 2018.
- [4] Tang, Evelyn, **Mattar, Marcelo G**, Giusti, Chad, Thompson-Schill, Sharon L, and Bassett, Danielle S. Effective learning is accompanied by increasingly efficient dimensionality of whole-brain responses. *arXiv preprint arXiv:1709.10045*, 2017.

PUBLISHED MANUSCRIPTS

- [1] Reddy, Pranav G, **Mattar, Marcelo G**, Murphy, Andrew C, Wymbs, Nicholas F, Grafton, Scott T, Satterthwaite, Theodore D, and Bassett, Danielle S. Brain state flexibility accompanies motor-skill acquisition. *NeuroImage*, 171:135–147, 2018.
- [2] **Mattar, Marcelo G**, Wymbs, Nicholas F, Bock, Andrew S, Aguirre, Geoffrey K, Grafton, Scott T, and Bassett, Danielle S. Predicting future learning from baseline network architecture. *NeuroImage*, 172:107–117, 2018.
- [3] **Mattar, Marcelo G**, Thompson-Schill, Sharon L, and Bassett, Danielle S. The network architecture of value learning. *Network Neuroscience*, (Just Accepted):1–27, 2018.
- [4] Khambhati, Ankit N, **Mattar, Marcelo G**, Wymbs, Nicholas F, Grafton, Scott T, and Bassett, Danielle S. Beyond modularity: Fine-scale mechanisms and rules for brain network reconfiguration. *NeuroImage*, 166:385–399, 2018.
- [5] Kahn, Ari E, **Mattar, Marcelo G**, Vettel, Jean M, Wymbs, Nicholas F, Grafton, Scott T, and Bassett, Danielle S. Structural pathways supporting swift acquisition of new visuomotor skills. *Cerebral cortex*, 27(1):173–184, 2017.
- [6] Gu, Shi, Betzel, Richard F, **Mattar, Marcelo G**, Cieslak, Matthew, Delio, Philip R, Grafton, Scott T, Pasqualetti, Fabio, and Bassett, Danielle S. Optimal trajectories of brain state transitions. *Neuroimage*, 148:305–317, 2017.
- [7] Bassett, Danielle S and **Mattar, Marcelo G**. A network neuroscience of human learning: potential to inform quantitative theories of brain and behavior. *Trends in cognitive sciences*, 21(4):250–264, 2017.
- [8] Ashourvan, Arian, Gu, Shi, **Mattar, Marcelo G**, Vettel, Jean M, and Bassett, Danielle S. The energy landscape underpinning module dynamics in the human brain connectome. *Neuroimage*, 157:364–380, 2017.
- [9] ***Mattar, Marcelo G**, *Kahn, David A, Thompson-Schill, Sharon L, and Aguirre, Geoffrey K. Varying timescales of stimulus integration unite neural adaptation and prototype formation. *Current Biology*, 26(13):1669–1676, 2016.
- [10] ***Mattar, Marcelo G**, *Betzel, Richard F, and Bassett, Danielle S. The flexible brain. *Brain*, 139(8):2110–2112, 2016.

- [11] Kahn, Ari E, **Mattar, Marcelo G**, Vettel, Jean M, Wymbs, Nicholas F, Grafton, Scott T, and Bassett, Danielle S. Structural pathways supporting swift acquisition of new visuomotor skills. *Cerebral cortex*, 2016.
- [12] Chai, Lucy R, **Mattar, Marcelo G**, Blank, Idan Asher, Fedorenko, Evelina, and Bassett, Danielle S. Functional network dynamics of the language system. *Cerebral Cortex*, 26(11):4148–4159, 2016.
- [13] *Pegors, Teresa K, ***Mattar, Marcelo G**, Bryan, Peter B, and Epstein, Russell A. Simultaneous perceptual and response biases on sequential face attractiveness judgments. *Journal of Experimental Psychology: General*, 144(3):664–673, 2015.
- [14] **Mattar, Marcelo G**, Cole, Michael W., Thompson-Schill, Sharon L., and Bassett, Danielle S. A functional cartography of cognitive systems. *PLoS Comput Biol*, 11(12):e1004533, 12 2015.
- [15] Wyble, Brad, Potter, Mary C, and **Mattar, Marcelo G**. Rsvp in orbit: Identification of single and dual targets in motion. *Attention, Perception, & Psychophysics*, 74(3):553–562, 2012.
- [16] Aguirre, Geoffrey Karl, **Mattar, Marcelo G**, and Magis-Weinberg, Lucía. de bruijn cycles for neural decoding. *NeuroImage*, 56(3):1293–1300, 2011.

BOOK CHAPTERS

- [1] **Mattar, Marcelo G** and Bassett, Danielle S. Brain network architecture: Implications for human learning. 2016.
- [2] Yaden, David B, Anderson, Derek E, **Mattar, Marcelo G**, and Newberg, Andrew B. Psychoactive substances & psychoactive stimulation: Conceptual and ethical considerations. In Ellens, J H and Roberts, T J, Editors, *A Psychedelic Policy Quagmire: Health, Law, Freedom, and Society*. Praeger, 2014.

Conferences

CONFERENCE ABSTRACTS

- [1] Tang, Evelyn, **Mattar, Marcelo G**, Giusti, Chad, Thompson-Schill, Sharon L, and Bassett, Danielle S. Effective learning is accompanied by high dimensional efficient representations of neural activity, 2018. Poster presented at Computational and Systems Neuroscience (Cosyne), March 01-04, 2018, Denver, CO, USA.
- [2] **Mattar, Marcelo G** and Daw, Nathaniel D. Prioritized memory access explains planning and hippocampal replay, 2018. Poster presented at Computational and Systems Neuroscience (Cosyne), March 01-04, 2018, Denver, CO, USA.
- [3] **Mattar, Marcelo G** and Daw, Nathaniel D. A rational model of prioritized experience replay, 2017. Poster presented at The 3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM), June 11-14, 2017, Ann Arbor, MI, USA.
- [4] Khambhati, Ankit N, **Mattar, Marcelo G**, and Bassett, Danielle S. Non-negative matrix factorization uncover topological modes of dynamic brain networks, 2017. Poster presented at Organization for Human Brain Mapping (OHBM), June 25-29, 2017, Vancouver, BC, Canada.
- [5] Bock, Andrew S, Benson, Noah C, **Mattar, Marcelo G**, and K, Aguirre Geoffrey. Template fitting to automatically derive v1-v3 retinotopy from inter-areal functional correlations, 2016. Poster presented at the Vision Sciences Society (VSS), May 14-19, 2016, St Petersburg, FL, USA.
- [6] Olkkonen, Maria, **Mattar, Marcelo G**, Aguirre, Geoffrey, and Epstein, Russell. Adaptation sharpens object representations: Evidence from shape discrimination thresholds., 2015.
- [7] **Mattar, Marcelo G**, Wymbs, Nicholas F, Bock, Andrew S, K, Aguirre Geoffrey, Grafton, Scott T, and Bassett, Danielle S. Predicting future learning from baseline network architecture, 2015. Poster presented at Society for Neuroscience (SfN), Oct 17-21, 2015, Chicago, IL, USA.
- [8] **Mattar, Marcelo G**, Olkkonen, Maria, Aguirre, Geoffrey, and Epstein, Russell. Adaptation decorrelates object representations: Evidence from multivoxel pattern analysis., 2015.
- [9] Chai, Lucy R, **Mattar, Marcelo G**, Blank, Idan A, Fedorenko, Evelina, and Bassett, Danielle S. Functional network dynamics of the language system. Poster presented at Biomedical Engineering Society Annual Meeting (BMES), Oct 7-10, 2015, Tampa, FL, USA, 2015.
- [10] Chai, Lucy R, **Mattar, Marcelo G**, Blank, Idan A, Fedorenko, Evelina, and Bassett, Danielle S. Functional network dynamics of the language system. Poster presented at Society for Neuroscience (SfN), Oct 17-21, 2015, Chicago, IL, USA, 2015.
- [11] Aguirre, Geoffrey, **Mattar, Marcelo G**, Carter, Marie, and Thompson-Schill, Sharon. Individual differences in representation precision predict adaptation bias., 2015.
- [12] Pegors, Teresa, Bryan, Peter, **Mattar, Marcelo G**, and Epstein, Russell. Decoupling perceptual and response biases in a sequential face judgment task. *Journal of Vision*, 14(10):1257–1257, 2014.
- [13] ***Mattar, Marcelo G**, *Kahn, David A, and Aguirre, Geoffrey K. A single mechanism of temporal integration unites neural adaptation and norm-based coding. *Journal of Vision*, 14(10):120–120, 2014.
- [14] **Mattar, Marcelo G**, Cole, Michael W, Thompson-Schill, Sharon L, and Bassett, Danielle S. A functional cartography of cognitive systems, 2014. Poster presented at Society for Neuroscience (SfN), Nov 15-19, 2014, Washington, DC, USA.
- [15] Baker, David, Gu, Shi, Khambha, Ankit, **Mattar, Marcelo G**, Muldoon, Sarah Feldt, Telesford, Qawi, Yang, Muzhi, and Bassett, Danielle S. The network community architecture toolbox (ncat), 2014. Poster presented at Society for Neuroscience (SfN), Nov 15-19, 2014, Washington, DC, USA.

- [16] **Mattar, Marcelo G**, Magis-Weinberg, Lucía, and Aguirre, Geoffrey K. De bruijn cycles for neural decoding. *Journal of Vision*, 11(11):848–848, 2011.