

Marcelo G. Mattar

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Employment

Princeton University

Princeton, NJ, USA

POSTDOCTORAL RESEARCH ASSOCIATE

Sep. 2016 - Present

- Department: Princeton Neuroscience Institute
- Advisors: Nathaniel Daw and Máté Lengyel

Education

University of Pennsylvania

Philadelphia, PA, USA

PH.D. PSYCHOLOGY

Sep. 2010 - Aug. 2016

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

University of Pennsylvania

Philadelphia, PA, USA

M.A. STATISTICS

Sep. 2010 - Aug. 2016

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

University of Pennsylvania

Philadelphia, PA, USA

M.A. PSYCHOLOGY

Sep. 2010 - Aug. 2011

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

Aeronautics Institute of Technology

Sao Jose dos Campos, SP, Brazil

B.A. ELECTRONICS ENGINEERING

Jan. 2004 - Dec. 2009

Additional training

Marine Biological Laboratory

Woods Hole, MA, USA

METHODS IN COMPUTATIONAL NEUROSCIENCE

Summer 2016

University of California, Santa Barbara

Santa Barbara, CA, USA

SUMMER INSTITUTE IN COGNITIVE NEUROSCIENCE

Summer 2015

University of Jena

Jena, Germany

REPETITION SUPPRESSION SUMMER SCHOOL

Summer 2014

University of Pennsylvania

Philadelphia, PA, USA

COMPUTATIONAL NEUROSCIENCE SUMMER SCHOOL

Summer 2009

Massachusetts Institute of Technology

Cambridge, MA, USA

VISITING STUDENT - BRAIN AND COGNITIVE SCIENCES

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

- Neuroimage
- PLoS Computational Biology

- Cerebral Cortex
- Nature Scientific Reports
- Human Brain Mapping
- Biomedical Signal Processing Control

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.

Invited talks

Jun 2, 2017	Manhattan Area Memory Meeting (MAMM)	Avalon, NJ, USA
May 16, 2017	Princeton Neuroscience Institute Retreat	New York, 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

Conferences

CONFERENCE ABSTRACTS

- [1] **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.
- [2] 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.
- [3] 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.
- [4] Olkkonen, Maria, **Mattar, Marcelo G**, Aguirre, Geoffrey, and Epstein, Russell. Adaptation sharpens object representations: Evidence from shape discrimination thresholds., 2015.
- [5] **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.
- [6] **Mattar, Marcelo G**, Olkkonen, Maria, Aguirre, Geoffrey, and Epstein, Russell. Adaptation decorrelates object representations: Evidence from multivoxel pattern analysis., 2015.
- [7] 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.
- [8] 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.
- [9] Aguirre, Geoffrey, **Mattar, Marcelo G**, Carter, Marie, and Thompson-Schill, Sharon. Individual differences in representation precision predict adaptation bias., 2015.
- [10] 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.
- [11] ***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.
- [12] **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.
- [13] 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.
- [14] **Mattar, Marcelo G**, Magis-Weinberg, Lucía, and Aguirre, Geoffrey K. De bruijn cycles for neural decoding. *Journal of Vision*, 11(11):848–848, 2011.