

CURRICULUM VITAE - LUCA MAZZUCATO, Ph.D.

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Institute of Neuroscience
University of Oregon,
Eugene, OR 97403

CITIZENSHIP : Italian, US permanent resident.
LANGUAGES : English (fluent), Italian (native), Hebrew (basic).

RESEARCH INTERESTS My goal is to model the emergence of sensory perception and behavior from the coordinated activity of large neural populations. In particular, I aim at elucidating how perception and behavior are shaped by expectations and learning, combining statistical analysis of neurophysiological data from populations of neurons in behaving animals with theoretical models based on spiking neural networks endowed with synaptic plasticity.

PREVIOUS ACADEMIC POSITIONS

2017-2018	<i>Associate Research Scientist</i> Center for Theoretical Neuroscience, Zuckerman Mind Brain Behavior Institute, Columbia University
2013-2017	<i>Research Assistant Professor</i> Department of Neurobiology and Behavior, Stony Brook University
2008-2011	<i>Research Assistant Professor</i> Simons Center for Geometry and Physics, Stony Brook
2009	<i>Visiting Scientist</i> Kavli Institute for Theoretical Physics, University of California, Santa Barbara.
2006	<i>Visiting Researcher</i> Racah Institute for Physics, Hebrew University, Jerusalem.

TRAINING POSITIONS

2012	<i>Senior Postdoctoral Associate</i> Department of Neurobiology and Behavior, Stony Brook University
2005-2008	<i>Postdoctoral Associate</i> School of Physics and Astronomy, Tel Aviv University.
2002	<i>Research Assistant</i> High Energy Theory Group, Padua University.

GRANTS

2014-2019	Mentored Quantitative Research Career Development Award (K25) - NIDCD (Principal Investigator - total direct costs: \$665.000).
2013-2014	Swartz Fellow in Theoretical Neurobiology - The Swartz Foundation (\$55.000).
2006	Marie Curie Research Training Network (€57.000).

AWARDS

2015	CoSyNe Travel Award.
2013	Science playwriting competition, Stony Brook University.
2011	Howard Hughes Medical Institute Teaching Award.

EDUCATION	2016	<i>Communicating science</i> JR503, Alan Alda Center, Stony Brook.
	2012	<i>Biophysics and computation in neurons and networks</i> Summer course, Princeton University.
	2011	<i>Statistical analysis of neural data</i> STAT8285, Columbia University.
	2004,'06,'07	<i>Prospects in theoretical physics</i> Summer course, Institute for Advanced Study, Princeton.
	2002-2005	Ph.D., <i>Elementary particle theory</i> International School for Advanced Studies (SISSA/ISAS), Trieste. Advisor: Adam Schwimmer (Weizmann Institute, Rehovot)
	1997-2001	Laurea degree in theoretical physics (equiv. to M.Sci.) Padua University. Advisors: Mario Tonin and Marco Matone
TEACHING	2011	<i>Instructor</i> , Stony Brook University Physics 687 class - Computational Neuroscience (graduate level).
	2009	<i>Instructor</i> , Stony Brook University Maths 125 class - Calculus I (undergraduate level).
PROFESSIONAL MEMBERSHIPS	2015-2015-2012-	American Physical Society. Association for Chemical Senses. Society for Neuroscience.
CONFERENCES ORGANIZED	2011 2010	<i>Simons workshop on higher spins and holography</i> (co-organizer) <i>Simons workshop on superstrings on Ramond-Ramond backgrounds</i> (co-organizer)
OTHER ACTIVITIES	2010-2012 2010-2012 2009-2011 2008-2010 2005-2008	<i>Simons Center Neuroscience Program</i> (creator and co-organizer) <i>Simons Center Outreach Program</i> (creator and organizer) <i>Simons Manhattan Seminars</i> (co-organizer) <i>Simons Center Geometry and Physics weekly meetings</i> (organizer) <i>Theoretical physics journal club, Tel Aviv University</i> (organizer)
SERVICE	Peer-review:	<i>CoSyNe abstracts reviewer, Journal of Computational Neuroscience, Proceedings of the Royal Society B, Physical Review Letters, Physical Review E, Physical Review Applied, Journal of High Energy Physics, Nuclear Physics B, Physical Review D, Physics Letters B, Letters in Mathematical Physics, Frontiers in mathematical physics.</i>

PUBLICATIONS ([18-22]: *=co-first author; [1-17]: authors in alphabetical order)

- [23] – J. B. Priestley*, M. Ahmed*, A. Castro, F. Stefanini, E. Balough, E. Lavoie, **L. Mazzucato**, S. Fusi, A. Losonczy, Changes in Effective Hippocampal Network Coupling Mediate Learning and Memory of Associations Between Temporally Discontiguous Stimuli. *Biological Psychiatry* 83 (9), S115. doi:10.1016/j.biopsych.2018.02.304.
- [22] – **L. Mazzucato**, G. La Camera, A. Fontanini Expectation-induced modulation of metastable activity underlies faster coding of sensory stimuli, *submitted*. [biorxiv - doi:10.1101/199380]
- [21] – L. Le Donne, **L. Mazzucato**, R. Urbanczik, W. Senn, G. La Camera, Spike-based reinforcement learning for temporal stimulus segmentation and decision making, *CWS Workshop, NIPS 2016*.
- [20] – **L. Mazzucato**, A. Fontanini, G. La Camera, Stimuli reduce the dimensionality of cortical activity, *Front. in Syst. Neuro.* 2016; 10:11. doi:0.3389/fnsys.2016.00011.
- [19] – **L. Mazzucato**, A. Fontanini, G. La Camera, Dynamics of multistable states during ongoing and evoked cortical activity, *J Neurosci.* 2015 Nov 27;33(48):18966-78. doi:10.1523/JNEUROSCI.4819-14.2015.
- [18] – A. Jezzini*, **L. Mazzucato***, G. La Camera, A. Fontanini, Processing of hedonic and chemosensory features of taste in medial prefrontal and insular networks, *J Neurosci.* 2013 Nov 27;33(48):18966-78. doi:10.1523/JNEUROSCI.2974-13.2013.
- [17] – **L. Mazzucato**, Superstrings in AdS, *Phys. Rept.* 521 (2012) 1-68. doi: 10.1016/j.physrep.2012.08.001.
- [16] – **L. Mazzucato** and B. C. Vallilo, The Konishi multiplet at strong coupling, *J High Energy Phys.* 1012 (2011) 029. doi: 10.1007/JHEP12(2011)029.
- [15] – M. R. Douglas, **L. Mazzucato** and S. Razamat, Holographic dual of free field theory, *Phys. Rev. D* 83 (2011) 071701. doi: 10.1103/PhysRevD.83.071701.
- [14] – N. Berkovits and **L. Mazzucato**, Taming the b -antighost with Ramond- Ramond flux, *J High Energy Phys.* 1011 (2010) 019. doi: 10.1007/JHEP11(2010)019.
- [13] – B. Keren-Zur, **L. Mazzucato** and Y. Oz, Dark matter and pseudo-flat directions in weakly coupled SUSY breaking sectors, *J High Energy Phys.* 0909 (2009) 041. doi: 10.1088/1126-6708/2009/09/041.
- [12] – **L. Mazzucato** and B. C. Vallilo, On the non-renormalization of the AdS radius, *J High Energy Phys.* 0909 (2009) 056. doi: 10.1088/1126-6708/2009/09/056.
- [11] – **L. Mazzucato**, Y. Oz and S. Theisen, Non-relativistic branes, *J High Energy Phys.* 0904 (2009) 073. doi: 10.1088/1126-6708/2009/04/073.
- [10] – B. Keren-Zur, **L. Mazzucato** and Y. Oz, Direct mediation and a visible metastable supersymmetry breaking sector, *J High Energy Phys.* 0810 (2008) 099. doi: 10.1088/1126-6708/2008/10/099.
- [9] – **L. Mazzucato**, Y. Oz and S. Yankielowicz, Supersymmetry breaking vacua from M-theory fivebranes, *J High Energy Phys.* 0711 (2007) 094. doi: 10.1088/1126-6708/2007/11/094.
- [8] – I. Adam, A. Dekel, **L. Mazzucato** and Y. Oz, Integrability of type II superstrings on Ramond-Ramond backgrounds in various dimensions, *J High Energy Phys.* 0706 (2007) 085. doi: 10.1088/1126-6708/2007/06/085.

- [7] – I. Adam, P.A. Grassi, **L. Mazzucato**, Y. Oz and S. Yankielowicz, Non-critical pure spinor superstrings, *J High Energy Phys.* 0703 (2007) 091. doi: 10.1088/1126-6708/2007/03/091.
- [6] – **L. Mazzucato**, Remarks on the analytic structure of supersymmetric effective actions, *J High Energy Phys.* 0512 (2005) 026. doi: 10.1088/1126-6708/2005/12/026.
- [5] – **L. Mazzucato**, Chiral rings, anomalies and electric-magnetic duality, *J High Energy Phys.* 0411, 020 (2004). doi: 10.1088/1126-6708/2004/11/020.
- [4] – G. Bertoldi, S. Bolognesi, M. Matone, **L. Mazzucato** and Y. Nakayama, The Liouville geometry of $N = 2$ instantons and the moduli of punctured spheres, *J High Energy Phys.* 0405, 075 (2004). doi: 10.1088/1126-6708/2004/05/075.
- [3] – M. Matone and **L. Mazzucato**, On the chiral ring of $N=1$ supersymmetric gauge theories, *J High Energy Phys.* 0310, 011 (2003). doi: 10.1088/1126-6708/2003/10/011.
- [2] – M. Matone and **L. Mazzucato**, Branched matrix models and the scales of supersymmetric gauge theories, *J High Energy Phys.* 0307, 015 (2003). doi: 10.1088/1126-6708/2003/07/015.
- [1] – M. Matone, **L. Mazzucato**, I. Oda, D. Sorokin and M. Tonin, The superembedding origin of the Berkovits pure spinor covariant quantization of superstrings, *Nucl. Phys. B* 639, 182-202 (2002). doi: 10.1016/S0550-3213(02)00562-X.

CONFERENCE **L. Mazzucato**, A. Fontanini, G. La Camera, Dynamics of ongoing and evoked neural activity in the gustatory cortex, *Chemical Senses*, Vol. 40. No. 7. Great Clarendon St, Oxford OX2 6DP, England: Oxford Univ Press, 2015.

L. Mazzucato, B. C. Vallilo, Anomalous Dimensions at Strong Coupling, *Eleventh Workshop on Non-Perturbative QCD*, Institut Astrophysique de Paris, June 6-10, 2011.

B. Keren-Zur, **L. Mazzucato**, Y. Oz, Direct mediation and a visible metastable supersymmetry breaking sector, *Particles and nuclei*. Proceedings, 18th Int. Conf., PANIC08, Eilat, Israel, November 9-14, 2008 - *Nucl.Phys.* A827 (2009) pp.1c-694c. doi: 10.1016/j.nuclphysa.2009.05.006.

- CONFERENCE ABSTRACTS
- L. Mazzucato**, A. Jezzini, A. Fontanini, G. La Camera*, G. Mongillo*, CNS, Seattle, 2018.
 - L. Mazzucato**, G. La Camera*, A. Fontanini*, Areadne, Santorini, Greece, 2018.
 - J. B. Priestley*, M. Ahmed*, A. Castro, F. Stefanini, E. Balough, E. Lavoie, **L. Mazzucato**, S. Fusi, A. Losonczy, CoSyNe, 2018, Denver.
 - L. Mazzucato**, G. La Camera, A. Fontanini, Cognitive Computational Neuroscience, 2017, New York.
 - L. Mazzucato**, G. La Camera, A. Fontanini, Neural Coding, Computation, and Dynamics, 2017, Capbreton.
 - L. Mazzucato**, G. La Camera, A. Fontanini, International Conference on Mathematical Neuroscience, 2017, Boulder.
 - L. Mazzucato**, G. La Camera, A. Fontanini, American Physical Society March Meeting, 2017, New Orleans.
 - L. Mazzucato**, G. La Camera, A. Fontanini, Sense2Synapse, 2017, The Rockefeller University, New York.
 - L. Mazzucato**, G. La Camera, A. Fontanini, CoSyNe, 2017, Salt Lake City.
 - L. Mazzucato**, A. Fontanini, G. La Camera, American Physical Society March Meeting, 2016, Baltimore.
 - L. Mazzucato**, A. Fontanini, G. La Camera, CoSyNe, 2015, Salt Lake City.
 - L. Mazzucato**, A. Fontanini, G. La Camera, ICTP School on Quant. Bio., 2014, Trieste, Italy.
 - L. Mazzucato**, A. Fontanini, G. La Camera, Soc. for Neurosci., 2014, Washington, DC.
 - L. Mazzucato**, A. Fontanini, G. La Camera, Soc. for Neurosci., 2013, San Diego.

- CONFERENCE SEMINARS
- 2018 *27th Computational Neuroscience Meeting (CNS) Workshops*, Seattle.
 - 2017 *International Conference on Mathematical Neuroscience*, Boulder.
 - 2017 *Symposium in Neuroscience*, Stony Brook University, New York.
 - 2017 *Sense2Synapse*, The Rockefeller University, New York.
 - 2017 *American Physical Society March Meeting*, New Orleans.
 - 2016 *American Physical Society March Meeting*, Baltimore.
 - 2015 *Spotlight*, Alan Alda Center for Communicating Science, Stony Brook.
 - 2014 *Winter School on Quantitative Biology*, International Center for Theoretical Physics, Trieste, Italy.
 - 2011 *11th Workshop on non-perturbative quantum chromodynamics*, Institut d'Astrophysique de Paris.
 - 2010 *Avogadro meeting on theoretical physics*, Galileo Galilei Institute, Florence, Italy.
 - 2009 *Fundamental aspects of superstring theory*, Kavli Institute for Theoretical Physics, University of California, Santa Barbara.
 - 2008 *Avogadro meeting on theoretical physics*, Trieste, Italy.
 - 2007 *Avogadro meeting on theoretical physics*, Alessandria, Italy.
 - 2006 *Pure spinors in superstring theory*, Institute for Theoretical Physics, Sao Paulo, Brazil.
 - 2006 *Avogadro meeting on theoretical physics*, Alessandria, Italy.
 - 2006 *Eurostrings 2006*, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, UK.
 - 2005 *Nonperturbative gauge dynamics workshop*, Trieste, Italy.
 - 2004 *Gauge theories, gravity and strings*, Capri, Italy.
 - 2003 *Theoretical physics conference*, Cortona, Italy.
 - 2002 *Theoretical physics conference*, Cortona, Italy.

SELECTED	2018	Computational Neuroscience Center, University of Washington, Seattle.
INVITED	2017	Biorobotics Institute, Scuola Superiore Sant'Anna, Pisa.
SEMINARS	2017	Icahn School of Medicine, Mount Sinai Hospital, New York.
	2017	Center for Computational Biology, Flatiron Institute, New York.
	2017	Université Paris Descartes, Paris.
	2017	Institute of Neuroscience, University of Oregon.
	2017	<i>NIH K-award Workshop</i> , School of Medicine, Stony Brook University.
	2016	<i>Colloquium</i> , Brookhaven National Lab.
	2015	Initiative for the Theoretical Sciences, CUNY Graduate Center.
	2015	Simons Center for Quantitative Biology, Cold Spring Harbor Lab.
	2011	Physics Department, Brown University.
	2011	Perimeter Institute, Waterloo, Canada.
	2010	SLAC National Accelerator Lab, Stanford University.
	2010	SISSA, Trieste, Italy.
	2010	Padua University, Italy.
	2009	School of Physics and Astronomy, Tel Aviv University, Israel.
	2008	Joint High Energy Theory seminar, Newe-Shalom, Israel.
	2007	Yang Institute for Theoretical Physics, Stony Brook University.
	2007	Department of Physics and Astronomy, University of Pennsylvania.
	2007	Physics Department, California Institute of Technology.
	2007	Berkeley Center for Theoretical Physics, University of California, Berkeley.
	2007	Physics Department, Harvard University.
	2007	Physics Department, Princeton University.
	2007	Center for Cosmology and Particle Physics, New York University.
	2006	School of Physics and Astronomy, Tel Aviv University, Israel.
	2006	SISSA, Trieste, Italy.
	2006	Physics Department, Milan University-Bicocca, Italy.
	2005	Joint High Energy Theory seminar, Newe-Shalom, Israel.
	2004	Institute for Theoretical Physics, Amsterdam University, The Netherlands.
	2004	Physics Department, Pisa University, Italy.
	2004	International Center for Theoretical Physics, Trieste, Italy.
OUTREACH	2017	<i>Mentor for Undergraduate Travel Award</i> , Cosyne 2017.
	2013	<i>With strings attached</i> , Science playwriting competition, Stony Brook University.
	2010-	Correspondent for <i>Oggiscienza.it</i> , popular science online magazine.
	2010-	Member of the Italian National Journalist Guild (Ordine dei giornalisti).