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[Google Scholar](#)

Current position

Zuckerman Postdoctoral Fellow
School of Computer Science and Engineering
The Hebrew University of Jerusalem
Supervisor: Mor Nitzan

Areas of interest

Representation learning for dynamical systems
Cell-cell and gene regulatory networks
Neural dynamics in vision

Education

- 2020 *Ph.D. in Computational Neuroscience*
Brown University
Specialization: Neural dynamics, computer vision
Advisor: Thomas Serre
Dissertation: “Towards Systematic Vision: Limitations of Convolutional Neural Networks and Future Directions in Oscillatory Coding”
- 2012 *MA/BA in Mathematics*
University of Pennsylvania
Specialization: Signal processing
Advisor: Philip Gressman
- 2012 *BA in Musicology*
University of Pennsylvania

Specialization: American modernism, modernist performance practice
Advisors: Arman Schwartz, Emily Dolan

Appointments held

- Jul. 2020 -
Jul. 2021 *Postdoctoral Associate*
Data Science Initiative
Brown University
Supervisor: Stuart Geman
- Aug. 2018 -
Feb. 2018 *Visiting Doctoral Researcher*
Département d'informatique
École normale supérieure (Ulm)
Principal Investigator: Stéphane Mallat
- 2013-2014 *Research Assistant*
Rutgers University Center for Cognitive Science
Principal Investigator: Randy Gallistel

Grants, honors & awards

- Jul. 1, 2021- Zuckerman Postdoctoral Fellowship
Hebrew University of Jerusalem
Principal Investigator: Mor Nitzan
- Sep. 1, 2017-
July 1, 2019 NSF Graduate Research Fellowship
Award no. 1644760
Principal Investigator: Thomas Serre
- 2018 Brown University Graduate School Travel Grant
- 2017 CCN Travel Grant
- Jan. 1, 2015-
Jan. 1, 2017 NIH Vision Training Grant
Award no. 5T32EY018080-08
Principal Investigator: Michael Paradiso
- 2012 Admitted to Phi Beta Kappa
- 2011 Submatriculated into graduate program, Department of Mathematics, University of Pennsylvania

Peer-Reviewed Publications¹

SUBMITTED

Ricci, M.G., Thackray, J., Tischfield, M., Abraira, V. (Submitted). Animal2Vec: Sequence embedding methods for computational ethology.

PUBLISHED

Moriel, N., **Ricci, M.G.**, Nitzan, M. (2024). Let's do the time-warp-attend: Learning topological invariants of dynamical systems. In *Proceedings of the 12th International Conference on Learning Representations (ICLR, accepted)*.

Gradwell, M.A., Ozeri-Engelhard, N*, Eisdorfer, J.T., Laflamme, O.D., Upadhyay, A., Aoki, A., Shrier, T., Gandhi, M., Thackray, J., **Ricci, M.G.**, Gonzalez, M., Abbas-Zadeh, G., Yusuf, N., Katz, J., Haas, M., Akay, T., Abraira, V.E. (2024). Inhibitory interneurons within the deep dorsal horn integrate convergent sensory input to regulate motor performance. *Neuron (Accepted)*.

Bohic, M., Pattison, L.A., Jhumka, Z.A., Rossi, H., Thackray, J.K., **Ricci, M.G.**, Mossazghi, N., Foster, W., Ogundare, S., Twomey, C.R., Hilton, H., Arnold, J., Tischfield, M.A., Yttri, E.A., St. John Smith, E., Abdus-Saboor, I., Abraira, V.E. (2023). Mapping the neuroethological signatures of pain, analgesia, and recovery in mice. *Neuron*.

Ricci, M.G., Kim, J., Johansson, F. (2023). A computational passage-of-time model of the cerebellar Purkinje cell in eyeblink conditioning. *Frontiers in Computational Neuroscience*, 17:1108346.

Ricci, M.G., Moriel, N., Piran, Z., Nitzan, M. (2023). Phase2vec: Dynamical systems embedding with a physics-informed convolutional network. In *Proceedings of the 10th International Conference on Learning Representations, (ICLR, Spotlight)*.

Gallistel, C.R., Johansson, F., Jirenhed, D.A., Rasmussen, A., Ricci, M.G., Hesslow, G. (2022). Quantitative properties of the creation and activation of a cell-intrinsic duration-encoding engram. *Frontiers in Computational Neuroscience*, 16:1019812.

Chalvidal, M., **Ricci, M.G.**, Serre, T., VanRullen, R. (2021). Go With the Flow: Adaptive Control for Neural ODEs. In *Proceedings of the 8th International Conference on Learning Representations, (ICLR)*.

¹Red= first or co-first author

Alamia, A., Luo, C., Ricci, M.G., Kim, J., Serre, T., VanRullen, R. (2020). Differential involvement of EEG oscillatory components in identity vs. spatial-relation reasoning tasks. *eNeuro*, 8(1), ENEURO.0267-20.2020.

Ricci, M.G., Cadène, R., Serre, T. (2020). Same-different conceptualization: A machine vision perspective. *Current Opinion in Behavioral Sciences*, 37, 47–55.

Ricci, M.G., Serre, T. (2020). Hierarchical Models of the Visual System. In *Encyclopedia of Computational Neuroscience*, pp. 1–14.

Kim, J., Ricci, M.G., Serre, T. (2018). Not-so-CLEVR: Learning same-different relations strains feedforward neural networks. *Journal of the Royal Society Interface*, 8(4).

Ricci, M.G., Kim, J., Serre, T. (2018). Same-Different Problems Strain Convolutional Neural Networks. In *Proceedings of the 40th Annual Conference of the Cognitive Science Society*.

Ricci, M.G., Gallistel, R. (2017). Accurate Step-Hold Tracking of Smoothly Varying Periodic and Aperiodic Probability. *Atten. Percept. Psychophys.*, pp. 1–32.

Technical Reports and Preprints

Moriel, N., Ricci, M.G., Nitzan, M. Let’s do the time-warp-attend: Learning topological invariants of dynamical systems. [arXiv:2312.09234v1](#) [cs.LG].

Ricci, M.G., Moriel, N., Piran, Z., Nitzan, M. Phase2vec: Dynamical systems embedding with a physics-informed convolutional network. [arXiv:2212.03857v1](#) [cs.LG].

Ricci, M.G., Jung, M., Zhang, Y., Chalvidal, M., Soni, A., Serre, T. KuraNet: Systems of Coupled Oscillators that Learn to Synchronize. [arXiv:2105.02838](#) [nlin.AO].

Bohic, M., Pattison, L.A., Jhumka, Z.A., Rossi, H., Thackray, J.K., Ricci, M.G., Foster, W., Arnold, J., Mossazghi, N., Yttri, E.A., Tischfield, M.A., Smith, E.S-J, Abdus-Saboor, I., Abraira, V.E. Behavioral and nociceptor states of inflammatory pain across timescales in 2D and 3D. [bioRxiv 2019.12.16.877829](#).

Ricci, M.G., Jung, M., Zhang, Y., Chalvidal, M., Soni, A., Serre, T. KuraNet: Systems of Coupled Oscillators that Learn to Synchronize. [arXiv:2105.02838](#)

[nlin.AO].

Chalvidal, M., **Ricci, M.G.**, Serre, T., VanRullen, R. Go With the Flow: Adaptive Control for Neural ODEs. *arXiv:2006.09545* [cs.LG].

Alamia, A., Luo, C., **Ricci, M.G.**, Kim, J., Serre, T., VanRullen, R. Differential involvement of EEG oscillatory components in sameness vs. spatial-relation visual reasoning tasks. *bioRxiv* 2019.12.16.877829.

Gallistel, C.R., Johansson, F., Jirenhed, D.-A., Rasmussen, A., **Ricci, M.G.**, Hesslow, G. (2020). Quantitative Properties of the Creation and Activation of a Cell-Intrinsic Engram. *BioRxiv*, 2020.03.17.995258.

Ricci, M.G., Kim, J., Johansson, F. A Passage-of-time Model of the Cerebellar Purkinje Cell. *arXiv:1605.03060v2* [q-bio.NC].

Works in Progress

Ricci, M.G., Moriel, M., Piran, Z., Nitzan, M. Spatial-Phase2vec: representation learning for reaction-diffusion models.

Theis, T., Thackray, J., **Ricci, M.G.**, Tshang, M., Oputal, O., Mahmood, M., Vivinetto, A., Bernstein, A., Ruven, C., Tucker, A., Birch, D., Eisdorfer, J.T., Shrier, T., Kumar, S., Tysseling, V., Dulin, J., Sahni, V., Hollis, E.R., Schachner, M., Abaira, V. A machine-vision approach for automated locomotor recovery evaluation at millisecond timescales.

Conferences, Talks and Workshops

AS CONFERENCE PRESENTER

- May 2023 Ricci, M.G., Moriel, N., Piran, Z., Nitzan, M “Phase2vec: Dynamical systems embedding with a physics-informed convolutional network”. 10th International Conference on Learning Representations, ICLR 2023 (Spotlight), Kigali, Rwanda. May 1-5 2023
- March 2023 Ricci, M.G., Moriel, N., Piran, Z., Nitzan, M “Phase2vec: Dynamical systems embedding with a physics-informed convolutional network”. Physics of Life 2023. IOP. Harrowgate, UK. March 27-30, 2023
- Sep. 2022 Ricci, M.G., “Learning Generalizable Representations of Dynamical Systems”. NETDATA22: Inverse Network Dynamics - Network structure and function from nonlinear dynamics and time series data. Dresden, Germany. Sep. 12-21, 2022

- Nov. 2021 Mahmood, M., Theis, T., Ricci, M.G., Abreira, V. "A Machine-Vision Approach for Automated Locomotor Recovery Evaluation at Millisecond Timescales". Annual Biomedical Research Conference for Minority Students (ABRCMS), Virtual. Nov. 10-13, 2021.
- July 2021 Theis, T., Thackray, J.K., Ricci, M.G., Abreira, V. "A machine vision approach for automated locomotor recovery at millisecond timescales". 38th Annual National Neurotrauma Symposium, Virtual. July 11-14, 2021.
- June 2020 Ricci, M.G, "N'Sync: Learning to Synchronize in Complex Networks" Brown University Unconference, Virtual. June 29-30, 2020.
- Feb. 2020 Ricci, M.G., Zhang, Y., Soni, A., Jung, M., Serre, T. "Kura-Net: Exploring systems of coupled oscillators using deep learning" Poster, COSYNE 2020. Denver, USA. February 27-March 2, 2020.
- Feb. 2019 Ricci, M.G., Windolf, C., Serre, T. "A Formal Model of Neural Synchrony for Unsupervised Image Grouping". Poster, COSYNE 2019. Lisbon, Portugal. February 28-March 3, 2019.
- July 2018 "Not-So-CLEVR: Same-different problems strain feedforward neural networks". 40th Annual Meeting of the Cognitive Science Society", July 25, 2018. Monona Terrace Community and Convention Center, Madison, WI.
- Sep. 2017 "A Dichotomy of Visual Relations, Or the Limits of Convolutional Neural Networks", Conference on Cognitive Computational Neuroscience (CCN), September 6-8, 2017. Columbia University, NYC.
- Aug. 2017 "Deep RL Bootcamp", August 26-27, 2017, University of California, Berkeley. (Accepted)
- June 2015 "Cell autonomous metabotropic signaling", Kavli Futures Symposium – The Synapse Hypothesis: To be or not to be. June 25-26, 2015. University of California, Santa Barbara
- AS GUEST SPEAKER
- March 2022 "Go with the flow: Representation Learning for Dynamical Systems". Hebrew University of Jerusalem. School of Computer Science and Engineering. March 10, 2022
- June 2020 "The Kuramoto Model Meets Machine Learning: Some Early Results in the Statistical Modeling of Oscillatory Systems". University of Ghent. PI: Tom Verguts. June 19, 2020

- Nov. 2019 “The Serre Lab: From machine learning to biology and back again”, Information Theory (APMA 1710). Instructor: Govind Menon. November 11, 2019.
- Oct. 2019 “Coupled Oscillators for Data Science: A Research Program”, Serre Lab-ANITI Joint Meeting, PIs: Thomas Serre, Rufin VanRullen. October 24, 2019.
- Sep. 2019 “Review: Coupled Oscillators for Perceptual Grouping”, Carney Institute for Brain Science. September 5, 2019.
- April 2019 “Systems of coupled neural oscillators: Results and applications based on Slotine, Izhikevich, Kuramoto”, Carney Institute for Brain Science. April 30, 2019.
- Aug. 2019 “Kosterlitz Machines”, Carney Institute for Brain Science. August 7, 2019.
- Oct. 2018 “Get Rhythm: Object Multiplexing in Phase Neural Networks”. Centre de Recherche Cerveau et Cognition, Toulouse, France. October 2., 2018
- March 2018 “Reinforcement Learning 101”, Computational Cognitive Science (CLPS 1291). Instructor: Thomas Serre. March 22, 2018.
- Dec. 2017 “Visual Relations and Convolutional Networks”, Perception & Action Seminar, Brown University, Department of Cognitive, Linguistic and Psychological Sciences. December 7, 2017
- Oct. 2015 “Contemporary Problems in Vision”, Brown University, Department of Cognitive, Linguistic and Psychological Sciences. October 9, 2015.
- June 2015 “Contemporary Problems in Vision”, UCL Gatsby Computational Neuroscience Unit. June 26, 2015.
- June 2015 “Challenges to Hebbianism: A Case from Cerebellar Learning”, UCL Gatsby Computational Neuroscience Unit, June 25, 2015.
- June 2015 “Challenges to Hebbianism: A Case from Cerebellar Learning”, University of Geneva. June 3, 2015.
- June 2015 “Challenges to Hebbianism: A Case from Cerebellar Learning”, Neurospin. June 5, 2015.
- March 2014 “Non-stationary Bernoulli Processes: Ideal Observers’ Predictions and Surprisals”, Rutgers University Center for Cognitive Science. March 28, 2014.

AS ORGANIZER

- April 2018 “Beyond Deep Learning Workshop: Session 2”, Brown University, April 6, 2018
Speakers: David Heeger (NYU), Dima Amso (Brown University), Tom Griffiths (UC Berkeley)
- Jan. 2018 “Beyond Deep Learning Workshop: Session 1”, Brown University, January 18-19, 2018
Speakers: Matthias Bethge (Universität Tübingen), Randy Gallistel (Rutgers University), Gary Marcus (NYU), Samuel Gershman (Harvard)

Teaching

BROWN UNIVERSITY

- 2019-2021 *Mentor*
Visiting undergraduate researcher, Yuwei Zhang
Nankai University
Project: An end-to-end differentiable clustering algorithm using the Kuramoto Model
- 2019 *Teaching Assistant*
Human Cognition (CLPS 0200)
Instructor: Katheryn Spoehr
- 2018 *Teaching Assistant*
Deep Learning in Brains, Minds and Machines (CLPS 1950)
Instructor: Thomas Serre
- 2017 *Teaching Assistant*
Introduction to Programming for Mind, Brain and Behavior (CLPS 1292)
Instructor: Thomas Serre

2016-2018

Mentor

Masters student, Charles Windolf

Department of Applied Mathematics, Brown University

Project: Angular Gibbs random fields for image processing

UNIVERSITY OF PENNSYLVANIA

2012-2013

Tutor

Multivariable calculus, linear algebra (MATH 103, MATH 104)

Department of Mathematics

PRINCETON REVIEW

2013

SAT Instructor

2013

MCAT Instructor

References

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