Raja Marjieh

Contact Information
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Present Address
Peretsman-Scully Hall,
Princeton, New Jersey,
USA 08540

Education

PhD Program in Psychology, Princeton University — 2021-present
Sub-discipline: Computational Cognitive Science
GPA: 4.0/4.0, Advisor: Prof. Thomas L. Griffiths

MSc in Physics, Technion, Israel Institute of Technology — 2016-2018
Dissertation Title: An Entropy Current in Superspace
GPA: 96/100, Advisor: Prof. Amos Yarom

Joint BSc in Physics and Electrical Engineering, Technion — 2011-2016
GPA: 93.6/100, *cum laude*

Professional Experience

Student Researcher, Google Research — 2023

Lab Manager, Computational Auditory Perception Group, — 2019-2021
PI Dr. Nori Jacoby, Max Planck Institute for Empirical Aesthetics,
Frankfurt am Main, Germany

Intern, Decision Analytics Group - IBM Research Labs, Haifa — 2015

Research Assistant, Quantum and Ultrafast Devices Lab, — 2015-2016
Department of Electrical Engineering, Technion

Fellowships, Awards, and Honors

Cognitive Science Society Travel Award — 2023
Princeton Cognitive Science Program Graduate Funding Award — 2021
Princeton First-Year Fellowship in Natural Sciences — 2021
Katzir Travel Grant - Batsheva de Rothschild Fund — 2018
and The Israel Academy of Sciences and Humanities
The Clara Nevai and B. Bella Nevai Family Fellowship — 2017
The Israel Council for Higher Education Fellowship — 2016
for Outstanding Master Students from the Arab Minority
Norman and Barbara Seiden Family Prize — 2015
for Multi-Disciplinary Undergraduate Projects
Kasher Competition for Outstanding Student Projects, Honorable Mention — 2015
Friedman Fund Undergraduate Fellowship — 2014

Skills

Programming: Python, JavaScript, R, Matlab, Mathematica
Other: Experience in designing and implementing large-scale online experiments on various recruitment platforms (e.g., Prolific and Amazon Mechanical Turk)

Teaching

Assistant in Instruction, Developmental Psychology, Princeton — 2024
Department of Psychology, Level: UG

Head Assistant in Instruction, Computational Models of Cognition, Princeton — 2023
Departments of Psychology and Computer Science, Level: UG/G

Head Assistant in Instruction, Probabilistic Models of Cognition, Princeton Departments of Psychology and Computer Science, Level: UG/G — 2022

Head Assistant in Instruction, Introduction to Solid State Physics, Technion Department of Electrical Engineering, Level: UG/G — 2015

Selected Publications

- **Marjieh, R.**, Harrison, P. M., Lee, H., Deligiannaki, F., & Jacoby, N. (2024). Timbral effects on consonance disentangle psychoacoustic mechanisms and suggest perceptual origins for musical scales. *Nature Communications*, 15(1), 1482.
- **Marjieh, R.**, Sucholutsky, I., van Rijn, P., Jacoby, N., & Griffiths, T. L. (2024). Large language models predict human sensory judgments across six modalities. *Scientific Reports*, 14(1), 21445.
- **Marjieh, R.**, Jacoby, N., Peterson, J. C., & Griffiths, T. L. (2024). The universal law of generalization holds for naturalistic stimuli. *Journal of Experimental Psychology: General*, 153(3), 573. (*Editor's Choice article*)
- **Marjieh, R**., van Rijn, P., Sucholutsky, I., Sumers, T. R., Lee, H., Griffiths, T. L., & Jacoby, N. (2023). Words are all you need? Capturing human sensory similarity with textual descriptors. *The Eleventh International Conference on Learning Representations* (*ICLR* 2023).
- **Marjieh, R.**, Sucholutsky, I., Langlois, T. A., Jacoby, N., & Griffiths, T. L. (2023). Analyzing diffusion as serial reproduction. *Proceedings of the 40th International Conference on Machine Learning*, PMLR 202:24005-24019 (*ICML* 2023).
- Harrison*, P., **Marjieh*, R.**, Adolfi, F., van Rijn, P., Anglada-Tort, M., Tchernichovski, O., ... & Jacoby, N. (2020). Gibbs sampling with people. *Advances in Neural Information Processing Systems*, 33, 10659-10671. (*NeurIPS* 2020; *selected for oral presentation*) (*Equal contribution).

Working Papers

- **Marjieh, R.**, Veselovsky, V., Griffiths, T. L. & Sucholutsky, I., (2025). What is a Number, That a Large Language Model May Know It? *arXiv preprint arXiv:2502.01540* (under review).
- **Marjieh, R.**, Kumar, S., Campbell, D., Zhang, L., Bencomo, G., Snell, J., & Griffiths, T. L. (2025). Learning Human-Aligned Representations with Contrastive Learning and Generative Similarity. *arXiv preprint arXiv:2405.19420* (under review).
- **Marjieh, R.**, van Rijn, P., Sucholutsky, I., Lee, H., Jacoby, N., & Griffiths, T. L. (2024). Characterizing the Large-Scale Structure of Grounded Semantic Networks. *PsyArXiv* (under review).
- **Marjieh, R.**, Griffiths, T. L., & Jacoby, N. (2024). Pitch is Not a Helix: Probing the Structure of Musical Pitch Across Tasks and Experience. *bioRxiv* (under review).
- Sucholutsky, I., Muttenthaler, L., Weller, A., Peng, A., Bobu, A., Kim, B., ..., **Marjieh, R.**, ... & Griffiths, T. L. (2024). Getting aligned on representational alignment. *arXiv preprint arXiv:2310.13018* (under review).
- Liu, R., Yen, H., **Marjieh, R.**, Griffiths, T.L. & Krishna, R., 2023. Improving interpersonal communication by simulating audiences with language models. *arXiv preprint arXiv:2311.00687* (under review).

Competitively Peer-Reviewed Publications

- **Marjieh, R.**, Harrison, P. M., Lee, H., Deligiannaki, F., & Jacoby, N. (2024). Timbral effects on consonance disentangle psychoacoustic mechanisms and suggest perceptual origins for musical scales. *Nature Communications*, 15(1), 1482.
- Rathje, S., Mirea, D. M., Sucholutsky, I., **Marjieh, R.**, Robertson, C. E., & Van Bavel, J. J. (2024). GPT is an effective tool for multilingual psychological text analysis. *Proceedings of the National Academy of Sciences*, 121(34), e2308950121.
- **Marjieh, R.**, Sucholutsky, I., van Rijn, P., Jacoby, N., & Griffiths, T. L. (2024). Large language models predict human sensory judgments across six modalities. *Scientific Reports*, 14(1), 21445.
- **Marjieh, R.**, Jacoby, N., Peterson, J. C., & Griffiths, T. L. (2024). The universal law of generalization holds for naturalistic stimuli. *Journal of Experimental Psychology: General*, 153(3), 573. (*Editor's Choice article*)
- Huang, D. M., Van Rijn, P., Sucholutsky, I., **Marjieh, R.**, & Jacoby, N. (2024). Characterizing Similarities and Divergences in Conversational Tones in Humans and LLMs by Sampling with People. *Proceedings of the 62nd Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)* (ACL 2024).
- Tian, Y., Ravichander, A., Qin, L., Bras, R. L., **Marjieh, R.**, Peng, N., ... & Brahman, F. (2023). MacGyver: Are Large Language Models Creative Problem Solvers?. arXiv preprint arXiv:2311.09682. *Proceedings of the 2024 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (Volume 1: Long Papers)* (NAACL 2024).
- Sucholutsky, I., Battleday, R. M., Collins, K. M., **Marjieh, R.**, Peterson, J., Singh, P., ... & Griffiths, T. L. (2023, July). On the informativeness of supervision signals. *Uncertainty in Artificial Intelligence*, 2036-2046, PMLR (UAI 2023).
- **Marjieh, R.**, Sucholutsky, I., Langlois, T. A., Jacoby, N., & Griffiths, T. L. (2023). Analyzing diffusion as serial reproduction. *Proceedings of the 40th International Conference on Machine Learning*, PMLR 202:24005-24019 (ICML 2023).
- **Marjieh, R**., van Rijn, P., Sucholutsky, I., Sumers, T. R., Lee, H., Griffiths, T. L., & Jacoby, N. (2023). Words are all you need? Capturing human sensory similarity with textual descriptors. *The Eleventh International Conference on Learning Representations* (ICLR 2023).
- Kumar, S., Correa, C. G., Dasgupta, I., **Marjieh, R.**, Hu, M. Y., Hawkins, R., ... & Griffiths, T. L. (2022). Using natural language and program abstractions to instill human inductive biases in machines. *Advances in Neural Information Processing Systems*, 35, 167-180. *Outstanding paper award* (NeurIPS 2022).
- **Marjieh, R.**, Pinzani-Fokeeva, N., Tavor, B., & Yarom, A. (2022). Black Hole Supertranslations and Hydrodynamic Enstrophy. *Physical Review Letters*, 128(24), 241602.
- **Marjieh, R.**, Pinzani-Fokeeva, N., & Yarom, A. (2022). Enstrophy from symmetry. *SciPost Physics*, 12(3), 085.
- Harrison*, P., **Marjieh*, R.**, Adolfi, F., van Rijn, P., Anglada-Tort, M., Tchernichovski, O., ... & Jacoby, N. (2020). Gibbs sampling with people. *Advances in Neural Information Processing Systems*, 33, 10659-10671. (*Equal contribution) *Selected for oral presentation* (NeurIPS 2020).
- Jensen, K., **Marjieh, R.**, Pinzani-Fokeeva, N., & Yarom, A. (2019). An entropy current in superspace. *Journal of High Energy Physics*, 2019(1), 1-21.
- Jensen, K., **Marjieh, R.**, Pinzani-Fokeeva, N., & Yarom, A. (2018). A panoply of Schwinger-Keldysh transport. *SciPost Physics*, 5(5), 053.

- Panna, D., **Marjieh, R.**, Sabag, E., Rybak, L., Ribak, A., Kanigel, A., & Hayat, A. (2017). Linear-optical access to topological insulator surface states. *Applied Physics Letters*, 110(21).
- Sabag, E., Bouscher, S., **Marjieh, R.**, & Hayat, A. (2017). Photonic Bell-state analysis based on semiconductor-superconductor structures. *Physical Review B*, 95(9), 094503.
- Sabag, E., **Marjieh, R.**, & Hayat, A. (2016). Extreme multiphoton luminescence in GaAs. *Europhysics Letters*, 115(5), 57006.
- **Marjieh, R.**, Sabag, E., & Hayat, A. (2016). Light amplification in semiconductor-superconductor structures. *New Journal of Physics*, 18(2), 023019. *Highlighted in*: Donati, G., Light-matter interactions: Superconducting gain. *Nature Photonics* 10.4 (2016): 207-207.

Book Chapters

- Griffiths, T. L., Sanborn, A. N., **Marjieh, R.**, Langlois, T., Xu, J., & Jacoby, N. (2024). Estimating subjective probability distributions. In *Griffiths, T. L., Chater, N., & Tenenbaum, J. B. (in press) Bayesian models of cognition: Reverse-engineering the mind*. MIT Press

Conference Proceedings

- **Marjieh, R.**, van Rijn, P., Sucholutsky, I., Lee, H., Griffiths, T., & Jacoby, N. (2024). A Rational Analysis of the Speech-to-Song Illusion. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 46.
- Urano, Y., **Marjieh, R.**, Griffiths, T., & Jacoby, N. (2024). The Influence of Social Information and Presentation Interface on Aesthetic Evaluations. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 46.
- Barretto, D., **Marjieh, R.**, & Griffiths, T. (2024). Reaching Consensus through Theory of Mind in Social Networks with Locally Distributed Interactions. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 46.
- Kumar*, S., **Marjieh*, R.**, Zhang, B., Campbell, D., Hu, M. Y., Bhatt, U., ... & Griffiths, T. L. (2024). Comparing Abstraction in Humans and Large Language Models Using Multimodal Serial Reproduction. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 46. (*Equal contribution).
- Niedermann, J., Sucholutsky, I., **Marjieh, R.**, Celen, E., Griffiths, T. L., Jacoby, N., & van Rijn, P. (2024). Studying the Effect of Globalization on Color Perception using Multilingual Online Recruitment and Large Language Models. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 46.
- **Marjieh, R.**, Sucholutsky, I., van Rijn, P., Jacoby, N., & Griffiths, T. L. (2023). What Language Reveals about Perception: Distilling Psychophysical Knowledge from Large Language Models. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 45.
- van Rijn, P., Sun, Y., Lee, H., **Marjieh, R.**, Sucholutsky, I., Lanzarini, F., Andre, E., & Jacoby, N. (2023). Around the world in 60 words: A generative vocabulary test for online research. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 45.
- **Marjieh, R.**, Sucholutsky, I., Sumers, T., Jacoby, N., & Griffiths, T. (2022). Predicting Human Similarity Judgments Using Large Language Models. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 44.

Conference Talks, Invited Talks, Posters

- "Integrating Human Decisions into Computer Algorithms", Workshop on Broader Adoption of Massive Online Experiments (Joint with Nori Jacoby), CogSci, Sydney, Australia (July, 2023).
- "What Language Reveals about Perception: Distilling Psychophysical Knowledge from Large Language Models", CogSci, Sydney, Australia (July, 2023).
- "Analyzing Diffusion as Serial Reproduction", ICML (July 2023).
- "Words are all you need? Capturing human sensory similarity with textual descriptors", ICLR (May, 2023).
- "New answers to old questions in semantic representation and music perception", Music Cognition Lab, Department of Music, Princeton (April, 2023).
- "Predicting Human Similarity Judgments Using Large Language Models.", CogSci, Toronto, Canada (July, 2022)
- "Predicting Human Similarity Judgments Using Large Language Models", LNLS workshop, ACL, Dublin, Ireland (May, 2022).
- "Characterizing the subjective pleasantness of tone combinations as a function of intervallic and spectral structure", ICMPC16-ESCOM11, Sheffield, UK (July, 2021).
- "Revealing semantic representations through massive online experiments" CLaME, Max Planck - New York University Center for Language, Music and Emotion (September, 2020).
- "Gibbs Sampling with People" poster presentation at the Virtual Brains, Minds and Machines Summer Course (August 2020)
- "Enstrophy and AdS4 Black Branes", Avant-Garde Methods for Quantum Field Theory and Gravity, Nazareth, Israel (2018)
- "Semiconductor-Superconductor Two-Photon Amplifier", CLEO, San Jose, California, USA (2015)

Peer-review

CogSci, *NeurIPS*, *PLOS ONE*.

Advising

- Yoko Urano (Undergraduate, Princeton Psychology)
- Rivka Mandelbaum (Undergraduate, Princeton Computer Science)
- Byron Zhang (Undergraduate, Princeton Computer Science)
- Daphne Barretto (Undergraduate, Princeton Computer Science)

Workshop Organization

- Co-organizer, workshop on "Networks and Cognition", Princeton (June, 2023).

Media Coverage

- Article: "Timbre can affect what harmony is music to our ears", *Science News* (2024).
- Article: "Pythagoras was wrong about the maths behind pleasant music", *New Scientist* (2024).

Short Courses

- Virtual Brains, Minds and Machines Summer Course (August 2020)
- Deep Learning Specialization by deeplearning.ai and Stanford University on Coursera (2019)
- Spring School on Superstring Theory and Related Topics, International Centre for Theoretical Physics, Trieste, Italy (2017).

Diversity, Equity, and Inclusion	*Member*, Social Well-being Committee, Princeton Psychology	2024-2025
	Member, DEI Committee, Princeton Psychology	2023-2024
	Academic Tutor, Technion Unit for the Advancement of Students	2013-2015

Miscellaneous Languages: Arabic, Hebrew, English, Italian, Latin, Ancient Greek