Raja Marjieh

Contact Information	**Present Address**
raja.marjieh@princeton.edu	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 and The Israel Academy of Sciences and Humanities	2018
The Clara Nevai and B. Bella Nevai Family Fellowship	2017
The Israel Council for Higher Education Fellowship for Outstanding Master Students from the Arab Minority	2016
Norman and Barbara Seiden Family Prize for Multi-Disciplinary Undergraduate Projects	2015
Kasher Competition for Outstanding Student Projects, Honorable Mention	2015
Friedman Fund Undergraduate Fellowship	2014

Skills

<u>Programming:</u>	Python, JavaScript, R, Matlab, Mathematica
<u>Other:</u>	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

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

Teaching Assistant, Introduction to Solid State Physics, Technion   2015
Department of Electrical Engineering, Level: UG/G

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	