

# Polyphony J. Bruna

PHD STUDENT · COGNITIVE AND INFORMATION SCIENCES

University of California, Merced

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## Education

*Research Interests: Computational Models, Neural Networks, Complex Systems, Representation, Philosophy*

### University of California, Merced

Merced, CA

PHD COGNITIVE AND INFORMATION SCIENCES

Expected 2027

- Advisors: Christopher T. Kello and Michael J. Spivey
- Other committee members: Jeff Yoshimi

### University of California, Los Angeles

Los Angeles, CA

GRADUATE FELLOW, INSTITUTE FOR PURE AND APPLIED MATHEMATICS

Fall 2024

- Program: Mathematics of Intelligences

### Vassar College

Poughkeepsie, NY

BA COGNITIVE SCIENCE AND PHILOSOPHY

2018 - 2022

- Minor in Japanese
- Overall GPA: 3.99/4.00
- Honors: *Phi Beta Kappa, Sigma Xi, Psi Chi, cum laude generalis et cum laude in materia subiecta*
- Thesis advisors: Jan Andrews and Josh de Leeuw

Title: "Leveraging Surprise in a Recurrent Neural Network to (de)Construct Morphological Complexity in Japanese"

## Professional Experience

2021-2022 **Intern**, Dept. of Cognitive Science, Vassar College

2021 **Senior Researcher**, Undergraduate Research Summer Institute, Vassar College

2019, 2020 **Research Fellow**, Undergraduate Research Summer Institute, Vassar College

2018-2021 **Research Assistant**, Cognitive Science, Vassar College

## Publications

\* Denotes co-principal authorship

### UNDER REVIEW

**Bruna, P.** & Kello, C. (2024). *Least Effort and Alignment in Task-Oriented Communication*. PsyArXiv.  
<https://doi.org/10.31234/osf.io/ftz98>

### PUBLISHED

de Leeuw, J. R., Andrews, J., Barney, L., Bigler, M., **Bruna, P.**, Chen, Y., Cherry, R., Dowie, D. R., Forbes, E., Haffey, B., Hu, X., Jaklitsch, M., Leopold, N., Lewis, C., MacDonald, D., McShaffrey, C., Nakayama, K., Olstad, W., Peng, R., ... Zhang, L. (2021). Words May Jump-Start Meaning More Than Vision: A Non-Replication of Early ERP Effects in Boutonnet and Lupyan (2015). *Collabra: Psychology*, 7(1). <https://doi.org/10.1525/collabra.29763>

### PROCEEDINGS

Kello, C. & **Bruna, P.** (2024). Emergent Mental Lexicon Functions in ChatGPT. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 46. <https://escholarship.org/uc/item/5m9098b5>

\*Rane, S., \***Bruna, P.**, Sucholutsky, I., Kello, C., & Griffiths, T. (2023). Concept alignment. *1st NeurIPS Workshop on AI meets Moral Philosophy and Moral Psychology (MP2)*. <https://arxiv.org/abs/2401.08672>

## NON-ACADEMIC ARTICLES

2019 **Vassar College Journal of Philosophy**, "Taking Back Philosophy: A Multicultural Manifesto", Book Review

## Presentations

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\* *Presenting author(s)*; + *Mentored undergraduate*

### CONTRIBUTED TALKS

\***Bruna, P.** & Kello, C. 2024. *Least Effort and Alignment in Task-Oriented Communication*. Mathematics of Intelligences Seminar Series, Institute for Pure and Applied Mathematics, University of California, Los Angeles.

\***Bruna, P.**, Ryskin, R., & Spivey, M. J. 2023. *Semantics and Syntax Co-emerge in Adaptive Reservoir Network Dynamics*. Diverse Intelligences Summit, University of St. Andrews, Scotland.

\***Bruna, P.** 2020. *Hearing That It Is Silent: How to Hallucinate a Non-Perception*. 10th Annual Mid-Hudson Valley Undergraduate Philosophy Conference, Marist College, Poughkeepsie, NY. (Canceled due to COVID-19)

### CONTRIBUTED POSTERS

\*Kello, C. & \***Bruna, P.** 2024. *Emergent Mental Lexicon Functions in ChatGPT*. 46th Annual Conference of the Cognitive Science Society, Rotterdam, Netherlands.

\*Rane, S. & \***Bruna, P.** 2023. *Concept alignment*. 1st NeurIPS Workshop on AI meets Moral Philosophy and Moral Psychology (MP2), New Orleans, LA, United States.

\*+Leshock, E., \*\*Pena, Y., **Bruna, P.**, & Andrews, J. 2021. *Learned Categorical Perception with Artificially Generated Faces*. 36th Annual URSI Symposium, Vassar College, Poughkeepsie, NY.

\*Bigler, M. & \***Bruna, P.** 2020. *Probing the Methodology and Interpretation of Learned Categorical Perception Research*. 35th Annual URSI Symposium, Vassar College, Poughkeepsie, NY.

\***Bruna, P.** & \*Marks, P. 2019. *Psychophysical Adaptive Procedure: Developing a New, Generalizable Method*. 34th Annual URSI Symposium, Vassar College, Poughkeepsie, NY.

### INVITED TALKS

Fall 2024 (forthcoming). *Least Effort and Alignment in Task-Oriented Communication*. Dept. of Cognitive Science, Vassar College, Poughkeepsie, NY.

## Awards, Fellowships, & Grants

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\* *Awarded but declined*

2024	<b>Humane Studies Fellowship</b> , <i>Institute for Humane Studies</i>	\$ 5,000
2023	<b>Alumni Award</b> , <i>Diverse Intelligences Summer Institute</i>	\$ 750
	<b>Cognitive and Information Sciences Fall Fellowship</b> , <i>University of California, Merced</i>	\$ 22,500
2022	<b>Chancellor's Recruitment Fellowship</b> , <i>University of California, Merced</i>	\$ 45,000
	* <b>Foreign Language and Area Studies (FLAS) Fellowship</b> , <i>U.S. Department of Education</i>	\$ 22,500
	<b>Adolph Sutro Fellowship</b> , <i>Vassar College</i>	\$ 10,000
	<b>The Jamie Nisse Greenberg Philosophy Prize</b> , <i>Vassar College</i>	\$ 900
	<b>Best Technical Write-Up</b> , <i>Mid-Hudson IEEE Undergraduate Capstone Project Awards</i>	
	<b>Critical Language Scholarship for advanced Japanese, alternate</b> , <i>U.S. Department of State; American Councils for International Education</i>	
2021	<b>Frances Lehman Loeb 1928 Scholarship</b> , <i>Vassar College</i>	\$ 44,000
	<b>Research Award</b> , <i>Vassar College</i>	\$ 4,000
2020	<b>Frances Lehman Loeb 1928 Scholarship</b> , <i>Vassar College</i>	\$ 44,000
	<b>Undergraduate Research Summer Institute Fellowship</b> , <i>Vassar College</i>	\$ 5,000

2019	<b>Frances Lehman Loeb 1928 Scholarship</b> , <i>Vassar College</i>	\$ 42,500
	<b>Undergraduate Research Summer Institute Fellowship</b> , <i>Vassar College</i>	\$ 5,000
2018	<b>1956 Memorial Scholarship</b> , <i>Vassar College</i>	\$ 42,000

## Teaching Experience

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Spr. 2024	<b>Contemporary Moral Problems</b> , Teaching Assistant, <i>Dept. of Philosophy, University of California, Merced</i>
Spr. 2022	<b>Introduction to Cognitive Science</b> , Teaching Assistant, <i>Dept. of Cognitive Science, Vassar College</i>
Fall 2021	<b>Introduction to Cognitive Science</b> , Teaching Assistant, <i>Dept. of Cognitive Science, Vassar College</i>

## Outreach & Professional Development

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### WORKSHOPS & TRAINING

2024	<b>Berggruen Institute</b> , Future Humans Workshop on Computational Consciousness, <i>Beverly Hills, California</i>
2024	<b>Institute for Pure and Applied Mathematics</b> , Naturalistic Approaches to Artificial Intelligence, <i>University of California, Los Angeles</i>
2024	<b>Institute for Humane Studies</b> , Aristotle and Human-Centered AI, <i>Webinar</i>
2024	<b>Institute for Pure and Applied Mathematics</b> , Theory and Practice of Deep Learning, <i>University of California, Los Angeles</i>
2024	<b>Dynamic Interactions and Methodologies Symposium</b> , <i>University of California, Los Angeles</i>
2024	<b>Institute for Pure and Applied Mathematics</b> , Analyzing High-dimensional Traces of Intelligent Behavior, <i>University of California, Los Angeles</i>
2023	<b>Sante Fe Institute</b> , Complexity-GAINs International Summer School on Intelligence and Representation, <i>Isaac Newton Institute for Mathematical Sciences, University of Cambridge</i>
	<b>Diverse Intelligences Summer Institute</b> , <i>University of St. Andrews</i>
2022	<b>Phi Beta Kappa</b> , Key Connections, <i>Webinar</i>
2020	<b>Center for Philosophy of Science</b> , Pittsburgh Summer Program in Philosophy of Science and Specialized Sciences, <i>University of Pittsburgh and Carnegie Mellon University</i>

### SERVICE POSITIONS

2023-2024	<b>Graduate Student Chair</b> , Dept. of Cognitive and Information Sciences, <i>University of California, Merced</i>
	<b>Mentor</b> , Learning Aligned Employment Program (LAEP), <i>University of California, Merced</i>
2021	<b>Mentor</b> , Undergraduate Research Summer Institute, <i>Vassar College</i>
2018-2019	<b>Editor</b> , Vassar College Journal of Philosophy, <i>Vassar College</i>

### PEER REVIEW

Journal of Experimental Psychology: General

### PROFESSIONAL MEMBERSHIPS

Cognitive Science Society  
 Phi Beta Kappa  
 Sigma Xi, The Scientific Research Honor Society  
 Psi Chi, International Honor Society in Psychology

### SKILLS

Languages: English (native), Japanese (intermediate)  
 Programming: Python, R, JavaScript, HPC parallel computing

Technical: Neural networks, Information theory, Bayesian statistics, Data visualization