

# Thiago Tarraf Varella

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## EDUCATION

Princeton University

Princeton, NJ

*Ph.D. in Psychology and Neuroscience (joint program)*

*Sept. 2019 - Exp. May 2024*

- NSF Graduate Research Fellowship Program (GRFP), \$37k/year for 3 years
- President's Fellowship at Princeton University, \$500/year for 2 years

University of Sao Paulo

Sao Paulo, SP, Brazil

*B.Sc. in Mathematics applied to Neuroscience*

*Aug. 2014 - May 2018*

- Sao Paulo Research Foundation (FAPESP) undergraduate fellowship, R\$9k for 1 year (largest in Brazil)
- Best Student Paper of International Conference on Educational and Information Technology (ICEIT 2016)

## TECHNICAL SKILLS

- Programming: Python (NumPy, pandas, PyTorch, sklearn, SciPy), Matlab, R, C/C++, HTML/CSS, git, LaTeX
- Other: Machine learning, audio processing, mathematical modeling, Portuguese, French, Inkscape, Muscore, Audacity

## SELECTED RESEARCH EXPERIENCES

Princeton University | Department of Psychology

Princeton, NJ

*Graduate Researcher | Python, MATLAB, R, Jupyter Notebook, Inkscape, bash*

*May 2018 - Current*

- Perform audio analysis on samples of primate vocalizations, including acoustic feature extraction and audio classification with neural networks;
- Lead projects with an interdisciplinary team of two professors, two post-doctoral researcher, and one other graduate student, using datasets from different animals including humans, some with more than 100k audio samples;
- Develop mathematical models (e.g. Bayesian models, dynamical systems) and simulations of behavior, predicting milestones of primate vocal development and similarities on the evolution of the learning process with humans.

MIT | Center for Brains, Minds and Machines (CBMM)

Woods Hole, MA

*Summer student and researcher | PyTorch*

*Aug. 2019*

- Analyzed human intracranial neural data to predict vowels heard by a subject using deep learning;
- Tested the influence of cognitive and social factors in the evolution of language acoustics.

UFABC | Center for Mathematics, Computing, and Cognition (CMCC)

Sao Paulo, SP, Brazil

*Undergraduate researcher | Python, MATLAB*

*Aug. 2016 - May 2018*

- Simulated and mathematically modeled networks of biologically plausible neurons to predict behavioral properties observed in perception of time;
- Analyzed distributions and applied machine learning (e.g. model fitting, clustering) to data collected from rats.

## SELECTED PUBLICATIONS AND PRESENTATIONS

A mechanism for punctuating equilibria during mammalian vocal development (2022)

*PLoS Computational Biology*

**Varella, T. T.**, Zhang, Y.S., Takahashi, D.Y., & Ghazanfar, A. A.

Cooperative care and the evolution of the prelinguistic vocal learning (2021)

*Developmental Psychobiology*

**Varella, T. T.** & Ghazanfar, A. A.

Phase transitions in vocal development are driven by energy-information balance (2020)

*COSYNE 2020 poster presentation*

**Varella, T. T.**, Zhang, Y.S., Takahashi, D.Y., & Ghazanfar, A. A.

The impact of different productions styles of videos in online education (2015)

*ICERI 2015 Proceedings*

Olguin, G.S., de Souza, I.A., **Varella, T. T.**, & Seabra, A. C.

## SELECTED TEAMWORK & LEADERSHIP EXPERIENCES

Resident Graduate Student at Princeton University

Princeton, NJ

- Organize social events and provide career mentoring to undergraduates

*Aug. 2022 - Current*

Brains, Black Holes, and Beyond podcast host

Princeton, NJ

- Write and record interviews with Princeton researchers, 1000+ downloads

*Jan. 2021 - Current*

Treasurer for 2 Dickinson food cooperative

Princeton, NJ

- Managed a budget of ~\$40k for the 2 Dickinson coop, student organization

*2021 - 2022*

Teaching assistant at Princeton Univ. and Univ. of Sao Paulo

Princeton, NJ / Sao Paulo, Brazil

- Led group discussions, generated and graded exam questions with a team

*2015 - 2016 & 2020*

Piano player

Princeton, NJ / Sao Paulo, Brazil

- Play piano solo and in small ensembles, classical and jazz

*2010 - Current*