

Zenna Tavares

ZENNATAVARES@GMAIL.COM – 617-642-6145 – 93 GORE STREET, APT 1, CAMBRIDGE, MA,
02141

CURRENT POSITION

Columbia University, Mortimer B. Zuckerman Mind Brain Behavior Institute and Data Science Institute

Innovation Scholar and Research Associate, since June 2020

EDUCATION AND ACADEMIC EXPERIENCE

Massachusetts Institute of Technology, Computer Science Artificial Intelligence Lab (CSAIL)

Postdoctoral Researcher, since January 2020

Advised by Armando Solar-Lezama. Co-advised by Joshua Tenenbaum.

Research focuses on probabilistic and causal reasoning in simulation models, combining tools from Bayesian inference, machine learning, probabilistic programming, program analysis and synthesis.

Massachusetts Institute of Technology, Department of Brain and Cognitive Sciences

Ph.D Cognitive Science and Statistics, 2011 - 2019

Advised by: Armando Solar-Lezama (Computer Aided Programming Group, CSAIL)

Affiliation: Joshua Tenenbaum (Computational Cognitive Science).

Thesis: “Imaginative Reasoning in Probabilistic Programs”

Thesis committee: Joshua Tenenbaum, Armando-Solar Lezama, Leslie Kaebbling, Thomas Icard

Imperial College London

MSc in Biomedical Engineering with Neurotechnology, 2009 - 2010

Advised by: Mauricio Barahona

Thesis: “Exploring Hierarchical Structure in Complex Brain Networks”

University of Nottingham

MEng in Electronic Engineering with Japanese, 2005 - 2009

First Class Degree with Honours

Dissertation: “XEAL: An XPU (CPU/GPU) Evolutionary Algorithm Library”

Osaka University, Japan – JST ERATO LAB

Visiting Student - OUSSEP Exchange Program, 2008

Reinforcement Learning with CB2Robot. Pruning in Fahlman neural networks

AWARDS AND FELLOWSHIPS

Fulbright Program - International Institute of Education

International Fulbright Science and Technology Award for Outstanding Foreign Students

Imperial College and Royal College of Art - Design London

Design Fellow on Innovation, Entrepreneurship and Design Program, 2011

Imperial College London

Imperial College Neurotechnology Brain Machine Interface Competition Prize

University of Nottingham

Farnell Project Student of the Year

PUBLICATIONS

Parametric Inversion of Non-Invertible Programs – *Z Tavares, J Burroni, E Minaysan, D Morejon, A Solar-Lezama* – POPL 2021, Languages for Inference 2021

A Language for Counterfactual Generative Models – *Z Tavares, J Koppel, X Zhang, A Solar-Lezama* – PROBPLOG 2020

Causal Inductive Synthesis Corpus – *Z Tavares, R Das, E Weeks, K Lin, J Tenenbaum, A Solar-Lezama* – NeurIPS 2020 Workshop on Computer Aided Programming

Synthesizing Programmatic Policies that Inductively Generalize – *JP Inala, O Bastani, Z Tavares, A Solar-Lezama* – International Conference on Learning Representations 2020

Predicate Exchange: Inference with Declarative Knowledge – *Z Tavares, J Burroni, E Minasyan, A Solar-Lezama, R Ranganath* International Conference on Machine Learning 2019

The Random Conditional Distribution *Z Tavares, X Zhang, E Minasyan, J Burroni, R Ranganath, A Solar-Lezama* – arXiv:1903.10556

Learning Distribution Sensitive Data Structures – *Z Tavares, A Solar-Lezama* – AAAI Spring Symposium 2017

Parametric Inverse Simulation – *Z Tavares, A Solar-Lezama* – NIPS 2016, Advances in Approximate Bayesian Inference Workshop

Smooth Nondeterministic Arrows – *Z Tavares, A Solar-Lezama* – NIPS 2015, Black-Box Inference Workshop (Best Paper)

Probabilistic Programming by Abstraction Refinement – *Z Tavares, A Solar-Lezama* – NIPS 2014, Probabilistic Programming Workshop

TEACHING AND MENTORSHIP

Masters of Engineering Advisor, *Massachusetts Institute of Technology, (2012-2020)*: Advised five MEng student theses.

Advisor in undergraduate research opportunity program (UROP), *Massachusetts Institute of Technology, (2012-2020)*. Advised seven UROP students.

Teaching Assistant in Lab in Visual Cognition, *Massachusetts Institute of Technology (Spring 2014)*. Lectured and graded for course in experimental design and statistical analysis of experimental data.

Teaching Assistant in Computational Cognitive Science, *Massachusetts Institute of Technology*, (Fall 2012):. Lectured, tutored and graded for large mixed undergraduate/graduate class.

WORK EXPERIENCE

Imperial College, Department of Mathematics

Research Assistant, 2010 - 2011

Research on combinatorial energy landscapes, graphical analysis of complex systems.

Cortexica Vision Systems

GPU Research Engineer, 2009 - 2010

Optimised core image recognition algorithm, reducing runtime of core CUDA loop from 30ms to 7ms. Devised parallel linear algebra routines such as QR matrix decomposition, matrix inversion.

Lokku – nestoria.com

Engineering Intern, January 2008 - May 2008

Learned programming skills as well as software development practices.

SELECTED TALKS

UCLA 2020

Common Sense Reasoning through Causal Probabilistic Programming

<https://www.youtube.com/watch?v=neCwSmbmmic>

Strange Loop 2017

Running Programs In Reverse For Deeper A.I.

www.thestrangeloop.com/2017/running-programs-in-reverse-for-deeper-a-dot-i.html

Strange Loop 2015

Probabilistic Programming That Makes Common Sense

www.youtube.com/watch?v=xxA766PrzQI

JuliaCon 2015

Julia as a Probabilistic Programming Language