Wilka Torrico De Carvalho, *Aspiring Brain Scientist*

Contact Information

Website: wcarvalho.io
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Google Scholar

Research Interests

• computational cognitive science • theoretical neuroscience • artificial neural networks

Education

University of Southern California, Los Angeles, California USA
Viterbi School of Engineering, M.S. in Computer Science, May 2017
Advisor: Yan Liu

Stony Brook University, Stony Brook, New York USA
College of Arts and Sciences, B.S. in Physics, May 2015
Advisor: Axel Drees
Honors Thesis: "*Modeling a Detection of Internally Reflected Cherenkov Light Particle Detector for High-Multiplicity Heavy-ion Collisions*"
Honors and Awards:
- Provost Award for Academic Excellence ($\sim 0.5\%$ of graduates chosen), 2015
- Researcher of the Month (1 school-wide per month), 2014

Brooklyn Technical High School, Brooklyn, New York USA
Diploma in Applied Physics, May 2011
Honor: USA National Achievement Scholarship Finalist (top 5% nationally), 2011

Positions

Machine Learning Research Intern, *September 2017 - December 2017 (expected)*
IBM Alamaden, San Jose, California USA

Machine Learning Research Intern, *June 2017 - August 2017*
VISA, Palo Alto, California USA

Honors and Awards

GEM Fellowship sponsored by IBM (declined)	2017
ICLR Travel Award	2017
NSF Graduate Research Fellowship (Neuroscience)	2015
HHMI Minority Undergraduate Research Fellowship	2014
Sigma Pi Sigma Physics Honor Society (only 2nd year student inducted)	2013
Scholar of Science, Technology, Engineering and Math	2012
NSF Louis Stokes Alliance for Minority Participation Scholar	2011
Deans List	2011-2015

Conference Publications

Sanjay Purushotham*, **Wilka Carvalho***, Yan Liu. "Variational Recurrent Adversarial Domain Adaptation" *In 5th International Conference on Learning Representations* (ICLR), 2017

Sanjay Purushotham*, **Wilka Carvalho***, Yan Liu. "Variational Adversarial Deep Domain Adaptation for Health Care Time Series Analysis" *In 29th Annual Conference on Neural Information Processing Systems Workshop on Machine Learning for Healthcare* (NIPS ML4HC), 2016 **(Spotlight)**

Wilka Carvalho. "Modeling a Detection of internally reflected Cherenkov light (DIRC) Particle Detector for High-Multiplicity Collisions." *State University of New York Undergraduate Research*

Compiled October 12, 2017
* implies equal contribution

Conference (SURC), 2015

Invited Talks

Machine Learning Lunch Seminar. University of Southern California. (April, 2017)

Symposium Presentations

"Variational Adversarial Deep Domain Adaptation for Healthcare Time Series." *Southern California Machine Learning Symposium.* California Institute of Technology, Pasadena, CA, 2016. **Runner-up, best poster**

"Modeling a DIRC Particle Detector for High-Multiplicity Collisions." *23rd Annual CSTEP Statewide Student Conference.* Bolton Landing, NY, 2015. **2nd place, physics and math**

"Modeling the Cognitive Process of Attributing Traits to Others." *Summer Seminar Day.* California Institute of Technology, Pasadena, CA, 2014.

"Modeling Deep Brain Stimulation of Globus Palidus Internus." *22nd Annual CSTEP Statewide Student Conference.* Bolton Landing, NY, 2014.

"Modeling a Detection of internally reflected Cherenkov light (DIRC) Particle Detector for High-Multiplicity Collisions." *URECA Celebration of Undergraduate Research & Creativity.* Stony Brook University, Stony Brook, NY, 2014.

"Modeling Deep Brain Stimulation of Globus Palidus Internus." *Poster Symposium.* University of Minnesota, Minneapolis, MN, 2013.

Research Experience

IBM Alamaden, San Jose, California USA
IBM Research, *September 2017 - Present*
Advisor: Bryant Chen
Leading development of an algorithm to defend convolutional neural networks from poisoning attacks using Tensorflow. The algorithm projects neural activations into a low-dimensional space, in which they are clustered to determine data authenticity. I motivated projecting into a lower-space, which improved our accuracy to a false-positive and false-negative below 2%. To study our algorithm and continue to develop techniques, I am doing extensive visual analyses of neural firing patterns.

Visa, Palo Alto, California USA
Visa Research, *June 2017 - Present*
Advisor: Jing Huang
Leading development of a deep learning model in Tensorflow that interfaces with the ParlAI natural language processing platform. The model employs bayesian inference and relational reasoning to infer and relate linguistic features in order to answer context-dependent questions.

University of Southern California, Los Angeles, California USA
Melady Machine Learning Lab, *November 2015 - May 2017*
Advisor: Yan Liu
Samsung and NSF funded project: "*Variational Adversarial Deep Domain Adaptation for Health Care Time Series Analysis*". Led development of a neural network model in Theano that employed variational methods and adversarial training to perform domain adaptation on multivariate time-series. Proposed analyses used in publications to empirically verfiy that our model (a) performed domain adaptation by creating domain-invariant representations and (b) transferrred temporal dependencies across domains. Research led to a publication and a patent.

Stony Brook Univeristy, Stony Brook, New York USA
Heavy Ion Research Group, *January 2013 - August 2015*
Advisor: Axel Drees

DOE funded project: "*Modeling a Detection of internally reflected Cherenkov light Particle Detector for High-Multiplicity Collisions*". Created a model for a DIRC particle detector and a corresponding Monte Carlo light simulator. Developed a pattern recognition algorithm that exploited physics, statistics, and geometry to identify particles from synthetic light data. Led software development of C++ libraries and programs used for simulations and analyses.

Stony Brook Univeristy, Stony Brook, New York USA
Computational Neuroscience Group, *Fall 2014*
Advisor: Giancarlo La Camera
NSF LSAMP funded project: "*Spectral Analysis of Rodent Neural Data*". Performed spectral analyses on neural data to determine behavioral correlates of neural activity.

California Institute of Technology, Pasadena, California USA
Emotion and Social Cognition Laboratory, *Summer 2014*
Advisor: Ralph Adolphs
HHMI funded project: "*Modeling the Cognitive Process of Attributing Traits to Others*". Developed a Trait Learning Task in which participants would learn about the distinguishing traits of other people by observing their behavior in various situations. Built a free, web-based, general-purpose platform existed to administer online psychology experiments with user-input contingent progression.

University of Minnesota, Minneapolis, Minnesota USA
Neuromodulation Research and Technology Laboratory, *Summer 2013*
Advisor: Matthew Johnson
NIH funded project: "*Modeling Deep Brain Stimulation of Globus Palidus Internus*". Wrote a python script that interfaced with the neural network simulation environment, "Neuron", to build a computational model of the network of neurons surrounding Globus Palidus Internus, and simulated Deep Brain Stimulation and the resultant neural activity.

National Central University, Jhongli City, Taiwan
Turbulent Combustion Laboratory, *Summer 2012*
Advisor: Shenqyang Shy
Project: "*Empricial Analysis of Theories from Fluid Dynamics*". Explored boundary layer conditions, and laminar and turbulent flow of fluids through pipes of varying cross-sections.

Teaching Experience

Stony Brook University, Stony Brook, NY
Calculus Instructor, *Spring 2015*
Worked with two math professors to develop and teach a supplementary calculus curriculum that promoted minority representation in stem majors.

Stony Brook University, Stony Brook, NY
Educational Opportunity Program Personal Tutor, *Spring 2013 - Fall 2014*
Tutored marginalized students in introductory physics and math courses.

Service

Student Volunteer, ICLR, 2017

Outreach

Research and Fellowships Week NSF Panel, Los Angeles, CA 2016
National Society of Black Engineers Grad Panel, Los Angeles, CA 2016
Graduate School External Fellowship Boot Camp, Los Angeles, CA 2016
Engineering Graduate Diversity Symposium, Los Angeles, CA 2015
Black Student Association: What it takes to go to Graduate School, Los Angeles, CA 2015
Collegiate Science and Technology Entry Program Undergraduate Research Panel, Stony Brook, CA 2014

Skills	Deep learning software: TensorFlow, Theano, Keras Neuroscience software: Neuron Languages: Python, C++, C, Java Operating systems: Unix, Linux, Windows
Interests	• traveling • chess • software development • improvisational dance • deadpan humor