miranda9@illinoi.edu
(956) 776-8681

Brando Miranda

303 W Green Street
Urbana, IL 61801

Google Scholar; Website; linkedin; github brando90; stack exchange; Quora

Education

Ph.D., Computer Science *2018-present*
University of Illinois Urbana-Champaign GPA: 3.72/4.0
Master of Engineering, Concentration: AI & Machine Learning *2014-2016*
Massachusetts Institute of Technology GPA: 4.8/5.0
Bachelor of Science, Computer Science & Engineering *2010-2014*
Massachusetts Institute of Technology minor in Mathematics & Music

Coursework

- Statistical Learning Theory
- Artificial Intelligence
- Probability
- Distributed Systems
- Computer System Security
- Intro. to Algorithms
- Multi-variable Calculus
- Intro. to Machine Learning
- Linear Algebra
- Computability & Complexity
- Differential Equations
- Computer System Engineering
- MDPS, Reinforcement Learning
- Mathematical Logic
- Algorithms for Inference (Probabilistic Graphical Models)
- Algorithmic Aspects of Machine Learning
- Design & Analysis of Algorithms
- Online Methods in Machine Learning
- Programming Language Semantics

Research Experience

Universisty of Illinois Urbana-Champaign - Urbana-Chmpaign, IL *September 2018 - Present*
Graduate Student

- PhD student with professor Sanmi Koyejo working on meta-learning and cognitively inspired deep learning methods for reasoning and theorem proving.

MIT CBMM (Center for Brain Minds & Machines) - Cambridge, MA *June 2015 - September 2018*
Research Assistant

- Research assistant with professor Tomaso Poggio working Deep Learning Theory
- Graduate research assistant; thesis topic: training methods for deep Gaussian Networks and function approximation for compositional function
- website at CBMM: https://cbmm.mit.edu/about/people/miranda

MIT CBMM (Center for Brain Minds & Machines) - Cambridge, MA *June 2016 - September 2018*
Research Mentor

- Research leader mentoring undergraduates with the Engineering of Intelligence Team (EIT) at MIT CBMM
- Engaged in mentoring and research with MIT undergraduates

MIT (Undergraduate Research Opportunity Program) - Cambridge, MA *June 2012 - August 2012*
Undergraduate Research Assistant

- Project: Crowd-Sourcing the Design of Drug-Delivery Vehicles for Cancer Treatment
- Developed user interface (UI) that enables the general population to design drug delivery vehicles for cancer treatment
- Built the communication network allowing reliable interaction amongst the user interface, database and back-end of the project
- Presented and explained the project to the research lab.

Publications

Q. Liao, Miranda B., Banburski A., Hidary, J., and Poggio, T., A Surprising Linear Relationship Predicts Test Performance in Deep Networks

Q. Liao, Miranda B., Hidary, J., and Poggio, T., Classical generalization bounds are surprisingly tight for Deep Networks. 2018.

A Banburski, Q Liao, B Miranda, L Rosasco, B Liang, J Hidary, T Poggio "Theory III: Dynamics and Generalization in Deep Networks". 2019

T. Poggio, Liao, Q., Miranda, B., Banburski, A., Boix, X., and Hidary, J., Theory IIIb: Generalization in Deep Networks. 2018.

C. Zhang, Liao Q., Rakhlin A., Sridharan K., Miranda B., Golowich N., and Poggio T., Theory of Deep Learning III: Generalization Properties of SGD. 2017.

T. Poggio, Mhaskar H., Rosasco L., Miranda B., and Liao Q., Why and when can deep-but not shallow-networks avoid the curse of dimensionality: A review, International Journal of Automation and Computing, pp. 1-17, 2017.

C. Zhang, Liao Q., Rakhlin A., Sridharan K., Miranda B., Golowich N., and Poggio T., Theory of Deep Learning III: Generalization Properties of SGD. 2017.

T. Poggio, Mhaskar H., Rosasco L., Miranda B., and Liao Q., Why and When Can Deep - but Not Shallow - Networks Avoid the Curse of Dimensionality: a Review. 2016.

Miranda B., Nasr A., Liao Q., T.Poggio Natural Language Understanding by Predicting Answer Quality on Stack Exchange. Work in progress with Engineering of Intelligence Team (EIT) at MIT CBMM

Liao Q., Miranda B., Ahmadi E., I. Jutamulia, M. Augustine, T.Poggio, MathNet: mathematics reasoning challenge for intelligent machines. Work in progress with Engineering of Intelligence Team (EIT) at MIT CBMM

Derek Kita, Brando Miranda, Hongtao Lin, Jerome Michon, David Favela, Juejun Hu, High-resolution on-chip digital Fourier transform spectroscopy, CLEO: Science and Innovations.

Derek Kita, Brando Miranda, Hongtao Lin, Jerome Michon, David Favela, Juejun Hu, Compact, scalable, high-resolution photonic waveguide-integrated Fourier transform spectroscopy.

Awards & Honors

- Computer Science Excellence Saburo Muroga Endowed Fellow, (2019-2020)
- Sloan Scholar, Alfred P. Sloan Foundations Minority Ph.D. (MPHD) Program, awarded in (2018-2019)
- Grainger Engineering SUREGE Fellowship, awarded in (2018-2019)
- Chopper Trading, LLC, Best Strategy Report award, MIT Battle Code AI competition (2013)
- MIT Mitchell B. Kaufman Memorial Scholarship (2012-2013, 2013-2014)
- MIT Eugene and Margaret (HM) McDermott Scholarship (2012-2013, 2013-2014)
- High Achievement Prize Award, Greengates School (2007, 2008, 2009, 2010), similar to Valedictorian
- Best all round student award, Greengates School (2010)
- Achievement Prize award, Greengates School (2006)
- Certificate for Progress award, Greengates School (2005)

Teaching experience

MIT CBMM - Cambridge, MA *September 2016 - December 2016*
Graduate Teaching Assistant

- Statistical Learning Theory & Applications (9.520/6.860) with professor Lorenzo Rosasco & Tomaso Poggio
- Made the first draft of course slides for OCW
- Graded final projects
- Provided extra support for office hours when needed

MIT EECS - Cambridge, MA *February 2016 - June 2016*
Graduate Teaching Assistant

- Introduction to Algorithms (6.006) with professor Nancy Lynch, Bruce Tidor and Aleksander Madry
- Held weekly office hours
- Helped prepare problem sets and exams
- Graded exams

MIT EECS - Cambridge, MA *September 2015 - December 2015*
Graduate Teaching Assistant

- Design & Analysis of Algorithms (6.046) with Shafi Goldwasser, Dana Moshkovitz, Nir N. Shavit
- Held weekly office hours
- Instructed students across weekly recitations
- Helped prepare problem sets and exams

MIT EECS - Cambridge, MA *February 2015 - May 2015*
Graduate Teaching Assistant

- Introduction to Machine Learning (6.036) with professor Tommi S Jaakkola, Suvrit Sra & Regina Barzilay
- Instructed students across bi-weekly recitations
- Held weekly office hours
- Helped prepare problem sets, projects and exams
- Graded problem sets, projects and exams

MIT EECS - Cambridge, MA *September 2014 - December 2014*
Graduate Teaching Assistant

- Mathematics for Computer Science (6.042) with professor F.Thomson Leighton & Ankur Moitra
- Instructed students across four recitations and problem solving sessions weekly
- Held weekly office hours
- Graded exams

MIT - Cambridge, MA *September 2012 - June 2013*
National Honor Society for Computer Science and Electrical Engineering (Eta Kappa Nu)

- Algorithms tutor for undergraduates at MIT

Industry experience

Rackspace - San Antonio, TX *June 2014 - August 2014*
Software Engineering Intern

- Built a concurrent proxy to extend the functionality of the Redis Database
- Added security functionality to the proxy
- Presented and delivered a demo to engineering team and higher level management

Adobe - San Jose, CA *June 2013 - August 2013*
Software Engineering Intern

- Developed and optimized Machine Learning software for Sentiment Analysis in Spanish
- Researched different machine learning and natural language processing (NLP) techniques to optimize the Nave Bayes algorithm
- Developed different methods for automatic extraction of training data
- Presented and delivered a demo to Adobe's engineering department

Projects

Function approximation with deep Neural and Gaussian Networks
Masters of Engineering Thesis, advised by professor Tomaso Poggio

- Researched the optimization landscape of Gaussian Networks with Gradient Descent
- Discovered a novel source of vanishing gradient impeding the training using backpropagation

Collaborative filtering for movie rating prediction
Matrix completion using mixture of Gaussians

- Designed questions and solutions with fellow TA He Sun and professor Tommi S Jaakola
- Helped implement code that solved project with EM algorithm for matrix completion

Survey in Statistical Learning Theory
Graduate project for class 9.520/6.860 2014

- Prepared a survey on Uniform Stability and Generalization in Learning theory
- Survey contained conceptual explanation to mathematical concepts in learning theory
- Survey also contained my own presentation of the proof for the theorems
- Survey can be read at: project report

Survey in Theoretical Computer Science
Project for graduate class in mathematics 18.409 2015

- Research paper survey on provable algorithms that require less computation time given more training examples
- In the case of SVM optimization PEGASOS requires less runtime assuming a target generalization
- When learning halfspaces over sparse vectors, more training examples reduce the training runtime from exponential to polynomial time
- Provided my unique outline of the main proof for halfspaces time reduction

Evaluating sublinear estimators for big data
undergraduate thesis project, advised by professor Samuel Madden

- Designed sub-linear sampling algorithms for estimating groups from big data in databases
- Designed and proved that the algorithmic estimators were statistically consistency and unbiased
- Experimentally evaluated the algorithms with synthetic data sets using the Mean Absolute Percentage Error

Road Runner
Persistent, fault-tolerant, high-performance KV store

- Built Multipaxos library for efficient consensus
- Optimized disk I/O with batching scheme
- Tested with mocks simulating RPC delays on unreliable, long-distance network

Dark Cloud
Secure, shared, cloud filesystem on untrusted server

- Designed layered cryptography scheme
- Implemented the cryptography API
- Report can be read here:: report report

BattleCode
Artificial Intelligence competition

- Wrote path finding algorithms & distributed combat strategy
- Finalists in competition pool of 300 teams
- Awarded *Best Strategy Report*

Certification

- Coursera: Learning how to Learn: Powerful mental tools to help you master tough subjects (with Honors), awarded by UC San Diego, Dr. Barbara Oakley, Dr. Terrence Sejnowski & Linda Walker
- Coursera: Mindshift: Break Through Obstacles to Learning and Discover Your Hidden Potential (with Honors), by McMaster University Dr. Barbara Oakley, Dr. Terrence Sejnowski & Linda Walker

Skills

Coding: Python, Matlab, OCaml, Java, Go, Javascript, Maude, Coq

Tools: Pytorch, Tensorflow, Unix, vim, git

Languages: English, Spanish (native fluency)

Leadership

UIUC Undergraduate Research Mentor - Urbana-Champaign, IL *May 2019 - Present*
Research Mentor

- Research mentor for Research Experience for Undergraduates (REU).
- Mentoring five undergraduate students on two projects: meta-learning and neural theorem proving)

MIT CBMM (Center for Brain Minds & Machines) - Cambridge, MA *June 2016 - May 2019*
Research Mentor

- Research leader mentoring undergraduates with the Engineering of Intelligence Team (EIT) at MIT CBMM
- Engaged in mentoring and research with MIT undergraduates

UIUC Bachata Sensual & Zouk (Latin Dance Group) - Urbana-Champaign, IL *January 2019 - Present*
President and Founder

- Founded the first Bachata Sensual & Zouk dance group at the UIUC campus
- Lead weekly practice and dance classes for students and local community members
- Organized first Bachata Sensual and Brazilian Zouk social with guest artist from Chicago

MIT Student Latin Dance Group - Cambridge, MA *September 2015 - July 2017*

- Lead an unofficial but committed student dance group under the guidance of MIT Casino Rueda
- Prepared and lead weekly dance practices
- Compiled a foundations Bachata dance curriculum

Undergraduate Practice Opportunity Program (UPOP) - Cambridge, MA *January 2011 - June 2011*

- Advanced professional skills with a one-week MIT intensive course and semester activities
- Advance "firm skills" through guided discovery learning, team decision-making, leadership skills, project engineering, cross cultural communication and recognizing the presence of an ethical dilemma with guidance of seasoned industry professionals and UPOP MIT faculty

Activities

MIT Chamber Music Society - Cambridge, MA *September 2011 - June 2014*
Jazz Musician

- Alto Saxophone player with MIT's Jazz combo as part of the Chamber Music Society lead by Boston jazz artist Keala Kaumeheiwa
- Performed, Composed and arranged several Jazz pieces

MIT Wind Ensemble (MITWE) - Cambridge, MA *February 2011 - June 2011*
Clarinetist

- Clarinet player with director Dr. Harris
- Performed with the Wind Ensemble at the MIT 150th Convocation

Websites

https://cbmm.mit.edu/about/people/miranda
https://www.linkedin.com/in/brando-miranda-40821046/
https://github.com/brando90
https://stackexchange.com/users/1589784/charlie-parker?tab=accounts
https://www.quora.com/profile/Brando-Miranda

Ethnicity

Latino/Hispanic, Mexican heritage.