Brando Miranda

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

Education

Ph.D. in Computer Science *2018-present*
University of Illinois at Urbana-Champaign GPA: 3.81/4.0
Master of Engineering in Electrical Engineering and Computer Science *2014-2016*
Massachusetts Institute of Technology GPA: 4.8/5.0
Bachelor of Science, Computer Science and 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
- 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
- Formal Software Development Methods
- Learning to Learn

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 program synthesis, theorem proving and reasoning .

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
- My 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

B. Miranda, O. Koyejo, Sketching: a Cognitively inspired Compositional Theorem Prover that Learns to Prove (In Prep.)

B. Miranda, S. W. Ko, O. Koyejo, When does oundation of Meta-learning: Meta-Learning Algorithms outperform Pre-trained models for Few Shot Learning? (In Prep.)

D. Ma, Q. Yang, J. Jiang, A. Andrade, B. Miranda, O. Koyejo, Isa-Gym: A Large Scale Machine Learning Data set and Reinforcement Learning environment for Theorem Proving in Isabelle (In Prep.)

B. Miranda, N. Podder, V. Shitole, D. Sun, O. Koyejo, Learning to Prove via Complexity Minimization (In Prep.)

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

A Banburski, Q Liao, B Miranda, L Rosasco, B Liang, J Hidary, T Poggio Q. Liao, Miranda B., Banburski A., Hidary, J., and Poggio, T., A Surprising Linear Relationship Predicts Test Performance in Deep Networks. 2018.

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

C. Zhang, Liao Q., Rakhlin A., Miranda B., Golowich N., and Poggio T., Theory of Deep Learning IIb: Optimization Properties of SGD. 2018.

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., Miranda B., Golowich N., and Poggio T., Theory of Deep Learning III: Generalization Properties of SGD. 2017.

Poggio T., Kawaguchi K., Liao Q., Miranda B., Rosasco L., Boix X., Hidary J., Mhaskar M. Theory of Deep Learning III: explaining the non-overfitting puzzle. 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.

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.

D. Kita, B. Miranda, H. Lin, J. Michon, D. Favela, J. Hu, High-resolution on-chip digital Fourier transform spectroscopy, CLEO: Science and Innovations. 2018.

D. Kita, B. Miranda, D. Favela, D. Bono, J. Michon, H. Lin, T Gu, J. Hu, High-performance and scalable on-chip digital Fourier transform spectroscopy. Nature communications 9 (1), 4405. 2018

Awards & Honors

- HSF (Hispanic Scholarship Fund) Scholar (2020)
- Honorable Mention, Ford Foundation Fellowship (2020)
- Most Cited Paper Certificate, International Journal of Automation & Computing (IJAC) (December 2019)
- 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 SURGE 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)
- Greengates Scholarship (30% 2007, 50% 2008, 100% 2009, 100% 2010)
- Achievement Prize award, Greengates School (2006)
- Certificate for Progress award, Greengates School (2005)

Presentations and Posters

Compact, Fourier transform spectroscopy (poster)	Materials Day MIT	*Cambridge, MA, November 2018*
Theories of Deep Learning (Poster)	MIT CBMM External Advisory Committee meeting	*Cambridge, MA, April 2018*
Theories of Deep Learning (Poster)	MIT Quest for Intelligence launch	*Cambridge, MA, March 2018*
Theories of Deep Learning (Poster)	MIT CBMM annual NSF meeting	*Cambridge, MA, March 2018*
Thesis presentation	Final M.Eng presentation MIT CBCL	*Cambridge, MA, August 2016*
Proxy for the Redis database	Rackspace Final Internship Presentations	*San Antonio, TX, August 2014*
Sentiment Analysis presentation	Adobes Engineering Department	*San Jose, CA, August 2013*

Academic Service

- ICLR 2020 (International Conference on Learning Representations) reviewer
- JMLR 2018 (Journal of Machine Learning Research) joint review with Qianli Liao

Service & Outreach

- Graduate advisor for Latinos in Computer Science (LCS) UIUC 2019-Present
- Outreach research mentorship Distributed Research Experiences for Undergraduates (DREU) UIUC 2019
- Outreach research mentorship Undergradudate Research Opportunity Program (UROP) MIT 2017-2018
- Outreach research mentorship Engineering of Intelligence Team (EIT) CBMM MIT 2017-2018

Teaching experience

UIUC - Cambridge, MA *August 2020 - present*
Graduate Teaching Assistant

- CS 446 Machine Learning
- Responsible for problem sets and exam design. Held weekly office hours.

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 MIT's OpenCourseWare (OCW)
- Graded final projects
- Provided extra support for office hours

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 Naive 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
- Certified Dance instructor with the World-Mastery program: completed the online training by world renowned artists Korke & Judith

Skills

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

Tools: Pytorch, Tensorflow, Unix, vim, git

Languages: English, Spanish (native fluency), Portuguese, Japanese (learning/beginner)

Leadership

UIUC Latinos in Computer Science (LCS) - Urbana-Champaign, IL *December 2019 - Present*
Graduate Advisor

- Graduate advisor for Latinos in Computer Science (LCS)
- Founded the "LCS professional & wellness development colloquium" speaker series for LCS.
- Organizing "LCS professional & wellness development colloquium" speaker series for LCS. Talks will be made available in the world wide web.

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

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

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://brando90.github.io/brandomiranda/
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

Family Background

Latino/Hispanic, Mexican heritage.