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Brando Miranda

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

EDUCATION

Ph.D., Computer Science

University of Illinois Urbana-Champaign

Master of Engineering, Concentration: AI & Machine Learning

Massachusetts Institute of Technology

Bachelor of Science, Computer Science & Engineering

Massachusetts Institute of Technology

2018-present

GPA: 3.72/4.0

2014-2016

GPA: 4.8/5.0

2010-2014

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

University of Illinois Urbana-Champaign - Urbana-Champaign, IL

Graduate Student

September 2018 - Present

- 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

Research Assistant

June 2015 - September 2018

- 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

Research Mentor

June 2016 - September 2018

- 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

Undergraduate Research Assistant

June 2012 - August 2012

- 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 IIb: 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 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)
- Achievement Prize award, Greengates School (2006)
- Certificate for Progress award, Greengates School (2005)

PRESENTATIONS AND POSTERS

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

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 Undergraduate Research Opportunity Program (UROP) MIT 2017-2018
- Outreach research mentorship Engineering of Intelligence Team (EIT) CBMM MIT 2017-2018

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 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: has completed the online training by world renowned artists Korke & Judith

SKILLS

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

Tools: Pytorch, Tensorflow, Unix, vim, git

Languages: English, Spanish (native fluency)

LEADERSHIP

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

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

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 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)

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 Latinos in Computer Science (LCS) - Urbana-Champaign, IL

December 2019 - Present

Graduate Advisor

- Graduate advisor for Latinos in Computer Science (LCS)
- Organizing professional development, research and graduate school advice for Spring 2020

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>

ETHNICITY

Latino/Hispanic, Mexican heritage.