# José Bento

| CONTACT INFORMATION | Computer Science Department<br>St. Mary's Hall, 2nd floor S., Boston College, Chestnut Hill, MA 02467 | office: +001 617 552 1780<br>e-mail: jose.bento@bc.edu |

**RESEARCH INTERESTS**

Distributed and parallel optimization; machine-learning and probabilistic graphical models; multi-robot planning; computer vision/graphics; emergence and control of antibiotic resistance; emergence and control of stable microbial communities.

**PROFESSIONAL AFFILIATION**

**Boston College**, Chestnut Hill, Massachusetts, USA

*Associate Professor* **2020 – present**

**Amazon Robotics**, Cambridge & Westborough, Massachusetts, USA

*Amazon Visiting Academic* **2020 – 2024**

**Boston College**, Chestnut Hill, Massachusetts, USA

*Assistant Professor* **2014 – 2020**

**Disney Research Boston**, Cambridge, Massachusetts, USA

*Post Doctoral Researcher* **2012 – 2014**
- Advisor: Jonathan Yeddidia

**EDUCATION**

**Stanford University**, Stanford, California, USA

*Doctor of Philosophy* **2008 – 2012**
- Principal advisor: Professor Andrea Montanari
- Co-advisor: Professor Iain Johnstone

*Master's Program* **2006 – 2008**

**Porto University**, Porto, Portugal

*Engineering Degree* **2001 – 2006**

**GRANTS, HONORS AND AWARDS**

NIH-NIAID, "A blind source separation approach for deconvolution of bulk transcriptional data leads to early detection of ATF cell-states in complex bacterial populations, in vitro and in vivo", (PI, 21%, $2.3M, [1]) , 2022–present

Amazon Machine Learning Award, "Distributed Large Scale Optimization", ($75k), 2018

NSF-IIS, "Design and Computation of Scalable Graph Distances in Metric Spaces: A Unified Multiscale Interpretable Perspective", (PI, 37.5%, $1.6M,[2]), 2017–2023

NIH-NIAID, "Predicting the Emergence of Antibiotic Resistance through Multi-omics Approaches and Immune System-Surveillance", (PI, 22.5%, $10M, [3]) , 2016–2021

Disney Inventor Award, "Method and Device for 3-Weight Message-Passing Optimization Scheme", 2014

RecSys-CAMRa Challenge winner, "Identifying users from their rating patterns", 2011

SIGWEB DocEng Best paper award, "Probabilistic document model", 2011

Doctoral Fellowship from Fundação para a Ciência e Tecnologia, Portugal, 2007-2010

Stanford University, Electrical Engineering, Departmental Fellowship, 2006 - 2007

Prize Infineon Technologies (top graduating student class of 2006), 2006

Porto University Engineering merit scholarship award (top 10 students), 2002-2006

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[1] https://reporter.nih.gov/project-details/10171121
[2] https://nsf.gov/awardsearch/showAward?AWD_ID=1741129
[3] https://www.niaid.nih.gov/research/systems-biology-consortium-antibacterial-resistance

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Papers accepted
to
peer–reviewed
journals

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L. Mi, A. Sheikholeslami, J. Bento, "A family of pairwise multi-marginal optimal transports that define a generalized metric", *Springer Machine Learning 112 (1), 353-384*, 2023.

G. Tsueng, M. Cano, J. Bento, C. Czech, M. Kang, L. Pache, ..., "Developing a standardized but extendable framework to increase the findability of infectious disease datasets", *Scientific Data 10 (1), 99*, 2023

G. Tsueng, M. Cano, J. Bento, C. Czech, M. Kang, L. Pache, ..., "Developing a standardized but extendable framework to increase the findability of infectious disease datasets", *Scientific Data 10 (1), 99*, 2023

G. França, J. Bento, "Distributed Optimization, Averaging via ADMM, and Network Topology", *Proceedings of the IEEE 108 (11), 1939-1952*, 2020.

Z. Zhu, D. Surujon, J. C Ortiz-Marquez, W. Huo, R. R Isberg, J. Bento, T. van Opijnen, "Entropy of a bacterial stress response is a generalizable predictor for fitness and antibiotic sensitivity", *Nature communications*, 2020.

D. Oh, J. Strattan, J. Hur, J. Bento, A. Urban, G. Song, J. Cherry, "cnn-peaks: chip-Seq peak detection pipeline using convolutional neural networks that imitate human visual inspection", *Scientific reports*, 2020.

A. Moharrer, J. Gao, S. Wang, J. Bento, S. Ioannidis, "Massively Distributed Graph Distances", *IEEE Transactions on Signal and Information Processing over Networks*, 2020.

J. Bento, S. Ioannidis, "A Family of tractable graph distances", *Applied Network Science*, 2019.

J. Bento, R. Furmaniak, S. Ray, "On the complexity of the weighted fused Lasso", *IEEE Letters in Signal Processing*, 2018.

G. França, J. Bento, "Markov chain lifting and distributed ADMM", *IEEE Letters in Signal Processing*, 2017.

T. van Opijnen, S. Dedrick, J. Bento, "Strain dependent genetic networks for antibiotic-sensitivity in a bacterial pathogen with a large pan-genome", *Plos Pathogens*, 2016.

N. Ben-Zvi, J. Bento, M. Mahler, J. Hodgins, A. Shamir, "Line-Drawing Video Stylization", *Computer Graphics Forum*, 2015.

N. Derbinsky, J. Bento, J. S. Yedidia, "Scalable methods to integrate task knowledge with the three-weight algorithm for hybrid cognitive processing via optimization," *Biologically Inspired Cognitive Architectures*, 2014.

J. Bento, M. Ibrahimi, "Support Recovery for the Drift Coefficient of High-Dimensional Diffusions", *IEEE Transactions on Information Theory*, 2013.

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Papers accepted
to
peer–reviewed
conferences

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J. Wang, J. Bento, "Optimal Activation Functions for the Random Features Regression Model", *International Conference on Learning Representations (ICLR)*, 2023

L. Yang, M. Saunders, J. Lachance, B. Palsson, J. Bento, "Estimating cellular goals from high-dimensional biological data", *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 2019.

S. Safavi, J. Bento, "Tractable n-metrics for multiple graphs", Spotlight talk only, *International Conference on Machine Learning, (ICML)*, 2019.

B. Jia, S. Ray, S. Safavi, J. Bento, "Efficient projection onto the perfect phylogeny model", *Advances in Neural Information Processing Systems (NIPS)*, 2018.

J. Bento, S. Ioannidis, "A Family of tractable graph distances", *SIAM International Conference on Data Mining (SDM)*, 2018.

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S. Safavi, B. Joshi, G. França, J. Bento, "An explicit convergence rate for Nesterov's method from SDP", *IEEE International Symposium on Information Theory (ISIT)*, 2018.

G. França, J. Bento, "An explicit rate bound for the over-relaxed ADMM", *IEEE International Symposium on Information Theory (ISIT)*, 2016.

J. Bento, N. Derbinsky, C. Mathy, J. Yedidia, "Proximal operators for multi-agent path planning", *Proceedings of the 29th National Conference on Artifical Intelligence (AAAI)*, 2015.

J. Bento, N. Derbinsky, C. Mathy, J. Yedidia, "Proximal operators for multi-agent path planning", *Proceedings of the 29th National Conference on Artifical Intelligence (AAAI)*, 2015.

C. Mathy, N. Derbinsky, J. Bento, J. Yedidia, "The boundary forest algorithm for online supervised and unsupervised learning", *Proceedings of the 29th National Conference on Artificial Intelligence (AAAI)*, 2015.

D. Krishnan, B. Freeman, J. Bento, D. Zoran, "Shape and Illumination from Shading using the Generic Viewpoint Assumption", *In Advances in Neural Information Processing Systems (NIPS)*, 2014.

J. Bento, N. Derbinsky, J. Mora, J. Yedidia, "A message-passing algorithm for multi-agent trajectory planning", *In Advances in Neural Information Processing Systems (NIPS)*, 2013.

J. Bento, S. Ioannidis, S. Muthukrishnan, and J. Yan, "A time and space efficient algorithm for contextual linear bandits", *Proceedings of the European Conference in Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)*, 2013.

N. Derbinsky, J. Bento, J. Yedidia, "Methods for integrating knowledge with the Three-Weight optimization algorithm for hybrid cognitive processing", *AAAI Fall Symposium on Integrated Cognition*, 2013.

J. Bento, S. Ioannidis, S. Muthukrishnan, J. Yan, "Group recommendations via multi-armed bandits", *Proceedings of the 21st International Conference on World Wide Web*, 2012.

N. Damera, J. Bento, "Ad insertion in automatically composed documents", *Proceedings of the 12th ACM Symposium on Document Engineering (DocEng)*, 2012.

N. Damera, J. Bento, E. O'Brien, "Probabilistic document model", *Proceedings of the 11th ACM Symposium on Document Engineering (DocEng)*, 2011.

J. Bento, N. Fawaz, A. Montanari, S. Ioannidis, "Identifying users from their rating patterns", *Proceedings of the 5th ACM Conference on Recommender Systems (RecSys)*, 2011.

J. Bento, M. Ibrahimi, A. Montanari, "Information theoretic limits on learning stochastic differential equations", *IEEE International Symposium on Information Theory (ISIT)*, 2011.

M. Bayati, J. Bento, A. Montanari, "The LASSO Risk: asymptotic results and real world examples", *In Advances in Neural Information Processing Systems (NIPS)*, 2010.

J. Bento, M. Ibrahimi, A. Montanari, "Learning networks of stochastic differential equations", *In Advances in Neural Information Processing Systems (NIPS)*, 2010.

J. Bento, A. Montanari, "Which graphical models are difficult to learn?", *In Advances in Neural Information Processing Systems (NIPS)*, 2009.

PAPERS ACCEPTED TO PEER-REVIEWED WORKSHOPS

G. França, J. Bento, "ADMM and Random Walks on Graphs", *Workshops In Advances in Neural Information Processing Systems (NIPS)*, 2017.

J. J. Zhu, J. Bento, "Generative adversarial active learning", *Workshops In Advances in Neural Information Processing Systems (NIPS)*, 2017.

G. França, J. Bento, "Markov chain lifting and the distributed ADMM", *Workshops In Advances in Neural Information Processing Systems (NIPS)*, 2016.

G. França, J. Bento, "Tuning the over-relaxed ADMM', *Workshops In Advances in Neural Information Processing Systems (NIPS)*, 2016.

N. Hao, A. Oghbaee, M. Rostami, N. Derbinsky, J. Bento, "Testing fine-grained parallelism for the ADMM on a factor-graph", *Proceedings of the Sixth IEEE Workshop on Parallel Computing and Optimization (IPDPS)*, 2016.

C. Mathy, F. Gonda, D. Shmidt, N. Derbinsky, A. Alemi, J. Bento, F. Delle Fave, J. Yedidia, "SPARTA: Fast global planning of collision-avoiding robot trajectories", *Workshops In Advances in Neural Information Processing Systems (NIPS)*, 2015.

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TECHNICAL
REPORTS

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D. Surujon, J. Bento, T. van Opijnen. "Boundary-Forest Clustering: large-scale consensus clustering of biological sequences", *bioRxiv:065870 v1.*, 2020.

S. Ray, B. Jia, S. Safavi, T. van Opijnen, R. Isberg, J. Rosch, J. Bento, "Exact inference under the perfect phylogeny model", *arXiv:1908.08623 [q-bio.QM]*, 2019.

Z. Zhu, D. Surujon, A. Pavao, J. Bento, T. van Opijnen, "Forecasting bacterial survival-success and adaptive evolution through multi-omics stress response-mapping, network analyses and machine learning", *bioRxiv: 387910.*, 2018.

G. França, J. Bento, "How is Distributed ADMM Affected by Network Topology?", *arXiv:1710.00889 [stat.ML]*, 2017.

J. Bento, J. J. Zhu, "A metric for sets of trajectories that is practical and mathematically consistent", *arXiv:1601.03094v1 [cs.CV]*, 2016.

N. Derbinsky, J. Bento, V. Elser, J. Yedidia, "An improved three-weight message-passing algorithm", *arXiv:1305.1961 [cs.AI]*, 2013.

J. Bento, "Learning graphical models, fundamental limits and efficient algorithms", *PhD Dissertation*, 2012.

J. Bento, A. Montanari, "On the trade-off between complexity and correlation decay in structural learning algorithms", *arXiv:1110.1769 [stat.ML]*, 2011.

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PATENTS AND
INVENTIONS

Method for aptamer selection and identification (US20220389407A1, Pending)

Method and device for multi-agent path planning (US10579926B2, Granted & Active)

Method and Device For Three-Weight Message-Passing Optimization Scheme (US9639813B2, Granted & Active)

Method and Device For Three-Weight Message-Passing Optimization Scheme Using Splines (US10572807B2, Granted & Active)

INDUSTRY
EXPERIENCE

**Amazon Robotics**, Cambridge & Westborough, Massachusetts, USA

*Amazon Visiting Scholar* **2020-2024**

Project 1: Researched movement optimization and congestion management algorithms for automated warehouses (Kiva-style `https://en.wikipedia.org/wiki/Amazon_Robotics`);
Team leader: `https://www.linkedin.com/in/jeremy-wyatt-0715161/`
Project 2: Researched and tested algorithms to solve very large mixed integer programming problems having in mind their use under solve-time constraint and distributed computing resources; These problems were related to finding optimal allocation objects to different regions on a warehouse;
Team leader: `https://www.linkedin.com/in/benmcclosky/`
Project 3: Developed an event-drive simulator from scratch that is a first -order approximation of an automated warehouse (Kiva-style `https://en.wikipedia.org/wiki/Amazon_Robotics`) where hundreds of robots interact and carry items to different types of stations; Implemented algorithms for path planning, collision avoidance, collision resolution, replanning, and floor-space reservations that approximate real-life behavior at Amazon's warehouses; Simulator was used to find optimal operating parameters for the warehouse;
Team leader: `https://www.linkedin.com/in/tyebrady/`

**Technicolor Labs**, Palo Alto, California, USA

*Summer intern* **2011**

Researched and implemented algorithms for identifying accounts used by multiple users in recommendation systems: Identified the problem as an important step in improving the accuracy of recommendation systems; Developed and compared in real data different algorithms for identifying users in a household from their rating patterns; Contributed for a project concerning recommendation for groups when feedback about their satisfaction is given and groups change over time; Co-Authored two patent application and two papers; Team leader: `https://www.linkedin.com/in/stratis-ioannidis-87b826110/`.

**Hewlett Packard Labs**, Palo Alto, California, USA

*Summer intern* **2010**

Researched and implemented algorithms for automated document composition based on mixed continuous/discrete Bayesian inference: Provided a clear understanding of the theory and computational tradeoffs underlying various HPLabs automated document composition algorithms; Derived fast parallel algorithms for implementation on GPU/server clusters; Implemented algorithm on GPU achieving a speedup of 2000x over reference MatLab implementation; Briefed and transferred knowledge to remote teams in China; Co-authored two patent applications and two papers; Team leader: `https://www.linkedin.com/in/ndv-1363822/`.

INVITED
PRESENTATIONS

"Optimal Activation Functions for the Random Features Regression Model", *The Eleventh International Conference on Learning Representations, Kigali Rwanda*, May 2023.

"Multi marginal optimal transport defines generalized metric", *Information Theory and Applications Workshop, San Diego*, February 2020.

"How should we (correctly) compare graphs?", *Computer Science Department, U. Mass Lowell*, September 2019.

"Tractable n-metrics for multiple graphs", *International Conference in Machine Learning, Spotlight, Long Beach*, June 2019.

"How should we (correctly) compare graphs?", *Open Data Science Conference, Boston*, May 2019.

"Graph Metric Spaces", *SIAM International Conference on Data Mining (SDM19), Calgary, Alberta Canada*, May 2019.

"Distributed Averaging via ADMM, Random Walks on Graphs and Markov Chain Lifting", *International Seminar & Workshop on Stochastic dynamics on large networks: Prediction and inference, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany*, October 2018.

"Graph Metric Spaces", *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, London, UK*, August 2018.

"Networks and large-scale optimization", *Open Data Science Conference, Boston*, May 2018.

"An improved explicit rate bound for Nesterov's accelerated method",*Coordinated Science Laboratory, University of Illinois, Urbana Champaign*, March 2018.

"ADMM and Random Walks on Graphs", *School of Electrical and Computer Engineering, Purdue University*, March 2018.

"ADMM and Random Walks on Graphs", *Coordinated Science Laboratory, University of Illinois, Urbana Champaign*, October 2017.

"An improved rate bound on Nesterov's scheme using IQC", *Electrical and Computer Engineering, Tufts University* , October 2017.

"Phylogenetic Tree Inference from Time Series Data", *School of Engineering, Porto University*, July 2017.

"Markov chain lifting and the distributed ADMM", *Information Theory and Applications Workshop, San Diego*, February 2017.

"Markov chain lifting and the distributed ADMM", *NIPS OPT Workshop, Barcelona*, December 2016.

"A metric for sets of trajectories", *Disney Research, Pittsburg*, July 2016.

"An explicit rate bound for the over-relaxed ADMM", *ISIT, Barcelona*, July 2016.

"Testing fine-grained parallelism for the ADMM on a factor-graph", *GPU Technology Conference*, April 2016

"A metric for sets of trajectories", *B-Spiral, Northeastern University*, March 2016.

"An explicit rate bound for the over-relaxed ADMM", *School of Engineering, Porto University*, February 2016.

"Learning stochastic differential equations", *NIPS 2015 Workshop on Modeling and inference for dynamics on complex interaction networks: joining up machine learning and statistical physics, Montréal*, December 2015.

"Variations on the Alternating Direction Method of Multipliers", *Graphical Models, Statistical Inference, and Algorithms workshop, University of Minnesota*, May 2015.

"Towards understanding the Boundary Forest algorithm", *New England Machine Learning Day, Microsoft Research, Cambridge*, May 2015.

"Towards understanding the Boundary Forest Algorithm", *School of Science, Porto University*, May 2015.

"A metric for sets of trajectories", *School of Engineering, Porto University*, January 2015.

"The Three-Weight Algorithm: a method for large scale distributed optimization", *Department of Electrical and Computer Engineering,Texas A&M University*, March 2014.

"The Three-Weight Algorithm: a method for large scale distributed optimization", *Center for Information and Systems Engineering, Boston University*, January 2014.

"Message-passing algorithms for general-purpose optimization based on ADMM ", *Information System Lab. Colloquium, Stanford University*, August 2013.

"Improved message-passing algorithm incorporating uncertainty information", *New England Machine Learning Day, Microsoft Research, Cambridge*, May 2013.

"Algorithms and fundamental limits in learning stochastic differential equations", *Electrical and Computer Engineering Department, Boston University*, April 2013.

"A time and space efficient algorithm for contextual linear bandits", *School of Science, Porto University*, January 2013.

"Which graphical models are difficult to learn?", *Information Theory and Applications Workshop*, February 2012.

"Learning stochastic differential equations", *Coordinated Sciences Laboratory, University of Illinois UC*, October 2011.

"Learning graphical models: results and challenges", *ECE Back To Basics Colloquium, Porto University*, September 2011.

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|---|---|
| Mentoring Experience | **Amazon Robotics**, Cambridge, Massachusetts, USA |

*Intern advisor for Ph.D. student*        **Summer 2021**
Worked with Shuangjun Liu on congested prediction algorithms for multiple robots on automated warehouses.

**Boston College**, Newton, Massachusetts, USA

*Post-doctoral advisor* **January 2023 − present**

Worked with Dr. Jacob Caudell on deconvolution algorithms for time series of bulk RNA-seq samples.

*Post-doctoral advisor* **January 2021 − March 2022**

Worked with Dr. Nazar Emirov on developing and analyzing novel algorithms for distributed optimization under adversarial network attacks.

*Post-doctoral advisor* **January 2021 − July 2022**

Worked with Dr. Josiah Couch on developing and analyzing novel algorithms for dynamic graph matching.

*Senior-thesis undergraduate advisor* **March 2020 − May 2023**

Worked with John Marangola, doing his Bachelor of Science in Computer Science, on developing fast homotopy algorithms for phylogeny inference.

*Post-doctoral co-advisor* **September 2020 − January 2022**

Worked with Dr. Dmitry Leshchiner on developing frameworks for systematically exploring the predictive power of different algorithms.

*Undergraduate advisor* **July 2021 − January 2022**

Worked with Yu Zhu, doing her Bachelor of Science in Biochemistry, on developing frameworks for systematically exploring the predictive power of different bioinformatics algorithms.

*Senior-thesis undergraduate advisor* **March 2020 − May 2022**

Worked with Jianxin Wang, doing his Bachelor of Science in Computer Science, on developing optimal activation functions by studying the Random Feature Regression model.

*Co-advisor of Ph.D. student* **August 2019 − June 2023**

Co-advised Stephen Hummel on algorithms for the automatic design of optimally-binding molecular complexes.

*Post-doctoral advisor* **October 2019 − August 2021**

Worked with Dr. Azadeh Sheikholeslami on developing novel algorithms to infer phylogenetic trees and mine biological networks.

*Senior-thesis undergraduate advisor* **February 2020 − April 2021**

Worked with Andres Rivera, doing his Bachelor of Science in Computer Science, on developing network models embeddings for biological networks.

*Advisor for visiting Ph.D. student* **June 2020 − September 2020**

Worked with Alireza Javani on developing novel algorithms to build network models from data.

*Advisor for visiting Ph.D. student* **October 2019 − May 2020**

Worked with Liang Mi on developing novel algorithms to solve the optimal transport problem.

*Advisor for visiting Ph.D. students* **May 2019 − August 2019**

Worked with Erin Teeple, and Neshat Mohammadi on graph data mining methods with applications to biology.

*Co-advisor of Ph.D. student* **January 2019 − December 2020**

Member of the thesis committee of Ph.D. student Defne Surujon from Boston College, being advised by Professor Tim van Opijnen. Co-advisor of Defne on several of her Ph.D. projects.

*Co-advisor of Ph.D. student* **January 2018 − Present**

Member of the thesis committee of Ph.D. student Armin Moharrer from Northeastern University, being advised by Professor Stratis Ioannidis. Co-advisor of Armin on some of his Ph.D. projects.

*Research Undergraduate Fellowship advisor* **September 2016 − July 2017**

Working with Dr. Babak Momeni, and undergraduate students Lorin Niehaus, Kevin Chen, Minghao Liu, and Kaitlin Chaung, to understand the emergence of bacterial communities.

*Post-graduate advisor* **September 2016 − October 2019**

Worked with Ray Surgyendu on algorithms for predicting the emergence of antibiotic resistance.

*Thesis committee* **December 2018**

Took part in the thesis committee of Ph.D. student Amir Bayegan from Boston College, being advised by Professor Peter Clote.

*Senior-thesis undergraduate advisor* **May 2018 − May 2019**

Worked with Shikun Wang on distributed algorithms for graph matching.

*Post-doctoral advisor* **January 2018 − April 2019**

Worked with Dr. Sam Safavi on algorithms for graph matching and algorithms for predicting the emergence of antibiotic resistance.

*Post-doctoral advisor* **September 2017 − June 2018**

Worked with Dr. Bei Jia on algorithms for predicting the emergence of antibiotic resistance.

*Thesis committee* **December 2017**

Took part in the thesis committee of Ph.D. student Sam Safavi from Tufts University, being advised by Professor Usman Khan.

*Advisor for visiting Ph.D. students* **May 2017 − September 2017**

Worked with Elaheh Noursadeghi, Sam Safavi and Tomislavon Petrovic on information theory bounds for time-series reconstruction, accelerated optimization methods and bayesian inference algorithms for phylogenetic tree reconstruction.

*Thesis committee* **September 2016**

Took part in the thesis committee of Ph.D. student Chenguang Xi from Tufts University, being advised by Professor Usman Khan.

*Post-doctoral advisor* **January 2016 − August 2017**

Worked with Dr. J.J. Zhu on active learning, their application to biology and computer vision algorithms for evaluation of tracking performance.

*Advisor for visiting Ph.D. students* **May 2016 − September 2016**

Worked with Mohammad Rostami, Bikash Joshi and Elaheh Noursadeghi on active learning, accelerated optimization methods and complexity bounds for learning time series.

*Post-doctoral advisor* **October 2015 − May 2016**

Worked with Dr. Guilherme França on distributed optimization.

*Advisor for visiting Ph.D. students* **May 2015 − August 2015**

Worked with AmirReza Oghbaee and Mohammad Rostami on optimal control and active learning using distributed algorithms.

*Post-doctoral advisor* **September 2014 − January 2015**

Worked with Dr. Ning Hao on distributed optimization and artificial intelligence.

**Disney Research Boston**, Cambridge, Massachusetts, USA

*Intern advisor for Ph.D. student* **Summer 2013 and Summer 2014**

Worked with Caglayan Dicle on computer vision (parallel) algorithms for multi-object tracking.

**Stanford University**, Stanford, California, USA

*Teaching assistant* **Fall 2007, Summer 2008**

Teaching assistant for graduate course in statistical signal processing (EE278). Grading position for graduate course in stochastic processes (STATS 217/218).

REFERENCES    Contact information provided upon request.