Jorge Ortiz, Ph.D.

[601 West 57 Street, Apt 5Q, NY, NY 10019]

jortiz@alum.mit.edu
http://jorgeortizphd.info

Education

- **University of California, Berkeley** — Berkeley, CA
  Doctor of Philosophy in Computer Science; — *May. 2010 – Dec. 2013*
  - Dissertation: A Platform Architecture for Sensor Data Processing and Verification in Buildings
- **University of California, Berkeley** — Berkeley, CA
  Masters of Science in Computer Science; — *Aug. 2007 – May 2010*
  - Thesis: Multichannel Reliability Assessment in Real World WSNs
  - Relevant Courses: Advanced Systems Seminar I & II, Graduate Networking, Sensor Networks Seminar, Combinatorial Algorithms, Parallel Computation Algorithms, Statistical Learning Theory, Practical Machine Learning.
- **Massachusetts Institute of Technology** — Cambridge, MA
  Bachelors of Science in Computer Science and Engineering; — *Aug. 1999 – May 2003*
  - Thesis: Connection Oriented Routing Environment (CORE): A Generalized Device Interconnect

Experience

- **IBM Research** — Yorktown Heights, NY
  Research Staff Member — *Dec. 2013 – Present*
  - Research work on a variety of topics related to distributed systems, mobile sensing, cloud-based middleware architectures, and machine learning.
- **Spire** — San Francisco, CA
  Senior Software Engineer — *Jan. 2013 – Sept. 2013*
  - Designed and wrote communication kernel for arduino-based, nano satellites.
- **Oracle Corporation** — Burlington, MA
  Software Engineer — *Sept. 2003 – Feb. 2007*
  - Assisted in designing, debugging, and maintaining several features in Oracle Enterprise Planning and Budgeting (EPB) software suite; include, but not limited to the setup of PL/SQL packages, schemas, and interfaces to the Javabased UI.

Skills

Proficient in: Java, Python, C

Experience/Familiar with: C++, Javascript, Perl, NesC, TinyOS, Android development

Fluent in: Spanish

Projects

- **Systems for Large-Scale Distributed Machine Learning**
  - Application programmers in domains like machine learning, scientific computing, and computational biology are accustomed to using powerful, high productivity array languages such as MatLab, R and NumPy. Distributed array frameworks aim to scale array programs across machines. High performance is necessary to facilitate broad experimentation. We have been examining various fundamental algorithms and system designed for increasing machine leanring job performance and completetion time.
  - Spartan [8] maximizes locality of access to distributed arrays. Such locality is critical for high performance. Spartan is a distributed array framework that automatically determines how to best partition (aka tile) n-dimensional arrays and to co-locate data with computation to maximize locality.

- **Systems for Distributed Machine Learning in Resource-constrained Environments**
  - Machine learning system for running machine learning in resource constrained environments, such as mobile phones.
  - Approximation techniques for cooperatively clustering images taken by phones in the same location, in real time.
  - Design of mechanisms and APIs for separating machine learning algorithm design from the distribued system complexities for lossy links and high-failure rates of mobile environments
- **Automatic Metadata Normalization of Sensor Feeds**
  - Machine learning techniques for characterizing timeseries sensor data into class types.
  - Active learning techniques where string formats are used to automatically parse contextual metadata embedded in sensor tag names [1] .
  - Transfer learning techniques to use models across sensor deployments in the similar deployment domains. For example, metadata models that can be applied across buildings [4, 5, 6] .

Select Publications

[1] Arka A. Bhattacharya, Dezhi Hong, David Culler, **Ortiz, Jorge**, Kamin Whitehouse, and Eugene Wu. "Automated Metadata Construction to Support Portable Building Applications(**Best Paper Honorbale Mention, 1st Highest Review Score**)". In: *Proceedings of the 2nd ACM International Conference on Embedded Systems for Energy-Efficient Built Environments*. BuildSys '15. Seoul, South Korea: ACM, 2015, pp. 3–12. ISBN: 978-1-4503-3981-0. DOI: 10.1145/2821650.2821667. URL: http://doi.acm.org/10.1145/2821650.2821667.

[2] Stephen Dawson-Haggerty, **Jorge Ortiz**, Xiaofan Fred Jiang, and David E. Culler. *The Effect of Link Churn on Wireless Routing*. 2008.

[3] Stephen Dawson-Haggerty, **Ortiz, Jorge**, Xiaofan Jiang, Jeff Hsu, Sushant Shankar, and David Culler. "Enabling Green Building Applications". In: *Proceedings of the 6th Workshop on Hot Topics in Embedded Networked Sensors*. HotEmNets '10. Killarney, Ireland: ACM, 2010, 4:1–4:5. ISBN: 978-1-4503-0265-4. DOI: 10.1145/1978642.1978648.

[4] Romain Fontugne, **Ortiz, Jorge**, Nicolas Tremblay, Pierre Borgnat, Patrick Flandrin, Kensuke Fukuda, David Culler, and Hiroshi Esaki. "Strip, Bind, and Search: A Method for Identifying Abnormal Energy Consumption in Buildings". In: *Proceedings of the 12th International Conference on Information Processing in Sensor Networks*. IPSN '13. Philadelphia, Pennsylvania, USA: ACM, 2013, pp. 129–140. ISBN: 978-1-4503-1959-1. DOI: 10.1145/2461381.2461399.

[5] Dezhi Hong, **Ortiz, Jorge**, Kamin Whitehouse, and David Culler. "Towards Automatic Spatial Verification of Sensor Placement in Buildings". In: *Proceedings of the 5th ACM Workshop on Embedded Systems For Energy-Efficient Buildings*. BuildSys'13. Roma, Italy: ACM, 2013, 13:1–13:8. ISBN: 978-1-4503-2431-1.

[6] Dezhi Hong, Hongning Wang, **Ortiz, Jorge**, and Kamin Whitehouse. "The Building Adapter: Towards Quickly Applying Building Analytics at Scale (**Best Paper Honorbale Mention, 2nd Highest Review Score**)". In: *Proceedings of the 2nd ACM International Conference on Embedded Systems for Energy-Efficient Built Environments*. BuildSys '15. Seoul, South Korea: ACM, 2015, pp. 123–132. ISBN: 978-1-4503-3981-0. DOI: 10.1145/2821650.2821657. URL: http://doi.acm.org/10.1145/2821650.2821657.

[7] Jeff Hsu, Prashanth Mohan, Xiaofan Jiang, **Ortiz, Jorge**, Sushant Shankar, Stephen Dawson-Haggerty, and David Culler. "HBCI: Human-building-computer Interaction". In: *Proceedings of the 2Nd ACM Workshop on Embedded Sensing Systems for Energy-Efficiency in Building*. BuildSys '10. Zurich, Switzerland: ACM, 2010, pp. 55–60. ISBN: 978-1-4503-0458-0. DOI: 10.1145/1878431.1878444.

[8] Chien-Chin Huang, Qi Chen, Zhaoguo Wang, Russell Power, **Jorge Ortiz**, Jinyang Li, and Zhen Xiao. "Spartan: A Distributed Array Framework with Smart Tiling". In: *2015 USENIX Annual Technical Conference (USENIX ATC 15)*. Santa Clara, CA: USENIX Association, July 2015, pp. 1–15. ISBN: 978-1-931971-225.

[9] Xiaofan Jiang, Jay Taneja, **Ortiz, Jorge**, Arsalan Tavakoli, Prabal Dutta, Jaein Jeong, David Culler, Philip Levis, and Scott Shenker. "An Architecture for Energy Management in Wireless Sensor Networks". In: *SIGBED Rev.* 4.3 (July 2007), pp. 31–36. ISSN: 1551-3688. DOI: 10.1145/1317103.1317109.

[10] **Jorge Ortiz**, Chien-Chin Huang, and Supriyo Chakraborty. *Get More With Less: Near Real-Time Image Clustering on Mobile Phones (*Under Submission.*)*

[11] **Ortiz, J.**, C.R. Baker, Daekyeong Moon, R. Fonseca, and I. Stoica. "Beacon Location Service: A Location Service for Point-to-Point Routing in Wireless Sensor Networks". In: *Information Processing in Sensor Networks, 2007. IPSN 2007. 6th International Symposium on*. 2007, pp. 166–175. DOI: 10.1109/IPSN.2007.4379676.

[12] **Ortiz, Jorge** and David Culler. "Multichannel Reliability Assessment in Real World WSNs". In: *Proceedings of the 9th ACM/IEEE International Conference on Information Processing in Sensor Networks*. IPSN '10. Stockholm, Sweden: ACM, 2010, pp. 162–173. ISBN: 978-1-60558-988-6. DOI: 10.1145/1791212.1791233.

[13] **Ortiz, Jorge**, Yongwoo Noh, Gavin Saldanha, David Su, and David Culler. "Towards Real-time, Fine-grained Energy Analytics in Buildings Through Mobile Phones". In: *Proceedings of the Fourth ACM Workshop on Embedded Sensing Systems for Energy-Efficiency in Buildings*. BuildSys '12. Toronto, Ontario, Canada: ACM, 2012, pp. 42–44. ISBN: 978-1-4503-1170-0. DOI: 10.1145/2422531.2422540.