Jorge Ortiz, Ph.D.

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Research Interests

My research research is in applied machine learning for sensor-based systems with a focus on sustainability and healthcare. I am interested how information is exchanged between humans and physically engineered systems and how to use this two-way exchange to improve both human quality of life and system outcomes.

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

Academic Appointments

- **Rutgers University** — New Brunswick, NJ
  Assistant Professor — *August 2018 – Present*
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Honors and Invited Talks

- Invited speaker at NSF Workshop on the Dynamic Interaction of Embodied Human and Machine Intelligence, May 2019

- Invited speaker ECE Seminar at Emory Univeristy, February 2019

- **Keynote speaker** Workshop on Smart and Connected Indoor Environments *in conjunction with IEEE International Conference on Sensing, Communication and Networking (SECON 2017)*

- Qualcomm Innovation Fellowship Finalist 2011

- NSF Graduate Fellowship Honorable Mention 2008

- Ford Foundation Diversity Fellowship Honorable Mention 2008

Conferences and Journals

[1] Raghu Ganti, Mudhakar Srivatsa, Dakshi Agrawal, Petros Zerfos, and **Jorge Ortiz**. "MP-trie: Fast Spatial Queries on Moving Objects". In: *Proceedings of the Industrial Track of the 17th International Middleware Conference*. Middleware Industry '16. Trento, Italy: ACM, 2016, 1:1–1:6.

[2] **Jorge Ortiz**, Catherine Crawford, and Franck Le. "DeviceMien: Network Device Behavior Modeling for Identifying Unknown IoT Devices (**Best Paper Finalist**)". In: *ACM/IEEE Conference on Internet of Things Design and Implementation*. ACM, 2019.

[3] Shiqiang Wang and **Jorge Ortiz**. "Non-negative matrix factorization of signals with overlapping events for event detection applications". In: *The 42nd IEEE International Conference on Acoustics, Speech and Signal Processing ICASSP 2017*. 2017.

[4] Dezhi Hong, Hongning Wang, **Jorge Ortiz**, and Kamin Whitehouse. "The Building Adapter: Towards Quickly Applying Building Analytics at Scale (**Best Paper Finalist, 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.

[5] Arka A. Bhattacharya, Dezhi Hong, David Culler, **Jorge Ortiz**, Kamin Whitehouse, and Eugene Wu. "Automated Metadata Construction to Support Portable Building Applications (**Best Paper Finalist, 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.

[6] 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, 2015, pp. 1–15.

[7] Romain Fontugne, **Jorge Ortiz**, 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, 2013, pp. 129–140.

[8] **Jorge Ortiz** 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.

[9] **Jorge Ortiz**, 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.

[10] Stephen Dawson-Haggerty, Xiaofan Jiang, Gilman Tolle, **Jorge Ortiz**, and David Culler. "sMAP: A Simple Measurement and Actuation Profile for Physical Information". In: *Proceedings of the 8th ACM Conference on Embedded Networked Sensor Systems*. SenSys '10. Zurich, Switzerland: ACM, 2010, pp. 197–210. ISBN: 978-1-4503-0344-6.

[11] Mehdi Maasoumy, **Jorge Ortiz**, David Culler, and Alberto Sangiovanni-Vincentelli. "Flexibility of Commercial Building HVAC Fan as Ancillary Service for Smart Grid". In: *IEEE Green Energy and Smart Systems Conference*. 2013.

Workshops, Demos and Technical Reports

[1] Stephen Dawson-Haggerty, **Jorge Ortiz**, Xiaofan Fred Jiang, and David E. Culler. "The Effect of Link Churn on Wireless Routing". In: UCB/EECS-2008-109 (2008). URL: http://www2.eecs.berkeley.edu/Pubs/TechRpts/2008/EECS-2008-109.html.

[2] Wei-Han Lee, **Jorge Ortiz**, Bongjun Ko, and Ruby B. Lee. "Time Series Segmentation through Automatic Feature Learning". In: *CoRR* abs/1801.05394 (2018). arXiv: 1801.05394. URL: http://arxiv.org/abs/1801.05394.

[3] Xiaofan Jiang, Jay Taneja, **Jorge Ortiz**, 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.

[4] **Jorge Ortiz**. "A Platform Architecture for Sensor Data Processing and Verification in Buildings". In: UCB/EECS-2013-196 (2013). URL: http://www2.eecs.berkeley.edu/Pubs/TechRpts/2013/EECS-2013-196.html.

[5] "An information-centric energy infrastructure: The Berkeley view". In: *Sustainable Computing: Informatics and Systems* 1.1 (2011), pp. 7 –22.

[6] Arsalan Tavakoli, Prabal Dutta, Jaein Jeong, Sukun Kim, **Jorge Ortiz**, David Culler, Phillip Levis, and Scott Shenker. "A Modular Sensornet Architecture: Past, Present, and Future Directions". In: *SIGBED Rev.* 4.3 (July 2007), pp. 49–54. ISSN: 1551-3688. DOI: 10.1145/1317103.1317112. URL: http://doi.acm.org/10.1145/1317103.1317112.

[7] **Jorge Ortiz** and David Culler. "Exploring Diversity: Evaluating the Cost of Frequency Diversity in Communication and Routing (**Best Poster Award**)". In: SenSys '08 (2008), pp. 411–412.

[8] Arka Bhattacharya, David E. Culler, **Jorge Ortiz**, Dezhi Hong, and Kamin Whitehouse. "Enabling Portable Building Applications through Automated Metadata Transformation". In: UCB/EECS-2014-159 (2014). URL: http://www2.eecs.berkeley.edu/Pubs/TechRpts/2014/EECS-2014-159.html.

[9] **Jorge Ortiz**. "A System for Managing Physical Data in Buildings". In: UCB/EECS-2010-128 (2010). Ed. by David E. Culler. URL: http://www2.eecs.berkeley.edu/Pubs/TechRpts/2010/EECS-2010-128.html.

[10] Dezhi Hong, **Jorge Ortiz**, Arka Aloke Bhattacharya, and Kamin Whitehouse. "Sensor-Type Classification in Buildings". In: *CoRR* abs/1509.00498 (2015). URL: http://arxiv.org/abs/1509.00498.

[11] Stephen Dawson-Haggerty, **Jorge Ortiz**, Xiaofan Jiang, Jeff Hsu, Sushant Shankar, and David Culler. "Enabling Green Building Applications". In: HotEmNets '10 (2010), 4:1–4:5.

[12] Arka Bhattacharya, David Culler, Dezhi Hong, Kamin Whitehouse, and **Jorge Ortiz**. "Automated Metadata Transformation for A-priori Deployed Sensor Networks". In: SenSys '14 (2014), pp. 364–365.

[13] Maanit Mehra, Aditya Bagri, **Jorge Ortiz**, and Xiaofan Jiang. "Image Analysis for Identifying Mosquito Breeding Grounds". In: IoTPDA '16 (2016).

[14] **Jorge Ortiz**, Chien-Chin Huang, and Supriyo Chakraborty. "Fast Image Clustering on Network of Mobile Phones". In: ICML '16 (2016).

[15] **Jorge Ortiz** and Younghun Kim. "Project Tidy: Ranking Time Series for Smart Energy Systems: Poster Abstract". In: BuildSys '16 (2016).

[16] Bong Jun Ko, **Jorge Ortiz**, Theodoros Salonidis, Maroun Touma, Dinesh Verma, Shiqiang Wang, Xiping Wang, and David Wood. "Acoustic Signal Processing for Anomaly Detection in Machine Room Environments: Demo Abstract". In: BuildSys '16 (2016).

[17] S. Lanzisera, S. Dawson-Haggerty, X. Jiang, H. Y. Cheung, J. Taneja, J. Lai, **J. Ortiz**, D. Culler, and R. Brown. "Wireless electricity metering of miscellaneous and electronic devices in buildings". In: (2011), pp. 16–19. DOI: 10.1109/FIIW.2011.6476843.

[18] Dezhi Hong, **Jorge Ortiz**, Kamin Whitehouse, and David Culler. "Towards Automatic Spatial Verification of Sensor Placement in Buildings". In: BuildSys'13 (2013), 13:1–13:8.

[19] **Jorge Ortiz**, Yongwoo Noh, Gavin Saldanha, David Su, and David Culler. "Towards Real-time, Fine-grained Energy Analytics in Buildings Through Mobile Phones". In: BuildSys '12 (2012).

[20] Jeff Hsu, Prashanth Mohan, Xiaofan Jiang, **Jorge Ortiz**, Sushant Shankar, Stephen Dawson-Haggerty, and David Culler. "HBCI: Human-building-computer Interaction". In: BuildSys '10 (2010), pp. 55–60.

Service

1. CPS-IoT Week 2019 Publication Chair (HSCC, ICCPS, IPSN, RTAS, IoTDI)

2. Richard Tapia Celebration in Diversity Poster Co-Chair 2018, Chair 2019

3. TPC Member Latinos in Artificial Intelligence Workshop NeurIPS 2018, ICML 2019

4. TPC Member Energy Data and Analytics Workshop at e-Energy 2018, 2019

5. TPC Member Sensys 2016 (Demo Session),

6. TPC Member IPSN 2014, 2017

7. TPC Member Buildsys 2016, 2017, 2018, 2019

8. Organizing Committee Sensys/Buildsys 2016, 2017

9. The 26th International Conference on Computer Communication and Networks (ICCCN 2017)

10. TPC Member 1st Workshop on Smart and Connected Indoor Environments (SCIE) in conjunction with IEEE International Conference on Sensing, Communication and Networking (SECON 2017)

11. TPC Member 1st Workshop on Internet of Thing Physical Data Analytics (IoTPDA) in conjunction with IEEE International Conference on Sensing, Communication and Networking (SECON 2016)

12. TPC Member DCOSS 2016 (The annual International Conference on Distributed Computing in Sensor Systems)

13. TPC Member ALGOSENSORS 2017

14. TPC IEEE workshop on Big Data Management for the Internet of Things (BIOT2017)

15. Member of CSGSA Faculty Candidate Evaluation Committee, UCB Computer Science Div. (2008, 2009, 2010)

16. President of CSGSA Faculty Candidate Evaluation Committee, UCB Computer Science Div. (2011)

17. Chair, Internet of Things Professional Interest Community (IoT-PIC) IBM Research at Watson Labs.

Patents

References

[1]   Jorge J Ortiz Theodoros Salonidis Rahul Urgaonkar Dinesh C Verma Xiping Wang
       Xiping Wang Keith William Grueneberg Bong Jun Ko. "Extending cloud computing to on-premises
       data". Patent US 9342357 (US). May 2016.

[2]   Jorge J Ortiz Theodoros Salonidis Rahul Urgaonkar Dinesh C Verma Xiping Wang
       Xiping Wang Keith W Grueneberg Bong Jun Ko. "Matching untagged data sources to untagged
       data analysis applications". Patent US 14/743,130 (US). June 2015.

Industry Experience

- **IBM Research**   Yorktown Heights, NY
  Research Staff Member   *Dec. 2013 – Aug. 2018*
    - Research work on systems and algorithms for physical analytics in buildings and IoT, deploying machine
      learning on resource constrained devices, and distributed systems and algorithms for large-scale machine
      learning applications.

- **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.

References

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