Jay Taneja

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RESEARCH INTERESTS

I develop and study computing systems applying sensing and communications technology on large-scale infrastructure systems in developing and industrialized regions. I also apply analytical tools to improve planning and operations of infrastructure systems.

RESEARCH EXPERIENCE

2017 Jan. University of Massachusetts – Amherst, U.S.A.

 Present Assistant Professor, Department of Electrical and Computer Engineering Adjunct Assistant Professor, Department of Computer Science Director, Systems Towards Infrastructure Monitoring and Analytics (STIMA) Lab Tenure-track faculty position

2013 Sept. IBM Research – Africa, Nairobi, Kenya

- 2016 Aug. Research Scientist

Supervisor: Dr. Kamal Bhattacharya (kamal@ke.ibm.com) Leads the lab's research team on energy, including formulating a research strategy, building an ecosystem of partners and collaborators, conducting research projects, and publishing results on improving electricity reliability, access, and quality in sub-Saharan Africa. Supervises team members, interns, and students on research projects on energy and transportation in the developing world.

2005 – University of California, Berkeley, U.S.A.

2013 Ph.D. Researcher

Advisor: Professor David Culler (culler@cs.berkeley.edu) Constructed a networked system for sculpting electricity loads to match the availability of renewable supplies. Designed and built a networked system for demand-controlled ventilation in an office building. Designed a solar-powered microweather station and deployed 50 units in a forest environment. Managed and demonstrated a 600-node outdoor wireless target tracking network to DARPA.

2008 May Microsoft Research – India, Bangalore, India

 Sept. Graduate Research Intern, Mobility, Networks, and Systems Group Supervisor: Dr. Venkat Padmanabhan (padmanab@microsoft.com) Designed a platform to enable a wide range of applications that use the sensors present on mobile phones. Demonstrated an opportunistic application on mobile phones to gather and stitch photographs of landmarks. Built a simulator to explore issues of scale in the emerging field of opportunistic sensing.

2004 Jun. Intel Corporation, Hudson, MA, U.S.A.

 Sept. Electrical Eng. Intern, Global Electrical Performance Verification Team Supervisor: Richard Gammack (Richard.Gammack@intel.com)
 Learned a 64-bit Intel chip design flow and design tools working on next-generation Itanium processor. Developed process to stitch together hierarchical RC SPEF networks. Collaborated with architects to correct connectivity mismatches between RTL code and circuit schematics.

2003 Jun. Eaton Corporation, Milwaukee, WI, U.S.A.

 Sept. Research Intern, Innovation Center, Embedded Systems and Comm. Group Supervisor: José A. Gutierrez (JoseGutierrez@eaton.com)
 Designed and demonstrated a bitwise IEEE 802.15.4 decoder in C using a digital logic analyzer. Composed and delivered project presentation to team, facility, and Chief Technology Officer.

EDUCATION

University of California, Berkeley

- 2013 Ph.D., Computer Science
 Advisor: Professor David Culler
 Dissertation: "Assessment and Methods for Supply-Following Loads in Modern
 Electricity Grids with Deep Renewables Penetration"
 Minors: Statistical Learning and Management of Technology Certificate
- 2007 Master of Science, Computer Science Advisor: Professor David Culler Thesis: "Design, Deployment, and Analysis of Sustainable Sensor Networks for Environmental Monitoring"
- 2005 The Ohio State University Bachelor of Science, Electrical and Computer Engineering Magna cum Laude

PEER-REVIEWED PUBLICATIONS * - Advisees/Interns

Conferences

Simone Fobi*, Joel Mugyenyi*, Vijay Modi, and <u>Jay Taneja</u>. "Predicting Levels of Household Electricity Consumption in Low-Access Settings." In the Proceedings of the Winter Conference on Applications of Computer Vision (WACV '22), January 2022.

Noah Klugman*, Joshua Adkins, Emily Paszkiewicz, Molly G. Hickman, Matthew Podolsky, <u>Jay</u> <u>Taneja</u>, and Prabal Dutta. "Watching the Grid: Utility-Independent Measurements of Electricity Reliability in Accra, Ghana." In Proceedings of the 20th International Conference on Information Processing in Sensor Networks (IPSN '21), May 2021.

Santiago Correa*, Zeal Shah*, and <u>Jay Taneja</u>. "This Little Light of Mine: Electricity Access Mapping Using Night-time Light Data." In The 12th ACM International Conference on Future Energy Systems (e-Energy '21), June 2021. Note paper.

Santiago Correa*, Lei Jiao, Aidas Jakubenas*, Roby Moyano, Jesus Omana Iglesias, and Jay Taneja. "Who's in Charge Here? Scheduling EV Charging on Dynamic Grids via Online Auctions with Soft Deadlines." In the 7th ACM International Conference on Systems for Energy-Efficient Built Environments, Cities, and Transportation (BuildSys'20), November 2020.

Amee Trivedi, Phuthipong Bovornkeeratiroj, Joseph Breda*, Prashant Shenoy, Jay Taneja, and David Irwin. "Phone-based Ambient Temperature Sensing Using Opportunistic Crowdsensing and Machine Learning." In the 11th International Green and Sustainable Computing Conference (IGSC 2020), October 2020. **Best Paper Award.**

Zeal Shah*, Feng-Chi Hsu, Christopher D. Elvidge, and Jay Taneja. "Mapping Disasters & Tracking Recovery in Conflict Zones Using Nighttime Lights." In the 10th IEEE Global Humanitarian Technology Conference (GHTC'20), November 2020.

June Lukuyu*, Aggrey Muhebwa*, and Jay Taneja. "Fish and Chips: Converting Fishing Boats for Electric Mobility to Serve as Minigrid Anchor Loads." In The 11th ACM International Conference on Future Energy Systems (e-Energy '20), June 2020. Acceptance Rate: 23% (29/125).

Santiago Correa*, Noman Bashir, Andrew Tran*, David Irwin, and Jay Taneja. "Extend: A Framework for Increasing Energy Access by Interconnecting Solar Home Systems." In the 3rd ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS '20), June 2020. Acceptance Rate: 33% (28/84).

Simone Fobi*, Terence Conlon, Jay Taneja, and Vijay Modi. "Learning to Segment from Misaligned and Partial Labels." In the 3rd ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS '20), June 2020. Note paper.

Zeal Shah*, Alex Yen*, Ajey Pandey*, and <u>Jay Taneja</u>. "GridInSight: Monitoring Electricity Using Visible Lights." In the 6th ACM International Conference on Systems for Energy-Efficient Built Environments, Cities, and Transportation (BuildSys'19), November 2019. **Nominated for Best Paper Award.**

Joseph Breda*, Amee Trivedi, Chulabhaya Wijesundara*, Phuthipong Bovornkeeratiroj, David Irwin, Prashant Shenoy, and <u>Jay Taneja</u>. "Hot or Not: Leveraging Mobile Devices for Ubiquitous Temperature Sensing." In the 6th ACM International Conference on Systems for Energy-Efficient Built Environments, Cities, and Transportation (BuildSys'19), November 2019.

Rob Fetter, June Lukuyu*, Krishnapriya Perumbillissery, Nathan Williams, and <u>Jay Taneja</u>. "Minigrids, Macro Development, and Economic Sustainability: Experiments in Minigrid Demand Stimulation." The 13th Annual Meeting of the Environment for Development Initiative (EfD), November 2019. **Non-archival.**

Gabriel Cadamuro^{*}, Aggrey Muhebwa^{*}, and <u>Jay Taneja</u>. "Street Smarts: Measuring Intercity Road Quality Using Deep Learning on Satellite Imagery." In the Second ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS 2019), July 2019.

Noah Klugman*, Joshua Adkins, Susanna Berkouwer, Kwame Abrokwah, Ivan Bobashev, Patrick Pannuto, Matthew Podolsky, Aldo Suseno, Revati Thatte, Catherine Wolfram, <u>Jay</u> <u>Taneja</u>, and Prabal Dutta. "Hardware, Apps, and Surveys at Scale: Measuring Low-Voltage Grid Reliability in Accra, Ghana." In the Second ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS 2019), July 2019.

Santiago Correa*, Noman Bashir, Jesus Omana Iglesias, Candace Saffery, and <u>Jay Taneja</u>. "Like a Good Neighbor, Solar is There." In the Tenth ACM International Conference on Future Energy Systems (e-Energy '19), June 2019. Noah Klugman*, Santiago Correa*, Patrick Pannuto, Matt Podolsky, <u>Jay Taneja</u>, and Prabal Dutta. "The Open INcentive Kit (OINK): Simplifying the Generation, Comparison, and Deployment of Incentive Systems." In the Tenth International Conference on Information and Communication Technologies and Development (ICTD X). January 2019.

Santiago Correa*, Noah Klugman*, and <u>Jay Taneja</u>. "Deployment Strategies for Crowdsourced Power Outage Detection." In the Ninth IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm '18). October 2018.

Noah Klugman*, Veronica Jacome, Meghan Clark, Matthew Podolsky, Patrick Pannuto, Neal Jackson, Aley Soud Nassor, Catherine Wolfram, Duncan Callaway, <u>Jay Taneja</u>, and Prabal Dutta. "Experience: Android Resists Liberation from Its Primary Use Case." In Proceedings of the 24th Annual International Conference on Mobile Computing and Networking (MobiCom '18). October 2018.

Joseph Breda* and <u>Jay Taneja</u>. "Fancy That: Measuring Electricity Grid Voltage Using a Phone and a Fan." In the First ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS 2018), June 2018.

Santiago Correa*, Noah Klugman*, and <u>Jay Taneja</u>. "How Many Smartphones Does It Take To Detect A Power Outage?" In the Ninth ACM International Conference on Future Energy Systems (e-Energy '18), June 2018. **Audience Choice Award.**

Noman Bashir, David Irwin, Prashant Shenoy, and <u>Jay Taneja</u>. "Enforcing Fair Grid Energy Access for Controllable Distributed Solar Capacity." In the Fourth ACM International Conference on Systems for Energy-Efficient Build Environments (BuildSys'17), November 2017. **Nominated for Best Paper Award.**

Nathan Williams*, Paulina Jaramillo, and <u>Jay Taneja</u>. "PV-array Sizing in Hybrid Diesel/PV/Battery Microgrids under Uncertainty." In the IEEE PES PowerAfrica Conference, June 2016.

Adedamola Adepetu* and <u>Jay Taneja</u>. "Filling Spatial and Temporal Gaps in Development Surveys Using Night Lights." In the UNESCO Chair Conference on Technologies for Development (Tech4Dev 2016), May 2016.

Douglas Fabini*, Diego Ponce de Leon Barido*, Akomeno Omu, and <u>Jay Taneja</u>. "Mapping Induced Residential Demand For Electricity in Kenya." In the Fifth ACM Symposium on Computing for Development (DEV-5), December 2014.

<u>Jay Taneja</u>. "Growth in Renewable Generation and its Effect on Demand-Side Management." In the Fifth IEEE International Conference on Smart Grid Communications (SmartGridComm'14), November 2014.

<u>Jay Taneja</u>, Ken Lutz, and David Culler. "The Impact of Flexible Loads in Increasingly Renewable Grids." In the Fourth IEEE International Conference on Smart Grid Communications (SmartGridComm'13), October 2013.

Jay Taneja, Virginia Smith, David Culler, and Catherine Rosenberg. "A Comparative Study of High Renewables Penetration Electricity Grids." In the Fourth IEEE International Conference on

Smart Grid Communications (SmartGridComm'13), October 2013.

<u>Jay Taneja</u>, Andrew Krioukov, Stephen Dawson-Haggerty, and David Culler. "Enabling Advanced Environmental Conditioning with a Building Application Stack." In Proceedings of the 4th International Green Computing Conference (IGCC '13), June 2013. **Best Paper Award.**

Stephen Dawson-Haggerty, Andrew Krioukov, <u>Jay Taneja</u>, Sagar Karandikar, Gabe Fierro, Nikita Kitaev, and David Culler. "BOSS: Building Operating System Services." In Proceedings of the 10th USENIX Symposium on Networked Systems Design and Implementation (NSDI '13), April 2013.

Nathan Murthy*, <u>Jay Taneja</u>, Kamil Bojanczyk, David Auslander, and David Culler. "Energy-Agile Laptops: Demand Response of Mobile Plug Loads Using Sensor/Actuator Networks." In the Third IEEE International Conference on Smart Grid Communications (SmartGridComm'12), November 2012.

Anil Aswani, Neal Master, <u>Jay Taneja</u>, Andrew Krioukov, David Culler, and Claire Tomlin. "Quantitative Methods for Comparing Different HVAC Control Schemes." In the Sixth International ICST Conference on Performance Evaluation Methodologies and Tools (VALUETOOLS'12), October 2012.

Tyler C. Jones, David M. Auslander, <u>Jay Taneja</u>, Jason Trager, Michael Sankur, and Therese Peffer. "Improved Methods to Load Prediction in Commercial Buildings." In the ACEEE Summer Study on Energy Efficient Buildings, August 2012.

Jason Trager, Michael Sankur, Jorge Ortiz, Tyler Jones, <u>Jay Taneja</u>, Dave Auslander, David E. Culler, and Paul K. Wright. "Rapidly Adaptable Plug-load Simulation for Evaluating Energy Curtailment Strategies." In the ACEEE Summer Study on Energy Efficient Buildings, August 2012.

Therese Peffer, David Auslander, Domenico Caramagno, David Culler, Tyler Jones, Andrew Krioukov, Michael Sankur, <u>Jay Taneja</u>, Jason Trager, Sila Kiliccote, Rongxin Yin, Yan Lu, and Prasad Mukka. "Deep Demand Response: The Case Study of the CITRIS Building at the University of California-Berkeley." In the ACEEE Summer Study on Energy Efficient Buildings, August 2012.

H.Y. Iris Cheung, Steven Lanzisera, Judy Lai, Richard Brown, Stephen Dawson-Haggerty, <u>Jay</u> <u>Taneja</u>, and David Culler. "Detailed Energy Data Collection for Miscellaneous and Electronic Loads in a Commercial Office Building." In the ACEEE Summer Study on Energy Efficient Buildings, August 2012.

Anil Aswani, Neal Master, <u>Jay Taneja</u>, Andrew Krioukov, David Culler, and Claire Tomlin. "Energy-efficient Building HVAC Control Using Hybrid System LBMPC." In the IFAC Conference on Nonlinear Model Predictive Control, August 2012.

<u>Jay Taneja</u>, Randy Katz, and David Culler. "Defining CPS Challenges in a Sustainable Electricity Grid." In the ACM/IEEE Third International Conference on Cyber-Physical Systems, April 2012. (Invited)

Anil Aswani, Neal Master, <u>Jay Taneja</u>, Virginia Smith, Andrew Krioukov, David Culler, and Claire Tomlin. "Identifying Models of HVAC Systems Using Semiparametric Regression." In

Proceedings of the American Control Conference, 2012.

Stephen Dawson-Haggerty, Steven Lanzisera, <u>Jay Taneja</u>, Richard Brown, and David Culler. "@scale: Insights from a Large, Long-Lived Appliance Energy WSN." In Proceedings of the 11th ACM/IEEE Conference on Information Processing in Sensor Networks, SPOTS Track (IPSN/SPOTS '12), April 2012.

Richard Brown, Steven Lanzisera, Hoi Ying (Iris) Cheung, Judy Lai, Xiaofan Jiang, Stephen Dawson-Haggerty, <u>Jay Taneja</u>, Jorge Ortiz, and David Culler. "Using Wireless Power Meters to Measure Energy Use of Miscellaneous and Electric Devices in Buildings." In the 6th International Conference on Energy Efficiency in Domestic Appliances and Lighting (EEDAL '11), Copenhagen, Denmark. May 2011.

<u>Jay Taneja</u>, David Culler, and Prabal Dutta. "Towards Cooperative Grids: Sensor/Actuator Networks for Renewables Integration." In the First IEEE International Conference on Smart Grid Communications (SmartGridComm'10), October 2010.

Xiaofan Jiang, Minh Van Ly, <u>Jay Taneja</u>, Prabal Dutta, and David Culler. "Experiences with a High-Fidelity Wireless Building Energy Auditing Network." In the Seventh ACM Conference on Embedded Networked Sensor Systems (SenSys'09), November 2009.

Prabal Dutta, <u>Jay Taneja</u>, Jaein Jeong, Xiaofan Jiang, and David Culler. "A Building Block Approach to Sensornet Systems." In the Sixth ACM Conference on Embedded Networked Sensor Systems (SenSys '08), November 2008.

Jay Taneja, Jaein Jeong, and David Culler. "Design, Modeling, and Capacity Planning for Micro-Solar Power Sensor Networks." In the Seventh International Conference on Information Processing in Sensor Networks Special Track on Platform Tools and Design Methods for Network Embedded Sensors (IPSN SPOTS '08), April 2008.

Prabal Dutta, Jonathan Hui, Jaein Jeong, Sukun Kim, Cory Sharp, <u>Jay Taneja</u>, Gilman Tolle, Kamin Whitehouse, and David Culler. "Trio: Enabling Sustainable and Scalable Outdoor Wireless Sensor Network Deployments." In the Fifth International Conference on Information Processing in Sensor Networks Special Track on Platform Tools and Design Methods for Network Embedded Sensors (IPSN SPOTS '06), April 2006.

Kamin Whitehouse, Gilman Tolle, <u>Jay Taneja</u>, Cory Sharp, Sukun Kim, Jaein Jeong, Jonathan Hui, Prabal Dutta, and David Culler. "Marionette: Providing an Interactive Environment for Wireless Debugging and Development." In the Fifth International Conference on Information Processing in Sensor Networks Special Track on Platform Tools and Design Methods for Network Embedded Sensors (IPSN SPOTS '06), April 2006.

Journals

Bob Muhwezi*, Nathan Williams, and <u>Jay Taneja</u>. "Ingredients for Growth: Examining Electricity Consumption and Complementary Infrastructure for Small and Medium Enterprises in Kenya." Development Engineering: Special Issue on Geospatial Analysis for Development, 6. 2021.

Feng-Chi Hsu, Mikhail Zhizhin, Tilottama Ghosh, Christopher D. Elvidge, and <u>Jay Taneja</u>. "The Annual Cycling of Nighttime Lights in India." Remote Sensing, 13 (6), 2021.

Christopher D. Elvidge, Mikhail Zhizhin, Tilottama Ghosh, Feng-Chi Hsu, and <u>Jay Taneja</u>. "Annual Time Series of Global VIIRS Nighttime Lights Derived From Monthly Averages: 2012 to 2019." Remote Sensing, 13 (5). 2021.

Amee Trivedi, Phuthipong Bovornkeeratiroj, Joseph Breda*, Prashant Shenoy, Jay Taneja, and David Irwin. "Phone-based Ambient Temperature Sensing Using Opportunistic Crowdsensing and Machine Learning." Sustainable Computing: Informatics and Systems, 29. 2021.

Simone Fobi*, Ayse Selin Kocaman, Jay Taneja, and Vijay Modi. "A Scalable Framework to Measure the Impact of Spatial Heterogeneity on Electrification." Energy for Sustainable Development, 60. 2021.

June Lukuyu^{*}, Robert Fetter, P.P. Krishnapriya, Nathan Williams, and Jay Taneja. "Building the Supply of Demand: Experiments in Mini-grid Demand Stimulation." Development Engineering, 6. 2020.

Christopher D. Elvidge, Feng-Chi Hsu, Mikhail Zhizhin, Tilottama Ghosh, <u>Jay Taneja</u>, and Morgan Bazilian. "Indicators of Electric Power Instability from Satellite Observed Nighttime Lights." Remote Sensing, 2020.

J.P. Carvallo*, <u>Jay Taneja</u>, Duncan Callaway, and Dan Kammen, "Distributed Resources Shift Paradigms on Power System Design, Planning, and Operation: an Application of the GAP Model", Proceedings of IEEE: Special Issue: "Electricity Access for All", September 2019. Noah Klugman*, Meghan Clark, Matthew Podolsky, Patrick Pannuto, <u>Jay Taneja</u>, and Prabal Dutta. "You Can't Teach a New Phone Old Tricks: Smartphones Resist Traditional Compute Roles." ACM GetMobile: Mobile Computing and Communications, 23(1), March 2019. (Invited)

Simone Fobi*, Varun Deshpande*, Samson Ondiek, Vijay Modi, and <u>Jay Taneja</u>. "A Longitudinal Study of Electricity Consumption Growth in Kenya." Energy Policy, 2018.

Noman Bashir, David Irwin, Prashant Shenoy, and <u>Jay Taneja</u>. "Mechanisms and Policies for Controlling Distributed Solar Capacity." ACM Transactions on Sensor Networks (TOSN), 2018.

Nathan Williams^{*}, Paulina Jaramillo, and <u>Jay Taneja</u>. "Investment Risk Assessment of Microgrid Utilities for Rural Electrification Using the Stochastic Techno-Economic Microgrid Model: A Case Study in Rwanda." Energy for Sustainable Development, 2017.

Diego Ponce de Leon Barido*, Simone Fobi Nsutezo*, and <u>Jay Taneja</u>. "The Natural and Capital Infrastructure of Potential Post-Electrification Wealth Creation in Kenya." Energy, Sustainability and Society, 2017.

Nathan Williams*, Paulina Jaramillo, <u>Jay Taneja</u>, and Taha Selim Ustun. "Enabling Private Sector Investment in Microgrid-based Rural Electrification in Developing Countries: A Review." Renewable and Sustainable Energy Reviews, 2015.

Steven Lanzisera, Stephen Dawson-Haggerty, H.Y. Iris Cheung, <u>Jay Taneja</u>, David Culler, and Richard Brown. "Methods for Detailed Energy Data Collection of Miscellaneous and Electronic Loads in a Commercial Office Building." Building and Environment, 2013.

Thomas Clasen, Douglas Fabini*, Sophie Boisson, <u>Jay Taneja</u>, Joshua Song*, Elisabeth Aichinger, Anthony Bui*, Sean Dadashi*, Wolf-Peter Schmidt, Zachary Burt, and Kara L.

Nelson. "Making Sanitation Count: Developing and Testing a Device for Assessing Latrine Use in Low-Income Settings." Environmental Science and Technology, 2012.

Anil Aswani, Neal Master, <u>Jay Taneja</u>, David E. Culler, and Claire Tomlin. "Reducing Transient and Steady State Electricity Consumption in HVAC Using Learning-based Model Predictive Control." Proceedings of the IEEE, volume 100, no. 1: 240-253. 2011.

Randy H. Katz, David E. Culler, Seth Sanders, Sara Alspaugh, Yanpei Chen, Stephen Dawson-Haggerty, Prabal Dutta, Mike He, Xiaofan Jiang, Laura Keys, Andrew Krioukov, Ken Lutz, Jorge Ortiz, Prashanth Mohan, Evan Reutzel, <u>Jay Taneja</u>, Jeff Hsu, and Sushant Shankar. "An Information-Centric Energy Infrastructure: the Berkeley View." Sustainable Computing: Informatics and Systems 1 (2011): 7-22. 2011.

Xiaofan Jiang, <u>Jay Taneja</u>, Jorge Ortiz, Arsalan Tavakoli, Prabal Dutta, Jaein Jeong, David Culler, Philip Levis, and Scott Shenker. "An Architecture for Energy Management in Wireless Sensor Networks." SIGBED Review - Special Issue on the Workshop on Wireless Sensor Network Architecture, Volume 4, Issue 3 (July 2007): 31-36. 2007.

Workshops

Simone Fobi*, Joel Mugyenyi, <u>Jay Taneja</u>, and Vijay Modi. I Spy With My Electricity Eye: Predicting Levels of Electricity Consumption for Residential Buildings in Kenya from Satellite Imagery." In the Machine Learning for the Developing World (ML4D) Workshop at NeurIPS 2020. December 2020.

June Lukuyu*, Myriam Shiran, Ryan Kennedy, and Jay Taneja. "Comparing Decentralized Electricity Customers and Their Patterns in East Africa." In the 5th Annual Meeting of the Sustainable Energy Transitions Initiative (SETI'20), September 2020.

Lefu Maqelepo, Nathan Williams, and Jay Taneja. "Assessment of Subsidies for Rural Grid Electrification in East Africa." In the 5th Annual Meeting of the Sustainable Energy Transitions Initiative (SETI'20), September 2020.

Gabriel Cadamuro, Aggrey Muhebwa*, and <u>Jay Taneja</u>. "Assigning a Grade: Accurate Measurement of Road Quality Using Satellite Imagery." In the Machine Learning for the Developing World (ML4D) Workshop at NeurIPS 2018. November 2018.

Steven Lanzisera, Stephen Dawson-Haggerty, Xiaofan Jiang, Hoi Ying Cheung, <u>Jay Taneja</u>, Judy Lai, Jorge Ortiz, David Culler, and Richard Brown. "Wireless Electricity Metering of Miscellaneous and Electronic Devices in Buildings." In the 2011 Future of Instrumentation International Workshop, November 2011.

Prabal Dutta, Mark Feldmeier, <u>Jay Taneja</u>, Joseph Paradiso, and David Culler. "Energy Metering for Free: Augmenting Switching Regulators for Real-Time Monitoring." In the International Symposium on Low-Power Electronics and Design (ISLPED '08) Design Contest, August 2008. Design Contest winner.

Xiaofan Jiang, <u>Jay Taneja</u>, 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 the International Workshop on Wireless Sensor Network Architecture (WWSNA'07), April 2007.

Phoebus Chen, Songhwai Oh, Michael Manzo, Bruno Sinopoli, Cory Sharp, Kamin Whitehouse, Gilman Tolle, Jaein Jeong, Prabal Dutta, Jonathan Hui, Shawn Schaffert, Sukun Kim, Jay <u>Taneja</u>, Bonnie Zhu, Tanya Roosta, Michael Howard, David Culler, and Shankar Sastry. "Experiments in Instrumenting Wireless Sensor Networks for Real-Time Surveillance." In the 2006 IEEE International Conference on Robotics and Automation (ICRA '06). Video and Poster.

Other

Stephen J. Lee, Dhruv Suri, Priyanshi Somani, Christopher L. Dean, Jason Pacheco, Robert Stoner, Ignacio J. Perez-Arriaga, John W. Fisher, and <u>Jay Taneja</u>. "How Probabilistic Electricity Demand Forecasts Can Expedite Universal Access to Clean and Reliable Electricity." Energy and Economic Growth (EEG) Programme Working Paper Series, July 2021.

J.P. Carvallo, Feng-Chi Hsu, Zeal Shah*, and Jay Taneja. "Frozen Out in Texas: Blackouts and Inequity." Rockefeller Foundation Blog, April 2021. <u>Link</u>. [Press: <u>Forbes</u>, <u>UMass</u>]

June Lukuyu*, Anvita Patel*, and <u>Jay Taneja</u>. "Identifying Opportunities to Electrify Diesel-Powered Irrigation Pumps Using Remote Sensing Data in Ethiopia." Accepted for Oral Presentation at the American Geophysical Union Fall 2020 Meeting –Session on Sustainable Energy Transitions in the Developing World I (GC094), December 2020.

Zeal Shah* and <u>Jay Taneja</u>. "Monitoring Electric Grid Reliability Using Satellite Imagery Data." In the 6th ACM International Conference on Systems for Energy-Efficient Built Environments, Cities, and Transportation (BuildSys'19), November 2019. Poster. **Best Poster Award.**

Simone Fobi*, Terence Conlon, <u>Jay Taneja</u>, and Vijay Modi. "Using Remote Sensed Data to Understand & Predict Residential Electricity Demand in Kenya." In the RITE-IIASA Demand Workshop, November 2019. Poster. **Best Poster Award (Distinguished).**

SERVICE

National Science Foundation (U.S.) – Review Panel for Cyber-Physical Systems (CPS) – 12/4/2020 + 12/7/2020

ACM COMPASS – Conference

- Technical Program Committee 2016 (ACM DEV), 2018-2021
- Track Chair (Energy, IoT, and Smart Cities) 2020
- Poster Program Committee 2019
- Poster Session Chair 2016 (ACM DEV)
- ACM e-Energy Conference
- Technical Program Committee 2015, 2018-2022
- Travel Grants Chair 2018, 2020
- Publications Chair 2016
- Information and Communication Technologies on Development (ICTD) Conference
- Technical Program Committee 2017, 2019, 2020, 2022
- ACM BuildSys Conference
- Technical Program Committee 2016
- Poster Program Committee 2021
- IARIA ENERGY Conference
- Technical Program Committee 2016, 2020, 2021

N2Women 2019 – Networking Networking Women – Workshop – Poster Program Committee ACM Richard Tapia Celebration of Diversity in Computing - Poster Program Committee – 2018, 2019

IEEE PowerAfrica 2018 – Conference – Technical Program Committee IEEE PerEnergy 2016 – Workshop – Technical Program Committee ACM DEN 2015 – Workshop (co-located with ACM e-Energy) – Co-Chair IEEE AfriCon 2015 – Conference – Technical Program Committee IFIP/IEEE SustainIT 2015 – Conference – Technical Program Committee

IFIP/IEEE SustainI I 2015 – Conference – Technical Program Committee

IEEE PerEnergy 2015 – Workshop – Technical Program Committee

UMass ECE Department

- Diversity, Equity, and Inclusion Committee Founder and Chair, 2020-2022
- Undergraduate Social Events Committee Co-Chair, 2019-2020
- Department Personnel Committee Member (Elected), 2018-2019
- Seminar Committee, 2017-2018

UMass Spaulding-Smith Graduate Diversity Fellowship – Committee Member, 2020-2022

INVITED TALKS / PARTICIPATION

2021 – 17 Rooms Workshop on UN Sustainable Development Goals – Room 7 – Sustainable Energy For All – Participant (Host: Brookings Institution and Rockefeller Foundation) 5/27/2021 – Energy and Economic Growth (EEG) Programme – "Frontiers in Energy Modeling" – Panel (Host: Benjamin Klooss)

3/23-24/2021 – NSF Power Systems Engineering Research Center (PSERC) – "Grid at the Edge" Workshop Participant (Host: Mladen Kezunovic)

12/2/2020 – World Bank Africa GIS Team – Seminar (Host: Rhonda Jordan-Antoine)

11/25/2020 – African Utility Week – Panel (Host: Clarion Events)

1/23/2020 – AIIP Fellowship kickoff (Host: Persis Asher)

11/13/2019 – RITE-IIASA Demand Workshop (invited) (Host: Shonali Pachauri)

6/20/2019 – SEforAll Charrettes Partners' Session (Host: Glenn Pearce-Oroz)

4/29/2019 – MIT e4Dev Group (Host: Ignacio Perez-Arriaga and Stephen Lee)

2/4/2019 – Busara Center for Behavioral Economics (Host: James Vancel)

1/31/2019 – Carnegie Mellon University Africa – Kigali, Rwanda (Host: Nathan Williams)

12/10/2018 – Rockefeller Foundation – Drinks and Thinks Event (Host: Evan Tachovsky)

11/26/2018 – UMass CICS – Data Science Tea (Host: Brant Cheikes)

10/1/2018 – World Bank – ESMAP (Host: Dana Rysankova)

7/26/2018 - Power For All - Utilities 2.0 Conference (Host: Kristina Skierka)

7/23/2018 – gMin (Host: Lola Aleru)

7/20/2018 – M-KOPA – Business Analytics (Host: David Damberger)

7/12/2018 – IBM Research – Africa (Host: Skyler Speakman)

6/21/2018 – Breakthrough Institute – Breakthrough Annual Dialogue (Host: Todd Moss)

5/17/2018 – Duke University – Sustainable Energy Transitions Initiative Annual Conference (Host: Kyle Bradbury)

5/14/2018 – University of Connecticut – Civil and Environmental Engineering and Eversource Research Center (Host: Manos Anagnostou)

5/8/2018 – Columbia University – Electrical Engineering and Data Science Institute (Host: Fred Jiang)

5/8/2018 – Rockefeller Foundation – Data Analytics for Energy Bootcamp (Host: Clare Boland Ross)

4/11/2018 – Northwestern University – Electrical and Computer Engineering (Host: Ermin Wei)

- 4/10/2018 Northwestern University Microgrids Symposium (Host: Eric Masanet)
- 2/24/2018 National Rural Electric Cooperatives Association (Host: Dan Waddle)

11/10/2017 – Columbia University – Mechanical Engineering (Host: Vijay Modi)

9/6/2017 – Georgia Tech (Host: Valerie Thomas)

7/6/2017 – Lawrence Berkeley National Lab – Energy and Environmental Technologies Division (Host: Rich Brown)

- 6/30/2017 Millennium Challenge Corporation (Host: Hana Freymiller)
- 6/29/2017 World Bank (Host: Rhonda Jordan)
- 5/18/2017 Duke University Energy Initiative (Host: Kyle Bradbury)
- 4/25/2017 IEEE Springfield (MA) Chapter (Host: Ken Harstine)
- 4/5/2017 UN Sustainable Energy for All (SE4All) Annual Conference (Host: Vijay Modi)
- 10/13/2016 Carnegie Mellon University Africa Kigali, Rwanda (Host: Paulina Jaramillo)

TEACHING EXPERIENCE

2017 Jan. University of Massachusetts, Amherst

present Engineering 100 (Introduction to Engineering) – Fall 2018, 2019, 2020, 2021
 ECE 597DE/697DE (Data-Enabled Electricity Networks) – Spring 2021
 ECE 331 (Computer Organization and Design – Co-Instructor) – Spring 2018
 ECE 597ED/697ED (Electricity Delivery and Infrastructure in the Developing
 World) – Fall 2017, 2018, 2019
 ECE 232 (Computer Organization and Design – Co-Instructor) – Spring 2017

2005 Aug. University of California, Berkeley

– Dec. Graduate Student Instructor under the guidance of Prof. Babak Ayazifar (babak@eecs.berkeley.edu).

Head teaching assistant for EECS 20N, an introductory course on signals and systems. Led weekly meetings to coordinate team of nine teaching assistants for a course with enrollment of 230 students. Served as chief liaison between professor and teaching team. Also taught weekly laboratory and discussion sections along with grading laboratory write-ups.

STUDENTS ADVISED

*sole advisor, ^co-advised, +on committee

Ph.D. Advisees

- *Mercy Kyatha (UMass) Electrical and Computer Engineering (2021-present)
- *Civian Kiki Massa (UMass) Electrical and Computer Engineering (2021-present)
- *Bob Muhwezi (UMass) Electrical and Computer Engineering (2019-present)
- *June Lukuyu (UMass) Electrical and Computer Engineering (2018-present)
- *Aggrey Muhebwa (UMass) Electrical and Computer Engineering (2018-present)
- *Zeal Shah (UMass) Electrical and Computer Engineering (2018-present)
- *Santiago Correa Cardona (UMass) Electrical and Computer Engineering (2017present)
- ^Simone Fobi (Columbia) Mechanical Engineering, analysis and prediction of electricity consumption patterns among sub-Saharan African consumers (2016-present)
- Noah Klugman (University of Michigan / University of California, Berkeley) Electrical

Engineering and Computer Sciences (2016-present)

- Gabriel Cadamuro (University of Washington) Computer Science, built machine learning models to develop road quality predictions using satellite mapping imagery in urban and rural sub-Saharan Africa (2016-2019)
- Adedamola Adepetu (University of Waterloo) Computer Science, built machine learning models for using satellite night light imagery to interpolate socioeconomic data over time and space for Kenya and Nigeria (2015-2016)
- ^Nathan Williams (Carnegie Mellon) Engineering and Public Policy, built a technoeconomic model for analyzing investment risks of private capital in microgrids for electricity access (2015-2017)
- Diego Ponce de León Baridó (UC Berkeley) Energy and Resources Group, created a metric for the intensity of microenterprise development across Kenya to be used for determining latent nonresidential electricity demand (2014-2015)
- Douglas Fabini (UC Santa Barbara) Materials Science and Engineering, formulated and evaluated a methodology for determining latent residential electricity consumption for unelectrified locales in Kenya (2014)

Ph.D. Committees

- +Akansha Bansal (UMass) Electrical and Computer Engineering (2021-present)
- +Noman Bashir (UMass) Electrical and Computer Engineering (2021-present)
- +Jorge Izar (Carnegie Mellon) Engineering and Public Policy (2019-2021)
- +Isa Ferrall (UC Berkeley) Energy and Resources Group (2019-present)
- +Thiago Teixeira (UMass) Electrical and Computer Engineering (2019)
- +Stephen Lee (MIT) Electrical Engineering and Computer Science (2019-present)
- +Juan Pablo Carvallo (UC Berkeley) Energy and Resources Group, models for electricity system expansion in emerging markets (2018-2019)
- +Rodrigo Mercado Fernandez (UMass) Industrial Engineering, using multi-criteria decision analysis to study electricity generation plans for Mexico (2017-2020)
- +Dong Chen (UMass) Electrical and Computer Engineering, privacy-preserving energy data analytics for solar photovoltaics (2017-2018)
- +Destenie Nock (UMass) Industrial Engineering, model for integration of renewables into grid planning systems (2017-2019)

M.S.

- *Abhiraksha Pattabhiraman (UMass) Electrical and Computer Engineering, analysis of joint undergrounding of electricity distribution and fiber optic infrastructure (2021present)
- *Shuya Zhang (UMass) Electrical and Computer Engineering, design of control systems for energy access minigrids in East Africa (2018-2019)
- *Daksha Naik (UMass) Electrical and Computer Engineering, targeting of demand response via smart meter data analysis in Kenya (2018-2019)
- Neha Yadav (UMass) Computer Science, design of a system for measuring roof size and type using satellite imagery (2017)
- Simone Fobi (Stanford) Environmental Engineering, design and analysis of an optimization model for directing energy storage research for applications in off-grid electricity systems in Kenya and development of a GIS-based model for selecting optimal off-grid electricity sources for Kenya (2014-2015)

- Majid Khan (UC Berkeley) Industrial Engineering and Operations Research, design and deployment of rainwater cistern water level sensor for supporting research in Brazil (2011-2016)
- Deepak Subramanian (UC Berkeley) School of Information, design and deployment of second-generation latrine usage sensor for supporting research in India (2011-2012)
- Anu Sridharan and Jack Reilly (UC Berkeley) Civil Engineering, sensors for detecting electricity grid frequency (2010)

M.S. Committees

 +Chethan Ramesh (UMass) – Electrical and Computer Engineering, "Crosstalk-Based Cover Side Channel Attack in FPGAs" (2019)

B.S. (*Honors' Thesis advisor)

- *Berke Belge (UMass) Electrical and Computer Engineering, detection of water and sanitation features from overhead satellite imagery to support underground mapping (2021-present) – Senior Honors' Thesis primary advisor
- *Xavier Farrell (UMass) Electrical and Computer Engineering, infrastructure placement and grid impacts of increased electric vehicle penetration in Nairobi, Kenya (2020-2021)
 – Senior Honors' Thesis primary advisor
- Anvita Patel (UMass) Electrical and Computer Engineering, evaluating the potential to use satellite data to locate irrigation activity in Ethiopia (2020-present)
- *Aidas Jakubenas (UMass) Electrical and Computer Engineering, an auction-based electric vehicle charging algorithm for maximizing social welfare (2020-present) – Senior Honors' Thesis primary advisor
- Andrew Tran (UMass) Electrical and Computer Engineering, interconnection of solar home systems to achieve lower-cost electrification in rural electricity access settings (2020-present)
- Emma Emasealu (UMass) Electrical and Computer Engineering, characterization of digital camera capabilities for electricity grid monitoring (2019)
- *Ajey Pandey (UMass) Electrical and Computer Engineering, development of a system for identifying the AC phase of light bulbs to build an automatic grid mapping tool (2018-2019) – Senior Honors' Thesis primary advisor
- *Alexander Yen (UMass) Electrical and Computer Engineering, design and construction of a camera-based system for measuring electricity grid phase (2018-2020)
 – Senior Honors' Thesis primary advisor
- Rohan Nandakumar (UMass) Electrical and Computer Engineering, evaluation of the capacity of satellite nightlights data to measure electrification at high-resolution (2018-2020)
- *Chulabhaya Wijesundara (UMass) Electrical and Computer Engineering, development of a system for using internal temperature sensors on mobile phones for measuring indoor air temperatures (2017-2018) – Senior Honors' Thesis primary advisor
- Tristan Koopman (UMass) Electrical and Computer Engineering, development of a model for a pumped hydroelectric storage system (2017-2018) – Senior Honors' Thesis secondary advisor
- *Joseph Breda (UMass) Electrical and Computer Engineering, development of a system to indirectly measure electricity grid voltage using mobile phones (2017-2019) – Senior Honors' Thesis primary advisor
- Stephanie Yan and Jeffrey Nieh (UC Berkeley) Computer Science, development of a

city-scale dashboard combining housing energy and real estate data for improving city planning (2012)

- Nathan Murthy (UC Berkeley) Applied Mathematics, development of a supply-aware laptop battery charging algorithm (2010-2012)
- Douglas Fabini, Joshua Song, Anthony Bui, and Sean Dadashi (UC Berkeley) Mechanical Engineering, design and deployment of first-generation latrine usage sensor for supporting research in India (2010-2011)
- Greg Rulifson, Nicole Walter, and Lauren Valdez (UC Berkeley) Civil Engineering and Architecture, advice on a sustainable housing project in French Polynesia (2009-2010)
- Larry Ly (UC Berkeley) Electrical Engineering, deployment of a solar-powered microclimate sensing network in a forest (2008-2009)

AWARDS, HONORS, AND ACCOMPLISHMENTS

- 2018 UMass ECE Tesla Awards Outstanding Junior Faculty Member
- 2018 UMass ECE Tesla Awards Best Discussion Lead (1st Place)
- 2017 UMass ECE Tesla Awards Best Discussion Lead (2nd Place)
- 2013 Lawrence Berkeley National Laboratory, EETD Rosenfeld Postdoctoral Fellowship (declined)
- 2012 California Council on Science and Technology Policy Fellowship (declined)
- 2007–10 National Defense Science & Engineering Graduate (NDSEG) Fellowship
- 2001 National Merit Finalist