Sokratis Papadopoulos

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EDUCATION

Ph.D. Urban Systems and Informatics, New York University, expected Spring 2019
Dissertation: *Machine learning algorithms for urban energy data analytics and policy evaluation*
Advisor: Constantine E. Kontokosta

M.S. Engineering Systems and Management, Masdar Institute, 2015

B.S. Mechanical Engineering, Technological Educational Institute of Patras, 2012

RESEARCH/TEACHING INTERESTS

Urban science and informatics, towards the environmental, social and economic development of cities

Intra-building and urban scale energy analytics

Applied data science (machine learning, computational statistics, big data analytics, data visualization)

RESEARCH EXPERIENCE

New York University

2016– Graduate Research Assistant, Department of Civil and Urban Engineering / Center for Urban Science + Progress

- Contextualized and analyzed spatio-temporal patterns in large-scale building energy data.
- Developed a method for city-specific building energy performance grading, which was tested on more than 7,500 buildings in New York City.
- Analyzed building energy audit data to identify hurdle rates pertaining retrofit decision.
- Actively participated in grant proposals and worked closely with industry collaborators.

Masdar Institute

2013-16 Research Assistant, Department of Engineering Systems and Management

- Used statistical learning methods and agent-based modeling to quantify occupants' impact on building energy performance.
- Developed an occupant behavior optimization models using numerical computing and building performance simulation software.
- Benchmarked machine learning algorithms for building energy design optimization.

PUBLICATIONS

Peer-Reviewed Journal Articles

2018 Papadopoulos, S., Kontokosta, C.E. "Grading buildings on energy performance using city benchmarking data" Accepted at *Applied Energy*.

2018 Papadopoulos, S., Bonczak, B., Kontokosta, C.E. "Pattern recognition in building energy performance over time using energy benchmarking data." *Applied Energy* 221, 576-586.

2017 Papadopoulos, S., Azar, E., Woon, W.L., Kontokosta, C.E. "Evaluation of tree-based ensemble learning algorithms for building energy performance estimation." *Journal of Building Performance Simulation* 11 (3), 322-332.

2016 Papadopoulos, S., Azar, E. "Integrating building performance simulation in agent-based modeling using regression surrogate models: A novel human-in-the-loop energy modeling approach." *Energy and Buildings* 128, 214-223.

2016 Azar, E., Nikolopoulou, C., Papadopoulos, S. "Integrating and optimizing metrics of sustainable building performance using human-focused agent-based modeling." *Applied Energy* 183, 926-937.

Journal Article Manuscripts Under Review

2018 Kontokosta, C.E., Spiegel-Feld, D., Papadopoulos, S. "Do mandatory energy audits reduce building energy use? A Bayesian approach." Under review at *Energy and Buildings*.

Peer-Reviewed Conference Proceedings and Presentations

Presenting author *italicized*, if other.

2018 Papadopoulos, S., Kontokosta, C.E. "Revisiting city energy performance grading: The inadequacy of current standards and the promise of big data." 3rd International Graduate Student Symposium IIT College of Architecture: Buildings, Cities, and Performance, Chicago (forthcoming Nov '18).

2018 Papadopoulos, S., Woon, W.L., *Azar, E.* "Machine learning as surrogate to building performance simulation: A building design optimization application" The European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases, Dublin, Ireland.

2018 *Kontokosta, C.E.*, Lai, Y., Bonczak, B., Papadopoulos, S., Hong, B., Johnson, N., Malik, A. "A dynamic spatial-temporal model of urban carbon emissions for data-driven climate action by cities" Bloomberg Data for Good Exchange, New York City.

2017 Papadopoulos, S., Kontokosta, C.E. "Big buildings and big data: Do energy disclosure policies impact energy use over time?" ASCE International Workshop on Computing in Civil Engineering, Seattle.

2017 Papadopoulos, S., Bonczak, B., *Kontokosta, C.E.* "Spatial and geographic patterns of building energy performance: A cross-city comparative analysis of large-scale data" ASCE International Conference on Sustainable Infrastructure, New York City.

2017 *Azar E.,* Papadopoulos, S. "Human behavior and energy consumption in buildings: An integrated agent-based modeling and building performance simulation framework" IBPSA Building Simulation, San Francisco.

2016 Papadopoulos, S., *Azar E.* "Optimizing HVAC operation in commercial buildings: a genetic algorithm multi-objective optimization framework" Winter Simulation Conference, Washington, DC.

2015 Papadopoulos, S.,Karakatsanis I. "Short-term electricity load forecasting using time series and ensemble learning methods" IEEE Power and Energy Conference at Illinois, Urbana-Champaign.

Presentations and panel discussions

2018 "Do mandatory building energy audits change energy behaviors?" Behavior, Energy, and Climate Change Conference, Washington, DC.

2018 [Panelist] "The roles and potential of local governments" Behavior, Energy, and Climate Change Conference, Washington, DC .

2016 "Integrating building performance simulation in agent-based models: A human-in-the-loop building energy modeling approach." UAE Graduate Student Research Conference, Al Ain.

Reports

2017 Urban Green Council - "New York City's Energy and Water Use 2014 and 2015 Report" (as partner)

Manuscripts in Preparation

2018 Papadopoulos, S., Azar, E. "The potential to revise HVAC operational setpoints in commercial buildings. A study in different climate zones".

2018 Papadopoulos, S., Lai, Y., Kontokosta, C.E. "A method to model spatio-temporal, city-wide building GHG emissions".

2018 Lai, Y., Papadopoulos, S. "Socio-economic drivers of innovation: A big data analysis on a crowdfunding platform".

FELLOWSHIPS AND AWARDS

2018 Stanford Precourt Energy Efficiency Center Student Fellowship (*Conference registration*)

2018 United Nations Data for Climate Action – Best Visualization Award (*among 450 participants*)

2017 NESEA BE the Future Scholarship (*Conference registration and annual membership*)

2016 Siemens Inc. Fellowship (*Full funding for 2 years of Ph.D. research*)

2016 UAE Student Graduate Conference – Best paper award

2013 Masdar Institute Scholarship (*Fully funded MS studies and housing allowance*)

2012 Technological Educational Institute of Patras (*Class of 2012 first graduate*)

TEACHING AND MENTORING EXPERIENCE

New York University

2017 Teaching Assistant, Civic Analytics and Urban Intelligence (Fall)

2017 M.S. Capstone project mentor (Spring and Summer)
Students: Xianbo Gao, Enrique Sanz Gonzalez, Victor Sette Gripp, Peng Jia
Project: *The Energy Snapshot: Driving Behavior Change Through Energy Data Analytics*
Sponsor: New York City Mayor's Office of Sustainability

Masdar Institute

2015-16 Teaching Assistant, Sustainable Energy (Fall and Spring)

2014 Teaching Assistant, Applied Statistics and Research Methods for Engineering Systems (Fall)

JOURNAL REVIEWER

Energy and Buildings
Building Simulation

SKILLS

Statistical Methods

Machine learning, statistical inference, data wrangling and processing, Bayesian statistics, spatial analysis

Programming

Python, MatLab, R, Apache Spark, SQL, LaTeX, Git

Software

EnergyPlus, SPSS, Stata, QGIS, Anylogic

Updated October 2018