

Stanford



Rishee Jain

Assistant Professor of Civil and Environmental Engineering

CONTACT INFORMATION

- **Administrator**

Geoffrey Tuttle - Program Administrator

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Bio

BIO

Professor Jain's research focuses on the development of data-driven and socio-technical solutions to sustainability problems facing the urban built environment. His work lies at the intersection of civil engineering, data analytics and social science. Recently, his research has focused on understanding the socio-spatial dynamics of commercial building energy usage, conducting data-driven benchmarking and sustainability planning of urban buildings and characterizing the coupled dynamics of urban systems using data science and micro-experimentation. For more information, see the active projects on his lab (Stanford Urban Informatics Lab) website.

ACADEMIC APPOINTMENTS

- Assistant Professor, Civil and Environmental Engineering

HONORS AND AWARDS

- CAREER Award, National Science Foundation (2019)
- Science, Engineering and Education for Sustainability (SEES) Fellow, National Science Foundation (2014)

PROFESSIONAL EDUCATION

- PhD, Columbia University , Civil Engineering
- MS, Columbia University , Civil Engineering
- BS, University of Texas at Austin , Civil, Environmental & Architectural Engineering

LINKS

- Urban Informatics Lab Website: <http://www.uil.stanford.edu/>

Research & Scholarship

PROJECTS

- Data-driven Sustainable Upgradation of Dharavi Informal Settlement (Mumbai, India) - Stanford University

Teaching

COURSES

2022-23

- Building Systems Design & Analysis: CEE 156, CEE 256 (Win)
- Intro to Urban Sys Engrg: CEE 243 (Spr)
- Racial Equity in Energy: CEE 130R, CEE 330 (Spr)

2021-22

- Building Systems Design & Analysis: CEE 156, CEE 256 (Win)
- Intro to Urban Sys Engrg: CEE 243 (Aut)
- Racial Equity in Energy: CEE 130R, CEE 330 (Aut)

2020-21

- Building Systems Design & Analysis: CEE 156 (Spr)
- Racial Equity in Energy: CEE 130R, CEE 330 (Aut)

2019-20

- Building Systems Design & Analysis: CEE 156, CEE 256 (Win)
- Intro to Urban Sys Engrg: CEE 243 (Aut)

STANFORD ADVISEES

Dinesh Moorjani, Poojan Patel

Doctoral Dissertation Reader (AC)

Alissa Cooperman, Tess Hegarty, Tulika Majumdar

Doctoral Dissertation Advisor (AC)

Abigail Andrews, Thomas Dougherty, Kopal Nihar

Master's Program Advisor

Devan Addison-Turner, Lena Bakalian, Adorina Beit-Tchoutcheca, Pascal Flury, Lauren Gill, Eleanor Ho, Lisiman Hua, Melissa Lopez, Cheryl Mulor, Juliet Nwagwu Ume-Ezeoke, Saed Osman, Santiago Ossa, Ruby Tian, Daniel Traver, Spencer Zhang

Doctoral Dissertation Co-Advisor (AC)

Jill Ferguson, Ranjitha Shivaram

Doctoral (Program)

Devan Addison-Turner, Eleanor Ho, Dinesh Moorjani, Juliet Nwagwu Ume-Ezeoke

Publications

PUBLICATIONS

- **A barrier too far: Understanding the role of intersection crossing distance on bicycle rider behavior in Chicago** *ENVIRONMENT AND PLANNING B-URBAN ANALYTICS AND CITY SCIENCE*
Aras, R. L., Ouellette, N. T., Jain, R. K.
2023
- **Beyond Energy Efficiency: A clustering approach to embed demand flexibility into building energy benchmarking** *APPLIED ENERGY*
Andrews, A., Jain, R. K.

2022; 327

- **Optimizing pipe network design and central plant positioning of district heating and cooling System: A Graph-Based Multi-Objective genetic algorithm approach** *APPLIED ENERGY*
Su, L., Nie, T., Ho, C., Yang, Z., Calvez, P., Jain, R. K., Donat, R.
2022; 325
- **A Global Building Occupant Behavior Database.** *Scientific data*
Dong, B., Liu, Y., Mu, W., Jiang, Z., Pandey, P., Hong, T., Olesen, B., Lawrence, T., O'Neil, Z., Andrews, C., Azar, E., Bandurski, K., Bardhan, et al
2022; 9 (1): 369
- **Cool roofs can mitigate cooling energy demand for informal settlement dwellers** *RENEWABLE & SUSTAINABLE ENERGY REVIEWS*
Natkiewicz, A., Mastrucci, A., Rao, N. D., Jain, R. K.
2022; 159
- **Context-aware Urban Energy Analytics (CUE-A): A framework to model relationships between building energy use and spatial proximity of urban systems** *SUSTAINABLE CITIES AND SOCIETY*
Shivaram, R., Yang, Z., Jain, R. K.
2021; 72
- **Data-driven optimization of building layouts for energy efficiency** *ENERGY AND BUILDINGS*
Sonta, A., Dougherty, T. R., Jain, R. K.
2021; 238
- **Uncertainty Matters: Bayesian Probabilistic Forecasting for Residential Smart Meter Prediction, Segmentation, and Behavioral Measurement and Verification** *ENERGIES*
Roth, J., Chadalawada, J., Jain, R. K., Miller, C.
2021; 14 (5)
- **Automated identification of urban substructure for comparative analysis.** *PloS one*
Aras, R. L., Ouellette, N. T., Jain, R. K.
2021; 16 (1): e0245067
- **SynCity: Using open data to create a synthetic city of hourly building energy estimates by integrating data-driven and physics-based methods** *APPLIED ENERGY*
Roth, J., Martin, A., Miller, C., Jain, R. K.
2020; 280
- **Harnessing smart meter data for a Multitiered Energy Management Performance Indicators (MEMPI) framework: A facility manager informed approach** *APPLIED ENERGY*
Roth, J., Brown, H., Jain, R. K.
2020; 276
- **Simulation-aided occupant-centric building design: A critical review of tools, methods, and applications** *ENERGY AND BUILDINGS*
Azar, E., O'Brien, W., Carlucci, S., Hong, T., Sonta, A., Kim, J., Andargie, M. S., Abuimara, T., El Asmar, M., Jain, R. K., Ouf, M. M., Tahmasebi, F., Zhou, et al
2020; 224
- **One approach does not fit all (smart) cities: Causal recipes for cities' use of "data and analytics"** *CITIES*
Ruhlandt, R., Levitt, R., Jain, R., Hall, D.
2020; 104
- **Building Relationships: Using Embedded Plug Load Sensors for Occupant Network Inference** *IEEE EMBEDDED SYSTEMS LETTERS*
Sonta, A. J., Jain, R. K.
2020; 12 (2): 41–44
- **Examining the feasibility of using open data to benchmark building energy usage in cities: A data science and policy perspective** *ENERGY POLICY*
Roth, J., Lim, B., Jain, R. K., Grueneich, D.
2020; 139
- **Drivers of Data and Analytics Utilization within (Smart) Cities: A Multimethod Approach** *JOURNAL OF MANAGEMENT IN ENGINEERING*
Ruhlandt, R., Levitt, R., Jain, R., Hall, D.

2020; 36 (2)

- **Exploring the integration of simulation and deep learning models for urban building energy modelling and retrofit analysis**
Nutkiewicz, A., Jain, R. K., Corrado, Fabrizio, E., Gasparella, A., Patuzzi, F.
INT BUILDING PERFORMANCE SIMULATION ASSOC-IBPSA.2020: 3209-3216
- **Learning socio-organizational network structure in buildings with ambient sensing data** *DATA-CENTRIC ENGINEERING*
Sonta, A., Jain, R. K.
2020; 1
- **Energy-cyber-physical systems** *APPLIED ENERGY*
Jin, M., Jain, R., Spanos, C., Jia, Q., Norford, L. K., Kjaergaard, M., Yan, J.
2019; 256
- **Computational Approaches to Enable Smart and Sustainable Urban Systems** *JOURNAL OF COMPUTING IN CIVIL ENGINEERING*
Jain, R. K., Abraham, D.
2019; 33 (6)
- **Understanding the adoption and usage of data analytics and simulation among building energy management professionals: A nationwide survey** *BUILDING AND ENVIRONMENT*
Srivastava, C., Yang, Z., Jain, R. K.
2019; 157: 139–64
- **Urban Data Integration Using Proximity Relationship Learning for Design, Management, and Operations of Sustainable Urban Systems** *JOURNAL OF COMPUTING IN CIVIL ENGINEERING*
Gupta, K., Yang, Z., Jain, R. K.
2019; 33 (2)
- **DUE-A: Data-driven Urban Energy Analytics for understanding relationships between building energy use and urban systems**
Yang, Z., Gupta, K., Jain, R. K., Yan, J., Yang, H. X., Li, H., Chen
ELSEVIER SCIENCE BV.2019: 6478–83
- **Optimizing Neighborhood-Scale Walkability**
Sonta, A. J., Jain, R. K., Cho, Y. K., Leite, F., Behzadan, A., Wang, C.
AMER SOC CIVIL ENGINEERS.2019: 454–61
- **Spatial and Temporal Modeling of Urban Building Energy Consumption Using Machine Learning and Open Data**
Roth, J., Bailey, A., Choudhary, S., Jain, R. K., Cho, Y. K., Leite, F., Behzadan, A., Wang, C.
AMER SOC CIVIL ENGINEERS.2019: 459–67
- **Energy modeling of urban informal settlement redevelopment: Exploring design parameters for optimal thermal comfort in Dharavi, Mumbai, India** *APPLIED ENERGY*
Nutkiewicz, A., Jain, R. K., Bardhan, R.
2018; 231: 433–45
- **Data-driven Urban Energy Simulation (DUE-S): A framework for integrating engineering simulation and machine learning methods in a multi-scale urban energy modeling workflow**
Nutkiewicz, A., Yang, Z., Jain, R. K.
ELSEVIER SCI LTD.2018: 1176–89
- **Understanding building occupant activities at scale: An integrated knowledge-based and data-driven approach**
Sonta, A. J., Simmons, P. E., Jain, R. K.
ELSEVIER SCI LTD.2018: 1–13
- **A review of occupant energy feedback research: Opportunities for methodological fusion at the intersection of experimentation, analytics, surveys and simulation** *APPLIED ENERGY*
Khosrowpour, A., Jain, R. K., Taylor, J. E., Peschiera, G., Chen, J., Gulbinas, R.
2018; 218: 304–16
- **DUE-B: Data-driven urban energy benchmarking of buildings using recursive partitioning and stochastic frontier analysis** *ENERGY AND BUILDINGS*
Yang, Z., Roth, J., Jain, R. K.

2018; 163: 58–69

- **Data-Driven, Multi-metric, and Time-Varying (DMT) Building Energy Benchmarking Using Smart Meter Data**
Roth, J., Jain, R. K., Smith, I. F., Domer, B.
SPRINGER INTERNATIONAL PUBLISHING AG.2018: 568–93
- **Inferring Occupant Ties Automated Inference of Occupant Network Structure in Commercial Buildings**
Sonta, A. J., Jain, R. K., Ramachandran, G. S., Batra, N.
ASSOC COMPUTING MACHINERY.2018: 126–29
- **OESPG: Computational Framework for Multidimensional Analysis of Occupant Energy Use Data in Commercial Buildings** *JOURNAL OF COMPUTING IN CIVIL ENGINEERING*
Sonta, A. J., Jain, R. K., Gulbinas, R., Moura, J. M., Taylor, J. E.
2017; 31 (4)
- **Data-driven planning of distributed energy resources amidst socio-technical complexities** *Nature Energy*
Jain, R. K., Qin, J., Rajagopal, R.
2017
- **Data-driven Urban Energy Simulation (DUE-S): Integrating machine learning into an urban building energy simulation workflow**
Natkiewicz, A., Yang, Z., Jain, R. K., Yan, J., Wu, J., Li, H.
ELSEVIER SCIENCE BV.2017: 2114–19
- **Intestinal Enteroendocrine Lineage Cells Possess Homeostatic and Injury-Inducible Stem Cell Activity** *Cell Stem Cell*
Yan, K., Gevaert, O., Zheng, G., Anchang, B., Probert, C., et al
2017; 21 (1): 78 - 90.e6
- **A Data Integration Framework for Urban Systems Analysis Based on Geo-Relationship Learning**
Yang, Z., Gupta, K., Gupta, A., Jain, R. K., Lin, K. Y., ElGohary, N., Tang, P.
AMER SOC CIVIL ENGINEERS.2017: 467–74
- **Towards Automated Inference of Occupant Behavioral Dynamics Using Plug-Load Energy Data**
Sonta, A. J., Simmons, P. E., Jain, R. K., Lin, K. Y., ElGohary, N., Tang, P.
AMER SOC CIVIL ENGINEERS.2017: 290–97
- **Poster Abstract: Towards City-Scale Building Energy Performance Benchmarking**
Yang, Z., Roth, J., Jain, R. K., ACM
ASSOC COMPUTING MACHINERY.2016: 241–42
- **Data-Driven Benchmarking of Building Energy Performance at the City Scale**
Yang, Z., Roth, J., Jain, R. K., ACM
ASSOC COMPUTING MACHINERY.2016
- **Poster abstract: A data-driven design framework for urban slum housing - Case of Mumbai**
Debnath, R., Bardhan, R., Jain, R. K., ACM
ASSOC COMPUTING MACHINERY.2016: 239–40
- **Modeling the determinants of large-scale building water use: Implications for data-driven urban sustainability policy** *SUSTAINABLE CITIES AND SOCIETY*
Kontokosta, C. E., Jain, R. K.
2015; 18: 44-55
- **BizWatts: A modular socio-technical energy management system for empowering commercial building occupants to conserve energy** *APPLIED ENERGY*
Gulbinas, R., Jain, R. K., Taylor, J. E.
2014; 136: 1076-1084
- **The impact of combined water and energy consumption eco-feedback on conservation** *ENERGY AND BUILDINGS*
Jeong, S. H., Gulbinas, R., Jain, R. K., Taylor, J. E.
2014; 80: 114-119
- **Big Data plus Big Cities: Graph Signals of Urban Air Pollution** *IEEE SIGNAL PROCESSING MAGAZINE*

Jain, R. K., Moura, J. M., Kontokosta, C. E.

2014; 31 (5): 130-136

- **Forecasting energy consumption of multi-family residential buildings using support vector regression: Investigating the impact of temporal and spatial monitoring granularity on performance accuracy** *APPLIED ENERGY*
Jain, R. K., Smith, K. M., Culligan, P. J., Taylor, J. E.
2014; 123: 168-178
- **Network Ecoinformatics: Development of a Social Ecofeedback System to Drive Energy Efficiency in Residential Buildings** *JOURNAL OF COMPUTING IN CIVIL ENGINEERING*
Gulbinas, R., Jain, R. K., Taylor, J. E., Peschiera, G., Golparvar-Fard, M.
2014; 28 (1): 89-98
- **Can social influence drive energy savings? Detecting the impact of social influence on the energy consumption behavior of networked users exposed to normative eco-feedback** *ENERGY AND BUILDINGS*
Jain, R. K., Gulbinas, R., Taylor, J. E., Culligan, P. J.
2013; 66: 119-127
- **Investigating the impact eco-feedback information representation has on building occupant energy consumption behavior and savings** *ENERGY AND BUILDINGS*
Jain, R. K., Taylor, J. E., Culligan, P. J.
2013; 64: 408-414
- **Block Configuration Modeling: A novel simulation model to emulate building occupant peer networks and their impact on building energy consumption** *APPLIED ENERGY*
Chen, J., Jain, R. K., Taylor, J. E.
2013; 105: 358-368
- **Assessing eco-feedback interface usage and design to drive energy efficiency in buildings** *ENERGY AND BUILDINGS*
Jain, R. K., Taylor, J. E., Peschiera, G.
2012; 48: 8-17