Yapan Liu

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EDUCATION

Ph.D. (Candidate) Mechanical & Aerospace Engineering   August 2019 – January 2024 (Expected)
Syracuse University, College of Engineering & Computer Science   *Syracuse, NY*
- Specialization: Building Control and Simulation; Human Mobility; Data Analysis and Visualization
- Advisor: Professor Bing Dong

M.S. in Mechanical & Aerospace Engineering   August 2016 – May 2018
Syracuse University, College of Engineering & Computer Science   *Syracuse, NY*
- Specialization: Design & 3D Modeling; Cyber Manufacturing System; Quality Engineering
- Advisor: Professor Young B. Moon

B.E. in Mechanical Engineering   September 2010 – June 2014
Yangzhou University, College of Mechanical Engineering   *Yangzhou, China*
- Specialization: Mechanical Design, Manufacturing and Automation

RESEARCH AREA

- Big Data Analytics
- Experimental Sensing
- Internet of Things
- Building Controls and Diagnostics
- Machine Learning in Building Control
- Building to Grid Integration
- Spatial Temporal Data Analysis
- EV Charging and Discharging Control

RESEARCH EXPERIENCE

Research Assistant   August 2019 – Present
BEST Lab, Syracuse University   *Syracuse, NY*
- Led the development of Global Occupant Behavior Database for ASHRAE
- Processed geospatial data and time-series data through big data analytics
- Designed a benchmarking website for machine learning models focused on occupant behavior
- Leveraged machine learning to study human mobility and occupant behaviors at an urban scale
- Created advanced building-to-grid and building control algorithms (e.g. MPC, Reinforcement Learning)
- Set up a comprehensive building sensing network, achieving automated data collection
- Developed various advanced data visualization techniques to present research results

Graduate Research Assistant   May – September 2017
Dept. of Mechanical & Aerospace Engineering, Syracuse University   *Syracuse, NY*
- Evaluated the vulnerability of a sample CyberManufacturing System (CMS)
- Enhanced the security of CMS through data analysis and image processing

Project Team Co-Lead   July – September 2017
Marquardt Switches Inc.   *Cazenovia, NY*
- Collaborated with a cross-functional team of 6 engineers to build and optimize an assembly line
- Gathered relevant data, constructed a robust model, and executed simulations in Arena software
- Analyzed and optimized simulation results reducing the number of operators from 6 to 5

Project Team Leader   Spring & Fall 2017
Syracuse University   *Syracuse, NY*
- Led a team to build a tobacco-free environment and improve the accessibility of Bird Library
- Optimized "A Weather Disaster Management" process applying the skills of Six Sigma, DOE, SPC, PFMEA, etc. - *course MFE 634 Productivity and Quality Engineering*
- Designed a model for a simulated grocery store to minimize the labor cost in Arena – *course ECS 630 Simulation and Data Analytics*

PROFESSIONAL EXPERIENCE

Mechanical Engineer   September 2018 – August 2019
UsPLM, Inc.   *Syracuse, NY*
- Presenting UsPLM product at various domestic and international conferences
- Create 3D drone models and create animations using Onshape and Blender software
- Analyze flight log data and simulate drone missions in 3D environments

Product Development Engineer   July 2014 – April 2015
Jiangsu Olive Sensors High-tech Co. Ltd.   *Yangzhou, China*
- Collaborated with a team of 10 engineers to develop 6 new products using the process of Advanced Product Quality Planning (APQP)
- Reviewed product design using NX software and led the pre-production process

TECHNICAL SKILLS

- *Programming languages:* Python, MATLAB, R, C, Javascript
- *Skills:* Building Sensing and Simulation, Data Visualization and Analytics, Web Development, 3D Modeling

PUBLICATION

- **Liu, Y.**, & Dong, B. (2023, August). Modeling urban scale human mobility through big data analysis and machine learning. In *Building Simulation* (pp. 1-19). Beijing: Tsinghua University Press.
- Li, H., Johra, H., de Andrade Pereira, F., Hong, T., Le Dréau, J., Maturo, A., ... & Dong, B. (2023). Data-driven key performance indicators and datasets for building energy flexibility: A review and perspectives. *Applied Energy*, 343, 121217.
- **Liu, Y.**, Dong, B., Hong, T., Olesen, B., Lawrence, T., & O'Neill, Z. (2023). ASHRAE URP-1883: Development and Analysis of the ASHRAE Global Occupant Behavior Database. *Science and Technology for the Built Environment*, 1-33.
- Luo, N., Fierro, G., **Liu, Y.**, Dong, B., & Hong, T. (2022). Extending the Brick schema to represent metadata of occupants. *Automation in Construction*, 139, 104307.
- Dong, B., **Liu, Y.**, Mu, W., Jiang, Z., Pandey, P., Hong, T., ... & Zhou, X. (2022). A global building occupant behavior database. *Scientific data*, 9(1), 1-15.
- Dong, B., Markovic, R., Carlucci, S., **Liu, Y.**, Wagner, A., Liguori, A., ... & Kang, X. (2022). A guideline to document occupant behavior models for advanced building controls. *Building and Environment*, 109195.
- Pisello, A. L., Pigliautile, I., Andargie, M., Berger, C., Bluyssen, P. M., Carlucci, S., ... & Wei, S. (2021). Test rooms to study human comfort in buildings: A review of controlled experiments and facilities. *Renewable and Sustainable Energy Reviews*, 149, 111359.
- Dong, B., **Liu, Y.**, Fontenot, H., Ouf, M., Osman, M., Chong, A., ... & Carlucci, S. (2021). Occupant behavior modeling methods for resilient building design, operation and policy at urban scale: A review. *Applied Energy*, 293, 116856.
- Wu, W., Dong, B., Wang, Q. R., Kong, M., Yan, D., An, J., & **Liu, Y.** (2020). A novel mobility-based approach to derive urban-scale building occupant profiles and analyze impacts on building energy consumption. *Applied Energy*, 278, 115656.
- Salim, F. D., Dong, B., Ouf, M., Wang, Q., Pigliautile, I., Kang, X., ... & Yan, D. (2020). Modelling urban-scale occupant behaviour, mobility, and energy in buildings: A survey. *Building and Environment*, 183, 106964.
- Wu, M., Song, J., Lin, L. W. L., Aurelle, N., **Liu, Y.**, Ding, B., ... & Moon, Y. B. (2018). Establishment of intrusion detection testbed for CyberManufacturing systems. *Procedia Manufacturing*, 26, 1053-1064.

VOLUNTEER EXPERIENCE

Student President, ASHRAE Student Branch at SU, Syracuse, NY   November 2022 – Present
Student Leader, Chinese American Friendship Association, Syracuse, NY   August 2017 – June 2018
Disaster Relief Volunteer, NAMB, Johnsonville, SC & Carolina, Puerto Rico   March & December 2017
Global Graduate Ambassadors Orientation Leader, Syracuse University, Syracuse, NY   August 2017