

# Yapan Liu

Syracuse, NY | yliu88@syr.edu | yapan.page

## EDUCATION

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**Ph.D. (Candidate) Mechanical and Aerospace Engineering** August 2019 – Expected Spring 2024  
*Syracuse University, College of Engineering and Computer Science* Syracuse, NY

- Specialization: Building Control and Simulation; Building Energy Modeling; Data Analysis
- Advisor: Professor Bing Dong

**M.S. in Mechanical and Aerospace Engineering** August 2016 – May 2018  
*Syracuse University, College of Engineering and Computer Science* Syracuse, NY

- Specialization: Design and 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

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- Big Data Analytics
- Building Controls and Simulation
- Building Energy Modeling (Energy Plus)
- Building Sensing and Energy monitoring
- Spatial Temporal Data Analysis
- Building to Grid Integration
- Internet of Things
- Machine Learning in Building Control

## RESEARCH EXPERIENCE

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**Research Assistant** August 2019 – Present  
*BEST Lab, Syracuse University* Syracuse, NY

- Developed Python-EnergyPlus co-simulation algorithms
- Enhanced building energy models with occupant behavior integration in EnergyPlus
- Set up building energy monitoring network with automated data acquisition for student dorms
- Led the development of Global Building Occupant Behavior Database for ASHRAE
- 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 HVAC control algorithms (e.g. MPC, Reinforcement Learning)

**Graduate Research Assistant** May – September 2017  
*Dept. of Mechanical and Aerospace Engineering, Syracuse University* Syracuse, NY

- Evaluated the vulnerability of a sample Cyber Manufacturing 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 and 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

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### Mechanical Engineer

September 2018 – August 2019

UsPLM, Inc. (Now AutoModality)

Syracuse, NY

- Presented UsPLM product at various domestic and international conferences
- Designed 3D drone models and created animations using Onshape and Blender software
- Analyzed flight log data and simulated 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

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

## PUBLICATION

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- **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., Bluysen, 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

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**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 and Carolina, Puerto Rico

March and December 2017

**Global Graduate Ambassadors Orientation Leader**, Syracuse University, Syracuse, NY

August 2017