Ramyar Tajik

ARCHITECTURAL ENGINEERING PH.D. CANDIDATE
BUILDING PERFORMANCE & ENERGY EFFICIENCY
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PROFESSIONAL SUMMARY

Architectural engineering Ph.D. candidate focused on whole-building energy simulation, passive design, and adaptive shading. Uses EnergyPlus and TRNSYS to compare envelope and HVAC options and explain trade-offs across energy use, daylight, and occupant comfort.

CORE SKILLS

Energy, envelope, and climate: Whole-building energy modeling and model audits; building physics, envelope heat transfer, infiltration, passive design and cooling, weather files, adaptive thermal comfort, and transient and end-use analysis.

HVAC and renewables: Room-by-room HVAC load calculations and systems analysis (academic), PTAC/VAV sensitivity, zone and surface heat balances, convection algorithms and time-step checks. Modeled natural/night ventilation, heat recovery, setpoint, lighting, fan and boiler scenarios, solar thermal, ground-coupled ventilation, and PV feasibility.

Simulation tools: EnergyPlus, OpenStudio (academic), TRNSYS/TRNBUILD/TRNEdit, eQUEST, Sefaira, THERM, Meteonorm, and Skelion/SketchUp for PV layout, shading, and production.

Thermal systems and controls: Independent/academic modeling of data-hall airflow, coupled thermal/control response, outages and recovery, thermal capacitance and storage, chilled-water distribution, balancing and pressure losses, CRAH/CRAC, fan walls, CDUs, heat exchangers, pumps, valves, and variable-speed, differential-pressure, and temperature controls and sequencing.

Cooling and CFD training: IESVE (basic; data-center HVAC training), ANSYS Fluent, Flownex, mesh refinement, cold plates/direct-to-chip cooling, and single- and two-phase immersion cooling.

BIM and CAD: Revit/BIM and Revit MEP, Autodesk Insight / Insight 360, AutoCAD 2D drafting, Rhino/Grasshopper, and SketchUp. 3D and parametric option studies, coordinated architectural/MEP drawings, façade and interior documentation, adaptive reuse and urban design (academic), and QGIS (coursework).

Analysis and project delivery: Numerical methods, predictive CFD and neural networks (academic: Python, Keras, scikit-learn), MATLAB, Excel, tariff and utility-charge reconciliation, design reviews, project coordination, and technical reports. Project management, surveying, and estimating (coursework).

SELECTED TECHNICAL PROJECTS

Building Energy Simulation and HVAC Analysis, Drexel University | 2022

- Modeled a U.S. Department of Energy small-office reference building in EnergyPlus and OpenStudio. Combined envelope, infiltration, lighting, and shading measures reduced modeled annual energy use by 20.8%, from 363.95 to 288.13 GJ of site energy per year.
- Reported end-use results at each stage to distinguish the effect of the successive model changes.
- Ran separate sensitivity studies on packaged terminal air conditioning (PTAC) and variable air volume (VAV), and evaluated zone and surface heat balances under three HVAC cooling scenarios.

EnergyPlus model and stage-by-stage results

M.Sc. Thesis Researcher, Intelligent Shading Retrofit, Politecnico di Milano | 2019–2021

- Co-developed a Rhino and Grasshopper workflow coupling daylight, glare, thermal, and energy simulation with multi-objective optimization (NSGA-II) and regression-based occupant preferences.
- Compared four shading alternatives with an unshaded baseline and developed a user-specific approach to dynamic shading control for a home office. Generated TMY2, TMY3, and EPW weather files with Meteonorm.

Home for Life Residential Energy and Comfort Study, Politecnico di Milano | 2020

- Led a collaborative TRNSYS study of a Danish house, comparing ventilation and shading controls using indoor temperature and adaptive thermal comfort.
- Developed the building-integrated photovoltaics analysis. Across model stages, combined annual sensible heating and cooling loads declined from 34.46 to 4.20 kWh/m².

Predictive CFD with Neural Networks, Drexel University | 2022

- Prepared simulation data and contributed to a 13-input neural network for indoor temperature prediction. The source dataset contained more than 20,000 hourly records; model outputs were evaluated on held-out simulation data.

RESEARCH AND PROFESSIONAL EXPERIENCE

Graduate Research Assistant, Drexel University | **2021–Present**

- Led protocol development, integration, and field evaluation of a wearable-to-dashboard light sensing system, connecting measured indoor conditions to occupant feedback.
- Led writing and workshop synthesis for a 17-author roadmap on building sensors, controls, human-building interfaces, interoperability, and implementation.

Teaching Assistant and Grader, Drexel University | **2022–2026**

- Guided students through eQUEST energy models, room-by-room HVAC load calculations, and daylight assessment. Supported instruction in building performance analysis using Revit and Autodesk Insight.
- Supported laboratory and design work through data interpretation, technical writing, and assessment.

Teaching Assistant and Junior Tutor, Politecnico di Milano | **2019–2021**

- Supported design reviews and taught workshops in climate analysis, passive design, and building energy simulation.

Interior Design Assistant, 123 Studio, Tehran, Iran | **Jan–Jul 2018**

- Prepared interior models and technical drawings in Rhino for two small real estate offices in Tehran. Developed parametric forms and geometric detailing in Grasshopper.
- Modeled mechanical, electrical, and plumbing systems in Autodesk Revit.

SELECTED SYSTEMS AND DESIGN PROJECTS

Resilient Data Hall Thermal Management, Independent Simulation Project | **2026**

- Built an interactive four-zone model around a 24-rack, 163.2 kW reference IT load. Tested containment, fan speed, cooling-unit availability, and outdoor temperature; documented six reproducible comparisons and an outage-and-recovery trace.

Data hall simulation and results

NEO-TULOU, Nearly Zero-Energy Residential Design, Politecnico di Milano | **2020**

- Contributed to a residential design for Hong Kong that integrated annual daylight, comfort, and HVAC comparisons with architectural design.
- Generated and exported weather data using Meteonorm and used Skelion in SketchUp for photovoltaic layout, shading, and production analysis.

Greco-Breda Carbon-Free Development Concept, Politecnico di Milano | **2019**

- Developed a mixed-use regeneration strategy integrating passive design, renewable energy, housing, mobility, urban agriculture, and water and waste strategies. The project received second place in the Laure Larouze Sustainable Built Environment Study Award.

Behavioral Health Emergency Department Expansion, AIA AAH and ASHE PDC Student Design Challenge | **2025**

- Worked on a 48-hour multidisciplinary team to design an emergency department and EmPATH crisis-unit expansion for Grady Memorial Hospital.
- The team incorporated clinical space planning and HVAC concept comparisons and placed third in the design challenge.

EDUCATION

Ph.D., Architectural Engineering, Drexel University, Philadelphia, PA | **Expected December 2026**

M.Sc., Building & Architectural Engineering, Politecnico di Milano, Milan, Italy | **2021**
Final grade: 110/110

B.Sc., Architectural Engineering, University of Guilan, Rasht, Iran | **2017**

SELECTED PUBLICATIONS

Tajik et al. (2024). “A case study: Intelligent shading retrofit to existing home-office using multi-objective optimization.” Journal of Green Building, 19(1), 123–155. DOI

Hoque et al. (2026). “Nature-based solutions to overheating for equitable heat health protection.” Springer Nature. DOI

RECOGNITION AND PROFESSIONAL INVOLVEMENT

Kling-Lindquist Endowed Grant, Drexel University College of Engineering, 2023.

ASCE and Architectural Engineering Institute member; ASHRAE Philadelphia Chapter student member.

Preparing for the NCEES FE Other Disciplines exam.