Ramyar Tajik

ARCHITECTURAL ENGINEERING PH.D. CANDIDATE | BUILDING SCIENCE, HUMAN HEALTH, SENSING & INTELLIGENT BUILDINGS

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PROFESSIONAL SUMMARY

Architectural engineering Ph.D. candidate working at the intersection of building science, human health, environmental sensing, occupant behavior, and intelligent building systems. Research focuses on translating environmental measurements into actionable feedback for building occupants through connected sensing platforms, human-subject field studies, and time-series and mixed-methods analysis. Earlier work in parametric design and building simulation focused on adaptive shading, daylight, energy, and thermal performance. Additional experience includes teaching, architectural design, interdisciplinary workshops, and student-organization leadership. Currently preparing for the NCEES FE Other Disciplines exam and Pennsylvania EIT certification, and open to pursuing other related certifications based on role requirements.

EDUCATION

Drexel University, Philadelphia PA - Ph.D., Architectural Engineering **Expected Dec 2026**
Dissertation: *LuxRest: Field Feasibility of a Personal Circadian-Supportive Light Measure-to-Action System*
Advisor and GPA: Dr. S. Hoque | 3.71/4.00

Politecnico di Milano, Milan, Italy - M.Sc., Building & Architectural Engineering **2021**
Thesis: *User-Specific Automated Kinetic Shading Design Implementing Multi-Objective Optimization and Machine Learning Tools*
Advisor and grade: Dr. G. Masera | 110/110

University of Guilan, Rasht, Iran - B.Sc., Architectural Engineering **2017**
Thesis: *Designing a Sustainable Off-Grid Ski Resort and Mountain Accommodation*
Advisor and GPA: Dr. A. Agharabie | 15.01/20

TECHNICAL AND RESEARCH SKILLS

CONNECTED SYSTEMS AND PROCESSES
Environmental, IAQ, And Light Sensors and Controls • Connected-System Integration and Automation • AI-assisted Agent Workflows • Smart Buildings • IoT • Sensor Networks • Edge-To-Cloud Workflows • MQTT • Workflow Automation • Data Acquisition • Sensor Calibration • Field Deployment
Tools: Raspberry Pi • Pico W • Arduino • n8n • Ubidots • Notecard/Notehub

DATA ANALYSIS AND PROGRAMMING
AI-assisted programming • APIs and JSON • Time-Series Analysis • Regression • Mixed-Effects Models • PCA • K-Means Clustering • Machine Learning
Tools: Python • MATLAB • Excel • Git/GitHub • SQL And R (basic)

BIM, CAD, AND COMPUTATIONAL DESIGN
Architectural Design • 2D CAD drafting • 3D modeling • Parametric and computational design • Architectural Visualization • Building and Urban Design • Design Deliverables
Tools: Revit/BIM • AutoCAD • Rhino • Grasshopper • SketchUp • V-Ray • Lumion •

BUILDING PERFORMANCE AND SIMULATION
Lighting Simulation • Daylight and Glare Analysis • Adaptive-Shading Simulation • Whole-Building Energy Modeling (BEM) • IEQ • IAQ • Building Physics • Building-Envelope Heat Transfer • Human-Building Interaction • Occupant-Centered Systems • Non-Visual/Circadian Lighting • Visual and Thermal Comfort Analysis • Passive Design • Intelligent Building Systems • Prototyping and Product Design • Wearable Technologies • HVAC load calculations and building-systems analysis (academic)
Tools: EnergyPlus • TRNSYS/TRNBUILD • Ladybug/Honeybee • Radiance • eQUEST • Sefaira • THERM

RESEARCH METHODS
Human-Subject Research • IRB Protocols • Experimental Design • Field Studies • Repeated-Measures Analysis • Surveys • Qualitative Analysis • Evidence Mapping • Sensor QA/QC • Mixed-Methods Research

VISUAL COMMUNICATION
Adobe Photoshop • Illustrator • InDesign • DaVinci Resolve • Canva • Linearity Curve • Inkscape • CapCut

SELECTED COURSEWORK

Ph.D. Drexel University: Comfort Analysis and Indoor Air Quality; Building Energy Systems I; Data Analytics for the Built Environment; Applied Engineering Analysis Methods II; Risk Assessment; Introduction to AI for Engineers; Fundamentals of Independent Research
M.Sc. Politecnico di Milano: Sustainable Multidisciplinary Design Process and Studio; Building Physics; Energy-Efficient Buildings; Sustainable Building Technologies and Studio; Building Services; Building Renovation and Studio; Integrated Project Management and Design Tools; Urban Design and Studio; Conservation; Structural Design
B.Sc. University of Guilan: Architectural Design Studios and Final Project; Environmental Control; Building Construction and Materials; Concrete and Steel Structures; Mechanical and Electrical Installations; Rural Architecture; Urban Space Analysis; Historic Building Survey and Restoration; Surveying and Estimating; History and Theory of Architecture

RESEARCH EXPERIENCE

Graduate Research Assistant - Drexel University **2021-Present**

Personal circadian-light sensing and feedback platform

- Led requirements, systems integration, field deployment, dashboard and workflow configuration, feedback design, participant protocol, and analysis for a participant-in-the-loop research platform; collaborated on companion PCB and MQTT firmware.
- Integrated LiDo near-corneal sensing with a Pico W companion, Raspberry Pi gateway, local receipt records, cloud routing, Ubidots dashboards, n8n workflows, Notecard/Notehub services, Qualtrics, and Telegram communication.
- Designed a traceable measurement-to-information chain separating sensor acquisition, receipt, routing, visualization, message delivery, participant uptake, and behavioral response.
- Deployed and analyzed a fixed-order, within-participant pilot with 18 operational records and 14 completers; built reproducible workflows for data cleaning, QA, time series, repeated measures, mixed effects, surveys, and qualitative analysis.

Lead Author and Framework Developer - ET4WIBE **2023-Present**

Research and application roadmap for occupant-centered technologies that support well-being in buildings

- Led writing, workshop synthesis, and literature integration for a 17-author roadmap covering building sensors, controls, human-building interfaces, interoperability, data governance, and adoption.
- Converted interdisciplinary expert discussions into technology layers, challenge categories, research gaps, and implementation priorities. Manuscript submitted to Building and Environment.

M.Sc. Thesis Researcher - Politecnico di Milano **2019-2021**

Intelligent shading retrofit and multi-objective building-performance optimization

- Developed a parametric design, building-simulation, and NSGA-II workflow to evaluate home-office shading options across daylight, energy, thermal, and user-preference objectives.
- Designed a user-specific control approach for dynamic shading and translated the work into a peer-reviewed Journal of Green Building case study.

ADDITIONAL RESEARCH

Circadian-Supportive Lighting Triad - First Author and Project Lead **2025-Present**

- Conceptualized a three-domain framework linking non-visual biological responses, light-exposure systems, and occupant engagement; led methodology, data curation, analysis, visualization, drafting, and project administration.
- Built an evidence map of 684 applied human studies using multi-database searching, researcher-verified AI-assisted screening, structured coding, full-text review, and evidence synthesis. Manuscript submitted to Building and Environment.

Indoor Air Quality in Low-Income Philadelphia Housing **2022-2024**

- Supported monitoring in 54 households with Awair Element and IQAir sensors in partnership with the Philadelphia Energy Authority and Energy Coordinating Agency; contributed calibration, deployment, timestamp normalization, data QA, visualization, and mixed-methods assessment.
- Developed exploratory feature-engineering, principal-component analysis, and K-means clustering workflows to characterize household air-quality patterns.

Controlled Multisensory Indoor Environment Pilot **2021-2023**

- Contributed to a controlled study with nine adults and 16 test conditions linking thermal, acoustic, lighting, olfactory, physiological, and perceptual data to stress and comfort in healthcare-oriented environments.

Schools as Community Critical Infrastructure **2023-2026**

- Contributed statistical analysis and a structured decision-support matrix for evaluating public schools as community infrastructure during and beyond disruptive events with Drexel and Temple University researchers.

Nature-Based Solutions to Overheating for Equitable Heat Health **2023-2025**

- Contributed to a Springer book chapter on behavioral, building-scale, and landscape strategies for equitable heat-health protection.

PUBLICATIONS AND MANUSCRIPTS

Tajik, R., Soltanmohammadlou, S., Kianfar, A., Masera, G., & Hoque, S. (2024). A case study: Intelligent shading retrofit to existing home-office using multi-objective optimization. Journal of Green Building, 19(1), 123-156. https://doi.org/10.3992/jgb.19.1.123

Tajik, R., & Hoque, S. (2024). Challenges in mixed methods research: Data collection and assessment of indoor air quality in low-income households, Philadelphia. Proceedings of the 7th Residential Building Design and Construction Conference, Pennsylvania State University. Researchgate.net

Hoque, S., & Tajik, R. (2024). ChatGPT: Perspectives of an international Ph.D. student and his PI. Current Trends in Civil and Structural Engineering, 11(1). https://doi.org/10.33552/CTCSE.2024.11.000755

Hoque, S., Schinasi, L., Hesson, M., & Tajik, R. (2026). Nature-based solutions to overheating for equitable heat health protection. In Towards a Nature-Positive Built Environment (pp. 247-258). Springer Nature. https://doi.org/10.1007/978-3-031-95292-0_13

Submitted: Tajik, R., Hoque, S., Glickman, G. L., & Stefani, O. The Circadian-Supportive Lighting Triad: A conceptual framework and evidence map of applied human research. Submitted to Building and Environment.

Submitted: Tajik, R., et al. Charting the future of occupant-centric enabling technologies for well-being in buildings: Challenges, gaps, and a research and application roadmap. Submitted to Building and Environment.

Preprint: https://doi.org/10.2139/ssrn.7438101

In preparation: Tajik, R., et al. LuxRest: Field feasibility of a personal circadian-supportive light measure-to-action system.

In preparation: Tajik, R., et al. Characterizing indoor air quality in low-income urban households through unsupervised machine-learning clustering.

Working paper: Tajik, R., et al. Adapting vernacular passive-cooling strategies from Guilan to mitigate residential overheating in Philadelphia.

TECHNICAL REPORTS

Tajik, R., Ebrahimkhanlou, A., & Hoque, S. (2024). Characterizing Indoor Air Quality in Low-Income Urban Households Through Unsupervised Machine Learning Clustering. Technical report, AE 580, Drexel University.

Edske, V., Moussa, J., & Tajik, R. (2022). Artificial Neural Network for Predictive CFD. Technical report, AE 555, Drexel University.

Edske, V., Moussa, J., & Tajik, R. (2022). Relational Database for LEED-Certified Buildings. Technical report, AE 555, Drexel University.

Tajik, R. (2022). EnergyPlus Analysis and Optimization of a DOE Small Office Reference Building. Technical report, AE 551, Drexel University.

Tajik, R. (2022). Building Zone and Surface Heat-Balance Modeling Under Three HVAC Cooling Scenarios. Technical report, AE 551, Drexel University.

Moussa, J., & Tajik, R. (2021). Risk-Based Ventilation to Control the Airborne Transmission of COVID-19 in Sports Centers. Technical report, AE 550, Drexel University.

Tajik, R., Moussa, J., N. Varman, Jyrteanna Teo (2021). Review of Numerical Methods Used in Engineering Research. Technical report, MEM 591, Drexel University.

Tajik, R., Kianfar, A., & Soltanmohammadlou, S. (2021). User-Specific Automated Kinetic Shading Design Implementing Multi-Objective Optimization and Machine Learning Tools. Master's thesis, Politecnico di Milano.

Tajik, R., et al. (2020). NEO-TULOU Architectural Design Book. Technical report, Politecnico di Milano.

Tajik, R., et al. (2020). Sustainable Building Technologies: NEO-TULOU Technical Design. Technical report, Politecnico di Milano.

Tajik, R. (2017). Design of a Sustainable Off-Grid Ski Resort and Mountain Accommodation. Bachelor's thesis, University of Guilan.

PRESENTATIONS AND RESEARCH FACILITATION

The Missing Link in Circadian-Supportive Lighting Solutions **Mar 2026**

Invited seminar, Centre for Chronobiology, Basel, Switzerland

- Presented real-time light feedback as a behavioral intervention for circadian health.

Challenges in Mixed Methods Research **Mar 2024**

- Conference presentation, Residential Building Design and Construction Conference, Pennsylvania State University.

Experts and Tools for Well-Being in Built Environments **Sep 2023**

- Facilitated an interdisciplinary research-roadmap workshop at Drexel University.

TEACHING AND MENTORING

Teaching Assistant and Grader - Drexel University **2022-2026**

- Supported instruction, laboratories, design reviews, technical writing, and assessment in First-Year Engineering Design, HVAC and building systems, daylighting, hydraulics, and construction materials.
- Guided students through prototyping, eQUEST energy modeling, room-by-room load calculations, daylight assessment, fluid and materials laboratories, graphing, and technical reports.

Teaching Assistant and Junior Tutor - Politecnico di Milano **2019-2021**

- Supported Urban Design and Studio and Energy-Efficient Buildings through design reviews and workshops on passive strategies, climate analysis, building simulation, and performance-based decisions.

Program Facilitator - Eureka STEM Summer Program **2022-2023**

- Facilitated hands-on sustainability and engineering activities for rising eighth- and ninth-grade girls through an NSF-supported informal STEM program at Drexel and Girls Inc.

Earlier Teaching **2012-2016**

- Taught high-school mathematics and intermediate to upper-intermediate English; served as a SketchUp and V-Ray tutor at AHG Institution in 2016.

ARCHITECTURAL AND BUILDING DESIGN

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

- Worked in a 48-hour multidisciplinary team to design a behavioral-health emergency department and EmPATH crisis-unit expansion for Grady Memorial Hospital; team received third place.

Carbon-Free Development at Greco-Breda - Milan, Italy **2019**

- Developed a mixed-use urban-regeneration strategy integrating housing, mobility, passive design, renewable energy, urban agriculture, and water and waste strategies; project received second place in the 17th Laure Larouze Sustainable Built Environment Study Award.

POLITECNICO DI MILANO - M.SC. DESIGN STUDIOS **2018-2021**

- NEO-TULOU: A Nearly Zero-Energy Residential Complex in Hong Kong to Revitalize Traditional Cantonese Living Culture. — Supervisors: Dr. G. Masera, Prof. M. Brasca, Arch. F. Pagliani
- Project for an Innovative and Carbon-Free Development at the Greco-Breda Area in Milan. — Supervisors: Dr. M. Tadi and Dr. F. Nolesini
- reGreeneration: Refurbishment of an Old Industrial Site as a Mountain Sports Hub. — Supervisor: Dr. M. Grecchi
- The Vitality Chain: A Sustainable Lecco City Initiative. — Supervisor: Dr. A. Colucci
- Home for Life: Thermal Comfort Automation Using Passive Strategies. — Supervisor: Dr. G. Salvalai

UNIVERSITY OF GUILAN - B.SC. DESIGN STUDIOS **2012-2017**

- Architect's Villa Design in Rasht. — Supervisor: Dr. A. Tarkashvand
- Museum of Contemporary Arts Design in Rasht. — Supervisor: Dr. M. Khakpour
- Hospital Design in Tehran. — Supervisor: Dr. J. Mirbazel
- Urban Design Regarding Typical Rural Housing, Energy Efficiency, and Local Job Creation. — Supervisor: Dr. A. Agharabie
- Residential Complex Design in Rasht. — Supervisor: Dr. M. Javaherian

Graduate Design Portfolio - Politecnico di Milano **2018-2021**

- Projects included adaptive reuse of an industrial site in Lecco, an urban sustainability and livability strategy, a nearly zero-energy residential complex in Hong Kong, and a TRNSYS study of a net-positive Danish house.

Undergraduate Design Portfolio - University of Guilan **2012-2017**

- Projects included a sustainable off-grid ski resort, a physics-focused high school, an architect's villa, a contemporary art museum, a hospital, a rural housing and job-creation strategy, and a residential complex.

LEADERSHIP, ENTREPRENEURSHIP AND SERVICE

President - Persian Students Association at Drexel University **2023-2024**

- Led a four-person executive team and event teams of 8-10; organized cultural, wellness, networking, and service programs, including events for more than 150 and 400 attendees.
- Expanded resources from approximately $500 to more than $25,000 through ticket sales, partnerships, and more than $7,000 in fundraising; helped secure an $11,000 budget for the following year and launched the organization's Instagram presence.
- The organization received a 2024 Drexel Student Life IMPACT Award during the leadership term.

Technical Lead - NSF I-Corps Hub Northeast Regional Program **Spring 2026**

- Participated in customer-discovery and research-commercialization training covering customer archetypes, value propositions, hypothesis testing, market opportunity, and pathways from research to products and services.

Ad Hoc Peer Reviewer **2023-2024**

- Completed three reviews for the Journal of Green Building and one review for the Residential Building Design and Construction Conference proceedings.

Additional Service

- Member, Scientific Association of Students, Faculty of Art and Architecture, University of Guilan, 2013-2014; elected core member of the Association of Student Council, 2015.

HONORS AND RECOGNITION

- Third Place, AIA Academy of Architecture for Health and ASHE PDC Student Design Challenge, 2025.
- Nominee, Drexel Common Good Award for scholarship, civic engagement, and community building, 2024.
- Kling-Lindquist Endowed Grant, Drexel University College of Engineering, 2023.
- Second Place, 17th Laure Larouze Sustainable Built Environment Study Award, Politecnico di Milano, 2019.
- 98th percentile among more than 400,000 participants, Iran's national university entrance examination, 2012.
- Advanced to the second level of Iran's National Mathematics Olympiad, 2011, and National Informatics Olympiad, 2010.

PROFESSIONAL AFFILIATIONS

ASCE and AEI: Member, American Society of Civil Engineers and Architectural Engineering Institute
IEEE: Member, Philadelphia Section; Consumer Technology Society and Internet of Things community
ASHRAE: Student member, Philadelphia Chapter

LANGUAGES AND ADDITIONAL QUALIFICATIONS

Languages: Persian (native); English (fluent, C1); Italian (intermediate, A2)
Standardized tests: TOEFL iBT 116/120, 2020; GRE 326 total: 167 Quantitative and 159 Verbal, 2017