H A N I N O T H M A N

Architect, Researcher, & Designer

Ph.D. in Architecture
Assistant Professor
College of Architecture, Planning and
Landscape Architecture | CAPLA
School of Architecture
The University of Arizona

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Research Areas

Indoor Environmental Quality Monitoring & Sensor Technologies.
Smart Building Systems & IoT-Driven Environmental Optimization.
Robotics and Computational Design for Built Environment Research.
Climate-Responsive & Health-Equitable Design.

Education

Ph.D. in Architecture
The Pennsylvania State University, University Park, PA, USA
Conferred: August 2026
Dissertation: Framework for Integrating IoT with A Mobile System for Indoor Air Quality (IAQ) Sensing, Monitoring, and Optimization.
Dissertation Advisor: Rahman Azari, Ph.D.

Master of Science in Architectural Engineering (M.SC)
University of Jordan, Amman, Jordan | Aug 2019.

Bachelor of Science in Architectural Engineering
The Hashemite University, Az Zarqa, Jordan | May 2014.

Academic Appointments

Assistant Professor of Architecture | University of Arizona
School of Architecture, College of Architecture, Planning and Landscape Architecture (CAPLA), Tucson, AZ, USA | Aug 2026 - Present

Graduate Teaching Assistant | Penn State University · Full-time
ARCH 130A| Basic Design and Research (May 2025)
ARCH 170N|Sustainable Architecture 1 (Summer 2025)
ARCH 270N| Introduction to Sustainable Architecture2 (2024-2025)
Department of Architecture, Penn State University, USA | Aug 2024 – May 2025

Artist and Maker in Residence at Learning Factory
Learning Factory, College of Engineering, Penn State University, USA | Aug 2024 – May 2025
Designed and led workshops on low-cost IAQ sensing, mobile systems, and Arduino-based environmental monitoring.

Assistant Mentor Coordinator - The Learning Edge Academic Program (LEAP)
Learning Edge Academic Program (LEAP), Penn State University, USA | Summer 2023, 2024, 2025 Supported incoming first-year students through mentorship training, orientation coordination, and academic readiness workshops.

Graduate Research Assistant
Department of Architecture, Penn State University, USA | Aug 2022 – May 2024
Research on IoT-based indoor air quality monitoring, low-cost sensor calibration, and robotic sensing platforms.

Instructor for Architectural Design Studio & Teacher Assistant - The Hashemite University
Department of Architectural Engineering, Hashemite University, Jordan | Oct 2016 – Aug 2022

Architect and Designer - Ruba Hosuah for Engineering
Ruba Hosuah for Engineering, Amman, Jordan | May 2016 – Oct 2016
Design Studio Supervisor - The Hashemite University. Sep 2014 -May 2016
Intern Architect - Bitar Consultants, Architects, Engineers & Project | May2013- Aug 2013.

Honors & Awards

2026| IAQVEC Scholarship Award, in recognition of academic excellence and research potential at the IAQVEC 2026 Conference.
2026| Kalisperis Mentorship Award, College of Arts and Architecture, Penn State (2025&2026)
Recognized for outstanding mentorship and contributions to student development.
2026 | A&A Graduate Student Research Support Program, Penn State
Selected for competitive college-wide research funding in 2026 in recognition of the strength and merit of the proposed research project. Awarded to support research development and implementation.
2026| Sustainability Graduate Student Award, College of Arts and Architecture, Penn State
Winner of the college-wide award in 2026 in recognition of sustainability-focused research and academic leadership.
2025| Cocozziello Institute of Real Estate awards - SEED Grant for DECODE: Digital twin Environments for Comprehensive Decarbonization Evaluation of the urban and rural real estate
2025| J. Jeffery and Ann Marie Fox Graduate School Fox Summer Research Grant, Penn State University - Support summer research advancing academic progress and scholarly contributions
2025-2026| ICDS Rising Researcher Award - Penn State University
Selected to support the "TwinSight: A Data-Driven Digital Twin Framework for Human-Centric Health Monitoring" project for Summer 2026. Competitive, interdisciplinary funding from the Institute for Computational and Data Sciences.
2025| Fox Scholar, Penn State University **–** Awarded in recognition of outstanding academic achievement and research potential in architecture and environmental design.
2024-2025| Artists and Makers in Residence - Learning Factory, Penn State
Selected for a competitive residency program within the College of Engineering. Designed and led interdisciplinary workshops on IoT and environmental monitoring using Arduino-based systems.
2024| Alma Heinz and August Louis Pohland Graduate Student Fellowship
Development of a Mobile Robotic Platform for Indoor Air Quality Sensing and Environmental Justice Applications Penn State University
2023- 2024| AT&T Graduate Fellowship - Penn State University
Nominated by the Department of Architecture for the AT&T Graduate Fellowship. | Nominee
2022| Graduate Assistantship for Ph.D. Studies - Penn State University
Awarded full assistantship support for doctoral research.
2023-2025| Graduate Student Instructor, LEAP Program Mentor -Penn State University
Selected to mentor incoming undergraduate students as part of the Learning Edge Academic Program.
2019| Best Master Thesis Published Paper Award - University of Jordan
Recognized for publication excellence based on master's thesis research.
2014| Best Graduation Project Award - Hashemite University
Received top prize for undergraduate thesis project, including financial support.
Ranked Top in Architecture Department - Hashemite University
Consistently ranked among the top students at both undergraduate (2014) and graduate (top-tier ranking, 2019) levels.
2009-2014| Dean's Honor List, & **1st Place Graduation Project -** Hashemite University
Ranked first among architecture students for final graduation design project.

Publications

Peer-Reviewed Journals

1. **Othman, Hanin,** and Rahman Azari. 2026. "Enhancing Spatial Indoor Air Quality Sensing Using a Hybrid Low-Cost Fixed Mobile IoT Network." Energy and Buildings 365 (August): 117670. https://doi.org/10.1016/j.enbuild.2026.117670.
2. **Othman, Hanin,** Guilherme Sieves, Tamy Guimarães, and Rahman Azari. 2025. "A Calibration Chamber Framework for Low-Cost Indoor Air Quality Sensor Validation." Building and Environment 260: 113856. https://doi.org/10.1016/j.buildenv.2025.113856.

3. **Othman, Hanin,** Rahman Azari, and Tamy Guimarães. 2024. "Low-Cost IoT-Based Indoor Air Quality Monitoring." Technology | Architecture + Design 8 (2): 250–70. https://doi.org/10.1080/24751448.2024.2405403.
4. **Othman, Hanin,** Alshboul A.A. The role of urban morphology on outdoor thermal comfort: The case of Al-Sharq City – Az Zarqa. (2020) Urban Climate, 34, no.100706. https://doi.org/10.1016/j.uclim.2020.100706.

Peer-Reviewed Conference Papers

5. **Othman, Hanin,** and Rahman Azari. 2026. "Enhancing the Granularity of Spatial Sensing Using a Low-Cost IoT-Based Sensing Network." E3S Web of Conferences, 716: 01002. IAQVEC 2026. EDP Sciences. https://doi.org/10.1051/e3sconf/202671601002
6. **Othman, Hanin**, Guilherme Sieves, Tamy Guimaraes, and Rahman Azari. 2024. "Development of a Calibration Chamber to Evaluate the Performance of a Low-Cost IAQ Sensing Device." In SIGraDi 2024 - Biodigital Intelligent Systems Conference, 2024, Volume1:1493–1504. Barcelona (Spain). https://sigradi.org/sigradi2024/#publications.
7. **Othman, Hanin**, and Rahman Azari. 2023. "Internet of Things (IOT) Sensing of Indoor Environmental Quality (IEQ): A Review of Possibilities, Challenges, and Open Problems." In Amps Proceedings Series, 34.1:146–60. Amps Proceedings Series 34.1. New York. https://amps-research.com/wp-content/uploads/2024/04/Amps_Proceedings-Series_34.1.pdf.
8. **Othman, Hanin**, and Rahman Azari. 2023. "Exploring Low-Cost Sensors for Indoor Air Quality (IAQ) Monitoring: A Review of Stationary and Mobile Sensing Systems." In Computation, Culture, and Context, 224–42. Amman Jordan. https://ascaad.org/conference/2023/docs/ASCAAD2023Proceedings.pdf.
9. Imam, Chowdhury, **Othman, Hanin**, and Çapunaman, Özgüç. "Robotic Plaster Carving: Formalizing Subtractive Detailing of Plaster Surfaces for Construction and Crafts." Digital Design Reconsidered, 2023, https://papers.cumincad.org/data/works/att/ecaade2023_318.pdf.

Ongoing Research and Manuscripts

10. **Book Chapter:** The Applications of Internet-of-Things (IoT) and Mobile Systems for Indoor Environmental Quality (IEQ) Sensing: A Review of Possibilities, Challenges, and Knowledge. **|| Othman, Hanin**, Rahman Azari
11. **Manuscript in Preparation:** Hybrid Fixed-Mobile Indoor Air Quality Monitoring for Spatial Field Reconstruction. || **Othman, Hanin**, Rahman Azari.
12. **Ongoing Research Project:** DECODE: Digital Twin Environments for Comprehensive Decarbonization Evaluation of Urban and Rural Real Estate. || Lead Researcher: **Hanin Othman** (PI: Rahman Azari; Co-PIs: Katie Fitzsimons, Tamy Guimaraes, Julian Wang; Co-I: Lisa Iulo).

Peer Review & Editorial Contributions

2023 - Present | Journal Reviewer – Urban Climate
2026| Journal Reviewer – Academia Green Energy
2026| Design Research Society Conference (DRS)
2026| The Ibero-American Society of Digital Graphics (SIGraDi)
2024| Arab Society for Computation in Architecture, Art and Design (ASCAAD)

Conferences & Presentations

2026| Othman, Hanin. 2026. Cocoziello Institute Built Environment Showcase. (Oral + poster presentation)
2026| Othman, Hanin. 2026. University of Pittsburgh at the Department of Civil and Environmental Engineering. (Oral presentation)
2026| Othman, Hanin. 2026. Sustainability Council Showcase Exhibit. College of Arts and Architecture, Penn State. (Oral presentation)
2026| Othman, Hanin. 2026. 2nd Annual Living Materials Day (LiMDay) at Penn State. (Poster presentation)
2025| Othman, Hanin. 2025. ICDS Fall 2025 Symposium. PSU Institute for Computational and Data Sciences, Penn State. (poster presentation)
2024| Othman, Hanin. MIT Senseable City Lab (Global Seminar). Massachusetts Institute of Technology. (invited)
2024| **Othman, Hanin**. 2024. Thermal Architecture Lab. University of Pennsylvania. (research presentation)
2024-2025| Othman, Hanin. 2024. Sustainability Council, Penn State. (research presentation)
2024-2025| Othman, Hanin. ARCH 412: Integrative Energy and Environmental Design
Penn State. (Lecture presentation)
2024| **Othman, Hanin**. Sustainability Council Showcase Exhibit. College of Arts and Architecture, Penn State. (poster presentation)
2023-2024 | Othman, Hanin. University-wide Research Showcase. (poster presentation)
2024| Othman, Hanin. A Framework for Integrating IoT with a Mobile System for Indoor Air Quality (IAQ) Sensing in Built Environments. Sustainability Research Get-Together. College of Arts and Architecture Sustainability Round Table, Penn State. (invited)

2023-2024| Othman, Hanin. LiMC^2 Poster Exhibition, Penn State University. (poster presentation)
2024| Othman, Hanin. Development of a Calibration Chamber to Evaluate the Performance of a Low-Cost IAQ Sensing Device. SIGraDi - Biodigital Intelligent Systems Conference, Barcelona, Spain. (conference presentation)
2023| Othman, Hanin. Exploring Low-Cost Sensors for Indoor Air Quality (IAQ) Monitoring: A Review of Stationary and Mobile Sensing Systems. ASCAAD Conference Amman, Jordan. (conference presentation)
2023|Othman, Hanin. A Review of Using IoT and mobile sensing for monitoring Indoor Environmental Quality (IEQ) Perspective: Possibilities, issues, challenges, and open problems. Livable Cities Conference New York. (conference presentation)
2023| Othman, Hanin. Robotic Plaster Carving: Formalizing Subtractive Detailing of Plaster Surfaces for Construction and Crafts. The 41st eCAADe Conference, Graz University of Technology, Austria, 2023. (conference presentation)

Competitions

2025 | LAGI– Land Art Generator Initiative: Marou Village, Fiji

Role: Lead Designer | Status: 4th-place
Project Title: *DRUA – A Resilient Energy-Water Infrastructure Rooted in Local Knowledge*. 2025. Recognized as a 4th-place finalist and selected for international exhibition & publication. Competition organized by LAGI 2025 – Land Art Generator Initiative: Marou Village, Fiji. Team Submission.

2025| U.S. Department of Energy Solar Decathlon– Design Challenge

Role: Indoor Environmental Quality & Designer Lead
Team: Penn State – Morgan State | Status: Submitted
Project Title: *Retrofitting a Single-Family Building for Net-Zero Urban Farming – Park Heights, Baltimore.* 2025. Competition organized by the U.S. Department of Energy Solar Decathlon 2025 – Design Challenge. Team submission.

2024| SCCLT South Garner Street Design Competition – State College, PA

Role: Team Designer | Status: Submitted
Project Title: *Affordable High-Performance Housing for Community Land Trust Residents.* 2024. State College Community Land Trust (SCCLT) South Garner Street Design Competition – State College, PA.

2017-2019| Architectural Contribution – Hashemite University Presidency Building

Role: Design Collaborator | Status: Completed
Collaborated on the architectural design and planning of the Hashemite University's Presidency Building, delivering solutions that reflected the university's institutional identity while incorporating sustainable and climatically responsive strategies. Contributed to spatial planning, façade articulation, and site integration.

2016| Royal Monument Design Competition

Hashemite Royal Palace Campus (2015–2016)
Role: Design Team Member | Status: Awarded – First Place
Supported the first place-winning team in a national design competition for the Al Rayah Monument, located at the Hashemite Royal Palace. Contributed to schematic design development, presentation graphics, and cultural research under the leadership of Dr. Shaher Rababa, Dr. Rama Al-Rabady, and Dr. Ahmad Al-Husban.

Academic Service & Outreach

2026-Present | Development of CAPLA Environmental Sensing Equipment Library
School of Architecture, University of Arizona
2026-Present | Faculty Search Committee Member
School of Architecture, University of Arizona
2026-Present | Faculty Co-Advisor, National Organization of Minority Architecture Students (NOMAS)
School of Architecture, University of Arizona
Mentorship, Leadership & Student Development
Mentor Coordinator, *The Learning Edge Academic Program (LEAP)*
Penn State University (Summers 2023-2025)
Workshop Instructor – Artists and Makers in Residence
Learning Factory – Penn State University (Fall 2024-Spring 2025)
A&A Sustainability Council (2024-2026), Sustainability Fellow – Penn State University
Muslim Graduate Student Organization (MGSO) - Penn State University
Graduate Research and Innovative Design Organization (GRID) - Penn State University

Technical Skills & Knowledge

- **Design & Visualization Tools**

AutoCAD (2D/3D) – Architectural drafting, code-compliant documentation, and detailing

SketchUp & V-Ray – Massing studies, spatial diagramming, and visualization
Autodesk Revit Architecture – BIM modeling with parametric components and system analysis
3ds Max – Advanced architectural modeling and photorealistic rendering
Adobe Creative Suite (Photoshop, Illustrator, InDesign) – Diagrams, portfolios, presentations, and visual branding
Rhinoceros 3D & Grasshopper – Parametric design, environmental optimization workflows, and robotic toolpath generation (intermediate)

- **Environmental Simulation & Analytical Tools**

DesignBuilder – Whole-building energy performance simulation
ENVI-met – Microclimate simulation for outdoor thermal comfort
RayMan & Leonardo – Solar radiation and thermal comfort modeling
Agisoft Metashape, RealityCapture, Meshroom – Photogrammetry workflows for 3D heritage documentation
SolidWorks (CFD tools) – Simulation of airflow, heat transfer, and mechanical systems
ArcGIS/QGIS – Environmental and urban morphology mapping and analysis
The City Energy Analyst (CEA): an urban building energy modeling (UBEM) platform for Urban Decarbonisation Planning & Design.
COVE Tool – Building Performance Analysis.

- **Embedded Systems, IoT & Robotics**

Raspberry Pi (Single and Networked Systems) – IAQ monitoring, SLAM implementation, sensor-host communication
Arduino & Arduino IDE – Embedded programming, circuit prototyping, and low-cost sensor integration
Low-Cost Sensors – BME680, MH-Z19B, DHT22, PM sensors, SGP30, TSL2591
Ubuntu/Linux Systems – ROS configuration, Python environment setup, multi-board coordination
ROS (Robot Operating System) – ROS1 & ROS2, including SLAM, wall-following, services/actions, and multi-node networks
IoT Hardware & Systems Design – Design and deployment of sensor-based environmental systems for IAQ monitoring, mobile sensing, and real-time feedback
Socket.IO & Flask – Live data visualization with web dashboards for IoT systems
Altium Designer – PCB layout and electronic hardware prototyping

- **Data Analysis & Research Tools**

Jupyter Notebook – Data processing, visualization, and calibration scripts
Statistical Tools – Regression analysis, ANOVA, t-tests, MAE/MSE/RMSE calculations for sensor performance
Excel & Google Sheets – Experimental logging, charting, and structured tabulation
LaTeX, Microsoft Word, PowerPoint - Research writing, presentations, and academic formatting

- **Digital Fabrication & Lab Operations**

Digital Fabrication Tools – 3D printing (FDM), laser cutting, CNC (introductory)
Lab Safety & Access Policy Development – Authored and enforced policies for student use of Craft & Computation Labs
Workshop Design & Delivery – Led student trainings in digital fabrication tools, photogrammetry, and fabrication software
Lab Management – Oversaw materials lab and Digital Design Shop operations for rapid prototyping and CAD/CAM experimentation

Certificates

- **Pedagogy, Inclusion & Communication – Penn State University**

Arts and Architecture Graduate Certificate in Teaching – Pedagogy in Arts and Design
Center for Pedagogy in Arts and Design, Fall 2024
BUILD @ Penn State Track 1 – Recognizing the Importance of Inclusion in the Workplace (Feb 2022)
BUILD @ Penn State Track 2 – Adopting an Inclusion Mindset at Work (Nov 2024)
BUILD @ Penn State Track 3 – Skills for Building a Culture of Inclusion (Jan 2025)
Foundations of Diversity, Equity, Inclusion, and Belonging (Nov 2023)
The Art and Science of Communication (Feb 2025)
Values, Ethics, and Compliance at Penn State (Mar 2025)

- **Robotics, Programming & Embedded Systems**

Code Foundation for ROS – The Construct Robotics Institute, Feb 2025 Modules:
Linux for Robotics
Python 3 for Robotics
Mastering with ROS: TurtleBot3 – The Construct Robotics Institute, May 2025
ROS1 Basics (Python) – The Construct Robotics Institute, April 2025

ROS2 Basics (Python) – The Construct Robotics Institute, April 2025
ROS2 Navigation – The Construct Robotics Institute, May 2025
Raspberry Pi Essential Training – LinkedIn Learning Certificate, Jan 2022
Programming Foundations: Fundamentals – LinkedIn Learning Certificate, Oct 2022

- **Computational Design & Parametric Modeling**

Rhino & Grasshopper Workshop – How to Rhino Platform, Instructor: Dušan Cvetković
Covered parametric modeling, environmental plugins, and digital workflows for architecture.

- **Coursera Specializations & Technical Courses**

ME 456: Introduction to Robotics – *Prof. Xiaogang Hu, Penn State*
ME 348: Circuit Analysis, Instrumentation & Statistics – *Prof. Linxiao Zhu, Penn State*
Introduction to Electronics – *Georgia Institute of Technology*
Instructors: Dr. Bonnie H. Ferri, Dr. Robert A. Robinson, Jr.
An Introduction to Programming the Internet of Things (IoT) Specialization – *University of California, Irvine*
Instructor: Ian Harris
Python Basics *(Part of Python 3 Programming Specialization) – University of Michigan*
Instructors: Paul Resnick, Steve Oney

- **Penn State University – The School of Engineering Design and Innovation (EDI)**
  Learning Factory Skills Training | 2024–2025

The Learning Factory provides access and hands-on training for digital fabrication, prototyping, electronics, and manufacturing tools. The following certifications were completed as part of technical training for interdisciplinary design and research:

Additive – Basic I
• Operation of Prusa 3D Printers (PLA & PETG)
• Set up for long-duration 3D prints without continuous supervision
Additive – Basic II
• Use of advanced Prusa printers (MK4, XL) with dual toolheads
• Proficiency in printing with multiple materials, including PLA, PETG, TPU, and ABS
Additive – Advanced Manufacturing
• Training in high-performance fabrication using metal, carbon fiber, and poly jet resin printing
• Operation of Bambu Lab X1-Carbon Combo 3D Printer
EE and IoT Training
• Hands-on training in electronic prototyping and diagnostics
• Proficient use of soldering equipment, multimeters, and other electronics tools.
Immersive Environments Lab
• Hands-on training in immersive experience with 3D platform integrating sketching and generative AI for scenic design prototyping, enabling rapid exploration of visual ideas.
• Training to use Hyve-3D which is an immersive design and visualization system.