

Milad Hakimshafaei

Computational Design Lead | BIM Automation | Revit API | Prefabrication | Digital Construction

Email: mhakimsh@ucsc.edu | milad.hakim90@gmail.com | Location: Barcelona, Spain (Remote Worldwide)

Professional Summary

Computational designer, software developer, and BIM automation specialist with 8+ years of experience spanning architecture, prefabrication, digital construction, extended reality, and design technology. Currently leading the development of automation systems for industrialized construction, with expertise in Revit API, Rhino.Inside, Grasshopper, BIM workflows, and AI-assisted design-to-fabrication processes. Proven track record delivering production-grade software solutions that streamline engineering, documentation, and manufacturing workflows for large-scale construction projects.

Core Expertise

- BIM Automation & Revit API Development
- Digital Construction Workflows
- AI for Architecture & Construction
- Prefabrication & Industrialized Construction
- Design-to-Fabrication Automation
- AR/VR & Interactive Visualization
- Computational Design & Generative Systems
- Rhino.Inside & Grasshopper Development
- Software Development for AEC Technology

Professional Experience

Lead Developer — TektonOS, USA | 2024–Present

Lead development of BIM automation and prefabrication software systems for industrialized residential construction. Develop Revit API, Rhino.Inside, and Grasshopper workflows connecting design, engineering, and manufacturing processes. Design production-grade software architectures supporting design-to-fabrication pipelines. Implement AI-assisted automation for model generation, documentation, and manufacturing coordination.

Computational Designer — Agorus, USA | 2024

Developed automation tools for prefabricated housing design and production systems. Built custom BIM workflows for engineering, coordination, and manufacturing-oriented model generation. Worked with Revit, Rhino.Inside, Revit API, Grasshopper, Visual Basic, and C# for design automation.

Computational Designer — BLOX, USA | 2023–2024

Developed software tools for prefabricated healthcare facilities and construction documentation workflows. Designed automation systems that reduced documentation timelines from weeks to a single day. Implemented BIM automation workflows used in live healthcare construction projects.

Visualization Designer Intern / AR Prototype Developer — Payette, USA | 2022

Developed accessible augmented reality prototypes for architectural visualization and design review. Built Unity-based AR workflows using C#, AR Foundation, iOS deployment, and Rhino-based 3D models.

Research & Innovation Experience

Research Assistant / Digital Heritage Developer — SPECS Lab, Institute for Bioengineering of Catalonia, Spain | 2018–2021

Developed procedural and algorithmic workflows for large-scale reconstruction of historically significant environments. Built AR/VR applications for museum, education, and cultural heritage contexts within EU-funded research projects. Worked across Houdini, Unity, C#, AR/VR, Cinema4D, Blender, SketchUp, and QGIS for immersive digital heritage systems.

Design Researcher — Morphogenesis, Iran | 2014

Contributed to algorithmic and parametric design studies for architectural facade systems using Rhino, Grasshopper, and SketchUp.

Education

M.S. Computational Media — University of California, Santa Cruz, USA (2021–2023)

Master in Advanced Design & Digital Architecture — ELISAVA School of Design and Engineering, Barcelona, Spain (2015–2016)

M.S. Architectural Engineering — Islamic Azad University, Kish, Iran (2012–2015)

B.S. Architectural Engineering — Eshragh Institute of Higher Education, Iran (2008–2012)

Publications & Scholarly Output

Hakimshafaei, M. Survey of Generative AI in Architecture and Design. M.S. Thesis, University of California, Santa Cruz, 2023.

Hakimshafaei, M., Ehrlich, D., Elec, O. Scaffolding Generation using a 3D Physarum Polycephalum Model. ACM Symposium on Computational Fabrication, 2022.

Wierenga, S., Blancas-Muñoz, M., Mura, A., Pacheco, D., Omedas, P., Hakimshafaei, M., Verschure, P. FutureMemory: An application for Digital Heritage. Mobile and Ubiquitous Multimedia, 2019.

Google Scholar: scholar.google.com/citations?user=JqElCh8AAAAJ

Technical Skills

Programming: Python, C#, Visual Basic / VB.NET, JavaScript

Design & BIM: Autodesk Revit API, Rhino.Inside Revit, Grasshopper, Dynamo, Houdini, Blender, Rhino

Digital Construction: BIM automation, prefabrication workflows, design-to-fabrication systems, interoperability, documentation automation

XR & Interactive Systems: Unity, AR/VR, AR Foundation, ARCore

AI & Data: TensorFlow, Keras, generative AI for architecture and design

Other: QGIS, p5.js, Processing

Teaching & Mentoring

Teaching Assistant — Introduction to 3D Animation (Blender), University of California, Santa Cruz (2022).

Workshop leader and instructor in computational design, generative design, 3D modeling, and digital fabrication at University of Tehran, Khayyam University, and independent programs.

Selected Portfolio & Work Samples

Academic & Research Work

- Google Scholar Profile (publications & citations): Google Scholar
- Baskin Engineering Anti-Racism Research Fellowship – Generative AI & Visual Design Research: UCSC Fellowship Announcement
- Digital Heritage Research (EU-funded, SPECS Lab): <https://specs-lab.com/>
- Future Memory Foundation – Digital Heritage Projects: <https://www.futurememoryfoundation.org/>

Industry & Applied Research

- TektonOS – Prefabrication Automation & Computational Design Tools:

Selected work sample: Google Drive Link

- BLOX – Computational Design for Prefabricated Healthcare Buildings: <https://www.bloxbuilt.com/>
- Payette – AR Prototypes for Architectural Visualization: Company Website

Selected work sample: Google Drive Link

Artistic, Experimental & Visual Work

- NeurIPS 2022 Workshop on Machine Learning for Creativity & Design – Accepted Artwork: Workshop Page
- NeurIPS 2022 Artwork – Gallery / Video Documentation: Youtube

Architectural Design Portfolio (Pre-2016)

Selected architectural design work completed prior to and during my Master's studies at ELISAVA, Barcelona. This portfolio is provided for contextual reference to my architectural foundation and spatial design background.

- Architecture Portfolio (ELISAVA and prior work): Google Drive Link