

# Arman Nikkhah Dehnavi

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## ABOUT ME

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I am a building science researcher, data analyst and computer programmer with 7 years of experience in Iran. I have a Master's degree in Building Science from the University of Shahid Beheshti, where I worked on developing a novel method for building performance simulation using data-driven method. I have also been involved in several research projects that integrate AEC and data science, such as analyzing building performance data, developing smart building applications, and creating data visualization web-tools. I am currently a lecturer in data science for architecture at IBPSA-Iran, where I share my knowledge and experience with students and professionals who want to learn how to apply data science techniques to building design and operation. I am passionate about exploring interdisciplinary fields to advance building science and find innovative solutions for the challenges of the built environment.

## EDUCATION

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### **Master of science, building science, Shahid Beheshti university, August 2020-August2023**

**Thesis:** The development of the early stage web-based application in building performance simulation (case study: prediction of fire evacuation in public buildings)

GPA:(3.92/4.00)

### **Bachelor of Architectural Engineering (BSc), Art university of Isfahan, August 2015-August 2020**

**Final project:** The development of the 5D model for a stadium for 3000 people in the southern part of Isfahan. Iran. (BIM approach)

GPA: (3.76 /4.00)

## EMPLOYMENT

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### International Building performance simulation association (IBPSA-Iran)

April 2021- present

*Lecturer in data science for building science*

- Teaching courses on building science, data analysis, programming, research method to undergraduate and graduate students.
- Designing course materials, assignments, exams. based on learning objectives and outcomes
- Evaluating student performance and provided feedback and guidance

### BSPsim .co

August 2021 - present

- Research and development (focused on web-based application in building performance simulation)
- python developer
- data scientist

### University of Shahid Beheshti (SBU)

March 2021 - present

*Research assistant ,architecture and urban design department*

- Analyzed data from experiments, simulations, surveys, etc. using various tools and techniques
- Prepared reports, papers, posters, slides, etc. for dissemination of research findings
- Collaborated with other researchers, engineers, architects, etc. on multidisciplinary projects

*Technical assistant , architecture and urban design department*

- Developed and implemented algorithms and models for building performance optimization and prediction

## WORK EXPERIENCE

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### As a developer and researcher:

**Fabinnov Innovation Center**, University of Isfahan, Isfahan, Iran

July 2020 -August 2021

Role: Researcher – Arduino developer

**Project:** •An interdisciplinary research project started with an innovative idea related to human emotions, which led to three prototypes in interactive Serious Game and Design. (Currently in the stage of testing and evaluating in university of Illinois Urbana Champaign)

**Project:** Designing an Evaporative Shading System to reduce energy consumption in hot and aired area. performance of the ESS is evaluated in real environment and simulation software.

**Building performance research group (PRG)**, Isfahan, Iran

July 2019 - August 2021

Role: founder –data analyst

Data analyzing in building performance simulation researches – Consulting and giving advice to researcher

## As an architect:

**More office (Architectural Office)**, Isfahan, Iran

2016-2019

Role: Co-founder - architect-junior data analyst in building projects

**Project:** Golsar Gym

2019

Design Collaborated in developing the final design idea. Prepared the design maps. Advised clients on the project feasibility and cost-effectiveness.

**Project:** Karako Cofe

2018

Design Collaborated in developing the final design idea. Prepared the design maps. Advised clients on the project feasibility and cost-effectiveness.

**Project:** Joft Shish Cofe

Collaborated in developing a design idea and in the final fabrication.

2017

**Project:** Heart Health Clinic

Design Collaborated in developing the final design idea. Prepared the design maps. Advised clients on the project feasibility and cost-effectiveness.

**Project:** MARAL gym

2016

Collaborated in developing the final design idea. Prepared the design maps. Advised clients on the project feasibility and cost-effectiveness.

## SKILLS

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- |                                |                  |
|--------------------------------|------------------|
| • Python(programming language) | • AutoCAD        |
| • Arduino                      | • SketchUp       |
| • SPSS                         | • Design Builder |
| • Grasshopper                  |                  |
| • smart PLS                    |                  |

## RESEARCH METHODS

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- Machine learning and statistical learning algorithms
  - Generative adversarial neural network(VAE-pix2pix)
  - Convolutional neural network
  - Natural language processing
  - Optimization algorithms(GA-NSGA2-NSGA3-RBF)
  - Sensitivity analysis (*SHAP*)
  - Hypothesize tests (parametric and non-parametric test)
  - Fuzzy inference systems
  - Structure equation modeling(SEM)

## RESEARCH EXPERIENCE

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### Scientific journal papers:

**Early Design Stage Evaluation of Architectural Factors in Fire Emergency Evacuation of the Buildings Using Pix2Pix and Explainable XGBoost Model**

Journal of Building Performance Simulation

DOI:<https://doi.org/10.1080/19401493.2022.2163422>

**Targeting modular adaptive façade personalization in a shared office space using fuzzy logic and genetic optimization**

Journal of Building Engineering

DOI:<https://doi.org/10.1016/j.jobbe.2023.106118>

**Estimating the Impact of Occupants' Behaviour on Energy Consumption by PIs-SEM: A Case Study of Pakdel Residential Complex in Isfahan, IRAN**

Frontiers in Sustainable Cities

DOI: <https://doi.org/10.3389/frsc.2022.700090>

**Feasibility Study for Poverty Alleviation by Energy Production Through Photovoltaic Panels in Underprivileged Areas of Iran**

Journal of Renewable and New Energy

DOI: [https://www.jrenew.ir/article\\_161990.html?lang=en](https://www.jrenew.ir/article_161990.html?lang=en) (10.52547/jrenew.10.1.138)

**Façade Design of Side-lit Spaces for Different Climates and Surroundings by Machine Learning and NSGAIII (submitted)**

### Conference papers:

**Compilation of structural components estimation method; Case example: steel and concrete moment frame residential buildings in Tehran (in Persian)**

The First International Conference on Built Environment in Digital Age

**Application of Machine Learning Methods in the Analysis of Building Emergency Evacuation at Early Design Stages**

4th International Conference on Civil Engineering, Architecture, Art and Urban Design

**Productivity management of construction machinery in large civil engineering projects of Isfahan Municipality**

13th international project management conference

## RESEARCH INTEREST

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Develop new Data-driven method in different types of building performance analysis:

- Energy consumption and Thermal comfort analysis in buildings
- Daylight simulation
- Fire evacuation(safety)
- Acoustic in buildings
- Occupant behavior

## COMPETITIONS

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### Serious Games Competition - SEGAP 2021

September 2021 - November 2021

Organizer: University of Tehran, Tehran, Iran

Design and fabrication of the game prototype, prepared the final maps, documents and the final presentation.

### NOVA Competition : (1<sup>st</sup> place)

September 2020

Organizer: University of Sahid Beheshti, Tehran, Iran

Developing a web-application named BSP

### EVOLO Competition

December 2018 - February 2019

## TEACHING EXPERIENCE

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### Classes as lecturer (180 students since now):

•Data science and python programming for building science (IBPSA-Iran)

2021-present

## REFERENCES

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### Dr. Mahsa(zahra) zomorodian

Assistant professor in university of shahid beheshti ,Iran,Tehran | Email: [z\\_zomorodian@sbu.ac.ir](mailto:z_zomorodian@sbu.ac.ir)

### Dr. Mohammad Tahsildoost

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### Dr. Amir Tabadkani

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### Dr. Sepideh Korsavi

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