

# Mohsen Vatandoost, Ph.D., M.Arch., M.Sc.

Lecturer, Researcher

Taubman College of Architecture and Urban Planning | taubmancollege.umich.edu  
2000 Bonisteel Boulevard | Ann Arbor, MI 48109  
mohsenv@umich.edu | University of Michigan

## EDUCATION

- 2025 Ph.D. in Architectural Technology, Department of Architectural Technology, Faculty of Architecture, College of Fine Arts, University of Tehran, Tehran, Iran (Expected 2025)
- 2019 Master of Architecture (M.Arch.), Iran University of Science and Technology (IUST), Tehran, Iran
- 2010 Master of Science (M.Sc.) in Civil Engineering (Structural Engineering), Islamic Azad University (IAU), Iran
- 2006 Bachelor of Science (B.Sc.) in civil engineering, Islamic Azad University (IAU), Tehran, Iran

## ACADEMIC APPOINTMENTS

- 2023- University of Michigan, A. Alfred Taubman College of Architecture and Urban Planning. Lecturer of Architecture.
- 2019-21 Iran University of Science and Technology (IUST), School of Architecture and Environmental Design. Adjunct lecturer | Teaching Assistant.
- 2021-22 Pars University, Department of Architecture. Design Studio Instructor | Adjunct Lecturer | Teaching Assistant.
- 2018-21 Iranian Architecture Center (IAC) Summer School. Guest Lecturer

## REGISTRATION AND PROFESSIONAL SOCIETIES

### REGISTRATION

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- 2010- Consulting Engineering Certification and License, *Bolandmartabe Vatan* Consulting Engineering Firm, Co-founder and board member, Issued by the Iran Department of Roads & Urban Planning and Construction Engineering Organization of Tehran Province.
- 2009- Registered Engineer, Professional Engineer, P.E. Issued by the Iran Department of Roads & Urban Planning and Construction Engineering Organization of Tehran Province.

### PROFESSIONAL SOCIETIES

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- 2025 Association for Computer-Aided Design in Architecture (ACADIA), Member
  - 2025 The International Association for Automation and Robotics in Construction (IAARC), Member
  - 2021 International Association for Shell and Spatial Structures (IASS), Member
  - 2018 IRAN's National Elites Foundation, Member
  - 2010 Iranian Concrete Institute (ICI), Member
  - 2009 Iran National Retrofitting Center (IRNC), Member
  - 2009 Tehran Construction Engineering Organization (TCEO), (*Nezam Mohandesi Tehran*), with a Grade 1 Engineer professional license

## AWARDS & HONORS

- 2025 SEED Funding  
Taubman College of Architecture and Urban Planning, University of Michigan  
Collaborators: Prof. Peter von Buelow and Prof. Lars Junghans  
Project Title: *A Machine Learning Paradigm for Performance Enhancement and Predictive Analysis in Buildings* (\$12,610)
- 2025 The Research Catalyst and Innovation (RCI) Award.  
Office of the Vice President for Research (OVPR), University of Michigan.  
Collaborators: Prof. Peter von Buelow and Prof. Lars Junghans  
Project Title: *A Machine Learning Paradigm for Performance Enhancement and Predictive Analysis in Buildings* (\$12,610)
- 2024 Awarded to present research at the ADDOPTIMAL 2024 Conference.  
Taubman College of Architecture and Urban Planning, University of Michigan  
Paper Title: *"Bio-Inspired Innovation: Optimizing Gridshell Structures through the Dolphin Echolocation Algorithm"*
- 2024 SEED Funding  
Taubman College of Architecture and Urban Planning, University of Michigan  
Collaborators: Peter von Buelow and Prof. Wes McGee  
Project Title: *"Ultra-thin-layered 3D-printed hollow core sections for concrete casting"* (\$10,000)
- 2024 The Research Catalyst and Innovation (RCI) Award.  
Office of the Vice President for Research (OVPR), University of Michigan.  
Collaborators: Peter von Buelow and Prof. Wes McGee  
Project Title: *"Ultra-thin-layered 3D-printed hollow core sections for concrete casting"* (\$10,000)
- 2023 Scholarship and Fellowship for the Master of Science (M.Sc.) in Architecture Design and Research degree in the concentration of Digital and Material Technologies (DMT) program  
University of Michigan, Taubman College of Architecture and Urban Planning.
- 2022 Scholarship for supporting international academic Visiting  
University of Tehran and Ministry of Science, Research and Technology of Iran (MSRT)
- 2019 Best result and score on the comprehensive exam among all the Ph.D. classmate students.

University of Tehran

- 2019 Highest average grade point among all the Ph.D. classmate students, grade excellent 18.71 out of 20 (equivalent to a GPA of 4.0)  
University of Tehran
- 2018 Top student, best total score among all the colleges (M.Arch.) in a cohort of 2018, Average score 18.78 out of 20 (equivalent to GPA of 4.0) grade Excellent, with a written document, Iran University of Science and Technology (IUST)
- 2018 The Highest grade for the M.Arch. Thesis (19.25 of 20), with a written document, Iran University of Science and Technology (IUST)
- 2017 Full scholarship and tuition waiver for M.Arch. at Iran University Science and Technology Ministry of Science, Research and Technology of Iran (MSRT)
- 2006 Ranked 3rd place in the National Entrance Exam (*Konkure*) of the Islamic Azad University M.Sc. Structural Engineering program.  
Ministry of Science, Research and Technology of Iran (MSRT)
- 2001 Ranked 9th in the National Entrance Exam (*Konkure*) of the Islamic Azad University B.Sc. program.  
Ministry of Science, Research and Technology of Iran (MSRT)

## RESEARCH & SCHOLARLY WORKS

### RESEARCH EXPERIENCES

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- 2025- Independent researcher | Researcher Assistant I  
Taubman College of the University of Michigan,  
Collaboration with Prof. Peter von Buelow and Prof. Lars Junghans.  
Projects: "*A Machine Learning Paradigm for Performance Enhancement and Predictive Analysis in Buildings*"
- 2023- Independent researcher | Researcher Assistant I  
Taubman College of the University of Michigan,  
Collaboration with Prof. Peter von Buelow and Prof. Lars Junghans.  
Projects: "*Developing a bespoke fabrication method by utilizing robotic fabrication, 3D printing, and additive manufacturing.*"
- 2022-23 Research Assistant | Visiting Scholar  
ADR Lab, Directed by Prof. Arash Adel  
Taubman College of Architecture and Urban Planning, University of Michigan
  - Bespoke robotically fabricated timber structures (RFS)
  - Structural evaluation of the non-standard size reclaimed lumber robotically fabricated timber trusses
- 2020-22 Research Assistant | Independent researcher  
Mahmood Golabchi's Lab  
University of Tehran, Department of Architecture  
Writing my Doctoral dissertation, Title: "Form-finding and Optimization of Shell Structures with Meta-heuristic Algorithms,"
  - Computational design and Utilizing metaheuristic algorithms in the design process

- 2018-19 **Research Assistant,**  
**Advanced Design @ Fabrication Laboratory (ADF Lab),** Directed by Prof. A. Ekhlasi  
 Department of Architecture, Iran University of Science and Technology
- Performing research on computer simulation and parametric modeling with Grasshopper of Rhino for measuring and optimizing building performances.
- 2018 **Master of Architecture thesis**  
 Iran University of Science and Technology,  
 Title: *“Extension and Renovation of Baharlou Hospital with the application of intelligent algorithms in the design process.”*  
 Supervisor: Prof. A. Ekhlasi and Prof. S. A. Yazdanfar
- Optimization of the Building orientation with the application of intelligent algorithms in the design process*
- 2008-10 **Master of Science thesis**  
 Islamic Azad University and International Institute of Earthquake Engineering and Seismology (IIEES),  
 Title: *“Seismic Retrofitting R.C. Structures with Precast Prestressed Concrete Braces,”*  
 Supervisor: Prof. F. Natyeghi-Alahi
- Computer Simulation and FEM Analysis of the Precast Prestressed Concrete Braces

## EXHIBITIONS

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- 2004 **Climate Future 2024,**  
 Liberty Research Annex, Taubman College of Architecture & Urban Planning, University of Michigan.  
 Project title: *“Bespoke Ultra-Thin Layered 3D-Printed Reusable Formwork for Casting Complex Geometries”*  
 Collaborators: Mohsen Vatandoost, Peter von Buelow, and Wes McGee

## PATENT

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- 2021 Title: *Single Diagonal Precast Prestressed Concrete Bracing for Seismically Retrofitting Reinforced Concrete Frames;*  
 PI: Professor Fariborz Nateghi (Distinguished Professor of Structure and Earthquake Engineering, IIEES), Co-worker: Mohsen Vatandoost,  
 Role: Cooperation in Data collection and data analysis;  
 Status: formally submitted and under Evaluation, March 2021

## PRESENTATION / INVITED LECTURES

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- 2024 University of Tehran, (Online session)  
 Subject: *“Ultra-thin-layered 3D-printed hollow core sections for concrete casting.”*  
 Audiences: doctoral students, Ph.d. candidates, Cohort of 2023
- 2024 University of Michigan, Taubman College,  
 Subject: *Advanced Research Methods and Case Studies,*  
 Audiences: doctoral students (ARCH801, 813); Host: Prof. M. Navvab
- 2021 University of Tehran  
 Subject: *Bionic Architecture, inspiration by Nature*  
 Audiences: Master of Architecture students (Digital Architectural); Host: Prof. K. Taghizadeh

- 2020 Iran University of Science and Technology  
Subject: Lean-led Hospital Design  
Audiences: Master of Architecture students (Healthcare facility Design); Host: Prof. S. Litkouhi

### **Thesis and Dissertation**

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- 2024 Ph.D. thesis, Architectural Technology,  
University of Tehran, Tehran, Iran.  
Title: *“Form-finding and Optimization of Shell Structures with Meta-heuristic Algorithms,”*  
Supervisors: Mahmoud Golabchi (Distinguished professor of Architectural Technology, University of Tehran), and second supervisor Ahmad Ekhlassi (Associate professor, Iran University of Science and Technology), Advisor Morteza Rahbar (Assistant professor, IUST)
- 2019 M.Arch thesis, Architectural Engineering,  
Iran University of Science and Technology (IUST), Tehran, Iran.  
Title: *“Extension and Renovation of Baharlou Hospital with the application of the intelligent algorithms in the design process.”*  
Supervised by Prof. S.A. Yazdanfar and co-supervised by Prof. A. Ekhlassi
- 2010 M.Sc. thesis, Structural Engineering,  
International Institute of Earthquake Engineering and Seismology (IIEES), and Islamic Azad University (IAU), Iran.  
Title: *“Seismic Retrofitting R.C. Structures with Precast Prestressed Concrete Braces,”*  
Supervised by Prof. Fariborz Nateghi-Alahi (IIEES), Distinguished Professor of earthquake engineering and disaster management.

## **SCHOLARLY WORKS**

### **BOOKS/ BOOK CHAPTERS**

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- 2024 Book chapter: *“Seismic Retrofitting Reinforced Concrete Structures with Precast Pre-Stressed Concrete Braces: An Overview,”* in the book: *“Advances in Civil Engineering - Sustainable Materials and Resilient Structures,”*  
Publisher: IntechOpen, London, United Kingdom, 2024.  
Authors: Mohsen Vatandoost and Fariborz Nateghi-A,  
Academic Editor: Ali Bahadori-Jahromi.  
DOI: 10.5772/intechopen.1006362
- 2019 Translated Book: *“The Story of Post-Modernism; Five Decades of Ironic, Iconic and Critical in Architecture,”* by Charles Jencks (2011).  
Translated in Farsi by Mohsen Vatandoost,  
Publisher: *Simaye-Danesh*, Tehran, Iran, (2019),  
ISBN: 978-600-120-462-3,  
Link: <http://opac.nlai.ir/opac-prod/bibliographic/5920166>
- 2019 Translated Book: *“Lean-led Hospital Design; Creating Efficient Hospital of the Future,”* By Charles Hagood and Naida Grunden (2012),  
Translated in Farsi by M. Vatandoost, A. Ekhlassi, S. A. Yazdanfar,  
Publisher: *Simaye-Danesh*, Tehran, Iran,(2019),  
ISBN: 978-600-120-466-1,  
Link: <http://opac.nlai.ir/opac-prod/bibliographic/5970792>

## PEER-REVIEWED JOURNAL PAPERS

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- 2024 Vatandoost, M., Golabchi, M., Ekhlasi, A., Rahbar, M. & von Buelow, P. (2024). Fabrication Methods of Shell Structures. *Automation in Construction*. DOI:10.1016/j.autcon.2024.105570
- 2024 Vatandoost, M., Golabchi, M., Ekhlasi, A., & Rahbar, M. (2024). Computational Morphogenesis of Lightweight Continuous Shell Structures by Utilizing Metaheuristic Algorithms. *Journal of the International Association for Shell and Spatial Structures*. Vol 65(No.3), 2024, Sep n.221. <https://doi.org/10.20898/j.ias.2024.007>
- 2023 Vatandoost, M., Golabchi, M., Ekhlasi, A., & Rahbar, M. (2023). Topology and Thickness Optimization of Concrete Thin Shell Structures Based on Weight, Deflection, and Strain Energy. *International Journal of Engineering*. DOI: 10.5829/ije.2024.37.07a.15
- 2020 Vatandoost, M., Ekhlasi, A., & Yazdanfar, S. A. (2020). Computer-Aided Architectural Design: Classification and Application of Optimization Algorithms. *Journal of Information and Computational Science*, 10(6), 18-43. DOI:10.12733/JICS.2020.V10I6.535569.12503 (Link to publication)
- 2019 Vatandoost, M., Yazdanfar, S. A., & Ekhlasi, A. (2019). Computer-Aided Design: Classification of Design Problems in Architecture. *Journal of Information and Computational Science*, 9(10), 605-625.
- 2019 Vatandoost, M., & Litkouhi, S. (2019). The future of healthcare facilities: how technology and medical advances may shape hospitals of the future. *Hospital Practices and Research*, 4(1), 1-11. doi: 10.15171/hpr.2019.01 (Link)
- 2018 Nateghi A, F., & Vatandoost, M. (2018). Seismic retrofitting R.C. structures with precast prestressed concrete braces-ABAQUS FEA modeling. *International Journal of Engineering*, 31(3), 394-404. doi:10.5829/ije.2018.31.03c.01
- 2018 Alahi, F. N., & Vatandoost, M. (2018). Single diagonal precast prestressed concrete bracing for strengthening existing concrete frames, *International Journal of Advanced Structural Engineering*, 10(4), 339-347. doi: 10.1007/s40091-018-0201-5
- 2017 Nateghi A, F., & Vatandoost, M. (2017). Seismic Assessment of the Precast Prestressed Concrete Braces. *Research Bulletin of Seismology and Earthquake Engineering (Pizhūhishnāmah-i zilzilah/shināsī va muhandisī-i zilzilah)*, ISSN 1735-1677. 20(1), 37-54

## PEER-REVIEWED CONFERENCE PAPERS

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- 2025 Vatandoost, M. (2025). Bio-Inspired Innovation: Optimizing Gridshell Structures through the Dolphin Echolocation Algorithm. *Proceedings of the IASS 2025, Mexico City, Mexico*. (IASS2025, Submission 83)
- 2025 Vatandoost, M., Golabchi, M., Ekhlasi, A., Rahbar, M., von Buelow, P. (2025). On tradeoffs between structural, acoustic, and energy performance in the design of lightweight shell structures: ranking the Pareto front. *Proceedings of the IASS 2025, Mexico City, Mexico*. (IASS2025, Submission 84)
- 2004 Vatandoost, M. (2024). Dolphin Echolocation Algorithm for optimization of grid shells. *ADDOPTIML 2024 conference*. (Status: Accepted.)
- 2024 Vatandoost, M., McGee, W., & von Buelow, P. (2024). Ultra thin-layered 3D-printed formwork

- for hollow core concrete casting. *Proceedings of the IASS 2024 Symposium, Redefining the Art of Structural Design*, August 26-30, 2024, Zurich, Switzerland.
- 2022 Vatandoost, M., Ekhlasi, A., & Yazdanfar, S. A. (2022). Applying the Delphi Method in decision-making: Selection of Architectural Optimization Problem Case Study: Extension and Renovation of Baharloo Hospital. *Proceeding in the 1st conference on civil engineering, urban planning, architecture, and environment*, 17 February 2022, Vienna, Austria.
- 2020 Vatandoost, M., Yazdanfar, S. A., & Ekhlasi, A. (2020). CAAD: Optimization of Building Orientation based on maximizing daylight, case study: Extension and Renovation of Baharloo Hospital. *6th National Congress on civil engineering, architecture, and urban development*. Tehran, <https://civilica.com/doc/1373998>
- 2020 Vatandoost, M., Yazdanfar, S. A., & Ekhlasi, A. (2020). Applying the Delphi method in Computer-Aided Design, case study: Extension and Renovation of Baharloo Hospital. *1st conference on civil engineering, urban planning, architecture, and environment*, 17 February 2022, Vienna, Austria.
- 2019 Vatandoost, M., & Nateghi A, F. (2019). Developing a method of strengthening concrete structures: Precast Prestressed Concrete Braces, Paper presented at the *2nd National Conference on Civil Engineering, Architecture and Urban Development of the Islamic World Countries* (2019-10-21).With Science Nordic Certificate: NSPR47258
- 2017 Nateghi A, F., & Vatandoost, M. (2017). Single diagonal precast prestressed concrete braces for retrofitting reinforced concrete structures, Paper presented at the *5th Civil Engineering, Architecture & Urban Development (2017-12-26)*, Tehran. ICSAU05-1439. (ISC)

## UNDER REVIEW | UNDER PREPARATION

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- 2025 Vatandoost, M., Golabchi, M., Ekhlasi, A., & Rahbar, M. (2025). Ranking and sorting the Pareto front in optimal shell structure design, *Frontier of Architectural Research*. (Status: Under review, Manuscript number: FOAR-D-25-00137)
- 2025 Vatandoost, M., von Buelow, P. (2025). Utilizing machine learning in the early stage of the design of shell structures., *Automation in Construction*. (Status: In the process.)
- 2025 Vatandoost, M., McGee, W., & von Buelow, P. (2025). Bespoke ultra-thin layered 3D-printed reusable formwork for casting complex concrete geometries, *Additive Manufacturing*. (Status: first draft.)
- Adel, A. Mozaffari, S. Vatandoost, M. Liu, X. (2024). Structural assessment of the non-standard size reclaimed lumber robotically fabricated timber trusses. (Status: In the process.)

## TEACHING EXPERIENCES

### UNIVERSITY OF MICHIGAN, Taubman College of Architecture and Urban Planning

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| 2024-25 | ARCH 314<br>ARCH 324<br>ARCH 527<br>ARCH 509 | Structures I (3 credit hrs.)<br>Structures II (3 credit hrs.)<br>Integrative Systems (3 credit hrs.)<br>Algorithmic Approaches to Architectural Optimization (3 credit hrs),<br>(Elective   A new course I designed and developed exclusively and successfully taught.) |
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ARCH-	<b>Applied Machine Learning in Architecture</b> (3 credit hrs), (Elective   A new course I designed and developed exclusively and proposed to be included in the curriculum.)
2023-24	ARCH 314 <b>Structures I</b> (3 credit hrs.) ARCH 324 <b>Structures II</b> (3 credit hrs.) ARCH 528 <b>Integrative Systems</b> (3 credit hrs.)

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**IRAN UNIVERSITY OF SCIENCE AND TECHNOLOGY, Department of Architecture**

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2019-21	<b>Graduate Level, Design Studios</b> (M.Arch. Healthcare design)
Design Studio I	Subject: Design of a 96-bed General Hospital in East Tehran Subject: Design of a 96-bed General Hospital in <i>Chitgar</i> of Tehran
Design Studio II	Subject: Extension and Renovation of <i>Bou-Ali</i> Hospital Subject: Extension and Renovation of <i>Baharlou</i> Hospital

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**PARS UNIVERSITY, Department of Architecture**

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2021-23	<b>Graduate Level, Design Studio</b> (M.Arch. Digital Architecture)
Design Studio I	Subject: High-rise tower multi-functional design
Design Studio II	Subject: Iran Pavilion for the 2025 Expo
Design Studio II Design Studio IV	<b>Undergraduate Level,</b> mixed-use design (Residential-work complex) Extension of the <i>Ramsar</i> Airport

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**IRANIAN ARCHITECTURE CENTER (IAC)**

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2018-20	Workshop      Summer school of 2018, 2019, 2020 workshop: sketch and design strategies Prepare graduated bachelor students for M.Arch positions in the national yearly conquest ( <i>Konkur</i> ). Subjects: Design Development, Architectural Design, Critical Thinking and Design Process, Sketches by hand.
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## ACADEMIC SERVICES

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### UNIVERSITY AND COLLEGE SERVICES | COMMITTEES MEMBERSHIP

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2004-25	Selected Member of the <b>steering committee</b> and sub-group of the writing committee For planning the school's future vision for research and teaching direction, Taubman College of the University of Michigan.
2024-25	Member of the <b>review committee</b> (for two consecutive years), <b>Application reviewer</b> for B.Sc. Arch first-year applications 2023–24 and 2024–25. Taubman College of the University of Michigan.

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### JURIES

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2025	<b>A442 - UG4: Wallenberg, Hwang Studio, Catalyzing the Peripheral, Midterm Review,</b> Taubman College of Architecture and Urban Planning, Invited by Irene Hwang.
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- 2004 M. ARCH. Design Studio, Midterm Review, Taubman College of Architecture and Urban Planning, Invited by Sharon Haar.

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## RESEARCH AND THESIS SUPERVISING/ ADVISORY

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- 2025 Valeria, H. Project title: "Developing an adaptable steel element for repairing individual concrete panels in prefabricated panel housing in Ukraine." (Thesis adviser)

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## PEER-REVIEW SERVICES

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Providing peer-review services for scientific journals upon invitation by Editors, including:

- 2005 International Journal of the Architectural Computing (IJAC), Reviewer
- 2025 Nexus Network Journals, Reviewer
- 2025 PlusOne, Reviewer
- 2024 *Hoviyat-e-Shahr*, Reviewer

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## OTHER SERVICES

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- 2025 "*ARC Meet 'n Eats event*,"  
Taubman College of the University of Michigan.  
Assisting admitted students with inquiries and addressing their concerns.
- 2004 "*Launch with faculty and current students*,"  
Taubman College of the University of Michigan.  
Assisting admitted students with inquiries and addressing their concerns.

## PROFESSIONAL EXPERIENCES (selected works)

- 2024- Consultation services on architectural design and structural system selection and development for US-based architectural firms.
- 2010- Co-founder and member of the board  
Boland Martabe Group (BMG), Architectural consulting engineering firm
- 2020-22 Extension and renovation of AJA University of Medical Science, Tehran,  
Site study and management, design of new College of Medical Science, design of Student Dormitory extension,  
Role: Leading architecture, Phase 0 and Phase I,  
Individual cooperation with IGM Group.
- 2020-21 Extension and renovation of *Shahid Chamran Hospital*, Tehran,  
Design of the new building for the Genetic Lab and adding three surgery rooms and C.T. Scan and CT-Angio section,  
Role: Leading architecture for Phase II and redesign of Phase I,  
Individual cooperation with IGM Group.
- 2020-21 Extension program for Café Mohit- Restaurant and coffee shop, Tehran,  
Design and seismic retrofitting and Interior design,  
Role: Design, Expert Consultant, and Construction Supervision.

- 2021 Extension and Refurbishment of General Clinic in *Pasdaran Str.*, Tehran
- 2011-12 Co-founder of *Vatan Tarh Sakht (VTS)*, an Architectural consulting engineering firm.
- 2007-17 Project Manager for residential, office, and mixed-use projects, Tehran  
Including Sarmad (mixed-use), Hovieze (office), and Kavosifar (office-commercial).
- 2010-21 Certified Supervision (Architectural, Structural) for residential buildings in Tehran,  
Officially assigned by TCEO (Tehran Construction Engineering Organization)  
more than fifteen Residential projects
- 2005-22 Structural Design, Design Control, and supervising  
Role: Chief Structural designer,  
Various projects (more than 500,000 square meters, approximately 800 projects), from  
residential to commercial and office buildings and mixed-use in Tehran and other parts of the  
country, Individual works and works at the BMG group