

Soroush Mahjoubi

Research Scientist II, Massachusetts Institute of Technology

Concrete Sustainability Hub (CSHub) ◇ Department of Civil and Environmental Engineering ◇ MIT

Olivetti Group ◇ Department of Materials Science and Engineering ◇ MIT

E-mail: mahjoubi@mit.edu ◇ Website ◇ [Google Scholar](#)

EDUCATION

Ph.D. in Civil Engineering

2023

Stevens Institute of Technology

Hoboken, NJ

Thesis: Development and applications of machine learning for designing and health monitoring of civil structures and materials

Advisor: Prof. Yi Bao

M.Sc. in Structural Engineering

2017

Iran University of Science and Technology

Tehran, Iran

Thesis: Design optimization of steel plate shear walls using surrogate modeling and metaheuristic optimization

Advisor: Prof. A. Kaveh

B.Sc. in Civil Engineering

2014

Kharazmi University

Tehran, Iran

RESEARCH EXPERIENCE

Research Scientist II

Jul 2026 - Present

Olivetti Group & Concrete Sustainability Hub - Massachusetts Institute of Technology (MIT)

Cambridge, MA

Postdoctoral Associate

Oct 2023 - Jul 2026

Olivetti Group & Concrete Sustainability Hub - Massachusetts Institute of Technology (MIT)

Cambridge, MA

Led collaboration projects to develop ML/LLM/optimization workflows for sustainable, low-carbon concrete systems.

- ◇ Developed models for predicting chemical reactivity and material properties using deep learning, significantly impacting material selection and concrete design.
- ◇ Led embodied-carbon assessments for data centers, warehouses, and industrial facilities; identified concrete hotspots (slab-on-grade, foundations) and delivered low-carbon playbooks combining high-SCM/binder-intensity reduction, performance-based specs, and logistics-aware procurement.
- ◇ Investigated strength overdesign and its variance drivers, developing explainable probabilistic models that partition within-batch, batch-to-batch, plant, and project effects; quantified the embodied carbon penalty of overdesign and recommended specification/process changes to reduce unnecessary cement.
- ◇ Automated the development of application-specific, low-carbon, cost-efficient, and workable concrete mixes using advanced machine learning and optimization, achieving a 20% reduction in carbon emissions and associated costs.
- ◇ Built ML + retrieval augmented generation (RAG) pipelines, in collaboration with the MIT-IBM Watson AI Lab, to screen 50k+ papers and assemble a structured precursor dataset; accelerated reactivity mapping and mix-design search.
- ◇ Mentor Ph.D. students in the Olivetti Group, guiding them in framing research questions, developing methods, and preparing manuscripts.
- ◇ Interviewed potential MIT students for the research group.
- ◇ Engaged with industry partners (e.g., Amazon, Amrize, Apple, Shell, Prologis) through regular presentations.

Laboratory Manager

Smart Infrastructure Lab - Stevens Institute of Technology

Jan 2022 - May 2023

Hoboken, NJ

Directed research and educational activities in a Structural Health Monitoring & Materials Characterization lab, managing 7 projects end-to-end.

- ◇ Oversaw laboratory operations, including equipment and facilities maintenance.
- ◇ Procured essential laboratory items and equipment.
- ◇ Specified and acquired high-speed cameras, distributed fiber optic sensor systems, actuators, and 3D printers.
- ◇ Designed a 365 kN compression frame via finite element analysis and validated instrumentation workflows.
- ◇ Mentored five graduate and three undergraduate students by guiding their research projects, providing on-boarding and professional development training, and enhancing their operational skills.

Graduate Research Assistant

Smart Infrastructure Lab - Stevens Institute of Technology

Aug 2019 - May 2023

Hoboken, NJ

Applied machine learning and optimization to civil and materials engineering, emphasizing data-driven concrete science and fiber-optic structural health monitoring; contributed to projects funded by the National Science Foundation (NSF), Department of Defense (DoD), and Department of Transportation (DOT).

- ◇ Developed material property prediction models for cementitious materials using machine learning, generative AI, and sequential learning with limited amount of data.
- ◇ Pioneered the development of low-carbon, ultra-high-performance cementitious materials utilizing AI.
- ◇ Created a logic-guided neural network capable of predicting material properties based on domain knowledge and logical reasoning.
- ◇ Collaborated with the Department of Mechanical Engineering at Stevens to develop a computer vision method for accelerating the development of 2D nanomaterials.
- ◇ Contributed to securing over \$500,000 in successful research funding through grant writing and proposal submissions.

TEACHING EXPERIENCE

Adjunct Lecturer

Department of Civil, Environmental and Ocean Engineering - Stevens Institute of Technology

Aug 2023 - June 2025

Hoboken, NJ

Sole instructor for CE518: Advanced Mechanics of Materials, responsible for curriculum design, content delivery, and performance assessment.

- ◇ Developed and curated comprehensive course materials, including lectures, exams, and weekly assignments, for 20+ undergraduate and 30+ graduate students.
- ◇ Designed and administered mid-term and final exams, ensuring alignment with course objectives.
- ◇ Evaluated assignments and exams, providing detailed feedback to support student growth.
- ◇ Created a student progress survey to assess engagement and identify areas for improving learning outcomes.
- ◇ Facilitated in-person group activities to promote peer learning and collaboration.
- ◇ Streamlined course communication, ensuring timely distribution of materials and addressing student inquiries for continued engagement.
- ◇ Designed specialized exercises to accommodate students from diverse academic backgrounds.

Graduate Teaching Assistant

Department of Civil, Environmental and Ocean Engineering - Stevens Institute of Technology

Jan 2020 - May 2022

Hoboken, NJ

Assisted instructors for Civil Engineering Design VI (30 students) and Mechanics of Solids (350 students) by designing assignments, grading coursework, and providing comprehensive student support.

- ◇ Developed and continuously updated course materials to support both undergraduate and graduate students.
- ◇ Provided individualized assistance through weekly office hours and one-on-one tutoring for over 500 students.
- ◇ Designed and evaluated assignments and exams, ensuring alignment with course objectives and enhancing learning outcomes.

PROPOSAL CONTRIBUTIONS

Contributed to funded and submitted proposals spanning industry and federal sponsors, developing ML/optimization methodology, validation plans, and deployable decision-support workflows.

- ◇ **Extraction risk reduction through AI-integrated Geology and Processing**, *U.S. Department of Energy (DOE), Genesis Mission: Transforming Science and Energy with AI*, Massachusetts Institute of Technology, **Submitted**, 2026.
- ◇ **Empowering Low-Carbon Decision Making in the Construction Industry**, *Amazon, Concrete Sustainability Hub*, Massachusetts Institute of Technology, **Funded**, 2025.
- ◇ **Framework for Evaluating Risks and Deriving Lower-Carbon Cement-Based Products**, *Amazon, Concrete Sustainability Hub*, Massachusetts Institute of Technology, **Funded**, 2024.
- ◇ **Flue Gas CO₂ Mineralization of U.S. By-Products: Chemistry-Aware Machine Learning Process Modeling, Optimization, and Hub-Scale Carbon Savings**, *Future Energy Systems Center, MIT Energy Initiative*, Concrete Sustainability Hub, Massachusetts Institute of Technology, 2025.
- ◇ **Routing U.S. By-Products to Supplement Energy-Intensive Cement Using Machine Learning**, *Future Energy Systems Center, MIT Energy Initiative*, Concrete Sustainability Hub, Massachusetts Institute of Technology, 2025.
- ◇ **Agentic AI for Scientific Co-Pilots in Materials**, *Shell, Olivetti Group*, Massachusetts Institute of Technology, **Funded**, 2025.
- ◇ **Resilience of Civil Infrastructure Against Natural Disasters**, *National Science Foundation*, Smart Infrastructure Lab, Stevens Institute of Technology, 2022.
- ◇ **Incorporation of Industrial Waste Materials in High-Performance Concrete**, *Department of Defense*, Smart Infrastructure Lab, Stevens Institute of Technology, **Funded**, 2021.
- ◇ **Distributed Fiber Optic Sensor Network for Real-Time Monitoring of Pipeline Interactive Anomalies**, *U.S. Department of Transportation*, Smart Infrastructure Lab, Stevens Institute of Technology, **Funded**, 2019.

PROFESSIONAL EXPERIENCE

Civil and Structural Designer

Jan 2016 - Jan 2017

Sangachin Construction Company

Tehran, Iran

Designed structural components for wastewater facilities, ensuring compliance with engineering standards and operational efficiency.

- ◇ Designed circular clarifiers, Dissolved Air Flotation (DAF) systems, pump foundations, and pipeline supports.
- ◇ Prepared detailed fabrication drawings for structural works, facilitating accurate and efficient construction.
- ◇ Provided technical clarification for over 50 construction crews to ensure clear understanding and adherence to design specifications.
- ◇ Collaborated with multidisciplinary teams to coordinate area layout designs.

Civil Engineer

Farand Sazeh Gharn Company

Jan 2014 - Aug 2019

Tehran, Iran

Led rehabilitation projects for aging schools, focusing on improving seismic resilience and structural safety.

- ◇ Supervised construction workers to ensure strict compliance with project plans and technical specifications.
- ◇ Monitored weekly project progress, analyzing operational data on steelwork to optimize structural support for beams and columns.
- ◇ Provided expert guidance and implemented immediate, innovative solutions to resolve construction challenges.

HONORS & AWARDS

Best Paper Award for Sustainability in Construction

2025

Giatec Scientific Inc.

Awarded for the paper “Data-driven material screening of secondary and natural cementitious precursors,” recognizing data-driven innovation in sustainable concrete, and accompanied by a \$2,000 prize. [\[Link\]](#)

Sponsor Winner in the Hackathon: LLMs for Materials and Chemistry

2024

Anthropic AI

Our team, Thoughtful Beavers, earned a \$500 prize for developing a multi-agent framework of finely-tuned large language models that autonomously generate practical, impactful, and novel hypotheses for material-based solutions in concrete sustainability. [\[Github\]](#)[\[Youtube\]](#)

Paul Kaplan Award

2023

Stevens Institute of Technology

Awarded to the single most outstanding graduate student each year for exceptional academic achievements, research excellence, and demonstrated potential for future success. Received a \$2,000 prize. [\[Link\]](#)

Outstanding Graduate Student Leader

2023

Stevens Institute of Technology

The award is given to one graduate student for outstanding student leadership in student organizations or in volunteer activities and has excelled in student life. Received a \$500 prize. [\[Link\]](#)

Peer Mentor Award

2023

Stevens Institute of Technology

The award is given to one Ph.D. student for exceptional student leadership in the mentor program. Received a \$500 prize. [\[Linkedin\]](#)

NSF Conference Funding Award

2022

National Science Foundation

Received funding from the National Science Foundation to participate in a grant proposal writing workshop during the 2022 Engineering Mechanics Institute (EMI) Conference. Received a \$1500 prize. [\[Link\]](#)

Travel Grant

2022

Stevens Institute of Technology

The award enables graduate students at Stevens Institute of Technology to present their recent research at key conferences. Received a \$3000 prize.

Richard I. Hires Research Award

2022

Stevens Institute of Technology

The award is given annually to one graduate student in the fields of civil, environmental, ocean, naval engineering, and construction management for exceptional research achievements. Received a \$300 prize.

Stevens Excellence Doctoral Fellowship

2022

Stevens Institute of Technology

Awarded for exceptional achievements in Ph.D. research and dissertation writing. Received full tuition coverage and a yearly stipend. [\[Fellowship\]](#)

-
34. **Mahjoubi, S.**, Field, F.R., Olivetti, E.A., Kirchain, R.E. & AzariJafari, H. (2026). Decarbonizing ready-mixed concrete with overdesign optimization and variability control. *Cement and Concrete Composites*, Under review.
33. Qiu, H., Tan, X., Wang, Y., Ren, J., Xing, J., Gu, H. & **Mahjoubi, S.** (2026). Explainable machine learning surrogate for rapid prediction of abnormal settlement in high-filled canal embankments. *Results in Engineering*, 110752. <https://doi.org/10.1016/j.rineng.2026.110752>.
32. Yang, J., Zhang, Z., Leng, J., Zhou, J., Wang, X., Zhang, Z., Zou, Y., Teng, L., **Mahjoubi, S.**, et al. (2026). Polydopamine-assisted carbon black grafting on natural fine aggregates for highly conductive and piezoresistive cement mortar. *Cement and Concrete Composites*, 106493. <https://doi.org/10.1016/j.cemconcomp.2026.106493>.
31. Tan, X., Xing, J., **Mahjoubi, S.**, Guo, P., Wei, Z., Wang, Y., Ren, J., Ai, L., Meng, W., et al. (2026). Explainable machine learning and life cycle assessment for sustainable design of fiber-reinforced asphalt concrete. *Journal of Cleaner Production*, 547, 147759. <https://doi.org/10.1016/j.jclepro.2026.147759>.
30. Tan, X., Xing, J., Wang, Y., Qiu, H., **Mahjoubi, S.** & Guo, P. (2026). Explainable machine learning for predicting compressive strength of rubberized concrete: SHAP interpretation, lifecycle assessment, and design recommendations. *Journal of Cleaner Production*, 538, 147338. <https://doi.org/10.1016/j.jclepro.2025.147338>.
29. Du, J., Zhang, K., Zhou, J., Wang, X., Zhang, Z., Zou, Y., Liu, D., **Mahjoubi, S.**, & Yang, J. (2025). Mussel-inspired superhydrophobic coating via self-assembled polydopamine/SiO₂ for enhancing the durability of marine concrete. *Case Studies in Construction Materials*, 23, e05104. <https://doi.org/10.1016/j.cscm.2025.e05104>.
28. Zimmermann, Y., Bazgir, A., Al-Feghali, A., Ansari, M., Bocarsly, J., Brinson, L.C., Chiang, Y., Circi, D., Chiu, M.-H., Daelman, N., Evans, M., Gangan, A.S., George, J., Harb, H., Khalighinejad, G., Khan, S.T., Klawohn, S., Lederbauer, M., **Mahjoubi, S.**, et al. (2025). 32 examples of LLM applications in materials science and chemistry: towards automation, assistants, agents, and accelerated scientific discovery. *Machine Learning: Science and Technology*, 6(3), 030701. <https://doi.org/10.1088/2632-2153/ae011a>.
27. Barhemat, R., **Mahjoubi, S.** & Bao, Y. (2025). Optimized adaptive connections for enhancing seismic resilience in reconfigurable modular structures. *Journal of Constructional Steel Research*, 235(A), 109840. <https://doi.org/10.1016/j.jcsr.2025.109840>.
26. **Mahjoubi, S.**, Venugopal, V., Manav, I.B., AzariJafari, H., Kirchain, R.E., Olivetti, E. (2025). Data-driven material screening of secondary and natural cementitious precursors. *Communications Materials* 6, 99. <https://doi.org/10.1038/s43246-025-00820-4>.
25. **Mahjoubi, S.**, Barhemat, R., Meng, W. & Bao, Y. (2025). Review of AI-assisted design of low-carbon cost-effective concrete toward carbon neutrality. *Artificial Intelligence Review*, 58, 225. <https://doi.org/10.1007/s10462-025-11182-1>.
24. Barhemat, R., **Mahjoubi, S.**, Meng, W. & Bao, Y. (2024). Automated design of architected polymer-concrete composites with high specific flexural strength and toughness using sequential learning. *Construction and Building Materials*, 449, 138311. <https://doi.org/10.1016/j.conbuildmat.2024.138311>.
23. Zhou, C., Tan, X., Zheng, Y., Wang, Y. & **Mahjoubi, S.** (2024). Data-driven axial bearing capacity analysis of steel tubes infilled with rubberized alkali-activated concrete. *Advances in Structural Engineering*, 28, 1. <https://doi.org/10.1177/13694332241268243>.
22. Farazin, A. & **Mahjoubi, S.** (2024). Dual-functional Hydroxyapatite scaffolds for bone regeneration and precision drug delivery, *Journal of the Mechanical Behavior of Biomedical Materials*, 157, 106661. <https://doi.org/10.1016/j.jmbbm.2024.106661>.
21. Guo, P., **Mahjoubi, S.**, Liu, K., Meng, W. & Bao, Y. (2023). Self-updatable AI-assisted design of low-carbon cost-effective ultra-high-performance concrete (UHPC). *Case Studies in Construction Materials*, 19, e02625. <https://doi.org/10.1016/j.cscm.2023.e02625>.
-

20. Du, J., **Mahjoubi, S.**, Bao, Y., Banthia, N. & Meng, W. (2023). Modeling mixing kinetics for large-scale production of ultra-high-performance concrete: Effects of temperature, volume, and mixing method. *Construction and Building Materials*, 397, 132439. <https://doi.org/10.1016/j.conbuildmat.2023.132439>.
19. Tan, X., **Mahjoubi, S.**, Zou, X., Meng, W. & Bao, Y. (2023). Metaheuristic inverse analysis on interfacial mechanics of distributed fiber optic sensors undergoing interfacial debonding. *Mechanical Systems and Signal Processing*, 200, 110532. <https://doi.org/10.1016/j.ymssp.2023.110532>.
18. **Mahjoubi, S.**, Barhemat, R., Meng, W. & Bao, Y. (2023). Deep learning from physicochemical information of concrete with an artificial language for property prediction and reaction discovery. *Resources, Conservation and Recycling*, 190, 106870. <https://doi.org/10.1016/j.resconrec.2023.106870>.
17. **Mahjoubi, S.**, Ye, F., Bao, Y., Meng, W. & Zhang, X.(2023). Identification and classification of exfoliated graphene flakes from microscopy images using a hierarchical deep convolutional neural network. *Engineering Applications of Artificial Intelligence*, 119, 105743. <https://doi.org/10.1016/j.engappai.2022.105743>.
16. **Mahjoubi, S.**, Barhemat, R., Meng, W. & Bao, Y. (2023). AI-guided auto-discovery of low-carbon cost-effective ultra-high performance concrete (UHPC). *Resources, Conservation and Recycling*, 189, 106741. <https://doi.org/10.1016/j.resconrec.2022.106741>.
15. Tan, X., **Mahjoubi, S.**, Zhang, Q., Dong, D. & Bao, Y. (2022). A framework for improving bridge resilience and sustainability through optimizing high-performance fiber-reinforced cementitious composites. *Journal of Infrastructure Preservation and Resilience*, 3(1), 1-18. <https://doi.org/10.1186/s43065-022-00067-0>.
14. Barhemat, R., **Mahjoubi, S.**, Li, V., & Bao, Y (2022). Lego-inspired reconfigurable modular blocks for automated construction of engineering structures. *Automation in Construction*, 139, 104323. <https://doi.org/10.1016/j.autcon.2022.104323>.
13. Yan, M., Tan, X., **Mahjoubi, S.**, & Bao, Y. (2022). Strain transfer effect on measurements with distributed fiber optic sensors. *Automation in Construction*, 139, 104262. <https://doi.org/10.1016/j.autcon.2022.104262>.
12. **Mahjoubi, S.** & Bao, Y. (2022). Logic-guided neural network for predicting steel-concrete interfacial behaviors. *Expert Systems with Applications*, 198, 116820. <https://doi.org/10.1016/j.eswa.2022.116820>.
11. **Mahjoubi, S.**, Tan, X. & Bao, Y. (2022). Inverse analysis of strain distributions sensed by distributed fiber optic sensors subject to strain transfer. *Mechanical Systems and Signal Processing*, 166, 108474. <https://doi.org/10.1016/j.ymssp.2021.108474>.
10. **Mahjoubi, S.**, Barhemat, R., Guo, P., Meng, W. & Bao, Y. (2021). Prediction and multi-objective optimization of mechanical, economical, and environmental properties for strain-hardening cementitious composites (SHCC) based on automated machine learning and metaheuristic algorithms. *Journal of Cleaner Production*, 329, 129665. <https://doi.org/10.1016/j.jclepro.2021.129665>.
9. **Mahjoubi, S.**, Meng, W. & Bao, Y. (2022). Auto-tune learning framework for prediction of flowability, mechanical properties, and porosity of ultra-high-performance concrete. *Applied Soft Computing*, 115, 108182. <https://doi.org/10.1016/j.asoc.2021.108182>.
8. **Mahjoubi, S.** & Bao, Y. (2021). Game theory-based metaheuristics for structural design optimization. *Computer-Aided Civil and Infrastructure Engineering*, 36(10), 1337-1353. <https://doi.org/10.1111/mice.12661>.
7. **Mahjoubi, S.**, Barhemat, R. & Bao, Y. (2020). Optimal placement of triaxial accelerometers using hypotrochoid spiral optimization algorithm for automated monitoring of high-rise buildings. *Automation in Construction*, 118, 103273. <https://doi.org/10.1016/j.autcon.2020.103273>.
6. Dar, M.A., Subramanian, N., Dar, D.A., Dar, A.R., Anbarasu, M., Lim, J.B. & **Mahjoubi, S.** (2020). Flexural strength of cold-formed steel built-up composite beams with rectangular compression flanges. *Steel and Composite Structures*, 34(2), 171-188. <https://doi.org/10.12989/scs.2020.34.2.171>.

5. Kaveh, A. & **Mahjoubi, S.** (2019). Hypotrochoid spiral optimization approach for sizing and layout optimization of truss structures with multiple frequency constraints. *Engineering with Computers*, 35(4), 1443-1462. <https://doi.org/10.1007/s00366-018-0675-6>.
4. Kaveh, A. & **Mahjoubi, S.** (2018). Lion pride optimization algorithm: A meta-heuristic method for global optimization problems. *Scientia Iranica*, 25(6), 3113-3132. <https://doi.org/10.24200/SCI.2018.20833>.
3. Kaveh, A., Ilchi Ghazaan, M. & **Mahjoubi, S.** (2018). Comparison of four meta-heuristic algorithms for optimal design of double-layer barrel vaults. *International Journal of Space Structures*, 33(3-4), 115-123. <https://doi.org/10.1177/0266351118803019>.
2. Kaveh, A. & **Mahjoubi, S.** (2018). Optimum design of double-layer barrel vaults by lion pride optimization algorithm and a comparative study. *Structures*, 13, 213-229. <https://doi.org/10.1016/j.istruc.2018.01.002>.
1. Kaveh, A. & **Mahjoubi, S.** (2017). Design of multi-span steel box girder using lion pride optimization algorithm. *Smart Structures and Systems*, 20(5), 607-618. <https://doi.org/10.12989/ss.2017.20.5.607>.

RESEARCH PROJECTS

Empowering low-carbon decision making in the construction industry 2026

Sponsor: Amazon

MIT Concrete Sustainability Hub

PIs: Randolph Kirchain, Hessam AzariJafari

A regional decarbonization playbook for cement-based products in data centers, warehouses, and industrial facilities 2025

Sponsor: MIT Climate & Sustainability Consortium (MCSC)

MIT Concrete Sustainability Hub

PIs: Randolph Kirchain, Hessam AzariJafari

Agentic AI for scientific co-pilots in materials 2025

Sponsor: Shell

Olivetti Group, MIT

PIs: Rafael Gomez-Bombarelli (DMSE), Connor Coley (ChemE/EECS), Ju Li (NSE/DMSE), Mingda Li (NSE), Elsa Olivetti (DMSE), Tess Smidt (EECS), Marin Soljačić (Physics/RLE)

Open-source mix design optimization webtool for climate-smart concrete 2024

Sponsor: Concrete Advancement Foundation

MIT Concrete Sustainability Hub Olivetti Group

CAREER: Consecutive assembly-and-mineralization processed calcium-silicate-hydrate nacre with high specific flexural strength and fracture toughness 2020

Sponsor: National Science Foundation (CMMI-2046407) *Smart Infrastructure Lab, Stevens Institute of Technology*

PI: Weina Meng

Distributed fiber optic sensor network for real-time monitoring of pipeline interactive anomalies 2019

Sponsor: U.S. DOT Pipeline and Hazardous Materials Safety Administration (693JK31950008CAAP)

Smart

Infrastructure Lab, Stevens Institute of Technology

PIs: Yi Bao, Ying Huang

TECHNICAL REPORTS

Data-driven discovery of sustainable clinker replacements, [MIT Concrete Sustainability Hub](#), 2026.

Assessing the impact of overdesign on concrete embodied emissions, [MIT Concrete Sustainability Hub](#), 2025.

Impact of compressive strength test variability on concrete embodied emissions, [MIT Concrete Sustainability Hub](#), 2025.

Distributed fiber optic sensor network for real-time monitoring of pipeline interactive anomalies, CAAP final report, U.S. DOT Pipeline and Hazardous Materials Safety Administration, Contract No. 693JK31950008CAAP, 2023.

PRESENTATIONS

The materiality of AI data centers: methodology, embodied carbon, and technologies, **ACLCA 26**, *San Diego*, 2026.

A new tool in the toolkit: the emerging role of AI in decarbonizing concrete, **PROCEMCO'26 – Latin America's Premier Cement & Concrete Meeting**, *Cartagena, Colombia*, 2026.

Decarbonizing the concrete value chain with artificial intelligence, **PROCEMCO'26 – Latin America's Premier Cement & Concrete Meeting**, *Cartagena, Colombia*, 2026.

Data-driven material screening of secondary and natural cementitious precursors, **University of Miami Civil & Architectural Engineering Seminar Series**, *Virtual*, 2026.

From data to concrete: practical applications of artificial intelligence in the construction industry, **Ibero-American Concrete Forum**, *Antigua, Guatemala*, 2025.

Data-driven discovery of alternative binders for climate-smart concrete, **NRMCA Concrete Innovations Webinar – Session 35: Responsible Materials Sourcing**, *Virtual*, 2025.

Leveraging AI for revolutionary materials, **American Cement Association, Manufacturing Technical Committee**, *Virtual*, 2025.

Data-driven material screening of secondary and natural cementitious precursors, **Data Enabling Transformation and Optimization toward Concrete Sustainability (DETOCS), Episode 1**, *Virtual*, 2025.

Mapping the reactivity landscape of cementitious precursors via agent-based large language models, retrieval-augmented generation, and representation learning, **Scientific Foundation Models Workshop, University of Michigan**, *Ann Arbor, MI*, 2024.

Design of LEGO-inspired reconfigurable modular blocks for automated construction of engineering structures, **24th Annual Research Showcase, New Jersey Department of Transportation (NJDOT) Bureau of Research**, *West Windsor, NJ*, 2022.

Multi-objective optimization of strain-hardening cementitious composites (SHCC) via automated machine learning and metaheuristic algorithms, **Engineering Mechanics Institute Conference (EMI)**, *Baltimore, MD*, 2022.

Inverse analysis of strain distribution sensed by distributed fiber optic sensors subject to strain transfer, **Engineering Mechanics Institute Conference (EMI)**, *Baltimore, MD*, 2022.

A machine learning framework for predicting flowability, mechanical properties, and porosity of ultra-high-performance concrete, **American Concrete Institute (ACI) Fall Convention**, *Virtual*, 2021.

Artificial intelligence applications for design and inspection of bridges, **21st Annual Research Showcase, New Jersey Department of Transportation (NJDOT) Bureau of Research**, *West Windsor, NJ*, 2020.

COMMUNITY ENGAGEMENT

Graduate Student Representative

Aug 2022 - May 2023

Stevens Institute of Technology - Graduate Curriculum Committee (GCC)

Hoboken, NJ

I was appointed to the committee by the Graduate Academics & Student Success to represent all graduate students at Stevens Institute of Technology. The committee is responsible for proposing, discussing, and voting on all curriculum updates such as new courses, new graduate programs, changes to curriculum.

- ◇ Collaborated with faculty representatives from each graduate program, and **Senior Vice Provost of Graduate Education (Prof. Constantin Chassapis)** to make important decisions for the graduate curriculum.
- ◇ Actively engaged in curriculum review meetings, contributing to discussions and casting votes on proposed changes to better address the needs of graduate students.
- ◇ Keep informed of the latest developments in the field, and providing feedback on the current curriculum.

Graduate Peer Mentor & Event Organizer

Stevens Institute of Technology - Graduate Academics & Student Success

Aug 2021 - May 2023

Hoboken, NJ

The Graduate Peer Mentor Program is designed to connect incoming graduate students with current graduate students to facilitate their transition to the graduate program at Stevens Institute of Technology.

- ◇ Mentored 50+ Ph.D. students over two academic years, providing academic resources, research opportunities, and networking with peers and faculty.
- ◇ Acted as a liaison between graduate students and university administration, ensuring effective communication and addressing student concerns.
- ◇ Guided students through non-academic challenges, offering personalized support and advice.
- ◇ Participated as a panelist in events such as *"What I Wish I had Known: Reflection on the Doctoral Student Experience"* and *"American Classroom Culture"* to share my experiences and insights with graduate students and provide guidance.
- ◇ Assisted to organize and facilitate workshops and events for peer mentors and graduate students aimed at providing support for graduate students.

President

Iranian Association at Stevens

Aug 2022 - May 2023

Hoboken, NJ

The Iranian Association at Stevens is a student organization dedicated to promoting Persian culture and supporting the Persian community at Stevens Institute of Technology. It organizes meetings, cultural events, and social gatherings to engage members, and hosts seminars to connect alumni with current students.

- ◇ Promote Iranian culture through organizing events and activities
- ◇ Coordinate and communicate with members, other student organizations, and university officials to enhance cultural awareness.
- ◇ Ensure that the organization's mission and goals are effectively communicated and upheld, and create a welcoming and inclusive environment for all members.
- ◇ Facilitate communication between members to create a sense of community.

SERVICE

Member, RILEM Technical Committee 315-DCS: Data-Driven Concrete Science

Jul 2026 – Present

International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM) [[Link](#)]

Associate Editor

Dec 2025 - Present

ASCE Practice Periodical on Structural Design and Construction

Guest Editor

Feb 2023 - Present

Engineering Applications of Artificial Intelligence, special issue on ["AI-Enabled systems thinking for advanced construction materials in sustainable and resilient infrastructure: knowledge-guided reasoning, life cycle management, and cross-disciplinary optimization"](#), 2026.

ASTM International's Journal of Testing and Evaluation, special issue on ["Artificial Intelligence and Knowledge Graphs for Construction Materials"](#), 2026.

ASCE Practice Periodical on Structural Design and Construction, special issue on ["Strengthening critical civil infrastructure: Advancing resilience in the face of climate change, urbanization, and natural hazards"](#), 2025.

Electronics, special issue on ["Artificial intelligence and sensing technologies for structural health monitoring"](#), 2024.

Frontiers in Materials, special issue on ["Artificial intelligence approaches in assessing sustainable materials"](#), 2023.

Social Media Manager

Sep 2021 - Aug 2023

Engineering Structures, Elsevier Scientific Journal

Remote

Managed the social media strategy for Engineering Structures, optimizing LinkedIn presence to enhance brand visibility and audience engagement. [\[LinkedIn\]](#)

Peer Reviewer

Nov 2021 - Present

Resources, Conservation and Recycling, Engineering Applications of Artificial Intelligence, Advanced Modeling and Simulation in Engineering Sciences, Digital Discovery, Journal of Environmental Chemical Engineering, Automation in Construction, Construction and Building Materials, Scientific Reports, Quantum Machine Intelligence, Journal of Shock and Vibration, Scientific Reports, Transportation Research Record

REFERENCES

Prof. Elsa Olivetti

Postdoctoral supervisor

Associate Dean of Engineering, Jerry McAfee (1940) Professor in Engineering, Professor of Materials Science and Engineering, MacVicar Faculty Fellow

Massachusetts Institute of Technology

E-mail: elsao@mit.edu

Prof. Muhammad Hajj

Chair, Department of Civil, Environmental and Ocean Engineering

Director of Davidson Laboratory, and George Meade Bond Professor

Stevens Institute of Technology

E-mail: mhajj@stevens.edu

Prof. Constantin Chassapis

Senior vice provost for graduate education

Stevens Institute of Technology

E-mail: cchassap@stevens.edu

Prof. Yi Bao

Ph.D. advisor

Associate Professor, Department of Civil, Environmental and Ocean Engineering

Stevens Institute of Technology

E-mail: ybao3@stevens.edu

Dr. Hessam AzariJafari

Postdoctoral supervisor

Deputy Director, MIT Concrete Sustainability Hub (CSHub)

Massachusetts Institute of Technology

E-mail: hessam@mit.edu

Dr. Randolph Kirchain

Postdoctoral supervisor

Director, MIT Concrete Sustainability Hub (CSHub), Principal Research Scientist, Materials Research Laboratory

Massachusetts Institute of Technology

E-mail: kirchain@mit.edu