FARZAD SHAFIEI DIZAJI, M.Sc., P.E.

Civil & Structural Engineer • Engineering Mathematics Educator
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PROFESSIONAL SUMMARY

Civil and structural engineer (M.Sc., Structural Engineering, University of Virginia; M.Sc., Earthquake Engineering, Iran University of Science and Technology) and licensed Professional Engineer with structural design and seismic-retrofit practice and seven academic years (Fall 2019 – Spring 2026) of full-time university teaching. Although housed administratively in UVA's Applied Mathematics Center, my teaching load consisted almost entirely of engineering mathematics for civil, mechanical, and structural engineering undergraduates, and every course I taught – Calculus, Differential Equations, Linear Algebra, and Probability – was built around structural and civil engineering applications: stiffness and flexibility matrices, vibration and structural-dynamics models, beam deflection, load and resistance factors, and structural reliability. My own graduate research applied shape memory alloys and graph-theoretical optimization to seismic structural control, and I bring hands-on field experience reviewing structural designs for reinforced concrete and steel school and bridge projects. Seeking lecturer and assistant professor positions in Civil or Structural Engineering.

STRUCTURAL ENGINEERING PRACTICE

Design & Supervising Engineer *2009 – 2015*

State Organization of Schools Renovation & Development / Department of Road & Transportation / Private Consulting Firms – Tabriz, Iran

- **Structural design review.** Reviewed and supervised structural design calculations for reinforced concrete and steel school and bridge projects, evaluating code compliance (analogous to IBC/ASCE/ACI/AISC provisions) and recommending projects for public approval.
- **Failure investigation.** Investigated and authored technical reports on the collapse of two bridges, combining field data collection with structural failure analysis and risk-management recommendations for public agencies.
- **Transportation infrastructure.** Developed engineering plans for bridge and roadway construction, repair, and rehabilitation for the Department of Road and Transportation.
- **Process improvement.** Built an Excel-based structural design-review tool that standardized and accelerated review across multiple concurrent reinforced concrete and steel projects.

Licensed Professional Engineer, Iranian Organization for Engineering Order of Building | Member: ASCE, ACI, Iranian Earthquake Engineering Association

Graduate Research Fellow – Structural Control & Smart Materials *2016 – 2019*

University of Virginia, NSF-Funded Project | Advisor: Prof. O. E. Ozbulut

- **Device design.** Designed and characterized a novel passive seismic control device (SMARD) using high-performance superelastic NiTiHfPd shape memory alloys, addressing the limited damping capacity of conventional NiTi SMA dampers in tall, flexible structures.
- **Structural analysis.** Modeled 6- and 9-story steel moment frame buildings retrofitted with the proposed damper and ran nonlinear time-history analyses against 44 FEMA P695-scaled ground motions, showing significant reductions in inter-story and residual drift relative to conventional frames.
- **Materials characterization.** Conducted compressive/uniaxial materials testing and DSC analysis across varied temperatures and loading frequencies to characterize alloy behavior for structural applications.
- **Additional materials research.** Also served as Research Assistant, UVA Department of Materials Science (Summer 2019, advisor Prof. Sean Agnew): materials characterization via microscopy, x-ray diffraction, and mechanical testing.

ENGINEERING MATHEMATICS INSTRUCTION

Lecturer (Academic General Faculty), Applied Mathematics Center *Fall 2019 – Spring 2026*

University of Virginia, School of Engineering and Applied Science | No longer teaching at UVA; appointment ended Spring 2026 | Department of Engineering and Society (2019–2022); Applied Mathematics Center (2022–2026)

- **Engineering-embedded curriculum.** Taught the core mathematics sequence for civil, mechanical, structural, and general engineering majors, built around engineering examples rather than abstract mathematics: stiffness/flexibility matrices (Linear Algebra), vibration and mass-spring-damper models (Differential Equations), beam deflection and work-energy methods (Calculus), and structural reliability/load-factor concepts (Probability).
- **Scale.** Instructor of record across more than twenty sections; documented enrollments exceed 1,100 engineering students.
- **Full instructional cycle.** Wrote syllabi and learning objectives, designed problem sets and exams around real structural and civil engineering scenarios, delivered lectures, held office hours, and maintained grade records.
- **Team leadership.** Supervised up to nine undergraduate teaching assistants and a graduate TA per semester; guided 10+ TAs in 2024; helped write and grade exam problems for multi-section course consistency.

- **Online instruction and scholarship of teaching.** Taught multiple sections fully online during UVA's Spring 2020 – Spring 2021 remote-instruction period and co-authored two ASEE studies on how that transition affected engineering students' confidence in required mathematics coursework.
- **Advising and outreach.** Advised engineering students on course and major selection, wrote recommendation letters (2024, 2025), and presented at university open house events (2024, 2025).

Courses taught, with embedded engineering applications

Ordinary Differential Equations (APMA 2130)	Vibration and structural-dynamics models (mass-spring-damper systems); Fall 2019; Spring 2020 (x2); Summer 2020; Spring 2022; Fall 2022
Linear Algebra (APMA 3080)	Stiffness/flexibility matrix methods, matrix structural analysis; Spring 2021
Probability (APMA 3100)	Structural reliability and load/resistance factor concepts; Spring 2020
Calculus II (APMA 1110)	Work-energy and beam-deflection applications; Fall 2019; Fall 2020 (x2); Fall 2021 (x2); Fall 2022 (x2, 89 students)
Multivariable Calculus (APMA 2120)	Stress/strain fields, multi-dimensional load analysis; Spring 2022
Single Variable Calculus I (APMA 1090)	Fall 2023 (2 sections) and multiple additional semesters

Graduate Teaching Fellow, University of Virginia *2017 – 2019*

Statics (CEE 2300, 85 students); Strength of Materials (CEE 2310, 56); Partial Differential Equations (APMA 3140, 65); Multivariable Calculus (APMA 2120, 143); Engineering Mathematics (APMA 3410, 55); Probability (APMA 3100, 23); Linear Algebra (APMA 3080, 14)

Graduate Teaching Fellow, University of Central Florida *2015 – 2016*

Statics (140 students); Structural Analysis laboratory (80); Design of Reinforced Concrete (60); Structural Mechanics (65)

Instructor, Islamic Azad University of Tabriz and University of Maraghe (Iran) *2011 – 2014*

Mechanics of Materials; Structural Analysis; Solid Mechanics; Design of Steel and Concrete Structures; Seismic Design of Masonry Structures

EDUCATION

M.Sc., Civil (Structural) Engineering, University of Virginia *2016 – 2019*

GPA 3.97/4.0 | Thesis: Multi-Level Seismic Response Mitigation Using Shape Memory Alloy-Based Self-Centering Control Devices | Advisor: Prof. O. E. Ozbulut

M.Sc., Civil (Earthquake) Engineering, Iran University of Science and Technology *2005 – 2008*

Thesis: Graph-Theoretical and Algebraic Methods for Improving the Conditioning of the Structural Flexibility Matrix (seven original optimization algorithms; grade 4/4) | Advisor: Prof. A. Kaveh

B.S., Civil Engineering, University of Tabriz *2000 – 2005*

Thesis grade 4/4. Graduate study in Civil Engineering, University of Central Florida, 2015–2016 (GPA 4.0/4.0), advisor Prof. Nicos Makris.

SCHOLARSHIP: FULL PUBLICATION LIST

Structural engineering, smart materials, and computation

1. **Shafiei Dizaji, F.** and Shafiei Dizaji, M. (2022). Seismic performance assessment of steel frames upgraded with shape memory alloy re-centering dampers for passive protection of structures subjected to seismic excitations using high-performance NiTiHfPd material. *Smart Materials and Structures*, 31, 065004.
2. **Shafiei Dizaji, F.** and Shafiei Dizaji, M. (2022). Novel computational mathematical algorithms for structural optimization using graph-theoretical methods. *Engineering Computations*, 39(6).
3. Farrokh, M., **Shafiei Dizaji, F.**, and Shafiei Dizaji, M. (2022). Hysteresis identification using extended Preisach neural network. *Neural Processing Letters*, 1–25.
4. Shafiei Dizaji, M., **Shafiei Dizaji, F.**, and Taghizadeh, E. (2018). Nonlinear adaptive simulation of concrete gravity dams using generalized Prandtl neural networks and damage detection. *International Research Journal of Engineering and Technology*, 5(6).
5. Shafiei Dizaji, M. and **Shafiei Dizaji, F.** (2017). Artificial neural networks to determine source of acoustic emission and damage detection. *International Research Journal of Engineering and Technology*, 4(6).
6. **Shafiei Dizaji, F.** and Khanzadi, M. (2011). Graph theoretical methods for improving the well-conditioning of structures flexibility matrix. *Journal of Civil Engineering, Ferdowsi University of Mashhad*, 22(1), 27–44.

Conference papers and proceedings

7. **Shafiei Dizaji, F.** (2022). A novel passive structural control device using high-performance NiTiHfPd material. *Proc. SPIE 12043, Active and Passive Smart Structures and Integrated Systems XVI*, 120430WP; SPIE Smart Structures + Nondestructive Evaluation, March 6–10, 2022.
8. Shi, F., Toker, G. P., **Shafiei Dizaji, F.**, Ozbulut, O. E., and Karaca, H. E. (2018). Experimental and numerical investigations on seismic applications of high damping SMAs. *Eleventh U.S. National Conference on Earthquake Engineering*, Los Angeles, CA, June 25–29, 2018.
9. Saedi, S., **Shafiei Dizaji, F.**, Ozbulut, O. E., and Karaca, H. E. (2017). Structural vibration control using high strength and damping capacity shape memory alloys. *Structural Dynamics Challenges in Next Generation Aerospace Systems (IMAC XXXV)*, Garden Grove, CA, Jan. 30 – Feb. 2, 2017.

10. Joghataie, A., Shafiei Dizaji, M., and **Shafiei Dizaji, F.** (2012). Neural network software for dam-reservoir foundation interaction. *International Conference on Intelligent Computational Systems (ICICS'2012)*, Dubai, UAE, Jan. 7–8, 2012.
11. **Shafiei Dizaji, F.**, Khanzadi, M., and Shafiei Dizaji, M. (2010). Using ESO method for topology optimization of structures. *3rd International Conference on Seismic Retrofitting with the Focus on Bridges, Lifeline Engineering & Concrete Technology*, Tabriz, Iran, Oct. 20–22, 2010.
12. **Shafiei Dizaji, F.**, Khanzadi, M., and Shafiei Dizaji, M. (2010). Structural topology optimization with frequency dynamic constraints. *3rd International Conference on Seismic Retrofitting with the Focus on Bridges, Lifeline Engineering & Concrete Technology*, Tabriz, Iran, Oct. 20–22, 2010.
13. **Shafiei Dizaji, F.** and Khanzadi, M. (2009). Comparison of different nonlinear models for simulating nonlinear behavior of concrete gravity dams. *2nd International Conference on Seismic Retrofitting with the Focus on Concrete Technology*, Tabriz, Iran, Nov. 6–7, 2009.
14. Kaveh, A., **Shafiei Dizaji, F.**, and Khanzadi, M. (2009). Using graph theoretical methods for improving the conditioning of structures flexibility matrix in structural optimization analysis. *8th International Congress on Civil Engineering*, Shiraz, Iran, May 11–13, 2009 (oral presentation).
15. Kaveh, A. and **Shafiei Dizaji, F.** (2008). Optimization of the conditioning of structural matrices in force method. *1st International Conference on Seismic Retrofitting*, Tabriz, Iran, Oct. 21–23, 2008 (oral presentation).

Engineering and mathematics education (conference papers)

16. Morris, Diana D., Hui Ma, and **Farzad Shafiei Dizaji** (2024). Exploring the Impact of Mastery Grading on Student Performance. *ASEE Annual Conference & Exposition*, 2024.
17. Guadagni, G., Maiti, D., and **Shafiei Dizaji, F.** (2023). Exploiting a Grading Option to Measure Mathematics Confidence of Engineering Students. *ASEE Annual Conference & Exposition*, Baltimore, MD.
18. Guadagni, G., Maiti, D., and **Shafiei Dizaji, F.** (2022). Impact of COVID-19 on Applied Mathematics Courses for Engineering Students. *ASEE Annual Conference & Exposition*, Minneapolis, MN.

In preparation: A Novel Seismic Resisting System Based on Mechanical Characteristics of Carbon Nano-Structures.

Peer reviewer: Smart Materials and Structures; Journal of Intelligent Material Systems and Structures; Smart Structures and Systems.

PEDAGOGICAL TRAINING

- Foundations of Scholarly Teaching (FOSTer), six-week program, and Fellow, Tomorrow's Professor Today (TPT) program, UVA Center for Teaching Excellence
- Active Learning Techniques for a More Engaged Engineering Class (workshop); Research Communication Training Program (RCTP); ongoing CTE sessions on curriculum (re)design, 2024–2025

SERVICE, MENTORING, AND DIVERSITY INITIATIVES

- Guided 10+ teaching assistants (2024); helped write and grade exams for multi-section courses (2024, 2025); attended Center for Teaching Excellence sessions (2024, 2025).
- Volunteer, BRIDGE summer program for college students from underrepresented backgrounds (2018); mentor, VA-NC Alliance for Minority Participation and Diversity summer research program (2018).
- Vice President, American Concrete Institute Student Chapter at UVA (2018–2019); graduate student team leader, Jefferson's Public Citizen Program (2018); student member, UVA Advanced Research Computing Services Focus Group (2018).

HONORS AND PROFESSIONAL STANDING

- Recognized for contributions to the UVA community by the P.R.I. Society, Department of Applied Mathematics and Science, University of Virginia (2019–2020).
- Graduate scholarships at UVA (2016–2019), UCF (2015–2016), and Iran University of Science and Technology (2005–2008); sole recipient of UCF's Geotechnical and Environmental endowed scholarship for 2016–2017.
- Ranked 192nd of 70,000+ candidates in Iran's national graduate entrance exam in civil engineering (2005); top 0.6% of 450,000+ in the national university entrance exam (2000).
- Licensed Professional Engineer (Iranian Organization for Engineering Order of Building); member, ASCE, ACI, and the Iranian Earthquake Engineering Association.

TECHNICAL AND LANGUAGE SKILLS

Structural/engineering software: SAP2000, SAFE, Perform-3D, ANSYS, Abaqus, RISA, OpenSees, AutoCAD, Revit, Rhino, Massir.

Programming and computation: MATLAB (advanced), Python, Fortran, Formian.

Simulation: FRAC-DAM, Seismosignal, Kijko2001, Seisrisk III, Duhamel, Structural Dynamic Analysis v1.0.

Languages: English (fluent); Farsi and Azerbaijani (native); Turkish (good); Arabic (basic). References available upon request.