FARZAD SHAFIEI DIZAJI, M.Sc.

Mathematics & Civil (Structural) Engineering Educator

Charlottesville, VA | ffs5da@virginia.edu | farzadshafieidizaji@gmail.com

Website | orcid.org/0000-0001-9165-8577 | linkedin.com/in/farzad-shafiei-dizaji-143945a6

CURRICULUM VITAE

PROFILE

Mathematics and civil (structural) engineering educator with seven academic years (Fall 2019 – Spring 2026) as a full-time Lecturer at the University of Virginia, teaching Calculus, Multivariable Calculus, Ordinary Differential Equations, Linear Algebra, and Probability to engineering undergraduates. Two M.Sc. degrees in structural and earthquake engineering, research in smart structures, graph-theoretical structural optimization, and neural networks for hysteresis, 18 journal and conference publications, structural design and review practice (2009 – 2015), and teaching experience at four universities.

RESEARCH INTERESTS

Smart structures and energy dissipation systems · structural applications of smart and advanced materials · earthquake engineering and structural dynamics · seismic resilience · structural optimization with graph theory · machine learning and artificial neural networks for hysteresis and damage detection · structural health monitoring and system identification · finite element and computational mechanics · engineering mathematics education

EDUCATION

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

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

Graduate study, Civil (Structural) Engineering, University of Central Florida, Orlando, FL **2015 – 2016**

- Research: mathematical processing of earthquake records with wavelet analysis and empirical mode decomposition. Advisor: Prof. N. Makris. GPA 4.0/4.0

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

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

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

- Thesis: *Seismic Behavior of Low-Ductility Concentrically Braced Frames*. Advisor: Prof. A. Davaran. Thesis grade 4/4 (excellent)

Selected graduate coursework: Stochastic Modeling (A); Risk Analysis (A+); Nondestructive Evaluation (A); Smart Structures (A−); Non-Linear Structural Systems (A+); Computational Methods in Civil Engineering (A+); Matrix Structural Analysis (A+); Optimal Structural Analysis (A); Advanced Mechanics of Materials (A+); Mechanics of Composite Materials (A+); Advanced Reinforced Concrete Design (A+)

TEACHING EXPERIENCE

Lecturer (Academic General Faculty), Applied Mathematics Center, University of Virginia **Fall 2022 – Spring 2026**

Lecturer (Teaching Professor), Department of Engineering and Society (Applied Mathematics), University of Virginia **Fall 2019 – Spring 2022**

- Instructor of record for the core engineering mathematics sequence; documented enrollments across lecturer and teaching-fellow sections exceed 1,100 students.
- Wrote syllabi and learning objectives; designed homework, quizzes, and exams; ran inquiry-based (ODE) and mastery-graded (Calculus I, Probability) courses.
- Supervised one to two undergraduate TAs and a graduate TA per section, and up to nine undergraduate TAs per semester in later years; taught fully online Spring 2020 – Spring 2021.

Fall 2019	APMA 2130 Ordinary Differential Equations	43 students
Fall 2019	APMA 1110 Calculus II	47

Spring 2020	APMA 2130 Ordinary Differential Equations (2 sections)	46, 33
Spring 2020	APMA 3100 Probability	44
Summer 2020	APMA 2130 Ordinary Differential Equations	26
Fall 2020	APMA 1110 Calculus II (2 sections)	49, 50
Spring 2021	APMA 3080 Linear Algebra	39
Fall 2021	APMA 1110 Calculus II (2 sections)	51, 55
Spring 2022	APMA 2120 Multivariable Calculus; APMA 2130 Ordinary Differential Equations	45, 30
Fall 2022	APMA 2130 Ordinary Differential Equations; APMA 1110 Calculus II	44, 89
Fall 2023	APMA 1090 Single Variable Calculus I (2 sections)	32, 24
2022 – 2026	Rotating assignments across the Center's course offerings, supervising up to nine undergraduate TAs	

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

Fall 2017	CEE 2300 Engineering Analysis – Statics	85 students
Spring 2018	CEE 2310 Strength of Materials	56
Fall 2018	APMA 3140 Partial Differential Equations	65
Spring 2019	APMA 2120 Multivariable Calculus; APMA 3410 Engineering Mathematics	143, 55
Summer 2019	APMA 3100 Introduction to Probability; APMA 3080 Linear Algebra	23, 14

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

Fall 2015	CES 3310 Engineering Analysis – Statics; CES 4100 Structural Analysis (laboratory instructor)	140, 80
Spring 2016	CES 4702 Design of Reinforced Concrete; CES 4205 Structural Mechanics	60, 65

Instructor, University of Maragheh (branch of the University of Tabriz), Iran **2012 – 2014**

- Selected Topics in Civil Engineering; Solid Mechanics; Structural Analysis; Design of Steel and Concrete Structures; Seismic Design of Masonry Structures

Instructor, Islamic Azad University of Tabriz, Department of Civil Engineering, Iran **2011 – 2012**

- Mechanics of Materials; Structural Analysis (Statics); Selected Topics in Civil Engineering

PEDAGOGICAL TRAINING

- Fellow, Tomorrow's Professor Today (TPT) program, University of Virginia
- Foundations of Scholarly Teaching (FOSTer), six-week program, UVA Center for Teaching Excellence
- Active Learning Techniques for a More Engaged Engineering Class (workshop); Strategic Career Design for the Peak Performing Professor (workshop); Research Communication Training Program (RCTP), UVA
- Center for Teaching Excellence sessions on curriculum (re)design and teaching, 2017 – 2025

RESEARCH EXPERIENCE

Graduate Research Fellow, Resilient and Advanced Infrastructure Laboratory, University of Virginia **2016 – 2019**

- NSF-funded project (CMMI-1538770): multi-level seismic response mitigation with shape memory alloy-based self-centering control devices.
- Designed and characterized a passive re-centering damper (SMARD) using superelastic NiTiHfPd alloys; compressive testing and DSC across temperatures and loading frequencies.
- Modeled 6- and 9-story steel moment frames retrofitted with the damper; nonlinear time-history analyses under 44 FEMA P695 ground motions showed reduced inter-story and residual drifts.

Research Assistant, Department of Materials Science and Engineering, University of Virginia **Summer 2019**

- Materials characterization with microscopy, x-ray diffraction, and mechanical testing; optimization studies with Prof. S. Agnew's research group.

Graduate Research Assistant, Centre of Excellence for Fundamental Studies in Structural Engineering, Iran University of Science and Technology **2005 – 2008**

- Topology optimization of structures (seminar, 2005 – 2006); graph-theoretical and algebraic methods for well-conditioned structural flexibility matrices (thesis, 2006 – 2008).

PUBLICATIONS

Engineering and mathematics education (conference papers)

1. Morris, D. D., Ma, H., and Shafiei Dizaji, F. (2024). Exploring the impact of mastery grading on student performance. *ASEE Annual Conference & Exposition*.
2. 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.
3. 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.

Journal articles

4. 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.
5. Shafiei Dizaji, F. and Shafiei Dizaji, M. (2022). Novel computational mathematical algorithms for structural optimization using graph-theoretical methods. *Engineering Computations*, 39(6).
6. Farrokh, M., Shafiei Dizaji, F., and Shafiei Dizaji, M. (2022). Hysteresis identification using extended Preisach neural network. *Neural Processing Letters*, 1–25.
7. 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).
8. 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).
9. 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

10. 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.
11. 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.
12. 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.
13. 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.
14. Shafiei Dizaji, F., Khanzadi, M., and Shafiei Dizaji, M. (2010). Using ESO method for topology optimization of structures. *3rd International Conference on Seismic Retrofitting*, Tabriz, Iran.
15. Shafiei Dizaji, F., Khanzadi, M., and Shafiei Dizaji, M. (2010). Structural topology optimization with frequency dynamic constraints. *3rd International Conference on Seismic Retrofitting*, Tabriz, Iran.
16. 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*, Tabriz, Iran.
17. 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 (oral presentation).
18. 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 (oral presentation).

In preparation

- Shafiei Dizaji, F. A novel seismic resisting system based on mechanical characteristics of carbon nano-structures. For submission to *Earthquake Engineering & Structural Dynamics*.

PRESENTATIONS AND WORKSHOPS

- "High-Performance Superelastic Materials for Seismic Applications," M.Sc. thesis presentation, University of Virginia, April 2019.
- "Using Graph Theoretical and Algebraic Methods for Improving the Well-Conditioning of Structural Matrices," M.Sc. thesis presentation, Iran University of Science and Technology, July 2008.
- "Topology Optimization of Structures," M.Sc. seminar, Iran University of Science and Technology, February 2008.
- Oral presentations: 8th International Congress on Civil Engineering, Shiraz (2009); 1st International Conference on Seismic Retrofitting, Tabriz (2008).
- Workshops attended: Symposium on New Technology and Industrialization of Building, Building & Housing Research Center, Tehran (2011); Analysis and Design of Space Structures, University of Tehran (2008); Analysis of Space Structures using the FORMIAN programming language, 86-hour course, University of Kerman (2008).

HONORS AND AWARDS

2019 – 2020	Recognized for contributions to the UVA community by the P.R.I. Society, Department of Applied Mathematics and Science, University of Virginia
2016 – 2019	M.Sc. scholarship, Department of Engineering Systems and Environment, University of Virginia
2016 – 2017	Sole recipient of the Geotechnical and Environmental endowed scholarship, University of Central Florida
2015 – 2016	Teaching and research assistant scholarship, Civil, Environmental and Construction Engineering, University of Central Florida
2010	Member, National Elites Foundation of Iran
2005 – 2008	M.Sc. scholarship, Iran University of Science and Technology
2005	Ranked 192nd of 70,000+ candidates, national M.Sc. entrance exam in civil engineering
2000 – 2005	B.S. scholarship, University of Tabriz; ranked in the top 0.6% of 450,000+ candidates in the national university entrance exam (2000)

SERVICE, MENTORING, AND OUTREACH

- Guided 10+ teaching assistants (2024); helped the course coordinator write and grade exam problems for multi-section courses (2024, 2025).
- Advised students on choosing majors and minors and wrote recommendation letters (2024, 2025); held additional office hours (2025).
- Prepared and gave lectures at UVA open house events (2024, 2025).
- 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).
- Volunteer, BRIDGE summer program for college students from underrepresented backgrounds (2018); Mentor, VA-NC Alliance for Minority Participation summer research program (2018).
- Peer reviewer: *Smart Materials and Structures*; *Journal of Intelligent Material Systems and Structures*; *Smart Structures and Systems*.

PROFESSIONAL EXPERIENCE

Supervising Engineer, State Organization of Schools Renovation, Development and Mobilization, Tabriz, Iran (full-time) **2009 – 2014**

- Reviewed and supervised analysis and design calculations for reinforced concrete and steel school buildings and foundations; recommended projects for approval.
- Developed engineering plans for construction, retrofit, maintenance, and rehabilitation of school structures; built an Excel design-review tool that standardized and sped up reviews.

Engineer, Department of Road and Transportation, Tabriz, Iran (part-time) **2011 – 2015**

- Reviewed design calculations for reinforced concrete and steel bridges and developed plans for bridge and roadway construction, repair, and rehabilitation.
- Investigated the collapse of two bridges and authored technical reports with risk-management recommendations.

Site Supervising Engineer, Azar Abadegane Nahand Construction Company, Bolor Tower (25 stories), Tabriz, Iran (part-time) **2004 – 2005**

- Supervised construction quality and met with clients, contractors, and stakeholders on project details.

PROFESSIONAL MEMBERSHIPS

Licensed Professional Engineer, Iranian Organization for Engineering Order of Building (Tabriz) · American Society of Civil Engineers (ASCE) · American Concrete Institute (ACI) · Iranian Earthquake Engineering Association (IEEA) · Iranian Society of Civil Engineers (ISCE)

SKILLS AND LANGUAGES

Programming: MATLAB (advanced), Python, Fortran, Formian. **Engineering software:** SAP2000, SAFE, Perform-3D, Abaqus, ANSYS, OpenSees, RISA, AutoCAD, Revit, Rhino. **Teaching:** learning management systems for course delivery; Microsoft Office.

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

References available upon request.