Milad Roohi Ghareshiran

Contact Information

Structural Monitoring, Diagnostics and Prognostics Lab (SMDP)
Department of Civil and Environmental Engineering
College of Engineering and Mathematical Science
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Education

2015 – Present **The University of Vermont**, Burlington, VT, USA
Ph.D. Candidate in Civil and Environmental Engineering (Structural Engineering)

Advisors: – Prof. Eric M. Hernandez
– Prof. David Rosowsky

Dissertation Title: "Performance-based Seismic Monitoring of Minimally Instrumented Buildings"

Candidacy Exam: Structural Dynamics, Reliability of Engineering Systems, Stochastic Processes, Control Systems and Advanced Structural Analysis (October 2017)

2011 – 2014 **University of Tehran**, Tehran, Iran
M.Sc. in Earthquake Engineering

Advisor: – Prof. Reza Attarnejad

Thesis: "Effects of Connection's Damping on Seismic Performance of Semi-Rigid Frames"

2007 – 2011 **K. N. Toosi University of Technology**, Tehran, Iran
B.Sc. in Civil and Environmental Engineering

Graduation Project: "Structural Analysis and Design of Steel and Reinforced Concrete Buildings"

Non-Degree Education

Spring 2018 **Northeastern University**, Boston, MA, USA
Visiting Non-Degree Special Student in Civil Engineering

Instructor: – Prof. Dionisio Bernal

Coursework: Vibration-based Structural Health Monitoring and System Identification

Research Interests

– Multi-hazard Risk, Reliability and Resilience Assessment of Built Environment

– Identification, Monitoring and Control of Civil Infrastructure Systems

– Earthquake Engineering and Structural Dynamics

– Probabilistic Methods for Modeling, Uncertainty Quantification and Propagation of Structural Systems

– Computational Structural Mechanics and Nonlinear Analysis of Structures

– Post-hazard Recovery and Decision-making under Uncertainty

Professional Experience

2015 – Present	**Graduate Research Assistant**	University of Vermont, VT, USA
2012 – 2014	**Research Assistant**	University of Tehran, Tehran, Iran
June, 2014	**Licensed as a Professional Engineer**	IOEOB, Tehran, Iran
2014 – 2015	**Structural Supervisor**	Shahr Khane Farda Co., Ardebil, Iran
2013 – 2014	**Structural Engineer** (part-time)	Azar Aab Andish Co., Ardebil, Iran
Summer, 2011	**Summer Internship**	Ofogh Tarh & Andisheh Co. Ardebil, Iran

Journal Publications

[1] E.M. Hernandez, **Milad Roohi**, David V. Rosowsky., "Estimation of element-by-element demand-to-capacity ratios in instrumented SMRF buildings using measured seismic response.", **Earthquake Engineering & Structural Dynamics**, 47(12), 2561-2578. [Link: https://doi.org/10.1002/eqe.3099]

[2] **Milad Roohi**, E.M. Hernandez, David V. Rosowsky., "Nonlinear Seismic Response Reconstruction and Performance Assessment in Minimally Instrumented Wood-frame Buildings - Validation using NEESWood Capstone Full-Scale Tests", **Structural Control and Health Monitoring**. [Under Review]

[3] **Milad Roohi**, E.M. Hernandez, David V. Rosowsky., "Nonlinear Model-Data Fusion for High-resolution Seismic Damage Index Estimation in Instrumented buildings: An Application to Van Nuys Reinforced Concrete Building", **Journal of Engineering Mechanics**. [To be submitted]

[4] **Milad Roohi**, E.M. Hernandez, Kalil Erazo, David V. Rosowsky., "An Extended Finite Element Model-based State Observer for State Estimation in Nonlinear Structural Systems", **Mechanical Systems and Signal Processing**. [To be submitted]

Manuscripts in Preparation

[5] **Milad Roohi**, E.M. Hernandez, David V. Rosowsky., "Element-by-element Low-cycle Seismic Damage Diagnosis and Prognosis in Minimally Instrumented Woodframe Buildings – Application to NEESWood Capstone Full-Scale Tests".

[6] **Milad Roohi**, E.M. Hernandez, David V. Rosowsky., "Performance-based Seismic Monitoring of Minimally Instrumented Buildings".

Conferences Papers and Proceedings

[1] **Milad Roohi**, E.M. Hernandez, David V. Rosowsky., "Nonlinear Seismic Response Reconstruction in Minimally Instrumented Buildings - Validation using NEESWood Capstone Full-Scale Tests", **The 12th International Workshop on Structural Health Monitoring (IWSHM 2019) , Stanford University**, Stanford, California, USA (September 10-12, 2019). [Abstract Submitted (Upcoming Conference)]

[2] **Milad Roohi**, E.M. Hernandez, David V. Rosowsky., "Nonlinear Seismic Response Reconstruction in Minimally Instrumented Buildings - Validation using NEESWood Capstone Full-Scale Tests", **Engineering Mechanics Institute Conference (ASCE), California Institute of Technology (CalTech)**, Pasadena, California, USA (June 18-21, 2019). [Abstract Submitted (Upcoming Conference)]

[3] **Milad Roohi**, E.M. Hernandez, David V. Rosowsky., "Element-by-element Seismic Damage Diagnosis and Prognosis in Minimally Instrumented Woodframe Buildings", **Engineering Mechanics Institute Conference (ASCE), Massachusetts Institute of Technology (MIT)**, Boston, Massachusetts, USA (May 29 - June 1, 2018). [Abstract, Presentation and Student Paper Competition of ASCE EMI SHMC Committee]

[4] **Milad Roohi**, E.M. Hernandez, David V. Rosowsky., "Element-by-Element Demand-to-Capacity Ratio Estimation from SMRF Building Seismic Records", **7th International Conference on Experimental Vibration Analysis for Civil Engineering Structures, University of California San Diego (UCSD)**, California, USA (July 12-14, 2017). [Paper and Presentation]

[5] R. Attarnejad, **Milad Roohi**, A. Pirmoz., "Seismic performance of semi-rigid frames with connection dampers", **8th National Congress on Civil Engineering**, Babol Noshirvani University of Technology, Iran (May 6-7, 2014). [Paper and Presentation]

[6] R. Attarnejad, **Milad Roohi**., "Nonlinear seismic assessment of semi-rigid frames with connection dampers considering near-fault effects",**National Conference on Architecture, Civil Engineering & Urban Modern Development**, Islamic Azad University, Tabriz, Iran (May 21, 2014). [Paper and Presentation]

[7] **Milad Roohi**, R. Attarnejad., "Seismic performance comparison of rigid and semi-rigid frames under far-field and near-field earthquake records", **15th Civil Engineering Students Conference**, Urmia University, Iran (September 2-4, 2014). [Paper and Presentation]

[8] **Milad Roohi**, R. Attarnejad., "Dynamic time history analysis of damped semi-rigid frames", **15th Civil Engineering Students Conference**, Urmia University, Iran (2-4 Sep 2014). [Paper and Presentation]

Invited Talks and Research Seminars

[1] **Milad Roohi**, "Post-Earthquake Assessment of Minimally Instrumented Buildings - Application to NEESWood Capstone Tests", **NIST Center of Excellence for Risk-Based Community Resilience Planning**, Department of Civil and Environmental Engineering, Colorado State University, April 2018.

[2] **Milad Roohi**, "Post-Earthquake Damage Assessment of Instrumented Buildings", CEE Graduate Seminar, College of Engineering and Mathematical Science, University of Vermont, December 2016.

Research Experience

Graduate Research Assistant (GRA) **August, 2015-Present**
Structural Monitoring Diagnostics and Prognostics Lab (SMDP), University of Vermont, VT, USA
Project Title: Structural Health Monitoring, Diagnosis and Prognosis of Minimally Instrumented Structural Systems
Supported by: National Science Foundation [Link]

Reseacrh Topics:
– Development of nonlinear filtering algorithms for seismic monitoring of nonlinear structural systems
– Performance-based Earthquake Engineering
– Vibration-based structural damage assessment of concrete, steel and wood-frame structural systems
– Validation of linear/nonlinear filtering algorithms using real-world experiments and structures.

Ph.D. Dissertation contributions:
– Proposed a new concept for *performance-based seismic monitoring* (PBM) and post-earthquake assessment of minimally instrumented buildings subjected to earthquakes.

– Developed a *fatigue usage monitoring* (FUM) framework for element-by-element low-cycle fatigue damage diagnosis and prognosis in large-scale instrumented building structures subjected to earthquakes.

– Proposed a new *extended model-based state observer* (EMBO) for nonlinear model-data fusion (state estimation) in large-scale nonlinear structural systems.

– Validated application of the proposed PBM, FUM and EMBO frameworks using full-scale seismic tests and real-world structures including:

1) A six-story wood frame Capstone building tested in a series of full-scale seismic tests in the final phase of the **NSF NEESWood project** at the E-Defense facility in Japan. [Link to NSF project website]

2) A partially instrumented 6-story steel building located in Burbank, CA instrumented by the California Strong Motion Instrumentation Program (CSMIP) station 24370

3) A 7-story reinforced concrete structure located in Van Nuys, CA instrumented by the CSMIP

Research Assistant (RA) **June, 2012-August, 2014**
Center of Numerical Methods in Engineering (CNME), University of Tehran, Tehran, Iran

Projects:
– Developed nonlinear finite element models of 3 and 6 story rigid and semi-rigid steed frame buildings in OpenSEES software and performed Pushover, Nonlinear Dynamic and Incremental Dynamic Analysis of the models to assess and compare the performance of Rigid, Semi-Rigid and Damped Semi-Rigid structural systems

– Seismic evaluation of Reduced Beam Section (RBS) frames using ANSYS software

– Effects of near-fault earthquakes on steel-frame building structures

Graduate Coursework

Northeastern University

CIVE 5699 Special Topics in CE: Vibration-based Structural Health Monitoring

University of Vermont

CE 272 Structural Dynamics
CE 370 Reliability of Engineering Systems
CE 271 Advanced Structural Analysis
EE 210 Control Systems
EE 211 Real-Time Control Systems (Audit)
EE 314 Nonlinear System Theory (Audit)
ME 259 Computational Solid Mechanics
ME 252 Mechanical Behavior of Materials
EE 301 System Theory
EE 302 Stochastic Processes
EE 171 Signals & Systems (Audit)
CDAE 395 Smart Resilient Communities (Audit)

University of Tehran

Hazards Analysis & Risks Assessment	Dynamics of Structures
Seismic Assessment and Rehabilitation	Finite Element Method
Seismic Design of Steel Structures	Advance Steel Structures
Soil Dynamics	Advanced Engineering Mathematics

Coursera (Andrew Ng)

Machine Learning	Neural Networks and Deep Learning (In progress)

Teaching Experience

Khaje Nasir Toosi University of Technology, Tehran, Iran Fall 2012-Spring 2013
Teaching Assistant (TA) of Professor. Nader Fanaie in Structural Analysis and Design of Steel Structures courses

Nasir Institute for Higher Education, Tehran, Iran 2012-2014
Question designing for Mechanics of Materials, Structural Analysis and Design of Steel and Concrete Structures preparation courses and exams for nationwide M.Sc. degree entrance exam

Parseh Institute for Higher Education, Tehran, Iran 2012-2013
Reviewer of questions designed for Mechanics of Materials and Structural Analysis preparation exams for nationwide M.Sc. degree entrance exam

Computer Skills

Finite Element Software	ABAQUS, ANSYS
Structural Software	OpenSEES, SAP2000, ETABS, SAFE, Seismosignal
Programming Languages	Matlab, Python, C++, TCL (Tool Command Language)
Graphical Programming	Simulink
Office Tools	AUTOCAD, LaTeX, Office
Platforms	Mac OS, Windows

Languages

English (Fluent), Farsi (Native Language), Azerbaicani (Mother Tongue), Turkish (Intermediate)

Professional Membership

– Earthquake Engineering Research Institute (EERI)

– American Society of Civil Engineers (ASCE-EMI/SEI): Engineering Mechanics and Structural Engineering Institutes

– Society for Industrial and Applied Mathematics (SIAM)

– Iranian Organization for Engineering Order of Building (IOEOB)

Awards and Honors

– Awarded Graduate Research Assistantship from Department of Civil and Environmental Engineering, University of Vermont, 2015-2019.

– Ranked in top 1% in Nationwide University Entrance Exam for M.Sc. degree in Iran, 2011.

– Ranked in top 1% in Nationwide University Entrance Exam for B.Sc. degree in Iran, 2007.

References

Dr. Eric M. Hernandez, Associate Professor, University of Vermont. eric.hernandez@uvm.edu

Dr. David V. Rosowsky, Provost & Senior Vice President; Professor, University of Vermont. david.rosowsky@uvm.edu

Dr. Dionisio P. Bernal, Professor, Northeastern University. d.bernal@northeastern.edu

Dr. Reza Attarnejad, Professor, University of Tehran. attarnjd@ut.ac.ir

Dr. Nader Fanaie, Assistant Professor, K. N. Toosi University of Technology. fanaie@kntu.ac.ir