

# AZIN GHAFARY

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## Education

- *Ph.D., Civil and Environmental Engineering*, 2021  
University of Nevada Reno
  - *M.Sc., Civil and Environmental Engineering*, 2016  
K.N. Toosi University of Technology, Tehran, Iran
  - *B.S., Civil and Environmental Engineering*, 2011  
K.N. Toosi University of Technology, Tehran, Iran
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## Professional Experience

- **Faculty Fellow, 2023-present**  
**Center for Urban Science and Progress (CUSP), New York University**
    - *Teaching experience I: Design, development, and teaching of a course titled “Data Analytics of Urban Systems Failures”, Summer 2023.*
    - *Teaching experience II: Design and development of lectures and labs and co-teaching one week out of three weeks of the CUSP international summer school about the application of regression models to quantify socioeconomic metabolism, Summer 2024.*
    - *Teaching experience III: scheduled to teach a course titled “Disaster Risk Analysis and Urban Systems Resilience” in Fall 2024.*
    - *Teaching experience IV: scheduled to co-teach CUSP PhD colloquium, an interactive zero-credit seminar course for doctoral track students in Fall 2024.*
    - *Research collaboration, Part I: Probabilistic assessment of wind-induced interference effects on the structural performance of tall buildings from a performance-based design perspective.*
    - *Service: Leading the organization and moderating annual CUSP research seminar series featuring leading voices in the growing field of urban science, Fall 2023 – Spring 2024.*
  - **Associate, 2021-2023**  
**Exponent Inc., Buildings and Structures Practice, New York**
    - *Development of a quantitative risk framework in collaboration with a large team of engineers and scientists for identifying vulnerability of a large utility company’s power transmission assets to fatigue from wind-induced aeolian vibrations to inform their wildfire mitigation asset strategy.*
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- *Finite Element Simulation of conductor clashing due to high winds in ABAQUS to inform a risk framework for a large utility company to avoid wildfires due to conductor clashing.*
  - *Investigating allegations of design errors/omissions for a power station construction project as part of an international arbitration.*
  - *Failure and damage investigations following adjacent construction incidents, moisture exposure, and construction defects.*
  - *Leading the drafting and preparation of a proposal to provide consulting services to a large utility company.*

- **Graduate Research and Teaching Assistant, 2017-2021**

- **University of Nevada Reno**

- *Teaching assistant for Bridge Engineering I (graduate and undergraduate level course). My responsibilities included grading, holding labs for teaching modeling and analysis of concrete box girder and steel plate girder bridges using CSi Bridge software program and preparation of example manuals.*
  - *Teaching Assistant for Computer-Assisted Problem Solving (undergraduate senior level course). My responsibilities included grading, holding office hours, teaching interactive labs showing the students how to use Matlab and MathCad to apply what they have learned in the main lectures to solve example problems.*
  - *Teaching Assistant for Engineering 100 (undergraduate freshman level course). In this course, students undertook a long-term project to build a hovercraft with their teammates. My responsibilities included grading, holding office hours, and teaching classes in two parts: (a) lectures for teaching the theories and step by step guide on each stage of the hovercraft project; (b) hands on activity to help student groups apply what they have learned in the lecture part of the class to their project.*
  - *Assisting my PhD advisor for the course Structural Concrete Design II (graduate and undergraduate level course): My responsibilities included holding labs for teaching modeling, analysis, and design of floor systems using SAP2000 and preparation of a step-by-step example manual.*
  - *Main PhD Research, part I: Performance-Based assessment of a steel Building under wind hazards through collapse using nonlinear Finite Element Simulations. The main objective of this part of the research was to investigate the importance and necessity of performance-based wind design methodologies.*
  - *Main PhD Research, Part II: Uncertainty quantification and probabilistic performance-based assessment of nonlinear behavior of*
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*moment resisting frames under design and extreme wind Loads. The main objective of this part of the research was to investigate the possible effect(s) and importance of including uncertainties in assessing the performance of buildings subjected to wind loads.*

- *Main PhD Research, Part III: Multi-physics simulation of aerodynamic feedback variation due to linear and nonlinear structural response of buildings under extreme wind loads. The main objective of this part of the research was to assess the possible effects of nonlinear wind design of buildings in causing wind-induced instabilities or intensification of existing instabilities.*
  - *Additional Research, No. I: Investigating challenges and performing analytical foundational work for proposing a hybrid simulation approach for aeroelastic wind tunnel testing.*
  - *Additional Research, No. II: Investigating synthesis of repair materials and methods for reinforced concrete and prestressed bridge girders as part of an ABC-UTC project.*
- **Structural Engineer, 2016-2017**  
**Pars Geometry Consultants (P.G.C), Tehran, Iran**
    - *Design and detailing of a Liquefied Petroleum Gas (LPG) berthing structure in SAP2000 and seismic assessment in ABAQUS.*
  - **OpenSees software instructor, 2016-2017**  
**K.N. Toosi University of Technology, Tehran, Iran**
    - *Design and development of training sessions for teaching basic theories and introductory skills needed for static and nonlinear dynamic analysis of concrete and steel frames in the OpenSees software program to graduate students of structural and earthquake engineering majors.*

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**Leadership,  
Outreach, &  
Academic  
Service**

- *Leading a collaborative effort for starting a series of software program trainings at K.N.Toosi University of Technology, 2016-2017*
  - *CEE Ambassador for Nevada bound tours, a program for prospective high school students and their families at the University of Nevada Reno, 2018-2021*
  - *Reviewer for Journal of Structural Engineering, 2020-present*
  - *Leading the organization and moderating the CUSP Research Seminar Series featuring leading voices in the growing field of urban informatics, Fall 2023-present*
  - *Committee member, ASCE Structural Engineering Institute Technical Committee on Solar PV Structures and the Subcommittee on Reliability, 2024-present.*
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**Awards**

- Graduate Dean's merit scholarship, Fall 2020.
- NSF Primary Travel Award to join the Natural Hazards Research Summit on May 14th and 15th 2024, in College Park, MD.
- NSF Travel Award to the NHERI Summer Institute for Early-Career Faculty at the University of Texas at San Antonio, June 12-14, 2024.

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**Invited Talks**

- *Guest speaker at Thornton Tomasetti, Performance-Based Seismic Design Practice, Spring 2023*
  - Presentation title: *Advancing Nonlinear Design of Buildings under Extreme Wind Loads*
- *Guest Lecturer at New York University, School of Professional Studies, Schack Institute of Real Estate, Spring 2023, Fall 2023, and Spring 2024*
  - Course title: Construction Methods and Technology.
  - Lecture title: Vibration Control in Buildings.
- *Guest speaker at the CUSP PhD cohort colloquium, Fall 2023*
  - Presentation title: Performance-based Wind Engineering: Application to Isolated and Surrounded Buildings in a Cityscape

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**Professional Affiliations**

- American Association for Wind Engineering (AAWE) member
  - Earthquake Engineering Research Institute (EERI) member
  - American Society of Civil Engineers (ASCE) member
  - Structural Engineering Association of New York member
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**Publications**

1. **Azin Ghaffary**, Luis Ceferino. "Wind-Induced Interference Effects on the Structural Performance of a High-Rise Building." Under preparation.
  2. **Ghaffary, Azin**, and Mohamed A. Moustafa. "Uncertainty quantification and probabilistic performance-based assessment of nonlinear behavior of moment resisting frames under design and extreme wind loads." *Journal of Building Engineering* 68 (2023): 106173.
  3. **Azin Ghaffary**, Mohamed Moustafa. "Multi-Physics Simulation for Assessing Aerodynamic Feedback Variation due to Linear and Nonlinear Structural Response of Buildings under Extreme Wind Loads." Under review.
  4. **Ghaffary, Azin**, and Mohamed A. Moustafa. "Performance-Based Assessment and Structural Response of 20-Story SAC Building under Wind Hazards through Collapse." *Journal of Structural Engineering* 147.3 (2020): 04020346.
  5. **Ghaffary, Azin**, Elif Ecem Bas, and Mohamed A. Moustafa. "A hybrid simulation approach for aeroelastic wind tunnel testing: challenges and foundational work." *International Journal of Lifecycle Performance Engineering* 4.1-3 (2020): 46-79.
  6. **Ghaffary, Azin**, and Mohamed Moustafa. "Wind-induced response of buildings incorporating nonlinear fluid-structure interaction effects." 6th American Association for Wind Engineering Workshop (2021).
  7. **Ghaffary, Azin**, and Mohamed Moustafa. "Probabilistic assessment of the nonlinear response of the 20-story SAC building under extreme wind loads through collapse." 6th American Association for Wind Engineering Workshop (2021).
  8. **Ghaffary, Azin**, and Mohamed A. Moustafa. "Synthesis of Repair Materials and Methods for Reinforced Concrete and Prestressed Bridge Girders." *Materials* 13.18 (2020): 4079.
  9. **Ghaffary, Azin**, and Mohamed A. Moustafa. Synthesis of Repair Methods for RC Bridge Girders. Report No. ABC-UTC-2016-C2-UNR02-Final (2020).
  10. **Ghaffary, A.**, & Karami Mohammadi, R. (2019). Comprehensive nonlinear seismic performance assessment of MR damper controlled systems using virtual real-time hybrid simulation. *The Structural Design of Tall and Special Buildings*, e1606.
  11. **Ghaffary, A.**, & Karami Mohammadi, R. (2018). Framework for virtual hybrid simulation of TADAS frames using openses and abaqus. *Journal of Vibration and Control*, 24(11), 2165-2179.
  12. Mohammadi, R. K., Nasri, A., & **Ghaffary, A.** (2017). TADAS dampers in very large deformations. *International Journal of Steel Structures*, 17(2), 515-524.
  13. Reza Karami Mohammadi, **Azin Ghaffary**, Kamal Mohagheghian, Numerical Modeling of Dynamic Testing System for Structural Virtual Hybrid Simulation. 2nd international conference on civil, architectural and urban management, Tehran, Iran.
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**Presentations**

1. Azin Ghaffary, Luis Ceferino, Structural performance sensitivity of buildings to wind-induced interference effects in growing cities, oral presentation at the Engineering Mechanics Institute (EMI) Conference 2024, Chicago, Illinois.
  2. Azin Ghaffary, Luis Ceferino, Probabilistic Assessment of Structural Performance of Buildings in the presence of Wind-Induced Interference Effects, poster presentation at the Natural Hazards Research Summit, May 2024, Maryland, College Park.
  3. Azin Ghaffary, Mohamed Moustafa, Probabilistic Performance-based Assessment of Nonlinear Behavior of a 20-story moment Resisting Frames under Design and Extreme Wind Loads, Oral presentation in 14th Americas Conference on Wind Engineering (ACWE) 2022, Lubbock, Texas.
  4. Azin Ghaffary, Mohamed Moustafa, FSI Effects on NL-Response of Buildings under Design Wind Loads, ASCE SEI Structures Congress 2022, Atlanta, Georgia.
  5. Azin Ghaffary, Mohamed Moustafa, Numerical Substructures Limitations for Future Real-Time Hybrid Simulation under wind loading, Oral presentation in Engineering Mechanics Institute (EMI) Conference 2018, MIT, Cambridge.
  6. Azin Ghaffary, Mohamed Moustafa, Performance-Based Assessment and Structural Response of 20-Story SAC Building under wind Hazards through Collapse, Engineering Mechanics Institute (EMI) Conference 2019, Caltech, Pasadena.
  7. Azin Ghaffary, Mohamed Moustafa, Synthesis of Repair Methods for RC Bridge Girders, Poster presentation in the 2019 International Accelerated Bridge Construction Conference.
  8. Azin Ghaffary, Mohamed Moustafa, Synthesis of Available Methods for Repair of Reinforced Concrete and Prestressed Concrete Girders, ABC-UTC online quarterly research seminar, 31 July 2020 (with the final count of registered sites equal to 870 – presentation is recorded and is uploaded on the BAC-UTC website): <https://abc-utc.fiu.edu/mc-events/synthesis-of-available-methods-for-repair-of-reinforced-concrete-and-prestress-girder-ends/>
  9. Azin Ghaffary, Mohamed Moustafa, Effect of eliminating nonlinear aerodynamic damping from the wind-induced response of flexible building structures, Engineering Mechanics Institute (EMI) Conference 2021, Columbia University, New York, May 2021.
  10. Azin Ghaffary, Mohamed Moustafa, Probabilistic assessment of the nonlinear response of the 20-story SAC building under extreme wind loads through collapse, 6th AAWE Workshop, Clemson University, Clemson, SC, USA, May 2021.
  11. Azin Ghaffary, Mohamed Moustafa, Wind-induced response of buildings incorporating nonlinear fluid-structure interaction effects, 6th AAWE Workshop, Clemson University, Clemson, SC, USA, May 2021.
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