

# Hooman Nick

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M.Sc. structural engineer specializing in Structural Health Monitoring (SHM) of bridges and frames. Proficient in finite element (FE) modelling with ABAQUS and in Python/MATLAB machine learning (ML) pipelines using modal data to quantify damage and estimate severity with artificial neural networks (ANNs), robust to measurement noise. Seeking a fully funded PhD position in SHM and AI based structural monitoring starting Fall 2026.

## Academic Background

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| 01/2016 – 09/2019 | Master of Science (M.Sc.) in Structural Engineering - Islamic Azad University of Science and Research Branch, Tehran, Iran<br>Thesis: “Damage identification in steel girder bridges using modal strain energy-based damage index”<br>Supervisors: Dr. Armin Aziminejad, Dr. Mirhamid Hosseini<br>GPA: 17.20/20 |
| 09/2010 – 09/2015 | Bachelor of Science (B.Sc.) in Civil Engineering - Islamic Azad University of Parand, Iran<br>GPA: 15.44/20   |

## Research Experience

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| 01/2021 – 12/2023 | Senior Researcher - Iran’s National Elites Foundation, Tehran <ul style="list-style-type: none"><li>• Developed a dual-criteria, two-stage damage identification framework for steel frames, integrating modified Modal Flexibility Damage Index (MFDI) and Modal Strain Energy-based Damage Index (MSEDI) to significantly improve detection reliability.</li><li>• Developed and trained two distinct Artificial Neural Networks, each specialized for an individual damage index, to precisely quantify the severity of both single and multiple damage scenarios.</li><li>• Introduced a computationally efficient data-gathering strategy for ANN training by collecting data exclusively from the detected damage location and its immediate neighbors, reducing computational costs.</li><li>• Published the methodology and results in <i>Structures</i> (2023).</li></ul>  |
| 01/2016 – 09/2019 | Research Assistant (M.Sc.) - Islamic Azad University of Science and Research Branch <ul style="list-style-type: none"><li>• Developed a method for steel girder bridges that couples a modal strain-energy-based (for localization) with an ANN (for severity quantification).</li><li>• Advanced the methodology to address real-world limitations by investigating its performance under noisy conditions, identifying Modal Flexibility (MFDI) as the most robust damage indicator.</li><li>• Engineered a novel noise-cancellation and quantification approach by training an ANN to map noisy vibration data to a noise-free output, successfully estimating damage magnitude in contaminated datasets.</li><li>• Constructed and validated a 3D Finite Element (FE) model of the I-40 Bridge in ABAQUS, which served as the analytical testbed for developing and testing all damage detection frameworks.</li><li>• Published the primary findings in two peer-reviewed journals: <i>Engineering Failure Analysis</i> and the <i>Journal of Nondestructive Evaluation</i>.</li></ul> |

## Publications

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Academic Impact Metrics: Total Citations: 189 | h-index: 3 (Source: [Google Scholar](#), as of November 2025)

## Peer-Reviewed Journal Articles

- **Nick, H.**, Ashrafpour, A., & Aziminejad, A. (2023). Damage identification in steel frames using dual-criteria vibration-based damage detection method and artificial neural network. *Structures*, 51, 1833-1851. <https://doi.org/10.1016/j.istruc.2023.03.152>
- **Nick, H.**, & Aziminejad, A. (2021). Vibration-based damage identification in steel girder bridges using artificial neural network under noisy conditions. *Journal of Nondestructive Evaluation*, 40(2). <https://doi.org/10.1007/s10921-020-00744-8>
- **Nick, H.**, Aziminejad, A., Hosseini, M. H., & Laknejadi, K. (2021). Damage identification in steel girder bridges using modal strain energy-based damage index method and artificial neural network. *Engineering Failure Analysis*, 119. <https://doi.org/10.1016/j.engfailanal.2020.105010>

## Conference Presentations

- **Nick, H.** (2020). Damage Identification in steel girder bridges via modal flexibility damage index and artificial neural network under the influence of noise. *4th International Conference on Civil, Structural and Earthquake Engineering, Tehran, Iran.*
- **Nick, H.**, Aziminejad, A., Hosseini, M. H., & Laknejadi, K. (2019). Damage assessment of steel girder bridges using modal strain energy and artificial neural network. *3rd International Conference on Applied Researches in Structural, Tehran, Iran.*
- **Nick, H.**, Aziminejad, A., Hosseini, M. H., & Laknejadi, K. (2019). Damage identification in steel girder bridges using improved damage index method by modal combination and artificial neural network. *8th International Conference on Seismology & Earthquake Engineering, Tehran, Iran.*
- **Nick, H.**, Aziminejad, A., Hosseini, M. H., & Laknejadi, K. (2019). Damage identification in girders of steel bridges using damage index method and artificial neural network. *5th International Conference on Bridge, Tehran, Iran.*

## Professional Experience

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01/2018 – Present	Bridge Designer - ASAN TARH PARS Engineering Consultant Co., Tehran <ul style="list-style-type: none"><li>• Designed urban/rural steel-girder bridges with earthquake-resistant details and code compliance.</li><li>• Built and validated analysis models with SAP2000, ETABS, SAFE, CSiBridge.</li></ul>
01/2017 – 12/2018	Bridge & Structural Designer - KIATARH Engineering Consultant Co., Tehran <ul style="list-style-type: none"><li>• Contributed to superstructure/substructure designs and performed seismic checks for buildings.</li></ul>
01/2016 – 12/2017	Intern (Structural & Bridge Design) - PASAR Engineering Consultant Co., Tehran <ul style="list-style-type: none"><li>• Supported project execution via AutoCAD drafting, 3D modeling, preliminary concepts, and material/cost studies.</li></ul>

## Academic Service & Peer Review

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08/2025	Peer Reviewer, <i>Scientific Reports</i> (Springer Nature); reviewed one manuscript.
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## Technical Skills & Languages

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- **Finite-Element & Structural Analysis:** ABAQUS; SAP2000; ETABS; SAFE; CSiBridge; AutoCAD
- **Programming & Data Analysis:** Python (data processing, plotting); MATLAB (time-series analysis, artificial-neural-network training); C (basic)
- **Structural Health Monitoring Methods:** Vibration-Based Damage Detection (Modal Strain Energy damage index & Modal Flexibility damage index), Finite-Element Modeling (FEM), Model Updating, Time Series Preprocessing, Anomaly Detection
- **Research Interests:** BIM-SHM Integration, Digital Twin Methodologies, Real-Time monitoring and decision support
- **Languages:** English - TOEFL iBT 100 (R25 | L27 | S23 | W25; Oct 19, 2024); Persian - Native

## Honors & Awards

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2017	Ranked top 1% among M.Sc. structural engineering cohort (IAU - Science & Research Branch)
2017	1st place, Matrix Analysis project (IAU - Science & Research Branch)
2016	Ranked top 1% in national graduate entrance exam (~570,000 participants)
2015	1st place, Steel Structures project (Azad University of Parand)

## References

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**Dr. Armin Aziminejad** - Assistant Professor, Civil Engineering, Islamic Azad University (Science & Research Branch), Tehran

Email: [arminaziminejad@srbiau.ac.ir](mailto:arminaziminejad@srbiau.ac.ir) | Relationship: M.Sc. thesis supervisor

**Dr. Karim Laknejadi** - Assistant Professor, Civil Engineering, Islamic Azad University (Science & Research Branch), Tehran

Email: [k.laknejadi@srbiau.ac.ir](mailto:k.laknejadi@srbiau.ac.ir) | Relationship: M.Sc. thesis advisor and instructor