

Maurizio Morgese

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Google Scholar: <https://scholar.google.com/citations?user=jUcU6zQAAAAAJ&hl=en&oi=ao>

Profile

- Engineering Research Project Manager in with 4+ years of experience in performance evaluation and forensic analysis of structures, targeting areas for improvement within the resilience of infrastructures and sustainable development.
- Experienced in Structural Health Monitoring (SHM) and Non-Destructive Testing (NDT) with a background in lab/field installations of discrete/distributed sensors and coordination of static/dynamic tests.
- Permanent resident, Green Card holder through I140 petition in the EB2 National Interest Waiver (NIW) category.

Skills

- High-skilled in data analysis with Python, and Finite Element (FE) analysis with Sap2000 and CSi Bridge. Knowledge of LabVIEW, Ansys, MIDAS, COMSOL, and Python packages for Machine Learning. High-skilled in Office Suite and AutoCAD.
- Speaking fluently in English, Spanish, and Italian.

Education

University of Illinois at Chicago – Chicago, Illinois, USA

Jan '20 – Aug '23

Ph.D. in Civil Structural Engineering.

Thesis: “Methods for Structural Health Monitoring based on Distributed Fiber Optic Sensors”.

Polytechnique of Turin – Turin, Italy

Sept '16 – Dec '19

Master's degree in Structural Engineering.

Exchange program with the University of Cordoba, Argentina.

Thesis: “Vulnerability of existing infrastructures: the Morandi bridge and SHM possible prospects”.

Polytechnique of Turin – Turin, Italy

Sept '12 – July '16

Bachelor's Degree in Civil Engineering.

Thesis: “Tsunami-proof building design”.

Experience

Center for Advanced Infrastructure and Transportation, Rutgers University - New York City

Metropolitan Area

Sept '23 – Current

• **Engineering Research Project Manager**

Plan, coordinate, and oversee engineering research projects within the organization. Manage cross-functional teams, develop project strategies, and ensure the successful execution of engineering research initiatives. Work closely with researchers, engineers, stakeholders, and external partners to drive projects to completion while adhering to timelines and budgets.

University of Illinois at Chicago – Chicago, IL

Jan '20 - Aug '23

• **Senior Research Assistant**

Mentor and track the progress of 3 Junior Ph.D. students and 4 visiting investigators to integrate them into lab research and to independently perform experiments, data analysis, presentation of results, and writing technical papers.

- Prof. Ying, College of Information and Control Engineering, Shenyang Jianzhu, China
- Antonio Domel, Ph.D. Student, University of Illinois at Chicago, Chicago, USA
- Chengwei Wang, Ph.D. Student, University of Illinois at Chicago, Chicago, USA
- Amir Louaibi, Ph.D. Student, University of Illinois at Chicago, Chicago, USA
- Giacomo Contucci, M.Sc. Student, Politecnico di Milano, Milan, Italy
- Dario Poloni, Ph.D. Student, Politecnico di Milano, Milan, Italy
- Prof. Muhammad Tariq Chaudhary, Department of Civil Engineering, Kuwait University, Shadadiya, Kuwait

- **Research Assistant**

- Kishwaukee River Bridges monitoring project with Distributed Brillouin Scattering Fiber Optic Sensor System (Highway I-39, Rockford, Illinois, USA)
 - Research Problem: twins 5-span precast, post tensioned segmental concrete box girder bridges exhibiting cracking in several segments and critical condition due to fatigue and corrosion.
 - Implemented Methodology: inspected the bridges. Installed fiber optic distributed sensors system. Designed and performed static load tests. Installed accelerometers and FBG crack sensors. Designed and performed dynamic tests under daily traffic conditions. Performed 3D finite element analysis (CSi Bridge). Determined the safety of the bridges. Realized a final report to IDOT. Implemented an automatic method based on A.I. algorithms for detection, location, and quantification of cracks. Established an approach for quasi-real-time monitoring of cracks in long structures. Developed a novel approach for determination of fundamental dynamic characteristics of bridges based on fiber optic sensor data.
- Post-Collapse Analysis of Morandi's bridge (Polcevera Viaduct – Geona, Italy)
 - Research Problem: Polcevera Viaduct in Genoa, Italy, suffered a high-profile collapse on August 14, 2018, killing 43 people.
 - Implemented Methodology: performed capacity-demand analysis in the domain of the time. Performed 3D FE model, and generated S–N curves to estimate fatigue life in case of corrosion. Performed Applied Element Analysis to rigorously discover the collapse mechanism. Proposed an analytical method that involves corrosion and fatigue models for examination of remaining life of existing structures.
- Method and Theory for Conversion of Distributed Fiber-Optic Strains to Crack Opening Displacements
 - Research Problem: conversion of distributed strain data into information about crack opening displacement (COD).
 - Implemented Methodology: designed and performed static and dynamic lab tests on a 15-meter-long steel beam, and finite element model to verify the theoretical analysis. Introduced an analytical equation that allows accurate conversion between distributed strain peak measurements and corresponding COD.
- Stress-Strain Response of Optical Fibers in Direct Tension
 - Research Problem: characterization of fiber optic mechanical properties based on BOTDA distributed strain and direct tension test data.
 - Implemented Methodology: designed and installed test setup (distributed fiber optic sensors, load cell, displacement actuator system). Performed direct tension test. Introduced a new strain transfer model for distributed fiber optic sensors in direct tension. Introduced a relationship between theoretical distributed strain and stress.
- Crack Detection in Steel Pipelines
 - Research Problem: detection of cracks on steel pipes.
 - Implemented Methodology: designed and installed test setup and sensor system. Designed and implemented air pressure system to reproduce the natural gas conditions in real pipelines. Designed and implemented pressure test for crack detection with distributed fiber optic sensors.
- NetZero
 - Research Problem: effects on the EV charger installation on the CO₂.
 - Implemented Methodology: collected data from state and local agencies about EV and CV cars; CO₂ emissions related to cars; and locations of EV chargers.

- **Teaching Assistant**

In charge of 20+ weekly hours of support activities to the Distinguished Professor Farhad Ansari. Conduct up to 4 weekly office hours to guide and assist over 250 students in 3 years. Appointed as instructor for topics such as determinacy and indeterminacy of structures, solution of determinate and indeterminate structures, lab sections for non-destructive evaluation of structures (i.e., UPV, Rebound

hammer). Prepare and grade: 1 weekly assignment per course, 1 final project per course, 2 mid-term and 1 final exams per course.

- Structural Analysis I – CME 205 Spring '23
- No-Destructive Testing of Concrete – CME 536 Fall '22
- Structural Analysis II – CME 409 Fall '20, '21, '22
- Structural Analysis I – CME 205 Spring '21, '22
- Statics – CME 201 Spring '20

Polytechnique of Turin – Turin, Piedmont, Italy

Oct '18 – Dec '19

• Research Assistant

- Two-stage SHM method for damage detection and quantification in long concrete structures
 - Research Problem: implementation of digital image correlation (DIC) low resolution BOTDR interrogator for distributed sensing.
 - Implemented Methodology: performed design and analysis of concrete beams. Installed sensor systems. Performed 4-point bending test. Integrated DIC with distributed fiber optic sensors to create a two-phase system that identifies the location of structural damage quantifying it.

InGroup – Cordoba Capital, Cordoba, Argentina

March '18 – Sept '18

• Structural Engineer

- Train station “Belgrano C”, Mitre Viaduct – Buenos Aires, Argentina
 - Project: design of the new “Belgrano C” train Station.
 - Implemented Methodology: performed 3D FE model, designed reinforced concrete and prestressed concrete structural elements. Performed vibrations analysis and control assessment for crowd overload.
- Bridges of “Circunvalacion de la ciudad de Cordoba” – Cordoba, Argentina
 - Project: static evaluation of new constructed bridges.
 - Implemented Methodology: performed 3D FE model, designed and performed static load tests.

Polytechnique of Turin – Turin, Piedmont, Italy

Sept '15 – Dec '15

• Office employee

- Project: Control of fire-fighting system.
- Implemented Methodology: collected data and analyzed.

Journal Publications

- **M. Morgese**, C. Wang, T. Taylor, M. Etemadi, F. Ansari, 2023. “*Distributed Detection and Quantification of Cracks in Operating Large Bridges*”, Journal of Bridge Engineering, ASCE. doi:10.1061/JBENF2/BEENG-6454.
- **M. Morgese**, C. Wang, Y. Ying, T. Taylor, F. Ansari, 2023. “*Stress-Strain Response of Optical Fibers in Direct Tension*”, Journal of Engineering Mechanics, ASCE. DOI: 10.1061/JENMDT.EMENG-6990 (**Selected technical paper of the week by ASCE Publishing**).
- **M. Morgese**, Y. Ying, T. Taylor, F. Ansari, 2022. “*Method and Theory for Conversion of Distributed Fiber-Optic Strains to Crack Opening Displacements*”, Journal of Engineering Mechanics, ASCE. 148(12). DOI: 10.1061/(ASCE)EM.1943-7889.0002168.
- C. Wang, F. Ansari, B. Wu, S. Li, **M. Morgese**, J. Zhou, 2022. “*LSTM approach for condition assessment of suspension bridges based on time-series deflection and temperature data*”, Advances in Structural Engineering, SAGE Publications. Vol. 0(0) 1–14. DOI: 10.1177/13694332221133604.
- B. Yuan, Y. Ying, **M. Morgese**, F. Ansari, 2022. “*Theoretical and Experimental Studies of Micro-Surface Crack Detections Based on BOTDA*”, Sensors, MDPI. 22(9), 3529.

<https://doi.org/10.3390/s22093529>.

- **M. Morgese**, Marco Domaneschi, Farhad Ansari, Gian Paolo Cimellaro, Daniele Inaudi, 2021. “*Improving distributed FOS measures by DIC: a two-stage SHM*”, ACI Structural Journal, ACI Structural and Materials Journals. 118 (6): 91–102. doi: 10.14359/51732994.
- M. Domaneschi, C. Pellicchia, E. De Iuliis, G. P. Cimellaro, **M. Morgese**, A.A. Khalil, F. Ansari, 2020. “*Analysis of collapse mechanisms of the Polcevera Viaduct by the Applied Element Method*”, Engineering Structures, Elsevier. Volume 214. <https://doi.org/10.1016/j.engstruct.2020.110659>.
- **M. Morgese**, F. Ansari, M. Domaneschi, G.P. Cimellaro, 2020. “*Post Collapse Analysis of Morandi’s Polcevera Viaduct in Genova Italy*”, Journal of Civil Structural Health Monitoring, Springer. 10 (1): 69–85. <https://doi.org/10.1007/s13349-019-00370-7>.

Journal Publications Under Review Process

- C. Wang, **M. Morgese**, T. Taylor, M. Etemadi, F. Ansari, “*Generalized Method for Distributed Detection and Quantification of Cracks in Bridges*”, Structural Health Monitoring, SAGE. (Under Review).
- Y. Ying, **M. Morgese**, F. Ansari, Z. Gao, “*Prediction of crack opening in steel beam based on strains measured from distributed optical fiber sensors*”, Measurement Science and Technology, IOP Publishing. (Under Review)

Conference Publications

- **M. Morgese**, F. Ansari, T. Taylor, C. Wang, “*Distributed Detection of Cracks in Post-tensioned Concrete Box Girder Bridges*”, The Transportation Research Board 102nd Annual Meeting, January 8 – 12, 2023, Washington, D.C, USA.
- M. Domaneschi, G.P. Cimellaro, F. Ansari, **M. Morgese**, “*Safety of existing infrastructures: The collapse of Morandi bridge in Genoa*”, 10th International Conference on Bridge Maintenance, Safety and Management (IABMAS 2020), April 11 – 18, 2021, Sapporo, Japan.
- M. Domaneschi, G.P. Cimellaro, F. Ansari, **M. Morgese**, D. Inaudi, “*Embedded fiber-optic sensors in reinforced concrete elements of bridge structures*”, 10th International Conference on Bridge Maintenance, Safety and Management (IABMAS 2020), April 11 – 18, 2021, Sapporo, Japan.
- M. Domaneschi, G.P. Cimellaro, **M. Morgese**, F. Ansari, D. Inaudi, “*Embedded fiber-optic sensors in reinforced concrete beams*”, 7th Conference on Structural Engineering, Mechanics and Computation (SEMC 2019), September 2-4, 2019, Cape Town, South Africa.
- M. Domaneschi, G.P. Cimellaro, **M. Morgese**, A. Zona, F. Ansari, “*Safety of infrastructures: A case study*”, 7th Conference on Structural Engineering, Mechanics and Computation (SEMC 2019), September 2-4, 2019, Cape Town, South Africa.
- M. Domaneschi, G. P. Cimellaro, **M. Morgese**, F. Ansari, A. Zona, “*Remarks on the Collapse of the Polcevera Viaduct*”, The 12th International Workshop on Structural Health Monitoring, September 10-12, 2019, Stanford, California, USA.

Editorial Board Member

- Journal of Building Pathology and Rehabilitation, Springer.
- Corresponding Primary Guest Editor of the Special Issue “Monitoring Approaches for Resilient Structures” in the Journal of Building Pathology and Rehabilitation (Springer)

Reviewer Activities

Provided feedback to 4 peer reviewed journals on 10+ papers, suggest improvements to the authors, and make a recommendation to the editor about whether to accept, reject or request changes to the article.

- Structural and Materials Journals, American Concrete Institute.
- Journal of Bridge Engineering, ASCE.
- Journal of Engineering Mechanics, ASCE.
- Journal of Civil Structural Health Monitoring, Springer.
- Journal of Vibration and Control, SAGE.
- M. Noori, C. Rainieri, M. Domaneschi, V. Sarhosis (2021), “Data Driven Methods for Civil Structural Health Monitoring and Resilience: Latest Developments and Applications”, CRC Press. – Invited by the Editor to review three chapters.

Speaker at Conferences

- “*Safety of existing infrastructures: The collapse of the Morandi bridge in Genoa*”, Tenth International Conference on Bridge Maintenance, Safety and Management (IABMAS 2020). 11-18 April 2020 Sapporo, Japan.
- “*Embedded fiber-optic sensors in reinforced concrete elements of bridge structures*”, Tenth International Conference on Bridge Maintenance, Safety and Management (IABMAS 2020). 11-18 April 2020 Sapporo, Japan.

Skills, certifications and languages

- Programs: Sap2000, CSi Bridge, LUSAS, MIDAS, Ansys, COMSOL, Python, MATLAB, Applied Element Method software, Microsoft Office 365, AutoCAD.
- Languages: Italian (Native Speaker), English (Full Professional), Spanish (Full Professional).
- Professional Certification: Italian Professional Engineer License (P. E.), Section A, No Expiration Date.

Awards

- Full tuition waiver for Ph.D. studies in Civil Structural Engineering at University of Illinois at Chicago.
- Scholarships for exchange study programs (extra-EU) at Polytechnique of Turin.

Extracurricular Activities

- **Co-Founder** of no-profit association “L’Onda” (Apulia, Italy), focused on the organization of “Strada Chiusa” events and concerts.
- **International Volunteer** for “Fundacion Iconos” (Argentina), oriented to provide integral health to people in conditions of risk and social vulnerability, through the formation of sustained support links.
- American Society of Civil Engineering member.