

Negar Kamali

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RESEARCH INTERESTS

• Explainable AI • Interpretable AI • ML-Assisted Decision Making • Uncertainty Quantification • Conformal Prediction

EDUCATION

Ph.D. in Computer Science *2022-present* Northwestern University
Evanston, IL, USA

Ph.D. in Computational Mechanics University of Illinois at Chicago
Chicago, IL, USA

M. Sc. in Computational Mechanics University of Tehran
Tehran, Iran

B.Sc. in Civil Engineering Tabriz University
Tabriz, Iran

ACADEMIC EXPERIENCE

Northwestern University | *Research Assistant at MU Collective Lab* September 2022 - Present

Project: Conformal Prediction Set Utility Evaluation

- Exploring conformal prediction sets as a method for generating valid confidence sets in distribution-free uncertainty quantification.
- Conducting a thematic analysis on perceptions of AI assistance during an experiment where participants labeled in-distribution and OOD images.

Project: Co-design Patient-Facing Machine Learning Strategies for Prenatal Stress Reduction

- Collaborating with the Center for Advancing Safety of Machine Intelligence (CASMI)
- Investigated preferred interactions of pregnant people with next-day machine learning stress predictions along with preferred explanations, and recommendations
- Directing various participatory design sessions catering to a diverse group
- Crafting co-design approaches for effective virtual engagement with research participants
- Devising a prototype for the patient-oriented Decision Support Tool (DST) showcasing different facets of machine learning including predictions, explanations, bias, uncertainty, risk, and stress management recommendations

Univ. of Illinois at Chicago | *Research Assistant* 2013-2018

- Developed an Enriched Finite Element (FE) to solve for Linear and Nonlinear Wave Propagation Problems.
- Developed an Enriched Reproducing Kernel Particle Method (RKPM) to solve for linear and nonlinear wave propagation problems.
- conducted numerical Simulation of Nonlinear Ultrasonic Testing (NLUT) and multiscale material.
- Wrote several user subroutines for commercial software Abaqus.

Univ. of Illinois at Chicago | *Teaching Assistant* 2013-2015

- Teaching assistant for Structural Analysis, conducting review session and office hours.

Univ. of Illinois at Chicago | *Research Mentor* 2013-2015

- Assisted in developing and conducting research projects for several undergraduate students.

PUBLICATIONS

Conference Publications

- "Evaluating the Utility of Conformal Prediction Sets for AI-Advised Image Labeling", D. Zhang, A. Chatzimpampas, **N. Kamali**, J. Hullam, *submitted to CHI '24*, 2023
- "Patient-facing Machine Learning for Prenatal Stress Reduction in the United States: A Co-design Toolkit", M. Ullua, **N. Kamali**, G. Fernandes, E. Soyemi, M. Beltzer, N. G. Menon, N. Alshurafa, M. Jacobs, *Presented at CSCW '23 workshop "Supporting User Engagement in Testing, Auditing, and Contesting AI"*, 2023
- "Patient Perspectives of Machine Learning for Prenatal and Perinatal Stress Reduction: Qualitative Analysis ", M. Ullua, **N. Kamali**, G. Fernandes, E. Soyemi, M. Beltzer, N. Alshurafa, M. Jacobs, *Under preparation for ACM FAccT Conference on Fairness, Accountability, and Transparency (FAccT)*", 2024

Poster Presentation

- "Evaluating the Utility of Conformal Prediction Sets for AI-Advised Image Labeling", D. Zhang, A. Chatzimpampas, **N. Kamali**, J. Hullam, *Human+AI Symposium at the University of Chicago*, 2023

Journal Publications

- "Harmonic-enriched reproducing kernel approximation for highly oscillatory differential equations", A. Mahdavi, Sh. W. Chi, **N. Kamali**, *ASCE's Journal of Engineering Mechanics*, 2020
- "Influence of Mesoscale and Macroscale Heterogeneities in Higher Harmonics Under Plastic Deformation", **N. Kamali**, N. Tehrani, A. Mostavi, Sh. W. Chi, D. Ozevin, J.E. Indecochea, *Journal of Non-destructive Evaluation*, 2019
- "Numerical study on how heterogeneity affects ultrasound higher harmonics generation", **N. Kamali**, A. Mahdavi, Sh. W. Chi, *Nondestructive Testing and Evaluating*, 2019
- "Wavelet Based Harmonics Decomposition of Ultrasonic Signal in Assessment of Plastic Strain in Aluminium", A. Mostavi, **N. Kamali**, N. Tehrani, Sh. W. Chi *Nondestructive Testing and Evaluating*, 2018

Doctoral Thesis | Enriched Numerical Method for Wave Propagation and Assessing Material Damage Using Nonlinear Acoustics, **Negar Kamali**, 2018

SUMMARY OF RELATED SKILLS AND QUALIFICATIONS

- **Programming** | JavaScript, Python, HTML, CSS, SQL, MATLAB, R, Fortran, Git
- **ML** | Proficient in TensorFlow, PyTorch, SKLearn and other ML tools
- **Software** | Tableau, Abaqus, Ansys, AutoCAD, Rhinoceros 3D, Grasshopper, Solidworks
- Extensive and in-depth collaboration with experimental researchers in group, for NSF funded research
- Familiarity with the principles of experiment design and statistical decision theory
- Solid grasp of linear algebra and statistics

INDUSTRIAL EXPERIENCE

Software Developer | US API Manager | SkyCiv Jan 2021 - Sept 2022

- Developing cloud-based software for structural engineers

Structural Engineer | Automation Expert | Arup Nov 2020 - Jan 2021

- Developing and maintaining an automated design and analysis workflow for end-to-end collaboration

Structural Engineer Professional | SOM Jun 2018 - Nov 2021

- Research on Finite Element (FE) topology optimization for different structural elements
- ML prediction of post-tensioned tendons with TensorFlow's CNN
- Classifying building damages with TensorFlow's CNN

HONORS & AWARDS

Northwestern University | Todd M. and Ruth Warren and the Chookaszian Family Fellowship 2022

Univ. of Illinois, Chicago <i>Chancellor's Student Service and Leadership Award</i>	2017
Univ. of Illinois, Chicago <i>Excellence in Undergraduate Mentoring Scholarship</i>	2017
Univ. of Illinois, Chicago <i>Chicago Consular Corps of Engineers Scholarship</i>	2017
Univ. of Illinois, Chicago <i>UIC Presenter Award</i>	2016
Univ. of Illinois, Chicago <i>Graduate Student Council UIC Award</i>	2016

PROFESSIONAL AFFILIATIONS

- Graduate Society of Women Engineers, Professional Development Officer, *Northwestern University*, 2023-2024
- Graduate Society of Women Engineers, Founder and President, *Univ. of Illinois at Chicago*, 2016
- Active reviewer for professional journals such as *Journal of Engineering Mechanics*, *Journal of Applied Sciences*, and *Journal of Soft Computing in Civil Engineering*, 2019-2022