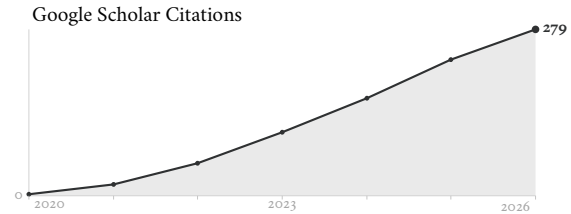


M. Naqib Rahimi, Ph.D.

Academic Curriculum Vitae | Computational Mechanics

✉ Nrahimi@synopsys.com ☎ +1-631-384-4156
✉ Naqib.Rahimy123@gmail.com 🌐 naqibr.github.io
📄 naqib-rahimi 📄 M. Naqib Rahimi
📄 Google Scholar: 279 citations · h-index 7 · i10-index 7 (Sep 2026)



SUMMARY

I am a computational mechanics researcher and simulation engineer specializing in fluid-structure interaction and fracture and failure analyses involving extreme events and high-rate dynamics. I develop advanced particle-based and meshfree computational methods using CPG, SPH, peridynamics, and phase field, with an emphasis on GPU acceleration and large-scale multiphysics simulation workflows.

EDUCATION

- 2021 – 2025 📄 **Ph.D. in Civil engineering**
Thesis title: Resilience Through Computation: Novel SPH Frameworks for Fracture, Fragmentation, and Fluid-Structure Coupling in Climate-Driven and Blast Scenarios
Stony Brook University, New York, USA.
- 2019 – 2021 📄 **M.Sc. in Material Science and Nanoengineering**
Sabanci University, Istanbul, Turkey.
- 2015 – 2021 📄 **B.Sc. in Mechanical Engineering**
Inonu University, Malatya, Turkey.
- 2014 – 2018 📄 **B.Sc. in Civil Engineering (Honors Degree)**
Inonu University, Malatya, Turkey.

AWARDS

- 2025 📄 Outstanding Ph.D. Dissertation Award — *Civil Engineering Department.*
- 2024 📄 Junior Researcher Award — *Institute for Advanced Computational Science.*
- 2023 📄 Civil Engineering Research Merit Award — *Stony Brook University.*
- 2022 📄 Best Student Paper — *EMI Conference.*
- 2019 📄 Summa Cum Laude Award for Civil Engineering Degree
- 2018 📄 First Place in National Undergraduate Thesis Competition
- 2017 📄 Young Merit Award— *MISA: Malatya International Students Association.*
- 2011 📄 Silver Medalist in International Science Olympiads
- 2010 📄 Gold Medalist in Mathematics — *Afghanistan.*

FUNDED RESEARCH PROPOSALS

- 2024 – 2026 📄 **NSF CAREER:** Open-Source GPU-Accelerated Computational Infrastructure for Coastal Fluid-Structure Interaction in Extreme Hydrodynamic Conditions. (PI: Georgios Moutsanidis)
Contributor (NSF AWARD #: 2338313)
- 2020 – 2022 📄 Development and Experimental Validation of Parallelized Hybrid SPH-PD Particle Method for Fluid-Solid Interaction Solutions of Hydro-elasticity Problems. (PI: Deniz Can Kolukisa)
Contributor/Co-author (TUBITAK Project ID: 121M425)
- 2020 – 2021 📄 Parallelized Hybrid Particle Methods Supported by Innovative Non-local Models: Applications to Fluid-Structure-Interaction Analysis
Author (Project ID: B.A.KM-21-02377)

JOB EXPERIENCE

R&D Engineer, Sr. Engineer, ANSYS, part of Synopsys Inc., Austin, TX (07/2025–Present)

- Develop the Continuum Particle Gas (CPG) meshfree particle method in LS-DYNA to simulate airbag deployment in vehicle crash analysis.
- Accelerate the ANSYS LS-DYNA solver for crash simulation through GPU implementation of its core numerical kernels.

R&D Simulation Engineer, ANSYS LS-DYNA, Livermore, CA (05/2024–08/2024)

R&D Simulation Engineer, ANSYS LS-DYNA, Livermore, CA (05/2023–08/2023)

Mechanical Engineer Intern, Istanbul Techno-park, Istanbul, Turkey (07/2020–11/2020)

Civil Engineer Intern, Inonu University, Malatya, Turkey (06/2017–08/2017)

Civil Engineer Intern, Guven Constructions, Malatya, Turkey (06/2016–08/2016)

TEACHING EXPERIENCE

Jan 2024 – May 2024 ■ Steel and Reinforced Concrete Design I (CIV312)

Jan 2021 – Jul 2021 ■ Calculus (Math102)

Sep 2020 – Jan 2021 ■ Manufacturing Processes (IE309)

Jan 2020 – June 2020 ■ Int. to Material Science (ENS205)

Jan 2019 – Jan 2020 ■ Calculus (MATH102)

Jan 2019 – Apr 2019 ■ Dynamics (DNK201)

SKILLS

Coding:

C++, Fortran, CUDA, Matlab, and some Python.

OpenSource Contributions to:

DualSPHysics and standalone Particle-based Concrete Failure Solver.

Softwares:

ANSYS-LSDYNA, FEniCs, and SolidWorks.

Numerical Methods:

SPH, Phase Field, FEM, IGA, and Peridynamics.

Languages:

English, Persian, Turkish, and speaking Hindi.

SCHOLARSHIPS

2019 ■ Fully Funded Master's Scholarship— *Sabanci University*.

2015 ■ Fully Funded Undergraduate Scholarship for Mechanical Engineering

2013 ■ Fully Funded Presidential Scholarship for Civil Engineering

2008 ■ High School Scholarship

REFERENCES

Assist. Prof. Georgios Moutsanidis

Ph.D. Advisor

Department of Civil Engineering

Stony Brook University, NY.

✉ Georgios.Moutsanidis@stonybrook.edu

🌐 Department Website

Assist. Prof. Lampros Svolos

Department of Civil and Environmental Engineering

University of Vermont.

✉ Lampros.Svolos@uvm.edu

Assist. Prof. Paolo Celli

Ph.D. Thesis Committee Chair

Department of Civil Engineering

Stony Brook University, NY.

✉ paolo.celli@stonybrook.edu

Dr. Jason Wang

Distinguished Engineer

ANSYS LS-DYNA

Livermore, CA.

✉ Jason.Wang@ansys.com

PUBLICATIONS

Google Scholar citation impact: 279 citations | h-index 7 | iio-index 7 (as of September 02, 2026).

Google Scholar profile

Journal Articles

- [12] **M. N. Rahimi** and G. Moutsanidis, "SoliDualSPHysics: An extension of DualSPHysics for solid mechanics with hyperelasticity, plasticity, and fracture," *Computer Physics Communications*, vol. 327, p. 110 257, 2026.  DOI: 10.1016/j.cpc.2026.110257
- [11] **M. N. Rahimi**, L. Svolos, and G. Moutsanidis, "Functionally graded ultra-high temperature ceramics for hypersonic applications: A numerical study of fracture under high-temperature extremes," *Engineering Fracture Mechanics*, vol. 332, p. 111 794, 2026.  DOI: 10.1016/j.engfracmech.2025.111794
- [10] **M. N. Rahimi** and G. Moutsanidis, "SPH modeling of concrete failure using the M7 microplane model," *International Journal of Mechanical Sciences*, vol. 299, p. 110 378, 2025.  DOI: 10.1016/j.ijmecsci.2025.110378
- [9] **M. N. Rahimi** and G. Moutsanidis, "IGA-SPH: coupling isogeometric analysis with smoothed particle hydrodynamics for air-blast-structure interaction," *Engineering with Computers*, vol. 41, no. 3, pp. 1–22, May 2024.  DOI: <https://doi.org/10.1007/s00366-024-01978-0>
- [8] **M. N. Rahimi** and G. Moutsanidis, "An SPH-based FSI framework for phase-field modeling of brittle fracture under extreme hydrodynamic events," *Engineering with Computers*, vol. 39, no. 4, pp. 2365–2399, Aug. 2023.  DOI: <https://doi.org/10.1007/s00366-023-01857-0>
- [7] **[Most Cited] M. N. Rahimi**, D. C. Kolukisa, M. Yildiz, M. Ozbulut, and A. Kefal, "A Generalized Hybrid Smoothed Particle Hydrodynamics-Peridynamics Algorithm with a Novel Lagrangian Mapping for Solution and Failure Analysis of Fluid-Structure Interaction Problems," *Computer Methods in Applied Mechanics and Engineering*, vol. 389, p. 114 370, Feb. 2022.  DOI: 10.1016/j.cma.2021.114370
- [6] **[Most Cited] M. N. Rahimi** and G. Moutsanidis, "A smoothed particle hydrodynamics approach for phase field modeling of brittle fracture," *Computer Methods in Applied Mechanics and Engineering*, vol. 398, p. 115 191, Aug. 2022.  DOI: <https://doi.org/10.1016/j.cma.2022.115191>
- [5] **M. N. Rahimi** and G. Moutsanidis, "Modeling dynamic brittle fracture in functionally graded materials using hyperbolic phase field and smoothed particle hydrodynamics," *Computer Methods in Applied Mechanics and Engineering*, vol. 401, p. 115 642, Nov. 2022.  DOI: <https://doi.org/10.1016/j.cma.2022.115642>
- [4] **M. N. Rahimi**, A. Kefal, and M. Yildiz, "An improved ordinary-state based peridynamic formulation for modeling FGs with sharp interface transitions," *International Journal of Mechanical Sciences*, vol. 197, p. 106 322, May 2021.  DOI: 10.1016/j.ijmecsci.2021.106322
- [3] B. AlKhateab et al., "Damage mechanisms in CFRP/HNT laminates under flexural and in-plane shear loadings using experimental and numerical methods," *Composites Part A: Applied Science and Manufacturing*, vol. 136, p. 105 962, Oct. 2020.  DOI: 10.1016/j.compositesa.2020.105962

- [2] **[Most Cited] M. N. Rahimi**, A. Kefal, M. Yildiz, and E. Oterkus, "An ordinary state-based peridynamic model for toughness enhancement of brittle materials through drilling stop-holes," *International Journal of Mechanical Sciences*, vol. 182, p. 105773, Sep. 2020.  DOI: 10.1016/j.ijmecsci.2020.105773
- [1] **M. N. Rahimi** and O. H. Bettemir, "Development of an Unmanned Ground Vehicle for Shelter and Cave Reconnaissance and annihilation," *Savtek 2018 9. Defence Technologies*, vol. 1, no. -, pp. 761–771, Apr. 2018.

Conference Proceedings

- [8] **M. N. Rahimi**, G. Moutsanidis, and L. Svolos, "Dynamic crack propagation in functionally graded materials under thermal shock: a novel phase field approach," in *Engineering Mechanics Institute Conference and Probabilistic Mechanics and Reliability Conference (EMI/PMC 2024) in Chicago, Illinois, May 28-31, 2024*, May 2024.
- [7] **M. N. Rahimi** and G. Moutsanidis, "High Fidelity Modeling of Fracture Under Extreme Hydrodynamic Events: A Coupled SPH-Phase-Field FSI Approach," in *Engineering Mechanics Institute Conference 2023 (EMI 2023) in Atlanta, Georgia, June 6-9, 2023*, Jun. 2023.
- [6] D. C. Kolukisa, R. Saghatchi, **M. N. Rahimi**, G. Moutsanidis, and M. Yildiz, "SPH-PD Modeling of the Periodic Elastic Response of a Beam Behind a Cylinder in Laminar Incompressible Flow," in *The 12th TSME International Conference on Mechanical Engineering in Phuket, Thailand*, Dec. 2022.
- [5] G. Moutsanidis and **M. N. Rahimi**, "SPH framework for Modeling Fracture in Fluid-Structure Interaction: a comparative study between phase field and peridynamics," in *Meshfree and Novel Finite Element Methods with Applications in Berkeley, California*, Jun. 2022.
- [4] **M. N. Rahimi** and G. Moutsanidis, "A coupled total Lagrangian SPH-phase field framework for brittle fracture," in *16th SPHERIC in Catania, Italy*, Jun. 2022.
- [3] **M. N. Rahimi** and G. Moutsanidis, "SPH framework for Hyperbolic phase field modeling of brittle fracture," in *Meshfree and Novel Finite Element Methods with Applications in Berkeley, California*, Jun. 2022.
- [2] **M. N. Rahimi**, A. Kefal, and M. Yildiz, "Numerical Investigation on Effective Toughening Mechanisms of Graded Composites," in *JOINT EVENT: ICCS23 - 23rd International Conference on Composite Structures & MECHCOMP6 - 6th International Conference on Mechanics of Composites*, Elsevier, Mar. 2020, p. 151.
- [1] **M. N. Rahimi**, O. F. Bulak, and O. H. Bettemir, "Excel Based Program Modeling and Project Management Application Development," in *Tubitak Project Competition Proceedings*, The Scientific and Technological Research Council of Turkey (TUBİTAK), 2018, p. 87.

Theses

- [2] **M. N. Rahimi**, "Resilience Through Computation: Novel SPH Frameworks for Fracture, Fragmentation, and Fluid-Structure Coupling in Climate-Driven and Blast Scenarios," Ph.D. thesis, State University of New York at Stony Brook, Stony Brook, New York, USA, 2025.  URL: <https://www.proquest.com/openview/574b5094207d8293a5f3b5056b23ab74/1?pq-origsite=gscholar&cbl=18750&diss=y>
- [1] **M. N. Rahimi**, "Peridynamic modelling of internal features and interfaces for material toughening," Master's thesis, Sabanci University, Istanbul, Turkey, Dec. 2020.  URL: <https://risc01.sabanciuniv.edu/record=b2553635>