

EMRE PALTA, Ph.D.

Assistant Professor of Mechanical Engineering

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RESEARCH INTERESTS

- Computational solid mechanics and nonlinear finite element analysis
- Impact mechanics, ballistics, and high-strain-rate material behavior
- Mechanical metamaterials and architected materials
- Crashworthiness, roadside safety, and energy-absorbing structures
- Multiscale modeling of composite and textile materials

EDUCATION

Ph.D., Mechanical Engineering, The University of North Carolina at Charlotte, USA 2014 – 2019

Dissertation: Multi-scale Finite Element Modeling of Multi-ply Woven Fabrics under Ballistic Impacts.

Advisor: Prof. Howie Fang.

M.S., Mechanical Engineering, The University of North Carolina at Charlotte, USA 2012 – 2014

Thesis: Finite Element Modeling and Simulation of a Full-Size Combat Helmet under Ballistic and Blunt Impacts.

Advisor: Prof. Howie Fang.

B.S., Mechanical Engineering, Uludağ University, Türkiye 2006 – 2010

ACADEMIC APPOINTMENTS

Vice Chair, Department of Mechanical Engineering 08/2024 – present

Tekirdağ Namık Kemal University, Türkiye

- Oversee undergraduate curriculum development and assessment; coordinate student advising and mentoring programs.

Assistant Professor, Department of Mechanical Engineering 08/2021 – present

Tekirdağ Namık Kemal University, Türkiye

- Conduct research in computational structural mechanics, impact dynamics, crashworthiness, and advanced material systems.

- Teach core and advanced courses including Statics, Dynamics, Numerical Analysis, Automobile Body Structural Design, and Senior Design.

Researcher 08/2019 – 08/2021

The Ministry of National Education of Türkiye

- Conducted research on advanced materials for ballistic protection applications.

- Collaborated with industry partners on the development of new armor systems.

Graduate Research Assistant, Dept. of Mechanical Engineering 08/2013 – 05/2019

University of North Carolina at Charlotte, USA

- Developed multi-scale finite element models of woven fabrics under ballistic impact.

- Contributed to five NCDOT-sponsored roadside safety research projects.

Graduate Teaching Assistant, Dept. of Mechanical Engineering 08/2013 – 05/2015

University of North Carolina at Charlotte, USA

- Taught lab sections of MEGR 3225, Introduction to Finite Element Analysis (Abaqus); developed course materials and graded assignments.

PUBLICATIONS

Peer-Reviewed Journal Articles

In Preparation

- [19] **Palta, E.** (2026). "Anatolian Kilim–Motif-Inspired Auxetic Metamaterials: Design, Deformation Mechanisms, and Energy Absorption."
- [18] **Palta, E.** (2026). "Connectivity-Controlled Collapse and Energy Absorption in Culturally Inspired Interlaced-Pentagon Architected Materials."

Under Review

- [17] **Palta, E.** (2026). "Boundary Configuration Effects on the Ballistic Response of Single-Ply UHMWPE Woven Fabric." *Journal of Polytechnic*.

Published

- [16] **Palta, E.** (2026). "Iso-energetic ballistic response of meso-scale woven fabrics." *International Journal of Mechanical Sciences*, 326, 111910.
- [15] **Palta, E.,** & Fang, H. (2025). "Crash Performance Analysis of the Oregon Triple-Tube Bridge Rail Under MASH TL-4 Impact Conditions." *International Journal of Crashworthiness*, 1–15.
- [14] **Palta, E.,** Fang, H., Stolle, C., & Wang, Q. (2025). "Experimental and Numerical Crashworthiness Evaluation of Two-Bar Bridge Rails." *Engineering Structures*, 340, 120753.
- [13] **Palta, E.,** Pachocki, L., Bruski, D., Wang, Q., Jaus, C., & Fang, H. (2025). "Finite Element Analysis of Occupant Risk in Vehicular Impacts into Cluster Mailboxes." *Computation*, 13(1), 12.
- [12] **Palta, E.,** Fang, H., & Wang, Q. (2025). "Investigation of dynamic impact behavior of bighorn sheep horn." *International Journal of Solids and Structures*, 307, 113133.
- [11] Fang, H., Jaus, C., Wang, Q., **Palta, E.,** Pachocki, L., & Bruski, D. (2024). "Numerical Modeling and Simulation of Vehicular Crashes into Three-Bar Metal Bridge Rail." *Computation*, 12(8), 165.
- [10] Wang, Q., **Palta, E.,** & Fang, H. (2024). "Numerical modeling and simulation of cable barriers under vehicular impacts on a sloped median." *International Journal of Protective Structures*, 15(4), 891–916.
- [9] **Palta, E.,** Fang, H., & Weggel, D. (2023). "A Numerical Study of the Effects of Projectile Properties on the Impact Behavior of Multi-ply Flexible Fabrics." *Applied Composite Materials*, 31, 511–533.
- [8] **Palta, E.,** & Fang, H. (2019). "On a multi-scale finite element model for evaluating the ballistic performance of multi-ply woven fabrics." *Composite Structures*, 217, 488–508.
- [7] **Palta, E.,** Gutowski, M., & Fang, H. (2018). "A numerical study of steel and hybrid armor plates under ballistic impacts." *International Journal of Solids and Structures*, 136, 279–294.
- [6] Fang, H., **Palta, E.,** & Gutowski, M. (2018). "Numerical simulation of high-speed impacts involving metallic and non-metallic materials." *Int. J. of Computational Methods and Experimental Measurements*, 6(3), 463–475.
- [5] **Palta, E.,** Fang, H., & Weggel, D. (2018). "Finite element analysis of the Advanced Combat Helmet under various ballistic impacts." *International Journal of Impact Engineering*, 112, 125–143.
- [4] Gutowski, M., **Palta, E.,** & Fang, H. (2017). "Crash analysis and evaluation of vehicular impacts on W-beam guardrails placed behind curbs using finite element simulations." *Advances in Engineering Software*, 114, 85–97.
- [3] Gutowski, M., **Palta, E.,** & Fang, H. (2017). "Crash analysis and evaluation of vehicular impacts on W-beam guardrails placed on sloped medians using finite element simulations." *Advances in Engineering Software*, 112, 88–100.
- [2] Fang, H., Bi, J., Zhang, C., Gutowski, M., **Palta, E.,** & Wang, Q. (2017). "A constitutive model of aluminum foam for crash simulations." *International Journal of Non-Linear Mechanics*, 90, 124–136.
- [1] Li, N., Fang, H., Zhang, C., Gutowski, M., **Palta, E.,** & Wang, Q. (2015). "A numerical study of occupant responses and injuries in vehicular crashes into roadside barriers based on finite element simulations." *Advances in Engineering Software*, 90, 22–40.

Conference Proceedings and Abstracts

- [9] **Palta, E.** (2024). “Comparative Study on Meso-scale Modeling of Woven Fabrics under Ballistic Impact.” *2024 International Conference on Defense Technology*, Xi'an, China.
- [8] Li, Z., **Palta, E.**, Joshua, F., & Fang, H. (2019). “Vehicular Impact Analysis and Safety Evaluation of Clustered Mailboxes.” *15th U.S. National Congress on Computational Mechanics*.
- [7] Joshua, F., Fang, H., **Palta, E.**, & Li, Z. (2019). “Performance Evaluation of a Two-Bar Bridge Rail Using Finite Element Analysis.” *15th U.S. National Congress on Computational Mechanics*.
- [6] **Palta, E.**, & Fang, H. (2018). “On the Numerical Study of Ballistic Performance of Multi-ply Woven Fabrics.” *13th World Congress on Computational Mechanics*.
- [5] Gutowski, M., **Palta, E.**, & Fang, H. (2017). “Crash Analysis and Evaluation of Vehicular Impacts on W-Beam Guardrails Placed behind Curbs Using Finite Element Simulations.” *14th U.S. National Congress on Computational Mechanics*.
- [4] **Palta, E.**, Gutowski, M., & Fang, H. (2016). “Performance Evaluation of Steel and Hybrid Armor Plates under Ballistic Impacts.” *12th World Congress on Computational Mechanics*.
- [3] **Palta, E.**, Fang, H., & Weggel, D. (2015). “Ballistic Impact Performance Evaluation of Advanced Combat Helmet Using Numerical Methods.” *13th U.S. National Congress on Computational Mechanics*.
- [2] Gutowski, M., Baker, R., Kuvila, D., **Palta, E.**, & Fang, H. (2015). “Numerical Simulations of Vehicular Impacts on Single- & Double-Faced W-Beam Guardrails on Sloped Median.” *13th U.S. National Congress on Computational Mechanics*.
- [1] Fang, H., Li, N., Gutowski, M., Baker, R., & **Palta, E.** (2014). “Performance Evaluation of 29- and 31-inch W-beam Guardrails behind Curbs under MASH TL-2 Conditions.” *11th World Congress on Computational Mechanics (WCCM XI)*.

FUNDED RESEARCH

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|--|-------------------|
| [6] Evaluation of Bridge Rails for MASH 2016 Compliance
<i>North Carolina Department of Transportation (NCDOT), Project #2019-23. Role: Researcher.</i> | 08/2018 – 08/2019 |
| [5] Risk Assessment of Roadside Utility Structures
<i>NCDOT, Project #2018-24. Role: Researcher.</i> | 08/2018 – 08/2020 |
| [4] Performance of Cable Barriers on 6:1 Slopes under MASH TL-3
<i>NCDOT, Project #2017-13. Role: Researcher.</i> | 08/2017 – 08/2019 |
| [3] Evaluation of Guardrails for MASH TL-4 and TL-5
<i>NCDOT, Project #2015-10. Role: Researcher.</i> | 08/2015 – 08/2017 |
| [2] Performance of W-Beam Guardrails on Divided Freeways
<i>NCDOT, Project #2014-14. Role: Researcher.</i> | 08/2014 – 08/2016 |
| [1] Evaluation of Guardrail Performance Behind Curbs
<i>NCDOT, Project #2013-07. Role: Researcher.</i> | 02/2014 – 07/2015 |

TEACHING EXPERIENCE

Tekirdağ Namık Kemal University

Graduate

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| LÜ-M-19 – Numerical Methods | Fall 2025, 2026 |
| LÜ-M-11 – Advanced Strength of Materials | Spring 2026 |

Undergraduate

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| MKB103 – Engineering Statics | Spring 2024, 2025, 2026 |
| MKB203 – Engineering Dynamics | Summer 2022; Fall 2023, 2024, 2025 |

MKB108 – Introduction to Mechanical Engineering	Spring 2022, 2023, 2025, 2026
MKSB438 – Automobile Body Structural Design (new course developed)	Spring 2022; Fall 2023, 2024
MKB491 – Senior Project	Fall 2021–2026
SYA002 – Numerical Analysis	Spring 2023, 2024
DFD001 – Differential Equations	Spring 2023, 2024
University of North Carolina at Charlotte	
MEGR 3225 – Introduction to Finite Element Analysis (Abaqus lab sections)	Fall 2013, 2014

STUDENT ADVISING AND MENTORING

Fatih Polat, M.S. in Mechanical Engineering expected 2026

Thesis: Mechanical and Microstructural Characterization of DC01 Steel Sheets with Different Thicknesses Joined by Laser and Argon Welding.

Züleyha Karaçam, B.S. in Mechanical Engineering 2025 – 2026

TÜBİTAK 2209-A Undergraduate Research Projects Support Program (competitive national grant). Project: Thermal Aging and High Temperature Strength Analysis of Composite Materials. Role: Advisor.

Undergraduate research and senior design projects supervised in FEA, mechanical testing, and structural design (2021 – present).

HONORS AND AWARDS

The T. Reynolds Graduate Research Fellow, UNC Charlotte Graduate School	2018
Conference Travel Award, UNC Charlotte Graduate School	2018
Outstanding Research Assistant, Dept. of Mechanical Eng., UNC Charlotte College of Eng.	2015
Outstanding Master's Thesis (Engineering), UNC Charlotte Graduate School	2015
Graduate Assistant Tuition Award, UNC Charlotte Graduate School	2014 – 2019
Merit-Based Master's Tuition Award, UNC Charlotte Graduate School	2012

INVITED TALKS

Advancing multi-ply soft armor design through computational analysis of ballistic impact behaviors, <i>Northwest University, China</i>	09/2024
Finite element analysis applications of crash and ballistic impact problems, <i>University of Nebraska–Lincoln, USA</i>	08/2021
Ballistic behaviors of woven fabric-reinforced composites, <i>Abdullah Gül University, Türkiye</i>	07/2020
Ballistic behaviors of woven fabric-reinforced composites, <i>Gebze Technical University, Türkiye</i>	01/2020

PROFESSIONAL SERVICE

Technical and Advisory Roles

External Expert Evaluator, *Belgian Defence-related Research Action (DEFRA), BELSPO & RHID* 2025 – 2026

- Remote peer review of proposals on next-generation ballistic armor steels; contributed to scientific evaluation and funding decisions.

Member and Expert Mentor, *NATO DLANA Program* 2024

- Scientific advisory for NATO-funded research projects; mentorship of early-career researchers in NATO countries.

Technical Expert, *KOSGEB (SME Development Organization of Türkiye), Innovation and Manufacturing Projects* 2021 – present

- Evaluate technical feasibility and merit of industry-led R&D projects; recommend funding and resource allocation.

Member, *EPSRC Peer Review College, UK Research and Innovation* 2022 – present

Editorial and Review Activities

Reviewer: Thin-Walled Structures; Acta Biomaterialia; International Journal of Mechanical Sciences; Applied Composite Materials; Scientific Reports; Results in Engineering; Expert Systems With Applications; International Journal of Computational Fluid Dynamics.

Conference Leadership

Organizing Committee Member, 4th International Congress on Applied Sciences, Engineering, and Mathematics 2023

- Chaired technical sessions on computational mechanics and materials science.

TECHNICAL SKILLS

Computational Mechanics: Nonlinear finite element analysis; explicit dynamics; contact, material failure, and large-deformation modeling; impact and crashworthiness simulations

Modeling and Design: Multiscale and mesoscale modeling; computational model validation against full-scale crash and impact tests; architected-material design

Experimental Mechanics: Quasi-static mechanical testing; digital image correlation; impact testing; material and structural characterization; additive manufacturing

Engineering Software: LS-DYNA; ANSYS; Abaqus; LS-PrePost; Hypermesh; Hyperview; Paraview; Fusion 360

Programming and Data Analysis: MATLAB; Python; Veusz; simulation-data processing and visualization