Exponent®
Engineering & Scientific Consulting

Behnam Ahmadikia, Ph.D.

Senior Associate | Mechanical Engineering
Menlo Park
+1-650-688-7356 | bahmadikia@exponent.com

Professional Profile

Dr. Behnam Ahmadikia specializes in solid mechanics, finite element analysis (FEA), mechanical design, and mechanics of materials. His expertise in simulation couples mechanical behavior with application-specific optimization of a wide range of materials including metallic alloys and composite materials used in applications such as medical devices, aerospace, energy, and utilities. He is also experienced with microstructure characterization techniques (e.g., electron microscopy and crystallography) and experimental methods including mechanical and fatigue testing of structural materials. Dr. Ahmadikia is interested in leveraging state-of-the-art, multi-scale experimental observations with computational methods to perform root cause failure analysis, as well as incorporating machine learning tools to investigate and design high-performance materials for targeted applications. With extensive expertise at the nexus of mechanical engineering and materials science, Dr. Ahmadikia is well-positioned to provide technical solutions to multidisciplinary problems.

Dr. Ahmadikia completed his Ph.D. at the University of California Santa Barbara, where his research focused on developing strategies and computational models for analyzing material behavior with an emphasis on grain-scale deformation mechanisms, such as slip bands and twins. Dr. Ahmadikia's novel simulation technique has resulted in major advancements in identifying and preventing crack-susceptible microstructural features and designing new materials with improved, targeted properties. During his M.S. studies, Dr. Ahmadikia conducted research on fatigue life extension of stainless-steel welded joints via surface modification techniques, such as severe plastic deformation via shot peening. His research leveraged experimental testing and finite element analysis of welding and high-energy impact processes to provide strategies for extending the service life of structures.

In addition to his research at the intersection of mechanical engineering and materials science, Dr. Ahmadikia served an active role in teaching and mentoring undergraduate students at the University of California Santa Barbara. He led a training course on the commercial FEA software Abaqus and assisted with several courses including strength of materials, fluid mechanics, and multi-physics simulation.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, University of California, Santa Barbara, 2023

M.Sc., Mechanical Engineering, Sharif University of Technology, Iran, 2017

B.Sc., Mechanical Engineering, Isfahan University of Technology, Iran, 2014

Academic Appointments

Finite Element Method Lecturer, Department of Mechanical Engineering, University of California Santa Barbara, 2022

Prior Experience

Graduate Research Assistant, Department of Mechanical Engineering, University of California Santa Barbara, 2018-2023

Mentor in Research Mentorship Program (RMP), University of California Santa Barbara, 2022

Teaching Assistant, University of California Santa Barbara, 2017-2018

Professional Affiliations

American Society of Mechanical Engineers (ASME)

Association for Iron & Steel Technology (AIST)

American Society for Metals (ASM International)

Publications

B. Ahmadikia, O. Paraskevas, W. Van Hyning, J.M. Hestroffer, I.J. Beyerlein, and C. Thrampoulidis, “Data-driven texture design for reducing elastic and plastic anisotropy in titanium alloys”, Acta Materialia, 265, 119585, 2024.

B. Ahmadikia, A.L. Beyerlein, J.M. Hestroffer, M Arul Kumar, and I.J. Beyerlein, “Designing Ti-6Al-4V microstructure for strain delocalization using neural networks”, Materials Theory, 8(1), p.4, 2024.

B. Ahmadikia, L. Wang, M. Arul Kumar, I. J. Beyerlein, “Grain Boundary Slip–Twin Transmission in Titanium”, Acta Materialia, 244, 118556, 2022.

B. Ahmadikia, M. Arul Kumar, I. J. Beyerlein, “Effect of Neighboring Grain Orientation on Strain Localization in Slip Bands in HCP Materials”, International Journal of Plasticity, 144, 103026, 2021.

W. Fu, B. Ahmadikia, “Optimizing Knitted-Fiber Reinforced Composite Carabiners”, IOP Materials Science and Engineering, vol. 1044, no. 1, p. 012008. IOP Publishing, 2021.

J. Park, B. Ahmadikia, “Accuracy Analysis of Classical Lamination Theory and Finite Element Method for Fiber Reinforced Composites under Thermomechanical Loading”, IEMENTech, pp. 1-5. IEEE, 2020.

Presentations

B. Ahmadikia, A. L. Beyerlein, I. J. Beyerlein, “Incorporation of Micromechanical Slip Band Modeling and Neural Network to Design a Slip-Transmission-Free Ti-6Al-4V Polycrystal”, TMS 2023 Annual Meeting & Exhibition, San Diego, CA, 2023.

B. Ahmadikia, O. Paraskevas, W. Van Hyning, J. Hestroffer, I. J. Beyerlein, C. Thrampoulidis, “Integrating Data-Driven Techniques with 3D Constitutive Modeling to Design Textures with Nearly Isotropic Elastic and Plastic Properties in Titanium-Based Materials”, The 10th International Conference on Multiscale Materials Modeling, Baltimore, MD, 2022.

B. Ahmadikia, J. C. Stinville, T. M. Pollock, I. J. Beyerlein, “Experimental Characterization and Explicit Slip

Band Micromechanical Modeling of Slip Localization in FCC and HCP Metals", TMS 2022 Annual Meeting & Exhibition, Anaheim, CA, 2022.

B. Ahmadikia, L. Wang, I. J. Beyerlein, "Experimental Characterization and FFT-based Modeling of Heterogeneous Deformation in Commercially Pure Titanium", TMS 2021 Annual Meeting & Exhibition, Orlando, FL, 2021.

B. Ahmadikia, I. J. Beyerlein, "Effect of Grain Orientation on Slip Transmission in Titanium: An Analysis of Strain Localization within Slip Bands", TMS 2021 Annual Meeting & Exhibition, Orlando, FL, 2021.

B. Ahmadikia, A. Nourani, G.H. Farrahi, "Experimental Investigation of the Effect of Severe Shot Peening on High Cycle Fatigue Behavior of a Welded Joint", 18th National Conference of Welding and Inspection (NCWI), Arak, Iran, 2018.

B. Ahmadikia, A. Jalalpour, R. Jafari Nadoushan, O. Izadi, "Meso-scale Modeling of Weft- knitted Fabric Reinforced Composites Using Hexagon Elements", 23rd Annual International Mechanical Engineering Conference, Tehran, Iran, 2015.

Peer Reviews

International Journal of Solids and Structures

Forces in Mechanics