

ABDUL ADAM, PMP

Ph.D. Candidate, Civil & Mechanical Engineering | Structural Adhesives | Polymer Composites | Materials Testing
East Lansing, MI | +1 614 607 9240 | adanabdi@msu.edu | [LinkedIn](#) | abdiadan.com

PROFESSIONAL SUMMARY

Dual Ph.D. candidate (expected Graduation: May 2027) at Michigan State University's Composite Vehicle Research Center specializing in structural adhesive joints, thermoplastic nanocomposites, and rate-dependent mechanical characterization. Hands-on expertise in ASTM-standard mechanical testing, high-speed digital image correlation (DIC), polymer thermal and chemical characterization, and cohesive zone modeling in Abaqus, viscoelastic Constitutive models, backed by industry structural design experience and PMP certification. Seeking Adhesive Engineer, Composite Engineer, and Materials Testing / R&D roles.

CORE COMPETENCIES

Mechanical Testing: Lap shear (ASTM D1002), tensile (ASTM D638), Mode I fracture toughness / DCB (ASTM D5528), drop-weight and intermediate strain rate impact testing, high-speed DIC (GOM Correlate), NDE (air-coupled ultrasound, IR thermography)

Materials Characterization: FTIR, DMA, TGA, DSC, SEM/TEM fractography, rheometry, contact angle, surface preparation, corrosion and adhesion testing

Modeling & Simulation: Abaqus (cohesive zone modeling, rate-dependent plasticity), Ansys, DIGIMAT, LS DYNA, and HyperMesh.

Composites & Manufacturing: VARTM / resin infusion, injection molding, compression molding, thermoforming, CNC machining, thermal spray and electrostatic powder coating, nanoparticle surface functionalization

Software & Programming: MATLAB, Python, SOLIDWORKS, Siemens NX, LaTeX, Microsoft Office

Professional: Project management (PMP) certified, technology commercialization, prior-art and patent analysis, technical presentations, peer review

PROFESSIONAL EXPERIENCE

Composite Vehicle Research Center (CVRC), Michigan State University

Aug 2022 – Present

Graduate Research Assistant II

East Lansing, MI

- Lead research on Fe_3O_4 nanoparticle and milled carbon fiber (MCF) reinforced Elium thermoplastic adhesives for bonded aluminum (Al 6061-T6) joints, from quasi-static to intermediate strain rates; sponsored by GVSC and NCMS.
- Developed a hierarchical, surface-functionalized hybrid adhesive (citric acid- Fe_3O_4 /MCF) that resolves the trade-off between mechanical strength and induction-heating capability, enabling reversible debonding and repair; induction healing recovered **85% of joint strength vs. 54%** for conventional oven healing.
- Characterize adhesive rate sensitivity using an in-house drop-weight fixture with high-speed DIC at 14,000 fps, capturing strain rates up to $\sim 67/\text{s}$; established reliable DIC post-processing workflows in GOM Correlate.
- Build cohesive zone (CZM) and rate-dependent constitutive models in Abaqus, calibrated from bulk ASTM D638 data and validated against independent ASTM D1002 lap shear results; automated tensile data reduction with an adaptive MATLAB fitting algorithm.
- Measured Mode I interlaminar fracture toughness of z-stitched composites (ASTM D5528); Y-direction stitching raised G_{Ic} to 4.72 N/mm vs. 0.77 N/mm baseline (**$\sim 6\times$ improvement**), resulting in an invention disclosure.
- Verified nanoparticle functionalization and failure mechanisms using FTIR, TGA, DMA, and SEM fractography; extending acid-oxidation functionalization of CNT and GNP fillers to ABS nanocomposites.
- Embedded tunable antennas in fiberglass composites via VARTM; performed foam impact testing and NDE (air-coupled ultrasound, IR imaging); led thermal spray and powder coating studies including corrosion and adhesion testing.

MSU Innovation Center, Michigan State University

2026 – Present

Technology Commercialization Intern

East Lansing, MI

- Screen university invention disclosures in materials, composites, and construction technologies for patentability and market potential; deliver written reports and presentations to technology managers.
- Conduct prior-art searches, inventor interviews, and application scouting to support patent filings and licensing strategy.
- Identified new markets and potential industry partners for university technologies beyond their original applications to expand licensing opportunities.

IACMI – The Composites Institute, Winona State University

Summer Fellow

Jun 2025

Winona, MN

- Completed hands-on training in injection molding (PET, PP), thermoforming, compression molding of glass fiber-reinforced thermoplastic plates, and CNC machining.

Larsen & Toubro

Structural Design Engineer Intern

Oct 2021 – Apr 2022

Chennai, India

- Analyzed structural systems in ETABS and verified design compliance with project specifications and codes.
- Performed material assessments and collaborated with senior engineers to optimize design efficiency.

EDUCATION

Michigan State University

Dual Ph.D., Civil Engineering and Mechanical Engineering

East Lansing, MI

Expected May 2027

Dissertation: Multi-Material Bonded Joints Under Intermediate Strain Rates

M.S., Mechanical Engineering

Dec 2024

Anna University (College of Engineering, Guindy)

M.S., Structural Engineering

Chennai, India

May 2021

Annamalai University

B.S., Civil and Structural Engineering

Annamalai Nagar, India

May 2019

Certification: Project Management Professional (PMP), Project Management Institute

Aug 2025

PUBLICATIONS & PRESENTATIONS

- A. Adan**, S. F. Hassan, A. Abdelwahab, M. Haq. "Influence of Functionalized Iron Oxide Nanoparticles on the Mechanical Performance of Thermoplastic Adhesives." *SAMPE 2026*, Seattle, WA, April 27–30, 2026.
- A. Adan**, A. Kuloglu, S. F. Hassan, M. Haq. "Effect of Fe₃O₄ Surface Functionalization on Mechanical–Magnetic Performance of Reversible Thermoplastic Adhesive Joints." Under review.
- B. Avireni, **A. Adan**, A. Kuloglu, M. Haq, P. Chahal. "Glass Fiber Composite Embedded Fabric-based RF Structures for Vehicular Applications." *IEEE Sensors Journal*, under review.
- J. D. Ponsingh, **A. Adan**, J. H. Helena. "The Residual Mechanical Properties of Fire-Exposed Hot-Rolled Structural Steel with Passive Fire Protection." *Engineering Structures*, under review.
- Mechanical Response of Carbon-Based ABS Nanocomposites Across Quasi-Static and Intermediate Strain Rates. SAMPE 2026 Conference Proceedings (Presenter).
- A. Adan**, T. Najam, M. Haq. "Enhancing Thermoplastic Adhesive Joint Performance Through Multiscale Reinforcement Architectures: An Experimental and Cohesive Zone Modeling Approach." Under internal review
- S. Kundurthi, M. Haq, **A. Adan**. "Effective Wall Thickness for Computational Modeling of Polymer Extrusion Additive Manufacturing." *SPE ANTEC 2023*, Denver, CO, USA.
- Invited talks: Literature review methodology in engineering research, East Africa University (2026); Introduction to composite materials, Banadir University (2023).

AWARDS & HONORS

- Distinguished SPE Foundation Scholarship winner** (2023,2025,2026).
- Delta Polymer Award**, 10th Annual Recipient, SPE Foundation (2024–2025), for contributions to polymer research and innovation
- Finalist**, American Society of Composites 4 - minute Doctoral Research Impact Live Competition and winner in 90 – sec video round
- 1st Place (2024) and 3rd Place (2023) Poster Awards**, SPE Auto EPCON Conference

LEADERSHIP & SERVICE

- President**, Society of Plastics Engineers (SPE) Student Chapter, Michigan State University.
- Vice President**, SAMPE Student Chapter, Michigan State University.
- Teaching Assistant**, EGR 102, MATLAB-based introductory engineering course, & Senior-level Structural Analysis class for senior mechanical and civil engineering students at Michigan State University.
- Trained 50+ students in CAD, 3D printing, and mechanical testing; led lab tours and coordinated outreach events.
- Peer reviewer**, SAE International Journal of Aerospace and SAE Journal of Materials and Manufacturing; Full Member, Sigma Xi.
- Conference session moderator**, SPE EPCON (2023, 2024); Hearing Board Member, College of Engineering Student Committee, MSU (2025–2026).