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EDUCATION

Ph.D., Civil, Environmental and Sustainable Engineering
Arizona State University, January 2022 – ongoing (expected graduation: Fall 2026).
Advisor: Dr. Hasan Ozer.
Dissertation Title: Development of Numerical Model for Reflective Cracking in Asphalt Overlays on Jointed Rigid Airport Pavements.

M.Sc., Civil and Environmental Engineering
Sharif University of Technology, September 2018 – March 2021.
Advisor: Prof. Nader Tabatabaee.
Thesis Title: Sustainability Assessment of Preventive Maintenance Plans (Case Study: Slurry Seal and Thin Overlay).

B.Sc., Civil and Environmental Engineering
Isfahan University of Technology, September 2014 – September 2018.

RESEARCH APPOINTMENT

Graduate Research Associate, School of Sustainable Engineering and the Built Environment, Arizona State University. January 2022 – ongoing. Advisor: Dr. Hasan Ozer.
Lead graduate researcher on federally and state sponsored research projects. Responsible for computational fracture mechanics modeling, mechanistic-empirical modeling, large-scale data engineering and analysis, mentoring of undergraduate and graduate students, development of research proposals and technical reports, and internal research-data and analytics infrastructure supporting the research team.

Project Sponsors: Federal Aviation Administration (FAA); Arizona Department of Transportation (ADOT); Southwest Pavement Technology Consortium (SWPT); National Center for Infrastructure Transformation (NCIT).

AREAS OF EXPERTISE

Computational fracture mechanics (three-dimensional Generalized Finite Element Method, finite element analysis); mechanistic-empirical highway and airfield pavement design; reflective, thermal, and durability cracking of asphalt overlays; machine learning; large-scale pavement data engineering and analytics; life cycle and sustainability assessment.

TECHNICAL AND COMPUTATIONAL SKILLS

Programming: Python, MATLAB, C++, Visual Basic (VB); used for large-scale tabular and geospatial data analysis, and development of high-performance and CPU/GPU-based computing workflows.

Computational mechanics: ABAQUS commercial software and development of custom numerical models using Python; used for high-fidelity three-dimensional GFEM/FEM fracture simulation, aircraft moving-load dynamic simulation, and analysis of pavement temperature profile.

Pavement design: AASHTOWare Pavement ME Design, FAARFIELD, and FlexPAVE.

Machine learning and GenAI: ANN surrogate models and object-detection models, RAG systems for research-data retrieval and analysis, and applied large language model workflows.

Road geometric design tools: Civil 3D, OpenRoads.

Traffic simulation tools: PTV Vissim, Synchro.

Tabular data analysis tools: STATA, SPSS.

Geospatial analysis tools: ArcGIS Pro, Google Earth Engine, QGIS.

RESEARCH FUNDING AND PROPOSAL DEVELOPMENT

Contributed as a proposal team member and co-author to the following funded and proposed research efforts:

- White Paper and Proposal for FAA Research Grant, "Design Model for Reflection Cracking in Airport Asphalt Overlays of Rigid Pavements," Federal Aviation Administration. $600,000 (PI: Dr. Hasan Ozer).
- Proposal for AZTI Research Grant, "SPR 797: Assessment of Pavement Mechanistic-Empirical (PaveME) Design Software," Arizona Department of Transportation. $200,000 (PI: Dr. Hasan Ozer).
- Proposal for NCIT Research Grant, "Near Real-time Construction Quality Monitoring and Inspection Protocols using Uncrewed Aerial Vehicles," National Center for Infrastructure Transformation. $150,000 (PI: Dr. Hasan Ozer).

RESEARCH PROJECTS

Design Model for Reflection Cracking in Airport Asphalt Overlays of Rigid Pavements, Phase II
Sponsor: FAA; PI: Dr. Hasan Ozer; Timeline: 2025 – ongoing

Project Description:
Extending the mechanistic-empirical joint reflective cracking model by strengthening the mechanistic framework and establishing transfer functions that incorporate field observations into model predictions. This project is part of the future enhancement of the FAA national airfield design program, FAARFIELD.
Role:
Lead graduate student researcher. Scope of the work includes:

- Development of numerical models using FEM and GFEM to capture effect of AC-PCC debonding and load transfer across the joints on AC overlay life.
- Implementation of the new numerical models into the existing M-E framework for AC overlay design for airfield pavements.
- Supervising and mentoring the other PhD researchers working on this project to establish transfer functions that incorporate field observations into model predictions.
- Writing the project deliverables, such as quarterly and interim reports and meeting slides.

Design Model for Reflection Cracking in Airport Asphalt Overlays of Rigid Pavements, Phase I
Sponsor: FAA; PI: Dr. Hasan Ozer; Timeline: 2021 – 2024
Project Description:
Development of a Mechanistic-Empirical (M-E) thickness design framework for joint reflective cracking in AC overlay for jointed rigid airfield pavements. This project is part of the future enhancement of the FAA national airfield design program, FAARFIELD.
Role:
Lead graduate student researcher. Scope of the work included:

- Development of three-dimensional GFEM-based reflective cracking simulation for asphalt overlays on jointed concrete airfield pavements
- Developing a robust mechanistic framework for a computationally efficient model that simulates fatigue crack propagation in AC in a three-dimensional domain, considering the effect of pavement temperature profile and aircraft dynamic moving load.
- Analysis of the data from the FAA's large-scale testing sections and using it to validate the established numerical framework for prediction of joint reflective cracking.
- Development of a simulation data library (using ASU Sol HPC) and coordinating with research team at University of Illinois at Urbana-Champaign (UIUC) to develop an artificial neural network (ANN) surrogate model for prediction of pavement responses.
- Writing project deliverables, such as quarterly, interim, and final reports and meeting slides.

Assessment of Pavement Mechanistic-Empirical (PaveME) Design Software, ADOT SPR 797
Sponsor: ADOT; PI: Dr. Hasan Ozer; Timeline: 2025 – ongoing

Project Description:
Assessment of PaveME design software and determining the quality of its predictions as a thickness design method for the Arizona highway network.

Role:
Lead graduate student researcher. The scope of work includes:

- Developing the data pipeline to bring ADOT's network information on material properties, pavement construction and maintenance history, traffic, annual pavement performance reports, climate data, and other key design inputs under a homogeneous database.
- Leveraging the compiled data to evaluate the predictions of using PaveME and AASHTO 1993 design methods across the Arizona highway network.
- Performing statistical analysis to determine factors affecting the PaveME and AASHTO 1993 predictions considering the properties of the Arizona highway pavement network (e.g., material properties, climate, geotechnical investigation data, distress survey records, etc.)
- Mentoring and coordination with two PhD student researchers from ASU and the University of Arizona (UofA) to perform the sensitivity analysis of AASHTOWare Pavement ME design models and compiling the geotechnical information on a set of selected sections for analysis in the ADOT highway network.
- Mentoring an undergraduate student researcher to develop an autonomous data pipeline to perform PaveME simulations at large scales, reducing the simulation time.
- Writing the project deliverables, such as technical memorandums and meeting slides.

Assessing the Consumption Costs of Motor Vehicles on Arizona Roads, ADOT SPR 788
Sponsor: ADOT; PI: Dr. Tejo Bheemasetti; Timeline: 2024 – ongoing

Project Description:
Determining the road consumption cost of vehicles for pavement and bridge infrastructure.

Role:
Lead graduate student researcher for pavement-related tasks. The scope of the work includes:

- Analysis of large-scale Weigh-in-Motion dataset to establish the characteristics of vehicles in Arizona's road network for both pavement and bridge related tasks.
- Analysis of ADOT's HPMS, climate, and project history records to establish representative pavement structures for the Arizona highway pavement network.
- Establishing a data pipeline to determine the current pavement structures of Arizona's highway network, leveraging the project history records, pavement coring logs, and HPMS records.
- Performing PaveME simulations and analysis of the results to develop computationally efficient surrogate models for establishing load equivalency factors (LEF) that convert all vehicle categories and their axle configurations into a standard equivalent 18-kip axle load.
- Performing life cycle cost analysis (LCCA) to determine the road consumption cost of standard and overweight vehicles.
- Writing the content related to the pavement analysis task for the project deliverables, such as technical memorandums and meeting slides.

Near Real-time Construction Quality Monitoring and Inspection Protocols using Aerial Thermal Images
Sponsor: NCIT / USDOT; PI: Dr. Hasan Ozer; Timeline: 2025 – ongoing

Project Description:
Enhancing the established framework for application of thermal aerial footage for pavement construction monitoring by increasing its computational efficiency and enhancing the evaluation metrics to achieve near real-time construction quality monitoring.

Role:
Graduate student researcher contributing to the development of the deep learning object detection model to track construction equipment to evaluate the construction quality. The scope of the work includes:

- Developing a segmentation deep learning object detection model to track roller and pavement site that is under construction using thermal images.
- Assisting the lead graduate student researcher (Naaga Vedula) in compiling the project deliverables such as quarterly reports and meeting slides.

- Mentoring an undergraduate computer science student as part of the Vertically Integrated Projects (VIP) program for using ASU's computational resources (Sol and Phoenix HPCs) and development of a deep learning object detection model, and a computationally efficient model training and inference pipeline. Student name: John Rouhana.

Automated Construction Quality Monitoring and Inspection Protocols using Aerial Thermal Images
Sponsor: NCIT / USDOT; PI: Dr. Hasan Ozer; Timeline: 2023 – 2025
Project Description:
Development of an automated framework for construction quality monitoring and evaluation of thermal segregation during paving operations using aerial thermal footage.
Role:
Graduate student researcher contributing to the development of the automated pipeline for analysis of the IR images and calculation of standard indices to evaluate the quality of the construction. The scope of the work included:

- Providing python-based tools to the lead graduate student researcher (Naaga Vedula) for automating the data analysis process.
- Development of a deep learning object detection model for tracking roller movement patterns during the paving operation.
- Contributing to a provisional patent application (ASU disclosure D24-166) and a commercialization pathway for the developed technology and automation.
- Assisting the lead graduate student researcher (Naaga Vedula) in compiling the project deliverables such as quarterly reports and meeting slides.
- Mentoring a college teacher on the development of deep learning object detection models, as part of the NCIT Research Experience for Teachers (RET) program. Teacher name: Leslie Arriaga, Estrella Mountain Community College.

Assessment of Thermal and Durability Cracks in Asphalt Pavements in the Southwest Region
Sponsor: SWPT; PI: Dr. Hasan Ozer; Timeline: 2023 – ongoing
Project Description:
Determining the factors affecting thermally induced wide cracks in Arizona pavements and development of asphalt mixtures that are resistant to it.
Role:
Graduate student researcher contributing to the mechanistic analysis to determine the effect of Arizona climate and mixture properties on wide cracking in AC pavement using FEM modeling. The scope of the work includes:

- Leading the numerical analysis tasks. Development of numerical models using ABAQUS (FEM modeling) to determine pavement responses and its fracture susceptibility due to climate changes in Arizona.
- Developing temperature profiles of various pavement structures against different climate zones in Arizona and comparing them against the temperature of similar pavement structures in other states.
- Leveraging the laboratory mixture test results to enhance the accuracy of the numerical predictions.
- Assisting the lead graduate student researcher (Awais Zahid) in compiling the project deliverables such as quarterly and interim reports, and meeting slides.

Development of Asphalt Concrete Mixture Long-term Aging Protocol Representative of Arizona's Climate Conditions
Sponsor: SWPT; PI: Dr. Hasan Ozer; Timeline: 2023 – ongoing
Project Description:
Development of asphalt mixture long-term aging protocol for the laboratory facilities based on Arizona's climate.

Role:
Graduate student researcher contributing to the mechanistic analysis to determine the variations in asphalt pavements temperature profiles which are among the key factors determining the aging rate of an asphalt concrete mixture. Scope of the work includes:

- Calculation of pavement temperature profile of various pavement structures in Arizona based on local weather station data.
- Assisting the lead graduate student researcher (Awais Zahid) in compiling the project deliverables such as quarterly and interim reports, and meeting slides.

MENTORING AND STUDENT SUPERVISION

Directed research tasks for and mentored undergraduate and graduate students and supported collaborative efforts spanning ASU and research partners at the University of Illinois Urbana-Champaign (FAA-sponsored projects) and the University of Arizona (ADOT-sponsored projects).

- **Onboarding and Research Mentoring of Incoming Ph.D. Students:** Provided onboarding, research direction, and training in computational and numerical methods for new doctoral researchers joining the group. Example mentees: Mehdi Sadeghi, Atakan Ozturk.
- **Supervision of Undergraduate Student Researchers:** Guided undergraduate computer science researchers on various research projects, sponsored by FAA, ADOT, and NCIT. The scope of the work included teaching the students how to leverage Python programming to establish computationally efficient frameworks for data analysis, development of object detection models, utilizing ASU computation resources, including HPCs and ASU-AIR. Example mentees: Chaitanya Nookala, Shivkesh Madasu, Sai Suchendhra Eravathri.
- **Research Experience for Teachers (RET) Mentor:** Mentored a participating educator through the NCIT Research Experience for Teachers program (RET) in Summer of 2024. Name: Leslie Arriaga, Estrella Mountain Community College.
- **Vertically Integrated Projects (VIP) Program:** Mentoring an undergraduate computer science student as part of the Vertically Integrated Projects (VIP) program (supervised by Dr. Hasan Ozer) for using ASU's computational resources (Sol and Phoenix HPCs) and development of deep learning object detection models, and a computationally efficient model training and inference pipeline. Student name: John Rouhana (Spring 2026). Also volunteered to contribute to program for Fall 2026.

TEACHING EXPERIENCE

Teaching Assistant Positions:

Graduate Teaching Assistant, Civil Engineering Materials (CEE 353), Arizona State University. Fall 2023 semester. Instructors: Prof. Narayanan Neithalath and Prof. Michael Mamlouk.
Role: Lab instructor for the CEE 353 laboratory sessions (teaching students how to perform the tests, grading lab reports, and preparing the lab for each session).

Developing Course Project Content:

- Developed technical materials for student course projects for the Airport Pavement Design course (CEE 494), Arizona State University. Spring 2026 semester. Instructor: Dr. Hasan Ozer
- Guest lecturer for Airport Pavement Design course (CEE 494), presenting how to use FAA's pavement design software, FAARFIELD, and the pavement research team's projects for FAA. Spring 2025 and 2026 semesters. Instructor: Dr. Hasan Ozer

VOLUNTEERING PROFESSIONAL SERVICES

- Member of APSE Student Committee. Role: Task Force Chair (2024 – ongoing). President: Dheeraj Adwani, Ph.D. candidate at University of Texas at Austin.
- Member of APSE Task Force on Educational Outreach and Resources. Role: Committee Member and Communication Liaison (2026 – ongoing). Task Force Chair: Saqib Golzar, Assistant Professor, Colorado State University Pueblo.

- Member of APSE Verification and Validation Task Force. Role: co-author of the task force's Verification and Validation Framework Guideline document (2024 – ongoing). Task Force Chair: Angeli Jayme, Assistant Professor, Arizona State University.
- Member of Graduate Student Government (GSG). Role: Research Grant Reviewer (2025 – ongoing).
- **Journal Peer Reviewer:** International Journal of Pavement Engineering, Automation in Construction, Transportation Research Record, Journal of Materials in Civil Engineering, Theoretical and Applied Fracture Mechanics.
- **Conference Peer Reviewer:** Transportation Research Board, International Road Federation.

RESEARCH OPERATIONS AND INTERNAL SERVICES

- **2026 AZTI Summit Event Coordination:** Assisting with the upcoming 2026 Arizona Transportation Research Summit (August 5th).
- **GenAI-Assisted Research Retrieval:** Developed a retrieval-augmented generation (RAG) agent for Dr. Hasan Ozer's research team that enables faster retrieval across the project archives and accelerated data analysis using large language models powered by the ASU-AIR platform. 2026.
- **Technical Deliverable Preparation:** Preparing SWPT consortium quarterly newsletters and technical deliverables. 2026 – ongoing.
- **Coordination of APSE Outreach Booth at ASCE ICTD Conference:** Organized and staffed the booth at the 2025 ASCE ICTD conference in Glendale, Arizona. 2025.
- **Consortium Event Coordination:** Assisting with coordinating workshops and technical forums for the Southwest Pavement Technology Consortium (SWPT). 2023 – ongoing.
- **Conference Support:** Assisted with the organization of the Arizona Pavements and Materials Conference. 2022 – ongoing.
- **Website and Social Media Management:** Managing the SWPT website and LinkedIn page (swpt.asu.edu) and the Pavements and Materials Program website (labs.engineering.asu.edu/pavement). 2023 – ongoing.
- **Conference Session Moderator:** Moderated a session at 2023 IRF Global R2T Conference and assisted with the conference coordination.

HONORS AND AWARDS

- APSE Student Member Award, Academy of Pavement Science and Engineering, 2026.
- 2nd place in SSEBE Graduate Research Symposium Student Poster Competition, 2026.
- SSEBE University Graduate Fellowship, 2026.
- 2nd place in Arizona Pavement Conference Student Poster Competition, 2025.
- SSEBE University Graduate Fellowship, 2025.
- 2nd and 3rd place in Arizona Pavement Conference Student Poster Competition (two separate posters), 2024.
- Support Sky Harbor Coalition Scholarship, WTS Foundation, 2023.
- Dr. Matthew W. Witczak Endowment, Arizona Pavements and Materials Conference, 2022.

PUBLICATIONS

1. Aker, S. N., Zahid, A., **Beheshti, M.**, and Ozer, H. (2026). Exploring the Root Causes of Wide Thermal Cracks in the Southwestern United States. *Infrastructures*, 11(1), 19.
2. Liu, F., Al-Qadi, I. L., **Beheshti, M.**, and Ozer, H. (2026). Machine Learning-Based Predicted Stress Intensity Factor to Estimate Reflective Cracking in Airfield Asphalt Concrete Overlay under Aircraft Loading. *International Journal of Pavement Engineering*, 27(1).
3. **Beheshti, M.**, and Ozer, H. (2025). A Viscoelastic Computational Fracture Mechanics Approach for the Analysis of Thermal Reflective Cracking in Asphalt Overlaid Jointed Concrete Airfield Pavements. *Transportation Research Record*, 2679(12), 823-843.
4. Liu, F., Al-Qadi, I. L., **Beheshti, M.**, and Ozer, H. (2025). Asphalt Concrete Overlay Thermal Reflective Cracking Stress Intensity Factor Prediction Using Machine Learning. *Road Materials and Pavement Design*.

5. Rahman, N., Castro, S., **Beheshti, M.**, Vedula, N. V., Noorvand, H., and Ozer, H. (2025). Development of a Cyclic Fracture Experiment for Characterization of High-Performance Asphalt Concrete Mixes. *Construction and Building Materials*, 491, 142716.
6. Vedula, N., **Beheshti, M.**, Madasu, S., and Ozer, H. (2025). Automated Framework for Evaluating Asphalt Pavement Construction Using UAV Imagery. *Automation in Construction*, 180, 106498.
7. Zahid, A., Rahman, N., **Beheshti, M.**, Alrajhi, A., Rowe, G., and Ozer, H. (2025). Development of an Accelerated Long-Term Aging Protocol for Simulating Asphalt Concrete Mixture Aging in Regions with Extreme Climatic Conditions. *Transportation Research Record*, 2680(1), 101-120.
8. **Beheshti, M.**, Castro, S., Vedula, N., Rahman, N., Al Rawahi, M., and Ozer, H. (2024). Rate Dependent C* Fracture Parameter Using the Optimized Wedge-Split Test Geometry and Vision-Based Automated Crack Tip Detection. *Construction and Building Materials*, 442, 137649.
9. **Beheshti, M.**, Bento, M. H. C., Ramos, C. S., Ozer, H., Duarte, C. A., and Brill, D. R. (2024). Analysis of Reflective Cracking in Asphalt Overlaid Jointed Concrete Airfield Pavements Using the 3-D Generalized Finite Element Approach. *International Journal of Pavement Engineering*, 25(1), 2346291.
10. Liu, F., **Beheshti, M.**, Ozer, H., and Al-Qadi, I. L. (2024). Prediction of Asphalt Concrete Energy Release Rate from Texas Overlay Test Using Machine Learning. *Road Materials and Pavement Design*, 26(2), 441-461.
11. Vedula, N., **Beheshti, M.**, Al-Alawi, O., and Ozer, H. (2024). Thermal Profiling of Asphalt Pavement Construction Using Unmanned Aerial Vehicle. *Transportation Research Record*.

PROFESSIONAL AFFILIATIONS

Academy of Pavement Science and Engineering (APSE); Transportation Research Board (TRB); American Society of Civil Engineers (ASCE).

LICENSES AND CERTIFICATIONS

FAA Unmanned Aircraft Systems (UAS) Remote Pilot License (Part 107), Federal Aviation Administration.