

# Bhaskar Vajipeyajula

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## Education

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- ➡ **Doctor of Philosophy**, Mechanical Engineering  
*Texas A&M University* 2017 – 2021  
Advisors: Dr. Kumbakonam Rajagopal and Dr. Eyad Masad
- ➡ **Master of Engineering**, Mechanical Engineering  
*Texas A&M University* 2014 – 2017  
Advisor: Dr. Robert Handler
- ➡ **Bachelor of Technology**, Mechanical Engineering  
*GITAM University* 2009 – 2013  
Advisor: Dr. Y.V.S.N. Murthy

## Research Experience

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- ➡ **Graduate Research Assistant**  
Department of Mechanical Engineering, Texas A&M University 2017 – 2018  
Advisor: Dr. Kumbakonam Rajagopal
  - Developed a thermodynamic model capturing nonlinear viscoelastic behavior of asphaltic materials
  - Designed experimental protocols to simulate in-field pavement loading conditions in a laboratory setting
- ➡ **Graduate Research Assistant**  
Department of Mechanical Engineering, Texas A&M University 2016 – 2017  
Advisor: Dr. Robert Handler
  - Created a generalized 3D computational module to solve viscoelastic constitutive equations for polymeric solutions
  - Built a spectral solver to study viscoelastic turbulence in low Reynolds number flows
  - Investigated Rayleigh–Bénard convection in non-Newtonian fluid systems
- ➡ **Graduate Research Assistant**  
Department of Mechanical Engineering, Texas A&M University 2013 – 2014  
Advisor: Dr. Partha Mukherjee
  - Studied mechanisms influencing the performance and lifespan of lithium-ion batteries
  - Developed a numerical model to simulate battery degradation under varied charge-discharge cycles

## Funding Experience

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- ➡ **Removable Support Structures for Powder Bed Fusion Metal Additive Manufacturing**  
PI: Dr. Wayne Hung   Co-PI: Dr. Bhaskar Vajipeyajula   Status: Funded   Amount: \$78,000
- ➡ **Understand and Characterizing support Structures for Powder Bed Fusion Metal Additive Manufacturing**  
PI: Dr. Wayne Hung   Co-PI: Dr. Bhaskar Vajipeyajula   Status: negotiation going on   Amount: \$400,000

## ► Experiment-Driven Certification Methods for Energetic Materials Made with Powder Material Extrusion

Co-PI Dr. Bhaskar Vajipeyajula    Status: In preparation    Amount: \$600,000

## Teaching Experience

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### ► Instructional Assistant Professor

Engineering Technology and Industrial Distribution, Texas A&M University    2021 – Present

Courses: MMET 401 (Fluid Power Transmission), MMET 301 (Mechanical Power Transmission)

MMET 281 (Manufacturing and Assembly Processes II), MMET 275 (Mechanics for Technologists), MMET 370 (Thermodynamics for Technologists)

- Redesigned MMET 281, 301, and 401 to enhance student engagement and hands-on learning
- Restructured course content and assessments to better align with program learning outcomes
- Modernized mechanical and fluid power labs to support interactive demonstrations and experiments

### ► Lecturer

Department of Mechanical Engineering, Texas A&M University    2017 – 2018

Course: MEEN 404 (Engineering Laboratory)

- Taught senior-level engineering design studio and mentored student teams in the development of custom experimental equipment
- Supported students in identifying research topics, defining requirements, conducting experiments, and interpreting results

### ► Graduate Teaching Assistant

Engineering Technology and Industrial Distribution, Texas A&M University    2015 – 2016, 2020 – 2021

Courses: MMET 301, 361, 401, 281

- Delivered lecture and lab sessions on fluid and mechanical power transmission systems
- Independently conducted CAD training (ProE, Inventor, SolidWorks) for 240+ students
- Supervised and coordinated undergraduate TAs; co-developed lab manuals and instructional materials

### ► Graduate Teaching Assistant

Department of Mechanical Engineering, Texas A&M University    2018 – 2019

Course: MEEN 464 (Heat Transfer)

- Led lab sessions for undergraduate heat transfer course, reinforcing core thermal principles through hands-on experimentation and problem-solving

## Journal Publications

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- J1. P. Sreejith, A. E. Patterson, K. R. Rajagopal, and **B. Vajipeyajula**.  
**Process-Induced Shrinking and Warping in Additively Manufactured Polycarbonate Plates**, *Applications in Engineering Science*, pp. 100220, 2025.
- J2. J. Beltra Mira, V. Restrepo, **B. Vajipeyajula**, and A. E. Patterson.  
**Effect of Specimen Size, Layout, and Bead Width on the Linear Elastic Fracture Toughness of FFF-Processed Polylactide**, *Engineering Fracture Mechanics*, vol. 315, pp. 110842, 2025.
- J3. S. K. Selvaraj, A. L. Manoj, A. B. Mathew, A. V. Govind, G. Sundaramali, U. Chadha, **B. Vajipeyajula**, and A. E. Patterson.  
**Parameter Optimization for Dissimilar Aluminum Alloys Joined Using Friction Stir Additive Manufacturing: A Screening Study**, *Engineering Reports*, vol. 7, pp. e13039, 2025.
- J4. M. P. Dulanjana, B. Nathan, D. K. Dimuthu, **B. Vajipeyajula**, C. G. Kevin, and S. Isuru.  
**Curve Parametric Modeling of Planar Soft Robots**, *IEEE*, pp. 299–304, 2024.

- J5. J. Beltra Mira, V. Restrepo, **B. Vajipeyajula**, and A. E. Patterson.  
**Impact of Compact Tension Specimen Size on Fracture Toughness of FFF Processed Thermoplastics**, *Procedia Structural Integrity*, Vol. 61, pp. 156–163, 2024.
- J6. **B. Vajipeyajula**, A. Narayan, E. Masad, and K. R. Rajagopal.  
**A Thermodynamic Viscoelastic Model to Capture the Effects of Confinement Pressure on Asphalt Mixtures**, *International Journal of Pavement Engineering*, Vol. 25, 2024.
- J7. **B. Vajipeyajula**, P. Murru, and K. R. Rajagopal.  
**Stress Concentration Due to an Elliptic Hole in a Porous Elastic Plate**, *Mathematics and Mechanics of Solids*, Vol. 28(3), pp. 854–869, 2023.
- J8. **B. Vajipeyajula**, P. Murru, and K. R. Rajagopal.  
**Stress Concentration Due to the Presence of a Rigid Elliptical Inclusion in Porous Elastic Solids Described by a New Class of Constitutive Relations**, *International Journal of Elasticity*, 2023.
- J9. **B. Vajipeyajula**, E. Masad, K. L. Roja, and K. R. Rajagopal.  
**Assessing Permanent Deformation of Reclaimed Asphalt Blended Binders Using Linear and Non-linear Viscoelasticity Theory**, *Materials and Structures*, Vol. 53, 2020.
- J10. K. L. Roja, **B. Vajipeyajula**, and E. Masad.  
**Chemical and Multi-scale Rheological Characterization of Recycled and Virgin Asphalt Binder**, *Construction and Building Materials*, Vol. 261, 2020.
- J11. **B. Vajipeyajula**, E. Masad, K. L. Roja, M. Sadeq, and K. R. Rajagopal.  
**Two-Constituent Nonlinear Viscoelastic Model for Asphalt Mixtures**, *Road Materials and Pavement Design*, July 2019.
- J12. **B. Vajipeyajula**, T. Krishna, and R. Handler.  
**Dynamics of a Single Buoyant Plume in FENE-P Fluid**, *Physics of Fluids*, Vol. 29, 2017.

## Conference Publications & Presentations

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- C1. S. Afolabi, E. Kabir, **B. Vajipeyajula**, and A. E. Patterson.  
**Designing Additively Manufactured Energetic Materials Based on Property/Process Relationships**, *Texas A&M Conference on Energy*, 2024.
- C2. A. E. Patterson and **B. Vajipeyajula**.  
**Designing Manufacturing Systems Under Energy Scarcity in Expeditionary Environments**, *Texas A&M Conference on Energy*, 2024.
- C3. G. Harmon, E. Kabir, **B. Vajipeyajula**, and A. E. Patterson.  
**Mapping Energy Consumption for Powder Material Extrusion Additive Manufacturing**, *Texas A&M Conference on Energy*, 2024.
- C4. J. Beltra Mira, V. Restrepo, **B. Vajipeyajula**, and A. E. Patterson.  
**Impact of Compact Tension Specimen Size on Fracture Toughness of FFF Processed Thermoplastics**, *IWPDPF*, 2023.
- C5. A. E. Patterson, S. Hasanov, and **B. Vajipeyajula**.  
**Influence of Matrix Material on Impact Properties of Chopped Carbon Fiber-Thermoplastic Composites Made Using FDM/FFF**, *ASME*, 2022.
- C6. A. E. Patterson, **B. Vajipeyajula**, and W. R. Norris.  
**System Architecture and Design Parameters for Extrusion-Based Autonomous Construction Systems**, *ASME*, 2022.

- C7. B. Vajipeyajula**, E. Masad, K. L. Roja, and K. R. Rajagopal.  
**Permanent Deformation of Reclaimed Asphalt Blended Binders Using Nonlinear Viscoelastic Theory**, *AM3P*, 2020.
- C8. K. L. Roja, B. Vajipeyajula**, and E. Masad.  
**Multi-Scale Evaluation of Asphalt Binders Containing Different Proportions of Reclaimed Asphalt Pavement**, *RILEM – ISBM Lyon*, 2020.

## Papers in preparation

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- P1.** Impact of matrix material on the flexural strength of the additively manufactured polymeric parts.
- P2.** Density-driven model to analyse fatigue and failure initiation in PDMS

## Award Nominations

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- APT Provost faculty fellow- Nominated by College of Engineering -2024
- COE Engineering Teaching Impact Award- Nominated by the college of engineering -2024
- COE Engineering Teaching Impact Award- Nominated by Department of ETID -2024

## Technical Skills

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### Programming Languages:

C   C++   Fortran   Python

### Simulation and Analysis:

ANSYS Fluent   Abaqus   COMSOL

### CAD and Modeling:

SolidWorks   Pro-E   Creo

### Other Tools:

MATLAB   LabVIEW   Automation Studio

## Student Mentoring

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### Graduate Students (Master's):

- Michael James Townsend — Texas A&M(2022–2023)
- Jose Maria Beltra Mira — Texas A&M (2022–2023)
- Cody Tew — Texas A&M (2022–2023)
- Saranya Gunasekar — Texas A&M (2023–2025)
- Jonathan Sanchez - Texas A&M (2023-2025)

### Undergraduate Students:

- Arden Sinclair, Rhett Lee, Aren Davis, Sebastian Salazar, Henry Harshfield, Devin Hooper, Danny Tran, Rodrigo De La Cabada, Yu-Tien Ku — Texas A&M (2022)
- Adam Ledoux, Duy Pham, Cole Shannon — Texas A&M (2023)

## Leadership and Service

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### Academic Peer Reviewer:

- *Theoretical and Applied Fracture Mechanics* (2025-Present)
- *Journal of Physics of Fluids* (2018–Present)

- ▣▣▣ *International Journal of Pavement Engineering* (2022)
- ▣▣▣ *ASME International Additive Manufacturing Conference* (2022)
- ▣▣▣ *Advances in Materials and Pavement Performance Prediction* (2021–Present)

**Departmental Service — ETID, Texas A&M University:**

- ▣▣▣ ABET Review Committee Member (2022)
- ▣▣▣ Student Activity Committee Member (2022)
- ▣▣▣ Scholarship Committee Member (2023)
- ▣▣▣ Accessibility Liaison (ADA Title II) (2025)