



Newsletter for January 2026
Department of Mechanical Engineering
Dayananda Sagar University
Bengaluru-562112



Dr. Shashidhar L. C.



Dr. Saravana bavan



Dr. Rajeev Kumar Gupta

Dr. Shashidhara L. C. (Assistant Professor) along with **Dr. Saravana Bavan** (Professor) and **Dr. Rajeev Kumar Gupta** (Assistant Professor), Mechanical Engineering Department have published a Q1 research article in the reputed Elsevier journal Theoretical and Applied Fracture Mechanics (Volume 143, 2026). The study examines the mixed-mode (I/II) fracture behaviour of banana fiber reinforced epoxy composites using asymmetric semi-circular bend specimens, providing experimental and criterion-based insights into fracture toughness and crack initiation. DOI: <https://doi.org/10.1016/j.tafmec.2025.105433>

Theoretical and Applied Fracture Mechanics is a high-ranking Q1 Elsevier journal focusing on the mechanics of materials and structures under various loading conditions. With an impact factor of 5.7 and a Cite Score of 8.4, the journal is highly regarded for publishing impactful research in fracture mechanics, stress intensity factors, and fatigue, underscoring the significance of this publication.



Mixed-mode(I/II) fracture behaviour and criterion-based analysis of banana fiber reinforced epoxy composites using asymmetric SCB specimens

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ARTICLE INFO

Keywords:

Banana fiber-epoxy composites
Mixed mode fracture toughness
Asymmetric semi-circular bend (ASCB)
Crack initiation angle

ABSTRACT

This work investigates the mixed-mode (I/II) fracture behaviour of banana fiber-reinforced epoxy composite using asymmetric semi-circular bend (ASCB) specimens. Laminates were fabricated via hand layup-assisted vacuum bag moulding, with banana fibers integrated into an epoxy matrix. Three-point bending tests were conducted on ASCB specimens (radius 60 mm, thickness 6 mm, and notch length 30 mm) under varying asymmetric support spans (40–40 mm to 40–20 mm) to transition from pure mode I to mixed-mode I/II loading. Results showed a non-monotonic mode I fracture toughness (K_{Ic}) trend (1.70 MPa·m^{1/2} decreasing to 1.54 MPa·m^{1/2}, then increasing to 1.92 MPa·m^{1/2}) and rising mode II fracture toughness (K_{IIc}) (0.30 to 0.87 MPa·m^{1/2}) with increasing mode II contribution, attributed to fiber-matrix interactions.

Experimental results were compared with analytical predictions based on the Power Law, maximum tangential stress (MTS), generalized maximum tangential stress (GMTS), and maximum energy release rate (G_{max}) criteria. The Power Law criterion underestimated fracture resistance failing to capture constraint effects and fiber-related toughening. Incorporation of T-stress in the MTS and GMTS models improved predictions, though both over-estimated crack initiation angles. Among the compared criteria, G_{max} provided the closest correlation with crack initiation angles (0° to −17.26°), highlighting its suitability for natural fiber composites. Overall, the findings reveal a strong dependence of mixed-mode fracture behaviour on fiber-matrix interaction mechanisms, confirming the suitability of energy-based criteria for accurately modelling the fracture response of anisotropic natural fiber composites.

1. Introduction

The increasing demand for sustainable and eco-friendly materials in engineering applications has driven significant research into natural fiber-reinforced composites (NFRCs), which offer a renewable and biodegradable alternative to synthetic fiber-based composites [1–3]. As industries increasingly prioritise environmental sustainability, NFRCs have gained attention for their potential applications in automotive, construction and aerospace sectors [4,5]. Among the various natural fibers, banana fibers derived from the pseudo-stem of the *Musa* species have emerged as a promising reinforcement material due to their

abundance, low cost, lightweight nature, and favourable mechanical properties [6,7]. However, the fracture behaviour of these composites remains a relatively unexplored area, particularly under mixed-mode (I/II) loading that plays a vital role in determining their structural reliability.

The resistance to crack propagation under the mechanical loading is characterised by a material property known as fracture toughness. Based on the nature of stress at the crack tip, there are basically three basic modes of fracture: mode I (Tensile load), mode II (Shear load) and mode III (Tearing load). While the numerous studies have investigated the fracture behaviour of banana fiber composites under pure tensile

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<https://doi.org/10.1016/j.tafmec.2025.105433>

Received 29 October 2025; Received in revised form 20 December 2025; Accepted 30 December 2025

Available online 2 January 2026

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Dr. Shashidhar L. C.



Dr. Naseem Khayum

Faculty member from the **Department of Mechanical Engineering**, **Dr. Shashidhar L C** and **Dr. Naseem Khayum** attended the **TechPulse FY26 Faculty Development Program (FDP)** organized by **Tata Technologies**, held from **19th to 23rd January 2026** at Tata Technologies, **Hinjewadi Phase-1, Pune**. This five-day FDP was conducted as part of Tata Technologies' early engagement initiative aimed at strengthening academia-industry collaboration and bridging academic learning with industry-relevant technologies. The program facilitated meaningful interaction with industry experts and provided valuable insights into current industrial practices.

Under the **Mechanical Engineering track**, the FDP covered **Automotive Engineering Essentials** and **Automotive Engineering and Simulation Fundamentals**. The sessions focused on contemporary automotive systems, engineering workflows, and simulation-based approaches widely used in the automotive industry. Participation in this FDP enhanced practical understanding of emerging technologies and industry processes, which will contribute to curriculum enrichment, improved teaching-learning methodologies, and better alignment of academic programs with industry expectations.







Dr. Ravitej Y P

Dr. Ravitej Y P, Assistant Professor, Mechanical Engineering Department, DSU participated in the AICTE Training and Learning Academy (ATAL)–sponsored One Week Faculty Development Programme on “**Application of Artificial Intelligence & Machine Learning Techniques in 3D Printing for Next-Gen Materials & Industry 4.0/5.0**”, held from **19–24 January 2026** at **K. S. Institute of Technology, Bengaluru**. The FDP provided in-depth exposure to emerging AI–ML tools applied to additive manufacturing, smart materials, and advanced mechanical engineering applications. Through expert lectures, interactive sessions, and practical discussions, the programme strengthened interdisciplinary knowledge and enhanced research and teaching capabilities aligned with Industry 4.0/5.0 trends.

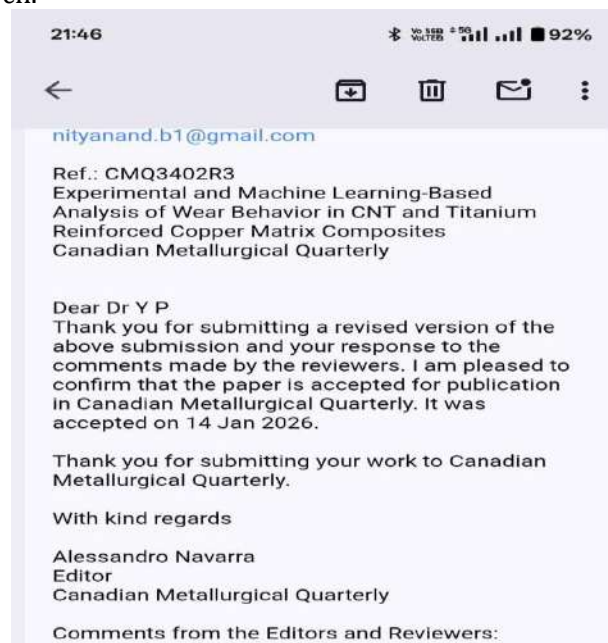




Dr. Manish Kumar Mishra,
Assistant Professor

Department of Mechanical Engineering

Two research papers have been successfully accepted for publication in reputed international journals. The paper titled "*Experimental and Machine Learning-Based Analysis of Wear Behavior in CNT and Titanium Reinforced Copper Matrix Composites*" has been accepted in **Canadian Metallurgical Quarterly (Q2 journal)** on 14 January 2026. Another paper titled "*Fractional-Order Modeling of Pneumonia Dynamics: A Novel Approach to Disease Impact Analysis*" has been accepted in the **Journal of Difference Equations and Applications (Q2 journal)** on 24 January 2026. Both publications were accepted after rigorous peer review, highlighting the quality and impact of the research.



Journal of Difference Equations and Applications - Decision on Manuscript ID GDEA-2025-0191.R2

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Journal of Difference Equations and Applications <onbehalf@manuscriptcentral.com>
Reply-To: setayd@trinity.edu
To: manish0546@gmail.com

Sun, Jan 25, 2026 at 3:58 AM

24-Jan-2026

Dear Dr Manish Kumar Mishra,

Ref: Fractional-Order Modeling of Pneumonia Dynamics: A Novel Approach to Disease Impact Analysis

Our referees have considered your paper and are pleased to accept your paper in its current form for publication in Journal of Difference Equations and Applications which will now be forwarded to the Production Editor for copy editing and typesetting.

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Thank you for your contribution to Journal of Difference Equations and Applications and we look forward to receiving further submissions from you.

Sincerely,
Dr. Elaydi
Editor in Chief, Journal of Difference Equations and Applications
setaydi@trinity.edu



Dr. Ravitej Y P



Dr. Rajeev Kumar Gupta

Dr. Ravitej Y P and Dr. Rajeev Kumar Gupta, Assistant Professor, Mechanical Engineering Department have published **two book chapters with Springer Nature** in the volume *Smart Materials and Manufacturing Technologies for Sustainable Development (SME 2025)*. The chapters present experimental investigations on the **wear behavior of aluminum-based metal matrix composites** fabricated using stir casting techniques. One study focuses on **LM13/Zircon/Carbon hybrid composites**, employing statistical analysis to identify the influence of reinforcement content on wear characteristics. The second chapter examines the **impact of wear parameters and heat treatment on Al7075-AlN composites**, demonstrating enhanced wear resistance in heat-treated materials. These contributions highlight Dr. Ravitej's research in **advanced materials, tribology, and sustainable manufacturing technologies**.

They also published a research article in the *European Journal of Materials* on optimizing Al7075-AlN composites. The study integrates experiments, statistical analysis, and machine learning to enhance heat-treatment parameters and improve composite performance.

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Experimental and Statistical Approach to the Evaluation of Chill Cast LM13/Zircon/Carbon Hybrid Composites' Wear Characteristics

Conference paper | First Online: 02 January 2026
pp 101–119 | [Cite this conference paper](#)



Smart Materials and Manufacturing...
(SME 2025)

Y. P. Ravitej, N. Abhijith, B. V. N. Ramakumar, Kramtikumar Kshaurad, M. Girish Prasad, Rajeev Kumar Gupta, Balachandra Halimani, Jayathirthe Patil, C. A. Vinay, L. C. Shashidhara & Arun Ananthanarayanan

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4 Accesses

Abstract

The wear of LM13 composites supplemented with different weight percentages of carbon and zircon is investigated in this work in relation to contact pressure, sliding speed, sliding distance, and zircon content. To ensure unidirectional solidification, stir casting was used to create the composites, and wear characteristics were assessed at the chill end. The composite containing 9% weight zircon showed the lowest wear rate, according to dry sliding wear testing. In general, wear rose as sliding distance, sliding speed, and contact pressure increased. Zircon content had the biggest impact on wear performance out of all the variables. Analysis of surface morphology revealed delamination and grooves, especially in composites with lower amounts of reinforcement.

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Impact of Wear Parameters and Heat Treatment on the Wear Rate of Aluminum Alloy/Al Nitride Composite: An Experimental Approach

Conference paper | First Online: 02 January 2026
pp 81–99 | [Cite this conference paper](#)



Smart Materials and Manufacturing...
(SME 2025)

Y. P. Ravitej, T. L. Annappaorn, Baktul Tlak Chandra, M. Girish Prasad, Rajeev Kumar Gupta, Kramtikumar Kshaurad, G. N. Thirumala, L. Deva, Shashank A. Gbakhale & Punith S. Kalyankar

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Abstract

This study examines the wear behavior of Al7075 aluminum alloy reinforced with varying weight percentages (2–8 wt%) of aluminum nitride (AlN), produced through stir casting. Both heat-treated and non-heat-treated specimens were tested under different wear conditions by independently varying the applied load, sliding velocity, and sliding distance. The findings indicate that the wear rate increases with greater load and sliding distance, but decreases at higher sliding velocities. Heat-treated composites demonstrated enhanced wear resistance compared to their non-heat-treated counterparts, which is attributed to improved microstructural stability. Mass loss measured wear, and worn surfaces were analyzed using optical microscopy and XRD. A composite connecting rod was fabricated from the optimized composition and examined for microstructural integrity. The findings confirm that AlN reinforcement and heat treatment effectively enhance the wear performance of Al7075 composites.



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Research Article

Heat Treatment-Driven Optimization of Al7075-AlN Composites: A Synergistic Approach Using Experiments, Statistics, and Machine Learning

Ravitej Y P, Annapoorna T L, Batluri Tilak Chandra,
Rajeev Kumar Gupta, Bashir Asdaque,
KrantiKumar Ksharad, ...show all

Received 13 Jun 2025, Accepted 30 Dec 2025, Accepted
author version posted online: 06 Jan 2026

“ Cite this article



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Dr. Ravitej Y P

Dr. Ravitej Y P published a research article in the *Canadian Metallurgical Quarterly* investigating the wear behaviour of CNT- and titanium-reinforced copper matrix composites. The study combines experimental investigations with machine learning models to accurately predict wear performance and understand reinforcement effects on tribological properties.

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Research Article

Experimental and machine learning-based analysis of wear behaviour in CNT and titanium reinforced copper matrix composites

Y. P. Ravitej  , Sripad Kulkarni, N. Subramani, B. V. N. Ramakumar, H. L. Vinayaka, Prabhakar Kuppahalli, [...show all](#)

Received 22 Oct 2025, Accepted 14 Jan 2026, Published online: 27 Jan 2026

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Dr. Saravana Bavan D
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Dr. Vinayak B Hemadri
Professor
Mechanical Engineering
Department



Prof. Abhijith N Assi
Professor
Mechanical Engineering
Department



Prof. Karthik S B
Assistant Professor
Mechanical Engineering
Department

Dr. Saravana Bavan D, Dr. Vinayak B Hemadri, Prof. Abhijith Nand Prof. Karthik S B, Mechanical Engineering Department of Dayananda Sagar University, Bengaluru successfully participated in a Five-Day Faculty Development Programme titled *"Next-Gen EV Innovation: A Holistic Blend of Mechanical Design, Electrical Systems, and Artificial Intelligence"*, conducted from **19th to 23rd January 2026** at **BMS Institute of Technology & Management, Yelahanka, Bengaluru**. The programme focused on emerging trends in electric vehicle technology, integrating mechanical engineering principles, electrical and electronics systems, and AI-driven innovations. His active participation enhanced interdisciplinary knowledge and strengthened practical insights into next-generation EV design and development.

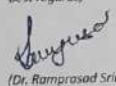






Dr. Vinay M S

Dr. Vinay M S, Assistant Professor, Department of Mechanical Engineering, participated in the **First International Conference on Advances in Computational and Experimental Approaches in Aerostructures (ICACEAA-2025)** held from **18-20 December 2025** at **CMS Business School, JAIN (Deemed-to-be University), Bengaluru**. The conference was organized by the **Faculty of Engineering and Technology, JAIN Global Campus** and focused on emerging research in **computational and experimental aerostructures, composite engineering, additive manufacturing, and aerospace engineering**.

 JGI JAIN FACULTY OF ENGINEERING AND TECHNOLOGY JAIN Global Campus, Jakkasandra Post, Hanakoppa Taluk, Ramnagara District, Bengaluru, Karnataka, India - 562112 INTERNATIONAL CONFERENCE ON ADVANCES IN COMPUTATIONAL AND EXPERIMENTAL APPROACHES IN AEROSTRUCTURES ICACEAA-2025 18th-20th December, 2025 Venue: CMS Business School, JAIN (Deemed-to-be University), No.17, Sesadri Road, Gandhi Nagar, Bengaluru - 56009	
PATRONS: Dr. Chandra Roychand Chancellor, JAIN, India Dr. Samir V Kamat Chairman, DRDO, India Dr. V.K. Arora Former SA to RM, DRDO, India Dr. S. Somnath Former Chairman, ISRO, India CONFERENCE CHAIRS: Prof. B. Dattaguru Miles Endowment Chair JAIN (Deemed-to-be University) Chair: Dr. Sundararajan Expert, JGI Steering Board CONFERENCE CO-CHAIR: Dr. T.S. Raju Former NASA-LARC, USA Dr. S.A. Hariprasad Dean-Academics JAIN (Deemed-to-be University) INTERNATIONAL STEERING COMMITTEE: Chairman: Dr. C.G. Krishnaswami Former Chairman, HAL & Former Chancellor, JAIN, Bengaluru Co-Chairman: Prof. P.D. Mangalgi Professor, Department of Aerospace Engg. JAIN (Deemed-to-be University) CONFERENCE SECRETARIES: Prof. S. Ramprasad Professor, Department of Aerospace Engg. JAIN (Deemed-to-be University) Prof. Sudhir Sastry Y.B. Professor, Department of Aerospace Engg. JAIN (Deemed-to-be University) ORGANISING COMMITTEE: Chair: Prof. Boonikumar N Department of Aerospace Engg. JAIN (Deemed-to-be University) Co-chair: Mr. M.S. Parwanath Director-Projects and Facilities, JGI, Bengaluru CONFERENCE CONTACT: E-mail: jain.intconf2025@gmail.com Website: https://www.jainuniversity.ac.in/ icaceaa-2025/	Date: 20-12-2025 Place: Bangalore From Dr. Ramprasad Srinivasan Organising Secretary, ICACEAA-2025 Professor, Aerospace Engineering Dept., Global Campus, New Jakkasandra Post, 45th KM, NH-209, Kanakapura Taluk Ramanagara District, Bengaluru - 562112 Email: ramprasad.srinivasan@jainuniversity.ac.in, jain.intconf2025@gmail.com Mob:9611895734 To Whomsoever it concerns, Sub: ICACEAA-2025 Conference participation letter Dear Sir/Madam, This is to bring to your notice that <u>Dr. Vinay M S</u> has participated in the First International Conference on Advances in Composite, Engineering, Additive & Aerospace (ICACEAA-2025), from 18th to 20th December 2025, at CMS Business School, under the aegis of JAIN (Deemed-to-be University), Bengaluru. The official certificate of participation will be sent via email in a few days' time. Kindly get in touch with me via email / phone in case of any queries. Best regards,  (Dr. Ramprasad Srinivasan)