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List of Publications

1. **A. Tiwari**, S.K. Panda, Fracture energy of CNT/epoxy nanocomposites with progressive interphase debonding, cavitation, and plastic deformation of nanovoids, ***Fatigue Fract. Eng. Mater. Struct***. 46 (3) (2023) 1170-1189. https://doi.org/10.1111/ffe.13929.
2. **A. Tiwari**, S.K. Panda, Magnetic field induced alignment of graphene nanoplatelets in epoxy resin to develop model nanocomposite, ***J. Compos. Mater***. 57 (15) (2023) 2451–2466. https://doi.org/10.1177/00219983231172063.
3. **A. Tiwari**, S.K. Panda, S.K. Shaw, Experimental characterization optimizing the alignment parameter for GNP epoxy base nanocomposite via a weak DC magnetic field, ***Polym. Adv. Technol***. 2023;34(10):3164-3182. https://doi.org/10.1002/PAT.6137.

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Highly skilled and Experienced **Mechanical Researcher** with expertise in **Multi-Scale** and **Multi-Mechanism Analytical Modeling**, **Micromechanics** as well as **Experimental** and **Computational Fatigue** and **Fracture Analysis**. Proficient in various testing methods like K_{IC}, G_{IC}, ***CTOD***, ΔK_{th} , ΔG_{th} & ***da/dN***. Strong technical skills in **Modeling**, **Software** applications, **Fabrication** techniques, materials **Characterization**, and **Testing**. Published researcher with notable contributions. Effective in **Teaching** and **Mentoring** engineering students. Diligent, versatile, with a passion for engineering and **Hindustani Classical Music**. Eagerly pursuing challenging opportunities to lead innovation in **Structural Material Research, Design, Development, and Engineering**.

COURSES & TEACHINGS

ENGINEERING MECHANICS | ENGINEERING DRAWING | CAD | MACHINE DRAWING | MECHANICS OF SOLIDS | MACHINE DESIGN | THEORY OF MECHANISMS | DYNAMICS OF MACHINES | FATIGUE & FRACTURE MECHANICS | MECHANICAL VIBRATIONS | FINITE ELEMENT METHOD | THEORY OF ELASTICITY | THEORY OF PLASTICICTY | THEORY OF PLATES AND SHELLS ADVANCED COMPOSITES MATERIALS

SOFTWARE SKILLS

AUTOCAD | SOLIDWORKS | COMSOL MULTI-PHYSICS | MS OFFICE | IMAGEJ | ORIGINPRO

PROGRAMMING SKILLS

PYTHON | MATLAB

MODELING SKILLS

MICROMECHANICS | MULTI-SCALE & MULTI-MECHANISM ANALYTICAL| COMPUTATIONAL

EXPERIMENTAL DESIGN & TESTING

TENSILE | COMPRESSION | FLEXURAL | FRACTURE | FATIGUE & FCGR | VIBRATIONS & DYNAMIC | 2D DIC | NDT | COD GAUGES | STATIC & DYNAMIC STRAIN ANALYSIS|

CHARACTERIZATION

XRD | TGA | FTIR | DSC | DMTA | AFM | XPS | BET | SEM | TEM | VSM RAMAN | DLS |FRACTOGRAPHY | 3D ROUGHNESS

EDUCATION

Degree/Course	Year	CPI/ %
Ph.D. in Machine Design in Mechanical Engineering, IIT(BHU), Varanasi, UP, India	**2016-2023**	**7.60**
B. Tech in Mechanical Engineering, Dr. A.P.J. Abdul Kalam Technical University, UP, India	**2010-2014**	**76.30**
12th (Physics, Chemistry, Mathematics, English, Hindi) Board of High School and Intermediate Education U.P.	**2007-2009**	**80.80**
10th (Sci., Mathematics, Social Sci., English, Sanskrit, Hindi) Board of High School and Intermediate Education U.P.	**2005-2007**	**75.50**

ACHIEVEMENTS

- Scholarship from **Ministry of Education (MoE)**, **GoI** for Ph.D.
- Earned a **Three-Year Diploma** in **Hindustani Classical Music (*Vocal*)** from **BHU** to learn fundamentals of **Sur** (notes), **Taal** (rhythm), and **Raag** (melody).
- **Top 6** overall in Institute and **Top 2** in B. Tech Course.
- **Merit-Cum-Means (MCM) Scholarship** as an undergraduate fee waiver.
- **1st** ranked in the General Science competition among all students in the Institute.

PUBLICATIONS

- **Tiwari A**, Panda SK, "Fracture energy of CNT/epoxy nanocomposites with progressive interphase debonding, cavitation, and plastic deformation of nanovoids ", **Fatigue & Fracture of Engineering Materials & Structures.** 46(3) (2023) 1170-1189, DOI: https://doi.org/10.1111/ffe.13929**.**
- **Tiwari A,** Panda SK, "Magnetic field induced alignment of graphene nanoplatelets in epoxy resin to develop model nanocomposite", **Journal of Composite Materials:** 57(15) (2023) 2451–2466 DOI: https:/doi.org/10.1177/00219983231172063.
- **Tiwari A**, S.K. Panda, S.K. Shaw Experimental characterization optimizing the alignment parameter for GNP epoxy base nanocomposite via a weak DC magnetic field" **Polymers for Advanced Technologies** 34(10) (2023) 3164-3182, *DOI:* https://doi.org/10.1002/PAT.6137
- S Behera, RK Gautam, S Mohan, **Tiwari A**. Experiment investigation and analysis of fish scale reinforced polymer composite materials. **Progress in Rubber, Plastics and Recycling Technology**. 2023;0(0). DOI: 10.1177/14777606231175921

INTERNATIONAL CONFERENCES

- **ITAS 2023: International Conference on Innovation and Technological Advances for Sustainability** *University of Doha for Science and Technology, Doha,* ***Qatar***
- **ICRACM-2019: International Conference on Recent Advances in Composite Materials,** *IIT (BHU), Varanasi, UP,* ***India***

Ph.D. DISSERTATION

Title: **Fatigue and Fracture Analysis of Graphene and CNT Epoxy Nanocomposites**

- Harmonized the relevance of the **Nano**, **Micro**, and **Macro-scale Stress** and **Strain** for Cylindrical **RVE**.
- Modeled a **Multi-scale and multi-mechanism** approach to assess the **fracture energy** of **CNT** epoxy nanocomposites.
- Expertise in **Sample Preparation** of **nanocomposites** with experience of **CNC** Machining, Conventional Machining, **Wire EDM**, RTV silicon mold Metal surface polishing, **Spin Coating**.
- Proficient in the fabrication of **FRP composites** Specimen using Hand Layup, Resin Transfer Molding (RTM), Autoclave Molding, Vacuum Bagging, and Spray Up techniques.
- Advanced Testing Proficiency with **Instron** 3367 **static** & Instron 8801 **fatigue testing**, along with Bluehill® Universal, FastTrack2 Console, MAX, LabVIEW™, LCF3 Console software for Dynamic & Quasi-static tests, meeting fatigue & fracture mechanics for **CT** & **SENB** specimen.
- Experience in **vibrations** and **dynamics** analysis using **Spectral** Dynamics' Electro Dynamic **Shaker**, as well as proficiency in utilizing the **DEWESoft SIRIUS FTT** analyzer.
- Skilled in materials characterization through a variety of techniques, including **XRD, TGA, FTIR, DSC, DMTA, AFM, XPS, BET, SEM, TEM, VSM, Raman Spectroscopy, DLS, Optical Microscope** and **Viscoelastic Rheology Analysis**.
- Evaluated the **Fracture Properties (Stress Intensity Factor K_{IC}, Strain Energy Release Rate G_{IC})** and **Failure Behavior** (*Young's Modulus, Yield Strength , Ultimate Tensile Strength (UTS), Strain, Toughness, Tensile Strength, Compressive Strength and Compressive Youngs Modulus*) of the GNP epoxy nanocomposites using **ASTM D638**, **ASTM D695, ASTM D5045-99** and **ASTM E647** testing standards along with **Static** & **Dynamic Extensometers** (**2630-112** & **2620-602**) as well as **COD Gauges** (**2670-116**) on **Instron 8801** fatigue testing UTM .
- Analyzed the **Crack Tip Opening Displacement (CTOD)** to assess fracture properties in GNP epoxy nanocomposites, track **Crack Growth** in plastic fracture analysis, and determine material susceptibility to brittle fracture in fracture mechanics. **Crack propagation** and **stress analysis** through Digital Image Correlation (**2D DIC**)
- Conducted an analysis of **Threshold Cyclic Fatigue Properties** (ΔK_{th} and ΔG_{th}), ***da/dN***, **Life Cycle**, and the constants of the **Paris law** for Graphene epoxy nanocomposites based on **ASTM D5045-99** and **ASTM E647**.
- Conducted an analysis of **Fatigue** and **Fracture Surfaces** morphology and **roughness parameters** using **SEM, Stereo Zoom Optical Microscopy**, and **AFM** to elucidate the mechanisms influencing **Crack Initiation**, **Crack Growth**, **CTOD**, **Fatigue Crack Growth Rate Resistance (FCGR)**, as well as **Intrinsic** and **Extrinsic Fatigue** and **Fracture Toughening Mechanisms** in GNP epoxy nanocomposites.

INTERNSHIPS

- **Fatigue Testing Laboratory, Research Designs and Standards Organization RDSO, Lucknow May 2013-July 2013**
- **Vibration / Shock Test System, Hindustan Aeronautics Limited (HAL), ASERDC, Lucknow May 2012-July 2012**

TEACHING, WORK EXPERIENCE AND POSITIONS OF RESPONSIBILITY

- **6 years** of work experience in **Solid Mechanics laboratory** at **IIT (BHU), Varanasi, India**. **2017-2023**
- Monitored 24 **graduate**, 10 **Integrated Dual Degree**, 11 **postgraduate**, and 5 **PhD** students in various aspects of composites research, including fabrication, characterization, mechanical properties analysis, DIC analysis, design software utilization, and micromechanics modeling for their research projects
- **4-years** of mechanical engineering **Teaching Experience**, specializing in **Machine Design Courses** and **Laboratory Sessions** for **Undergraduate** classes of **120** students and **Postgraduate** classes of **18** students.
- **1-year of** experience in Teaching Mechanical Engineering**,** specializing in **Machine Design Courses** and **Conducting Laboratory Sessions** for classes of 90 undergraduate students each**. SRM University, Lucknow 2015-2016**

PERSONAL INFORMATION

- **DOB:** 04/08/1992, **Nationality:** Indian **Language Proficiency:** English, Hindi
- **Address:** S/O Surendra Nath Tiwari, Village & Post Office Naurangia, District Kushinagar, UP, India-274305

Supervisor

- **Dr. S. K. Panda**, Professor, Mechanical Engineering, IIT (BHU), Varanasi, UP, India skpanda.mec@iitbhu.ac.in