Dr. Deepak Kumar

Curriculum Vitae

"Gain Knowledge, Help Human Being" - Deepak Kumar

Education

2012–2015 **Doctor of Philosophy**, *Gyeongsang National University*, Jinju, South Korea, *GPA – 4.06*.
Specialized in Aerospace Engineering

2008–2010 **Master of Engineering**, *Birla Institute of Technology Mesra*, Ranchi, *GPA – 8.63*.
Specialized in Computer Aided Analysis and Design

2003–2007 **Bachelor of Engineering**, *Manipal Institute of Technology*, Manipal, *GPA – 7.5*.
Specialized in Mechanical Engineering

PhD Thesis

Title *Finite element simulation of sub–laminate damage in composite laminates using cohesive elements under in–plane and transverse loading*

Supervisors Professor Jin-Hwe Kweon

Description Sub-laminate damage in the form of matrix cracking and delamination was simulated by using interface cohesive elements in the finite element code. Interface cohesive elements were inserted parallel to the fiber orientation in the transverse ply with equal spacing (matrix cracking) and between the interfaces (delamination). Matrix cracking initiation in the cohesive elements was based on stress traction separation laws and propagated under mixed-mode loading. Using this, a multiscale damage model for composite structures has been developed, which considered the onset and evolution of intra-laminar matrix cracking and interlaminar delamination in various ply-configurations considering the mixed mode failure.

Masters Thesis

Title *Development of ultra precision micro linear stage*

Supervisors Dr. Naresh Chandra Murmu & Professor Ram Pal Singh

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Description A linear stage with cross roller bearing is designed and developed in-house at CMERI Durgapur for the 5-axis micro milling machine. Structural motion occuring in a machine tool degrades the movement precision in such a manner that both the surface finish and contour are affected. Cross roller bearing should be adjusted in the machine design steps while, the effects of thermal expansion can be minimized by choice of material with low thermal co-efficient or by isolation of heat sources. The positioning with high resolution is performed using precise drives such as cross roller bearing, ultrasonic motor and linear encoder.

Bachelors Thesis

Title *Fluid structure interaction of compressible and incompressible fluids on airfoils*

Supervisors Mr. U. Achuta Kini

Description This thesis explored the numerical simulation of icing on the airfoil. The numerical investigations show that the angle of attack is going to change the temperature and pressure distribution on an airfoil. In result, ice formation occurs around the tip of the airfoil which interchanges the air flow pattern around it. Addition to this,icing also causes the deformation in the airfoil.

Experience

Teaching Experience

2018–Present **Assistant Professor**, National Institute of Technology Jamshedpur, Jamshedpur.
Conduct lecture and tutorial for under graduate and post graduate students, as well as participation in academic research.

2015–2018 **Assistant Professor**, Maharishi Markandeshwar University Mullana, Ambala.
Conduct lecture and tutorial for under graduate and post graduate students, as well as participation in academic research.

Research Experience

2012–2014 **Graduate Research Assistant (Industrial Project)**, Gyeongsang National University Jinju, South Korea.
Automated Fiber Placement Process Development for Aircraft Fuselagel ((Funding Agency: Korea Aerospace Industry, A Govt. Organization of South Korea)) and Air Spoiler Bolted Joint(Samsung Heavy Industries Limited, Geoje, South Korea.)

2010–2011 **Project Associate**, Indian Institute of Science, Bangalore.
Thermosonic Wave Crack detection in metallic structures through FEM and Experiment (Mathematical formulation is done by considering, linear Fourier conduction law and the energy balance equation) and Initial development of self–foldable Nanocomposite using CNT–hydrogel (A novel approach was used to fabricate reversible, thermally as well as electrically responsive actuators utilizing composites of sodium alginate hydrogel loaded with multi-walled carbon nanotubes (MWCNTs)).

2007–2008 **Project Assistant**, Indian Institute of Science, Bangalore.
Design of Prosthetic Limb and Finite Element Analysis of Knee Joint.

Vocational

2006–2007 **Industrial Trainee**, .
Heavy Engineering Corporation Limited, Ranchi, India.

Detailed Observations:
- Learned how to work in a manufacturing unit.
- Learned the various difficulty faced by the Industry to manufacture the realistic heavy equipments.
- Learned to manufacture large size equipments for nuclear sectoros using foundary and forge.
- Learned about organization and structure of a manufacturing unit.

Research Guidance: PhD

2021-Ongoing Mr. Rahul Kumar, Development of Bio-Materials for Artificial Tissues.

2021-Ongoing Mr. Mutaz Rizawee, Mechanics of Additive Manufactured structures.

2020-Ongoing Mr. Swaroop Kumar Mandal, Development of smart materials and Its Charchterization.

2018-Ongoing Mr. Bipin Kumar Chaurasia, Modeling of Composite Laminates under High Strain Rate.

Research Guidance: M.Tech

2021-Ongoing Mr Kumar Satyam, Performance analysis of thermoelectric generator system using various materials.

2021-Ongoing Mr Abhishek Kumar Yadav, Numerical modelling of closed cell Aluminium Foam.

2021-Ongoing Mr Rajeev Ranjan Singh, Design of low cost piezoelectric harvestor.

2020-Ongoing Mr Shubham Patnayak, Performance analysis of wind turbine blade with different pitch angle using FSI

2020-Completed Mr Vivek Kumar Singh (Currently, Pursuing PhD from IIT Mumbai), Numerical Investigation of Spike effects on drag reduction for supersonic vehicles.

2020-Completed Mr. Pankaj Chaupal (Currently, Pursuing PhD from NIT Trichy), Damage studies in randomly oriented glass fibre reinforced laminate under three point bending test.

2019-Completed Mr. Vasvani Ashish Mahesh Bhai (Placed in Avanti Pvt. Ltd), Interaction of Matrix cracking and delamination in Curved Composite laminates.

2019-Completed Mr. Ashish Kumar Gupt,Thermal separation in vortex tube using different shapes of the nozzle and working fluid.

Publications

Journal Publications

2021 U Biswas, JK Rakshit, B Suthar, D Kumar, C Nayak,Modeling and analysis of all–optical pressure sensor using photonic crystal based micro ring resonator.International Journal of Numerical Modelling: Electronics Networks, Devices and Fields,2021

2021 Binu Kumar, Sunny Brar, Deepak Kumar and K.M.Singh, Numerical Investigation of Al-Foam shock absorber for Transportation Cask. AIP conference proceeding, May 2021,Volume 2341, Issue 1, pp. 020036.

2021 Shivswamy Gurusiddaiah, Deepak Kumar, Corrugated Edge Margin Effect on Edge Failure Stresses in Solid Riveted Metallic Lap Joints, AIP conference proceeding, May 2021,Volume 2341, Issue 1, pp. 020025.

2020 Gurupreet Singh, Neeraj Sharma, Deepak Kumar and Hussien Hegab, Design, development and Tribological characterization of Ti-6Al-4V/hydroxyapatite composite for Bio-implant applications. Materials Chemistry and Physics,2020 122662.

2016 Deepak Kumar, Rene Roy, Jin-Hwe Kweon, Jin-Ho Choi, Numerical modeling of combined matrix cracking and delamination in composite laminates using cohesive elements, Applied Composite Materials June 2016,Volume 23, Issue 3, pp. 397–419.

2014 Deepak Kumar, Myung-Gyun Ko, Rene Roy, Jin-Hwe Kweon, Jin-ho Choi, Soon-Kwan Jeong, Jin-Woo Jeon, and Jun-Su Han., AFP mandrel development for composite aircraft fuselage skin, International Journal of Aeronautical and Space Sciences,2014, Volume 15, Issue 1, pp. 32–43.

2013 Deepak Kumar, Rajeev Kant, Finite element analysis of bolted clamped member stiffness analysis and its relationship between non–dimensionless stiffness and aspect ratio., International Journal of Applied Science and Technology Research Excellence, 2013, Volume 3, Issue 2, pp 37–41.

2011 Rajeev Kant, Deepak Kumar, Effect of die entrance radius on tube formability in closed–die tube hydro forming, International Journal of Applied Science and Technology Research Excellence, 2011, Volume 1, Issue 1, pp. 1–6.

Conference Publications

2020 Bipin Kumar Chourasia, Deepak Kumar, Mani Kant Paswan: Damage interaction in carbon fibre reinforced polymer laminates under in-plane loading, ICCS23 23rd International Conference on Composite Structures, 23, 2020, Portugal.

2020 Deepak Kumar: Damage analysis of adhesively bonded lap joints laminated composites ICCS23 23rd International Conference on Composite Structures, 23, 2020, Portugal.

2020 Bipin Kumar Chourasia, Deepak Kumar, Mani Kant Paswan: Delamination and matrix cracking in curved shape randomly oriented glass fibre composite under Pull-out test, ICCS23 - 23rd International Conference on Composite Structures, 23, 2020 Portugal.

2019 Vasvani Ashish Mahesh Bhai, Deepak Kumar and M. K. Paswan: Failure Load Prediction in LShape Carbon Fiber Laminates under pull out and 4–point bending - 4th Indian conference on applied mechanics (INCAM –2019) vol:4 (2019).

2015 Deepak Kumar, Jin-Hwe Kweon, Jin-Ho Choi, Numerical evaluation of stiffness degradation in cross–ply laminates due to matrix cracking and fiber splitting, International Conference on Advances in Composite Material and Structures (CACMS), 13th–15th April 2015, Istanbul,Turkey.

2014 V. H. Truong, Deepak Kumar, Jin-Hwe Kweon, Rene Roy, Jin-Ho Choi, Design, analysis, and manufacturing of AFP mandrel for composite aircraft fuselage skin, Asia–Australian Conference on Composite Materials, (ACCM–9), 15th–17th October 2014, Suzhou, China.

2013 Deepak Kumar, Jin-Hwe Kweon, Jin-Ho Choi, Damage evaluation due to low velocity impact on laminated composites, Japan–Korea Symposium on Composite Materials Conference (JKSCM–9), 24th–26th September 2013, Kagoshima, Japan.

2013 Son Han-Gi, Park Yong- Bin, B Lee, Deepak Kumar, Jin-Hwe Kweon, Jin-Ho Choi, Structural design, and analysis of composite aircraft fuselage used to develop AFP technology, International Symposium on Mechanics, Aerospace, and Informatics engineering, 21st–23rd. February 2013, Meiji University, Japan.

2013 Deepak Kumar, Jin-Hwe Kweon, Jin-Ho Choi, A finite element modeling of low velocity impact in laminated composite using continuum shell element, Korean Society of Aeronautical and Space Sciences (KSAS) Conference, 13th–15th November, 2013, Jeju Island, South Korea.

2012 Park Yong- Bin, B. Lee, Deepak Kumar, Jin-Hwe Kweon, Jin-Ho Choi, Failure characteristics of pin reinforced composite single lap bonded joints in various temperature conditions, 8th Asia–Australia Conference on Composite Materials, 2012, Kualalumpur, Malaysia.

Book Chapter

2021 Bipin Kumar Chaurasia, Deepak Kumar, Vasvani Ashish Maheshbhai: Investigation of Failure in L-shaped Woven Carbon Fiber-reinforced Polymer Composite Under Pull-out and 4-Point Bending.Recent Advances in Manufacturing, Automation, Design and Energy Technologies, Lecture Notes in Mechanical Engineering, Springer.

2020 Ashish Kumar Gupt, Deepak Kumar, M. K. Paswan: Thermal separation in 2–D Vortex Tube for a different tube length and cold mass flow ratio.Advances in Renewable Energy and Sustainable Environment, Lecture Notes in Electrical Engineering, 367-383, Springer.

Conference/Workshop Organized

2018 Organized 5–Days Short Term Course on Recent Innovations and Developments in Futuristic Materials from 17th December–21st December 2018, at NIT Jamshedpur.

2019 Organized 6–Days Workshop on Finite Element Structural Analysis using ANSYS from 20th May–25th May 2019, at NIT Jamshedpur.

2021 Organized 2–Days Virtual Seminar on Applied Mechanics(VSAM 4) jointly with Indian Society of Applied Mechanics(ISAM) from 29th July–30th July 2021, at NIT Jamshedpur.

Research Projects/Consultancy Projects

2018 Design of Food Waste Recycler Machine, Ongoing, Funded by National Initiative for Design Innovation, Amount: Rs. 4.40 Lacs.

2019 Evaluation of Mixed mode fracture toughness for the woven carbon fibre laminates and CNT-reinforced woven carbon fibre laminates, Ongoing Funded by SEED Grant (TEQIP-III), Amount: Rs. 3 Lacs.

Awards

2008 GATE Fellowship, MHRD(GOI)

2012-2015 Brain Korea Fellowship –PhD

Computer skills

Basic C++, Python

Intermediate LaTeX, Microsoft Office, Linux, Microsoft Windows

Advanced CAD and CAE Skills ANSYS Workbench V.19, Abaqus, Solid Works, CATIA, Auto-CAD, Matlab, Comsol Multiphysics, MSC. Patran and Nastran

Reviewer of International Journal and Books

2015–Present **Reviewer**, .

Reviewer of International Journal.

- Part E: Journal of Process Mechanical Engineering, SAGE publications.
- Journal for Manufacturing Science and Production, De Gruyter, USA.
- Australian Journal of Mechanical Engineering, Taylor and Francis Publishers.
- International Journal of Aeronautical and Space Sciences, Springer Nature.
- Grey System: Theory and Applications, Emerald Group Publishing.
- Journal of Intelligent and Robotics Systems, Springer.
- Reviewer of David Winter Young Investigator Award 2021, International Society of Biomechanics.

Invited Talk

2020 Invited Talk on Finite Element Procedures in 5–Days Webinar on FEAST software by SVR Infotech. Pvt. Ltd., Pune

2020 Oral Talk on The Importance of CAD in Next Generation Robotics in 5–Days FDP on Robotics organized by AICTE ATAL and Department of Mechanical Engineering, NIT Jamshedpur

2019 Oral Talk on Failure in Composite Laminates in 6–Days Short Term Course on Recent Advances in Composites and Coating organized by Department of Production and Industrial Engineering, NIT Jamshedpur

Member of Professional Academic Bodies

2019 Indian Society of Applied Mechanics (Life Member: LM00139)
2019 Association for Machines and Mechanisms (Life Member: A20190001)
2019 American Society of Mechanical Engineer (ASME, Membership No.:103175669)
2019 Society of Automotive Engineer (Life Member: 7190210021)
2020 International Society of Biomechanics (6764)

Administrative Roles and Responsibilities

2018-2020 Member of Institute Publication Cell, NIT Jamshedpur.
2018-2019 Nodal Teacher of Gender Champions, NIT Jamshedpur.
2018-2019 Faculty Advisor of B.Tech. (Hons.), ME- 2015 Batch NIT Jamshedpur.
2019-2020 Faculty Advisor of B.Tech. (Hons.), ME- 2019 Batch, NIT Jamshedpur.
2018-Present Faculty Advisor of TEAM PHOENIX Aero modeling Club, NIT Jamshedpur.
2020-Present Faculty In-charge ,Institute Guest House, NIT Jamshedpur.
2020-Present Warden-Hostel(H), NIT Jamshedpur.

Languages

Hindi **Mothertongue**
English **Advanced** *fluent*
Korean **Intermediate** *Conversationally fluent*
German **Basic** *Basic words and phrases only*

Interests

- Composite Structure Failure
- Nano–composites
- Finite Element Method
- Non–Destructive Testing
- Bone Biomechanics
- Impact Damage Mechanics
- Biomaterials
- Continuum Mechanics
- Tissue Engineering
- Machine Learning

Interests

- Cricket
- Cooking
- Running
- Badminton
- Listening Music

Course Taken at NIT Jamshedpur

- Mechanics of Solid
- Design of Machine Elements
- Machine Drawing
- Computer Aided Design
- Numerical Methods and Computational Techniques
- Computational Methods in Engineering

Any Other Informations

2012- **In-House training**, .

- Practical exposure of Carbon Fiber Laminates fabrications using Vacuum bagging process
- Operation of Autoclave, INSTRON Tensile and Compression Testing, INSTRON fatigue Test machine
- Hands on experience on 3-D laser Vibrometer