DEEPAK SHARMA

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RESEARCH INTERESTS

I am broadly interested in the area of computational continuum mechanics. Currently, my research pursuits revolve around the development of efficient and robust numerical techniques aimed at comprehending the mechanism of fatigue failure and accurately predicting the fatigue life of polycrystalline materials.

EDUCATION

Expected-2023
started
July, 2019

Ph.D. | Mechanical Engineering
Indian Institute of Technology, Roorkee, India

- Area of Specialization: Machine Design
- Dissertation: Stochastic simulation of fatigue life scatter in polycrystalline materials
- The thesis centers on developing a deep understanding of fracture and fatigue failure mechanisms in polycrystalline materials, employing continuum damage mechanics and FEM, with a specific emphasis on 2D and 3D microstructure modeling.
- Developed in-house Matlab codes, Abaqus user subroutines and Python scripts to facilitate the robust modeling of fatigue failure.
- Supervisor: Prof. Indra Vir Singh
- CGPA: 8.57/10

2019

M. Tech. | Mechanical Engineering
Indian Institute of Technology, Roorkee, India

- Area of Specialization: Machine Design
- Dissertation: Computational modeling of human head to study traumatic brain injury
- Supervisors: Prof. Shailesh Ganpule
- CGPA: 7.91/10

2017

B. Tech. | Mechanical Engineering
Maulana Azad National Institute of Technology, Bhopal, India

- Research project: Condition monitoring and vibration analysis of gear box
- CGPA: 7.5/10

2013

Senior Secondary Examination |
Board of Secondary Education, Rajasthan, India

- Score: 88.33 %

2011

Secondary Examination |
Board of Secondary Education, Rajasthan, India

- Score: 87.80 %

PROFESSIONAL EXPERIENCE

July 2019-
Dec. 2021

Junior Research Fellow | Aeronautics Research & Development Board
Indian Institute of Technology, Roorkee, India.

- **Research topic**: Development of XFEM based Damage Tolerance Philosophy for the Remaining Life Assessment of Aeroengine Components

PUBLICATIONS

Journal Publications |

J1. Sharma D., Singh I. V. and Kumar J. (2023). A Computational Framework based on 3D Microstructure Modelling to Predict the Mechanical Behaviour of Polycrystalline Materials. International Journal of Mechanical Sciences, 108565.

J2. Sharma D., Singh I. V. and Kumar J. (2022). A microstructure based elasto-plastic polygonal FEM and CDM approach to evaluate LCF life in titanium alloys. *International Journal of Mechanical Sciences*, *225*, 107356.

J3. Sharma D., Pandey V. B., Singh I. V., Natarajan S., Kumar J. and Ahmad S. (2021). A polygonal FEM and continuum damage mechanics based framework for stochastic simulation of fatigue life scatter in duplex microstructure titanium alloys. *Mechanics of Materials*, *163*, 104071.

J4. Sharma D. and Singh I. V. (2023). "*Generalized Strain-Life Models to Predict the Fatigue Life of Metallic Materials*." *International Journal of Mechanical Sciences*. (Submitted)

J5. Sharma D., Singh I. V Kumar J. and Ahmad S. (2023), "Microstructure based Fatigue Life Prediction of Polycrystalline Materials using SFEM and CDM," *International Journal of Fracture.* (Submitted)

Conference Presentations|

C1. Sharma D., Singh I. V Kumar J. and Ahmad S. (2023), "Microstructure based Fatigue Life Prediction of Polycrystalline Materials using SFEM and CDM," Structural Integrity Conference and Exhibition.

AWARDS AND RECOGNITIONS

- Received MHRD scholarship for 3 years duration of Ph.D. program.
- Received MHRD scholarship for the entire duration of M.Tech. program.
- Achieved All India Rank 583 (99.70 percentile) in GATE-2017 among 190K candidates.
- Received Foundation For Excellence (FFE) scholarship for entire duration of B. Tech. program.
- Achieved outstanding academic performance as a merit student in the 12th grade state board examination.

SKILLS

- Matlab programming
- Command in Fortran and Python
- Abaqus analysis (subroutine and python scripting)
- Machine learning: physics informed neural networks and PyTorch
- AutoCAD and Solidworks
- Proficient in Microsoft Office

TEACHING EXPERIENCES

2021, 2022, 2023: Machine Drawing (Teaching Assistance)
2022: Engineering Analysis and Design (Teaching Assistance)
2019, 2020, 2021: Engineering Drawing (Teaching Assistance)

REFERENCES

1. Prof. (Dr.) Indra Vir Singh
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Indian Institute of Technology Roorkee,
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2. Prof. (Dr.) Bhanu Kumar Mishra
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Email: bhanu.mishra@me.iitr.ac.in

3. Prof. (Dr.) Shailesh Ganpule
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