Recruitment brochure
2023-24

DEPARTMENT OF APPLIED MECHANICS IIT DELHI

WELCOME

Prof. Sanjeev Sanghi

Head of Department, Applied Mechanics

“The Applied Mechanics department offers a unique combination of courses for its UG & PG programs.
The students get a firm grounding in the fundamentals related to the areas of Design , Solid Mechanics & Fluid Mechanics along with rigorous training in the use of current analytical, experimental and computational tools. This equips them to analyze complex engineering systems and undertake their design with proficiency."

Prof. Vamsi K. Chalamalla

Faculty Coordinator , Applied Mechanics Dept

“The students graduating from our department are among the brightest in the nation and are well trained in various cutting-edge technology domains. They have achieved top positions in various leading organizations in the past and are always highly sought-after by leading organizations worldwide owing to the level of skills they acquire at IIT Delhi.
I welcome the recruiters for the campus placement, and I am confident that you will find exceptionally talented engineers for your organization.”

PROGRAMS

APPLIED MECHANICS

Bachelor of Technology
Engineering and Computational Mechanics

- **Admission Criteria :** Top ranked students qualifying JEE-Advance entrance examination

Master of Technology
Engineering analysis & Design

- M.Tech. program has two-thirds of the credits for the course work & one-third of credits for project work.
- **Admission Criteria :** Students with a minimum of 99 percentile in GATE are shortlisted followed by a separate written exam

MS-Research , Applied Mechanics

- Masters level research program
- MSR program has two-thirds of the credits for the project work & one third of credits for course work
- **Admission Criteria :** Students with a minimum of 99 percentile in GATE are shortlisted followed by a separate written exam

PHD , Applied Mechanics

- Doctoral level research program
- **Admission Criteria :** Students who have qualified GATE are shortlisted followed by a written test & interview session

WHY US ?

OUR STRENGTHS

Catering to Industry Needs

- Our curriculum is synchronized with industrial needs
- Courses such as
  a. FEA & CFD : cater to core industry needs
  b. Machine learning & AI : cater to growth of industry
  c. Data Structure & algorithm : Provides necessary coding skills

Interdisciplinary Backgrounds

- Our PG students come from diverse UG backgrounds
- Backgrounds generally involve Mechanical Engineering, Civil Engineering , Production & Industrial Engineering, Electrical Engineering

Interdisciplinary area of research

- Our projects are from varied interdisciplinary domains . In fact , we have Naval construction wing in collaboration with Indian Navy where Naval officers pursue PG diploma.
- Domains include : Solid Mechanics , Fluid Mechanics Design, Structural engineering, Artificial Intelligence Biomechanics , Nanotechnology , Naval construction

UG COURSES

COURSE OF STUDY

Programme Linked Core Courses

- Data Structure and Algorithm
- Digital Electronics
- Numerical Method and Computation
- Computer Aided Design

Important Core courses

- Machine Learning in Mechanics
- Product Design
- Multi scale Modelling and Computation
- Dynamics of Mechanical System
- Advanced Fluid mechanics
- Computational Fluid Dynamics
- Experimental Techniques in Fluid and Solid
- Finite element Methods
- Heat Transfer
- Engineering Thermodynamics
- Experimental Methods
- Advanced Solid mechanics

Special Courses

- Soft Robotics
- Probabilistic Machine Learning for Mechanics
- Aero Elasticity and Aircraft Structures
- Digital Image Processing
- Deep Learning for Mechanics
- Principles of Artificial Intelligence
- Digital Twins
- Parallel Processing in computational Mechanics
- Advanced design of Machine elements
- Design Optimization and Design Theory
- Human Computer Interface
- Continuum Mechanics
- Reliability Engineering
- Hydrodynamic stability and Turbulent flow Physics
- Smart Materials and Structures

PG COURSES

COURSE OF STUDY

Product Design

- Product Design & Feasibility
- Product Reliability & Maintenance
- Design Optimization
- Finite Element Methods
- Control Engineering
- Advanced Dynamics
- Modelling and Analysis of Mechanical Systems
- Computer Aided Design
- Major Project

Fluid Mechanics

- Computational Fluid dynamics
- Advance Fluid Mechanics
- Physics of Turbulent flows
- Turbulence & its modelling
- Wind & Hydro energy systems
- Major Project

Solid Mechanics

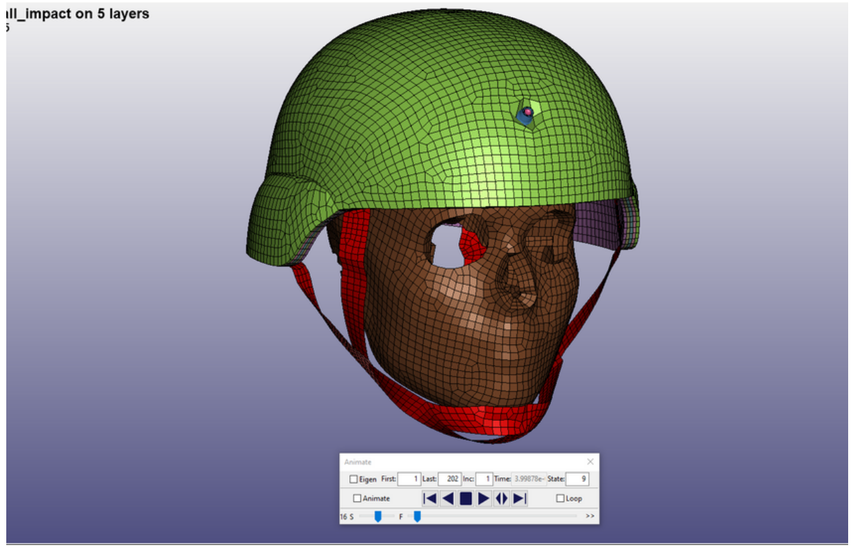
- Finite Element Methods
- Advanced Solid Mechanics
- Advance Finite element method
- Fracture Mechanics
- Theory of Plates & Shells
- Mechanics of Composite Materials
- Advanced Dynamics
- Major Project

Machine Learning

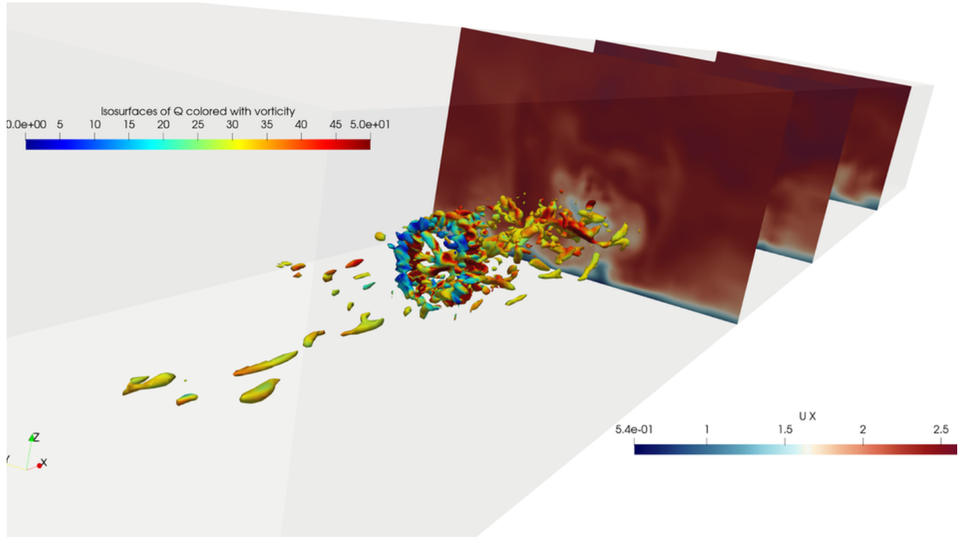
- Machine learning in mechanics
- Deep Learning In mechanics

PROJECTS

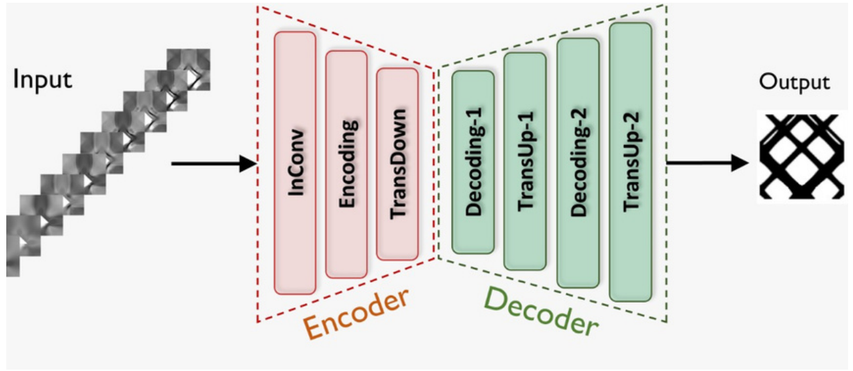
GLIMPSE OF SOME PROJECTS



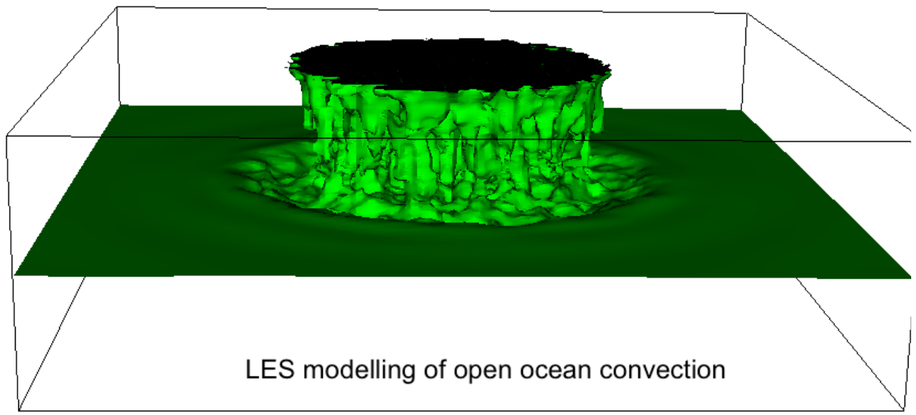
Impact analysis of composite helmet



Isosurfaces with vorticity



Design of metamaterials using Deep learning



Modelling of open ocean convection

PROJECTS

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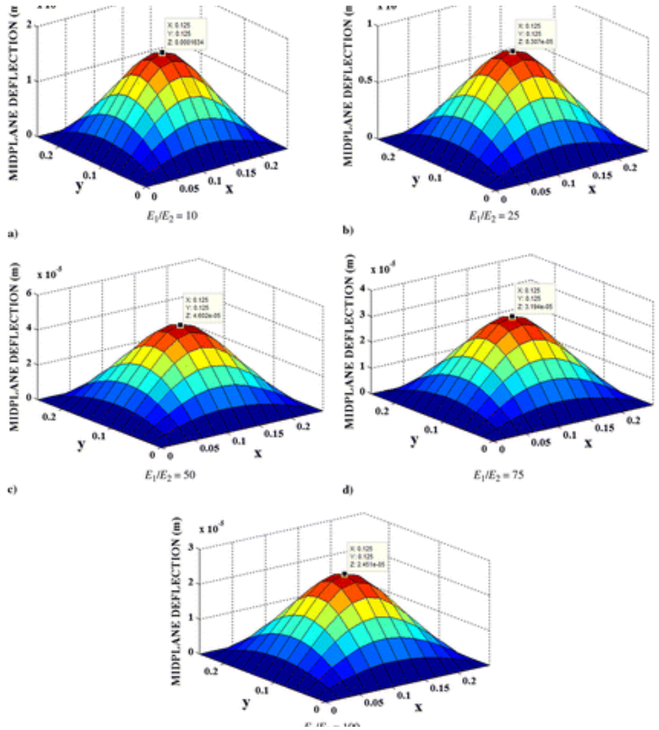
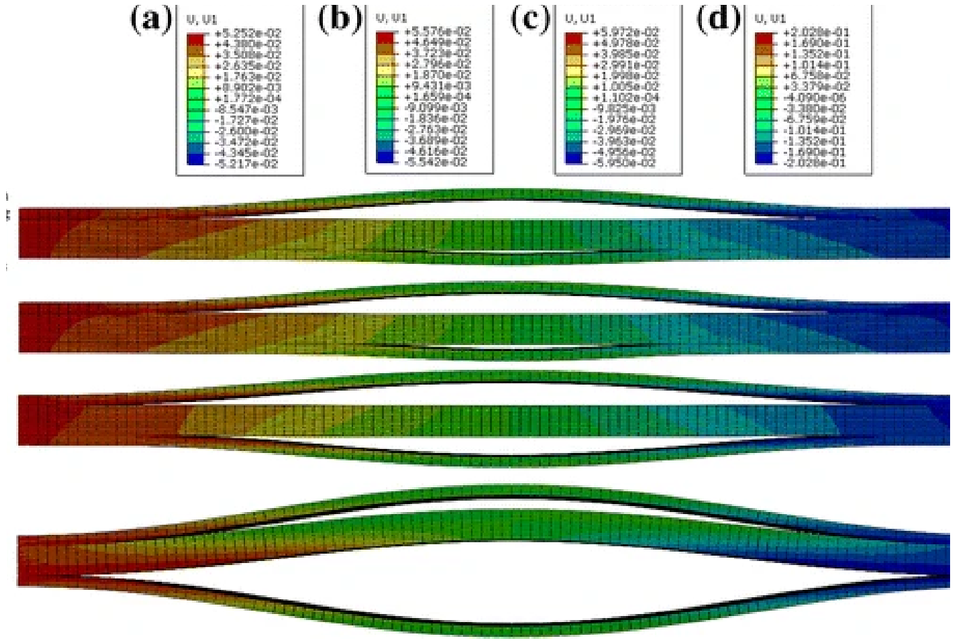
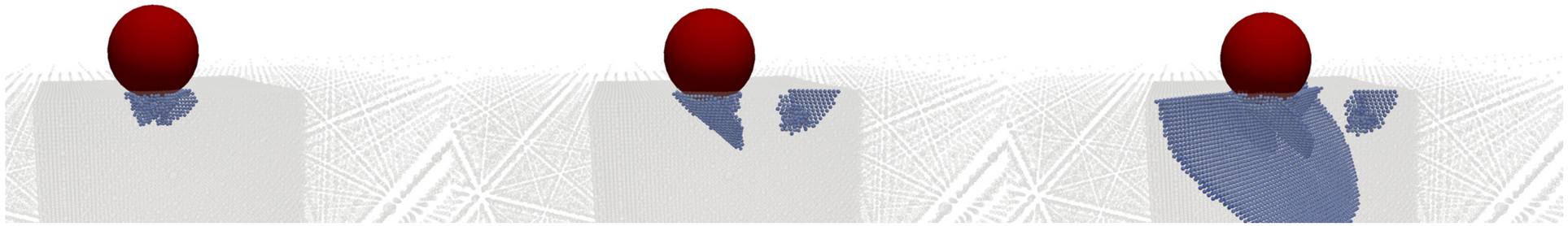




Analysis of vibration of composite structures



Modelling Nanoindentation at 0K

PROJECTS

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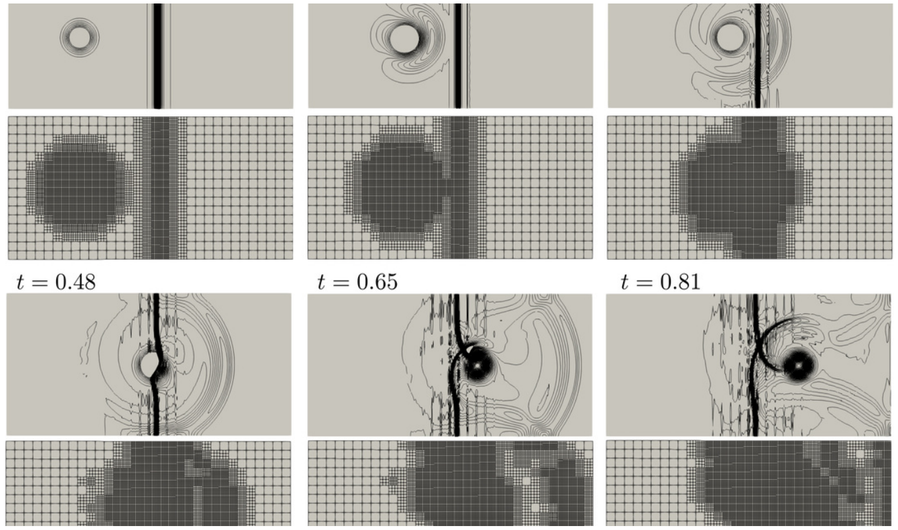
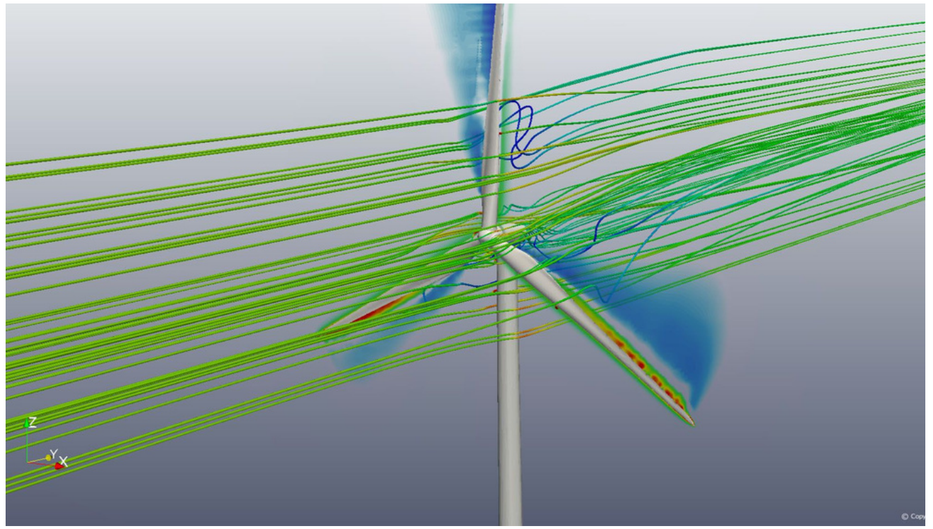
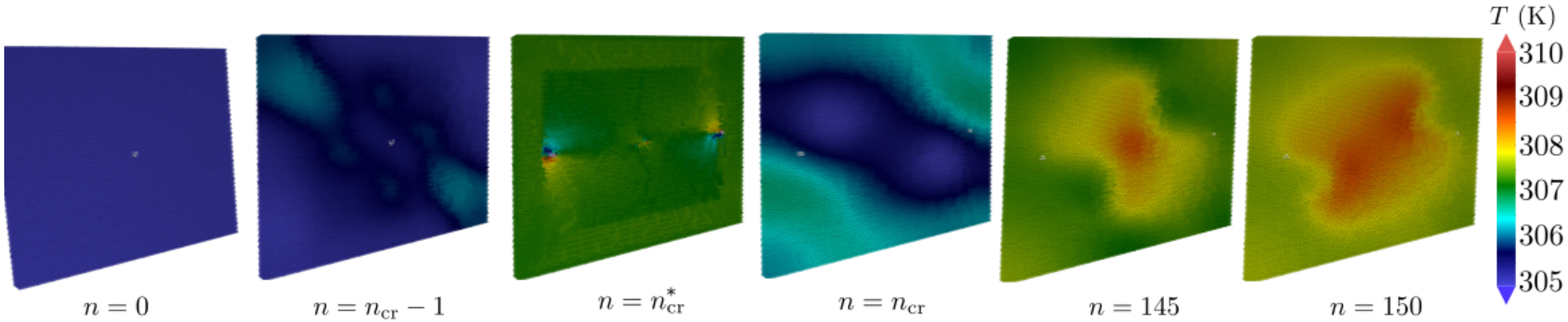


Vortex shock interaction



Fluid structure interaction modelling of Wind Turbine



Multiscale modelling of crystal plasticity

PROJECTS

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UG PROJECTS

Machine Learning & Artificial Intelligence

- Computationally efficient modeling of magnetostrictive material based sensors and actuators
- Analysis of Flexoelectric Semiconductors
- Digital human in medicine
- Two phase blood flow in deformable arteries
- Physics-informed Machine learning for data-assimilation and uncertainty quantification

Simulation based on commercial FEA,CFD package

- Improving the cooling efficiency of battery packs of electric vehicles using CFD based optimisation
- Simulations of sound radiated from multipole sources in shear flow
- Hybrid Boundary Integral and Finite Difference method for simulating squeeze film flows (computational, code development)

Experimental & Fabrication

- Fracture mechanics of paper (Experiments+ML techniques)
- KESTREL: Development of a real-time flow control device
- Development of portable non-contact type tonometer for measuring Intra-ocular Pressure (IOP) based on image processing

M.TECH PROJECTS IN PRODUCT DESIGN

PROJECTS

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Machine Learning & Artificial Intelligence

- Robust Design of Metamaterials using Machine Learning
- Structural health monitoring using lamb waves and machine learning
- Design and fabrication of Energy extraction from vortex induced vibrations

Simulation based on commercial FEA,CFD package

- Micro-structure sensitive fatigue design in presence of notches
- Design of soft active material based actuator device
- Designing Optimal Ship Hulls using Potential Flow solvers
- Optimization of shower design
- Design of sensor for underwater vehicle

Experimental & Fabrication

- Design and fabrication of remotely operated underwater vehicle
- Extraction of energy from vortex induced vibration
- Design and performance evaluation of Gas Flowmeter

M.TECH PROJECTS IN ENGINEERING ANALYSIS OF SOLIDS & FLUIDS

PROJECTS

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Simulation based on commercial FEA,CFD package

- Energy harvesting using Auxetic Sandwich structure
- Analysis of residual stresses in engineering components
- Bioinspired Biodegradable light weight composite for energy absorbption
- Wind blade impact, repair and fatigue

Machine Learning & Artificial Intelligence

- Optimization of Wind Turbine Rotor using Artificial Neural Network and CFD
- Deep learning for detection, diagnostics, and prognostics
- Imaging based machine learning for crack detection in solid
- Soft robotics control using reinforcement learning
- Machine learning application in fluid flow

Simulation based on self written codes

- Performance portable CFD solver for GPUs and CPUs
- Development for simulations of turbulent channel flow at low Reynolds number
- Wave propagation analysis using enriched finite element
- Wave propagation analysis using enriched finite element

PROJECTS

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MS-RESEARCH PROJECTS

Simulation based on commercial FEA, CFD package

- Wave propagation analysis of thin plates using SFEM
- Modeling of free shear flows using Physics Informed Neural Networks
- Biomechanical studies of foot and hip
- Modeling of free shear flows using Physics Informed Neural Networks

Simulation based on self written codes

- Multiscale modelling of 2D Materials at finite temperature
- Modelling and simulation of Chronic traumatic brain encephalopathy with gradient enhanced continuum damage mechanics

Machine Learning & Artificial Intelligence

- Physics informed multiscale deep learning framework for flows in random media
- Discovering Constitute Laws for Plasticity with uncertainty using Deep Learning
- Design, Development and Fabrication of a Textile Pneumatic Actuator for Exoskeleton suit

PROJECTS

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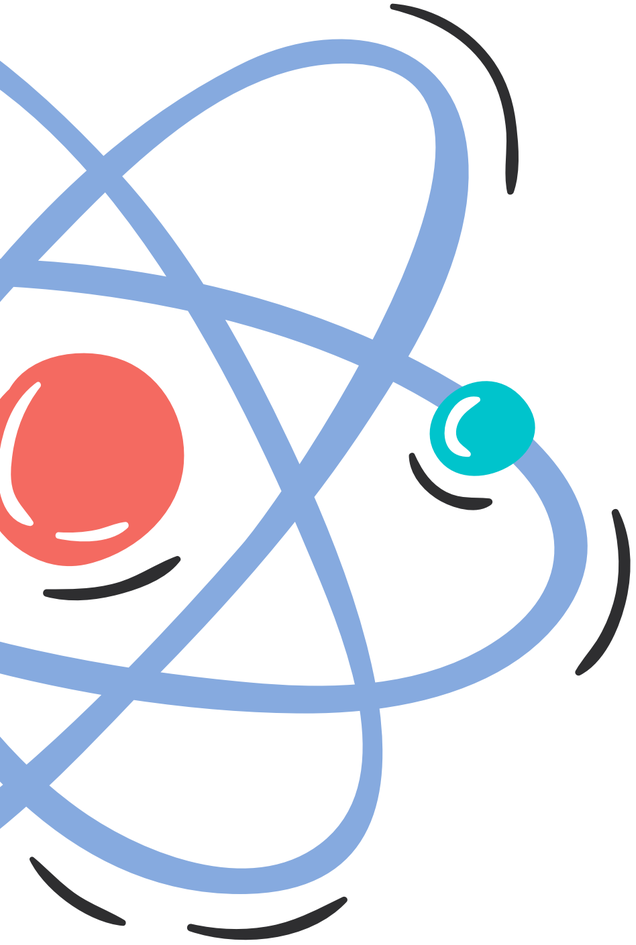
PHD PROJECTS

Fluid Mechanics

- Aerodynamic study of wind turbines
- Development of new hybrid-RANS solver for atmospheric boundary layer.
- Large eddy simulation of buoyant plume.
- Dispersion of pollutant particles in the wake.
- Enhancement of air curtain efficiency using experimental and numerical studies.
- Locomotion of flexible slender bodies in fluid media.
- Design and fabrication of remotely operated underwater vehicle.

Solid Mechanics

- Finite element modelling of curvilinear fiber based composite, piezo-laminated plates and shells.
- Structure health monitoring of delaminated composite structures.
- Characterisation and shock response of additively manufactured composite and alluminium alloys.
- Strain measurement in porous materials using DVC and micro-FE modeling.
- Frictional flaw fracture in quasi-brittle natural composites.
- Numerical analysis and simulation in plasticity.



RESEARCH FACILITIES

- Computational Fluid Dynamics Laboratory
- Fluid Mechanics Laboratory
- Strength of Materials Laboratory
- 3D Printers
- Laser Cutter Machine
- Gas Dynamics Laboratory
- Experimental Method and Analysis Laboratory
- Impact Mechanics Laboratory
- Computational Laboratory
- Well-equipped Workshop
- Stress Analysis Laboratory

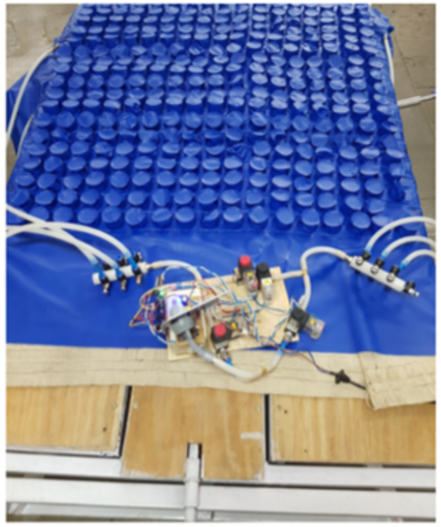
PATENTS

WE HAVE MADE THESE

Students of the department are quite active in developing technologies helpful for the society and many of them have been patented.

Multi functional bed to assist bedridden individuals for side turning and postural adjustment

Integrated 8 Stationed Open Gym



Channelized, pneumatic controlled cushion mattress for prevention of bed-sores

SOFTWARES

SKILL SET

PROFICIENCY IN SOFTWARE

RECRUITERS

COMPANIES THAT HIRE US

PAST RECRUITERS

INDUSTRY

PROJECTS IN COLLABORATION

COLLABORATIVE PROJECTS WITH INDUSTRY

ALUMNI

WE ARE PROUD OF THEM

NOTABLE ALUMNI

Gautam Acharya,
General Manager & PCP Head
Godrej Properties Limited
2005, M.Tech

Anil Sharma
Joint Director, Ministry of Defence
2001, M.Tech

Aashish Bhatia
President, Visteon India
2000, M.Tech

Dr AS Prakash,
Executive Vice President,
MoldTech Technologies Ltd
1997, M.Tech & PhD

Saiju Aravind
Founder & CEO
EduBrisk (Edtech)
1995, M.Tech Naval Construction Wing

Praveen Agrawal
Director
Sulzer Tech India Pvt Limited
1991, M.Tech

Dr KG Bhatia
CEO
D-CAD Technologies
1984, PhD

Sushil Gupta
CEO
Smaac Net Solutions P. Ltd.
1988, M.Tech

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