PRANAV D

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Summary: Mechanical engineering grad passionate about the areas of *Bayesian analysis, human body modelling and passive safety.*

EDUCATION

Vellore Institute of Technology – Chennai Campus Chennai, IN
Bachelor of Technology, Mechanical Engineering with spl. in E-Vehicles May 2021 - Jul 2025

- CGPA: 9.44 | Gold Medallist
- Meritorious Award (4 consecutive years): Rank 1 *(2025, 2024)* & Rank 3 *(2023, 2022)*
- 100% Attendance Award recipient *(2022)*
- Served as Programme Representative & Student Council Member

EXPERIENCE

Indian Institute of Technology Madras Chennai, IN
Project Officer Jul 2025 - Present

- Building a robust standalone python framework to compute the deformed shape of slender rods under complex loading conditions.
- Employed mathematical formulations from CAD and Cosserat rod theory to simulate the behaviour of these slender structures.

VIT – Medical College of Wisconsin, US Joint Internship Program Remote
Student Intern Aug 2023 - Dec 2023

- Developed a *Smooth Particle Hydrodynamics (SPH)* model to simulate cervical spinal cord behaviour for precise clinical interventions.
- Validated results against primary metrics such as segmental rotation, disc pressure and ligament strain.

La Dassault Systèmes Foundation – India Remote
Engineering DESIGN Internship Program May 2024 - May 2025

- Completed a 3-phase campus internship programme focused on the project *"Converting 'FE model of cervical spine' to 3D Digital bio-twin"*.
- Integrated concepts from biomechanics, FEA and 3D printing in the project workflow.

CORE COMPETENCIES

- Bayesian Analysis
- Exploratory Data Analysis
- Probabilistic Programming
- Spine Biomechanics
- Finite Element Analysis
- Computer Aided Design

SELECTED PROJECTS

Comparison of Flexion-Extension Responses between Male and Female Cervical Spine Segments

- Modelled the segmental rotations of sub-axial cervical spine segments using *hierarchical Bayesian regression analysis.*
- Presented in IRCOBI Europe (2025) Conference, Vilnius, Lithuania.
- Received travel grant from Toyota, and Best Presentation in the *Spine Biomechanics and Injury* session.

Sensitivity analysis of a morphological finite element L3-L4 FSU

- Parameterized the L3-L4 FSU FE model for population study to simulate the anatomical variances using *ANSA, python and LS-Dyna.*
- Estimated the rotation angle from anatomical parameters using *Bayesian multiple linear regression.*
- Presented at IRCOBI Asia (2025) Conference, Chennai, India.

Computational Modelling of Li-ion Battery in LS-Dyna for crash applications

- Coupled mechanical, thermal and electrochemical solvers to simulate the impact and short-circuit scenarios of lithium-ion battery.
- Followed the Tshell elements with Randles equivalent circuit modelling approach.

Contribution to Bambi Example Gallery

- Refined the documentation to clarify Bayesian hierarchical modelling concepts and improve consistency between Bambi and PyMC implementations.
- Expanded the hierarchical linear regression example by including mathematical formulations, EDA, and posterior visualisations.

Analysis of Road Accident Fatalities in India ***(Solo, WIP)***

- Analysing the trends in traffic accidents and fatalities classified by road, vehicles and time of occurrence.
- Developing a interactive data visualization dashboard to present key insights and temporal trends.

Effect of Helmet Fit & Orientation in Frontal and Lateral Impact ***(Solo, WIP)***

- Studying the common misuse of helmets and analysing its effect on injury using finite element analysis.
- Identifying the most vulnerable orientation of the helmet using Bayesian analysis.

TOOLS & SOFTWARE

CAE Software		*Coding*	*Essentials*
• ANSA pre-processor	• LS-Dyna	• Python	• MS-Office
• Solidworks	• Hypermesh	• Git	• Quarto

WORKSHOPS & CERTIFICATIONS

- Injury Biomechanics for Road Safety *CODE, IITM* (5D) Jun 2025
- An Introduction to Injury Assessment using Human Body Models *CODE, IITM* (2D) Jan 2025
- Introduction to Vehicle Occupant Safety *CODE, IITM* (5D) Sep 2024
- HyperWorks Introduction v2022 *Altair Learning – Online* Jan 2023
- Python 3.4.3 Training *Spoken Tutorial Project, IITB* Feb 2022

VOLUNTEERING EXPERIENCE

- IRCOBI Asia 2025 Conference Jun 2025
- Nasha Mukt Bharat Abhiyan | Anti-Drug Campaign Mar 2023
- Unnat Bharat Abhiyan | Rural Development Feb 2023

**Last updated on December 7, 2025*