Manthan Nitin Dhisale		**193109014**	
Mechanical Engineering		**M.Tech.**	
Indian Institute of Technology Bombay		**Gender: Male**	
Specialization: Manufacturing Engineering		**DOB: 05-01-1998**	

Examination	University	Institute	Year	CPI / %
Post Graduation	IIT Bombay	IIT Bombay	2022	9.91
Graduation	Shivaji University	Walchand College of Engineering	2019	9.67
Graduation Specialization: Mechanical Engineering				
Intermediate	Maharashtra State Board	D. E. S. Willingdon College	2015	94.00%
Matriculation	Maharashtra State Board	Shri A. B. P. English School	2013	96.00%

**Additional Qualifications:** **PG Minor in Design Engineering (Pursuing) | Lean Six Sigma Green Belt, KPMG**

Scholastic Achievements

❖ Awarded **Gold Medal, Bachelor of Technology, Mechanical** Batch 2019 among 60+ students in the discipline
❖ Achieved absolute **Gold Medal, Jaguar Land Rover Challenge** for Damping Energy Harvesting System **among 23 IITs**
❖ Acquired **Overall Silver Medal for IIT Bombay** (From 8th Position in Tech Meet 8.0 to 2nd in Tech Meet 9.0) **among all 23 IITs** as the **Contingent Leader in Inter IIT Tech Meet 9.0**, leading a team of 76+ tech-experts of the institute
❖ Secured **Mechanical Department Rank 1**, Master's among 80+ students **across all 4 specializations DES, TFE, MFG, MMM**
❖ "**Technical Colour 2021**": Entitled to 1 candidate among **100+ Master's students** Batch 2019-2021 for Technical excellence
❖ "**Organizational Colour 2021**": Entitled to 1 candidate among **100+ Master's students** Batch 2019-2021 for Overall Organizational excellence in the institute and department contributions, management activities
❖ "**Organizational Special Mention 2020**": Entitled to 1 candidate among **70+ Master's students** Batch 2018-2020 for Overall Organizational excellence in the institute and department contributions in management activities
❖ Recognized as amongst **India's top 10 CAD designers** in "AutoDesk Fusion 360 Design Challenge 2017" by AutoDesk India

Professional Experience

EATON India Innovation Center (**Engineering Intern 2018**)   _[May '18-July '18]_
- Development of **Cost Estimation Tool for Injection Moulded Polymer Products** for Lighting Division, EIIC
  The project aimed to develop a technique called "Design for Economy" which will help predict the price of final polymer products (both NPD and TPD) during the Design Stage itself by controlling the design, mfg. and material configurations.
- Development of **Polymer Database Recommendation Tool** for Lighting Division, EIIC (now Cooper Lighting)
  The application involved M2P (Metal to Polymer Transition) and P2P (Polymer to Polymer Transition) recommendations based on **123 characteristics** and **9 materials types** across brands like **IRiS, HALO, Corelite, Cooper, Trellix, Ametrix**, etc.

Nestlé India (**Operations Intern 2020**): The project involved the development of KPI and productivity estimation tool for "**Warehouse Loading-Unloading of Fast Moving Consumer Goods (FMCGs) Productivity Tracking**"   _[Nov '20-Jan '21]_
- The problem statement involved **20 FMCG types, 5 Bays, 3 shifts**, with Manpower, quantity as variables for optimization

Peppermint Robotics, a SINE-IITB company (**Design Intern 2020**): The project involved "**Designing of Automated Guided Vehicle Utilities** like Scrubber Motor Modelling (60W) and Squeegee Design (720W)" for specified requirements _[May '20-Jul '20]_

Featured Work

Development of a Hybrid Multi-Physics Finite Element Methods-AI based Transfer Learning technique for Prescriptive Analytics of design and manufacturing parameters over defects in LPDC components (Industry Sponsored)
[Master's Thesis Project][Guide: Prof. Asim Tewari]   _[Ongoing]_

Objective	From the computation aspect, the project focuses on decreasing FEM computational time and increasing the accuracy of results by coupling it with Machine Learning model; whereas from the NPD/TPD perspective, this involves optimizing the design and manufacturing process parameters for minimizing defects
Work	• Development of Multi-physics FEM model (Solid Mechanics-Heat transfer coupling) for LPDC using COMSOL • Speeding up the FEM inference by training on Physics based ML, fine-tuned with TL to increase the accuracy
Application	Multi-physics FEM systems like Thermo-mechanic, CFD, FSI in **Aerospace, Automotive & Electronics** industries

Design of Damping Energy Harvesting System for Automobile Suspension System [Inter IIT: Jaguar LR, India] _[Jan '21-Mar '21]_

Objective	Involved development of 5 different vibration energy capturing mechanisms recognized by JLR, India
Work	• Modelling the car suspension system in SIMULINK with **Max 37.85% conversion efficiency** and **450 CC space** • Modelling the mechanisms based on various physics involved: Vortex-Induced Vibrations, Thermoelectric
Application	Can be applied to structural elements where vibration is predominant and energy harvesting is feasible

Technical Projects Gallery

Topology Optimization using Finite Element Methods based on Optimality Criteria [Summer of Science]   _[May '21-Jul '21]_
- _**Highlights:**_ The project involved Topology Optimization of a Structural and Thermal system using SIMP method in Sigmund-Bendsoe algo. over FEM formulations, achieving an avg. **accuracy 92%** by validating against standard TopOpt, Ansys app.

Dynamic Degree of Freedom Reduction and Analysis of Finite Element Assembly using Characteristic Constraint Modes with Component Mode Synthesis Modelling _[Prof. Salil Kulkarni |Comp. Structural Dynamics: Course Project]_   _[Aug '20-Dec '20]_

- ***Highlights:*** The proposed technique achieved the DDoF reduction obtained by Craig Bampton for a Multi-Body FE Assembly from **3142 DoF to 50 Dof** with an **average error** of **0.0132** by introducing the interface node truncation of substructures

Design Optimization on the Full Car SUV vehicle suspension system to maximize riders comfort against road vibrations using Genetic Algo., Simulated Annealing and Particle Swarm *[Prof. Gogulapati|Engg. Design Opti: Course Project][Jan '21-May '21]*
- ***Highlights:*** The project involved designing of stable suspension for road vibrations by optimizing a **12 variable** Spring-Mass-Damper Laplace transformed design space achieving a maximum **accuracy of 86% & 90 MiB usage for SA algorithm**

Digital Twin Construction for Vibration Analysis of Spindle Head in various Machine Tools for Predictive Analytics
[Prof. Soham Majumdar | Computer Integrated Manufacturing: Course Project]   *[Apr '20-Jun '20]*
- ***Highlights:*** The construction involved the development of a Cyber Twin for Predictive Analytics over Vibration signatures in the form of 3D gyroscopic acceleration of Machine-tool Spindle head and simulating it real-time on CAD software

Development of Artificial Neural Network Approach for Solving Ordinary and Partial Differential equations
[Prof. Shyamaprasad Kargadde | Computational Tools for Process Modelling: Course Project]   *[Jan '20-Jul '20]*
- ***Highlights:*** This technique which is an application of Physics Informed Neural Network, involved solving Ordinary DE [1st and 2nd Order] with **MSE 0.02%** and Partial DE [Linear and Non-Linear] with **MSE 0.18%** using a single NN hidden layer

Predictive Maintenance of Aircraft Engines- Engine Health Monitoring and Predicting Time to Failure using various Machine Learning Models *[Prof. Asim Tewari | Statistical Machine Learning and Data Mining: Course Project]*   *[Aug '20-Dec '20]*
- ***Highlights:*** Reliability modelling and analysis of the Turbofan engine was done using the simulated run to failure data of 100 engines for 20000 cycles. ML models like regression were used to predict TTF with a **min. error of ±25 cycles (MAE)**

Design and Development of Foot Mounted 2 stage Planetary Gearbox for Conveyors with 180:1 speed reduction
[Prof. Amar Paranjpee | Machine Design: Course Project]   *[Jan '18-May '18]*
- ***Highlights:*** The project involved designing of gear train between 5kW Motor and a conveyor with 8 rpm speed using S45C Grade steel for Spur gears with Simpson Planetary Gear configuration using Bearing and Wear strength criteria

Conference and Publication
- Manthan Nitin Dhisale, "**CFD Simulation of Thermal Management System (Immersion Cooling) of Lithium-Ion Batteries in EVs**," *FOSSEE OpenFoam, Ministry of Education ICT, India*, 2021, *doi: 10.13140/RG.2.2.19948.69767*.   *[Jun '21]*
- Rohit Tembhare, Anay Panshikar, Valay Bundele, Manthan Dhisale, Aniket Jadhav, "**Design and Development of Unmanned Aerial Vehicles fleet for relief measures in disaster-struck areas like floods, landslides and earthquakes**," *Engineer's Conclave, IIT Guwahati*, 2021, *doi:10.13140/RG.2.2.35039.38564/1*. (Poster Presentation)   *[Mar '21]*

Institute Technical Contributions
Contingent Leader, Inter IIT Tech Meet 9.0: Led a team of IIT Bombay's best techno savvies among all 23 IITs *[Jan '21-May '21]*
- Achieved a historic victory for IIT Bombay by securing overall **First Runner Up** among all **23 IITs** with 13,000 participants
- Won **3 Gold medals, 2 Silver Medals and 4 Bronze Medals** among all 11 challenges from BOSCH, ISRO, DRDO, JLR, etc
- Achieved a special recognition of **Absolute Gold** by Jaguar Land Rover India for Energy Harvesting Challenge

Vice-President and **Senior Design Engineer**, Team **RAKSHAK UAV** (Unmanned Aerial Vehicles) 2021-22: Leading a team of 40+ members and contributing in the domains of Aero-structure and dynamics for **AUVSI-SUAS International Challenge**   *[Ongoing]*
- Design, modelling and structural analysis of Fixed-Wing UAV against the Payload, mechanical and electric components
- Computational Fluid Dynamic simulation for aerofoil shape selection and body streamline of the UAVs
- Drop Test Simulation for the loaded Payload based on the impact velocity of 3 m/s and altitude constraints using ANSYS

Researcher, RAKSHAK UAV, Research and Development in association with IRCC, IIT Bombay   *[Jul '20-May '21]*
- Design and analysis of Morphing in Aerofoil of Fixed-Wing UAVs using **Shape Memory Alloy Torsion Actuation** based on **Brinson's Model for uniaxial tensile-torsional behaviour** in COMSOL Multiphysics

Technical Strengths

Applications	SOLIDWORKS, Fusion 360, PTC Creo Inventor, COMSOL Multiphysics, ANSYS, Deform 3D, ThermoCalc		
Languages	Python, MATLAB, C, CPP, VBA, HTML, FEniCS	**ML Libraries**	OpenCV, Tensorflow, Keras, Pytorch, etc.
Key Courses	Computational Structural Dynamics, Finite Element Method, Computational Fluid Dynamics and HT Lab, Optimization for Engg. Design, Reliability Modelling & Analysis of Engineering Systems, Intro to ML		
Certifications	Digital Mfg. and Design; Mastering Digital Twins; Supply Chain Mng.: A Learning Pers.; Modelling & Design For Mech. Engg. (Fusion 360); Deep Learning Specialization; SQL for Data Sci.; R Programming *[Coursera]*		

Positions of Responsibility
- **Research Assistant**, Machine Intelligence Program, Dept. of Mechanical Engg., IIT Bombay *[Guide: Prof. Tewari] [Ongoing]*
- **Board Member**, PAN IIT (All 23 IITs): Decides on **Inter-IIT tech** contributions and hosting of tech meets   *[Jan '21-Mar '21]*
- **Post Graduate Nominee**, **Mech. Dept.**: Resolved academic issues of **150+ Masters, PhD and Post Docs**   *[Jul '20-May '21]*
- **Interview Coordinator**, **Placement Cell**: Coordinated with **250+ members** for **1700+ students interviews** *[Sep '19-Mar '20]*
- **E-Cell Coordinator**, **E-Summit:** Led to **30% y-o-y increase** in engaging users by designing media posts   *[Nov '19-Feb '20]*
- **Design Convenor**, **PG Cult**: Oversaw outreach of **20+ cultural events** (Phase 1, Informals) to **3K+**residents *[Jul '20-May '21]*
- **Design Coordinator**, **Mood Indigo**: Worked with **200+ members** for **10K+** participants; Budget: **50K INR**   *[Sep '19-Dec '19]*
- **PG Convenor**, **The Design Club**: Organized **VISION** for showcasing design projects, catering **5K+audience** *[Jul '20-May '21]*

Hobbies: 🏃 *Martial Arts (Karate: Black Belt)* 🪙 *Numismatics* 🖥 *Graphic Design* 🎤 *Anchoring* ✋ *Volunteering*