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| **Examination** | **University** | **Institute** | **Year** | **CPI / %** |
| M.Tech. + Ph.D. | IIT Bombay | IIT Bombay | 2013-Present | 7.55/10 |
| **Mechanical Engineering** *(Thesis submitted, 26 Nov, 2021)* |  |  |  |  |
| Graduation (B.Tech) | UPTU | GLAITM Mathura | 2012 | 70.18/100 |
| Intermediate | CBSE | JNV, Sitapur | 2008 | 78.2/100 |
| Matriculation | CBSE | JNV, Sitapur | 2006 | 83.0/100 |

**KEY PROJECTS**

**Ph.D. Project** | *Thermal Modeling of Drilling Titanium under Various Cooling Strategies (****Thesis submitted*** *on 25 Nov, 2021)*

***Guide:*** *Prof. S.S. Joshi, Prof. Rajneesh Bhardwaj, IIT Bombay*  *[July’ 15 – Present]*

* **Thermal model** was developed for the drilling process using the **ABAQUS heat transfer and static general model,** and an **analytical heat generation model** using **MATLAB code** forcomplex geometry of drill bits, combination of these models investigates variable heat generation, transient temperature distribution and thermal stresses on drill bits in dry conditions and a novel bottom channel heat-sink based cooling system.
* **Three computational fluid dynamics (CFD) models** were developed in **Ansys Fluent** using **Multi-phase** VOF model (for boiling of water and LN2), **Dynamic mesh** (for drill rotation), and **DPM** (Discrete phase model for mist droplets) to investigate transient temperature distribution in drill bits, coolants boiling effect on drill bits temperature and coolants flow field around drill cutting edges under flood, mist droplets, and cryogenic cooling conditions.
* 3-D **thermo-mechanical model** for the cutting process of drill bits was developed in an **ABAQUS** **dynamic, temp-disp explicit** model in order to simulate chips in the drilling process and investigates the cutting forces, stresses and strains, and temperatures distribution in drill bit under flood, mist, and cryogenic cooling conditions.
* **Designed and fabricated** novel heat-sink channel made of copper used for channelizing ice water and cryogenic coolant through it and direct injection of flood coolant over the cutting zone to reduce thermal deformities and improve machinability of titanium alloys.
* **250+ experimental tests** were performed under various cooling conditions to measure thrust, torque, and temperature (IR camera) and **validate** them with CFD and FE models.
* **1–10% accuracy** was predicted when compared to experimental results, as well as a **25–50%** temperature reduction with various cooling methods.

M. Tech. Project | *A Finite-element Heat Transfer Model for Orthogonal Cutting*

*Guide: Prof. S.S. Joshi, Prof. Rajneesh Bhardwaj, IIT Bombay [Jan’ 15 – June’ 15]*

* **Heat transfer solver** was developed in **FORTRAN code** to examine the temperature distribution within the chip, tool, and workpiece during orthogonal cutting.
* Numerical model successfully predicted the maximum temperature generated during Titanium alloy machining with a **9% accuracy** as compared to experimental results.

**M.Tech Project** |*Heat Transfer Augmentation in a Heated Laminar Channel flow via Vortex Induced Vibration*

***Guide:*** *Prof. Rajneesh Bhardwaj, IIT Bombay [July’– Dec’ 14]*

* Numerical investigation of heat transfer and flow induced deformation (FID) of an elastic plate attached with a circular cylinder in rectangular channel.
* In-house developed **FORTRAN solver** was used to investigate the flow characteristics in elastic plate attached with a circular cylinder.

B. Tech. Project *| Fundamental Consequences of Relativistic Mechanics*

*Guide: Dr. R.C. Gupta, GLA Mathura* *[Nov’ 11 – May’ 12]*

* Carried analytical study of gravity as the second order of relativistic manifestation of electrostatic force.
* Developed a prototype to increase the solar cell efficiency through the magnet concept of work function.

**PUBLICATIONS**

**Published articles**

* **Ankit Kumar**, Rajneesh Bhardwaj, Suhas S. Joshi (2020) *“Thermal modeling of drilling process in titanium alloy (Ti-6Al-4V)”*, Machining Science and Technology, 24:3, 341-365.
* **Ankit Kumar**, Rajneesh Bhardwaj, Suhas S. Joshi (2020) *“A finite-element heat transfer model for orthogonal cutting”*, Advances in Materials and Processing Technologies, 6:4, 686-702.
* Hemant S. Patne, **Ankit Kumar**, Shyamprasad Karagadde, Suhas S. Joshi (2017) *"Modeling of temperature distribution in drilling of titanium",* International Journal of Mechanical Sciences, vol. 33, pages 598-610.

**Conferences presented and published**

* **Ankit Kumar**, Rajneesh Bhardwaj, Suhas S. Joshi, *“A Thermal Model of Drilling a Titanium Alloy (Ti-6Al-4V) Under Different Cooling”* in “**WCMNM-2021”,**IIT Bombay, India(Sept ’ 21)
* **Ankit Kumar**, Rajneesh Bhardwaj, Suhas S. Joshi, *“CFD Simulation on Drilling of Titanium”,* at **COPEN-11**, IIT Indore, India. (Feb ’ 20)
* **Ankit Kumar**, Rajneesh Bhardwaj, Suhas S. Joshi*, “A finite-element heat transfer model for orthogonal cutting”* at **AMPT**, VIT Chennai, India. (Dec ’ 2017)
* Dipesh B. Trivedi, **Ankit Kumar**, Suhas S. Joshi (2018), "Drilling of Titanium Alloy using Heat Sink-based Ice Water Cooling", Procedia Manufacturing, vol. 26, pages 633-644.
* Dipesh B Trivedi, **Ankit Kumar**, Suhas S Joshi (2018), "Surface integrity analysis in Heat Sink-based Dry Drilling of Titanium Alloy", Materials Today: Proceedings, 5:9,19529-19538.
* D. B. Trivedi, **A. Kumar** and S. S. Joshi (2018), *"Heat sink approach to improve machinability in dry drilling of titanium alloys",*7th International Conference on Industrial Technology and Management, 2018, 37-41.

**Submitted and under preparation**

* **Ankit Kumar**, Rajneesh Bhardwaj, Suhas S. Joshi, "*Thermal Analysis of Drilling in Titanium under Flood and Cryogenic Cooling using Coupled CFD and FEM*", **Revision submitted** to Journal of Manufacturing Processes.
* **Ankit Kumar**, Rajneesh Bhardwaj, Suhas S. Joshi, *“A Thermal Model of Drilling a Titanium Alloy (Ti-6Al-4V) Under Different Cooling”* **under review** toJournal of Micromanufacturing (SEGA)
* **Ankit Kumar**, Rajneesh Bhardwaj, Suhas S. Joshi, "*Analysis of Coolant Flow and Temperature in Drilling Titanium under Flood, Mist and Cryogenic Cooling Considering Two-Phase Boiling* " **Revision submitted to** International Journal of Mechanical Sciences.
* **Ankit Kumar**, Rajneesh Bhardwaj, Suhas S. Joshi, "*Thermal Investigation of High Speed Drilling in Titanium Alloy with Using Heat Sink Cooling Approach in Water and Cryogenic Medium*”

**WORK EXPERIENCE**

**Teaching Assistant***|**IIT BOMBAY* *[July’ 13 – July’ 19]*

* Teaching assistant for Engineering drawing lab, Refrigeration & Air Conditioning lab, Applied Thermodynamics Lab, Data Analysis and Interpretation course, TFE lab, Computational Methods in TFE

**Group Coordinator** | Massive Open Online Course*[July’ 14 – May’ 15]*

* **Working for** an International level online educational project enhancement to education platform.
* Coordinated a team of 5 TAs we have Transcribed Video lectures which are published online for more than **25000**+ registered students

**Trainee engineer |** *Enco Engineer Combine Pvt Ltd, Gurgaon* *[Feb-June’13]*

* Worked as a trainee engineer on “**Design, Development, and Fabrication**” of a **Press Die Tool** to produce various automotive parts (Vacuum cylinder, Back plate and Paddle bracket) made of sheet metal.

**Summer Internship** *| BHEL, Jhansi in UP* ***[****June’10]*

* Completed 3 weeks of summer field training on “**Enhancement of Boiler efficiency**”, which was used for maintenance of transformers.

**FIELD OF INTEREST**

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| * Thermal Modelling and Simulation | * Computational Fluid Dynamics | * Finite Element Method |
| * Heat Transfer | * Fluid Dynamics | * Machining process |

**TECHNICAL PROFIENCY**

* **Design Module Software**: AutoCAD, Pro-E wildfire, Solidworks
* **Simulation Software** : ANSYS Fluent, ABAQUS
* **Programming Languages**: MATLAB, FORTRAN, Sci-Lab, Python, C/C++, HTML
* **Other Tools**: Gmsh, Tecplot, Latex, MS- office, Origin, ImageJ
* **Machines and Instruments**: CNC Vertical Machining Center, Rapid Tool Microscope, LabVIEW, IR camera

**ACHIEVEMENTS**

* Student Award in WCMNM conference, IIT Bombay,2021
* Ranked among the top 5% of the 1 lakh candidates who appeared in GATE 2013
* Govt. of India (MHRD) fellowship for Master of Technology and Ph.D.
* Successfully completed 16 Man-hours training of **MATLAB**.
* Successfully completed one month training of **SOLIDWORK 2012**.
* Participated in Bharat Scout in the year of 2006, acknowledged by state governor of UP.
* Participated in School Regional level Football Tournament in the year 2007.
* **Hobbies and Interest-** playing football, cricket, chess, carom, solving sudoku

**REFERENCES**

1. **Prof. Suhas S. Joshi, (M.Tech + Ph.D. Supervisor)** 🕾 +91-22-2576-7527

Dean Alumini and Corporate Relations IIT Bombay 🖂 [ssjoshi@iitb.ac.in](mailto:ssjoshi@iitb.ac.in)

1. **Prof. Rajneesh Bhardwaj (M.Tech + Ph.D. Supervisor)** 🕾 +91-22-2576-7534

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1. **Prof. Shyamprasad Karagadde** 🕾 +91-22-2576 7398

Associate Professor, Department of Mechanical Engineering , IIT Bombay 🖂s.karagadde@iitb.ac.in