Jay Divyesh Mehta

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Education

University of California, Los Angeles (UCLA), Los Angeles, USA **September 2018 – June 2019**

Master of Science in Mechanical Engineering with a GPA of 3.711/4.
Cleared the Ph.D. Qualification Examination in the field of Thermal Sciences and Engineering.

Relevant Courses: Foundation of Fluid Dynamics, Viscous Fluid Dynamics and Turbulence, Numerical Methods for Incompressible Flows, Modern Compressible Flows, Convective Heat Transfer, Radiative Heat Transfer, Microscopic Energy Transport

Dwarkadas J. Sanghvi College of Engineering, Mumbai, India **August 2014 – June 2018**

Bachelor of Engineering in Mechanical Engineering with a CGPA of 8.88/10.

Relevant Courses: Thermodynamics, Fluid Mechanics, Heat Transfer, Refrigeration and Air Conditioning, Thermal Fluid Power Engineering, Computational Fluid Dynamics.
Thesis: "Heat Transfer Augmentation Using Surface Modifications on Extended Surfaces"

Skills

Coding Languages	Python (Script, NumPy, SciPy, Pandas, Torch, BoTorch), MATLAB, Julia, C, C++, HTML, CSS.
Engineering CAD/Modeling Software	SolidWorks, Autodesk Inventor, AutoCAD.
Engineering Analysis Software	ANSYS Fluent, ANSYS CFX, ANSYS ICEM, OpenFOAM, SU^2, COMSOL Multiphysics.
Relevant Skills	Computational Fluid Dynamics (CFD), Multi-variable Optimization, Machine Learning (ML), Finite Difference Methods (FDM), Finite Volume Methods (FVM), Reduced Order Modelling (ROM), Bayesian Optimization (BO)

Projects and Research Experience

Solving the 2D Bin Packing Problem using an Aspect Ratio algorithm **November 2019 – December 2019**

- Developed an algorithm for solve the 2D Bin Packing Problem by segregating items according to their aspect ratios.
- Implemented Evolutionary Strategy Optimization Algorithms to obtain best hyper-parameters on benchmark test sets.
- Applied Bayes Optimization Algorithm to determine best hyper-parameters on real data sets. The results showed an 10% increase in throughput for operations against previous methods.

Navier-Stokes Equation Solver using Immersed Boundary Projection Method **April 2019 – June 2019**

- Created a Navier-Stokes Solver using the Immersed Boundary Projection Method.
- Simulated a variety of conditions for flow past a cylinder using the Crank-Nicholson scheme and 2nd order Adam's Bashforth scheme.
- Optimized the run-time of the code using code profiling.
- Compared results with previously published benchmark results and obtained less than 1% error.
- Reviewed concepts on software development, unit testing, debugging, and maintaining code using Git for software development.
- Code available at https://github.com/jaydm26/Immersed_Boundary_Projection_Method

Comparison of Predictive Models for Melting Point Depression in Nanoparticles **September 2018 – December 2018**

- Reviewed previously developed models for predicting the lowering (depression) of melting point for nanoparticles of Gold (Au), Aluminum (Al) and Tin (Sn).
- Successfully developed a new model to include variation in free surface energy and latent heat of fusion due to size and temperature effects.
- Presented the results in a conference-style presentation and technical paper.

Thermal Energy Storage Systems using Encapsulated Phase-Change Materials **June 2017 – August 2017**

- Applied Finite Difference Methods to model a thermal energy storage system on Python in a 1D and 3D axisymmetric domain.
- Obtained first and second law efficiencies for sensible and latent-heat based thermal energy storage systems.
- Performed parametric analysis to identify trends of change in first and second law thermodynamic efficiencies for Encapsulated Phase-Change Materials.
- Reduced the cost of the system by 6% by applying the Simulated Annealing algorithm on the bounded parametric space.

Heat Transfer Augmentation from Extended Surface Using Dimples **November 2016 – June 2018**

- Engineered a 10% increase in heat transferred from modified extended surfaces as compared to unmodified extended surfaces by the milling of dimples on the surface of the extended surfaces.
- Created 3D parametric computer models for Computational Fluid Dynamics (CFD) analysis and manufacturing of extended surfaces.
- Obtained data for thermal and flow analysis using CFD simulations.
- Performed data analysis on Python to obtain increase in Nusselt number from an unmodified extended surface.
- Developed a wind tunnel for conducting experiments for the dimpled fins. Additionally developed an experimental set up. Employed electromagnetic heating to provide constant heat supply to the fin base.
- Created a data acquisition system using an Arduino UNO to record temperature at every 5s interval.

DJS SkyLark **August 2015 – March 2016**

- Designed and fabricated a remote-controlled aircraft in 20-member team to compete in the SAE Aero Design competition in Fort Worth, TX, USA.
- Designed, analyzed, and manufactured the wing for the remote-controlled aircraft.
- Selected, tested, and implemented the avionics devices that included motors, speed controllers, batteries, etc. required on the aircraft.
- Performed take-off and drag analysis for the remote-controlled aircraft.
- Suggested design modifications based on hand-calculation and CFD analysis to reduce drag.
- Developed a PID device to restrict energy consumption of the aircraft to under 1kW.

Work Experience

Zeuva Automotive Private Limited **January 2020 - Present**

Mechanical Engineer (Simulations)

- Designed a battery pack and conducted numerical simulation to design a battery thermal management system (BTMS) that reduced the core temperatures of the battery by 7°C.
- Conducted simulations for coupled physics problems- fluid flow, heat transfer, and heat generation from Li-ion cells to obtain relevant thermal (heat flux and temperatures) and battery data (State of Charge, State of Health, Calendar Life, Cycle Life). Obtained results that were within 1°C deviation from experimental data.
- Conducted parameter estimation studies using experimental data to estimate unknown parameters of a battery cell for developing electrically equivalent circuits and for battery aging analysis
- Conducted structural mechanics simulations using modal decomposition to assess the impact of shocks and vibration on the battery pack.
- Applied Reliability Based Design Optimization (RBDO) to determine the optimum thermal design parameters for the battery pack.

P. B. Engineering Works Private Limited, Mumbai, India **November 2019 - December 2019**

Business Administrator

- Supervised the process of shot-blasting and painting for mild steel pipes (spools).
- Developed an algorithm to find an optimum loading schedule for shot-blasting and painting to maximize revenue generated. Increased throughput volume by 20% and revenue by 40%.
- Undertook various programs to improve profitability and reduce inefficiencies in business operations through automation of tasks and digitisation of old processes.

Indian Institute of Technology – Bombay (IIT-B), Mumbai, India **June 2017 – August 2017**

Research Intern

- Worked on a thermal energy storage system project based on encapsulated phase change materials.

Larsen & Toubro, Mumbai, India **June 2016 – July 2016**

Trainee Intern

- Collaborated with machine operators to review fabrication processes and create parts that met design specifications.
- Reviewed writing codes (G-code) for machining parts on a CNC milling and CNC lathe machine.
- Assisted engineers in managing and updating changes initiated through Engineering Change Requests (ECRs) provided by the production department.
- Assisted the quality assurance engineer in measuring fabricated parts using CMMs, Go-No Go gauge, and digital vernier calipers.

Publications

Mehta JD, Colah FN, Rao AP, Pendse VP, Bagal VU, Ajmera KP. Heat Transfer Augmentation From Extended Surface Using Dimples. ASME. ASME International Mechanical Engineering Congress and Exposition, Volume 8B: Heat Transfer and Thermal Engineering ():V08BT10A024. doi:10.1115/IMECE2018-87345.

Certificates

- Completed a 60-hour course on designing in SolidWorks at CADD Center, Mumbai, India.
- Completed a 60-hour course on "Application of MATLAB and Arduino in Mechanical Engineering" at the Dwarkadas J. Sanghvi College of Engineering, Mumbai, India.
- Completed a certification course on "MATLAB Programming for Numerical Computations" from the National Programme on Technology Enhanced Learning (NPTEL), India.
- Completed a certification course on "Computational Fluid Dynamics" from the National Programme on Technology Enhanced Learning (NPTEL), India.

Extra-Curricular Activities

Industry Guide, FSAE-EV Team, Sardar Patel College of Engineering, Mumbai, India **March 2020 - Present**

- Serving as a point-of-contact person to develop relations between Zeuva Automotive Pvt. Ltd. and the FSAE-EV Team at SPCE, Mumbai.
- Guided undergraduate students in development of high performance battery packs that can perform in the FSAE competition.

Section Leader, Code in Place, Stanford University, USA **April 2020 – May 2020**

- Part of a teaching team for Code in Place, offered by Stanford during the COVID-19 pandemic, with 10,000 global students and 900 volunteer teachers participating from around the world.
- Prepared and taught a weekly discussion section of 10 students to supplement professor's lectures in a 5-week introductory online Python programming course. Covered topics on control loops, variables, functions, images, and data science.
- Enabled an interactive learning-teaching experience through online video conferencing.
- Provided feedback on coding assignments submitted by students during the course.

Chairperson, Chancellor's Challenge, NMIMS University, Mumbai, India **June 2017 – February 2018**

- Led a team of 30 multi-disciplinary members to promote the entrepreneurial community at the NMIMS University, Mumbai.
- Developed and delivered numerous interactive guest speaker sessions, and mixer sessions to facilitate the development of an entrepreneurial community.
- Provided technical and non-technical consultation to student-entrepreneurs about their business ideas.

Achievements

- Won 3rd Prize for Oral Presentation in the Regular Class at SAE Aero Design and finished 2nd among all Asian teams.
- Awarded the "Certificate of Appreciation" by the Vice Chancellor of NMIMS University for my service to the success of the Chancellor's Challenge.
- Awarded "Best Project in Mechanical Engineering" by the Department of Mechanical Engineering at Dwarkadas J. Sanghvi College of Engineering.