SIDHARTH TADEPARTI

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EDUCATION

Stanford University *2023 - 2025*
Master of Science (MS) in Mechanical Engineering (Incoming Candidate)

Indian Institute of Technology Madras *2019 - 2023*
Bachelor of Technology (B.Tech) in Mechanical Engineering, **Honor's Degree**
Overall GPA: 9.76/10 - Department Rank - 1/149

Coursework: Electrical Vehicles and Renewable Energy - Ecology and Environment -Robotics and Robot Applications - Modern Control Theory - Field and Service Robotics - Measurement Instrumentation and Control - Machine Learning - **Scientific Computing** - Mathematical Foundations of Data Science - Probability and Statistics - Optimization (*MOOC)

RESEARCH EXPERIENCE

Bachelor's Thesis, IIT Madras - Model Predictive Control for Platooning August 2022 - April 2023
Automotive Controls Lab, IIT Madras *Chennai, India*

- Guided by Dr. CS Shankar Ram, Professor, IIT Madras and Dr. Devika KB, University of Exeter
- Developed an energy efficient model predictive control system for automated heavy vehicle platoons.
- Utilized a detailed vehicle model while leveraging CasADi to implement centralized and distributed frameworks.
- Demonstrated stable operations using on real-world drive cycles and hardware-in-loop tests.
- **Preliminary results accepted** at the *European Control Conference 2023* (ECC '23)-First Author.

Research Internship - Computational Creativity August 2021 –February 2022
Centre for Non-Destructive Evaluation, IIT Madras *Chennai, India*

- Guided by Dr. Krishnan Balasubramanian, Institute and Chair Professor, Mechanical Engineering, IIT Madras.
- Explored generating computational creativity using deep learning in applications across engineering and art.
- Fine-tuned pre-trained transformer models (GPT-2) to generate distinctive poetry with high coh-metrix scores.

Research Internship - Deep Learning for Heat Conduction August 2020 – December 2020
AI Design and Membrane Technology Lab, IIT Madras *Chennai, India*

- Guided by Dr. Vishal VRN, Assistant Professor, Mechanical Engineering, IIT Madras .
- Built and trained convolutional neural networks (CNNs) using synthetically generated temperature distributions.
- Evaluated the efficacy of encoder-decoder networks and variational-auto-encoders against ANN based approaches.
- **Results published** in *Case Studies in Thermal Engineering* (CSITE) - First Author.

PUBLICATIONS

Sidharth Tadeparti, Vishal V.R. Nandigana, Convolutional neural networks for heat conduction, Case Studies in Thermal Engineering, Volume 38,2022,102089,ISSN 2214-157X,https://doi.org/10.1016/j.csite.2022.102089.

Sidharth Tadeparti, K. B. Devika, and Shankar C. Subramanian "Computationally Efficient Non-linear Model Predictive Control for Truck Platoons", 2023 European Control Conference (ECC), Bucharest, Romania.

Sidharth Tadeparti, K. B. Devika, and Shankar C. Subramanian "Non-linear Model Predictive Control for Truck Platoons", 2023, (Sub-judice, under review at the Journal of the Franklin Institute)

INDUSTRY EXPERIENCE

Venture Highway LLP May 2023 - July 2023
Intern - Venture Capital *Bangalore, India*

- Explored the fundamentals of the space - Sourcing, Evaluations of startups and Portfolio Management.
- Investigated the role of interest rates on the Indian market for a real-estate tech portfolio company.

ITC Limited [1] May 2022 - July 2022
KITES Technical Intern - Manufacturing *Bangalore, India*

- Quantified and optimized the production capacity of the central kitchen at ITC's Cloud Kitchen Business.
- Developed a data-driven production planning tool and delineated an automation based capacity expansion plan.
- Improved utilization for 60% of SKUs and projected a 84% increase in productivity through an expansion plan.

Caterpillar Inc. May 2021 - July 2021
Engineering Intern - Engine R&D *Chennai, India*

- Interned with Engineering Design Centre on the design optimization, modeling and simulation of engine crankshafts.
- Developed GUI based design tools to optimize the location of oil-holes in crankshafts with errors of less than 1%.

SELECT SCHOLASTIC ACHIEVEMENTS

Cockerel Engineering Fellowship : Awarded a one-time grant in recognition of academic excellence. The scholarship is awarded to a select number of graduate school applicants at **UT Austin**.

Honda YES Scholar '21 : **1 among 14** students across India to be recognized for technical excellence and leadership potential. The award includes a $**7000** research grant to be utilized at a Japanese Institution.

Silver Medal winner at the **Bosch** EV Simulation Challenge as a part of the Inter IIT Tech Meet 9.0 - 2021. Offered an **Interview for a full time position** at Bosch at their Electrification Team.

Secured Second position at the **Caterpillar**, Industry Defined Problem Challenge (IDP) - 2021.
Offered an **Internship** at Caterpillar's Diesel Engine Design Team.

PROJECTS

Motion Planning of 7 DoF Surgical Robot February 2023 – May 2023
Course Project, Motion Planning, Dr. B Sebastian, Dr. N Patel *Chennai, India*

- Planned and simulated the motion of a KUKA iiwa robot subject to a remote centre of motion constraint.
- Implemented kinematics and collision check subroutines and interfaced the planner with the Gazebo Simulator.

Estimation and Model Predictive Control September 2022 –November - 2022
Course Project, Modern Control Theory, Dr. K Roy, Dr. R Srinivasan *Chennai, India*

- Designed a model predictive controller to control the water levels in a double actuator quadruple-tank setup[2].
- Implemented kalman filters and particle filters for state estimation in addition to constrained-state-space MPC.

Electric Vehicle Simulation March 2021
Bosch EV Simulation Challenge *Chennai, India*

- Evaluated a performance baseline for the electric passenger car segment and modeled the power-train in Simulink
- Designed parameters for a PMSM motor and verified power-train performance against performance baseline

Battery Life Prediction February 2021 – March 2021
Caterpillar-Industry Defined Problem *Chennai, India*

- Utilized empirical models based on aging experiment data to predict the remaining life of auxiliary engine batteries.
- Proposed a machine learning-based solution with empirical model based feature engineering to improve accuracy.

Computational Fluid Dynamics June 2020
Guide: Mr. Ramadoss Magesh, Siemens Digital Industries *Chennai, India*

- Explored the fundamentals of computational fluid dynamics by implementing finite differencing method codes.
- Capstone project on the Numerical Solution to a de-Laval nozzle, validated results against the analytical solution.

[1] Selected to be a part of ITC'c flagship technical internship. Offered a Full Time Technical Role
[2] K. H. Johansson, "The quadruple-tank process: a multivariable laboratory process with an adjustable zero,"

SKILLS

Software Tools	Fusion360, Mathematica, Siemens NX, Siemens Technomatix, SIMULINK.
Languages and Packages	C++, Python, MATLAB, NumPy, Mayavi, Keras, CasADi, SKLearn.

POSITIONS OF RESPONSIBILITY

Co-Head, Product Design Club September 2020 – February 2021
Centre for Innovation, IIT Madras *Chennai, India*

- Brought together facets of Technology, Design, and Business to develop a Product Design Culture at IIT M.
- Initiated and guided high impact projects across domains in-addition to conducting design thinking workshops.

Sample Projects:

- A low-cost Heads Up Display to help food delivery agents navigate safely and avoid road accidents.
- A user friendly course management system to help ease academic activity and enhance student collaboration.
- An automated liquid nitrogen dosing system delivery system to enable low-cost modified atmosphere packaging.

EXTRA-CURRICULAR ACTIVITIES

Member of Madras Hawks, IIT M's Squash Team , Fourth Place at the 55th Inter-IIT Sport Meet, IIT Roorkee 1st Place at Intercollegiate Tournament. Silver Medal at the *Schroeter*. Captained the Cauvery Hostel Team as a Freshman

Recognized as a Star Mentor for my enriching contribution in guiding 6 Mechanical Engineering Freshmen through their Freshman Year as a part of IITM's mental wellness and student mentorship initiative - *SAATHI*.