

# Chethan Ramakrishna Reddy

🌐 <https://chethanreddy.github.io>, ✉ [chethan.reddy@gmail.com](mailto:chethan.reddy@gmail.com), ☎ +1.906.275.9969 ♂ Pronoun - He, ☆ Date of birth - 14 Dec 1989,  
† Citizenship - India, → US Work Authorization - F1-OPT EAD Card Received, OPT Start Date - 21<sup>st</sup> Dec 2021

## EDUCATION

### MICHIGAN TECHNOLOGICAL UNIVERSITY

#### PHD IN MECHANICAL ENGINEERING

Co-advised by Dr Mahdi Shahbakhti and Dr Rush D. Robinett III  
Research focus - Model-based Predictive Control of Co-generation Energy Systems  
Expected Dec 2021 | Houghton, MI  
CGPA (so far): 3.77/4.00

### NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA

#### MTECH (MS EQUIVALENT) IN MECHATRONICS ENGINEERING

May 2013 | Surathkal, India  
CGPA: 8.37 / 10, US equivalent CGPA: 4.00 / 4.00

## EXPERIENCE

### RESEARCH ASSISTANT | MICHIGAN TECHNOLOGICAL UNIVERSITY

May 2017 – Present | Houghton, MI

- Research on Model Predictive Control of (i) Building HVAC System with Solar Energy Integration, and (ii) Internal Combustion Engine with Waste Heat Recovery at the Energy Mechatronics Laboratory.

### INTERN | HALLA MECHATRONICS

Jan 2019 – May 2019 | Bay City, MI

- Closed-Loop (Plant and Control) Model Development, Validation and Simulation of Electronic Controllers in Motor Controls Group.

### SENIOR ENGINEER | ROBERT BOSCH INDIA

Sep 2015 – Aug 2016 | Bangalore, India

- Modeling & Simulation Expert in the System Engineering Group (Responsible for Hybrid and Battery Electric Vehicle).

### ENGINEER | ROBERT BOSCH INDIA

Aug 2013 – Sep 2015 | Bangalore, India

- Plant model development, control model development, integration of models, and system simulation in modeling and simulation group.

### INTERN | ROBERT BOSCH INDIA

Jun 2012 – Mar 2013 | Bangalore, India

- Plant Modeling Support and Simulation Based Research on Automotive Waste Heat Recovery using Thermo-Electric Generators (My Masters Thesis).

## SELECTED PUBLICATIONS

- C. R. Reddy, V. B. Vinhaes, R. D. Robinett III, J. D. Naber, M. Shahbakhti, “**Model Predictive Control of a Waste Heat Recovery System Integrated with a Dual Fuel Natural Gas-Diesel Engine**”, in 2021 IEEE American Control Conference.
- C. R. Reddy, M. Shahbakhti, R. D. Robinett, and M. Razmara, “**Exergy-wise predictive control framework for optimal performance of MicroCSP systems for HVAC applications in buildings**”, in Energy Conversion and Management, Volume 210, pp.112711, 2020.
- M. Toub, C. R. Reddy, M. Razmara, M. Shahbakhti, R. D. Robinett, G. Aniba, “**Model-based predictive control for optimal MicroCSP operation integrated with building HVAC systems**”, in Energy Conversion and Management, Volume 199, pp.111924, 2019.

## SKILLS

- Modeling, Simulation, Data Analysis, and Code Generation in Matlab/Simulink.
- Energy systems, energy storage systems (thermal energy storage, battery energy storage) modeling & simulation.
- Modeling of thermal, mechanical, hydraulic, pneumatic, electronic and electric sub-systems.
- 0D, 1D and 3D Modeling Techniques.
- Automotive System Simulation in GT-Suite, AVL, AMESim, CarSim. And Co-Simulation with Matlab/Simulink.
- Model Predictive Control. Optimal Controller Design. Numerical Optimization Techniques. Linear and Non-Linear Control Theory.
- Model, Software, and Hardware in Loop (MiL, SiL and HiL) Model Development and Testing. Tool chains - ETAS, DSPACE, and MotoHawk.
- Mechanical CAD. Tools - Solidedge, Solidworks.

## PROJECTS

### ACADEMIC

#### PhD Course Projects

- Fuel Consumption Reduction Technologies and Hybrid Vehicle Design
- Control System Development for a Hybrid Vehicle ECU (MotoHawk)
- Effect of External Supercharging in a CI Diesel Engine with Swirl Combustion Chamber (Simulation study)
- Efficacy of PV Solar Energy in Houghton, MI
- Decentralized Model Predictive Control for Thermal Control of buildings
- Optimal Control of Wave Energy Converters

#### Masters Thesis

- Development of Automotive Thermo-Electric Generator (ATEG)

#### Bachelors Thesis

- Design and Fabrication of Boundary Layer Turbine as a Potential Automotive Engine (Compressed Air as Fuel)

## INDUSTRIAL

- Model-based Design, Testing, and Calibration.
- Modeling and Simulation of Electrically Assisted Power Steering System.
- Mechanical Design, Fabrication, and Controller Prototyping of Automotive Exhaust Active Noise Cancellation and Enhancement System.
- Bosch Boost Recuperation (Mild Hybrid Vehicle) System Simulation.