Hemanth Hariharan

Applying to: PhD in Civil and Environmental Engineering, Stanford University

Link to portfolio website: hemanthhariharan.github.io

Program	Institution	%/CGPA	Year of Graduation
MS in Sustainable Design and Construction	Stanford University	**4.036/4.3**	2024
B. Tech in Civil Engineering	Indian Institute of Technology Madras, Chennai	**9.17/10**	2020
AISSCE (12th grade)	Bala Vidya Mandir, Adyar, Chennai	97.2%	2016

RELEVANT COURSEWORK					
Carbon Capture and Sequestration		100% Clean, Renewable Energy and Storage for Everything		Convex Optimization **	
Global Project Finance		Machine Learning *		Urban Systems Engineering	
Skill Set	Python	MATLAB	Machine Learning	Data Analytics	Systems Modeling

PROJECTS AND PROFESSIONAL EXPERIENCE		
Machine Learning for Wind Turbine Output Prediction *Dr. Andrew Ng*	Sep 23' - ongoing	• Performed **exploratory data analysis** on wind-energy SCADA dataset comprising features including wind speed, direction and energy generated. • Used an **ensemble machine learning method** comprising linear regression, gradient boosting, and long short-term memory (LSTM) networks to perform time-series forecasting of wind energy. • Performed **ablation study** to identify feature importance and evaluate model reliability.
Crane Data Analysis *Dr. Martin Fischer*	Sep 23' – ongoing	• Conducted **data analysis and visualization** of crane data from two building projects in Honolulu. • Determined production rates and cycle times for key activities and assessed productivities for both projects. • Proposed recommendations on measures to improve key performance indicators for future projects.
ERCOT Interconnection Queue Analytics *Intern @ Cypress Creek Renewables*	Jun 23' - Sep 23'	• Carried out data analysis and visualization of publicly available historical data from **ERCOT interconnection queue.** • Predicting screening and interconnection study times and project outcomes using various **machine learning models**. • Proposed recommendations based on analysis to assist with early-stage development and green-fielding of solar and storage projects.

24/7 Carbon-Free Charging Project *Dr. Ram Rajagopal*	Apr 23' – Jun 23'	• Applied California's **Low Carbon Fuel Standards (LCFS)** to calculate potential monetary benefits for Stanford Transportation in both charging and capacity pathways. • Application of data analytics to **identify trends** in charging patterns, electricity costs incurred (energy and demand costs) and grid-related emissions. • Overall goal of **simultaneously minimizing costs and emissions** by solving a **large optimization problem** for routing and charging.
Developing a roadmap for a 100% WWS California *Dr. Mark Jacobson*	Apr 23' – Jun 23'	• Quantified **end-use demand in California** and converted to WWS (Wind-Water-Solar) energy. • Resource allocation of rooftop and utility-scale solar, onshore, and offshore wind, and existing geothermal and hydroelectric power. • Resource sizing (number of devices) and proposal of a **final energy mix** for California.
Urban Systems Modelling *Dr. Rishee Jain*	Apr 23' – Jun 23'	• Completed literature review and peer review of papers on systems engineering. • Developed a **systems model** to manage growth and pollution of a city. Performed sensitivity analyses and formulated policy interventions to minimize pollution and maximize urban growth. • Designed an **Urban Systems Sustainability Index** (USSI) as a weighted average composite of indices such as Gini Index, Air Quality Index, National Risk Index etc. to perform a holistic assessment of the sustainability of a city.
Global Infrastructure Policy Research *Dr. Michael Bennon*	Apr 23' – ongoing	• Assisted in writing sections on the rise of Industrial Policy and World Trade Organization for a paper exploring the failure of the global neoliberal project. • Compiled industry-wise statistics of Industrial Policy based on historical instances of government intervention and support. • Currently researching import substitution industrialization (ISI) and local content regulations.
Renewable Energy Financial Modeling *Dr. Mike Bennon*	Jan 23' - Mar 23'	• Built a **financial model** of an **undersea HVDC cable project** to utilize excess renewable energy capacity. • Performed **sensitivity analyses** based on exchange rate, inflation, schedule delays and outages to test resilience of model. • Prepared an investment recommendation consisting of targeted shareholding, valuation, and shaped debt to achieve target IRR and ROE.
Life Cycle Assessment (LCA) comparison *Dr. Michael Lepech*	Sep 22' - Dec 22'	• Conducted an **LCA comparison** of a carbon nanotube (CNT) building with US average building. • Performed Life Cycle Inventory analysis, Life Cycle Impact Assessment and Life Cycle Cost estimate for both alternatives. • Proposed recommendations to enhance the benefits of utilizing CNT as a building material.
Net-Zero Building Design (Renewable Energy Lab) *Dr. Gil Masters*	Sep 22' - Dec 22'	• Redesigned an existing summer home (Wolfeboro, NH) into an **NZE building** using passive solar design strategies, rooftop solar and geothermal heat pump. • Used an iterative process to optimize R-value of building envelope and minimize shading losses. Achieved **NPV of savings of ~$30k** over 20 years. • Performed experiments on characterizing solar PV performance, blower door testing, heat recovery ventilators, infiltration, and heat pumps.

Energy @ Stanford & SLAC *Precourt Institute of Energy*	Sep 22’	• Attended summer conference (week-long multidisciplinary session on Energy) and presented **solutions for a < 2^{o}C future**. • Measures proposed included a combination of carbon taxes, building and industrial energy efficiency, and carbon capture, sequestration, and storage.
Machine learning to predict masonry spandrel strength (**Undergraduate Thesis**) *Dr. Arun Menon*	Aug 19’ - Aug 20’	• Developed tool for **parametric study** of existing masonry strength formulations. • Characterized the **lateral resistance** of a masonry wall based on geometry, boundary conditions, strength, and stiffness. • Parametric analysis done through **non-linear FE modeling** on **TNO-DIANA**. • Formulated predictive equation using **Machine Learning** toolbox of **MATLAB**.
Inelastic Buckling of Concrete Filled Tubes (CFTs) *Dr. Amit Varma*	May 19’ - July 19’	• Developed a Graphical User Interface (**GUI**) on MATLAB with a **pre-processor** and a **post-processor** for an existing MATLAB code to analyze CFT columns. • **Column curves** and **interaction curves** were generated iteratively. • Used **higher order interpolation** to develop a tool that provides column designs. • Worked on **Bowen Lab Floor, Purdue University** in setting up test specimen of composite walls.

EXTRA CURRICULARS - INDIAN PERCUSSION DRUM (TABLA)

- Completed graduation concert in July 2017 at Krishna Gana Sabha, Chennai.
- Two-time winner of the Classical Arts Percussion competition held at IIT Madras in 2016 and 2017.
- Currently conducting online and offline classes for beginner and intermediate students and performing with senior musicians in the Bay Area.

* Currently doing the course
** Will be taken in the upcoming quarter