



# PONSUGANTH MUTHURAMAN

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## Education

**Indian Institute of Technology Madras, India**

2020-24

*Bachelor of Technology (Honours), Civil Engineering*

CGPA: 8.94/10, Department Rank: 2/125

## Scholastic Achievements

- Awarded the prestigious **MITACS Globalink Fellowship** to take up an international research project in Canada (2023)
- Awarded **Kalidas Madhavpeddi Scholarship** for the best B.Tech. student in the Civil Engineering Department (2023)
- Nominated for the **OP Jindal Engineering & Management Scholarship** for meritorious students (2021, 2022)
- Secured a percentile of **99.05%** in **Joint Entrance Examination Mains** among **1.4 Million** candidates (2020)
- Won **bronze medal** in the **National Physics Olympiad UAE** conducted by International Olympiad Foundation (2020)

## Bachelor's Thesis

**Benchmarking Sustainability in Buildings in the Indian Context**

(Jul'23 - Present)

*Guide: Prof. Ashwin Mahalingam, Civil Engineering, IIT Madras*

- Analyzed 64 LCA studies, suggested a competitive benchmark for Indian buildings, and compared it with a standard Indian house
- Developed a versatile workflow that can be scaled up for benchmarking and enhancing sustainability in construction practices
- Working on developing a dashboard highlighting quantitative sustainability assessments for buildings on my campus

## Research Experience

**Guided Waves-based Damage Detection and Localization using signal processing**

(Aug'23 - Present)

*Guide: Prof. Ayan Sadhu, Civil and Environmental Engineering, Western University, London, Ontario*

- Analyzed data from an open access data set of baseline and multiple damage-case measurements of 12 sensors
- Used a signal processing tool called Local Maximum Synchrosqueezing Transform (LMSST) to extract parameters
- Working on publishing a paper introducing an algorithm to detect and localize damage using LMSST on sensor data

**Modal identification analysis of Unreinforced Masonry Buildings under seismic loads**

(May'23 - Aug'23)

*Guide: Prof. Ayan Sadhu, Civil and Environmental Engineering, Western University, London, Ontario*

- Worked on identifying modal parameters of a structure using various signal processing methods and validating them
- Found modal parameters for a URM building with 40 accelerometers' data using Second-Order-Blind-Identification(SOBI) method
- Explored and performed the analysis of mode shapes using the acquired modal frequencies by SOBI method

**Automated framework for out-of-plane assessment of URM walls**

(March '22 - December '22)

*Guide: Prof. Arun Menon, Civil Engineering, IIT Madras*

- Worked on an automated numerical toolbox that assesses out-of-plane failure mechanisms given an input 3D model
- Discretized walls of a 2-storeyed unreinforced masonry building as per wall layout and boundary conditions
- Identified 5 out-of-plane failure mechanisms for discretized wall segments; developed capacity curves for the same

## Professional Experience

**Summer Intern**

(June '22)

*Lakshmi Engineers, Architects & Designers, Dubai, UAE (Structural Engineering Consultancy)*

- Perceived the general structural engineering design process and workflow for electrical substations
- Compared and verified results obtained from STAAD.Pro models with manual calculations for simple structures
- Critically analysed models and drawings of an existing security room of a 132/11kV substation in Dubai

## Academic Projects

**Understanding Koyambedu Market: Analysis of Chaos, Control, and Sustainability**

(November'23)

*Guide: Prof. Solomon Benjamin, Built Environment and Society Term Paper*

- Explored Koyambedu Market's urban dynamics, tracing its evolution and analyzing state-led interventions for transformation
- Examined key actors in the market through fieldwork, emphasizing social power structures and their narratives of sustainability
- Problematised the state blaming vendors' alleged noncompliance as the only reason hindering sustainable initiatives

## Solid Waste Management in the Koyambedu Wholesale Market Complex, Chennai

(November'23)

Guide: Prof. S.M. Shiva Nagendra, Environmental Monitoring and Data Analysis Term Paper

- Investigated current solid waste management practices in place at the largest wholesale perishable goods market in Asia
- Recommended strategies for Koyambedu Market to enhance practices and foster sustainability in its operations

## Project Scheduling for construction of a Standard Residential Home in Tamil Nadu

(May '23)

Guide: Prof. Ashwin Mahalingam, Construction Project Management Course Project

- Estimated the durations of and relations between activities from drawings and work breakdown structures of a residential house
- Prepared a Gantt Chart for the project highlighting the critical path using Microsoft Projects

## Water Reservoir Design in the Gadana river basin, Tamil Nadu

(November '22)

Guide: Prof. Venkatraman Srinivasan, Water Resources Engineering Course Project

- Estimated net irrigation water requirement and assessed the proposed site for satisfactory flow and topography
- Estimated design storm based on SCS approach for a dam of design life of 100 years with 50% reliability
- Routed the design storm through the reservoir and performed checks for inundation at downstream towns

## Technical Skills

- **Programming Languages:** MATLAB, Python, C, Grasshopper
- **Softwares:** STAAD.Pro, HEC-HMS, Fusion 360, AutoCAD, Revit, Rhino, Abaqus(Fundamentals), ETABS(Fundamentals)
- **Scientific Tools:** MS Projects, MS Excel, MS Word,  $\LaTeX$

## Relevant Courses

- **Environmental Sciences and Sustainability:** Environmental Engineering - Water Resources Engineering - Environmental Monitoring and Data Analysis - Sustainable Engineering and Life Cycle Analysis<sup>c</sup> - Surface Water Hydrology - Transport of Water and Wastewater
- **Mathematics :** Probability and Statistics - Linear Algebra - Multivariate Calculus - Series and Matrices
- **Computational and Data Sciences:** Introduction to C Programming - Intro to Machine Learning with Python<sup>c</sup> - MATLAB Onramp<sup>c</sup> - Machine Learning with MATLAB Onramp<sup>c</sup>
- **Social Sciences:** Built Environment and Society - Principles of Economics - Fundamentals of Operations Research<sup>c</sup> - Certified Online Course

## Technical Competitions

- **Master Builder** (CEA<sup>1</sup> Festival 2023): First place against 12+ teams in a miniature truss building competition, with aluminium strips, subjected to lab testing; best performance in terms of highest load carried to weight ratio of 80.7
- **Quiz** (CEA Festival 2023): Second place amongst 100+ participants in a 2 round Quiz based on civil engineering basics
- **Case Study** (CEA Festival 2023): Third place as a team of 2 amongst 10+ teams in a case study to identify the root cause of a bridge construction failure
- **Debate** (CEA Festival 2023): Third place as a team of 2 amongst 15+ teams in a 4-round technical debate with topics that are hot debates in the civil engineering industry

## Extra-Curricular Activities

- **Head, Shaastra<sup>2</sup> Debunk** (Shaastra 2022-23, IIT Madras): Spearheaded a **team of 6** to run the **first-ever student initiative** against misinformation in India, with an estimated budget of ₹200k+ and collaborated with **Google, BOOM, dataLEADS**.
- **Coordinator, Shaastra Mind Trials** (Shaastra 2021-22, IIT Madras): Part of a **team of 8** that threw light on the field of **Behavioral Science** in India and conducted **India's first** behavioural impact case study competition with a budget of ₹100k+ for 700+ participants
- **Social Impact through Mind Trials:** Improved **pedestrian safety in 3 high-risk zones** in Chennai, by increasing foot-over-bridge usage by **32%**, with the help of government's transportation department. Collaborated with an NGO to **enhance restroom usage** by men in two rural villages from **83% to 100%**.
- **Word Games:** An avid enthusiast and part of the **IIT Madras contingent** that competes in word games events across India. **Won** the Inter IIT Scrabble League that witnessed 200+ participants from 8 IITs
- **Electronic Keyboard:** Trained for **7+ years** and completed Grade 5 Trinity College of London Examination

1. Civil Engineering Association IIT Madras

2. Shaastra is the annual technical festival of IIT Madras