



Tushar Singh

M.Tech. in Environmental Science & Engineering

Indian Institute of Technology Bombay

Email: singhtushar13579@gmail.com | 24m1442@iitb.ac.in

Contact: +91-9987169021 | +977-9818555309

ORCID: [0009-0001-9808-8818](https://orcid.org/0009-0001-9808-8818) | [ResearchGate Profile](#)

24M1442

Gender: Male

Nationality: Nepalese

DOB: 19/04/2000

EDUCATION

Degree	Institute	Year	CPI / %
M.Tech.	Indian Institute of Technology (IIT) Bombay	2026	8.38 / 10
B.E. in Civil Engg.	Sri Venkateshwara College of Engineering (SVCE), Bangalore <i>affiliated to</i> Visvesvaraya Technological University	2022	8.25 / 10

RESEARCH INTERESTS

Atmospheric Chemistry & Aerosol Science | Carbonaceous Aerosols Characterization | Absorbing Aerosol Properties | Source Apportionment | Secondary Aerosol Formation | Satellite Remote Sensing for Atmospheric Studies | Atmospheric Modelling and Aerosol Transport | Aerosol–Climate Interactions

RESEARCH EXPERIENCE

Organic Aerosols in Indian Urban Areas: Levels and Characteristics | M.Tech. Thesis

Supervisor: Prof. Abhishek Chakraborty, ESED, IIT Bombay

[Jan'25 – Jun'26]

- Applied a single **size-resolved analytical framework** to fine-mode aerosol ($\text{PM}_{2.1}$) across four size bins — **<0.43, 0.43–0.65, 0.65–1.1, and 1.1–2.1 μm** — at two contrasting Indian sites: an **inland Indo-Gangetic Plain site** (IIT-BHU, Varanasi; winter) and a **coastal site** (IIT Bombay, Mumbai; winter and summer)
- Performed **Andersen cascade impactor sampling**, gravimetric analysis, **OC/EC thermal-optical fractionation** (TOT, IMPROVE_A; OC1–OC4, EC1–EC3), **WSOC** quantification, **ion chromatography**, and **UV–Vis spectrophotometry**
- Characterized size-resolved **brown carbon** optical properties by UV–Vis spectrophotometry of aerosol extracts: light absorption coefficients ($b_{\text{abs},365}$) and mass absorption efficiency (MAE_{365})
- Apportioned **primary vs. secondary organic carbon** (EC-tracer method)
- Modelled **aerosol liquid water content and aerosol acidity** using **ISORROPIA II**; quantified aqueous processing via **sulfur and nitrogen oxidation ratios (SOR/NOR)** and backward-trajectory analysis
- Showed that the **0.65–1.1 μm droplet mode** carried **74.4%** and **62.0%** of fine-mode OC at the two winter sites but only **25.4%** in coastal summer, and that this same size range is governed by **distinct, site- and season-specific chemical pathways** rather than a single inland-to-coastal gradient
- Executed all data analysis, statistical treatment, and figure generation in **Python**

Satellite Assessment of Reactive Nitrogen in India | M.Tech. Seminar

[Aug'25 – Nov'25]

Supervisor: Prof. Srinidhi Balasubramanian, ESED, IIT Bombay

- Critically reviewed **satellite remote sensing** of reactive nitrogen species (NO_2 , NH_3 , N_2O) across instruments including **TROPOMI, OMI, IASI, AIRS, GEMS, and TEMPO**, assessing their capability and applicability to the Indian domain

TEACHING AND LABORATORY EXPERIENCE

Teaching Assistant | ES 600: Environmental Science and Engineering | IIT Bombay [Jan'26 – Apr'26]

- Supported course delivery for a class of **64 students**: coordinated classes with the instructor, conducted quizzes, graded assignments, and maintained attendance records
- Handled evaluation of **mid-semester and end-semester examinations** and compiled final semester grades

Teaching Assistant | Analytical Instrumentation Laboratory | ESED, IIT Bombay [Jul'25 – Jan'26]

- Operated and maintained the **Sunset OC/EC Analyzer**, running **200+ ambient air samples** for internal and external users from B.Tech. to post-doctoral level
- Trained students on **sampling and thermal-optical analytical protocols**, and supported troubleshooting and quality control

PUBLICATION

Sapkota S.C., Yadav A., Khatri A., **Singh T.**, Dahal D. (2024). **Explainable Hybridized Ensemble Machine Learning for the Prognosis of the Compressive Strength of Recycled Plastic-Based Sustainable Concrete with Experimental Validation.** *Multiscale and Multidisciplinary Modeling, Experiments and Design*, Springer.

- Contributed to **manuscript writing** for an ensemble machine-learning study (XGB–LSA) achieving $R^2 = 0.97$ (training) and 0.95 (testing), with 94% experimental validation accuracy

TECHNICAL SKILLS

Laboratory	Size-resolved air sampling (Andersen cascade impactor) Gravimetric analysis Thermal-optical OC/EC analysis (Sunset, IMPROVE-A) Ion chromatography UV–Vis spectrophotometry Total organic carbon analysis Filter handling and extraction
Computational	Python (data analysis, statistics, figure generation) MATLAB Origin ArcGIS Pro
Modelling & Analysis	ISORROPIA II (aerosol thermodynamics, ALWC, pH) Backward-trajectory analysis
Relevant Coursework	ES 674 – Aerosol Science & Engineering ES 635 – Air Pollution Science & Engineering ES 664 – Environmental Systems Modelling ES 668 – Environmental Computational Laboratory ES 670 – Environmental Statistics ES 680 – GIS for Environmental Planning & Management ES 616 – Energy Conversion & Environment

REFEREES

Prof. Abhishek Chakraborty
Assistant Professor, ESED
IIT Bombay
M.Tech. thesis supervisor
abhishekc@iitb.ac.in

Prof. V. S. Vamsi Botlaguduru
Assistant Professor, ESED
IIT Bombay
M.Tech. thesis examiner; course instructor
vamsi.bvs@iitb.ac.in

PROFESSIONAL EXPERIENCE (PRIOR TO M.TECH.)

- **Junior Site Engineer** | B.M.M. Builders Pvt. Ltd., Janakpur, Nepal [Aug'22 – Jul'23]
Supervised execution of a 5 km road construction project (Ratwara–Madai road, Mahottari), overseeing quality control, contractor coordination, and delivery milestones
- **Engineering Intern** | B. Bros Engineering Consultancy, Janakpur, Nepal [Apr'22 – May'22]
Completed a four-week internship performing **2D drafting in AutoCAD** and **3D architectural modelling in SketchUp and V-Ray** for infrastructure design deliverables
- **NEC Certified Civil Engineer** | Nepal Engineering Council; Credential ID: 33486 [Sep'22]

ADDITIONAL INFORMATION

Languages	English (IELTS 7.5, CEFR C1) Maithili (Native) Nepali (Native) Hindi
Certification	Foundations of Sustainability and ESG Saïd Business School, University of Oxford [Dec'25]
Interests	Guitar Piano Hiking Reading Writing (tuisays.wordpress.com)