



**Shubham Uttamrao Barkale**  
**Civil Engineering**  
**Indian Institute of Technology, Bombay**  
**Specialization: Structural Engineering**

**160040025**  
**Dual Degree (B.Tech. + M.Tech.)**  
**Gender: Male**  
**DOB: 24-04-1998**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	.

### ACCOLADES

- **Department rank 1** in the Dual Degree Program (B. Tech + M. Tech), Civil Engineering department [‘20]
- **Co-authored** a publication “Does Lower Elastic Modulus Lead to Lower Flexural Stiffness in Reinforced Engineered Cementitious Composites?”, International Symposium on Brittle Matrix Composites 12, Warsaw, Poland [‘19]
- Awarded **Academic Proficiency (AP grade, top 1/108)** for exemplary performance in Foundation Engineering course [‘19]

### INTERNATIONAL EXPERIENCE

**HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY | RESEARCH SCHOLAR** [May ‘19-Jul ‘19]

**Objective: Optimize the mix design of self-healing Engineered Cementitious Composites (ECC) for the leak-proof basement wall**

<b>APPROACH</b>	<ul style="list-style-type: none"> <li>▪ Collaborated with <b>5</b> membered team in <b>designing experiments</b> to test flexure, tension, permeability &amp; self-healing</li> <li>▪ Validated strain hardening &amp; <b>multiple micro-cracking</b> behavior of ECC by analyzing experimental data using MATLAB</li> <li>▪ Developed MATLAB algorithm to <b>predict the response</b> of R/C &amp; R/ECC beams subjected to the four-point bending test</li> </ul>
<b>OUTCOMES</b>	<ul style="list-style-type: none"> <li>▪ Achieved <b>60% reduction</b> in steel reinforcement equivalent to <b>saving over near 17%</b> section area cutting down cost</li> <li>▪ Realized <b>7% higher</b> ultimate capacity of ECC in flexure compared to plain concrete &amp; comparable post-crack stiffness</li> </ul>

### KEY PROJECTS & INTERNSHIPS

**SUPPLEMENTAL ROTATIONAL INERTIA FOR SEISMIC RESPONSE REDUCTION | MASTER’S THESIS** [Jul ‘20-Present]

**Investigating the seismic response of base isolated structures with Clutched Inerter Damper, new vibration control mechanism**

<b>OBJECTIVES</b>	<ul style="list-style-type: none"> <li>▪ Identify suitability of Clutched Inerter Dampers &amp; <b>optimum design</b> parameters for linear &amp; non-linear isolation system</li> </ul>
<b>ANALYTICAL WORK</b>	<ul style="list-style-type: none"> <li>▪ Modeled a <b>10-story</b> base isolated building, generated the average <b>response spectrum</b> for <b>8+</b> near-fault <b>seismic events</b></li> <li>▪ Verified the functioning of inerter using <b>FORTRAN</b> by observing a <b>30% reduction</b> in peak relative displacement of the base</li> <li>▪ Extending analysis further to <b>elastomeric &amp; sliding bearings</b> systems to represent more realistic structural behavior</li> </ul>

**APPLICATION OF CLASSICAL CONTROL ENGINEERING TO ROBOTICS | IIT KANPUR** [May ‘17-Jun ‘17]

**Awarded a Letter of Recommendation by prof. Laxmidhar Behera, IITK for exceptional performance during the Summer project**

- Derived an algorithm for a **Quadcopter controller (PID)** which takes input from a manual control or **navigation controller**
- Simulated its functioning using **MATLAB Simulink**; Completed a workshop in the **Classical Control Engineering** in IIT Kanpur

**IMAGE PROCESSING FOR BINDER-AGGREGATE BOND FAILURE ANALYSIS** [Aug ‘18-Apr ‘19]

- Quantified **bitumen-aggregate affinity** in terms of adhesion by processing images in MATLAB, essential to **avoid raveling failure**
- Incorporated statistical methods, color threshold, morphological filters on **300+** diverse images to eliminate errors due to glare

**APPLICATION OF FEM IN IMPACT MECHANICS | IIT KHARAGPUR** [May ‘18-Jun ‘19]

- Simulated the dynamic behavior of structures under the **impact loading** through **Finite Element** based software Abaqus CAE
- Written a **Python** script for Abaqus to analyze the use of **FEM** in Impact Mechanics, Studied the key concepts of Fracture mechanics

**MODELLING ROAD TRAFFIC HAZARDS IN INDIA | PROBABILITY & STATISTICS COURSE PROJECT** [Oct ‘19-Nov ‘19]

- Formulated **multiple logarithmic regression** model using **16-year** data to establish a relation between total accidents & 7 factors
- Determined significant causes of accidents by rejecting **null hypothesis & provided solutions** to reduce traffic hazards in the future

<b>KEY COURSES</b>	Machine Learning*(Stanford University, Coursera), Python with Data Science (Theax Pvt. Ltd.), Python & Statistics for Financial Analysis (HKUST, Coursera), Accounting & Finance, Finite Element Methods (*ongoing)
<b>TECHNICAL SKILLS</b>	C++, Python, R, SQL, MATLAB, GNU Octave, Revit, ETABS, Abaqus, AutoCAD, STAAD.Pro, SOLIDWORKS

### POSITIONS OF RESPONSIBILITY

**TEAM MEMBER | EVENTS & OPERATIONS | STUDENT ALUMNI RELATIONS CELL** [May ‘17-Apr ‘17]

**Part of 3-tier institute body of 50+ members responsible for fostering the relations between 50k IIT alumni and students**

- Executed Phonathon-29, **interacted** with **150+** alumni leading to an increase in alumni registrations for Alumination, flagship event
- Organized **Provachan talks** of renowned alumni from all non-core sectors with a combined footfall of over **2000+** students
- Involved in **ideation & execution** of Alumination, connecting over **250+** alumni **1000+** students having a budget of **INR 0.4 million**

**TEACHING ASSISTANT | SOLID MECHANICS, CIVIL ENGINEERING** [Aug ‘20-Present]

- Responsible for **conducting tutorials, evaluating assignments** and **grading answer books** of **12** students for the whole semester
- Helping the students to clear their doubts in the subject, guiding them in academics via online mode

### EXTRA-CURRICULAR ACTIVITIES

<b>SOCIAL</b>	<ul style="list-style-type: none"> <li>▪ Part of execution of <b>500+</b> diabetes camps with <b>35000+</b> checkups, Guinness attempt [‘16]</li> <li>▪ Aided in organizing ‘<b>Rethink Pink</b>’, a Breast Cancer Awareness campaign across <b>7</b> cities [‘17]</li> </ul>
<b>CULTURAL</b>	<ul style="list-style-type: none"> <li>▪ Completed professional training of <b>classical vocals</b> up to <b>5 levels</b> from Gandharva Mahavidhyalaya [‘13]</li> </ul>
<b>MISC.</b>	<ul style="list-style-type: none"> <li>▪ Secured funding of <b>INR 50k</b> in DRR innovation challenge by Mumbai <b>Disaster</b> Management Department [‘18]</li> <li>▪ Selected in <b>top 19 out of 51</b>, based on the proposed concept plan in a competition by <b>MMRC-ORF</b> [‘19]</li> <li>▪ Bagged <b>A Grade</b> in NCC National ‘A’ Certificate exam conducted by <b>Ministry of Defence, Gol</b> [‘13]</li> </ul>

*Scholastic achievements and extracurricular activities are not verified by the Placement Cell*