



LAVISH SINGHAL

Pre-Final Year Undergraduate  
**Integrated Master's in Biotechnology and  
Biochemical Engineering**  
**Minor in Mathematics and Computing (M.sc 5Y)**



JCB Hall, IIT Kharagpur  
Kharagpur, India



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github.com/lvis4

#### EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2022	B. Tech and M. Tech (Dual Degree)	IIT Kharagpur	8.42 / 10
2017	CBSE	Vishva Bharti Public School	92.4%
2015	CBSE	Spring Fields Public School	10 / 10

#### COURSEWORK INFORMATION

- |   |   |  |
|---|---|--|
| • Probability and Statistics              | • Algorithms                            | • Programming and Data Structures              |
| • Mass Transfer                           | • Biochemical Reaction Engg.            | • Analytical Biochemistry                      |
| • Environmental Biotechnology             | • Plant Cell and Tissue Culture         | • Biochemistry                                 |
| • Python Data Structures                  | • Techno-Entrepreneurial Leadership     | • Python and Statistics for Financial analysis |
| • Economics                               | • Partial Differential Equations        | • Genomic Data Science and Clustering          |
| • Bioinformatics                          | • Stock Market Basics (Varsity Zerodha) | • Technical Market Analysis (Varsity Zerodha)  |
| • Neuronal Coding for sensory information |   | • Trading Basics (ISB)                         |

#### INTERNSHIPS AND PROJECTS

##### Genome Scale Metabolic Reconstruction and in-silico metabolic analysis

**Supervisor:** Dr. Amit Ghosh | Department of Energy Science and Engineering | IIT Kharagpur (May 2020 –July2020)

- Preparing Genome Scale Metabolic Model of *Geobacillus* LC300 leveraging modelSEED, COBRApy, MATLAB and COBRA Toolbox v3.0.
- Performed Manual curation using COBRApy, Pandas and Numpy libraries to rectify reversibility bounds, charge.
- **Computational Techniques learned:** RAST Server and modelSEED for Draft reconstruction model, COBRApy, Python for Data Science, COBRA Toolbox v3.0

**GitHub link:** [https://github.com/lvis4/genome\\_model.git](https://github.com/lvis4/genome_model.git)

##### Deep biosphere Database and Computational analysis of phylogenetic potential

**Supervisor:** Dr. Pinaki Sar | Department of Biotechnology, IIT Kharagpur (Dec 2019 –Jan 2020)

- Creating a database for the microbial consortia present in the deep biosphere, approx. 3000m below the earth's surface.
- Data mining FASTA files of raw sequences of the 16s rRNA amplicon sequence from the NCBI database.
- RNAseq Data Analysis using EXCEL for statistics for comparative analysis.

##### Techno-economic analysis and Scale-up Studies for efficient bio-ethanol production

**Supervisor:** Dr. Rintu Banerjee | Department of Agriculture and Food Processing, IIT Kharagpur (May2019–July2019)

- Developing strategies for optimization of lignin degradation, hydrolysis and fermentation for ethanol production from lignocellulosic biomass.
- Developing strategies and innovative solutions to build a circular bio-industry and performed Techno-economic analysis and scale-up analysis to understand the feasibility of scaling up of the technology.
- Significant achievements and outcomes:
  - Established pilot scale proof of concept and presentation of results.

#### WORK EXPERIENCE

##### Stock Market trading | Personal Portfolio Management | ICICIDIRECT | ZERODHA

- Actively managing seven-figure portfolio of stocks through long term investment based on fundamental analysis and Intraday square-offs based on technical analysis.
- Studied Candlestick pattern, financial statements, Pricing models (CAPM, APT), implemented Ichimoku clouds, Fibonacci retracement, Piotroski F –score indicators and have generated ROI of 10.8% in just 3 months.

#### COMPETITION/CONFERENCE

##### University Challenge | India Innovation Growth Programme (IIGP 2.0) (June 2019)

- Ideated a **biosensor for latent TB detection** using a Lateral Flow assay integrated with aptamers designed specific to LTB antigens.
- Built Financial Model, Roadmap, Business Model, performed Market Analysis and Scale-up strategy, for large-scale implementation of our product.

- Among **top 40 teams** in the University Challenge IIGP 2.0 organized by Department of Science and Technology (DST), Government of India, Lockheed Martin and Tata Trusts.
- Represented **IIT Kharagpur** in the downselect competition held at **IIT Bombay**.

### **Semi Finalist | Empresario '20 | Entrepreneurship Cell, IIT Kharagpur**

- Collaborated and Ideated with Professor Somdeb Bose Dasgupta, Department of Biotechnology, IIT Kharagpur a biosensor for Latent Tuberculosis detection using Aptamer Technology and Lateral Flow Assay.
- Prepared a detailed technical summary, Executive summary and model validation reports.
- Reviewed literature to understand the scientific principles behind the product and performed in-depth market analysis and formulated a business model and scale-up strategy.

### **Equities Trading | StockMIND Season 7 '19 | ICICI Securities | VGSOM IIT Kharagpur**

- Participated in a 5-day real-time trading event.
- Performed fundamental analysis, news analysis and built a stock portfolio and longed my position during 5-day virtual event.
- Secured 13th position amongst 54 participants from IIT Kharagpur and Vinod Gupta School of Management.

### **Captain, Product Design | General Championship | IIT Kharagpur**

- Ideated a Sound based Fire Extinguishing Drone inspired by research conducted by DARPA.
- Performed SWOT analysis and feasibility strategies for implementation.
- Served as Product Design Captain for the JCB Hall team and prepared a structured report and presentation for the team.

### **8<sup>th</sup> SOF International Mathematics Olympiad 2014**

- Secured **International Rank 246** in the final round of 8<sup>th</sup> SOF International Mathematics Olympiad in February 2015.

#### SKILLS AND EXPERTISE

<b>Design software</b>	SOLIDWORKS 2016, MATLAB, ADOBE Photoshop CS6
<b>LANGUAGES</b>	C, C++, python, R, HTML, CSS
<b>Platforms and IDE</b>	Ubuntu 16.04, Benchling, PyMOL, MEGA-X, Jupyter, KITE by Zerodha, ICICIdirect

#### POSITIONS OF RESPONSIBILITY

### **Head | Student Welfare Group –SWG, IIT Kharagpur (April 2019- Present)**

- Leading a team of 44 Members to address prominent student issues related to quality of on-campus student life.
- Organizing Campus-wide events like ‘**Campus tour**’, ‘**Welcome fresher**’ and **Student Mentor Program** for Freshers, **Foresight** for students to connect them to Alumni for guidance.

### **Core Team Member | Technology Adventure Society - TAdS, IIT Kharagpur (Aug 2018-March 2019)**

- Organizing and managing adventurous, adrenaline-rich activities like ‘**Adventure Weekends**’ in campus.
- Organized, managed and **successfully completed** a **Winter Trek to the Himalayas**.

#### AWARDS AND ACHIEVEMENTS

Holding Department rank **3**.

Secured a percentile of over **99.7%** in **IITJEE ADVANCED 2017** given by over **13,50,000 aspirants**.

#### EXTRA CURRICULAR ACTIVITIES

- Served as a volunteer in the **National Service Scheme (NSS)** (2017-2019) and **won GOLD** in the **Annual Winter Camp** held by NSS.
- Certified practitioner of ‘**Heartfulness**’ – a heart based meditation technique.
- Participated in Socio-cultural event ‘**Nukkad Natak**’ organized under **Open IIT competition, IIT Kharagpur**.