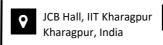# LAVISH SINGHAL

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	8.63 / 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

Engineering Consultant at ISGEC Heavy Engineering Ltd.

Saraswati Sugar Mills | Sugar and Chemicals Division of ISGEC | Yamunanagar, Haryana (Dec 20 - Jan 21)
- Worked as an engineering consultant at the sugar and chemicals division of ISGEC Heavy Engineering.
- Strategized, designed, and supervised the development of a new project for 100 KLD Ethanol distillery at SSM.
- Designed and established process flow for ethanol fermentation in 4 650m3 fermenters for 100KL per day production capacity.
- Worked jointly with the ETP (Effluent Treatment Plant) consulting team supervising and managing 1000KLD water treatment generated from the Sugar Industry.

Genome Scale Metabolic Reconstruction and in-silico metabolic analysis

Supervisor: Dr. Amit Ghosh | Department of Energy Science and Engineering | IIT Kharagpur (May 20 –July 20)
- 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

Deep biosphere Database and Computational analysis of phylogenetic potential

Supervisor: Dr. Pinaki Sar | Department of Biotechnology, IIT Kharagpur (Dec 19 –Jan 20)
- 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 (May 19–July 19)
- 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.

- Generated an ROI of 24.8% based of financial analysis like CAPM, Piotroski F-score, and technical indicators such as Stochastic Oscillator, Ichimoku clouds, Fibonacci retracement, rolling average, etc.

University Challenge | India Innovation Growth Programme (IIGP 2.0) (June '19)
- 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.

8th SOF International Mathematics Olympiad 2014
- Secured **International Rank 246** in the final round of 8th SOF International Mathematics Olympiad in February 2015.

Design software	SOLIDWORKS 2016, MATLAB, ADOBE Photoshop CS6
LANGUAGES	C, C++, python, R, HTML, CSS, Shell, Bash
Platforms and IDE	Ubuntu 16.04, Benchling, PyMOL, MEGA-X, Jupyter, KITE, ICICIdirect

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**.

Holding Department rank **3.**

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

- 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.**