



Examination	University	Institute	Year	CPI/%
Graduation	IIT Bombay	IIT Bombay	2028	9.68/10
Intermediate	TSBIE	Sri Chaitanya Junior Kalasala	2024	97.2%
Matriculation	BSEAP	Sri Viswa Shanthi High School	2021	100%

## SCHOLASTIC ACHIEVEMENTS

- Secured All India Rank 10 in the IIT Joint Entrance Examination Advanced among 2 lakh candidates (2024)
- Secured 5th rank at IITB and 35th rank globally in the Simon Marais Mathematics Competition (2025)
- Honoured with the Institute Academic Award for achieving Department Rank 15 (2025)
- Awarded prestigious Reliance Foundation Merit Scholarship for outstanding undergraduate studies (2024)
- Selected for the highly competitive Jane Street SEE (Student Exploration Event) program (2025)
- Achieved State-wide Rank 12 in AP EAMCET Exam 2024 out of 280,000+ candidates state-wide (2024)

## OLYMPIADS

- Among the top 35 students in India to clear the Indian National Physics Olympiad (INPhO) and invited twice to attend the Orientation-Cum-Selection Camp for International Physics Olympiad(IPhO) (2023,24)
- Awarded Gold Medal at Orientation-Cum-Selection-Camp(OCSC) for International Physics Olympiad (2023)
- Ranked among Top 29 participants nationwide in INAO and was invited to Astronomy OCSC for IOAA (2024)
- Secured All India Rank 4 in the International Earth Science Olympiad (IESO) in 8-th grade (2020)
- Awarded the prestigious Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship in 2021–2022 (2022)
- Qualified at the state level for the National Standard Examination NSEJS, NSEB, NSEC (2021,22,24)

## RESEARCH EXPERIENCE

**Using Lean to Teach Proof Writing (SUAMI)** | Carnegie Mellon University (May - July 2025)  
Guide: Prof. Pavel Kovalev

- Developed an interactive Lean 4 game using the Lean4 Game Engine, modeled after the early chapters of An Infinite Descent into Pure Mathematics-Clive Newstead, allowing players to improve their formal reasoning skills
- Project serves as an optional study supplement to guide students through proof techniques, with gradually reduced assistance as skills improve; suitable for self-study and under consideration by CMU for integration into courses
- Implemented lightweight custom tactics in Lean emulating textbook strategies such as contradiction, contrapositive, introduction and elimination rules allowing beginners to focus on ideas rather than Lean syntax in the game

**Exploring the Kinematics and Substructure of M31 & M32 (SIP)** | UCSC (May - July 2024)

Guide: Prof. Raja GuhaThakurta, Rohit Raj

- Used data analysis libraries (NumPy/Pandas/Astropy) to process SPLASH (Keck/DEIMOS) and DESI survey data of M31 (Andromeda) and its satellite M32, designing methods to reduce noise caused by stellar clustering
- Evaluated calibration accuracy by comparing DESI data with the HST-based stellar catalog—the most precise in that region—and used it as a guide to ensure consistency across different instruments and regions of M31
- Built a comparison pipeline to conduct comparison of SPLASH and DESI measurements of velocity and intensity, aimed at understanding M31 and M32 in the broader context of investigating the kinematics and substructures

## PUBLICATIONS

**Solving the N-Queens Problem Using Simulated Annealing** | [link] (2024)

- Published research presenting a novel hybrid algorithm combining simulated annealing with genetic operators to solve the classical N-Queens problem, providing a unique optimization perspective in algorithmic development
- Demonstrated improved performance over classical backtracking by applying probabilistic and evolutionary methods to minimize conflicts efficiently while solving N-Queens, ensuring scalability and efficiency of the solutions
- Applied initialization, iterative annealing, and fitness-based selection for scalable higher-order N-Queens solutions

## KEY PROJECTS

**Distributed Algorithms Simulation Project** | IIT Indore

(Dec 2025)

Guide: Prof. Debasish Pattanayak

- Extended an existing distributed-algorithm simulator (based on the CCM Model) by implementing a new algorithm for coordinated distribution of  $k$  agents across a graph, where agents operate independently
- Designed, evaluated and compared multiple algorithmic strategies for agent placement, comparing their efficiency, robustness, and convergence properties through large-scale simulation experiments on diverse graphs
- Built modular simulation components enabling rapid prototyping of additional distributed protocols, supporting visualization, instrumentation, and reproducible analysis of algorithmic behavior on arbitrary graphs

## Chess Engine with Classical Game Theory + NNUE | Seasons of Code

(May - July 2025)

- Developed a chess engine with chess library in C++ to represent board fen and performed **Min-max search with Alpha-Beta pruning**, using a handcrafted 5-parameter evaluation (material, position, mobility, promotion, danger)
- Trained a **NNUE (Efficiently Updatable Neural Network)** model (100k+ parameters) on extensive board-value data from Stockfish, enabling significantly more accurate position evaluation compared to the 5-parameter estimation
- Integrated **NNUE** with **iterative deepening search**, Zobrist hashing and transposition tables, combining evaluation, pruning, efficient memory use and faster updates to reliably compute optimal moves via deep self-play
- Achieved a rating of 1700, demonstrating strong competitive play and consistent performance against skilled opponents

## Facial Recognition System | Winter in Data Science

(December 2024)

- Built a **facial recognition system** with 97% accuracy using TensorFlow for deep learning and OpenCV for efficient real-time image capturing, GPU-accelerated pre-processing, optimized feature extraction, and latency reduction
- Performed **HOG-based detection**, extracted 128D embeddings and applied **distance-weighted k-NN**, combined with pre-processing (grayscale, resizing, normalization), PCA and evaluation on labeled datasets for accuracy
- Implemented **data augmentation**, **transfer learning** and **modular reusable code** with **exception handling and detailed logging** to reduce overfitting and ensure scalability and system reliability in face recognition

## Multiplayer Angry Birds | Course Project: Software Systems Lab

(2025)

Guide: Prof. Kameswari Chebrolu

- Built a two-player, turn-based **Angry Birds-style game** in Python using **pygame-ce** and **NumPy** and structured into modular components for birds, blocks, fortress, wind dynamics, environment settings and player history data
- Implemented **Newtonian physics** (projectile motion, gravity, restitution) with accurate collision detection, multiplayer state management, unique **special-ability projectiles** and smooth random wind noise via fractals
- Added a **theme selector** supporting distinct backgrounds, wind speed and ground levels, with context-aware sound effects, wind simulation, adaptive gravity and background music for enhanced variety and gameplay immersion

## OTHER PROJECTS

### Circuit Synthesis Using SAT Solver | Course Project: Logic

(August 2025)

Guide: Prof. Krishna S

- Built a SAT-solver based framework to automatically **synthesize NAND-only circuits** from arbitrary Boolean formulae/ truth tables while **minimizing the number of gates** through iterative deepening on number of gates
- Implemented in **Python** with PySAT, encoded input formulas into truth tables and applied NAND logic to generate valid NAND connections with constraints for input encoding, gate count, logic semantics and output constraints

### Assorted Projects | Self Projects

(2023–2025)

- Built a SAT solver in c++ using DPLL/CDCL with clause learning, intelligent backtracking, and efficient heuristics
- Built a **number recognition system** entirely in **NumPy**, implementing forward/backward propagation and the **Adam optimizer**, without any external ML libraries to train and evaluate a small neural network from scratch
- Developed a **Rubik's Cube solver** in Python using the IDA\* algorithm with a 54-element state, misplacement-based heuristic, move-cycle tables, pruning of inverse/duplicate states and depth-bounded search for efficient solutions
- Implemented a **Sudoku solver** using recursive backtracking with constraint checks and logging for real-time steps
- Designed a **spell-checker** with a Trie-based dictionary, enhanced **Levenshtein distance** using keyboard proximity and frequency-weighted ranking for accurate, context-aware auto-correction and word auto-complete suggestions
- Built a **MCMC** tool for decrypting basic substitution encryption and evaluating performance on noisy text data
- Built a lightweight **web server** to share personal messages and status updates, storing them in simple text files

## TEST SCORES

Year	Exam	Score/Grade
2024	Cambridge Further Mathematics (AS/A Level)	Grade 'A'
2023	Oxford MAT	92/100
2023	STEP II and III (Cambridge)	'S' (Outstanding)
2023	TMUA (Cambridge)	9/9
2023–24	College Board APs (Calc BC, Physics 1, Physics C: Mech & E&M, Chem)	5/5; <i>AP Scholar with Distinction</i>
2025	SAT	1510/1600

## TECHNICAL SKILLS

### Languages

C++, Python, Javascript, Bash, MATLAB, Assembly, Verilog, Make, HTML, L<sup>A</sup>T<sub>E</sub>X

### Data Science

NumPy, Pandas, Matplotlib, PyTorch, SK-Learn, Tensorflow

### Tools/Softwares

Git, Github, Sed, Awk, Jupyter, Fusion360, Fractory, LaserCAD

## EXTRACURRICULAR ACTIVITIES

- Achieved **fourth place in Tyro CTF Competition** (IIT Bombay) (2024)
- Participated in the **NSO athletics** training program, developing discipline, endurance and teamwork skills (2025)
- Awarded full scholarship by **Sri Chaitanya School**, with stipend support to join advanced training (2024)
- **Trained under-resourced students** in Mathematics and Science for 2 years, improving local literacy (2020-2024)
- Taught Yoga and Meditation to local community kids, promoting health, mindfulness and awareness (2020-2024)