Rounak Kumar Arya

PERSONAL INFO

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EDUCATION

Universität Bremen | October 2025 - present

Master of Science in Physics

- Focusing on Computational Physics and Nanostructures.
- Developing skills in simulation techniques, quantum modeling, and nanoscale material analysis.
- Participating in hands-on research labs, gaining practical experience with experimental methods, simulation workflows, and scientific data analysis.

Karnpura College (VBU), Hazaribagh | June 2021- May 2024

Bachelor of Science in Physics | GPA : 1.9(German Scale)

- Studied quantum mechanics, electromagnetism, thermodynamics, and statistical mechanics.
- One-year electives in Mathematics and Chemistry, enhancing interdisciplinary skills.

RESEARCH

Differential Optical Absorption Spectroscopy (DOAS) | Environmental Physics Lab

Master Student Research Lab | Dec 2025

- **Spectral Analysis**: Conducted Differential Optical Absorption Spectroscopy to quantify stratospheric NO2 concentrations.
- **Data Pipeline**: Developed a Python/SciPy pipeline to process raw spectral data, correcting for dark current, electronic offset, and broadband scattering
- **Mathematical Modeling**: Implemented polynomial fitting algorithms to retrieve Slant Column Densities (SCDs) and applied Air Mass Factors (AMFs).

PROJECTS

Astra Rocketry Challenge | Nov-December 2025

Bremen, Germany

- **Flight Simulation**: Spearheaded trajectory analysis using OpenRocket. Optimized the stability margin (CP vs. CG) and predicted apogee to ensure flight safety for a D-class motor vehicle.
- **Hardware Engineering**: Designed and 3D printed a custom motor mount with integrated fin geometry. Engineered a vibration-dampened avionics bay to house a barometric altimeter and fragile payload.
- **Failure Analysis**: Conducted post-flight diagnostics on the recovery system to identify mechanical failure points in the parachute deployment, optimizing future designs for reliability.

Simulation of Solar System (n-body problem) | Feb 2024 - Jul 2024

Tech: Python, Numpy, Matplotlib

- Developed physics-based simulation of gravitational interactions (N-body problem).
- Implemented Velocity Verlet algorithm for accurate orbital calculations and stability.
- Engineered Matplotlib 3D visualization for planetary movements and trajectories.

BlogHive-Blogging Platform | Jan 2024 - Jun 2024

Tech: MongoDB, ExpressJs, ReactJs, NodeJs, Redux, bcryptjs, Firebase, OAuth

- Designed fully responsive blog platform with user profile management.
- Implemented email and Google OAuth authentication
- Introduced search, user critique feature per post, and admin panel
- Github link

WORK

Web Developer Intern | The Indus Group Co. (Jul 2024 – Oct 2024, Remote)

- Contributed to feature design and development, improving development efficiency by 80%.
- Enhanced front-end structure and UI/UX, leading to a 45% improvement in user experience metrics.
- Assisted in back-end feature implementation, increasing overall performance and user interaction.

SKILLS

Scientific & Analytical: Classical and Quantum Mechanics, Solid State Physics, Statistical Physics
Libraries: Numpy, Matplotlib
Programming: Python, Java, JavaScript, C#, HTML, CSS
Web & App Development: React, Node.js, Express.js, MongoDB, MySQL, REST APIs, Redux
DevOps & Cloud: Docker, Kubernetes, AWS, Terraform, Ansible
Tools: Git, Firebase, OpenRocket, Fusion 360

COURSES & CERTIFICATIONS

Astronomy: Exploring Time and Space
Coursera : Feb 2025 - present

Understanding Einstein: The Special Theory of Relativity
Coursera : June 2024 - Nov 2024

100 Days of Code: The Ultimate Python Pro Bootcamp
Udemy : June 2024 - present

Google UX Design specialization
Coursera: August 2023 - Nov 2023

Meta Front-end Developer specialization
Coursera : June 2024 - Nov 2024

LANGUAGES

Hindi: Native
English: IELTS 7.5 (C1 CEFR)
German: A1 October 2025 - present