Pradyut Kumar

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Research Interests

Interests Mathematical Modeling, Disease Ecology, Predictive Modeling, Epidemiology, Behavior, Agricultural Ecology.

Education

Ph.D Biological Sciences **2024 – Present**
Purdue University, West Lafayette, GPA: 3.61/4.00

M.Sc. Biological Sciences and B.E. Electronics and Instrumentation **2019 – 2024**
Birla Institute of Technology and Science, Pilani, Rajasthan, CGPA: 8.21/10.00

Central Board of Secondary Education, Class XII **2018 – 2019**
Delhi Public School, R.K.Puram, 95.4%

Central Board of Secondary Education, Class X **2016 – 2017**
Delhi Public School, R.K.Puram, CGPA: 10.00/10.00

Work Experience

Teaching Assistant, BIOL 13500 — Aug. 2024 – Present

Instructor in-charge: Dr. Jacob Adler

- Instructed four lab sections of BIOL 135: *Introduction to Biology Research*, guiding first-year students through foundational techniques such as microscopy, pipetting, and gel electrophoresis.
- Designed and led two hands-on field studies to introduce students to real-world biological research and ecological data collection.
- Mentored students on experimental design, data interpretation, and scientific communication, fostering critical thinking and research confidence.

Software Engineering Intern — Jan. 2024 – June 2024

Aurigo Software Technologies, Bangalore

- Enhanced the functionality of Aurigo Masterworks, a platform for capital projects planning, by implementing .NET development.
- This involved addressing software bugs, improving report generation, and developing dynamic forms using XML, C#, and JavaScript.

Research Projects

Quantitative study of animal behaviour — June 2023 – Dec. 2023

Guide: Dr. Vishwesha Guttal, IISc Bangalore

- Explored image processing and data driven methods to analyse stochastic and non-linear patterns in fish schools.
- Performed comparative studies on tracking software for mixed species fish schools.
- Devised a novel tracking method for large fish schools using optical flow.

Mycoremediation of dye-containing wastewater — Sept. 2022 – May 2023

Guide: Dr. Jitendra Panwar, BITS Pilani

- Surveyed 15 fungal strains for optimal dye decolorization which can be employed for industrial dye effluent fixing.
- Devised a fungal enzymatic pathway through assays & morphological and analytical studies.
- Employed techniques like UV-Vis Spectrophotometry, GC/MS and SDS-PAGE to quantify the degradation pathway.

Analysis of land use pattern in the Gangetic Plain — June 2022 – Aug. 2022

Guide: Dr. Neelam Patel, NITI Aayog

- Analyzed the pattern of land use over 10 years in the districts across the Gangetic plain.
- Devised appropriate land use strategies to increase the yield of local farmers.

Alternate use of built-up stubble as insulation material — June 2021 – July 2021

Guide: Dr. N. Gajendran, Indian Society for Education and Environment

- Devised a novel rice stubble insulation system that can be used in the construction of cheap housing; reducing pollution and giving a boost in affordable housing.
- Conducted a thorough analysis of various research fora.

Strategies used by host and pathogen **Jan. 2021 – Apr. 2021**

Guide: Dr. Sandhya Amol Marathe, BITS Pilani

- Studied about the different types of innate and adaptive host immune responses exhibited using *Salmonella Typhi* infections as a model.
- Surveyed papers as part of the study oriented project on *S. Typhi's* invasion, spread, infection and persistence.
- Studied about Rck proteins which could change the way we study *S. Typhi* invasion in hosts.

Relevant Coursework

- Ecology and Environmental Science
- Conservation Biology
- Calculus (Math-I)
- Elements of Stochastic Processes
- Differential Equations
- Disease Ecology
- Genetics
- Microbiology
- Internet of Things
- Plant Physiology

Extracurricular Projects

Autonomous and modular mining and collection system **January 2017 – March 2017**

Guide: Anil K. Verma, DPS R.K.Puram

- Described a cost effective modular mining system to carry out excavation processes on the moon.
- Considered interdisciplinary aspects ranging from business development to organic chemistry to safely implement the working of the project.
- Used 3D modelling software Blender to model the entire layout of the modular system.

3D artworks and animations **September 2019 – Present**

Department of Visual Media, BITS Pilani

- Made the curtain raiser video for the college technical fest APOGEE using 3D animations as part of the department's video team.
- Used softwares like Blender and Substance Painter to produce artwork that were published on the department Instagram page.

Achievements

- Awarded the "Rosenberg Award" by Purdue University given to the brightest and most capable students of the entering graduate class. Onetime award in the amount of $4250.
- Awarded "Best Intern" award by Indian Society for Education and Environment for a seven week internship.
- Gold medal for seven consecutive years of academic excellence (2019).
- Third Prize, Grade 11 Small Team, NASA Ames Space Settlement Design Competition (2017).
- Finalist, Conrad Spirit of Innovation Challenge (2017).
- First Prize, Grade 11 Large Team, NASA Ames Space Settlement Design Competition (2016).

Technical Skills

Languages: C/C++, Python, HTML/CSS — **Tools**: MATLAB, Excel, LaTeX — **Softwares**: idTracker.ai, jSim, Blender

Leadership / Extracurricular

Department of Visual Media **September 2019 – May 2023**

APOGEE Joint Co-ordinator *BITS Pilani*

- Managed the workings of the Department of Visual Media for the technical fest of the college.

Aeross: Aerospace Society **July 2018 – June 2019**

Vice President *Delhi Public School, R.K.Puram*

- Led a three member team to the finals of Conrad Spirit of Innovation Challenge.