Pranav Ballaney

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Lucknow, India

+91-9044849046

ballaneypranav@gmail.com | f20180635@goa.bits-pilani.ac.in

linkedin.com/in/ballaneypranav | github.com/ballaneypranav

EDUCATION

Birla Institute of Technology and Science, Pilani   Goa, India

Master of Science in Biological Sciences   *Aug. 2018 – May 2023 (expected)*

Bachelor of Engineering in Computer Science and Engineering

Cumulative GPA: 9.25/10

Delhi Public School, Indira Nagar   Lucknow, India

All India Senior Secondary Certificate Examination   *Graduated May 2017*

Percentage in Class 12: 89.4%

CGPA in Class 10: 10/10

WORK EXPERIENCE

National Resource for Network Biology   May 2021 – August 2021

Student Developer under Google Summer of Code 2021 at Keio University, Japan   *(Link to Project)*

Developed a simulator for SBML models, along with parsers for SBML and MathML in Rust, under the guidance of
Dr Akira Funahashi, Department of Biosciences and Informatics. The simulator applies the Runge-Kutta and
Runge-Kutta-Fehlberg methods for numerical integration of ODEs in an SBML model.

Debian   May 2020 – August 2020

Student Developer under Google Summer of Code 2020   *(Link to Project)*

- Worked on quality assurance and continuous integration of applications in life sciences and medicine.
- Designed test suites for over 40 applications in bioinformatics, performed bug fixes and added several new packages to
  the Debian operating system.

PUBLICATIONS

Mishra, B., Ballaney, P., Saha, G., Shinde, A., Banerjee, S., Thimmakondu, V. S., & Aduri, R. (2022).
**An in silico discovery of potential 3CL protease inhibitors of SARS-CoV-2 based upon
inactivation of the cysteine 145-Histidine 41 catalytic dyad.**
Journal of Biomolecular Structure and Dynamics, 1–20.   https://doi.org/10.1080/07391102.2022.2047108

RESEARCH EXPERIENCE

CSIR - Institute of Genomics and Integrative Biology   February 2021 - July 2021

Carried out molecular dynamics simulations of autophagic complexes to understand the process of formation of
autophagosomes under the guidance of Dr. Lipi Thukral, Senior Scientist at the Computational Structural Biology lab.

RNA Secondary Structure Prediction   January 2021 - Present

Currently working on evaluation and extension of computational tools used to predict RNA secondary structures, under
the guidance of Dr. Raviprasad Aduri, Assistant Professor, BITS Goa.

iGEM Competition 2020, BITS Goa   November 2019 – November 2020

Software Team Lead   *(Link to Project)*

- Awarded the **Gold Medal** along with two Special Prizes for Best Software Tool and Best Composite Part
- Worked under the supervision of Dr. Sumit Biswas, as part of the first iGEM team from BITS Goa, on reduction of
  post-harvest losses in sugarcane, by using genetically engineered bacterial systems.

CSIR - Institute of Genomics and Integrative Biology   May 2020 – June 2020

Research Intern

- Worked under the guidance of Dr. Lipi Thukral, to quantify interactions between the SARS CoV2 spike glycoprotein
  and the human ACE2 receptor.
- Built visualizations using comparative force-directed graphs to understand these interactions.

Projects

iGEM WikiSync and the iGEM Wiki Starter Pack | *Python, Node.js*   June 2020 – Present
Developed software to help iGEM teams build their wikis. Adopted by several iGEM   *iGEM WikiSync*
teams throughout the competition season and awarded the **Best Software Tool**   *iGEM Wiki Starter Pack*
Special Prize at iGEM 2020.

Technical Skills

Languages: Python, C, C++, Java, Rust, HTML, CSS, JavaScript, Bash
Frameworks: Flask, Django, jQuery, NumPy, Pandas, Scikit-Learn, ProDy
Bioinformatics: Molecular dynamics simulations, protein modelling, docking and secondary structure prediction

Relevant Courses

Biology: Biochemistry, Microbiology, Cell and Molecular Biology, Bioinformatics, Genetics, Recombinant DNA Technology, Immunology, Biophysics, Developmental Biology, Biomolecular Modelling

Mathematics: Mathematics I (Multi-variable and Vector Calculus), Mathematics II (Linear Algebra and Complex Analysis), Mathematics III (Differential Equations), Probability and Statistics, Nonlinear Dynamics and Chaos

Computer Science: Object Oriented Programming, Data Structures and Algorithms, Database Management Systems, Operating Systems, Computer Architecture, Deep Learning, Compiler Construction, Design and Analysis of Algorithms, Computer Networks, Quantum Information and Computing

Other Experience

- **Teaching Assistant for Computer Programming and Digital Design:** Responsibilities include conducting labs for students.

- **Student Mentor under the Academic Assistance Program for General Biology:** Responsibilities included conducting extra tutorials for first-year students.

- **Peer Mentor as a part of the Peer Mentorship Program:** Helping students navigate through college and looking after their academic and personal interests.