

**PIYUSH KUMAR**+1 646-240-8689 | piyush.k@columbia.edu | <https://www.linkedin.com/in/piyushskumar/>**EDUCATION****Columbia University**, New York, NY**Masters of Science in Chemical Engineering; GPA: 3.92/4**

Expected Dec 2023

- Relevant Coursework: Computer Simulations in Biology, Solid State Chemistry in Pharmaceutical, Advanced Chemical Kinetics, Advanced Chemical Engineering Thermodynamics, Project Management.

**Dwarkadas J. Sanghvi College of Engineering**, Mumbai, IN**Bachelor of Engineering in Chemical Engineering; CGPA: 9.31/10**

Jun 2022

- Relevant Coursework: Biotechnology, Mass Transfer, Engineering Chemistry, Chemical Reaction Engineering.

**WORK EXPERIENCE****Columbia University**, New York, NY

May 2023 - Present

**Student Research Worker**

- Assembling proteins in pET vector and designed its primers by using Benchling and NEbuilder Assembly tool in tandem.
- Performing heterologous protein expression via cell culture technique and purified it using affinity chromatography.
- Performing FRET and CD to study the metal binding affinity of the different proteins obtained with 8 rare earth metals.
- Conducting protein-ligand molecular docking using various software tools to analyze protein binding sites.
- Managing technical training of interns, resulting in a 33.33% reduction in the time required to gather data on various proteins.

**Columbia University**, New York, NY

Sep 2023 - Present

**Grader**

- Working for CHEN E4800 Protein Engineering with prof. Scott Banta to grade homework and exams.

**Columbia University**, New York, NY

Jan 2023 - May 2023

**Graduate Research Assistant**

- Gained hands-on experience in molecular cloning techniques and standard laboratory procedures such as calibration of bioreactor, autoclaving, gel electrophoresis, DNA extraction, and FPLC protein purification technique.
- Altered DNA sequences using Gibson Assembly and restriction digest and cultured them in E-coli.

**Adage Automation Private Limited**, Verna, IN

Jul 2021 - Jul 2021

**Engineering Intern**

- Received hands-on experience with respect to process gas analyzer, gas chromatograph, and CV analyzer along with its applications.

**Aaharya Technologies**, Vijayawada, IN

Feb 2021 - Mar 2021

**Engineering Intern**

- Designed 80% of flowsheet of Dimethyl-Ether manufacturing plant on Aspen Hysys single handedly and designed more than 10 heat exchangers using Aspen Exchangers software and succeeded in its energy optimization by approximately 60%.

**PROJECTS AND RESEARCH****Columbia University**, New York, NY

Sep 2022 - Dec 2022

**Biopharmaceutical Process Laboratory**

- Performed protein purification on a mixture of lysozyme and  $\alpha$ -chymotrypsinogen by employing ion-exchange chromatography, analyzed the chromatograms for retention time, absorbance and improved the resolution to a value of 1.86.
- Conducted an Powdered X-Ray Diffraction (PXRD) analysis on crystals grown under 5 different conditions to assess its characteristics.
- Conducted a water permeability test and the desalination of water by employing the tangential filtration model with a 5k membrane.
- Simulated fermentation conditions by varying agitation and flow rates in the bioreactor during depletion and replenishing of oxygen.
- Compacted a blend of MCC and tartrazine by using MTS machine at 3 different pressures and then tested its solubility properties.

**Dwarkadas J. Sanghvi College of Engineering**, Mumbai, IN

Jul 2021 - Apr 2022

**Manufacturing of Sorbate and Sorbic Acid**

- Performed material and energy balance for more than 15 equipments, devise and simulated process flow sheets using Smartdraw and Aspen Hysys and worked on optimization of the process and modified the process thus increasing the flexibility of the process.

**TECHNICAL SKILLS**

- Laboratory Skills: Chromatography (Ion exchange - UNICORN software, Affinity, AKTA), Optical Microscopy, PXRD analysis, Compaction (MTS 7 kip compaction system), Filtration (minimate TFF capsule), Western Blot, Gel Electrophoresis, PCR, electroporation, Primer Design and Plasmid Construction (Benchling, NEbuilder Assembly tool), SDS-PAGE, Western Blot, Staining, Buffer and Media Preparation, Cell Culture, DNA extraction (Plasmid and Genomic), RNA extraction, FRET (Softmax Pro Software), Nanodrop.
- Programming Language: Python (NumPy, Pandas).
- Simulation Softwares: Autodock, PyRx, Vega ZZ, Open Babel GUI, Avogadro, PyMOL, AlphaFold, Aspen (Hysys, EDR), Polymath, Sympy, Chemsep, MATLAB, AutoCAD, Canva, Smartdraw.

**LEADERSHIP AND ACTIVITIES**

- Selected as the MS Ambassador of the chemical department to mentor the incoming MS candidates with their program onboarding.
- At PACE EOS, spearheaded a 40-member team and collaborated with 14+ institutions' committee heads to ensure seamless execution of events with national-level celebrities.
- Completed the Bronze level of Duke of Edinburgh Awards.