Abhishek Gupta

BS-MT (Dual) Undergraduate · Department of Chemistry & Biological Science and Bio-engineering

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Academic Qualification

Year	Degree	Institute	CPI / %
2020*	M.Tech. Biological Science & Bio-engineering	Indian Institute of Technology, Kanpur, India	9.4†/10.0
2019	B.S. Chemistry	Indian Institute of Technology, Kanpur, India	8.0/10.0
2015	Class XII (Central Board of Secondary Education)	Jain Bharti Mrigavati Vidyalaya, New Delhi, India	92.2 %
2013	Class X (Central Board of Secondary Education)	Jain Bharti Mrigavati Vidyalaya, New Delhi, India	9.6/10.0

(* expected, † till 2018-19-II)

Honors & Awards

2019 **Rank 1**, Department of Chemistry, among all undergraduates of the department over the four years — *IIT Kanpur, India*

2018 **Recipient**, INSPIRE Scholarship by Dept. of S&T, India, to students inclined to pursue career in science — *India*

2017 **Stood 3rd**, Techkriti Innovation Challenge in Techkriti '17 (annual international, technological festival) — *IIT Kanpur, India*

2016 **Awarded Silver Medal**, Hardware Competition in Inter-IIT Tech Meet (annual technological competition) — *IIT Mandi, India*

2016 **Secured 1st Place**, Techkriti Innovation Challenge in Techkriti '16 (annual international, technological festival) — *IIT Kanpur, India*

2016 **Best Project**, HUmanoid RObot (HURO) project, built an autonomous wheeled humanoid under Robotics Club — *IIT Kanpur, India*

2016 **Honorable Mention**, Air-Combat Game Project under Programming Club, Science and Technology Council — *IIT Kanpur, India*

2015 **Top 0.4%**, Joint Entrance Exam (All India Engineering Entrance Examination) among 1.5 million candidates — *India*

2014 **Rank 1**, Class topper in 8th Science Olympiad Foundation (SOF), International Mathematics Olympiad (IMO) — *New Delhi, India*

2013 **Secured 2nd Position**, One Act Play at zonal level organized by Delhi School Sports and Activities Board — *New Delhi, India*

Publications

Sequence-based prediction of olfactory receptor responses — *In Review*

Chemical Senses, published by Oxford University Press [bioXiv] — *June'19*

- Developed a novel model to deorphanize the responses of a receptor using responses and sequences of other con-specific receptors
- Applied the method to insect & vertebrate receptors and found predictions to be in significant agreement with experimental data
- This high-throughput approach could possibly facilitate the time-consuming and resource-intensive experimental procedures

Professional Experience

WorldQuant — *Remotely*

International Hedge Fund and Quantitative Investment Management Firm, headquartered in Connecticut, US — *Jan'19 - Present*

- Build high-quality financial market signals using top US/Europe/Asia firms market data for trading and portfolio construction
- Wrote scripts for filtering first-rate strategies to improve performance of the signals and used Selenium for web-based automation

Centre National de la Recherche Scientifique (C.N.R.S.) — *France*

Research Internship, under Prof. Frederic Marion-Poll, Laboratory of Evolution, Genomes, behaviour, Ecology — *May'18 - July'18*

- Understanding how bitterness related to toxicity in insects by conducting behavioural experiments in flies using multi-CAFE
- Built a GUI to monitor the experiments and implemented image processing algorithms using OpenCV for real-time object detection
- Created a network containing master (computer) and slave (raspberry pi) nodes for better experiment control and data acquisition

Projects

Insect Olfaction — *IIT Kanpur, India*

M.Tech Thesis & UG Project, under Prof. Nitin Gupta, Department of Biological Science & Bio-engineering — *May'17 - Present*

- Understanding brain circuitry that govern how specific smells become attractive or repulsive to insects using mosquito model
- Collected and analyzed, behavioural and electrophysiology data of different insect species using Python & Matlab environment
- Build a Graphical User Interface (GUI) to monitor and record the behaviour of mosquitoes in real-time using Tkinter package
- Developed a background modeling algorithm to extract the moving objects (mosquitoes) from the video frames using OpenCV
- Built walking assay to conduct experiments on wild-type and mutant mosquitoes to better understand the working of repellent

DNA Damage Response of Mycobacterium Tuberculosis — *IIT Kanpur, India*

Research Project, under Prof. Saravanan Matheshwaran, Department of Biological Science & Bio-engineering — *May'17 - July'17*

- Worked on understanding the SOS response machinery which activates in response to the damage conditions in M. Tuberculosis
- Isolation of vital enzymes involved in the SOS response mechanism was performed using standard molecular biology techniques

Phage Therapy against Staphylococcus aureus — *IIT Kanpur, India*

Research Project, under Prof. Saravanan Matheshwaran, Department of Biological Science & Bio-engineering — *Dec'16 - May'17*

- Worked on the isolation of Staphylococcus aureus bacteria (common cause of skin infections) from the Ganges in Bithoor, India
- Carried out phage isolation protocols which involves Protein purification, Gel Electrophoresis, Polymerase Chain Reaction etc.

Automatic Lift-Arm Sorter
COURSE PROJECT, UNDER PROF. SHASHANK SHEKHAR, DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING *IIT Kanpur, India* *Jan'17 - May'17*
- Implemented a model to automatically sort blocks of different sizes based on difference in the position of the center of mass

HUmanoid RObot (HURO)
ROBOTICS CLUB PROJECT, UNDER SCIENCE AND TECHNOLOGY COUNCIL *IIT Kanpur, India* *Sep'15 - May'17*
- Designed various improved models of Humanoid and performed simulations using Virtual Experimentation Platform (V-REP)
- Implemented a Chat-Bot using Wikidata, Speech Recognition, Natural Language Processing (NLP), and Wolfram Alpha API

Sign Language and Communication (SL-COM)
ROBOTICS CLUB PROJECT, UNDER SCIENCE AND TECHNOLOGY COUNCIL *IIT Kanpur, India* *Feb'16 - Mar'17*
- Aimed to lower the barrier of communication for deafs by developing an inexpensive portable sign-language translation device
- Assembled flex sensors into gloves with bluetooth connectivity to chat application, which translate sign-language into speech

Transportation Mechanism
COURSE PROJECT, UNDER PROF. NEERAJ SINHA, DEPARTMENT OF MECHANICAL ENGINEERING *IIT Kanpur, India* *Aug'17 - Nov'17*
- Manufactured an efficient box shifting mechanism, modeled on Autodesk Inventor, to transport the stacked work-pieces

Air War Window's Game
PROGRAMMING CLUB PROJECT, UNDER SCIENCE AND TECHNOLOGY COUNCIL *IIT Kanpur, India* *May'16 - July'16*
- Designed an air combat shooter game on Unity3D with high graphics, audio effects, animation physics, weapon switching etc.

Position of Responsibility

Teaching Assistant
NEUROBIOLOGY COURSE TUTOR, UNDER PROF. NITIN GUPTA, DEPARTMENT OF BIOLOGICAL SCIENCE & BIO-ENGINEERING *IIT Kanpur, India* *July'19 - Present*
- Helped course instructor in continuous evaluation of students by conducting quizzes & debates, checking answer sheets etc.

Dean of Undergraduate Committee, Student Nominee
ACADEMIC & RESEARCH CELL, UNDER STUDENT'S GYMKHANA *IIT Kanpur, India* *Aug'17 - July'18*
- Elected as the student nominees for the Department Undergraduate Committee, consisting of HOD, convener, and professors
- Played a pivotal role in policies establishment, course reconstruction, student appeals, department international collaborations etc.

Secretary
ROBOTICS CLUB, UNDER SCIENCE AND TECHNOLOGY COUNCIL *IIT Kanpur* *Aug'16 - Apr'17*
- Organized Takneek'16 (Intra-IITK S&T Championship) competitions, worked on designing problem statements, arenas etc.
- Mentor of ARduino-BAsed LED Table (ARBALT) project team consisting of four first year students, in the Winter Camp '16

Senior Executive of Web Development
TECHKRITI '17, ANNUAL INTERNATIONAL TECHNOLOGICAL FESTIVAL *IIT Kanpur* *Oct'16 - Mar'17*
- Responsible for developing sub-pages like TOSC, Technocruise competitions and editing main & beta version of main website

Senior Member
TEAM HUmanoid RObot (HURO), UNDER SCIENCE AND TECHNOLOGY COUNCIL *IIT Kanpur* *Aug'16 - Apr'17*
- Assigned projects, conducted workshops and lectures for new members of the team consisting of 10-12 first year students
- Mentor of Battery Management System (BMS) and Chat-Bot sub-teams, guided team in implementing module for the Humanoid

Skills

Programming	Python, Matlab, C, C++, R, Lua, HTML, CSS
Operating Systems	Gentoo Linux, Ubuntu, Kali, Raspian, Debian
Software & Utilities	Git, Arduino, OpenCV, Tkinter, Selenium, Autodesk Inventor, Altium, V-REP, LaTeX
Laboratory Skills	Cloning, Gel Electrophoresis, PCR, Protein Purification, Behavioural Experiments
Language Proficiency	English (written and spoken), Hindi (native), German (elementary proficiency)

Coursework

Computing	Fundamentals of Computing, Computational Cognitive Science, Machine Learning* [link]
Mathematics	Linear Algebra & Differential Equations, Partial Differential Equations, Complex Variables
Biology	Neurobiology, Bioinformatics & Computational Biology, Principles of Biotechnology, Biomaterials
Chemistry	Introduction to Bio-nanotechnology, Statistical Mechanics, Bio-systems, Organic, Inorganic, Physical
Miscellaneous	Introduction to Electronics, Microeconomics, Soft Skills & Personality Development, Thermodynamics

(* online course with certification)

Extra-Curricular Activities
- Participated in **EXL EQ'18**, Analytics Competition organized by EXL service (leading operations management and analytics firm)
- Participated in **Soccon '16 (&17)**, SOCial CONquest in Techkriti (annual technological festival), built a sign-language translator
- Participate in **Takneek '16 (&17)** (Intra-IITK S&T Championship), built robot controller using Inertial Measurement Unit sensor
- Participated in **code.fun.do 2017** (development competition organized by Microsoft), built a conversational interface for messaging