# UTKARSH SARASWAT

(+91)8828494876 ⋄ saraswat.utk@gmail.com

## EDUCATION

**Summary**

· Bachelors of Technology, Chemical Engineering, Indian Institute of Technology Bombay — 2015-19
· Sri Sankara Vidyalaya Bhilai, Higher Secondary School (12th class CBSE board) —2012-14
· Kendriya Vidyalaya Bilaspur, Secondary School (class 10th CBSE board) — 2012-14

**Achievements**

· Recieved Elite+Silver certificate from NPTEL in courses of Discrete Mathematics, Data structures
· Received Undergraduate Research Award-01 for contribution to scientific research at IIT Bombay, 2018
· Qualified entrance exam of JEE Advanced with all India rank of 1098 out of 122,000 appeared, 2015
· Secured first rank in school in NSO (National Science Olympiad), 2011

## UNDERGRADUATE RESEARCH

**Computation modelling of cell mechanics and Cytometry** Mar 2017- Mar 2018

Simulated interaction of two cell freely suspended on a jelly like substrate by duplicating the displacement field from single cell and placing them in radially symmetric fashion across the substrate,

· Extended FTTC (Fourier Transform Traction Cytometry) to calculate depth sensitivity of a cell and traction forces in substrate along depth (x-z and y-z plane) using Finite element method and while utilizing existing TFM(Traction Force Microscopy) MATLAB code to calculate x-y plane traction
· Estimated traction force in non-linearly elastic substrate via back-calculation of shear strain gradients using equation of linear elasticity and plugging it to the Neo-Hookean elasticity equation.

## PROJECTS

**Simulation using Dataflow programming : Beehive** Aug 2021-present
*Independent project for modelling and simulation*

· Developed a fully web-based framework named Beehive for modelling and simulation and user defined svg visualization of any simulation object
· Developed C++ library named Bahav providing interface to Beehive for all numerical calculations and design simulation architecture via implementing dataflow programming, actor model and graph algorithms

**Process design of chemical plant to produce of tert-Butanol** Jan 2019- Apr 2019
*Course: Process Design Project, dept. of Chemical Engineering, IIT-Bombay*

· Four month continuous project (in team of 4) to plan layout, design, operation and economics of Chemical manufacturing plant for producing TBA (tertiary butyl alcohol)
· Performed requirement analysis based on expected production, physio-chemical properties of TBA, climatic and geopolitical conditions to choose chemical processes, raw materials and process equipment
· Developed ASPEN simulation of the proposed plant to come up with Process flow diagram, p&id diagram and utilized it perform cost analysis and waste emission optimisation

**Weather prediction using time series analysis** Aug 2018 - Oct 2018

- Analysed one month monsoon weather data of Mumbai from Indian Meteorological department and applied Auto-Regressive Moving average SYSID models to predict weather in Mumbai. (Parameters included: precipitation, sunlight duration and intensity, humidity, wind speed and direction, duration of clouds in the sky, temperature and pressure)
- Estimated cause-effect relationship between different data sets using Granger causality test to narrow down dimensions of input data

**Simulation of Actin Polymerisation** Feb 2018- Apr 2018

- Designed kinetic Monte-Carlo simulation of Actin polymerization using random walk algorithm to study linear growth and chemical composition of polymeric chain
- Calculated rate constants for aggregation of each of the three different monomer units and established relationship between composition and concentration of Actin with length of the polymeric chain

**Modelling Transcription Network** Feb 2018- Apr 2018

*Course: Systems Biology, Guide: Prof Ganesh A Viswanathan, Dept of Chemical Engineering, IITB*

- Analysed metabolic data of Chinese Hamster's Ovary cells using MATLAB and proposed network model involved in cellular growth, Glucose & Lactate production; Obtained 80-90 % accuracy

## WORK EXPERIENCE

**Siemens Industrial Software India pvt Limited** July 2019 - present

*Graduate Trainee Engineer*

- Implemented multi-threaded execution of Cucumber and reduced the aver- age executing time of 10 test suites from 10 hours to 7.5 hours by unbinding scenarios from features and redistributing the tests more optimally
- Developed linear programming utility to group 400 installation suites of Teamcenter application into 20 sets on the basis of shared dependencies and minimization of overall installation time
- Designed dashboard to keep track of changes in daily releases of Active- Workspace testing framework and utilization of step-definations
- Developed java application based on sikuli (UI testing framework) to enable image-comparision based testing in puppeteer testing framework
- Developed airport simulator program written in C++ and Java to calculate scheduling of landing, take-off and waiting time on gates based on input of number of flights and runways as part of Codathon

**Grasim Industries, Aditya Birla Group** May 2018 - July 2018

*Internship: Plant process improvisation*

- Developed standalone operational dashboard based on python of daily plant production reports, enabling the plant manager to effectively monitor daily plant statistics
- Developed MATLAB program to replicate the batch Chemical process of manufacturing PAC (Poly-Aluminium Chloride) achieving around 90 % accuracy wrt daily plant production report: The simulation was extended to design a continuously operating plant for same operation
- Determined heat capacity and boiling point of concentrated PAC at room temperature and pressure using calorimetric analysis

**Nanosniff Technologies (MEMS RD Organisation based in IITB** Dec 2017-Jan 2018
*Internship: Modelling and simulation*

- Performed thermal simulation using ANSYS to find overheated regions in micro-fabricated machinery
- Obtained maximum permissible flow-rate and stress due to hydrodynamic pressure on cantilever like micro-sensors using ANSYS fluent for fluid mechanics and ANSYS structural analysis for bending stress

## EXTRA-CURRICULAR ACTIVITIES

**AZeotropy, IIT Bombay (Chemical Eng Symposium of IIT Bombay** Apr 2017-Mar 2018

- Part of a 12-member-ed team aimed to promote theoretical and practical learning among Chemical engineering students across India through organising 2-day event involving competitions, lectures, workshops and informal events
- Worked as competition manager responsible for for coming up with and executing innovative competition to enhance practical Chemical Engineering skills in participants. Newly conceptualised competitions involved: Chemically driven toy car/vehicle with curved track

**Tree climbing robot** May 2016- Jun 2016
*ITSP: Institute Technical Summer Project*

- Developed ball and screw mechanism based tree climbing machine from scratch starting from CAD-design (using SolidWorks) followed by manual manufacturing of robotic limbs at mechanical workshop and assembling electronic components into the machine
- Used Arduino microprocessor to write program to perform mechanical actions like climb/hold a tree. Parameters involved: rotation speed: for climbing, peak current: amount of current in mechanical grippers just enough to hold the robot

Volunteered CURED (Can You Really Escape Diabetes) by assisting medical professionals to perform free instant diabetes check-up for 200+ individuals in a residential area, an initiative by Techfest IIT Bombay 2016 to promote awareness of diabetes

Part of hostel music band as the flutist, participated in two inter hostel competitions of Music General Championship and Sophie band