Adeesh KOLLURU

Incoming PhD Candidate, CMU | B. Tech, IIT Delhi 2020

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Personal Website

Passionate problem solver with interests in developing deep learning models for chemical engineering applications. Gained experience in deep learning, kinetic modeling and CFD through various projects and coursework. I am always interested in solving complex inter-disciplinary problems and taking leadership roles.

🎓 EDUCATION

2020-	PhD in Chemical Engineering, Carnegie Mellon University	
2016-2020	B. Tech in Chemical Engineering, Indian Institute of Technology Delhi	**GPA :** 8.52/10

💼 RESEARCH EXPERIENCES

May 2019 – July 2019

Columbia University, NEW YORK CITY, USA, Prof. Faye McNeill
- Implemented statistical and machine learning regression techniques to calibrate low-cost air quality sensors with co-located government sensors
- The study led to higher spatial and temporal accuracy of PM 2.5 values for lower costs and was performed for Delhi, Kolkata and New York City

Data preprocessing | SQL | Statistics | Machine Learning | Air Quality

November 2018 – January 2019

National University of Singapore, SINGAPORE, Prof. Duane Loh
- Implemented a 2D self-avoiding random walks with hierarchy following specific rules to create a training dataset that has protein motif like recurrent structure
- Visualized the activations from encoded layers of auto encoders in order to analyze its ability to learn in an unsupervised manner

Computer Vision | Keras | Deep Learning | Bio-imaging

Mars 2018 – July 2018

Columbia University, NEW YORK CITY, USA, Prof. Faye McNeill
- Devised and implemented a technique through certain approximations to estimate emissions and concentration values of gas phase species and combined it to GAMMA model for analysis of atmospheric aerosol concentration
- Incorporated additional species and reactions relevant to Delhi's pollution in Gas Aerosol Model for Mechanism Analysis (GAMMA) to achieve accurate concentration profiles

Atmospheric Modeling | Data Analysis | Kinetic Modeling

🎓 SCHOLASTIC ACHIEVEMENTS

2019	REU Program of Columbia University 2019 : Selected in the summer program for undergraduates
2018	Awarded for Distinctive performance in Overall Activities from Chemical Engineering Society, IIT Delhi
2018	Semester Merit Award : Awarded for being in the Top 7% of Chemical Engineering batch
2016	KVPY fellowship 2016 : Awarded by Govt. of India for being in the Top 1% across the country
2016	National Science Talent Search Exam (NSTSE) : Secured All India Rank 1 hosted by Unified Council
2016	JEE Mains Examination : Secured All India Rank 770 among 1.5 million candidates

☰ SKILLS

Languages : Python (TensorFlow, Keras, PyTorch, Pandas, Scikit), C   **Software :** Ansys, Fluent, Matlab, Gromacs

☰ ADDITIONAL COURSEWORK

ChemE : Advanced Process Control, Air Pollution Control Engineering, Applications of Computational Fluid Dynamics, Advanced Bioprocesses and Bioseparations, Molecular Modeling and Simulations

CS & Math : Linear Algebra, Probability & Statistics, Machine Learning, Advanced Machine Learning

Economics : Microeconomics & Game Theory, Macroeconomics and Economic Policies

☰ POSTERS AND PUBLICATIONS

Posters

●**Adeesh Kolluru**, V. Faye Mcneill- Multiphase chemistry modeling of extreme air quality in Delhi – Air Pollution Extreme Workshop 2018, Columbia University, New York

●Md Abid Sikder, **Adeesh Kolluru**, V. Faye Mcneill - Modeling aerosol chemistry during wintertime in Dhaka – Air Pollution Extreme Workshop 2018, Columbia University, New York

Publications

●Leelaram Santharam, Somesh Mishra, **Adeesh Kolluru**, Anurag Rathore - A theoretical kLa model for enabling real time control of aeration and agitation rate in a bioreactor during continuous processing - *Submitted*

●**Adeesh Kolluru**, Leelaram Santharam, Anurag Rathore - Machine learning based control of aeration rate for mammalian cells - *in preparation*

●.., **Adeesh Kolluru**, V. Faye McNeill - Performance and In-field Calibration for Low-Cost Sensors Measuring Ambient Particulate Matter in Kolkata, India - *in preparation*

🖥 PROJECTS

MACHINE LEARNING BASED CONTROL OF AERATION RATE FOR MAMMALIAN CELLS IN A BIOREACTOR   AUGUST 2019 - MAY 2020
Prof. Anurag Rathore, IIT Delhi

Implemented a machine learning model to predict the VCC and a theoretical model for mass transfer coefficient for optimum control of aeration rate for Chinese Hamster Ovary (CHO) cell line in a stirred tank reactor

Machine Learning | Process Control | Reactor Modeling

CFD MODEL FOR COILED FLOW INVERTER   SEPTEMBER 2018 - OCTOBER 2019
Prof. Anurag Rathore, IIT Delhi

Built a CFD model on Fluent to analyze the concentration of protein products from refolding reaction in a coiled flow inverter and validated it with experimental results

Fluent | CFD | Kinetic Modeling

LEAST COST NEURAL NET ON BREAST CANCER DATABASE   AUGUST 2018 - NOVEMBER 2018
Prof. Jayadeva, IIT Delhi

Applied a neural network with a modified cost function that converges faster on sparser datasets and achieved a higher accuracy through this model on BreakHis database compared to various state of the art models

Deep learning | Computer Vision | Keras

DEEP LEARNING FOR SEGMENTATION AND CLASSIFICATION OF SPINAL X-RAY IMAGES   FEBRUARY 2020
Prof. Prathosh, IIT Delhi

Studied the performance of DeepLabV3+ with a pretrained backbone of mobilenet, resnet for segmentation and classification of novel spinal x-ray images dataset

Deep Learning | Computer Vision | Pytorch

APPLICATIONS OF COMPUTATIONAL FLUID DYNAMICS   JULY 2019 - NOVEMBER 2019
Prof. Ratan Mohan, IIT Delhi

Applied Volume of Fluid method to visualize the behaviour of gas bubbles in liquid mixtures
Applied Euler Euler granular kinetic theory model to demonstrate solid phase volume fraction variation within fluidized bed

Fluent | CFD | Kinetic Modeling

☰ EXTRACURRICULAR ACTIVITIES

Leadership

●Served as Sports Secretary of the Board for Sports Activities, IIT Delhi

●Captained the Aquatics and Water polo team in Intra-College competitions

●Conducted various National debating tournaments as Representative of Debating Club, IIT Delhi

Sports

●Represented IIT Delhi in Waterpolo and won Silver medal in 4x100 Medley Relay Aavhan Sports Meet 2018

●Won Best Waterpolo Player award twice consecutively in Intra-College competitions

●Played hockey, table tennis, cricket, weightlifting at the Institute Level

Cultural

●Breaking Adjudicator, Intra-IIT Parliamentary Debate'18   ●Breaking Speaker, Intra-IIT Parliamentary Debate'19

Voluntary work

●Mentored a group of students as a part of Student Mentorship Program

●Volunteered for Humanity Foundation that works for the welfare of specially abled students