KANAN PATEL

320-237-4000 | kananpatel@utexas.edu

EDUCATION

PhD Candidate in Chemical Engineering with a graduate portfolio in applied statistical modelling, The University of Texas at Austin (UT Austin), CGPA: 4/4	*Aug 2017 – Dec 2021 (est.)*
B.Tech (Hons.) Chemical Engineering, Indian Institute of Technology Madras (IIT-M), CGPA: 9.12/10; Class Rank: 3/110	*Aug 2010 - Jul 2014*

ACADEMIC RESEARCH EXPERIENCE

PhD Thesis: Factors Influencing Ambient air quality - From Texas to New Delhi *Aug 2017 - Present*

Insights from Ambient Particulate Matter (PM) Measurements in Austin, Texas, *Manuscript published*

- Led a field campaign to measure ambient PM in Austin by using aerosol mass and size spectrometry instruments
- Performed source apportionment using statistical receptor models, thermodynamic models, and back trajectory analysis on the data to identify the nature and sources of PM in Austin and demonstrated the influence of cement kilns on particulate sulfate in the region.

Using statistical tools/machine learning to understand PM in the Most Polluted Megacity, *Manuscripts in preparation*

- First group in the world to obtain long term, high resolution PM data in the world's most polluted megacity, New Delhi, India
- Demonstrated the influence of agricultural burning from the north-western states of Punjab and Haryana in causing extreme pollution episodes by combining dimensionality reduction methods such as positive matrix factorization with non-parametric wind regression
- Showed the influence of meteorology on PM by using statistical hypothesis tests
- Investigated the influence of the COVID-19 lockdown on New Delhi's air quality by combining temporal trends with quantitative robust statistical analysis
- Working on developing a deep learning model to predict PM concentrations in Delhi using meteorological data

Estimating Calibration Parameters for Chloride in Aerosol Chemical Speciation Monitor by Using Statistical Methods

- Developed an operating procedure to obtain calibration parameters for chloride by combining theory with ordinary least squares (OLS)
- Developed procedure to check all the assumptions of OLS to make sure that the linear regression is not inefficient or biased

Undergraduate Thesis *Aug 2013 - Apr 2014*

Molecular Dynamic Simulations of Polyacrylates (PAA) in Salt Solutions, *Manuscript published*

- Investigated the conformational, hydration and thermodynamic behaviour of PAA chains as a function of the degree-of-ionization and salt concentration in aqueous solutions
- Demonstrated a decrease in the rigidity of PAA chains with increase in salt concentration, and difference in conformational and hydration behaviour of acid and ionized forms of PAA
- The results were validated with Monte Carlo simulations on model systems in literature and were found to be in excellent agreement

S.N Bose Scholar (among 50 students selected all over India), University of Wisconsin- Madison *May - Jul 2013*

Genome Scale Metabolic Model Reconstruction

- Performed model reconstruction of micro-organisms such as Escherichia Coli with the aid of routines available in COBRA and RAVEN toolboxes in MATLAB
- Investigated the feasibility of synthetic biosynthesis of useful secondary metabolites, such as antibiotics, in Escherichia Coli with the aid of constraint-based modelling methods

Winner, Censeo, Chemclave (Chemical Engineering Department Fest), IIT-M *Mar - 2013*

- Performed a literature survey of the status of energy generation in Gujarat (a state in India) and provided alternative energy solutions utilizing the weather and geological conditions in the area
- Demonstrated the viability of Jatropha plantation to obtain oil from its seeds and the use of biomass for energy co-generation using bio-gas fuel cells

SELECTED PUBLICATIONS

- **Patel, K.,** Wang, D., Chhabra, P., Bean, J., Dhulipala, S. V. and Hildebrandt Ruiz, L.: Effects of Sources and Meteorology on Ambient Particulate Matter in Austin, Texas, ACS Earth and Space Chemistry, https://pubs.acs.org/doi/10.1021/acsearthspacechem.0c00016 , 2020
- **Patel, K. H.**, Chockalingam, R. and Natarajan, U.: Molecular dynamic simulations study of the effect of salt valency on structure and thermodynamic solvation behaviour of anionic polyacrylate PAA in aqueous solutions, Molecular Simulation, https:/doi.org/10.1080/08927022.2017.1295454, 2017
- Bhandari, S., Gani, S., **Patel, K.**, Wang, D. S., Soni, P., Arub, Z., Habib, G., Apte, J. S. and Hildebrandt Ruiz, L.: Sources and atmospheric dynamics of organic aerosol in New Delhi, India: Insights from receptor modeling, Atmospheric Chemistry and Physics Discussions, 1–33, https://doi.org/10.5194/acp-2019-403, 2019
- Gani, S., Bhandari, S., Seraj, S., Wang, D. S., **Patel, K.**, Soni, P., Arub, Z., Habib, G., Ruiz, L. H. and Apte, J. S.: Submicron aerosol composition in the world ' s most polluted megacity : The Delhi Aerosol Supersite campaign, Atmospheric Chemistry and Physics, 1–33, https://doi.org/10.5194/acp-19-6843-2019, 2019

INDUSTRIAL EXPERIENCE

Front End Development Manager, Pulau Bukom Refinery, Royal Dutch Shell, Singapore *May 2016 - May 2017*

- Responsible for the end-to-end development of a 10 million USD growth project to export slack wax (refinery by-product)
- Developed front end design which included process engineering calculations in compliance with Shell Design Engineering Practices
- Received a Special Recognition award from the Business Opportunity Manager for bringing the project to Final Investment Decision

Oil Movements Consultant, Technical Hydrocarbon Supply Chain, Shell Technology Centre, Bangalore *Aug 2014 - Apr 2016*

- Provided technical support to Shell and external refineries in Asia-Pacific in the Oil Movements and Product Quality domain, which included design support in brown and green field projects as well as day-to-day troubleshooting of product quality issues
- Performed Oil Loss Reviews for Shell and external refineries to help them identify avenues for oil loss reduction and control
- Received a Special Recognition Award from the Regional Manager of my team based on excellent customer feedback on work delivery

TEACHING AND LEADERSHIP

Member of GAIN (Graduate and Industry Networking Event), UT Austin *Spring 2020*

- Pitched GAIN 2020 to industry representatives and helped organize the logistics of the event

Teaching Assistant for "Numerical Methods in Chemical Eng." course, UT Austin *Fall 2018 - Spring 2019*

- Taught coding in Matlab to ~40 under-graduate students (per semester) and received an average rating of 4/5 as student feedback

Judge, Undergraduate Research Poster session, Chemical Engineering, UT Austin *Spring 2019*

- Served as a judge for the poster session where ~45 junior and senior year under-graduate students showcased their research results

President, Chemical Engineering Society, IIT-M *May 2013 - Apr 2014*

- Headed the department for organizing Chemclave (department technical fest, footfall of 5000) and mentored ~ 50 students to help them secure internships and job placements

SCHOLASTIC ACHIEVEMENTS

- Amongst top three winners in the department 1st -3rd year seminar series, UT Austin *2020*
- Received a full scholarship to participate in Earth Science Women's Network (ESWN) professional development workshop *2019*
- Recipient of the James R. and Merle Fair Endowed Graduate Fellowship in Chemical Engineering, UT Austin *2017- 2018*
- Amongst 8 students in the department to qualify for B.Tech. honors degree based on excellent academic record, IIT-M *2012*
- Amongst the top 0.5% in India's IIT-Joint Entrance Examination (IITJEE) among 470,000 participants *2010*

SKILLS

- Programming Languages/Software: Matlab, R, Python, C, VBA, Aspen Plus, Igor Pro
- Modelling/Data science/Machine learning - advanced statistical analysis, design of experiments, dimensionality reduction, supervised/unsupervised learning, deep learning, optimization
- Equipment: Aerosol Chemical Speciation Monitor (ACSM), Scanning Electrical Mobility System (SEMS), High-Resolution Time of Flight Chemical Ionization Mass Spectrometer (HR-ToF-CIMS)

RELEVANT COURSES

- University of Texas at Austin: Completed - From Data to Decisions, Atmospheric Chemistry and Physics, Energy Technology and Policy; Subsurface Machine Learning, Statistical Methods
- Online certifications from Coursera: Machine Learning, Deep Learning Specialization