PIYUSH KUMAR KUMAWAT

+1(385) 472-4292 ◇ Salt Lake City, Utah
piyush.kumawat@utah.edu ◇ linkedin.com/pkkumawat24 ◇ Google Scholar ◇ ORCID ◇ piyushkumawat.github.io

EDUCATION

University of Utah, Salt Lake City, USA — August 2022 - Present
Ph.D. Student, Department of Chemical Engineering
Research Focus: Carbon Storage, Machine Learning, Energy Systems

Indian Institute of Technology Patna, Bihar, India — January 2020 - August 2022
M.Tech by Research, Department of Chemical and Biochemical Engineering
Research Focus: Process Systems Engineering

Thapar Institute of Engineering and Technology, Patiala, India — July 2014 - July 2018
Bachelor of Engineering, Chemical Engineering

EXPERIENCE

Graduate Research Assistant — November 2022 - Present
Department of Chemical Engineering, University of Utah — *Salt Lake City, USA*

- Advisor: Prof. Milind Deo, Prof. Palash Panja,
- Research Focus: Energy Storage, Science Informed Machine Learning, Industrial Optimization

Junior Research Fellow — March - July 2022
Intelligent Applications in Chemical Engineering Lab, Indian Institute of Technology Madras — *Chennai, IN*

- Advisor: Prof. Rajagopalan Srinivasan
- Project: Endowing Explanation Abilities to Artificial Intelligence (AI) Methodologies for Process Monitoring and Fault Diagnosis
- Focus: Interpreting deep learning models, Process control

Junior Research Fellow — July 2019 - March 2022
Process Systems Engineering Lab, Indian Institute of Technology Patna — *Patna, IN*

- Advisor: Prof. Nitin Dutt Chaturvedi
- Project: Planning of process industries production to minimize carbon emission and energy consumption
- Optimization with uncertainty, AI in Chemical Engineering, Production planning and scheduling

Project Engineer — July 2018 - June 2019
Harsh Engineering Component Company — *Mumbai, IN*

- Tasks: Preparing, scheduling, coordinating and monitoring the assigned engineering projects of ONGC (Oil and Natural Gas Corporation, Government of India).
- Client Management: Improve B2B experience, implementing and representing clients needs in field.
- Focus: Pigging in oil well fluid line, hydro testing, dewatering, pre-commissioning services

Vocational Trainee — July 2017 - December 2017
Essar Oil Ltd (Now: Nayara Energy) — *Gujarat, IN*

- Designed a heat exchanger using HTRI xchanger suite to improve the pre-heat temperature.
- Analyzed potential changes to improve productivity and make the operation safer and more autonomous.

Summer Intern — June 2016 - July 2016
Shree Cement Ltd. — *Rajasthan, IN*

- Learned and analyzed the production of cement and maintaining its quality.
- Performed Heat balance across clinker unit.

JOURNAL PUBLICATIONS

PK Kumawat , A Bhakte, R Srinivasan (2022), "Escalating Operator Assurance for Deep Neural Network Fault Detection with Multiple-Steady State Operations" *Computers and Chemical Engineering* (in-Preparation)

PK Kumawat, ND Chaturvedi (2022), "Robust resource targeting in continuous and batch process", *Clean Technologies and Environmental Policy*, 24: 273–288 . DOI: 10.1007/s10098-021-02118-8

PK Kumawat, RK Sinha, ND Chaturvedi (2021), "Multi-objective optimization for sustainable production planning", *Environmental Progress Sustainable Energy*, 40(6): ep.13741. DOI: 10.1002/ep.13741

N Rathi, JP Kushwaha, N Singh, N Rajani, **PK Kumawat** (2020) "Adsorptive interaction of ortho-phenylenediamine with commercial activated carbon in presence of Indole and vice versa: synergistic/antagonistic evaluation." *Environment, Development and Sustainability: A Multidisciplinary Approach to the Theory and Practice of Sustainable Development*, 23: 2172–2189. DOI: 10.1007/s10668-020-00668-3

P Kaur, N Rajani, **PK Kumawat**, N Singh, JP Kushwaha (2018) "Performance and mechanism of dye extraction from aqueous solution using synthesized deep eutectic solvents", *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 539:85–91. DOI: 10.1016/j.colsurfa.2017.12.013

BOOK CHAPTER

ND Chaturvedi, **PK Kumawat**, (2022), "Constrained Production Planning with Parametric Uncertainties", *Optimisation for Energy Systems and Supply Chains: Fundamentals Applications*, CRC Press, 1: 133-149 DOI: 10.1201/9781003240228

CONFERENCE PUBLICATIONS

PK Kumawat, ND Chaturvedi (2021), "Feasibility Analysis in Batch Process: A Machine Learning Approach", Chemical Engineering Transactions, 88: 451-456, DOI: 10.3303/CET2188075

R Sudhanshu, **PK Kumawat**, ND Chaturvedi (2021), "Robust Optimization of Heat Exchanger Network with Uncertainty in Inlet Temperatures of Streams", Chemical Engineering Transactions, 88: 307-312, DOI: 10.3303/CET2188051

A Das, **PK Kumawat**, ND Chaturvedi, Gaurav Shukla (2021), "A Deep Learning Framework to predict the consumption of petroleum products", The 16th Conference on Sustainable Development of Energy, Water and Environment Systems (Letter of Acceptance)

PK Kumawat, ND Chaturvedi (2021), "A Data-Driven Approach to Plan Electricity Production from Diesel Engines with Constrained Parameters", Computer Aided Chemical Engineering, 50:1761-1767, DOI: 10.1016/B978-0-323-88506-5.50273-4

A Das, **PK Kumawat**, ND Chaturvedi (2021), "A Study to Target Energy Consumption in Wastewater Treatment Plant using Machine Learning Algorithms", Computer Aided Chemical Engineering, 50: 1511-1516, DOI: 10.1016/B978-0-323-88506-5.50233-3

ND Chaturvedi, **PK Kumawat**, AK Keshari (2021), "Energy and Carbon-Constrained Production Planning with Parametric Uncertainty", IFAC-PapersOnLine, 54(3): 560-565, DOI: 10.1016/j.ifacol.2021.08.301

PK Kumawat, ND Chaturvedi (2020), "Robust targeting of resource requirement in a continuous water network", Chemical Engineering Transactions, 81: 1003–1008, DOI: 10.3303/CET2081168

CONFERENCE PRESENTATIONS

Understanding Deep Learning Models for Operator Assistance: Explainable AI Approaches to Monitor Multi-Mode Operations, *10th Asian Symposium on Process Systems Engineering: Systems Engineering for the Digitalization Era* (Poster Presentation, Virtual) December 2022

Targeting Minimum Water Requirement in Batch Process with Uncertainties Invited at *5th Sustainable Process Integration Laboratory, (SPIL), Brno, Czech Republic* (Oral Presentation, Virtual) November 2021

Feasibility Analysis in Batch Process: A Machine Learning Approach, *23rd Conference of Process Integration, Modeling and Optimization for Energy Saving and Pollution Reduction: PRES'21, Brno, Czech Republic* (Oral Presentation, Virtual) October 2021

A Data-Driven Approach to Plan Electricity Production from Diesel Engines with Constrained Parameters, *31st European Symposium On Computer Aided Process Engineering: ESCAPE-31, Istanbul, Turkey* (Poster Presentation, Virtual) June 2021

Robust targeting of resource requirement in a continuous water network, *23rd Conference of Process Integration, Modeling and Optimization for Energy Saving and Pollution Reduction: PRES'20, Xi'an, China* (Oral Presentation, Virtual) August 2020

SCHOLARSHIPS AND ACHIEVEMENTS

- Kistler Graduate Fellowship, University of Utah
- Master's Fellowship at IIT Patna from Science and Engineering Research Board (SERB, Government of India) (July 2019-March 2022).
- Qualified Graduate Academic Test in Engineering-2019, Chemical Engineering
- Undergraduate Academic Scholarship, Thapar Institute of Engineering and Technology, Patiala (July 2014 - July 2015).

COMPUTATIONAL SKILLS

Machine learning (Libraries: Pytorch, Keras, TensorFlow, scikit-learn), Mathematical Modelling, Optimization (LP, NLP, MILP, MINLP), Data-Drive Optimization (Stochastic programming, Chance-Constrained modelling, Robust optimization for uncertainty), Simulation (Computational Fluid Dynamics, Simulink)

- Modeling Languages: Python, GAMS, CPLEX, MATPOWER
- Software: MATLAB, COMSOL, Aspen Plus

REFERENCES

Prof. Milind Deo
D. and Catherine R. Meldrum Endowed Professor
Chair, Department of Chemical Engineering
Director, Energy and Geoscience Institute, University of Utah

Prof. Rajagopalan Srinivasan
Professor, Department of Chemical Engineering
Head, American Express Lab for Data Analytics, Risk and Technology
Indian Institute of Technology Madras

Prof. Palash Panja
Research Assistant Professor
Department of Chemical Engineering, University of Utah

Prof. Nitin Dutt Chaturvedi
Assistant Professor
Department of Chemical Engineering and Biochemical Engineering, Indian Institute of Technology Patna