Piyush Kumar Kumawat

Senior Research Fellow, Process Systems Engineering Laboratory,
Department of Chemical and Biochemical Engineering,
Indian Institute of Technology Patna, India

https://piyushkumawat.github.io
pkkumawat24@gmail.com
Google Scholar
LinkedIn

EDUCATION

Indian Institute of Technology (IIT) Patna, Bihar, India

- M.Tech (by research) in Chemical Engineering (Process Systems Engineering) Jan 2020 – Present
  - Advisor: Dr. Nitin Dutt Chaturvedi, Department Head
  - Working on SERB sponsored project, R&D, IIT Patna
  - First in Class

Thapar Institute of Engineering and Technology (TIET), Patiala, Punjab, India

- B.E. in Chemical Engineering July 2014 – April 2018
  - Joint Entrance Exam (JEE Mains): 97.16 Percentile (All India), Academic Scholarship
  - Final Year Project: Integrated approach to the process and plant design for manufacturing of impact polypropylene

RESEARCH INTERESTS

- Optimization, Scheduling, Supply-Chain Management, Production Planning
- To develop data-driven methodologies for process industries; using ML, AI algorithms
- Life Cycle Assessment, Circular Economy

RESEARCH EXPERIENCE

R&D, Department of Chemical Engineering and Biochemical Engineering, IIT Patna

- Senior Research Fellow, Junior Research Fellow (July'19- July'21) July 2019 – Present
  - Supervisor: Dr. Nitin Dutt Chaturvedi, Department Head
  - Project Title - "*Planning of process industries production to minimize carbon emission and energy consumption*."
  - Funding: Science and Engineering Research Board, Government of India
  - Focus: Robust Optimization, Machine Learning, Production Planning, Scheduling

Department of Chemical Engineering and Biochemical Engineering, TIET Patiala

- Undergraduate Researcher July 2016 – April 2018
  - Supervisors: Dr. Jai Prakash Kushwaha and Dr. Neetu Singh
  - Developed a technique for extraction of industrial dyes using deep eutectic solvents.
  - Adsorptive interaction of organic pollutants with commercial activated carbon.
  - Focus: Separation Process, Mass Transfer Applications, Liquid-Liquid Extraction, Adsorption

INDUSTRIAL EXPERIENCE

Essar Oil Ltd. (Now: Nayara Energy), Jamnagar, Gujarat, India

- Vocational Trainee, Delayed Coker Unit July 2017 – Dec 2017
  - Designed a heat exchanger using HTRI xchanger suite and Kern method to improve the pre-heat temperature.
  - Analysis of possible modifications to increase productivity and make the operation safer and autonomous.

Shree Cement Ltd., Beawar, Rajasthan, India

- Summer Intern, quality and maintenance. June 2016 – July 2016
  - Learned and analyzed the production of cement and maintaining its quality.
  - Performed Heat balance across clinker unit.

JOURNAL PUBLICATIONS

- **Piyush Kumar Kumawat**, Nitin Dutt Chaturvedi (2021), "Multi-objective optimization for sustainable production planning", *Environmental Progress & Sustainable Energy*, **Accepted**.
- **Piyush Kumar Kumawat**, Nitin Dutt Chaturvedi (2021), "Robust resource targeting in continuous and batch process", *Clean Technologies and Environmental Policy*, 1-16. DOI: **10.1007/s10098-021-02118-8**
- Neha Rathi, Jai Prakash Kushwaha, Neetu Singh, Sehaspreet K. Toor, Nikhil Rajani, **Piyush Kumar 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**
- Paramjit Kaur, Nikhil Rajani, **Piyush Kumar Kumawat**, Neetu Singh, Jai Prakash 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**

CONFERENCE PUBLICATIONS

- **Piyush Kumar Kumawat**, Nitin Dutt Chaturvedi (2021), "Feasibility Analysis in Batch Process: A Machine Learning Approach", *Chemical Engineering Transactions*, **Accepted**, to be presented at **PRES'21**
- Rahul Sudhanshu, **Piyush Kumar Kumawat**, Nitin Dutt Chaturvedi (2021), "Robust Optimization of Heat Exchanger Network with Uncertainty in Inlet Temperatures of Streams", *Chemical Engineering Transactions*, **Accepted**, to be presented at **PRES'21**
- Akash Das, **Piyush Kumar Kumawat**, Nitin Dutt 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*, **Accepted**, to be presented at **SDEWES 21**
- **Piyush Kumar Kumawat,** Nitin Dutt 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**
- Akash Das, **Piyush Kumar Kumawat**, Nitin Dutt 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**
- Nitin Dutt Chaturvedi, **Piyush Kumar Kumawat** (2021), "Energy and Carbon-Constrained Production Planning with Parametric Uncertainty", *IFAC Papers Online*, *11th IFAC Symposium on Advanced Control of Chemical Processes*, **Available Soon**, presented at **ADCHEM 2021**
- **Piyush Kumar Kumawat**, Nitin Dutt Chaturvedi (2020), "Robust targeting of resource requirement in a continuous water network", *Chemical Engineering Transactions*, 81: 1003–1008, DOI: **10.3303/CET2081168**

CONFERENCE PRESENTATIONS

- Feasibility Analysis in Batch Process: A Machine Learning Approach, *24th Conference of Process Integration, Modeling and Optimization for Energy Saving and Pollution Reduction:* **PRES'21**, *Brno, Czech Republic*. (Oral Presentation, Virtual) *Upcoming, Oct* 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) Aug 2020

SCHOLARSHIPS & ACHIEVEMENTS

- SERB Fellowship, R&D, IIT Patna July 2019–Present
- Qualified Graduate Academic Test in Engineering-2019, Chemical Engineering April 2019
- Undergraduate Academic Scholarship for holding second position in the batch based of JEE score, TIET, Patiala. 2014 – 2015

COMPUTER SKILLS

- **Modelling Languages:** GAMS, CPLEX, Python, C++
- **Software:** MATLAB, Aspen HYSYS

RELEVANT COURSEWORK

- **Process Systems Engineering:** Process Integration (IIT Patna)
- **Optimization:** Linear Programming, Operation Research (NPTEL).
- **Applied Mathematics:** Linear Algebra (MIT 18.06CS, Online), Probability – The Science of Uncertainty and Data (MITx: 6.431X, Online)
- **Machine Learning:** Introduction to Machine Learning (Coursera), Deep Learning (Coursera), Artificial Intelligence (IIT Patna)

REFERENCES

- **Dr. Nitin Dutt Chaturvedi**
  Head and Assistant Professor, Department of Chemical and Biochemical Engineering, Indian Institute of Technology Patna, India
  nitind@iitp.ac.in **Homepage** **Google Scholar**
- **Dr. Jai Prakash Kushwaha**
  Associate Professor, Department of Chemical and Biochemical Engineering, Thapar Institute of Engineering and Technology Patiala, Punjab, India
  jpkushwaha@thapar.edu **Homepage** **Google Scholar**