





# Piyush Kumar Kumawat

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## EDUCATION

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### 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
  - Department Rank: 1, CGPA: 8.71/10

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

- B.E. in Chemical Engineering, First Class, CGPA: 6.95/10 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

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## RESEARCH INTERESTS

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- Optimization, Scheduling, Supply-Chain Management, Production and Energy Systems Planning
- To develop data-driven methodologies for process industries; using ML, AI algorithms
- Learning-based modelling and simulation

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## RESEARCH EXPERIENCE

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### 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, Process Scheduling

### Department of Chemical 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.
  - Studied adsorptive interaction of organic pollutants with commercial activated carbon.
  - Focus: Separation Process, Mass Transfer Applications, Liquid-Liquid Extraction, Adsorption

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## INDUSTRIAL EXPERIENCE

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### Harsh Engineering Components Company, Mumbai, India

- Project Engineer Aug 2018 – June 2019
  - 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: Piggings in oil well fluid line, hydro testing, dewatering, pre-commissioning services, pressurized gas injection.

### 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 to improve the pre-heat temperature.
  - Analyzed potential changes to improve productivity and make the operation safer and more 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

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- **Piyush Kumar Kumawat**, Rakesh Kumar Sinha, Nitin Dutt Chaturvedi (2021), “Multi-objective optimization for sustainable production planning”, *Environmental Progress & Sustainable Energy*, 40(6): ep.13741. DOI: [10.1002/ep.13741](https://doi.org/10.1002/ep.13741)
- **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](https://doi.org/10.1007/s10098-021-02118-8)
- Neha Rathi, Jai Prakash Kushwaha, Neetu Singh, 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](https://doi.org/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](https://doi.org/10.1016/j.colsurfa.2017.12.013)

## BOOK CHAPTER

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- **Piyush Kumar Kumawat**, Nitin Dutt Chaturvedi (2021), “Constrained Production Planning with Parametric Uncertainties”, *Optimisation for Energy Systems and Supply Chains: Fundamentals & Applications*, CRC Press - Submitted.

## CONFERENCE PUBLICATIONS

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- **Piyush Kumar Kumawat**, Nitin Dutt Chaturvedi (2021), “Feasibility Analysis in Batch Process: A Machine Learning Approach”, *Chemical Engineering Transactions*, 88: 451-456, DOI: [10.3303/CET2188075](https://doi.org/10.3303/CET2188075)
- 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*, 88: 307-312, DOI: [10.3303/CET2188051](https://doi.org/10.3303/CET2188051)
- 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, available soon, (Letter of Acceptance)*
- **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](https://doi.org/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](https://doi.org/10.1016/B978-0-323-88506-5.50233-3)
- Nitin Dutt Chaturvedi, **Piyush Kumar Kumawat**, Aditya Kumar 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](https://doi.org/10.1016/j.ifacol.2021.08.301)
- **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](https://doi.org/10.3303/CET2081168)

## INTERNATIONAL CONFERENCE PRESENTATIONS

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- Targeting Minimum Water Requirement in Batch Process with Uncertainties *Invited at 5<sup>th</sup> Sustainable Process Integration Laboratory, SPIL, Scientific Conference 2021 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

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- 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

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- Nominated for Institutional Silver Medal (Result Awaited)
- SERB Fellowship, R&D, IIT Patna July 2019–Present
- Qualified Graduate Academic Test in Engineering-2019, Chemical Engineering April 2019
- Undergraduate Academic Scholarship for securing second position in the batch, based on JEE score, TIET, Patiala. July 2014 – 2015

## COMPUTER SKILLS

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

## RELEVANT COURSEWORK

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- **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

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- **Dr. Nitin Dutt Chaturvedi**  
Head and Assistant Professor, Department of Chemical and Biochemical Engineering, Indian Institute of Technology Patna, India  
Email: [nitind@iitp.ac.in](mailto:nitind@iitp.ac.in)
- **Dr. Jose V Parambil**  
Assistant Professor, Department of Chemical and Biochemical Engineering, Indian Institute of Technology Patna, India  
Email: [josevparambil@iitp.ac.in](mailto:josevparambil@iitp.ac.in)
- **Dr. Jai Prakash Kushwaha**  
Associate Professor, Department of Chemical and Biochemical Engineering, Thapar Institute of Engineering and Technology Patiala, Punjab, India  
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