NAVEEN KUSHWAHA

MODELING AND SIMULATION ENGINEER

CONTACT

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TECHNICAL SKILLS

- Computational Fluid Dynamics (CFD)
  - Heat Transfer
  - Fluid Flow
  - Multiphase Flow:
  - Tools: Ansys Fluent, OpenFOAM, COMSOL
- Discrete Element Modeling (DEM)
  - Tools: Ansys Rocky
- Programming & Data Analysis
  - Languages: MATLAB, Python
  - Techniques: Machine Learning for data-driven insights
- High-Performance Computing (HPC)

ENGINEERING SKILLS

- Chemical Process Engineering
  - Design & Simulation:
  - Safety Management:

PROJECT & COMMUNICATION SKILLS

- Project Management
- Technical Reporting
- Leadership & Team Collaboration

PROFILE

Results-driven Chemical Engineer with over 7 years of experience in fluid dynamics, heat transfer, and particle flow dynamics. Demonstrated expertise in process optimization, computational fluid dynamics (CFD), and process safety management. Proven ability to lead cross-functional teams, improve manufacturing processes, and enhance product quality. Committed to driving innovation and sustainability within the chemical manufacturing sector.

EXPERIENCE

SENIOR PROCESS ENGINEER • FEB 2023 - PRESENT

Dr. Reddy's Laboratory, Hyderabad, INDIA

- **CFD Model Development**: Designed and optimized CFD models for pharmaceutical processes such as mixing, crystallization, drying, and tablet coating, enhancing efficiency and product quality.
- **Process Improvement**: Led initiatives to scale up manufacturing processes, improving efficiency and reducing costs through simulation-driven solutions.
- **DEM Application**: Developed DEM models to optimize particle dynamics, improving equipment performance for blenders and tablet coaters.
- **Validation & Case Studies**: Conducted case studies to validate CFD models at laboratory and plant scales, ensuring accuracy and reliability.
- **Cross-Functional Collaboration**: Partnered with engineers, R&D teams, and plant operators to integrate simulation results with practical solutions.
- **Technical Reporting**: Prepared detailed reports and presented findings to stakeholders, supporting informed decision-making.
- **Continuous Improvement**: Explored new methodologies to enhance simulation accuracy and process optimization.

EDUCATION

PHD (7.14/10), *CHEMICAL ENGINEERING*, INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE, INDIA, (DEC. 2017-JAN. 2023)

- Modelling of Multiphase Fluid Flow and Heat Transfer Enhancement using Curved Surface. (PhD thesis).

M. TECH. (7.65/10), CHEMICAL ENGINEERING, INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE, INDIA, (2015-2017)

- Heat transfer in curved channels, and
- Enhancement of Heat transfer in spiral coil using Nano-fluids.

B. E. (72.68%), *CHEMICAL ENGINEERING*, INSTITUTE OF ENGINEERING, JIWAJI UNIVERSITY, GWALIOR, INDIA (2010-2014)

- Process Upgrading of Heavy Crude Oil In-Situ Using Hydrogen.

PATENTS (2)

- Kushwaha, N., Kumar, V., Twisted Elliptical Tube-In-Tube Helically Coiled Heat Exchangers. Indian Institute of Technology Roorkee, (Class: 23–03; Filed on: 10.09.2022; File number: 370616-001; Granted on: 25.01.2023).
- Kushwaha, N., Silori, G., Kumar., V. 2021. A system and method for extracting shikimic acid from Chir pine needles. Application number 202111038776 dated 26.08.2021 (Published on 22/07/2022).

FELLOWSHIPS AND AWARDS

- Mitacs globalink research award 2021
- The ministry of human resource development (MHRD), India fellowship at Indian Institute of Technology, Roorkee in PhD (dec 2018 to dec 2022).
- The ministry of human resource development (MHRD), India fellowship at Indian Institute of Technology, Roorkee during m. Tech. (July 2015 to Jun 2017).
- Team leader in “Vigyan Manthan-Mission Excellence Programme” organized by M.P. council of science and technology, Bhopal, India during 27th January to 6th February 2008.
- All India rank two (silver medal) in all India computer knowledge competition organized by national research institute of knowledge development, Chennai, India, 2005.

PUBLICATIONS (7)

- Kushwaha N, Vikash, Kumar V. “Impact of Mixed Convective and Radiative Heat Transfer in Spiral-Coiled Tubes”. ASME. J. Heat Transfer. 2019; https://doi.org/10.1115/1.4043946.
- Silori G.K., Kushwaha N., Kumar V. (2019) “Essential Oils from Pines: Chemistry and Applications”. In: Malik S. (eds) Essential Oil Research. Springer, Cham. https://doi.org/10.1007/978-3-030-16546-8_10
- Kushwaha N., Kumawat T, Nigam K, Kumar V. "Heat Transfer and Fluid Flow Characteristics for Newtonian and Non-Newtonian Fluids in a Tube-in-Tube Helical Coil Heat Exchanger" Ind. Eng. Chem. Res. 2020, 59, 9, 3972–3984; https://doi.org/10.1021/acs.iecr.9b07044 (Invited manuscript for the special issue of “Characterization and Applications of Fluidic Devices without Moving Parts”).
- Kushwaha N., Kumar V. “Numerical Study of Saturated Boiling Heat Transfer over the Flat and Curved Surfaces”. Heat Transfer. https://doi.org/10.1002/htj.22640.
- Kushwaha N., Sasmito, A.P., Kumar V. “Vapour Bubble Dynamics and Heat Transfer Characteristics During the Boiling over the Spherical Surface” Heat Transfer https://doi.org/10.1002/htj.22727
- Kushwaha N, Jain N., Kumar V, Nigam K.D.P., “Numerical Study of Liquid-Liquid Two-Phase Flow through Coiled Flow Inverters: Effect of Volume Fraction, Dean Number and Orientation” Chem. Eng. Sci. 2023, 268, 118409 https://doi.org/10.1016/j.ces.2022.118409
- Kushwaha N, Kumar V, “Impact of Coil Curvature, Pitch, and Orientation on Vapor Hydrodynamics over Helically Coiled Tubes during Saturated Pool Boiling near Critical Pressure” Industrial & Engineering Chemistry Research, 62, 43, 18063-18078 https://doi.org/10.1021/acs.iecr.3c02629

CONFERENCES (6)

- **Kushwaha N,** Kumar V, “Numerical Study of Saturated Pool Boiling Over Horizontal Tube”, 9th International and 49th National Conference on Fluid Mechanics and Fluid Power (FMFP 2022)
- **Kushwaha N,** Kumar V, “Saturated Pool Boiling of Hydrogen over the Cylindrical Rod”, International conference on Chemical Engineering: Enabling Transition Towards Sustainable Future (Chemtsf 2022)
- **Kushwaha N**, Jain N, Kumar V, Nigam KDP “Numerical Study of Liquid-Liquid Two-Phase Flow through Coiled Flow Inverters: Effect of Volume Fraction, Dean Number and Orientation” 15th International Conference on Gas-Liquid & Gas-Liquid-Solid Reactor Engineering (GLS 2022, AIChE)
- **Kushwaha N.,** Kumar V. “Numerical Simulation of Film Boiling over Sphere using Suppressed Interface Tracking Method: A Two-Phase Approach” 16th international conference on heat transfer, fluid mechanics and thermodynamics (HEFAT-2022)
- **Kushwaha N.,** Kumar V. “Numerical Simulation of Film Boiling over Sphere using Suppressed Interface Tracking Method: A Two-Phase Approach” 15th international conference on heat transfer, fluid mechanics and thermodynamics (HEFAT-2021)
- **Kushwaha N.,** Kumar V. “Thermal performance enhancement in the spiral coiled tube heat exchanger using nano-fluids” Complex Fluids Symposium 2020 (COMPFLU-2020)

GRANTS

- Co-PREPARE Academic Grant (CAG) for webinar on “Scientific & Academic Writing”
- Marco fund for SWEP Workshop 2021
- Shri S.P. Elhence Memo. Travel Grant.
- Jagdish Narain Travel Grant.
- Rai Bhadur Narain Travel Grant.

PROJECT (1)

Design Innovation centre (DIC) IIT Roorkee P2P project entitled “Investigation of a Himalayan pine species as a potential drug in the treatment of Swine flu (H1N1)”. Project Id-DIC-P2P-2018-19-05.

EQUIPMENT HANDLING

- Rheometer (Anton Par MCR702)
- HPLC (waters)

SERVICES

- DAPC member at Department of Chemical Engineering, IIT Roorkee (2018-2019)
- As reviewer in “Energy Conversion and Management” journal