

NAVEEN KUSHWAHA

MODELING AND SIMULATION ENGINEER

CONTACT

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webpage: nvnkush.github.io

KEY SKILLS

- Computational Fluid Dynamics
- Ansys Fluent (CFD), Ansys Rocky (DEM), OpenFOAM
- MATLAB, Python, Machine Learning
- High-performance computing environment experience
- Chemical Process Design
- Process Simulation and Modeling
- Process Safety Management
- Project Management
- Technical Report Writing
- Environmental Regulations and Sustainability
- Team Collaboration and Leadership
- Problem Solving and Critical Thinking

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 2024 - PRESENT

Dr. Reddy's Laboratory, Hyderabad, INDIA

- Developed and optimized CFD models for various pharmaceutical manufacturing processes including mixing, crystallization, drying, and tablet coating.
- Led process improvement initiatives, focusing on scaling up manufacturing processes and ensuring process efficiency.
- Utilized Discrete Element Method (DEM) for developing particle dynamics models, improving equipment performance such as blenders and tablet coaters.
- Conducted extensive case studies to validate CFD models and simulations at both laboratory and plant scales.

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)
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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
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