Curriculum Vitae : Swapnil Sharma

Personal Information

Swapnil Sharma
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Education

PhD, Chemical Engineering — Aug 2021-June 2024
University of Houston, Texas, U.S.A
GPA : **4.0/4.0**

Post Graduate Diploma in Patents Law — July 2021
NALSAR, Hyderabad, India
Grade : **A**

Bachelor and Master of Technology (Dual Degree), Chemical Engineering — July 2019
Indian Institute of Technology (IIT), Delhi, India
Bachelors GPA : **8.22/10**
Masters GPA : **8.40/10**

Key Technical Skills

- Applied Mathematics, Numerical Methods, Bifurcation Analysis, CFD, Reactive Transport, Mathematical Modelling, IP risk analysis and innovation

Key Courses

- CO_2-free manufacturing technologies, Non-linear Analysis, Transport Phenomena, Chemical Reaction Engineering, Applied Linear Analysis, Numerical Methods

Publications

- S. Sharma, V. Balakotaiah, Non-Oberbeck-Boussinesq effects and sub-critical primary bifurcations in porous media convection (Int. J. Thermal Sci. 2023)
- S. Sharma, V. Balakotaiah, Bifurcation Analysis of Natural Convection in a Spherical Annulus with Gas Filled Porous Medium (Submitted to Applied Thermal Engineering)
- R. Ratnakar, S. Sharma, M. Taghavi, V. Balakotaiah, A short discussion on insulation strategies and design considerations for large-scale storage and transportation of liquid hydrogen (Energy Systems 2023)
- M. Taghavi, S. Sharma, R. Ratnakar, V. Balakotaiah, Natural Convection Effects in Insulation Systems of Cryogenic Storage Tanks (Int. J. of Heat and Mass Transfer 2024)
- S. Sharma, V. Balakotaiah, Analysis of Natural Convection Effects in Non-vacuum Based Insulation Layers of Large-Scale Liquid Hydrogen Tanks (Submitted, AIChE Journal)

Patents

- Granted : US11693201B2, US11300741B2, US11619796B2, Published : IN202011032795, IN202011042951

Posters and Presentations

- S. Sharma, V. Balakotaiah, Non-Oberbeck Boussinesq Effects and Sub critical Primary Bifurcations in Porous Media Convection, 2023, ISCRE-27, Quebec City, CA, (Poster)
- R. Ratnakar, S. Sharma, M. Taghavi, V. Balakotaiah, Insulation Strategies and Design Considerations for Large-scale Storage and Transportation of Liquid Hydrogen, 2023, Global Energy Meet, Boston, MA, (Invited Talk)
- S. Sharma, M. Taghavi, R. Ratnakar, V. Balakotaiah, Natural Convection Effects in Insulation Systems of Large-Scale Cryogenic Storage Tanks, 2022, AIChE annual meeting in Phoenix, AZ (Presentation)
- S. Sharma, M. Taghavi, V. Balakotaiah, Bifurcation analysis for H2/N2 filled porous cryogenic insulation layers, 2022, 3rd CES Honolulu, HI (Poster)

Scholastic Achievements

- Awarded with **Best Dissertation Award** by Cullen College of Engineering among all departments 2024
- Awarded with **Chevron Energy** Graduate Fellows Award for research in energy 2023
- Scholarship award from American Society of Indian Engineers and Architects 2023
- **Best Poster Award** at ISCRE-27 conference held in Quebec City 2023
- **Future Faculty Fellowship** awarded by UH to promising prospective faculty candidates 2022-23
- **Honorable Mention** by UH Energy Critical Issues in Energy : Technical Writing Competition 2022
- **Presidential Fellowship** at University of Houston for academic excellence 2021-23
- **MHRD Scholarship :** Appointed for the role of a teaching assistant for two semesters 2018-19
- Represented IITD at INSA-Lyon, France for fall semester by securing 7th rank out of 800+ students 2016
- **Merit Certificate :** Awarded by MHRD for 100/100 score in Maths in Class 12th board Exam 2014
- **KVPY :** All India Rank 68 in Kishore Vaigyanik Protsahan Yojna organised by IISC, Bangalore 2013

Work Experience

ExxonMobil (EMTEC) : Chemical Process Modeler, Woodlands, TX July'24-Present

- Developing mathematical models for reactors in Direct Lithium Extraction (DLE) using gPROMS
- Model development for Direct Air Capture

Co-Founder CovRelief (now Karuna) (pathcheck.org/karuna) April'21-July'21

- Conceptualized and designed an app for providing real-time information about resources to Indian citizens
- Endorsed by Ministry of Education (Govt. of India), PanIIT Alumni, several celebrities and media houses
- Gross visits during 2 month time were 30 million
- PathCheck foundation, USA has provided support to build CovRelief's second iteration called Karuna
- Managed the Karuna project from recruitment to deployment

Associate Manager in R&D at STL, Rakholi July'20-April'21

- Conferred with *CEO's Award* for developing world's highest fibre count cable 6912F
- Evaluated IP risk of designs/processes and generated new ideas for IP filing or IP risk mitigation

Post Graduate Engineer Trainee (PGET) in R&D at STL, Rakholi July'19-July'20

- Conferred with *Hunger to Learn Award* for developing capability to produce 1728 & 3456 optical fibre count cables for data centres ; STL became one of the only six companies worldwide with this capability

Internships & Projects

Intern at Shell Technology Center (STCH), Houston May'23-August'23

- Modelling thermal runaway in chemical reactors during catalyst activation/de-activation
- Implementing numerical schemes in python to solve coupled hyperbolic PDEs and ODEs

Characterization of dynamics of heterogeneous gas-liquid flow using two-/multi- fluid Eulerian simulations Jan'18-July '19
Masters thesis | Advisor : Prof. Vivek V. Buwa

- Predicted average gas holdup profiles with Tomiyama's drag model and a swarm correction term
- Characterized the dynamics by comparing Power Spectral Density and time-averaged gas holdup profiles
- Compared average gas holdup and dynamics in bubble-column using Fluent & OpenFOAM
- Modified turbulence model to solve convergence issues arising due to gas pockets at multi-fluid stage

Intern at Chakr Innovation (Pollution to ink), Gurgaon Jan'19-May'19

- Evaluated and selected different technologies for a retrofit exhaust treatment device for diesel gen sets
- Built a theoretical model for predicting the capturing efficiency of the retrofit device (Chakr shield)
- Envisaged the technical modification in Chakr shield to reduce the water consumption

Intern at Tata Research Development and Design Center (TRDDC), Pune May'17-July'17

- Simulated starch induced selective flocculation of Iron ore slimes through CFD & Population Balance
- Modelled the process through theoretically backed approaches in literature and implemented in Fluent
- Incorporated the effect of fractal structure & irreversible polymer degradation in Population Balance

Developing low cost diesel oxidation catalysts for BS-VI emission norms May'16-July'16
Sophomore Summer Research Project | Advisor : Prof. Divesh Bhatia

- Prepared Perovskite based catalysts from transition metals through citrate-complexation technique
- Characterized the catalysts using XRD, SEM & EDX ; XRD was analysed using Xpert High Score Plus

Computer Skills

Scientific Programming : FORTRAN, Python, gPROMS, Mathematica, C++, Ocaml

Softwares : ANSYS-Fluent (CFD), OpenFOAM, MATLAB, ASPEN Plus, Xpert High Score Plus

Others : Origin, Autodesk Inventor, Microsoft Office, LaTex