Shabina Khanam

Curriculum Vitae

I. PERSONAL DATA

Mailing Address:	Department of Chemical Engineering Indian Institute of Technology Roorkee Roorkee – 247 667, Uttarakhand
Email:	shabina.khanam@ch.iitr.ac.in, shabinahai@gmail.com
Phone:	+91-1332-285157 (O), 285066 (R), 9634783822 (M)
Permanent Address:	D/o – Late Haji Anwar Ali House Number – 352 Near Rabbani's House (Paper owner) Qazi Para, Eid Gah Road Bijnor – 246 701, Uttar Pradesh
Date of Birth:	07.04.1978
Gender:	Female, Unmarried

II. EDUCATION

2002 – 2007: Ph.D., Chemical Engineering, Indian Institute of Technology Roorkee, Course work grades: "A+" in Computer Application and "A" in Mixed Integer Programming and Comprehensive Examination

2000 – 2002: Master of Technology, Chemical Engineering, Indian Institute of Technology Roorkee
CGPA: 8.73 out of 10

1996 – 2000: Bachelor of Technology, Chemical Engineering, Aligarh Muslim University, Aligarh
CGPA: 8.03 out of 10

1995 : Intermediate: RBD Inter College (UP Board), Bijnor, 76%, Distinctions: Physics, Chemistry, Mathematics

1993 : Higher Secondary: KG Inter college (UP Board), Rampur, 70.66%, Distinctions: Mathematics.

III. RESEARCH EXPERIENCE

INTERESTS: Process Integration, Energy and water conservation

Ph.D. Thesis: Mar 2002 to Jun 2007
Topic: Synthesis of Multiple Effect Evaporator System
Field: Process Integration, Modeling and Simulation

- Developed a simplified mathematical model, based on principles of Process Integration, for the synthesis of a complex multiple effect evaporator (MEE) system which includes steam splitting, vapor bleeding, feed-, product- and condensate-flashing
- Used the developed simplified model as a rapid screening tool to select best flow sequence out of many possible sequences, based on three different screening tools such as steam consumption, steam economy and temperature path diagrams.
- Tested the model on a number of MEE systems having different number of effects ranging from 3 to 7 and for variety of liquors such as chemical solution, milk, caustic soda, sugar and black liquor.
- Performed the stream analysis of the MEE system using simplified model to estimate contributions of individual stream towards total evaporation. This approach provides in depth understanding of the complicated evaporation process and helps the designer to modify it for its betterment.

Ph.D Examiner's Response on my Ph.D work communicated to Dean (PD Studies and Research)

From alfricke@adelphia.net
Sent Saturday, March 3, 2007 3:30 am
To dpgsr@iitr.ernet.in
Subject Re: Thanks for evaluating the Ph.D. thesis in respect of Ms.SHABINAKHANAM for the award of Ph.D. Degree in Chemical Engineering.

945

Dear Dean Gupta:
It wasindeed a pleasure to review Ms. Khanam'
s PhD thesis. I am planning to use her program for screening on some projects that I am involved in for modification of pulping and for hemicellulose and lignin recovery from pulp mill streams. Her programs will help me quickly evaluate the sacrifice of fuel value resulting from removal of hemicellulose and lignin from the liquor stream.
I am willing to assist you in any future reviews that you believe are within my area of competence.
Best regards,
Arthur L. Fricke
Professor Emeritus (At that time)
Department of Chemical Engineering
University of Florida, USA

M.Tech. Dissertation: July 2001 to Feb 2002
Topic: Super Targeting of Mass Exchange Network
Field: Process Integration

Dissertation Supervised:

Degree	S.No.	Title	Candidate	Co-supervisor	Year
Ph.D.	1	Application of pinch technology for process integration in coal based sponge iron plant	A.K. Prasad, NIT Jamshedpur	Dr. R.K.Prasad, NIT Jamshedpur	2009-2011
	2	Process integration based modification for energy conservation in sponge iron plant	A.K. Poonia, NIT Raipur	Dr. A.B.Soni, NIT Raipur	2010-2017
	3	Energy conservation in coal based sponge iron process using heat of waste gas	Gajendra K. Gaurav	Nil	2012-2017
	4	Supercritical fluid extraction of turmeric root and carrot seed and its analysis	Priyanka Katiyar	Nil	2013-2018
	5	Energy conservation in sponge iron cluster using total site integration	B. Venakata Ramanaiah	Nil	2015-2019
	6	Supercritical fluid extraction of natural products: Modeling and Optimization	Vibha Devi	Nil	2014-2019
	7	Water and energy conservation in a thermal power plant	Shivendra S. Chauhan	Nil	2014-2020
	8	Biomass gasification of Jackfruit Peel	Sonam Kardam	Nil	2022-
	9	Modeling and simulation of rotary kiln to study the reduction of preheated iron ore to iron using syngas/coke oven gas/blast furnace gas	Neema Adhikari	Nil	2022-
	10	Mass integration of miniature system	Vishal Kumar	Dr. S. Ghosh, ChED, IITR	2022-
	11	Optimization of rotary kiln of sponge iron process to maximize % metallization	Jyoti Singh	Nil	2023-
	12	Biomass gasification of pine needle	Mohd. Ali Siddiqui	Dr. P. Mondal, ChED, IITR	2024-
M.Tech	1	Emission targeting using pinch technology	K. R. Gota	Nil	2008-2009
	2	Synthesis of process networks using mathematical modeling	G. Gautami	Nil	2009-2011
	3	Energy management in sponge iron industry	Vivek Kumar	Nil	2010-2011
	4	Design of heat integrated multiple effect evaporator system with zero discharge	Ghoshna Jyoti	Nil	2011-2012
	5	Modeling and simulation of rotary kiln which special emphasis on energy consumption	Tapash R. Majhi	Nil	2011-2012
	6	Optimization of mass exchange network	Pramod K. Singh	Nil	2013-2014
	7	Optimization of multiple effect evaporator system based on different configurations of vapor bleeding	Pratap Singh	Nil	2013-2014
	8	A heat integration study considering variable physical properties	Mohd. Imran	Nil	2013-2014
	9	Optimization of heat exchanger network based on emission targeting	Prashant A Nirpharake	Nil	2013-2014
	10	Modeling and simulation of multiple	Kuldeep Singh	Nil	2014-

		effect evaporator system			2015
	11	Reduction of CO_2, SO_2 and NO_2 emissions in chemical process industries	Babloo Kumar	Nil	2014-2015
	12	Total site integration in sponge iron production process	Anchal Tyagi	Nil	2014-2015
	13	Water management in chemical process industries	Roja Engu	Nil	2014-2015
	14	Reducing CO_2 emissions using carbon constrained energy planning	Ravi Shankar Duggi	Nil	2015-2016
	15	Waste water minimization in chemical process using process integration	Sanjay Dhariya	Nil	2015-2016
	16	Optimization of Mass Exchanger Network considering piping cost	Deepshikha Singh	Nil	2015-2016
	17	Optimization of Mass Exchanger Network accounting piping cost and pressure drop	Shashi Shekhar Singh	Nil	2016-2017
	18	Simultaneous optimization of water and energy in chemical plants	Gaurav Kumar Silori	Nil	2016-2017
	19	Optimization of hydrogen distribution in refinery considering piping cost	Avijeet Kulshrestha	Nil	2016-2017
	20	Exergy analysis of chemical processes	Kamalkant Meghwal	Nil	2016-2018
	21	Water conservation in thermal power plant considering piping cost and pressure drop	Vishnu Dev Kushawaha	Nil	2017-2018
	22	Energy and Exergy analysis of sponge iron process	Shubham Rathi	Nil	2017-2018
	23	Modeling and Simulation of prilling tower using ANSYS	Sachin Kumar	Nil	2018-2019
	24	Design of waste heat recovery systems for chemical Processes	Neeraj Sharma	Nil	2019-2020
	25	Simulation of Underground Coal Gasification	Viplav Mahavar	Nil	2020-2021
	26	Process Integration based optimization of mass separating agent for extraction of acetic acid using microchannel reactor	Harshal N. Raikwar	Dr. S. Ghosh, ChED, IITR	2021-2022
	27	CFD simulation of counter current gas liquid and gas solid flows	Samiksha	Dr. S. Ghosh, ChED, IITR	2022-2023
	28	Simulation of vertical shaft furnace to produce sponge iron	Prathyusha Bandi	Nil	2024-2025
	29	Energy recovery from buildings	Keshav Khairari	Nil	2024-2025

Experience Related to Industrial Research

Worked on industrial problems of following Process Plants:

- Eco Green Solution Systems (P) Ltd., Bangalore
- Trident Ltd., Barnala, Punjab
- Bihar Sponge Iron Ltd., Chandil, Near Jamshedpur, Jharkhand
- Chhabra Thermal Power Plant, Chhabra, Basan, Rajasthan
- Piparwar Washery, Ranchi
- Kedla Washery, Ranchi

- Uttam Sugar Mill, Roorkee
- SMC Power Generation Ltd., Jharsuguda, Odisha
- Tata Steel Ltd., Meramandali, Odisha

IV. TEACHING EXPERIENCE

1.7.2007 to 6.7.2012 **:** **Assistant Professor**, Department of Chemical Engineering, NIT Rourkela

Course offered	L-T-P	Level	Remark
Theory courses			
Processing and Handling of Materials	3-0-0	UG	
Pinch Technology	3-1-0	PG	Developed and taught the course
Advanced Heat Transfer	3-1-0	PG	
Laboratory courses			
Fluid Dynamics	0-0-3	UG	
Heat Transfer	0-0-3	UG	Revised manuals of experiments under Heat Transfer Laboratory.
Chemical Engineering Lab-IV: Computer Aided Design	0-0-3	PG	

9.7.2012 to 22.11.2015 **:** **Assistant Professor**, Department of Chemical Engineering, IIT Roorkee

23.11.2015 to till date **:** **Associate Professor**, Department of Chemical Engineering, IIT Roorkee

Course offered	L-T-P	Level	Remark
Theory courses			
Process Integration	3-0-0	UG/PG	
Thermodynamics	2-1-0	UG	
Process Equipment Design	3-0-2	UG	
Equipment Design	3-0-2	UG	
Mechanical Operations	3-1-2/2	UG	
Process Utilities, Economics and Plant Design	3-0-0	UG	
Polymer Production Engineering	3-0-0	UG	
Process Utilities and Safety	3-0-0	UG	
Energy Audit	3-1-0	UG	Developed this course recently
Laboratory courses			
Chemical Engineering Lab-III: Reaction and Process Dynamics and Control Lab	0-0-3	UG	
Mechanical Operations	0-0-2/2	UG	Purchased Rotap Sieve Shaker and brought Froth Flotation Cell as a new experiment
Fluid Dynamics	0-0-2	UG	

As Coordinator, UG Lab Manuals, revised following UG Lab manuals to improve its quality:

- Fluid Dynamics
- Heat Transfer
- Mechanical Operations
- Mass Transfer-I
- Mass Transfer-II
- Reaction Engineering
- Process Dynamics and Control

V. FELLOWSHIPS

- M.Tech. Assistantship funded by MHRD during Post Graduate studies (July, 2000 to February, 2002)
- Senior Research Fellowship of CSIR (Council of Scientific and Industrial Research), New Delhi, for pursuing Ph.D. Programme (August, 2002 to September, 2006)

VI. AWARDS AND HONOURS

- Received "Award of Excellence" for "HER Impact in STEM: Driving Sustainability and Environmental Change" on Nov., 2024 by IIT Roorkee.
- Member of Subject Expert Committee to evaluate proposals under WISE-SCOPE Fellowship program of WISE-KIRAN Division of DST for theme area of Environment, Climate and Sustainable Development (ECSD) from 04.10.2024 for 3 years.
- Received Best Research Poster Award for the paper: S. Kardam and S. Khanam, "Characterization of Jackfruit peel for Gasification Process" ICAFM-2024, Tribhuvan University, Nepal, October 25-27, 2024
- Member of National Mission on Green Steel, MoS since March, 2023
- Visiting Professor at Tribhuvan University, Nepal, for 5 years since Feb., 2023
- Received Outstanding Teacher Award in UG category in the year 2022.
- Secured Third Position in Poetry Competition in Staff Category under GATI in the year 2022.
- Received Best Research Paper Award for the paper: S.S. Chauhan and S. Khanam, "Flue gas waste energy integration system in steam cycle of thermal power plant", International Conference on Recent Advances in Engineering & Science (ICRAES-2020), AMU Aligarh, India, Jan 11-12, 2020.
- Was amongst the top 15 faculties in IIT Roorkee during screening for Outstanding Teacher Award in UG category in the year 2019.
- Editorial Board Member – Process Integration and Optimization for Sustainability (PIOS), published with Springer Nature.

VII. RESPONSIBILITIES DISCHARGED AT IIT ROORKEE:

July, 2013 to Dec, 2018	:	Dy-OC (Examination) of Department
March, 2015 to Jan, 2018	:	Coordinator (UG Labs Manuals) of Department
March, 2015 to till date	:	Faculty-in-Charge (Women Grievance Cell) of Department
Jan, 2016 to Feb, 2018	:	Member (Faculty Search Committee) of Department
Jan, 2022 to Mar, 2023	:	
Feb, 2018 to Sep, 2021	:	Coordinator (Safety Committee) of Department
Aug, 2018 to June, 2021	:	Coordinator (Case Study) of Department
Oct, 2018 to May, 2019	:	Member of Campus Accessibility and Inclusion for Diversity committee of Institute
Aug, 2019 to June, 2021	:	Coordinator (Industrial Oriented Problem) of Department
July, 2018 to till date	:	Faculty-in-Charge (Wellness) of Department
Sep, 2021 to Mar, 2023	:	Faculty-in-Charge (GSAT) Satellite Team of Department
Oct, 2020 to Oct, 2022	:	Member (House Allotment Committee-1) of Institute
Aug, 2022 to May, 2024	:	Coordinator (B.Tech. Project Design) of Department
Mar, 2023 to Dec, 2023	:	Member (Tinkering committee) of Institute
Mar, 2023 to till date	:	Faculty-in-Charge (Documentation) of Department
Mar, 2023 to till date	:	Member (Committee to modify SRIC Rules) of Institute
July, 2024 to Dec, 2024	:	Co-coordinator (Tinkering committee) of Institute
Jun, 2024 to till date	:	Coordinator (M.Tech. Thesis) of Department
Feb, 2025 to till date	:	Member of Institute Lecture Series Committee

VIII. PUBLICATIONS

Refereed Journal

1. **S. Khanam** and B. Mohanty, "Synthesis of mass exchange network using Supertargeting approach" Indian Chemical Engineer, 47 (2005) 8-12. (**IF:1.86**)
2. **S. Khanam** and B. Mohanty, "Mass Integration for Recovery of Zinc from Galvanizing and Metal Finishing Industry Using Supertargeting Approach", Indian Journal of Chemical Technology, 13 (2006) 378-385. (**IF:0.57**)
3. **S. Khanam** and B. Mohanty, "A Process Integration based Approach for the Analysis of Evaporator System", Chemical Engineering and Technology, 30 **(**2007) 1659-1665. **(IF: 2.100)**
4. R. Bhargava, **S. Khanam**, B. Mohanty and A.K. Ray, "Mathematical model for a multiple effect evaporator system with condensate-, feed- and product- flash and steam splitting", Indian Journal of Chemical Technology, 15 (2008) 118-129. (**IF:0.57**)
5. R. Bhargava, **S. Khanam**, B. Mohanty and A.K. Ray, "Selection of optimal feed flow sequence for a multiple effect evaporator system", Computers and Chemical Engineering, 32 (2008) 2203–2216. (**IF:4.300**)
6. R. Bhargava, **S. Khanam**, B. Mohanty and A.K. Ray, "Simulation of flat falling film evaporator system for concentration of black liquor", Computers and Chemical Engineering, 32 (2008) 3213–3223. (**IF:4.300**)
7. B.B. Gulyani, **S. Khanam** and B. Mohanty, "A New Approach for Shell Targeting of A Heat Exchanger Network", Computers and Chemical Engineering, 33 (2009) 1460-1467. (**IF:4.300**)

8. **S. Khanam** and B. Mohanty, "Energy reduction schemes for multiple effect evaporator systems", Applied Energy, 87 (2010) 1102-1111. (**IF:11.200**)
9. A. Kumar, G. Gautami and **S. Khanam**, "Hydrogen distribution in the refinery using mathematical modeling", Energy, 35 (2010) 3763-3772. (**IF:9.000**)
10. **S. Khanam** and B. Mohanty, "Placement of condensate flash tanks in a multiple effect evaporator system", Desalination, 262 (2010) 64-71. (**IF: 9.900**)
11. **S. Khanam** and B. Mohanty, "Development of a new model for multiple effect evaporator system", Computers and Chemical Engineering, 35 (2011) 1983-1993. (**IF:4.300**)
12. A.K Prasad, R.K. Prasad and **S. Khanam**, "Development of energy conservations scenarios for sponge iron industry using process integration", Energy Efficiency, 4 (2011) 321-333. (**IF:3.100**)
13. A.K. Prasad, R.K. Prasad and **S. Khanam**, "Design Modifications for Energy Conservation of Sponge Iron Plants", Journal of Thermal Science and Engineering Applications, 3 (2011) 015001-1 to 015001-11. (**IF: 2.100**)
14. G. Gautami and **S. Khanam,** "Selection of optimum configuration for multiple effect evaporator system", Desalination, 288 (2012)16-23. (**IF:9.900**)
15. V. Kumar and **S. Khanam,** "Recovery and utilisation of waste heat in a coal based sponge iron process", Chemical Engineering and Processing: Process Intensification, 56 (2012) 19–28. **(IF:4.300**)
16. G. Jyoti and **S. Khanam**, "Simulation of Heat Integrated Multiple Effect Evaporator System", International Journal of Thermal Sciences, 76 (2014) 110-117. (**IF:4.500**)
17. N. Jhaveri, B. Mohanty and **S. Khanam**, "Mathematical modeling and optimization of hydrogen distribution network used in refinery", International Journal of Hydrogen Energy, 39 (2014) 339-348. (**IF: 7.200**)
18. R. Wadhwani, B. Mohanty and **S. Khanam**, "Optimization of amount of chemical dosage to improve the performance of Dissolved Air Flotation unit", Separation Science and Technology, 50 (2015) 1038–1049. **(IF:2.800)**
19. R. D Souza, **S. Khanam** and B. Mohanty, "Synthesis of heat exchanger network considering pressure drop and layout of equipment exchanging heat", Energy, 101 (2016)484-495. **(IF: 9.000)**
20. G.K. Gaurav and **S. Khanam**, "Analysis of temperature profile and % metallization in rotary kiln of sponge iron process through CFD", Journal of the Taiwan Institute of Chemical Engineers, 63 (2016) 473-481. **(IF: 5.700)**
21. G.K. Gaurav and **S. Khanam**, "Computational fluid dynamics analysis of sponge iron rotary kiln", Case Studies in Thermal Engineering, 9 (2017) 14–27. **(IF: 6.800)**
22. G.K. Gaurav and S. Khanam, "Profitability analysis of power generation using waste heat of sponge iron process", Energy, 141 (2017) 333-347. **(IF: 9.000)**
23. V. Ramanaiah and **S. Khanam**, "Modified approach of total site integration for energy conservation: A case study of sponge iron cluster", Chemical Engineering Research and Design, 133 (2018) 142-154. **(IF: 3.900)**
24. G.K. Silori and **S. Khanam**, "Performance analyses of LP and MILP solvers based on newly introduced scale: Case studies of water network problems in chemical processes", Chemical Engineering Research and Design, 136 (2018) 417-430. **(IF: 3.900)**
25. Priyanka and **S. Khanam**, "Influence of operating parameters on supercritical fluid extraction of essential oil from turmeric root", Journal of Cleaner Production, 188 (2018) 816-824. **(IF: 11.100)**

26. Priyanka and **S. Khanam**, "Selection of suitable model for different matrices of raw materials used in supercritical fluid extraction process", Separation Science and Technology, 53 (2018) 71-96. **(IF: 2.800)**
27. V. Ramanaiah and **S. Khanam,** "Analyses of different modifications proposed for sponge iron process for best utilization of waste heat", Process Integration and Optimization for Sustainability, 2 (2018) 365–381. **(IF: 2.400)**
28. *S.S.* Chauhan and S. Khanam, "Energy integration in boiler section of thermal power plant"**,** Journal of Cleaner Production, 202 (2018) 601-615. **(IF: 11.100)**
29. V. Devi and **S. Khanam**, "Study of ω-6 linoleic and ω-3 α-linolenic acids of hemp (*Cannabis sativa*) seed oil extracted by supercritical CO_2 extraction: CCD optimization", Journal of Environmental Chemical Engineering, 7 (2019) 102818. **(IF: 7.700)**
30. V.Devi and **S. Khanam**, "Comparative study of different extraction processes for hemp (*Cannabis sativa*) seed oil considering physical, chemical and industrial-scale economic aspects", Journal of Cleaner Production, 207 (2019) 645-657. **(IF: 11.100)**
31. *S.S.* Chauhan and **S. Khanam**, "Enhancement of efficiency for steam cycle of thermal power plants using process integration"**,** Energy, 173 (2019) 364-373. **(IF: 9.000)**
32. Priyanka and **S. Khanam**, "Supercritical CO_2 extraction of carrot seed oil: screening, optimization and economic analysis", International Journal of Environmental Science and Technology, 17 (2019) 2311-2324. **(IF: 3.200)**
33. V. Devi and **S. Khanam**, "Development of generalized and simplified models for supercritical fluid extraction: Case study of papaya (Carica papaya) seed oil", Chemical Engineering Research and Design, 150 (2019) 341-358. **(IF: 3.900)**
34. Priyanka and **S. Khanam**, "Selection of suitable model for the supercritical fluid extraction of carrot seed oil: A parametric study", LWT - Food Science and Technology, 119 (2020) 108815. **(IF: 6.000)**
35. *S.S.* Chauhan and S. Khanam, "Simultaneous water and energy conservation in non-isothermal processes – A case study of thermal power plant"**,** Journal of Cleaner Production, 282 (2021) 125423. **(IF: 11.100)**
36. V. Devi and **S. Khanam**, "Statistical modeling of supercritical extraction of hemp (Cannabis sativa) and papaya (Carica papaya) seed oils through artificial neural network and central composite design", Soft Computing, 26 (2022) 1-18. **(IF: 4.100)**
37. Priyanka Katiyar, Karan Gupta, Pushpraj Katiyar, **Shabina Khanam**, "Supercritical fluid extraction of turmeric root oil using CO2: Experimental analysis and process modelling", Industrial Crops & Products, 188 (2022) 115559. (**IF: 5.900**)
38. **S. Khanam**, G. Durga Prasad, Pushp Raj Varma, "Optimization of Water Consumption in Coal Washeries of CCL", Minetech, 43 (2022) 15-24.
39. A. Sharma, A.A. Kumar, B. Mohanty, **S. Khanam**, "Synthesis, characterization and thermo-kinetic analysis of sawdust biochar for adsorbent and combustion drives", Bioresource Technology Reports, 22 (2023) 101485. (**IF: 5.06**)
40. Gajendra Kumar Gaurav, **Shabina Khanam**, Fuchun Zhang, Xinghui Liu, "Recovery and utilisation of waste heat for sponge iron process through combined preheating and power generation", Energy, 301 (2024), 131512141. **(IF: 9.000)**
41. Neema Adhikari, **Shabina Khanam**, "Toward Sustainable Production: Emerging Trends in Iron and Steel Making", ChemBioEng Reviews, 11 *(*2024), e202300055. **(IF: 6.300)**
42. S. Kardam, **S. Khanam**, "Characterization of jackfruit peel as a promising resource for different thermo-chemical processes". Sustainable Chemistry for Climate Action, 6 (2025) 100055. https://doi.org/10.1016/j.scca.2024.100055.

43. Gajendra K. Gaurav, Shivendra Singh Chauhan, **Shabina Khanam**, Fuchun Zhang, Xinghui Liu, "Efficient enhancement in thermal power plant using wastewater and flue gas streams", Energy, 319 (2025), 135088. **(IF: 9.000)**
44. Vishal Kumar, Pushpender Chaudhary, Sumana Ghosh, **Shabina Khanam**, "A review of double emulsions: Microfluidic preparation and CFD simulation", Sustainable Chemistry for Climate Action (Accepted), https://doi.org/10.1016/j.scca.2025.100063.

Average Impact Factor: **5.8**
Publications in Q1 Journals: **28**
Publications in Q2 Journals: **10**
Publications in Q3 Journals: **2**
Publications in Q4 Journals: **1**

Magazine Articles

Apart from these research publications, my following articles are published as **SOLE AUTHOR** in DRI UPDATE Magazine, Sponge Iron Manufacturers Association (SIMA), New Delhi. It is circulated to all sponge iron fraternity of the world through SIMA.

1. PROCESS INTEGRATION OF COAL BASED SPONGE IRON PLANT, November 2020.
2. HYDROGEN-ENRICHED SYNGAS PRODUCTION FROM BIOMASS, March, 2024.

Conferences/Symposia

1. **S. Khanam** and B. Mohanty, "Targeting and designing of mass exchange network for recovery of copper using Supertargeting approach", SPI – 2003, BHU, Varanasi, India, Feb 14-16, 2003, pp. 123-134.
2. **S. Khanam** and B. Mohanty, "Synthesis of mass exchange network for recovery of zinc using Supertargeting approach", CHEMCON – 2003, RRL, Bhubaneswar, Orissa, Dec 19-21, 2003.
3. **S. Khanam** and B. Mohanty, "Selection Criteria for LMTD Approximation Methods Used in the Development of Non-Linear Model for Area Targeting of Heat Exchanger Network", WMCI-2005, N.I.T. Rourkela, Orissa, India, Oct 1-2, 2005, pp: 158-169.
4. **S. Khanam** and B. Mohanty, "Optimal Area Targeting of Heat Exchanger Network Using Nonlinear Programming", 18th National and 7th ISHMT-ASME HMTC, IIT Guwahati, Assam, India, Jan 4-6, 2006, pp: 1173-1181.
5. **S. Khanam** and B. Mohanty, "Synthesis of triple-effect evaporator system", All India Seminar on Energy Management in Process Industries, Institution of Engineers (India) Aligarh, India, Feb 18-19, 2006, pp: 43-53.
6. R. Bhargava, **S. Khanam**, B. Mohanty and A. K. Ray, "A Single Nonlinear Equation Based Mathematical Model for an Evaporator Body", All India seminar on Energy and Environmental Issues Related to Chemical Industry, Institution of Engineers, Lucknow, India, Mar 10-11, 2007.

7. D. Srivastava, **S. Khanam**, R. Bhargava and B. Mohanty, "Crude oil fouling and its mitigation through design", All India seminar on Energy and Environmental Issues Related to Chemical Industry, Institution of Engineers, Lucknow, India, Mar 10-11, 2007.
8. **S. Khanam** and B. Mohanty, "Area Targeting of Heat Exchanger Network Based on Nonlinear Programming for Streams Having Un-equal Stream Side Heat Transfer Coefficients" All India seminar on Energy and Environmental Issues Related to Chemical Industry, Institution of Engineers, Lucknow, India, Mar 10-11, 2007.
9. **S. Khanam** and B. Mohanty, "Development of an Efficient Linear Model for the Analysis of Multiple Effect Evaporator System", International Conference on Advances in Energy Research (ICAER), IIT Bombay, Mumbai, India, Dec 12-14, 2007, pp: 724-730.
10. **S. Khanam** and B. Mohanty, "A Rapid Screening Tool to Predict Optimal Feed Flow Sequence of A Multiple Effect Evaporator System Using Process Integration", 19th National & 8th ISHMT-ASME Heat and Mass Transfer Conference, JNTU Hyderabad, India, Jan 3 - 5, 2008, Paper No: TPH-14.
11. **S. Khanam** and B. Mohanty, "Screening of Optimal Feed Flow Sequence for A Multiple Effect Evaporator System Using Modified Temperature Paths", All India Seminar on Advances in Chemical Engineering, The Institution of Engineers Lucknow, India, Sep 28-30, 2008.
12. B.B. Gulyani, **S. Khanam** and B. Mohanty, "Shell Targeting of A Heat Exchanger Network", A National Conference on Socio-Economic Development : Challenges before Women Scientists, Technologists & Engineers, NIT Rourkela, India, Feb 13-15, 2009, pp: 133-140.
13. K.R. Gota and **S. Khanam**, "Flue Gas Emission Targeting for A Chemical Process Industry", AChemE 2009, Thapar University, Patiala, India, Feb 27-28, 2009, pp: 125-131.
14. **S. Khanam** and B. Mohanty, "Selection of the Optimal Feed Flow Sequence for A Multiple Effect Evaporator System", AChemE 2009, Thapar University, Patiala, India, Feb 27-28, 2009, pp: 206-212.
15. K.R. Gota and **S. Khanam,** "Selection of utility system and fuels for emission targeting of chemical process Industries", ICEST 2010, First Hotel, Bangkok, Thailand, Apr 23-24, 2010, Paper No. T306.
16. V. Kumar and **S. Khanam**, "Modeling and simulation of waste gas carrying duct for sponge iron plant", RACET-2011, IIChE Kochi Regional Centre, Cochin, Kerela, India, Mar 10-12, 2011, Code: MSPC- 01
17. G. Gautami and **S. Khanam**, "Study of physical properties in multiple effect evaporator system", RACET-2011, IIChE Kochi Regional Centre, Cochin, Kerela, India, Mar 10-12, 2011, Code: RETP - 09
18. A.K. Prasad, V. Kumar and **S. Khanam**, "Generation of Energy Conservation Measures for Sponge Iron Plants", WCE-2011 Vol-III, Imperial college London, London, UK. Jul 6-8, 2011.
19. S. Sahoo, D. Tirumalaraju, **S. Khanam** and A Sahoo, "Recovery of heat from waste gas of a sponge iron plant", 1st ISC-2011, Maharaja Ranjit Singh College of Professional Sciences Indore, India, Dec 24-25, 2011.
20. **S. Khanam** and T.R.Majhi, "Study of temperature profile of Sponge Iron processing Rotary Kiln with CFD", Technological Advancements in Chemical and Environmental Engineering (TACEE), BITS Pilani, India, Mar 23-24, 2012.

21. D. Tirumalaraju, **S. Khanam** and A Sahoo, “Energy integration of sponge iron production process”, International Conference on Applied Sciences and Engineering, Hyderabad, India, Jul 30-31, 2012.
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23. N. Jhaveri, B. Mohanty and **S. Khanam**, "Optimal area targeting of heat exchanger network using LP Model", ACE-2013, IIT Roorkee, India, Mar 22-24, 2013, Ref. No. 166.
24. A.K. Poonia and **S. Khanam**, "Analysis of temperature profile for rotary kiln of sponge iron process using ANN", ACE-2013 IIT Roorkee, India, Mar 22-24, 2013, Ref. No. 112.
25. Priyanka and **S. Khanam**, “Simulation of Supercritical Fluid Extraction Process”, International Conference of COMSOL Multiphysics, Pune, India, Oct 28-29, 2015.
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27. G.K. Gaurav and **S. Khanam**, “Simulation of three dimensional sponge iron rotary kiln using CFD”, FMFP-2016, MNNIT Allahabad, India, Dec 15-17, 2016, Ref. No. 477.
28. G. K. Silori and **S. Khanam**, “Simultaneous water and energy integration techniques : A review”,International Conference on Frontiers in Engineering, Applied Sciences and Technology, NIT Tiruchirappalli, India, Mar 31 - Apr 1, 2017, Vol. 2, ISBN : 9788 190 838887.
29. V. Ramanaiah and **S. Khanam,** "Energy integration in an Indian sponge iron process", 6th International conference on Advances in Energy Research (ICAER-2017), IIT Bombay, India, Dec 12-14, 2017, Paper no. 121.
30. S. S. Chauhan and **S. Khanam**, "Flue Gas Water Energy Integration in Boiler of Thermal Power Plant Using Pinch Analysis", International Conference on Advances and Challenge for Sustainable Ecosystems, NIT Tiruchirapall, India, Dec 6-8, 2018.
31. S. Kumar and **S. Khanam**, "Evaporation loss and its prevention in thermal power plant", International Conference on Advances and Challenge for Sustainable Ecosystems, NIT Tiruchirapall, India, Dec 6-8, 2018.
32. S.S. Chauhan and **S. Khanam**, "Flue gas waste energy integration system in steam cycle of thermal power plant", International Conference on Recent Advances in Engineering & Science (ICRAES-2020), AMU Aligarh, India, Jan 11-12, 2020 (***Best Paper Award was received***).
33. Samiksha, S. Ghosh and **S. Khanam**, “Numerical Study of film thickness in gas-liquid counter current annular flow”, 11th International Conference on Multiphase Flow, ICMF-2023, Kobe, Japan, April 2-7, 2023, Paper no. 778.
34. Samiksha, N. Adhikari, S. Ghosh and **S. Khanam**, "CFD simulation of direct reduction rotary kiln to study the combustion behaviour", ICECEES-2024, IIT Roorkee, Feb 15-17, 2024, No. ABS20240098.
35. J. Singh and **S. Khanam**, "Optimization of %metallization inside the rotary kiln of sponge iron process", ICECEES-2024, IIT Roorkee, Feb 15-17, 2024, No. ABS202400108.
36. S. Kardam and **S. Khanam**, "Characterization of Jackfruit Peel as a Promising Resource for Gasification", ICECEES-2024, IIT Roorkee, Feb 15-17, 2024, No. ABS202400118.

37. V. Kumar, S. Ghosh and **S. Khanam**, "A study of sodium alginate drop on static oil film", ICECEES-2024, IIT Roorkee, Feb 15-17, 2024, No. ABS202400167.
38. V. Kumar, S. Ghosh and **S. Khanam**, "Liquid rope coiling of viscous Newtonian and non-Newtonian liquid on a solid surface: A numerical study", ICNMMF-**5**-2024, Reykajvik, Iceland, June 26-28, 2024, No. 45.
39. S. Kardam and **S. Khanam**, "Characterization of Jackfruit peel for Gasification Process" ICAFM-2024, Tribhuvan University, Nepal, October 25-27, 2024 (***Best Poster Award was received***).
40. V. Kumar, S. Ghosh and **S. Khanam**, "Liquid rope coiling on static solid surfaces: A CFD study", ICAFM-2024, Tribhuvan University, Nepal, October 25-27, 2024.
41. G.K. Gaurav, **S. Khanam**, "Optimization of % metallisation of rotary kiln of sponge iron process", ICMF-2025, Toulouse, France, May 12-16, 2025, Paper no. 213.
42. V. Kumar, S. Ghosh and **S. Khanam**, "Liquid rope coiling of viscous non-Newtonian silicone oil on a static solid surface: A numerical study", ICMF-2025, Toulouse, France, May 12-16, 2025, Paper no. 544.

Book/Book Chapters

1. **S. Khanam**, "Design Your Smile", Notion Press, Chennai, 2025, Amazon link https://www.amazon.in/dp/B0DRZ4TSZS.

IX. COURSES/LECTURES DELIVERED

Short Term Courses/Conference Organized

S. No.	Title	Place	Dates	No. of Participants	Remark
Short term courses					
1	Pinch Analysis: A Tool for Efficient Use of Energy	Chemical Engg. Dept., NIT Rourkela	17-21 March 2008	17	QIP course
2	Maximising Energy Savings in Process Industry Using Pinch Analysis	Continuing Education Centre, IIT Roorkee	7-9 Jan, 2013	15	Continuing Education course
Conference/Workshop					
3	Workshop on "Future trends in Chemical Engineering"	Chemical Engg. Dept., IIT Roorkee	18th August 2012	-	Coordinator of Publication
4	International conference on Advances in Chemical Engineering		22-24 Feb. 2013	-	Coordinator of Publication
5	International Conference Chemical Engineering: Enabling Transition Towards Sustainable Future		8-10 Sep, 2022	-	Member of Technical Committee

6	The International Chemical Engineering Conference on Energy, Environment and Sustainability (ICECEES-2024)		15-17 Feb, 2024	-	Joint Organizing Secretary and Coordinator of Technical Events

NPTEL MOOCs Courses Developed

S. No.	Title	Type	Duration (Week)	Dates	No. of Participants
1	Mechanical Operations	New	4	5.9.16 to 30.9.16	1052
2	Unit Operations of Particulate Matter	New	4	24.7.17 to 18.8.17	1536
3	Mechanical Operations	Re-run	4	5.2.18 to 2.3.18	1387
4	Unit Operations of Particulate Matter	Re-run	4	13.8.18 to 7.9.18	1290
5	Equipment Design: Mechanical Aspects	New	4	28.1.19 to 22.2.19	1097
6	Mechanical Operations	Re-run	4	28.1.19 to 22.2.19	1129
7	Unit Operations of Particulate Matter	Re-run	4	29.7.19 to 23.8.19	737
8	Equipment Design: Mechanical Aspects	Re-run	4	27.1.20 to 21.2.20	1217
9	Mechanical Operations	Re-run	4	14.9.20 to 9.10.20	1093
10	Unit Operations of Particulate Matter	Re-run	4	14.9.20 to 9.10.20	751
11	Process Equipment Design	New	12	18.1.21 to 9.4.21	830
12	Equipment Design: Mechanical Aspects	Re-run	4	18.1.21 to 12.2.21	791
13	Process Equipment Design	Repeat	12	24.1.22 to 15.4.22	1198
14	Unit Operations of Particulate Matter	Re-run	4	21.2.22 to 18.3.22	706
15	Mechanical Operations	Re-run	4	25.7.22 to 19.8.22	558
16	Equipment Design: Mechanical Aspects	Re-run	4	25.7.22 to 19.8.22	952
17	Unit operations of particulate matter	Repeat	4	23.1.23 to 17.2.23	438
18	Process Equipment Design	Repeat	12	23.1.23 to 14.4.23	955
19	Mechanical Operations	Re-run	4	25.7.23 to 19.8.23	558
20	Equipment Design: Mechanical Aspects	Repeat	4	25.7.23 to 19.8.23	952
21	Unit operations of particulate matter	Re-run	4	22.1.24 to 16.2.24	484
22	Process Equipment Design	Repeat	12	22.1.24 to 12.4.24	1054
23	Mechanical Operations	Repeat	4	July - Dec 2024	-
24	Equipment Design: Mechanical Aspects	Repeat	4	July - Dec 2024	-

NPTEL courses offered by me will continue to run till July 2026.

Lecture Delivered in Short Term Courses

S. No.	Course title	Lecture title	Place	Dates	Organized by	Remark
1	System thinking and environmental engineering for sustainable decision making	Optimization of water usage	Chemical Engg. Dept., IIT Roorkee	3 -7 June, 2019	Prof. P. Mondal	TEQIP course
2	Environmental Management in Tanneries (including ZLD, Chrome Recovery), Sponge Iron Plants, Slaughter Houses, Pharma and Chemical Sector,	Water & Energy Conservation in Sponge Iron Plants	Continuing Education Centre, IIT Roorkee	13-17 January, 2020	Prof. Vimal C. Srivastava	CPCB
3	Advanced Engineering Programme - Product Innovation in Industrial Production	Pressure Vessel Design (Stress analysis)	Continuing Education Centre, IIT Roorkee	18-22 December, 2023	Prof. Inderdeep Singh	Executives of PCBL Ltd. TN, were the attendees
4		Design of Heat Exchangers				
5	Training Program for Iron and Steel Industry	Emerging Low Emission Technologies with Case Studies	NPTI, Badarpur, New Delhi	11-12 November, 2024	NPTI-BEE	Attendees were from iron and steel sectors
6				19-20 December, 2024		

Lecture Delivered in Seminar/Webinar

S. No.	Seminar/Webinar	Lecture title	Place	Dates	Organized by
1	Advances in Chemical and Petrochemical Engineering	Energy Conservation in Sponge Iron Plants	Chemical Engg. Dept. AMU Aligarh	22nd Feb, 2020	Chemical Engg. Dept. AMU Aligarh
2	Cost Reduction Innovations in Coal based Sponge Iron Production	Energy Integration in Coal based Sponge Iron Process	Online	25th Jan, 2021	Sponge Iron Manufacturing Association, New Delhi
3	5th India International DRI Summit 2022	Research Trends in Sponge Iron Process: Energy Integration, Hydrogen Utilization and	Taj Palace, New Delhi	30th Sept, 2022	Sponge Iron Manufacturing Association, New Delhi

		Waste Plastic Utilization			
4	CII Steel Summit 2022	Measures to Decarbonize the DRI Sector	ITC Maurya, New Delhi	22nd Dec, 2022	Confederation of Indian Industry (CII), New Delhi
5	CSE's Workshop on Decarbonizing India's Iron and Steel Sector by 2030 and Beyond	Pathways for Cleaner DRI Production in India	Online	28th February, 2023	Centre for Science and Environment, New Delhi
6	Expert Lecture	Research Trends in Sponge Iron Process: Energy Integration, Hydrogen Utilization and Waste Plastic Utilization	Department of Petroleum Studies, AMU Aligarh	11th March, 2023	AMU Aligarh
7	6th India International DRI Summit 2024	Hydrogen – enriched Syngas Production from Biomass	Hotel Le Meridien, New Delhi	11th March, 2024	Sponge Iron Manufacturing Association, New Delhi
8	Sustainability Facets of DRI Industry	Possibilities to use alternative fuels in Rotary Kiln for De-carbonization-A Simulation Study	Joda, Odisha	26th-27th Sept, 24	Tata Steel Sponge Iron Joda, Odisha

X. SPONSORED AND CONSULTANCY RESEARCH PROJECTS

Sponsored Research Project as PI

S. No.	Title of project	Sponsoring Agency	Tenure	Co-PI	Project cost (Lakhs)
1	Process Integration based modifications for the energy conservation Sponge Iron Plants	CSIR, New Delhi	1.4.2011-6.6.2012	Dr. Abanti Sahoo, Chemical Engg., NIT Rourkela	9.24
2	Energy and mass integration studies on coal based sponge iron production process using process integration principles	SRIC, IIT R	May, 2013-Aug, 2016	-	9.00
3	Design of water network to optimize water consumption in coal washeries for removal of impurities from coal	Ministry of Coal	12.9.2017 — 21.7.2021	-	24.94
4*	Optimization of the performance of rotary kiln to maximize %metallization considering natural gas/syngas as reductant	Bureau of Energy Efficiency	9.11.22-8.11.25	-	64.60

5	Hydrogen-enriched syngas production from pine needle using bubbling fluidized bed gasifier	SERB-CRG	9.5.23-8.5.26	Dr.P.Mondal, ChED, IITR	48.38
6	Decarbonization of DRI process in rotary kiln using hydrogen	Ministry of Steel	17.1.25-16.1.27	Dr.N.Dhawan, MT, IITR	190.70
7	Production of Clean Coal from Raw Coal using Physical and Chemical Routes	Ministry of Power	Revision submitted on 21.7.2022	-	46.60
8	Development of a Continuous Chemical Looping Combustion Process of Coal to Produce High Purity CO_2 Gas and energy	Ministry of Power	Revision submitted on 24.7.2022	Dr.P.Mondal, ChED, IITR	183.91

* This project involves industry collaborations from Tata Steel Ltd., Meramandali, Odisha and SMC Power generation Ltd., Jharsuguda, Odisha.

Sponsored Research Projects as Co-PI

S.No.	Title of project	Sponsoring Agency	Tenure	PI	Co-PI	Project cost (Lakhs)
1	**Centre of Excellence**: Process Development, Wastewater Management in Petrochemical Industries	Ministry of Chemicals and Fertilizers, GoI	12.2.19 to 31.3.23	Prof. Shishir Sinha	1. Prof. B. Prasad 2. Prof. V.C. Srivastava 3. Dr. P. Biswas 4. Dr. V. Kumar 5. **Dr. S. Khanam**	1316.00

Consultancy Projects as PI

S.No.	Title of project	Sponsoring Agency	Tenure	Co-PI	Project cost (Lakhs)
1	Modeling and Simulation of Energy Efficient Multiple Effect Evaporator System	M/s. Eco Green Solution Systems (P) Ltd., Bangalore	1.2.2011-31.8.2011	-	4.46

XI. MEMBERSHIP

- Indian Institute of Chemical Engineers' (LAM-33404)
- International Association of Computer Science and Information Technology (80337277)
- International Association of Engineers (111838)
- Science and Engineering Institute (SCIEI) (20130531004)

XII. ACHIEVEMENTS AS STUDENT

- Received Certificate of Merit to show the proficiency in C++ Programming course organized by ChESS from August, 2000 to September, 2000, at Department of Chemical Engineering, IIT Roorkee.
- Won third Prize for Antakshari Competition in AKS-99 a Cultural Festival held in Aligarh Muslim University, Aligarh.

XIII. REFERENCES

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