

## ***Dr. Sarita Kalla***

***Assistant Professor***

*Department of Chemical Engineering*

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### **Academic Qualifications**

- **2015 - 2019: Doctor of Philosophy (Ph.D.) - Chemical Engineering**  
Area - Azeotropic Mixture Separation using Air Gap Membrane Distillation  
Institute - Malaviya National Institute of Technology (MNIT), Jaipur, CGPA - 9.33
- **2015: Master of Technology (M.Tech.) - Process Modeling and Simulation**  
University - Aligarh Muslim University, Aligarh, Aggregate - 81.42 (Honours)
- **2004 - 2008: Bachelor of Engineering (B.E.) - Chemical Engineering**  
University - University of Rajasthan, Jaipur, India, Aggregate - 80.02% (Honours)
- **2002 - 2004: Diploma in Pharmacy (D. Pharmacy)**  
University - University of Rajasthan, Jaipur, India, Aggregate - 65.52%
- **2001-2002: Senior Secondary**, Aggregate - 76%
- **1999-2000: Secondary**, Aggregate - 74%

### **Achievements**

- Selected for the prestigious national award from the Indian Institute of Chemical Engineers (IChE), Kolkata, India in the field of Membrane Science.  
**Name of Award:**  
**IChE Award for the Year 2019:** Prof Shymal Kanti Sanyal Memorial Award for the Best Ph.D. Thesis in the Area of Membranes Research with Significant Commercial Potential awarded by Indian Institute of Chemical Engineers (IChE), India. The award was presented to me during the 72nd Annual Session-cum-Indian Chemical Engineering Congress (CHEMCON 2019) held from 16-19, December, 2019 at Indian Institute of Technology Delhi (IITD), New Delhi.
- **Research**, “Experimental and mathematical study of air gap membrane distillation for aqueous HCl azeotropic separation” published in *Journal of Chemical Technology & Biotechnology, Wiley Publications*, is among **the top 10% most downloaded paper** between January 2018 and December 2019.
- **All India First (1<sup>st</sup>) Rank** in the exam for the post of Lecturer - Chemical Engineering, Technical Education Department conducted by Rajasthan Public Service Commission (**RPSC**), Ajmer.

- **Certificate of Appreciation** for outstanding contribution, coordination and participation during the Global Student Solar Ambassadors Workshop organized globally to commemorate the 150<sup>th</sup> Birth Anniversary of Mahatma Gandhi in association with Indian Institute of Technology (IIT), Bombay.
- The **Department of Science and Technology (DST), Govt. of Rajasthan** has accepted a student project for financial assistance. The Project is on **“Removal of heavy metals from industrial processed water using Bio-sorbent”**.
- Qualified **GATE 2014** with **87.59 percentile** in Chemical Engineering Branch conducted by Indian Institute of Technology (IIT), Kharagpur on behalf of the Department of Education, Ministry of Human Resources Development (MHRD), Government of India.
- Qualified **GATE 2011** with **87.76 percentile** in Chemical Engineering Branch conducted by Indian Institute of Technology (IIT), Madras on behalf of the Department of Education, Ministry of Human Resources Development (MHRD), Government of India.
- **First rank** holder in M.Tech. Entrance Exam (Chemical Engineering) conducted by Aligarh Muslim University (AMU), Aligarh in 2010. **(66 marks out of 100)**
- **First rank** holder in M.Tech. course (Specialization in Process Modeling and Simulation) with aggregate 81.42 (In consecutive three semesters).

## **Research Papers Published / Posters / Patent**

### **Paper Published in SCI /International Journals (08)**

1. **Sarita Kalla**, Sushant Upadhyaya, Kailash Singh, “Principles and Advancements of Air Gap Membrane Distillation - A Review”, *Reviews in Chemical Engineering*, Volume 35(8), pp. 817-859, 2018. doi: 10.1515/revce-2017-0112 (Impact Factor: 4.20)
2. **Sarita Kalla**, Sushant Upadhyaya, Kailash Singh, Rakesh Baghel, “Experimental and mathematical study of air gap membrane distillation for aqueous HCl azeotropic separation”, *Journal of Chemical Technology & Biotechnology* 94, no. 1 (2019): 63-78. doi: 10.1002/jctb.5766. (Impact Factor: 2.659) **(One of the figures along with the affiliation of the paper has been selected as the cover page of the journal)**
3. **Sarita Kalla**, Sushant Upadhyaya, Kailash Singh, Rakesh Baghel, “Development of Heat and Mass Transfer Correlations and Recovery Calculation for HCl - Water Azeotropic Separation using Air Gap Membrane Distillation”, *Chemical Papers*, Volume 73, pp-2449-2460, 2019. doi: 10.1007/s11696-019-00795-w. (Impact Factor: 1.246)
4. **Sarita Kalla**, Sushant Upadhyaya, Kailash Singh, Rajeev Kumar Dohare and Madhu Agarwal, “A case study on separation of IPA-water mixture by extractive distillation using aspen plus” published in *International Journal of Advanced Technology and Engineering Exploration*, Volume 3(24), November, 2016. doi: 10.19101/IJATEE.2016.324004
5. Rakesh Baghel, Sushant Upadhyaya, S. P. Chaurasia, Kailash Singh, and **Sarita Kalla**, "Optimization of process variables by the application of response surface methodology for

naphthol blue black dye removal in vacuum membrane distillation." *Journal of Cleaner Production*, Volume 199, pp. 900-915, 2018. doi: 10.1016/j.jclepro.2018.07.214. (Impact Factor: 6.395)

6. Rakesh Baghel, **Sarita Kalla**, Sushant Upadhyaya, S. P. Chaurasia and Kailash Singh, "CFD Modeling of Vacuum Membrane Distillation for Removal of Naphthol Blue Black Dye from Aqueous Solution using COMSOL Multiphysics" *Chemical Engineering Research and Design, Elsevier*, 158 (2020), 77–88. DOI: 10.1016/j.cherd.2020.03.016 (Impact Factor: 3.073)
7. Rakesh Baghel, **Sarita Kalla**, Sushant Upadhyaya, S.P. Chaurasia, Jitendra Kumar Singh, "Treatment of Sudan III Dye from wastewater using Vacuum Membrane Distillation" published in *International Journal of Basic Science and Applied Engineering Research*, vol.4(3), pp. 237-241, 2017.
8. **Sarita Kalla**, Syed Akhlaq Ahmad, "A Study on Pressure Swing Adsorption for Gas Separation" published in *INROADS, An International Journal of Jaipur National University*, Vol.3(1), pp 243-247, 2014.

#### **Papers Presented/Published in International/National Conferences Proceedings (07)**

1. **Sarita Kalla**, Sushant Upadhyaya, Kailash Singh, "Mathematical Modeling of the Separation of HCl/Water Mixture using Argon Gap Membrane Distillation" presented in *Scopus indexed International Conference on Mathematical Modeling, Computational Intelligence Techniques and Renewable Energy (MMCITRE-2020)* organised by Department of Mathematics, Pandit Deendayal Petroleum University in association with Forum for Interdisciplinary Mathematics, Institution of Engineers (IEI) - Gujarat and Computer Society of India (CSI), Ahmedabad February 21-23, 2020.
2. **Sarita Kalla**, Sushant Upadhyaya, Kailash Singh, Rakesh Baghel, "Taguchi Optimization Approach for Azeotropic Mixture Separation using Air Gap Membrane Distillation" accepted for oral presentation in 71<sup>st</sup> annual session of IChE *Chemcon'18* organised by Department of Chemical Engineering, Dr. B. R. Ambedkar National Institute of Technology Jalandhar, (India), December 27-30, 2018.
3. **Sarita Kalla**, Rakesh Baghel, Sushant Upadhyaya, Kailash Singh, "Effects of Operating Parameters and Development of Heat Transfer Correlation in Air Gap Membrane Distillation for Azeotropic Mixture Separation", accepted for oral presentation in *International Conference on Desalination (Inda-2018)* organised by NIT, Trichy and Indian Desalination Association (InDA) at Trichy, Tamil Nadu (India), April 20-21, 2018.
4. **Sarita Kalla**, Sushant Upadhyaya, Kailash Singh, "Theoretical Assessment of the separation of HCl-Water azeotrope using Air-Gap Membrane Distillation", presented in 69<sup>th</sup> annual session of IChE *Chemcon'16* organised by Chennai Regional Center of IChE and Department of Chemical Engineering, AC Tech., Anna University, Chennai (India), December 27-30, 2016.
5. Rakesh Baghel, **Sarita Kalla**, Sushant Upadhyaya, S.P. Chaurasia. "Removal of Basic Red 9 Azo Dye by using Flat Sheet PVDF Membrane in Vacuum Membrane Distillation" accepted for oral presentation in 71<sup>st</sup> annual session of IChE *Chemcon'18* organised by Department of

Chemical Engineering, Dr. B. R. Ambedkar National Institute of Technology Jalandhar, (India), December 27-30, 2018.

6. Aditya Anand, Abdul Quddoos, **Sarita Kalla**, “Removal of Methylene Blue from Aqueous Solution Using Mango Leaves”, presented at 67<sup>th</sup> annual session of IChE Chemcon’14, Punjab University, Chandigarh during December 27-30, 2014.
7. Aishwary Jain, **Sarita Kalla**, A poster on “The Production of Electrical Energy with the help of Geothermal Gradient” presented at *International Conference on Emerging Trends in Biotechnology-2014 (ICETB-2014)* to be organized jointly by School of Environmental Sciences, Jawaharlal Nehru University (JNU), The Biotech Research Society, India (BRSI), and Embassy of Italy, New Delhi held at JNU, New Delhi during November 6-9, 2014.

### **Book Chapter Publication (01)**

1. Sushant Upadhyaya, Kailash Singh, S.P. Chaurasia, Rakesh Baghel and **Sarita Kalla**. “Vacuum Membrane Distillation for Water Desalination” in “Membrane Processes: Pervaporation, Vapor Permeation and Membrane Distillation for Industrial Scale Separations”. S.Sridhar, Siddhartha Moulik (Editors) Published by **Wiley** (2018) pp.399 – 430

### **Membership of Professional Societies**

- Associate Member of Indian Institute of Chemical Engineers (IChE), LAM - 46237.
- Life Member of Indian Desalination Association (InDA), LM - 401.

### **Short Term Courses/ FDP/Workshop/National Symposium Attended:**

- Attended a one-week Faculty Development Program (FDP) on, “**Design of Experiment & Artificial Neural Network**” organized by the Department of Chemical Engineering, S.V. National Institute of Technology, Surat, under AICTE Training and Learning Academy (ATAL) program, 4 - 8 November 2019.
- Attended a one-week training program on, “**3D Printing & Robotics**” conducted by Center for Electronic Governance (CEG), Jaipur, 4 February – 8 February, 2019.
- Attended a two-week Short-Term Training Program (STTP) on, “**Induction Training Program**”, conducted by Teachers Training Centre (TTC) and Learning Resources Development Center (LRDC), Department of Technical Education, Jodhpur, 25 June - 6 July 2018.
- Attended a Five Days Short-Term Course (STC) on, “**Membrane Processes for Water Purification and Reject Management**”, organized by the Department of Chemical Engineering, Malaviya National Institute of Technology (MNIT), Jaipur, under TEQIP-III, September 2017.
- Attended a stakeholder’s workshop on, “**Community Water Purification Plants in Quality Affected Habitations of Rajasthan: Issues, Challenges & Way Forward**”, organized by the Department of Civil Engineering and Chemical Engineering, Malaviya National Institute of Technology (MNIT), Jaipur during 27<sup>th</sup> July 2017.

- Attended a Five Days training program on, “**Field Emission Scanning Electron Microscopy (FE-SEM)**” organized by Materials Research Center, Malaviya National Institute of Technology (MNIT), Jaipur, 28 March - 1 April 2017.
- Attended a National Symposium on, “**Water Purification & Reject Management (WPRM-2016)**”, organized by Department of Chemical Engineering, Malaviya National Institute of Technology (MNIT), Jaipur in association with WWSO, PHED Rajasthan, Indian Desalination Association (InDA) & Jaipur Regional Center of IChE on 12<sup>th</sup> November 2016.
- Attended a Three Days workshop on, “**Nature-Inspired Optimization**”, organized by Department of Electronics & Communication Engineering, Malaviya National Institute of Technology (MNIT), under the purview of TEQIP, 21<sup>st</sup> – 23<sup>rd</sup> October 2016.
- Attended a one day workshop on, “**Technical Manuscript Preparation with LaTeX**”, organized by Department of Electronics & Communication Engineering, Malaviya National Institute of Technology (MNIT), Jaipur, 19<sup>th</sup> September 2015.
- Attended a Seven Day’s Short-term training program (STTP) on, “**Writing Research Paper using LaTeX**”, organized by the Department of Physics, Mathematics and Computer Science, Govt. Women Engineering College, Ajmer, under TEQIP- II, October 2015.
- Attended a Two Day’s National Workshop on “**Process Modeling and Simulation**” organized by Aligarh Muslim University (AMU), under TEQIP-II, March 2013.
- Attended a Seven Day’s Short-Term Course (STC) for Faculty Development Program (FDP) on “**Application of MATLAB in Engineering**” organized by Malaviya National Institute of Technology (MNIT), under TEQIP-II, September 2013.

## **Professional Experience**

**October 16, 2019 - Present: Assistant Professor**, Department of Chemical Engineering, S.V. National Institute of Technology, Surat, Gujrat.

**January 2018 - October 12, 2019: Lecturer and in-charge Head**, Department of Chemical Engineering, Govt. Polytechnic College, Barmer, Rajasthan (Technical Education Department, Govt. of Rajasthan).

**Courses Taught:** Heat Transfer, Chemical reaction Engineering-I, Fluid Mechanics, Mechanical Operation.

### **Responsibilities:**

- Administrative responsibilities to lead, manage and develop the department.
- Subjects distribution, classes time table compilation, conduction of examination, classes & attendance monitoring, propose regular updates in syllabus to board of academic council, setting up a panel for external and internal paper setters.

**August 2008 - July 2010: Lecturer**, Department of Chemical Engineering, Jaipur National University, Rajasthan, India.

**Courses Taught:** Heat Transfer, Chemical Reaction Engineering and Fluid Mechanics.

### **Professional Activities**

- External Member of the Advisory Board meeting for Chemical Engineering Department of Chhotubhai GopalBhai Patel Institute of Technology (CGPIT), Uka Tarsadia University, Surat held on 25 January 2020.
- Member of Board of Studies (BOS) for Department of Petroleum Engineering, Bikaner Technical University (BTU), Bikaner, Rajasthan.
- Member of the interview panel for the recruitment of guest faculty (session 2018-19) at Govt. Engineering College, Barmer.
- Worked as Nodal officer, REEP-2018 at Govt. Polytechnic College, Barmer.
- Member of Grievance Redressal Committee, Govt. Polytechnic College, Barmer and Govt. Engineering College, Barmer.
- Member of the committee to conduct the work related to first-year admission at Govt. Polytechnic College, Barmer.
- Co-incharge of Cultural Activity Committee, Extra-Curricular Activity Committee, Discipline Committee, Purchase Committee, Govt. Polytechnic College, Barmer.
- Member of Anti-Ragging Committee, Women Sexual Harassment Committee, Govt. Polytechnic College, Barmer, and Govt. Engineering College, Barmer.
- Actively volunteered towards assistance & facilitation during CSAB counseling 2016, MNIT, Jaipur.
- Worked as a reviewer in 2<sup>nd</sup> International conference on “Innovative Advancement in Engineering and Technology (IAET- 2016)”, conducted by Jaipur National University, Jaipur on April, 2016.

### **M.Tech. Dissertation Guided**

Ongoing: Mr. A. Sushvanth Reddy, Year: 2019-2021

Supervisors: Dr. Z. V. P. Murthy, Professor (HAG), and Dr. Sarita Kalla

### **Invited Talks/Lectures Delivered**

- Invited lecture on “*AGMD Experimentation and Numerical modeling*”, during Summer Internship Program (SIP) under TEQIP III on “*Computational Techniques, Polymeric Membrane Fabrication, Wear and Friction of Materials*”, June 3–7, 2019 organized by Department of Chemical Engineering, MNIT, Jaipur.

### **Short Term Courses/ FDP/Workshop Organised**

- Worked as Coordinator for organizing one-week Short-Term Training Program (STTP) on, “MATLAB and Its Applications in Engineering and Computational Research”, Under TEQIP-III from February 17-21, 2020 at SVNIT, Surat.

- Worked as Coordinator for organizing, “Student Solar Ambassador (SSA) Workshop - 2019” for celebrating 150<sup>th</sup> Birth anniversary of Mahatma Gandhi on 5 October, 2019 at Govt. Polytechnic College, Barmer, in association with Indian Institute of Technology (IIT), Bombay.

## **Projects**

### **Doctoral Work:**

**Title:** Mathematical Modeling and Experimental Study of Air Gap Membrane Distillation for Separation of HCl/Water Azeotrope.

**Supervisors:** Dr. Sushant Upadhyaya (Associate Professor, MNIT, Jaipur) and Dr. Kailash Singh (Professor, MNIT, Jaipur)

**Brief Details:** The experimental and mathematical modeling has been carried out for the separation of HCl/Water azeotrope using air gap membrane distillation. The main purpose of this study is to eliminate the azeotropic point in both retentate and permeate and find out the operating conditions at which it will achieve. Two-Dimensional (2-D) numerical simulation has also been performed to determine the temperature profile at the membrane surface and inside the AGMD module by using COMSOL multiphysics simulation software. The trans-membrane flux has also been calculated by using the membrane surface temperature estimated by CFD simulation and compared it with the value obtained by MATLAB programming. The effects of the operating parameters on permeate flux and both retentate and permeate composition were also studied. Taguchi’s design of experiment is applied to determine the optimum conditions for higher permeate flux and to find out which parameter is more statistically significant. The effect of operating time on permeate flux and selectivity has been analysed. Heat and mass transfer correlation, experimental recovery and ANN model has been developed. The AGMD process compares with the extractive distillation (ED) to analyse the unit product cost and energy consumption and found production cost by AGMD process lower than ED process.

### **Master Course Project - 1**

**Title:** Optimization of Thermal Cracker using Linear Programming.

**Duration:** Six Months (with studies during third semester)

**Supervisor:** Prof. (Dr.) Mohammad Idrees (Professor, AMU, Aligarh) and Dr. Syed Akhlaq Ahmad (Associate Professor, AMU, Aligarh)

**Aim:** The estimation of optimal flow rates of different feeds to the cracking furnace under the restriction of ethylene and propylene production by using linear programming. LP method, have been successfully applied with different strategies to find the optimum flow rates of different feeds.

### **Project – 2 (Dissertation)**

**Title:** Dynamic Modeling and Simulation of Pressure Swing Adsorption Column

**Duration:** Six Months (with studies during fourth semester)

**Supervisor:** Dr. Syed Akhlaq Ahmad (Associate Professor, AMU, Aligarh)

**Aim:** A mathematical model of the pressure swing adsorption process has been developed using an axial plug flow model for the adsorption of the gaseous mixture. The model has been simulated in MATLAB for the separation of CO<sub>2</sub> from the CO<sub>2</sub>/N<sub>2</sub> mixture. The simulated results show that the cyclic steady-state condition has been achieved after 20 cycles in which the product is obtained with about 36 mole% CO<sub>2</sub> purity and about 94.5% of CO<sub>2</sub> has been removed in the product.

## **Technical Skills**

- Programming Languages: MATLAB
- Simulation Software: Aspen plus, Minitab, ImageJ©, COMSOL Multiphysics©
- LATEX, Dia Software, OriginPro, draw.io

**Languages:** English (Spoken and Written) - Good, Hindi - Fluent, Marwadi (Regional Language)

**Dr. Sarita Kalla**