

Brief CV and List of Publication

Present Position:

Dr. Debasis Sarkar
Professor
Department of Chemical Engineering
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Education:

Ph. D	Indian Institute of Science, Bangalore <i>Advisor: Prof. Jayant M. Modak</i>
M. E.	Indian Institute of Science, Bangalore <i>Master of Engineering in Chemical Engineering</i> <i>Advisor: Prof. Jayant M. Modak</i>
B. Tech.	University of Calcutta <i>B. Tech in Chemical Engineering</i>
B. Sc.	Presidency College, University of Calcutta <i>B. Sc. in Chemistry Honors</i>

Postdoctoral Research:

Postdoctoral Fellow, University of Western Ontario, Canada
Advisors: Prof. Sohrab Rohani and Prof. Arthur Jutan

Previous Professional Experience:

- Associate Professor, Department of Chemical Engineering, IIT Kharagpur
- Assistant Professor, Department of Chemical Engineering, IIT Kharagpur
- Research Fellow, Institute of Chemical Engineering and Sciences, Singapore
- Lecturer/Assistant Professor, Department of Chemical Engg, HBTI, Kanpur

Research Interest:

- Crystallization Systems Engineering
- Biosystems Engineering
- Process Modeling, Simulation and Optimization
- Optimization under Uncertainty

List of Research Publications

Journals

- 1) Gargi, Sarkar, D. Continuous antisolvent crystallization of pyrazinamide in a Coiled Flow Inverter device: Optimization by response surface methodology, *Journal of Crystal Growth*, 678, 128485, 2026.
- 2) Sehrawat, P., Sarkar, D., Kumar, S., Kumar, J. “An efficient approach for parameter sensitivity analysis using sigma point method”, *Chemical Engineering Communications*, 213(1), 2026.
- 3) Gargi, N., Arif, M.A., Trinadh, K.V.V.S., Maharana, A., Sarkar, D. “Continuous Isothermal Antisolvent Crystallization of Pyrazinamide in a Coiled Flow Inverter Device”, *Industrial and Engineering Chemistry Research*, 63, 17221 – 17235, 2024.
- 4) Maharana, A., Das, A., Kumar, J., Sarkar, D. “Multivariate population balance modeling and simulation of ultrasound-assisted crystallization of a plate-type pharmaceutical: Nucleation, growth, and breakage”, *Computers and Chemical Engineering*, 184, 108651, 2024.
- 5) Kumar, R.R., Sarkar, D., Sen, R. “Simultaneously maximizing microalgal biomass and lipid productivities by machine learning driven modeling”, *Applied Energy*, 358, 122597, 2024.
- 6) Maharana, A., Sehrawat, P., Das, A., Kumar, J., Sarkar, D. “Multi-dimensional population balance modeling of sonocrystallization of pyrazinamide with systematic estimation of kinetic parameters based on uncertainty and sensitivity analyses”, *Chemical Engineering Research and Design*, 200, 356 – 373, 2023.
- 7) Lenka, M., Bhoi, S., Sarkar, D. “Two-dimensional population balance modelling and validation of combined cooling and antisolvent crystallization of L-asparagine monohydrate”, *CrystEngComm*, 25, 1424 – 1435, 2023.
- 8) Maharana, A. and Sarkar, D. “Effects of Ultrasound and Its Amplitude on the Metastable Zone Width, Induction Time, and Nucleation Kinetics of Pyrazinamide in Acetone”, *Industrial & Engineering Chemistry Research*, 61, 11262–11275, 2022.
- 9) Sehrawat, P., Sarkar, D., and Kumar, J. “Parameter Identification in Population Balance Models Using Uncertainty and Sensitivity Analysis”, *Industrial & Engineering Chemistry Research*, 61, 8673–8684, 2022.

- 10) Das A., Bhoi S., Sarkar D., Kumar J. “Sonofragmentation of rectangular plate-like crystals: Bivariate population balance modeling and experimental validation”, ***Crystal Growth & Design*** 20, 5424-5434, 2020.
- 11) Bhoi S., Sarkar D. “Hybrid finite volume and Monte Carlo method for solving multidimensional population balance equations in crystallization processes”, ***Chemical Engineering Science*** 217 115511-15, 2020.
- 12) Kumar, R. R., Dhanarajan, G., Sarkar, D., and Sen, R. “Multi-fold enhancement in sustainable production of biomass, lipids and biodiesel from oleaginous yeast: an artificial neural network-genetic algorithm approach”, ***Sustainable Energy Fuels***, 4, 6075–6084, 2020.
- 13) Digarse H., Sarkar D. “Production of the metastable -polymorphic form of pyrazinamide by isothermal internal seeding anti-solvent crystallization”, ***Journal of Crystal Growth*** 526, 2019.
- 14) Maharana, A. and Sarkar, D. “Solubility measurements and thermodynamic modeling of pyrazinamide in five different solvent-antisolvent mixtures”, ***Fluid Phase Equilibria*** 497 33-54, 2019.
- 15) Bhoi, S., Das, A., Kumar, J. and Sarkar, D. “Sonofragmentation of two-dimensional plate-like crystals: Experiments and Monte Carlo simulations”, ***Chemical Engineering Science*** 203 (10), 12–27, 2019.
- 16) Bhoi, S. and Sarkar, D. “Constructing regions of attainable sizes and achieving target size distribution in a batch cooling sonocrystallization process”, ***Ultrasonics - Sonochemistry*** 42, 162–170, 2018.
- 17) Lenka, M. and Sarkar, D. “Combined cooling and antisolvent crystallization of L-asparagine monohydrate”, ***Powder Technology*** 334, 106–116, 2018.
- 18) Lenka, M. and Sarkar, D. “Improving crystal size distribution by internal seeding combined cooling/antisolvent crystallization with a cooling/heating cycle”, ***Journal of Crystal Growth*** 486, 130–136, 2018.
- 19) Lenka, M. and Sarkar, D. “Determination of metastable zone width and nucleation kinetics for combined cooling and antisolvent crystallization of L-asparagine monohydrate in water-isopropanol mixture.” ***Journal of crystal growth***, 501, 66-73, 2018.

- 20) Bhoi, S., Lenka, M. and Sarkar, D. "Particle engineering by optimization for the unseeded batch cooling crystallization of L-asparagine monohydrate", **CrystEngComm**, 19, 6373 – 6382, 2017.
- 21) Hazi Mastan, T., Lenka, M. and Sarkar, D. "Nucleation kinetics from metastable zone widths for sonocrystallization of L-phenylalanine", **Ultrasonics Sonochemistry**, 36, 497–506, 2017.
- 22) Garg, R. K. and Sarkar, D. "Polymorphism control of p-aminobenzoic acid by isothermal anti-solvent crystallization", **Journal of Crystal Growth**, 454, 180-185, 2016.
- 23) Bhoi, S. and Sarkar, D. "Modelling and experimental validation of ultrasound assisted unseeded batch cooling crystallization of L-asparagine monohydrate", **CrystEngComm**, 18, 4863-4874, 2016.
- 24) Lenka, M. and Sarjar, D. "Solubility of L -asparagine monohydrate in water and water- isopropanol mixed solvents: Measurements and thermodynamic modeling", **Fluid Phase Equilibria**, 412, 168-176, 2016.
- 25) Jaiswal, A. and Sarkar, D., "In situ determination of metastable zone width by a simple optical probe", **Crystal Research & Technology**, 50: 347-353, 2015.
- 26) Lisha, K. P. and Sarkar, D., "In silico analysis of bioethanol overproduction by genetically modified microorganisms in coculture fermentation", **Biotechnology Research International**, doi:10.1155/2015/238, 2015.
- 27) Lisha K. Parambil and Debasis Sarkar, "Probing the bioethanol production potential of Scheffersomyces (Pichia) stipitis using validated genome-scale model", **Biotechnology Letters**, 36:2443–2451, 2014.
- 28) Lenka, M., and Sarkar, D., "Determination of metastable zone width, induction period and primary nucleation kinetics for cooling crystallization of L-asparagine monohydrate", **Journal of Crystal Growth**, 408, 85-90, 2014.
- 29) Lisha K. P. and Sarkar, D., "In silico analysis of bioethanol production from glucose/xylose mixtures during fed-batch fermentation of co-culture and mono-culture systems", **Biotechnology and Bioprocess Engineering**, 19: 879-891, 2014.
- 30) Lisha, K.P. and Sarkar, D., "Dynamic flux balance analysis of batch fermentation: effect of genetic manipulations on ethanol production", **Bioprocess and Biosystems Engineering**, 37:617-627, 2014.

- 31) Chaitanya, K. K. and Sarkar, D., “Determination of the Metastable zone width by a simple optical probe”, ***Chemical Engineering & Technology***, 37 (6), 1037–1042, 2014.
- 32) Chakraborty, J., Sarkar, D., Singh, A., and Bharti, A.K., “Measuring the three-dimensional morphology of crystals using regular reflection of light”, ***Crystal Growth & Design***, 12, 6042-6049, 2012.
- 33) Sarkar, D., Doan, X. T., Ying, Z., Srinivasan, R., “In-situ particle size estimation for crystallization processes by multivariate image analysis”, ***Chemical Engineering Science***, 64(1), 9-19, 2009.
- 34) Sarkar, D., Ying, Z., Samavedham, L., Srinivasan, R., “Strategy for validating a population balance model of a batch crystallization process using particle size distribution from image-based sensor”, ***Computer Aided Chemical Engineering***, 26, 833-837, 2009.
- 35) Sarkar, D., Rohani, S., and Jutan, A., “Multi-objective optimization of semi-batch reactive crystallization processes”, ***AIChE Journal***, 53(5), 1164-1177, 2007
- 36) Sarkar, D. and Modak, J. M., “Dynamic reoptimisation of fed-batch bioreactors using genetic algorithms”, ***Indian Chemical Engineer***, 49(4), 375-391, 2007.
- 37) Sarkar, D., Rohani, S., and Jutan, A., “Multi-objective optimization of seeded batch crystallization processes”, ***Chemical Engineering Science***, 61(16), 5282-5295, 2006.
- 38) Sarkar, D. and Modak, J. M., “Optimal design of multiproduct batch chemical plant using NSGA-II”, ***Asia-Pacific Journal of Chemical Engineering***, 1(1/2), 13-20, 2006.
- 39) Sarkar, D. and Modak, J. M., “Pareto-optimal solutions for multi-objective optimization of fed-batch bioreactors using nondominated sorting genetic algorithms”, ***Chemical Engineering Science***, 60(2), 481-492, 2005.
- 40) Sarkar, D. and Modak, J. M., “Genetic algorithms with filters for optimal control problems”, ***Bio-systems and Bioprocess Engineering***, 263, 295-306, 2004.
- 41) Sarkar, D. and Modak, J. M., “Optimization of fed-batch bioreactors using genetic algorithms: multiple control variables”, ***Computers and Chemical Engineering***, 28(5), 789-798, 2004.

- 42) Sarkar, D. and Modak, J. M., “ANNSA: A hybrid artificial neural network-simulated annealing algorithm for optimal control problems”. ***Chemical Engineering Science***, 58(14), 3131-3142, 2003.
- 43) Sarkar, D. and Modak, J. M., “Optimization of fed-batch bioreactors using genetic algorithms”, ***Chemical Engineering Science***, 58(11), 2283-2296, 2003.
- 44) Sarkar, D. and Modak, J. M., “Optimization of fed-batch bioreactors using genetic algorithms: two control variables”, In Kraslawski, A. And Turunen, I. (Eds) ***Computer Aided Process Engineering - 13***, Elsevier, Amsterdam, pp. 1127-1132, 2003.
- 45) Sarkar, D. and Modak, J.M., “Adaptive optimization of continuous bioreactor using neural network model”, ***Chemical Engineering Communications***, 143, 99-116, 1996.

Important International Conference

- 46) Ajit Singathia, Debasis Sarkar, “Genome-Scale Metabolic Modeling and Predictive Control Strategies for Optimal Biomass and Lipid Growth for *Chlorella* Sp.”, **AICHE Annual Meeting 2025**, November 2, 2025 to November 6, 2025, Boston, Massachusetts, USA.
- 47) Gargi, Debasis Sarkar, “Continuous Antisolvent Crystallization of Pyrazinamide in Coiled Flow Inverter Device: Effects on Morphology and Size Distribution”, **AICHE Annual Meeting 2025**, November 2025, USA.
- 48) Bhoi, S. and Sarkar, D. “Particle size control by ultrasound”, **ACS Spring 2019 National Meeting**, March 31 – April 4, 2019, in Orlando, FL, USA.
- 49) Lisha, K. P. and Sarkar, D. “Dynamic Flux Balance Analysis of Bioethanol Production by *Zymomonas Mobilis*”, **Sustainable Energy and Environmental Sciences (SEES - 2019)**, February 18 – 19, 2019, Singapore.
- 50) Kumar A., Jaideep Singh Chauhan, J. S. and Sarkar, D. “Image Segmentation of Multi-shaped Overlapping Objects” **Proceedings of the 13th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISIGRAPP 2018, Funchal, Madeira – Portugal, January 27 – 29, 2018)**, Volume 4: VISAPP, Pages 410-418.

- 51) Ghosh, A. and Sarkar, D. "Molecule2Vec: Vector Space Representation of Organic Molecules for prediction of properties using Deep Neural networks", **7th EuCheMS Chemistry Congress**, August 26 – 30, 2018, Liverpool, UK.
- 52) Bhoi, S. and Sarkar, D. "Sonocrystallization of L-asparagine monohydrate: modeling and optimization", **AIChE Annual Meeting 2016**, Nov 13-18, 2016, San Francisco, CA, USA.
- 53) Lenka, M. and Sarkar, D. "Combined cooling and anti-solvent crystallization of l-asparagine monohydrate", **AIChE Annual Meeting 2016**, Nov 13-18, 2016, San Francisco, CA, USA.
- 54) Bhoi, S. and Sarkar, D. "Sonocrystallization of L-asparagine monohydrate", **BIWIC 2016 - 23rd International Workshop on Industrial Crystallization**, September 6 – 8, 2016, Magdeburg, Germany.
- 55) Lenka, M. and Sarkar, D. "Combined cooling and anti-solvent crystallization of l-asparagine monohydrate", **BIWIC 2016 - 23rd International Workshop on Industrial Crystallization**, September 06 – 08, 2016, Magdeburg, Germany.
- 56) Chakraborty, J., Sarkar, D. and Singh, A., "Measurement of crystal morphology: a new method based on reflection of light from crystal faces", **AIChE Annual Meeting 2012**, Oct 28 - Nov 2, 2012, Pittsburgh, PA, USA.
- 57) Sarkar, D. and Krishna Chaitanya, K., "Determination of metastable zone width for anti-solvent crystallization of glycine", **AIChE Annual Meeting 2012**, Oct 28 - Nov 2, 2012, Pittsburgh, PA, USA.
- 58) K.P. Lisha and Debasis Sarkar, "Dynamic flux balance modeling of fed-batch co-culture fermentation of glucose/xylose mixture for improved bioethanol". 2011 3rd International Conference on Chemical, Biological and Environmental Engineering **IPCBEE 2011** 20:92-96, Shanghai, China.
- 59) Sarkar, D., Jutan, A., and Rohani, S., "A fuzzy logic based approach to real time optimization of dynamic processes", **European Control Conference 2007**, Kos, Greece 2-5 July, 2007.

Important National Conference

- 60) Sreya Banerjee and Debasis Sarkar, “Robust Optimal Control of Batch Crystallization for Enantiomer Resolution Using an Evolutionary Algorithm and Stochastic Back-off Strategy”, **International Conference on Advances in Chemical and Materials Sciences, ACMS, IChE**, Jadavpur University Campus, Jadavpur, India, April, 2026.
- 61) Gargi, Debasis Sarkar, “Continuous Crystallization of Pyrazinamide in a Multi-Stage Mixed Suspension Mixed Product Removal (MSMPR) Crystallizer”, 2nd International Conference on Advances in Chemical and Materials Sciences (ACMS-2026), April 2026, India
- 62) Gargi, Debasis Sarkar, “Comparative Study of Single- and Two-Stage MSMPR Crystallizers for Polymorph and Particle Size Control of Pyrazinamide”, CHEM-TECHNOVA 2026, March 2026, India
- 63) Ajit Singathia, Debasis Sarkar, “FloXomics data-driven machine learning techniques for optimization of biomass and lipid production”, **CHEMCON 2025**, 27-30 December 2025, Annamalai University, Tamilnadu, India.
- 64) Gargi, Debasis Sarkar, “Continuous Crystallization in MSMPR: Investigating the Impact of Operating Variables”, CHEM-TECHNOVA 2025, April 2025, India
- 65) Gargi, Debasis Sarkar, “Process Integration of Mixed Suspension Mixed Product Removal Crystallization and Spray Drying of Pyrazinamide”, CHEMCON 2025, December 2025, India.
- 66) Sreya Banerjee and Debasis Sarkar, “Chance-constrained Dynamic Optimization using Bonobo Optimizer and its Application to Batch Preferential Crystallization Process”, **CHEMCON 2024**, NIT Jalandhar, India, December, 2024.
- 67) Ajit Singathia, Debasis Sarkar, “Genome-Scale Metabolic Modeling for Microalgae Chlorella sp.”, **CHEMCON 2024**, 27-30 December 2024, Conference location: NIT Jalandhar, Punjab, India
- 68) Gargi, Debasis Sarkar, “Continuous Anti-solvent Crystallization in a Single-Stage MSMPR”, CHEMCON 2024, December 2024, India.
- 69) Sreya Banerjee and Debasis Sarkar, “Optimization of Batch Cooling Preferential Crystallization under Model Parameter Uncertainty”, **CHEMCON 2023**, Heritage Institute of Technology, Kolkata, India, December, 2023.

- 70) Ajit Singathia, Debasis Sarkar, "Optimization of Microalgal Cultivation using Genome-Scale Metabolic Model", **CHEMCON 2023**, 27-30 December 2023, Heritage Institute of Technology, Kolkata, India.
- 71) Gargi, Debasis Sarkar, "Continuous Antisolvent Crystallization in a Coiled Flow Inverter Device", **CHEMCON 2023**, December 2023, India.
- 72) Abhishek Maharana, A. and Sarkar, D. "Multi-dimensional population balance modelling for sonocrystallization of plate-like polymorph of pyrazinamide", **PSE Asia 2022**, December 10 – 14, 2022, Chennai, India.
- 73) Kumar, R. R., Sarkar, D., and Sen, R. "Strategies for effective utilization of petroleum waste water and CO₂ for enhanced production of microalgal biomass, lipid synthesis and CO₂ biofixation", **BESCON 2022**, November 4 – 6, 2022, Kolkata, India.
- 74) Pattanayak, L. and Sarkar, D. "Cooling co-crystallisation of caffeine and cinnamic acid", **CHEMCON 2017**, Dec 27-30, Haldia, India.
- 75) Lenka, M. and Sarkar, D., "Undeeded Batch Cooling Crystallization of L-asparagine Monohydrate", **CHEMCON 2014**, December 27-30, 2014, Chandigarh, India.
- 76) Bhoi, S., Lenka, M. and Sarkar, D., "Population Balance Modeling of Batch Cooling Crystallization of L-asparagine Monohydrate", **CHEMCON 2014**, December 27-30, 2014, Chandigarh, India.
- 77) Lisha, K.P. and Sarkar, D., "In silico analysis of bioethanol production by microbial consortia: effect of genetic modifications", **CHEMCON 2013**, Dec 27-30, Mumbai, India.
- 78) Barik, K., Sarkar, D., "Multi-objective optimization of a combined cooling and anti-solvent crystallization process", **CHEMCON 2013**, Dec 27-30, Mumbai, India.
- 79) Lisha K.P. and Debasis Sarkar, "In silico analysis of bioethanol production by microbial consortia: effect of genetic modifications". 66th Annual Session of Indian Institute of Chemical Engineers-**CHEMCON 2013**: P-44.
- 80) Lisha K.P. and Debasis Sarkar, "Dynamic flux balance modeling of fed-batch co-culture fermentation for improved bioethanol production: effect of various genetic

manipulations and glucose to xylose ratio”. Proceedings of 65th Annual Session of Indian Institute of Chemical Engineers-**CHEMCON 2012**: P-227.

- 81) Lisha K.P. and Debasis Sarkar, “Dynamic flux balance modeling of batch fermentation of glucose/xylose mixture for improved bioethanol production”. Proceedings of Indian Chemical Engineering Congress-**CHEMCON 2011**:389-390.