

Resume of Dr. Gargi Das

Name : GARGI DAS

Designation : Professor and Head
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Date of Birth : 10-07-1965

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Educational Attainments

Examination / Degree	Subject(s)	University / Institute	Year of Passing	Percentage of Marks	Division / Class
ICSE	General	Indian Council for Secondary Education	1982	90%	No Division is awarded
Higher Secondary Examination	Basic Sciences	WB Board of Higher Secondary Education	1984	70%	1 st
B.Ch.E.	Chemical Engineering	Jadavpur University	1988	85%	1 st
M.Tech.	Chemical Engineering	IIT Kharagpur	1989	CGPA 9.12	1 st
Ph.D.	Chemical Engineering	IIT Kharagpur	1996	-	-

Employment Profile :

Position	Institute	Period	Nature of job
Professor	Indian Institute of Technology, Kharagpur	26.12.2008 to till date	Teaching and research
Associate Professor	Indian Institute of Technology, Kharagpur	20.08.2004 to 25.12.2008	Teaching and research
Assistant Professor	Indian Institute of Technology, Kharagpur	04-01-2001 to 20.08.2004	Teaching and research
Lecturer	Haldia Institute of Technology, Haldia	09-12-98 to 03-01-2001	Teaching and research
Research Associate (under CSIR Individual Scheme)	Indian Institute of Technology, Kharagpur	1-8-95 to 8-12-98	Research

Teaching Experience:

At the undergraduate level:

- Chemical Engineering Thermodynamics
- Process Instrumentation
- Transport Phenomena
- Process Equipment Design I-Design of Heat Transfer Equipment
- Process Equipment Design II – Design of Mass Transfer Equipment

At the post graduate level

- Multiphase Flow
- Biochemical Engineering

Laboratory classes on

- Fluid Mechanics
- Mass transfer
- Heat Transfer
- Unit operations

Research Experience:

Broad area of research

- Transport processes
- Multiphase flows involving Newtonian and non-Newtonian fluids
- Instrumentation of multiphase systems
- Process Intensification of heterogeneous reacting and non reacting systems
- CFD analysis of Multiphase systems

Ph.D. dissertation

Some Hydrodynamics Aspects of Gas-Liquid Two-Phase Flow Through Concentric Annuli

Post doctoral research:

In India

The Hydrodynamics of Gas-Liquid Two-Phase Flow through External Loop Air Lift Reactor (as a CSIR Research Associate)

Overseas:

Worked on different problems of two phase flow including flow distribution through T-junction as a BOYSCAST Fellow in the School of Chemical, Environmental and Mining Engineering, University of Nottingham, UK.

Present Research Pursuits:

- Process intensification of mass transfer controlled processes in reacting and non-reacting systems
- Internal hydraulic jump through closed conduits – Experimentation and analysis
- Hydrodynamics of liquid-liquid and gas-liquid two phase flow through horizontal and vertical pipes, inclined systems, pipe fittings and milli and micro systems.
- Hydrodynamics of gas-liquid-liquid three phase systems
- Multiphase Flows involving non Newtonian fluids
- Development of suitable instrumentation techniques to identify phase distribution during gas-liquid and liquid-liquid flows.
- Development of photographic and image processing techniques for multiphase flows.
- Core-annular flow for reduction of pressure drop during transportation of high viscosity oil
- Computing techniques for two phase flows

Sponsored Project: See Annexure III

Membership/Fellowship in Professional Societies : Life Member in Indian Institute of Chemical Engineers

List of Publications : See Annexure II

Awards and Distinctions Received : See Annexure I

Academic or Professional Awards

- Awarded the Chemical Weekly's Dr G P Kane Chemcon Distinguished Speaker Award by IChE the Indian Institute of Chemical Engineers in 2018
- Awarded the Young Scientist Project under the **DSTFast Track Scheme** in 2003
- Selected for the INSA – DFG Visiting Scientist program, 2004-2005
- Offered the **AICTE Career Award** for Young Teachers for the year 2001-2002.
- Awarded the **BOYSCAST Fellowship**, 1999-2000 in Engineering Sciences for Research in the School of Chemical Environmental and Mining Engineering, University of Nottingham, Nottingham for a period of one year.
- Recipient of **Amar Dye-Chem Award for Excellence in Research and Development for Chemical Engineer** by the Indian Institute of Chemical Engineers for the year 1998.
- Has been awarded a project on "Development of PC-based Instrumentation and Theoretical Modelling of an Air Lift Loop Reactor", by **DST under the Young Scientist (SERCYS) Scheme** vide reference number HR/SY/E-01/97 in 1997.
- Received CSIR Research Associateship in 1995.
- Recipient of "**ISCA Young Scientist Award**" in "Engineering Sciences" in the 82nd Session of Indian Science Congress held in January 1995.
- Recipient of "**Institute Silver Medal**" for securing First Position in M.Tech. in IIT Kharagpur in 1990.
- Awarded the "**University Gold Medal**" and **two other medals** for being First Class First during B.Ch.E. at Jadavpur University in 1988.
- Received "**Merit Prize** and **SAIL Scholarship** for securing First Position in Rourkela Township with 90% marks in ICSE in 1982.

Publications

Papers in refereed journals:

1. Kumar, A., Ray, S., & Das, G. (2018). Draining phenomenon in closed narrow tubes pierced at the top: an experimental and theoretical analysis, **Nature Scientific Reports**, 8:14114, 1-11, DOI :10.1038/s41598-018-32359-5
2. Kumar, A., Bhowmik, S., Ray, S., & Das, G. (2017). Flow pattern transition in gas-liquid downflow through narrow vertical tubes. **AIChE Journal**, 63(2), 792-800.
3. Maiti R., Das G. , Das P. K, (2017) Granular drainage from a quasi-2D rectangular silo through two orifices symmetrically and asymmetrically placed at the bottom, **Physics of Fluids**, 1-17
4. Kumar, A., Das, G., & Ray, S. (2017). Void Fraction and Pressure Drop in Gas-Liquid Downflow through Narrow Vertical Conduits-Experiments and Analysis. **Chemical Engineering Science**, 171, 117–130.
5. Sumana Ghosh, Gargi Das, Prasanta Kumar Das, (2016), Liquid buckling in a practical situation, **IOP Science Euro Physics Letters**, 115, 44004
6. Maiti, R., Das, G., and Das, P. K. (2016a), Experiments on eccentric granular discharge from a quasi-two-dimensional silo, **Powder Technol**, Vol. 301, pp. 1054–1066.
7. R. Maity, S. Meena, G. Das and P.K. Das, Flow field during eccentric discharge from quasi-two dimensional silos –extension of the kinematic model with validation, **AIChE J** (2016), 62 (5), 1439-1453
8. Kannan Aadithya, RaySubhabrata, Das, Gargi, Liquid-Liquid Flow Patterns in Reduced Dimension Based on Energy Minimization Approach, **AIChE J**,(2016),62(1),287-294
9. K.G. Biswas, G. Das, S. Ray, J.K. Basu, A simple flow device for enhanced mass transfer in reduced dimensions, **Chem. Eng. JI** 279 (2015), 973-982.
10. K.G. Biswas, S. Majumdar, G. Das, S. Ray, The influence of bends on liquid-liquid flow through reduced dimensions, **Chem. Eng. JI**.281, (2015), 995-1007
11. K.G. Biswas, G. Das, S.Ray, J.K. Basu, Mass transfer characteristics of liquid-liquid flow in small diameter conduits, **Chem. Eng. Sci.** 122 (2015) 652-661.
12. K.G. Biswas, R. Patra, G. Das, S. Ray, J.K. Basu, Effect of flow orientation on liquid-liquid slug flow in a capillary tube, **Chem. Eng. J.** 262 (2015) 436-446.

13. K.G. Biswas, G. Das, S. Ray, J.K. Basu, The use of bends for enhanced mass transfer during liquid-liquid flow through milli channels, **Int. J. Heat Mass Tran.**84 (2015) 876-892.
14. T. Mukherjee, G. Das, S. Ray, Sensor-based flow pattern detection—gas–liquid–liquid upflow through a vertical pipe, **AIChE J** 60 (2014) 3362-3375.
15. A.Kundu, J.K.Basu, G.Das, (2012), A novel gas-liquid contactor for chemisorption of CO₂, *Separation and Purification Technology*, 94, 115-123.
16. V. V. R. Kaushik, S. Ghosh, G. Das, P. K. Das, (2012), Simulation of core annular in sudden contraction and expansion - A comprehensive CFD study, **Journal of Petroleum Science and Engineering**, (in press).
17. S. Ghosh, G. Das, P. K. Das, (2012), Inception and termination of the core annular pattern during oil-water downflow through a vertical pipe, **AIChE Journal**, 58,7,
18. M. Sharma, P. Ravi, S. Ghosh, G. Das, P. K. Das, (2011), Hydrodynamics of lube oil-water flow through 180⁰ return bends, **Chemical Engineering Science**, 66(20), 4468-4476.
19. S. Ghosh, G. Das, P. K. Das, (2011),Simulation of core annular in return bends – A comprehensive CFD study, **Chemical Engineering Research and Design**, 89(11), 2244-2253.
20. M. Sharma, P. Ravi, S. Ghosh, G. Das, P. K. Das, (2011), “Studies on low viscous oil-water flow through return bends”, **Experimental Thermal and Fluid Science**, 35(3), 455-469.
21. S. Ghosh, G. Das, P. K. Das, (2011),“Pressure drop analysis for liquid-liquid downflow through vertical pipe”, **Journal of Fluid Engineering**, 133, 011202.1-011202.10.
22. V. V. R. Kaushik, S. Ghosh, G. Das, P. K. Das, (2011) “CFD modeling of water flow through sudden contraction and expansion in a horizontal pipe”, **Chemical Engineering Education** 45(1), Winter, 30-36.
23. P. Mondal, S. Ghosh, G. Das, S. Ray, (2010), “The influence of phase inversion on mass transfer during liquid-liquid flows through milli-channels”, **Chemical Engineering and Processing** 49(10), 1051-1067.
24. S. Ghosh, G. Das, P.K.Das,(2010), “Simulation of core annular downflow through CFD- A comprehensive study”, **Chemical Engineering and Processing**, 49(11), 1222-1228.

25. T. K. Mandal, G. Das, P.K. Das, (2010), “An appraisal of liquid–liquid slug flow in different pipe orientations”, **International Journal of Multiphase Flow**,36, 661-671.
26. B. De, T.K. Mandal, G. Das, (2010), “The rivulet flow pattern during oil–water horizontal flow through a 12 mm pipe”, **Experimental Thermal and Fluid Science**, 34 (5), pp 625–632.
27. Y. K. Summan, T. K. Mandal and G. Das, (2010), “Use of digital signal analysis to identify slug flow in a narrow vertical pipe”, **Chemical Engineering Communications**, 197 (10), pp1-16.
28. S.Ghosh ,T.K.Mondal , G.Das and P.K.Das, (2009),“Review of oil water core annular flow”,**Renewable & Sustainable Energy Reviews** 13, pp. 1957-1965.
29. S. Bhusan, S. Ghosh, G. Das and P. K. Das, (2009),“Rise of Taylor bubbles through narrow rectangular channels”, **Chemical Engineering Journal**, 155, pp 326-332.
30. T. Balakrishna, S.Ghosh, G.Das and P.K.Das (2010) “Oil-Water flows through Sudden Contraction and Expansion in a horizontal pipe –Phase distribution & Pressure drop”, **International journal of Multiphase flow**, 36, pp13-24.
31. D.P.Chakraborty, G.Das, P.K.Das,” (2009), “Liquid-liquid two phase flow through an orifice" **Chemical Engg Communication**, 1563-5201, 196, No 9, pp. 1117 – 1129
32. T. K. Mandal, G. Das, P. K. Das, (2009) “Liquid Taylor Bubbles Rising in a Vertical Column of a Heavier Liquid – An Approximate Analysis” **Trans ASME, Journal of Fluids Engg.** 131, pp. 011303-1-11303-7
33. A.K. Jana, G. Das, P. K. Das, (2008),“The hydrodynamics of liquid-liquid upflow through a venturimeter”,**Int J Multiphase Flow**, 34 , pp.1119-1129.
34. T. K. Mandal, G. Das, P. K. Das, (2008) “Motion of Taylor bubbles and Taylor drops in liquid-liquid systems”. **Industrial and Engineering Chemistry Research**, . 47, No 18, pp. 7048-7057.
35. T. K. Mandal, M.Bhuyan, G. Das and P.K. Das (2008), “Effect of undulation on gas-liquid two-phase flow through a horizontal pipeline”, **Chemical Engineering Research and Design**, 86, No 3, pp 269-278.

36. T.K.Mandal, A.K.Jana, R.Patra and G.Das (2007), “ Hydrodynamics of Intermittent flow through small diameter vertical pipe during liquid-liquid two phase flow”, **Int J Chemical Sci**, 5, No4, pp 1701-1711
37. T.K. Mandal, G. Das, and P.K. Das, (2007) "Prediction of rise velocity of a liquid Taylor bubble in vertical tube", **Physics of Fluids**, 19, 128109, pp1-4.
38. V. Agarwal, A. K. Jana, G. Das, P. K. Das, (2007) “Taylor bubbles in liquid filled annuli – some new observations”, **Physics of Fluids**, 19, 108105, pp1-4.
39. A.K. Jana, P. Ghoshal, G. Das, P. K. Das, (2007) “An analysis of pressure drop and holdup for liquid-liquid upflow through vertical pipes”, **Chemical Engineering and Technology**, 30, No.7, pp. 920-925.
40. T. K. Mandal, D. P. Chakrabarti, G. Das, (2007) “Oil-water flow through different diameter pipes - similarities and dissimilarities”, **Chemical Engineering Research and Design**, 85 (A4), pp.1-7.
41. A. K. Jana, T. K. Mandal, D. P. Chakrabarti, G. Das, P. K. Das, (2007) “An optical probe for liquid-liquid two-phase flows”, **Measurement Science and Technology**, 18, pp. 1562-1575.
42. D. P. Chakrabarti, G. Das, P. K. Das, (2007), “Identification of stratified liquid-liquid flow through horizontal pipes by a non-intrusive optical probe”, **Chemical Engineering Science**, 62, No 7, pp. 1861-1876.
43. D. P. Chakrabarti, G. Das, P. K. Das, (2006) ,“The transition from water continuous to oil continuous flow pattern” **AIChE Journal** 52, Issue 11, pp. 3668-3678
44. H.Sharma, G.Das, A.N.Samanta, (2006), “ANN-Based Prediction of two phase gas-liquid Flow patterns in a circular conduit”, **AIChE Journal**,52, No.9, pp. 3018-3028
45. Ashish Kumar, G. Das and S. Dasgupta, (2007), “An approximate analysis to predict the interface shape for stratified two-phase systems in a square geometry”, **International Journal of Transport Phenomena**, 8, pp. 359-370.
46. S. Pandey, A. Gupta, D. P. Chakrabarti, G. Das and S. Ray, (2006), “Liquid-liquid two phase flow through a horizontal T junction”, **Chemical Engineering Research and Design**, 84 (A10), pp.895-904.
47. D. P. Chakrabarti, P. Ghoshal, G. Das, (2006) “Behaviour of pressure gradient and transient pressure signals during liquid-liquid two phase flow”, **Chemical Engineering & Technology**, 29, 10, pp. 1183-1195

48. A. K. Jana, G. Das, P. K. Das, (2006), "A novel technique to identify flow patterns during liquid-liquid two-phase upflow through a vertical pipe", **Industrial and Engineering Chemistry Research**, 45, pp.2381-2393.
49. A. K. Jana, G. Das, P. K. Das, (2006) "Flow regime identification of two-phase liquid-liquid upflow through vertical pipe", **Chemical Engineering Science**, 61, 5, pp.1500-1515.
50. D. P. Chakrabarti, G. Das, S. Ray, (2005) "Pressure Drop in Liquid-Liquid Two Phase Horizontal Flow: Experiments and Prediction" **Chemical Engineering & Technology**, 28, 9, pp 1003-1009.
51. T. Sunder Raj, D. P. Chakrabarti, G. Das, (2005) "Liquid-Liquid Stratified Flow through Horizontal Conduit", **Chemical Engineering & Technology**, 28, 8, pp 899-907.
52. G. Das, P.K. Das and B.J. Azzopardi, (2005) "The Split of Stratified Gas-Liquid Flow at a Small Diameter T-junction", *Int. J. Multiphase Flow*, 31, 4, pp. 514-528.
53. G. Das, P. K. Das, N. K. Purohit and A. K. Mitra, (2001) "Geometry of Taylor Bubbles Rising Through Liquid Filled Annuli", **AIChE Journal**, 48, 2, pp. 411-416.
54. G. Das, P. K. Das, N. K. Purohit and A. K. Mitra, (2000), "Phase Distribution of Gas-Liquid Mixture in Concentric Annuli - Inception and Termination of Asymmetry", **Int. J. Multiphase Flow**, 26, pp.857-876.
55. G. Das, P. K. Das, N. K. Purohit and A. K. Mitra, (1999) "Flow Pattern Transition During Gas Liquid UpFlow Through Vertical Concentric Annuli Part I Experimental Investigations, **Trans. ASME, Journal of Fluids Engineering**, 121, pp. 895-901.
56. G. Das, P. K. Das, N. K. Purohit and A. K. Mitra, (1999) "Flow Pattern Transition During Gas Liquid UpFlow Through Vertical Concentric Annuli Part II Mathematical Models, **Trans. ASME, Journal of Fluids Engineering**, 121, pp. 902-907.
57. G. Das, P. K. Das, N. K. Purohit and A. K. Mitra (1998), "Rise of Taylor Bubbles Through Concentric Annuli", **Chem. Engg. Science**, 53, 5, pp. 977-995.
58. G. Das, P. K. Das, N. K. Purohit and A. K. Mitra, (2002) "Holdup of Gas-Liquid Mixtures in Concentric Annuli", **Canadian Journal of Chemical Engineering**, 80, 1, pp. 153-157.
59. G. Saha, N. K. Purohit and A. K. Mitra (1992), "Spherical Particle Terminal Settling Velocity and Drag in Bingham Liquids", **Int. J. Mineral Processing**, 36, pp. 273-281.

60. G. Das, K. C. Ghanta, N. K. Purohit and A. K. Mitra (1997), "Friction Factor for Flow of Bingham Plastic Fluid in Pipes", **Indian Chemical Engineer**, Section A, 39, 2, pp. 120-123.

Conference :

1. **Investigating the effects of flow pulsation on liquid-liquid two phase flow through Millimetre size conduits**, AbirChakravorty, Gargi Das*, Subhabrata Ray, *6th International & 43rd National Conference on Fluid Mechanics and Fluid power (FMFP 2016)(Paper no. 109)*.
2. **Effect Of In-Flow Pulsations On Liquid-Liquid Two Phase Downflow Through Millimeter Size Channels And Simultaneous Development Of Slug Characteristics**, AbirChakravorty, Subhrajit Mukherjee, Gargi Das*, Subhabrata Ray, *Indian Chemical Engineering Congress 2016, 69 Annual Session of Indian Institute of Chemical Engineers (CHEMCON 2016) (Abstract no.88)*
3. **Flow pulsation Induced Process Intensification in Liquid-liquid Milli-Contactors**, Gargi Das*, AbirChakravorty, Subhabrata Ray, *International Conference on Catalysis and Chemical Engineering, (CCE-2017)*.
4. Maiti, R., Das, G., and Das, P. K. (2013a), Pattern formation during outflow of granular material from a narrow rectangular conduit, In: 8th International Conference on Multiphas Flow, Jeju, Korea, May 26-31. pp 1–6.
5. Maiti, R., Sardar, S. K., Das, G., and Das, P. K. (2013b), An Investigation on Flow Pattern and Velocity Fields in a Two Dimensional Flat Bottomed Rectangular Silo with Central and Off-centre Discharge, In: International Conference on Powder, Granule and Bulk Solids: Innovations and Applications, Thapar University, Patiala, India, November 28-30.
6. Maiti, R., Das, G., and Das, P. K. (2016a), A Qualitative Assessment of Different Regimes during Concentric and Eccentric Discharge a Silo, In: Fluid Mechanics and Fluid Power – Contemporary Research. Springer, pp 1617–1626
7. K.G. Biswas, S. Srivastava, S. Ray, J.K. Basu, G. Das, Mass Transfer during liquid-liquid slug flow through millimeter size channels, CHEMCON 2011.
8. K.G. Biswas, R.V. Chakradhar, J.K. Basu, G. Das, Hydrodynamic Investigation of Gas-Liquid flow through pipe fittings in mill channels, SCHEMCON 2012.
9. K.G. Biswas, S. Majumdar, J.K. Basu, G. Das, Liquid-Liquid flow through tubes and tube fittings in milli channels, CHEMCON 2012.
10. K.G. Biswas, J. K. Basu, S. Ray, G. Das, Interrogating the effect of bends on liquid-liquid slug flow in capillaries – a means for process intensification, International Conference of Multiphase Flow (ICMF) 2013.
11. K.G. Biswas, J. K. Basu, S. Ray, and G. Das, Process intensification in liquid-liquid slug flow through capillaries, Heat and Mass transfer conference (ASME-ISHMT) 2013.

12. K.G. Biswas, M. Thakur, G. Das, J.K. Basu, Liquid-Liquid slug flow through helical coils - a means of process intensification, CHEMCON 2013.
13. S.Ghosh, G. Das and P. K. Das, "Hydrodynamics of lube oil-water downflow through a vertical pipe" International Conference on Multiphase Flow 2010 (ICMF-2010) Tampa, Florida, USA, May 30 to June 4, 2010.
14. P. Ravi, M. Sharma S.Ghosh, G. Das and P. K. Das "Effect of Return Bends on Kerosene-Water Flow Through a Horizontal Pipe" International Conference on Multiphase Flow 2010 (ICMF-2010) Tampa, Florida, USA, May 30 to June 4, 2010.
15. P. Mondal, S. Ghosh, G. Das, "Phase Inversion During Liquid - Liquid Flows And Its Influence On Mass Transfer Characteristics", ISHMT-ASME Heat and Mass Transfer Conference, Mumbai, India, January 4-6, 2010.
16. P.Ravi, M. Sharma, S. Ghosh, G. Das and P.K. Das, "Effect of return bends on oil-water flows through a horizontal pipe" CHEMCON,Visakhapatnam, India, December 27-30, 2009.
17. P.Ravi, M. Sharma, S. Ghosh, G. Das and P. K. Das," Effect of return bends on kerosene-water flows through a horizontal pipe", Young Researcher Conference 2009, Mumbai, India , January 27-29,2009.
18. P.Ravi, Mukesh Sharma, S. Ghosh, G. Das and P. K. Das,"Effect of return bends on kerosene-water flows through a horizontal pipe", Young Researcher Conference 2009, Mumbai, India , January 27-29,2009.
19. P. Mondal, S. Ghosh and G. Das, "Studies on liquid-liquid flow patterns and their influence on mass transfer characteristics", *Communicated*, CHEMCON ,Visakhapatnam, India, December 27-30, 2009.
20. P.Ravi, M. Sharma, S. Ghosh, G. Das and P. K. Das, "Effect of return bends on oil-water flows through a horizontal pipe" *Communicated*, CHEMCON ,Visakhapatnam, India, December 27-30, 2009.
21. A.K. Das, P.K. Das and G. Das, "Constructal Pattern Formation of a Fluid Network: A Preliminary Investigation" Proceedings of the 4th BSME-ASME IntConf on Thermal Engg, 27-29 Dec, 2008, Dhaka, Bangladesh

22. T. K. Mandal, G. Das, P. K. Das, "Liquid-liquid two-phase flow through undulating pipelines". Presented in International Conference of Multiphase Flow. Leipzig, Germany, July 2007.
23. T. K. Mandal, Y. K. Suman, G. Das, "Use of digital signal analysis to identify slug in narrow vertical pipe", Presentation in 8th International conference on gas-liquid and gas-liquid-solid reactor engineering, Delhi, India, December 2007
24. P. Ghoshal, F. Sinha, S. Sen, P. K. Das and G. Das, "Development of Wire Mesh Tomography for Gas-Liquid Systems" 8th International conference on gas-liquid and gas-liquid-solid reactor engineering' Delhi, India, December 2007
25. S. Bhusan, A. K. Jana, S. Ghosh, G. Das and P. K. Das, Gas-liquid two phase flow through narrow rectangular channel, Presented in CHEMCON- 2007
26. H. Varshney, S. Ghosh, G. Das, P. K. Das, Experimental Study of Wall Shear in an Airlift Loop Reactor, Presented in CHEMCON- 2007
27. P. Ghoshal, S. Sen, P. K. Das, G. Das "Tomographic Characterization Of Two Phase Flow Across Constriction," Presented in CHEMCON- 2007
28. T. K. Mandal, A. K. Jana, R. Patra, G. Das, "Hydrodynamics of intermittent flow through small Diameter vertical pipe during liquid-liquid two-phase flow", NCFCE-2007.
29. T. K. Mandal, A. K. Jana, R. Patra and G. Das, " Identification of flow regime of liquid-liquid two-phase flow through narrow vertical pipe" CHEMCON 2007.
30. T. K. Mandal, M. K. Bhuyan, G. Das, P. K. Das., "Flow Characteristics in a Hilly Terrain Pipeline during Gas-Liquid Two-Phase Flow." Published in the proceedings of 59th annual session of the Indian Institute of The Chemical Engineers, 27 - 30 December' 2006, Ankleshwar, India.
31. T. K. Mandal, G. Das, P. K. Das., "The Rise of Taylor Bubbles in Liquid-Liquid Systems", Published in the proceedings of 58th annual session of the Indian Institute of The Chemical Engineers, 14 - 17 December' 2005, Delhi, India.
32. D. P. Chakraborty and G. Das, "The stratified configuration of Liquid-liquid flows through horizontal Conduits" Presented in Chemcon 2004.

33. P.Ghoshal, D. P.Chakraborty and G. Das, "Flow Regime Identification from Pressure signals in Liquid-liquid two phase Horizontal flow", Presented in FMFP, 2004.
34. P.K.Das, G.Das, S.Sen and K. Biswas, "Impedance technique for the measurement of two phase parameters-possibilities and challenges", Presented on Workshop on Tomography, IIT Kanpur, 13-15 Feb, 2004.
35. D. P. Chakraborty, T. Sunder Raj, G. Das, "Liquid-liquid stratified flow through horizontal conduits" Presented at the Third International Conference on Theoretical Applied, Computational and Experimental Mechanics (ICTACEM), 2004.
36. A.K. Jana, and G. Das, " Liquid – Liquid Dispersed Flow Through Vertical Pipes" Presented in the 57th annual session of the Indian Institute of The Chemical Engineers 27 - 30 December' 2004. (CHEMCON-2004)
37. T. K. Mandal, D. P. Chakrabarti, G. Das, "Identification of the flow regime in small diameter pipe and comparison with large diameter pipes", Published in the proceedings of 1st National Conference of Research Scholars and Young Scientists in Chemical Engineering held in IIT, Kharagpur India from 25th –27th 'Sept'2004.
38. A.K. Jana, and G. Das, "Phase inversion in liquid – liquid two phase up flow in vertical pipe", Published in the proceedings of 1st National Conference of Research Scholars and Young Scientists in Chemical Engineering held in IIT, Kharagpur, India, 25th –27th September 2004.
39. D. P. Chakrabarti, A. K. Jana, G. Das, "The stratified flow during liquid-liquid flows through horizontal circular pipes", Published in the proceedings of 1st National Conference of Research Scholars and Young Scientists in Chemical Engineering held in IIT, Kharagpur, India, 25th –27th September 2004.
40. V Agarwal and G Das, "Taylor bubble characteristics in annuli with extreme value of diameter ratio", Presented at PRODIGY-2003, organized by University Institute of Chemical Technology (UICET), Mumbai under the IChE Students Chapter in 2003
41. G. Das, P. K. Das and B. J. Azzopardi "The Division of Stratified flow at a small diameter T-junction", Presentated at the International Conference on Multiphase Flow, New Orleans, USA in May-June 2001.
42. G. Das and P. K. Das, "A Novel Conductivity Probe for Measurement of two phase flow parameters in an Annulus", Presented in the National Conference of Heat and Mass Transfer in Kolkata from 3rd to 5th Jan. 2002.

43. G. Das (1995), "Some Hydrodynamic Aspects of Two Phase Flow Through a Vertical Concentric Annulus", Presented in the 82nd Session of Indian Science Congress under the Young Scientist Programme in the Engineering Science Section.
44. G. Das, N. K. Purohit, A. K. Mitra and P. K. Das (1994), "Hydrodynamics of Single Bubble Rising in Stagnant Columns of Water", Presented in the Chemical Engineering Congress held at IIT Kharagpur in December 1994.
45. G. Das, P. K. Das, N. K. Purohit and A. K. Mitra, "Churn Flow Through Concentric Annulus", Presented at the Chemical Engineering Congress held in December 1995.
46. G. Das, P. K. Das and M. N. Biswas, "Two Phase Hydrodynamics in the Downcomer of an External Loop ALR", Presented at CHEMCON'96.

Annexure – III

Patent:

1. Title: Optical Probe for Multiphase Flow

Patent application no.: 915/Kol/2005

Assignee: D. P. Chakrabarti, G.Das, P. K. Das

2. Title : An online device for in-situ measurement of low gas flow rates

Assignee: P.N.Dange, G.Das, P.K.Das, Rahul Raj

Status : (Approved by TIFAC for filing)

3. Separator-collector for thin oil layers floating on water

Patent application no.: 0795/KOL/2015

Assignee: AnshulPalliwal, S. Ray, G. Das

4. Title : A simple continuous flow device for process intensification in millimeter size conduits

Patent application no.: 990/Kol/2013

Assignee: K.G. Biswas, J.K.Basu, S. Ray, G. Das

Book Chapter:

Impedance Techniques for the measurement of two phase flow parameters- Possibilities and Challenges by P.K.Das, G.Das, S.Sen, K.Das *in* Computerised Tomography for Scientists and Engineers, (Published by: CRC Press 2007)

Development and Application of Wire Mesh Tomography for Gas-Liquid Systems by P. Ghoshal, F. Sinha, S. Sen, P. K. Das and G. Das *in* CT2008: TOMOGRAPHY CONFLUENCE: An International Conference on the Applications of Computerized Tomography (Published by: American Institute of Physics 2008)

Book

Hydrodynamics of gas-liquid-liquid upflow , **2012**, LAP Lambert Academic Publishing - ISBN: 978-3-659-28996-5

Educationl Package

- Video course on Fundamentals of Multiphase Flow under NPTEL (40 hours)
- Web course on Fundamentals of Multiphase Flow under NPTEL
- Video course on Adiabatic Two Phase Flow and Heat Transfer under MOOC (10 hours)
- Phase equilibrium thermodynamics under MOOC (20 hours)

Invited Talk

- Internal hydraulic jump and drop in two phase gas-liquid flow over an obstacle, M. Dhar, G. Das & P. K. Das, AIChE Conference, Pittsburgh, 28th October-2nd November, 2018.
- Hydraulic jumps and drops across obstacles, COMFLU conference. IIT Roorkee, 6th – 9th December, 2018.
- Tweaking the hydrodynamics to promote Process Intensification, Invited Talk for CHEMCON Distinguished Speaker Award, NIT Jalandhar, 26th – 28th December, 2018
- Physics of draining in the meso-scale: Experimental and theoretical analysis: IITG in 2018
- The Phenomenon of Liquid Draining in the Mesoscale: RGIPT as Chief guest on RS Day on 17.3.2018

- Draining phenomenon in closed narrow tubes pierced at the top: an experimental and theoretical analysis, Invited Talk in the weekly Lecture Series in IIT Roorkee in 05.02. 2018
- Intensifying Processes – Chemical and Biochemical – University of Georgia, Athens in 2017
- Theoretical modelling of macro and micro multiphase system in the Short term training program on Modelling and simulations of micro and macro multiphase systems (MS3MS - 2019) in NITK
- Experimental analysis of multiphase systems in the Short term training program on Modelling and simulations of micro and macro multiphase systems (MS3MS - 2019) in NITK

Annexure – V

Sponsored Research

- *Title of the project:* Flow Regime Transitions in liquid-liquid and gas-liquid- liquid horizontal flow by (a) neurofuzzy system (b) mechanistic analysis
Funding agency: AICTE, New Delhi, (AICTE Career Award for Young Teachers)
Amount of grant: Rs. 3,00,000/-, *Duration:* 3 years, w.e.f. 1.10.2001
- *Title of the project:* The split of a liquid-liquid two phase mixture at a horizontal dividing T junction – Experimentation and analysis
Funding agency: IIT, Kharagpur, under the ISIRD Scheme for Young Teachers
Amount of grant: Rs. 1,00,000 *Duration:* 1 years, w.e.f. 16.06.2001
- *Title of the project :* Flow visualization and theoretical modeling of liquid- liquid and gas-liquid-liquid flow through vertical and inclined conduits
Funding agency: DST under the Fast Track Scheme
Amount of grant: Rs, 7.32.000 *Duration:* 3 years w.e.f. 01.08.03

- *Title of the project:*CFD Analysis and Flow visualisation of gas-liquid flow through a nozzle and subsequent spray

*Funding agency:*MHRD

*Amount of grant:*Rs.7,00,000*Duration:* 1 years, w.e.f. 16.06.2001

- *Title of the project:*Investigations on oil-water core-annular flow through experiments and theoretical analysis for the production and processing of heavy oils

*Funding agency:*IIIT, Kharagpur, under the Mission Project

*Amount of grant:*Rs.1, 00,000 *Duration:* 3 years, w.e.f. 2003

- *Title of the project :* Development of sensors for gas-liquid and liquid-liquid two phase flow.

Funding agency: MHRD

Amount of grant: Rs14 lakhs *Duration:* 3 years w.e.f. 01.07.05

- *Title of the project :* Water lubricated transport of heavy oils – experimentation and theory

Funding agency: DST

Amount of grant: Rs, 19 lakhs *Duration:* 3 years w.e.f.01.12.06

- *Title of the project :* Experimental Investigations and theoretical Analysis of Internal Hydraulic Jump in closed conduits

Funding agency: DST

Amount of grant: Rs, 45 lakhs *Duration:* 3 years w.e.f.Sept 2012