RESUME

SUMANA GHOSH

Department of Chemical Engineering
IIT Roorkee, Roorkee-247667
E-mail:
ghoshfch@iitr.ac.in,ghos.sumana@gmail.com
Ph: 01332 284803

Specialization:

- ➢ Process intensification
- ➢ Experimental & Computational two-phase flow
- ➢ Renewable energy resources

Employment:

- ➢ **Assistant Professor at IIT Roorkee from June 2014-till date**

- ➢ **Assistant Professor at BITS Pilani from December 2012-February 2014**

- ➢ **Assistant Professor at BIT Mesra from June 2012-November 2012**

- ➢ **Postdoctoral Fellow**in **Institute Jean Le Rond D Alembert, University Pierre & Marie Curie, Paris, France** from **May 2011-March 2012**

Project title: Experimental and Numerical study of Cavitating bubbles

Education:

- ➢ **PhD**in [**Department of Chemical Engineering**] from [**Indian Institute of Technology Kharagpur**] in the month of [**February 2011**]

  Ph.D. Thesis Title: Liquid-liquid flow through pipe and pipe fittings-Experimentation and CFD analysis

- ➢ **M.Tech.**in [**Cryogenic Engineering**] Passed with 8.8 CGPA from [**Indian Institute of Technology Kharagpur** in [**June 2006**]

  M.Tech. Thesis Title: Study of Vortex Tube Air Separator

➢ **B.E.**in [**Chemical Engineering**] Passed with First class, [**78.20%**] from [**Regional Engineering College Durgapur**] in [**June 2003**]

➢ **Senior Secondary** Passed with First class, [**64.60%**] from [**Bidhan Chandra Institution for Girls, Durgapur, India**] in [**June 1998**]

➢ **Junior School** Passed with First class, [**78.0%**] from [**R. E. C. Model School, Durgapur, India**] in [**July 1996**]

Brief Outline of Doctoral Research:

Objective of the doctoral research work is to study the liquid-liquid downflow through a vertical tube as well as through pipe fittings namely expansion, contraction and return bend of different geometry in a horizontal tube

- Hydrodynamics of kerosene-water and lube oil-water downflow is studied in details. New types of flow patterns are noted. Mechanistic models have used to predict the transitions of flow patterns.

- Further attempts have made to understand the effects of sudden contraction, expansion and bends on the stability core flow.

- As core flow is the most desirable configuration to transport high viscous oil, further attempts have been made to develop CFD models for lube oil-water core flow through the above mentioned geometries

- A numerical algorithm has been developed based on Lattice Boltzmann method. Using the numerical algorithm, one of the simplest two-phase flow situation viz a liquid Taylor drop (heavier liquid is falling through a stationary column of a lighter liquid) has been simulated

Brief Outline of M.Tech. Thesis:

Objective of the thesis is to determine velocity, temperature and pressure profile in a two phase vortex tube operating at cryogenic temperatures.

- Air separation using vortex tube is studied numerically using CFD software Fluent 6.2.

- Mass and energy separation is investigated in detail from the velocity and pressure profile inside the tube.

B.E. Project: Material Selection and Model Development Based on ThiobacilusFerrooxidans Mediated Bioreaction in Vitro

Software Exposure:

Operating System	Linux, Windows
Languages	C, Fortran,
Software	FLUENT, Image pro-plus, Gnu plot

Instruments handled: High speed camera, Pressure sensors,Data acquisition system, Electromagnetic flow meter, Coriolis mass flow meter, Refractometer, Goniometer, Tensiometer, Optical probe, Conductivity probe, Laser sources.

Research Projects:

1. Hydrodynamic cavitation assisted biodiesel production ,2014-2017, Budget 10 Lakhs, Faculty Initiation Grant, IIT Roorkee

2. Experimentation & CFD analysis of water behavior and removal technique for PEM fuel cell, 2015-2018, Budget 25 Lakhs, SERB Fast Track Young Scientist

3. Hydrodynamic cavitation assisted advanced waste water treatment for micro pollutant- Experimentation, Numerical analysis and scale up ,Accepted under IMPRINT

Publications:

Book:

1. Liquid-liquid flow through pipe and pipe fittings, S. Ghosh, G. Das, P. K. Das, Lap Publishing, Saarbrücken, Germany, 2013.

International Journal Publications:

1. Review of oil water core annular flow, S. Ghosh, T. K. Mandal, G. Das, P. K. Das, **Renewable and sustainable energy reviews**, 13(8), 2009, 1957-1965

2. Oil water flow through sudden expansion/contraction: Phase distribution and Pressure drop T. Balakrishna, S. Ghosh, G. Das and P. K. Das,**International Journal of Multiphase Flow,** 36, 2010, 13-24.

3. Rise of Taylor bubbles through narrow rectangular channels, S. Bhusan, S. Ghosh, G. Das and P. K. Das,**Chemical engineering journal** 155, 2009, 326-332.

4. The influence of phase inversion on mass transfer during liquid-liquid flows through milli-channels, P. Mondal, S. Ghosh, G. Das, S. Ray,**Chemical Engineering and Processing** 49(10),2010, 1051-1067.

5. CFD modeling of water flow through sudden contraction and expansion in a horizontal pipe, V. V. R. Kaushik, S. Ghosh, G. Das, P. K. Das, **Chemical Engineering Education** 45(1),Winter 2011, 30-36.

6. Simulation of core annular downflow through CFD- A comprehensive study, S. Ghosh, G. Das, P.K.Das,**Chemical Engineering and Processing**, 49(11), 2010, 1222-1228.

7. Studies on low viscous oil-water flow through return bends, M. Sharma, P. Ravi, S. Ghosh, G. Das, P. K. Das,**Experimental Thermal and Fluid Science**, 35(3), 2011, 455-469.

8. Pressure drop analysis for liquid-liquid downflow through vertical pipe, S. Ghosh, G. Das, P. K. Das,**Journal of Fluid Engineering**, 133, 2011, 011202, 1-10.

9. Hydrodynamics of lube oil-water flow through 180^0 return bends, M. Sharma, P. Ravi, S. Ghosh, G. Das, P. K. Das,**Chemical Engineering Science**, 66(20), 2011, 4468-4476.

10. Simulation of core annular in return bends – A comprehensive CFD study, S. Ghosh, G. Das, P. K. Das,**Chemical Engineering Research and Design**, 89(11), 2011, 2244-2253.

11. Inception and termination of the core annular pattern for oil-water downflow through a vertical pipe, S. Ghosh, G. Das, P. K. Das,**AIChE Journal**, 58(7), 2012, 2020-2029.

12. 3-D lattice Boltzmann model for asymmetric Taylor bubble and Taylor drop in an inclined channel, S. Ghosh, P.K. Patil, A.K. Das, S.C. Mishra, P.K. Das, **Engineering Applications of Computational Fluid Mechanics**, 6(3), 2012, 383-394.

13. CFD Simulation of core annular flow through sudden contraction and expansion, V.V.R. Kaushik, S. Ghosh, G. Das, P.K. Das, **Journal of Petroleum Science and Engineering,** 86-87, 2012,153-164.

14. Numerical study of dynamics of bubbles using lattice Boltzmann method, S. Ghosh, A. Vaidya, A.K. Das, S.C. Mishra, P.K. Das, **Industrial Engineering and Chemistry Research,** 51(18), 2012, 6364-6376.

15. Computational fluid dynamic simulation of single and two phase vortex flow-A comparison of flow field and energy separation, G. Sharma, S. Ghosh, S. Karmakar, **ASME Journal of Heat Transfer**, 138, 2016, 082003-1-8.

16. Liquid buckling in a practical situation, S. Ghosh, G. Das, P. K. Das, **Euro Physics Letters (EPL**),115,2016,44004

.

Conference publications:

1. Khan, S.H., **Ghosh**, S., 2016. CFD simulation of water removal from gas flow channel of PEMFC using wettability gradient, ICMF, Firenze, Italy, May 22 to 27.
2. Alam, M.S., Ghosh, S., 2015. CFD Analysis of Hydrogen mixing in air, 42nd National conference on Fluid Mechanics and Fluid Power, NIT Surathkal, Karnataka, India, December 14 to 16
3. Samad, N., Ghosh, S., 2015. CFD Simulation of steam injection in suppression pool, 42nd National conference on Fluid Mechanics and Fluid Power, NIT Surathkal, Karnataka, India, December 14 to 16
4. Samad, N., Ghosh, S., 2015. CFD Simulation of steam injection in suppression pool, 23rd National Heat and Mass Transfer Conference and 1st International ISHMT-ASTFE Heat and Mass Transfer Conference, Thiruvananthapuram, India, December 17 to 20
5. Dwivedi, P., **Ghosh**, S.,2015. Experimental investigation of Hydrodynamic cavitation in sudden contraction, CHEMCON, Guwahati, India, December 27 to 30.
6. Malhotra, S., **Ghosh**, S.,2015. CFD Analysis of water behavior in a proton exchange membrane fuel cell using wettability gradient, CHEMCON, Guwahati, India, December 27 to 30.

7. Khan, S.H., **Ghosh**, S., 2015. Computational studies of 3D multiphase flow in PEMFC microchannels, CHEMCON, Guwahati, India, December 27 to 30.
8. Sharma., **G., Ghosh**, S., Karmakar., S., 2013. CFD Analysis of a vortex tube, **22nd National & 11th International ISHMT-ASME Heat and Mass Transfer Conference**, Kharagpur, India, December 28 to 31.
9. Ghosh, S., 2013. CFD Analysis of water behavior and removal technique in a proton exchange membrane fuel cell, **International Conference of Multiphase Flow**, Jeju, Korea, May 26 to 31.
10. Sharma., G., Ghosh, S., Karmakar., S., 2013. CFD Analysis of a vortex tube air separatorl, **International Conference of Multiphase Flow**, Jeju, Korea, May 26 to 31.
11. Experimental investigation of the influence of air injection on the collapse of bubble clouds, D. Fuster, S. Ghosh, P. Guibert, S. Zaleski, **8th International Symposium on Cavitation**, Singapore, 13th – 16th August, 2012

12. Effect of Return Bends on Kerosene-Water Flow Through a Horizontal Pipe, P. Ravi, M. Sharma S. Ghosh, G. Das and P. K. Das, **International Conference on Multiphase Flow 2010** (ICMF-2010) Tampa, Florida, USA, May 30 to June 4, 2010.

13. Hydrodynamics of lubeoil-water downflow through a vertical pipe, S.Ghosh, G. Das and P. K. Das, **International Conference on Multiphase Flow 2010** (ICMF-2010) Tampa, Florida, USA, May 30 to June 4, 2010.

14. Phase inversion during liquid-liquid flows and its influence on mass transfer characteristics, P. Mandal, S. Ghosh and G. Das,**20th National & 9th ISHMT-**

ASME Heat and Mass Transfer Conference, Mumbai, India, January 1-4, 2010.

15. Effect of return bends on lube oil-water flows through a horizontal pipe, P. Ravi, M. Sharma, S. Ghosh, G. Das , P. K. Das, **CHEMCON**, Visakhapatnam, India, 2009

16. Effect of return bends on kerosene-water flows through a horizontal pipe, P. Ravi, M. Sharma, S. Ghosh, G. Das , P. K. Das, **Young Reseacher Conference**, Mumbai, India, 2008.

17. Gas-liquid two phase flow through narrow rectangular channel, S. Bhusan S. Ghosh, G. Das, P. K. Das, **CHEMCON**, Kolkata, India, 2007.

18. Experimental study of wall shear in an airlift loop reactor, H. Varshney, S. Ghosh, G. Das, P. K. Das, **CHEMCON**, Kolkata, India, 2007

19. CFD Analysis of a Cryogenic Vortex Tube Air Separator,S. Ghosh, T. Dutta, P. Sandilya , S. S. Bandyopadhyay ,**CHEMCON**, Ankleshwar,India2006.

20. CFD Analysis of a Vortex Tube , S. Ghosh, P. Sandilya , S. S. Bandyopadhyay,**SCHEMCON**, Guwahati, India, 2005 (Best paper Award in Transport phenomena CFD and Interfacial Engg.).

Personal Profile:

Date of Birth:	25-12-1980.
Husband's name:	Dr. Arup Kumar Das
Nationality:	Indian
Religion:	Hindu
Sex:	Female
Marital status:	Married

(Sumana Ghosh)

Name(s) and address(es) of Indian expert(s) in the proposed area:

1. Prof. Prasanta Kumar Das
   Department of Mechanical Engineering
   Indian Institute of Technology Kharagpur
   Kharagpur - 721302
   West Bengal, India
   Email : pkd@mech.iitkgp.ernet.in
   Phone: 91-3222-282916

2. Prof. Gargi Das

Department of Chemical Engineering
Indian Institute of Technology Kharagpur
Kharagpur - 721302
West Bengal, India
Email : gargi@che.iitkgp.ernet.in
Phone: 91-3222-283952

3. Prof. S.C .Mishra
   Department of Mechanical Engineering
   Indian Institute of Technology Guwahati
   Guwahati-781039
   Assam, India
   Email:scm@iitg.ernet.in
   Phone: 91-361-2582660

4. Prof. A. B. Pandit
   Professor,
   Institute of Chemical Technology
   University of Mumbai, Matunga
   Mumbai - 400 019, India
   Ph: 022-24145616 Ext.278 (O)
   022-24302660 (R)
   Fax: 91 22 24145614
   E-mail: abp@udct.ernet.in

5. Prof. Pinaki Bhattachrya
   Professor,
   Department of Chemical Engineering,
   Jadavpur University
   Kolkata – 700 032,
   Ph: +91-33-2414-2501(O),
   Email: pbhattacharyya@chemical.jdvu.ac.in
   pinaki_che@rediffmail.com