Prof. PARTHASARATHI GHOSH

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Education

Indian Institute of Technology, Kharagpur, India, Ph.D., Cryogenic Engineering — 2002
Thesis: ***Analytical and Experimental Studies on Cryogenic Turboexpander***
A turboexpander for small-scale air separation has been designed, fabricated, and tested along with the performance investigation using meanline analysis. The turbine has been analyzed for centrifugal stress. A design methodology has been prescribed for the cryogenic turboexpander.

Indian Institute of Technology, Kharagpur, India, M. Tech., Cryogenic Engineering — 1995

South Gujarat University (SVREC), known as **Sardar Vallabhbhai National Institute of Technology, Surat**, **India,** — 1992
B.E., Mechanical Engineering

Research and Professional experience

Professor, Cryogenic Engineering Centre, Indian Institute of Technology, Kharagpur — Nov 2019-till date

Associate Professor, Cryogenic Engineering Centre, Indian Institute of Technology, Kharagpur — Jun 2013 – Dec 2019

Assistant Professor, Cryogenic Engineering Centre, Indian Institute of Technology, Kharagpur — Aug 2006 – Jun 2013

Scientific Officer, Raja Ramanna Centre for Advanced Technology, Indore, India (Department of Atomic Energy, Govt. of India) — Jan 2002 – Aug 2006

K. S. Krishnan Research Associate, Raja Ramanna Centre for Advanced Technology, Indore, India (Department of Atomic Energy, Govt. of India) — Oct 2000-Dec 2001

Achievements at CAT, Indore, Department of Atomic Energy:

1. Development of Cryogenic Reciprocating Expansion Engine: Cryogenic reciprocating engine has been successfully developed with thorough characterization. Maximum efficiency of 65% has been attained.
2. Development of 15 l/hr Helium Liquefier based on Claude Cycle. During my tenure at RRCAT 14 K, the no-load temperature has been achieved. The above machine is reported to achieve a production rate@15 l/hr. This is the first indigenously developed helium liquefier in India.

Expertise

1. Modeling and simulation of cryogenic refrigeration and liquefaction systems
2. Large-scale helium cryogenics
3. Cryogenic rotating turboexpander, pump, and other rotating equipment
4. Design and development of low-temperature processes and equipment

5. Reverse Brayton Cryocooler
6. Two-phase flow in cryogenic systems
7. Cavitation and bubble dynamics

Subjects taught at IIT Kharagpur

a. Introduction to Cryogenic Engineering **(U G students)**
b. Design of Cryogenic Equipment and Accessories **(P.G. students)**
c. Introduction to Cryogenics and Superconductivity
d. Compressors and Pumps for Cryogenic Systems
e. Cryogenic Expansion devices
f. Cryogenic Process Plant Simulation
g. Storage and transfer of cryogens
h. Cryogenic Safety

Subjects Introduced at IIT Kharagpur

a. Introduction to Cryogenics and Superconductivity (Jointly with Prof. V. Adyam)
b. Compressors and Pumps for Cryogenic Systems
c. Cryogenic Expansion devices
d. Cryogenic Process Plant Simulation
e. Storage and transfer of cryogens (Jointly with Prof. T. K. Nandi)

Guidance/ Supervision

B. Tech Guidance: 2 completed
M.S. (By Research) Guidance: 2 (Completed)
M. Tech Guidance: 19 (Completed); 3 (ongoing)
Ph. D Guidance: 7 completed, 5 (ongoing) (See Annexure 1 for the details)

Short-term Course

Principal coordinator: "Basic Cryogenics," course at IIT Kharagpur	Feb 20-24, 2017
Principal coordinator in Global Initiative of Academic Networks (GIAN) course: "Cryogenic Technology: Materials, Processes and Equipment" at IIT Kharagpur	Jun 27 – Jul 8, 2016
Principal coordinator for the TEQUIP II course "Cryogenic Technology: Materials, Processes and Equipment" course at IIT Kharagpur	Feb 17-21, 2014
Coordinator of the " Two day Training Programme of IOCL officers" at IIT Kharagpur	September 14-15,2022

Sponsored Research Projects

Principal Investigator (PI): Studies on Gas Bearings for Cryogenic Turboexpanders (**Funding agency: ISIRD, IIT Kharagpur**)

Principal Investigator (PI): Thermohydraulic simulation of LOX booster turbopump (**Funding agency: LPSC, ISRO**)

Co-Principal Investigator (Co-PI): Steady-State and Dynamic Simulation of kW Class Helium Refrigerator/Liquefier for Superconducting Magnets Used for Fusion Machines (**Funding agencies: NFP BRFS, IPR, Gandhinagar.)**

Principal Investigator (PI): Thermo-structural Analysis of 16" diameter, 130 m long Liquid Oxygen Pipeline during Chill-down Process **(Funding agency: ISRO Propulsion Complex (IPRC), Mahendragiri)**

Principal Investigator (PI): Theoretical and Experimental Studies on Flow Characteristics during Change-over of Flow from Start-up Tank to Run Tank during Liquid Rocket Engine Testing **(Funding agency: ISRO Propulsion Complex (IPRC), Mahendragiri)**

Principal Investigator (PI): Studies on Establishment of Collapse Factor for Pressurizing Cryogenic Liquid at Different Operable Conditions for Ground Tests of Cryogenic Rocket Engines **(Funding agency: ISRO Propulsion Complex (IPRC), Mahendragiri)**

Co. Principal Investigator (Co. PI): Design, analysis and development of nozzle protection system for sea level testing of ce20 engine with A/R 100 (NSL) **(Funding agency: ISRO Propulsion Complex (IPRC), Mahendragiri)**

Co. Principal Investigator (Co. PI): Engineering design solutions for on-board LNG storage vessels, including bunkering ships (LNG_CYC**)**
(Funding agency: Ministry of Shipping, Government of India, New Delhi)

Consultancy Projects and Product development

Principal Investigator: Chilldown Analysis of Cryogenic Jacketed Pipelines for ISRO-IPRC Mahendragiri (CRYOGAS Equipment Ltd.)

Principal Investigator: Performance Testing of Cryochamber and Soaking Chamber for cryo treatment of materials (SINTL Cryo)

Principal Investigator: The Process Design of Helium Liquefier for 50 Litre/Hr Helium Plant Development at VECC Kolkata, DAE Govt. of India

Co-Principal Investigator: The Heat Exchanger Design for Helium Liquefier (for 50 Litre/Hr Helium Plant Development) at VECC Kolkata DAE Govt. of India

Co-Principal Investigator: Calibration of RTD PT-500 sensors with thermowell from lowest possible temperature (4-30K) to room temperature using liquid helium and provide calibration certificate (LRHP), Indian Space Research Organisation, Govt. of India, Department of Space,

Involved in the development of Medical Oxygen Generator (PSA) with Nektor Health Science System

Involved in the development of India's first reciprocating expander-based helium liquefier at RRCAT

Development of FLONAT, a cryogenic fluid management code under Respond programme of ISRO

Development of a software for Computation of collapse factor for pressurized cryogenic transfer system under RESPOND programme of ISRO

Awards and Prizes

Outstanding Reviewer of Cryogenics Journal (Elsevier)	2015
KS Krishnan **Research Fellowship**, DAE-BRNS, Govt. of India	2000-2001
Best Student speaker award at the Sixteenth National Symposium on Cryogenics (SNSC-97) held at IIT Kharagpur	1997
2018 Van Duzer Prize from the IEEE Council on Superconductivity	2020
2021 Milton Van Dyke Award from Gallery of Fluid Motion at 74th APS Division of Fluid Dynamics Meeting	2021

Editorial Board Members

1. **Member of Advisory Editorial Board,** Cryogenics Journal, Elsevier (July 2021-present)
2. **Member of Editorial Board of Indian Journal of Cryogenics**, Indian Cryogenics Council

International Journal Publications (42)

1. Kunniyoor, K. R., & Ghosh, P. (2023). Development of transient flow film boiling heat transfer correlations for energy efficient cryogenic fluid management during feed line quenching operation. *International Journal of Heat and Mass Transfer*, *204*, 123806. 2023
2. Mishra, A., Garva, A., & Ghosh, P. (2022). Flow-focusing from interacting cavitation bubbles. In 75th Annual Meeting of the APS Division of Fluid Dynamics: **Gallery of Fluid Motion**, https://doi.org/10.1103/APS.DFD.2022.GFM.V0075. 2022
3. Mishra. A., Bourquard. C., Roy. A., Lakkaraju. R., Ghosh. P., & Supponen. O. Flow-focusing from interacting cavitation bubbles. **Physical Review Fluids, Invited,** 7(11), p.110502. 2022
4. Kunniyoor, K. R., & Ghosh, P. Investigation of quench flow boiling heat transfer correlations for liquid oxygen feed line chill-down with outlet contraction. **Cryogenics**, 103593. 2022
5. Maiti, T. K., Pal, S., Kundu, B., & Ghosh, P. Exergy evaluation of integrated liquefier-cryocondensation and cryosorption helium purification systems based on experimental data. **International Journal of Exergy** (In Press) 2022
6. Dhillon, A. K., & Ghosh, P. (2022). Analysis of modified Reverse Brayton cycle-based systems for cold generation at low-temperature using exergoeconomics. **Journal of Energy Resources Technology**, 1-36. 2022
7. Mishra, A., Bourquard, C., Roy, A., Lakkaraju, R., Supponen, O., & Ghosh, P. (2021, November). Flow-focusing from interacting cavitation bubbles. In 74th Annual Meeting of the APS Division of Fluid Dynamics: **Gallery of Fluid Motion**. 2021
8. Mondal, J., Lakkaraju, R., Ghosh, P. and Ashokkumar, M., 2021. Acoustic cavitation-induced shear: a mini-review, **Biophysical Reviews** (in Press) 2021
9. Kunniyoor, K. R., Govind, R., Venkateswaran, K. S., & Ghosh, P. (2021). Liquid hydrogen pipeline chill-down: Mathematical modelling and investigation. **Cryogenics**, 118, 103324. 2021
10. Yadav, G., Mishra, A., Ghosh, P., Sindhu, R., Vinayak, V., & Pugazhendhi, A. (2021). Technical, economic and environmental feasibility of resource recovery technologies from wastewater. **Science of The Total Environment**, 796, 149022. 2021
11. Dhillon, A. K., & Ghosh, P. (2021). Exergoeconomic evaluation and optimization of reverse Brayton refrigerator. **Journal of Energy Resources Technology**, 143(9). 2021
12. Dhillon, A. K., & Ghosh, P. (2021). Exergetic analysis of reverse Brayton cryocooler with different turbine arrangements for HTS power cables. **Cryogenics**, 115, 103262.. 2021
13. Bhuvana, R. G., & Ghosh, P. (2022). A Scaling Procedure for Predicting Pressure Fluctuations Caused by Fluid Transient in Cryogenic Systems. In **Recent Advances in** 2021

Computational and Experimental Mechanics, Vol—I (pp. 65-80). Springer, Singapore.

14. Mondal, J., Li, W., Rezk, A. R., Yeo, L. Y., Lakkaraju, R., Ghosh, P., & Ashokkumar, M. (2021). Acoustic cavitation at low gas pressures in PZT-based ultrasonic systems. **Ultrasonics Sonochemistry**, 73, 105493. 2021

15. Narayanan, J. K., Roy, A., & Ghosh, P. (2020). Numerical studies on unstable oscillatory direct contact condensation (DCC) of oxygen vapor jets in subcooled flowing liquid oxygen. **Cryogenics**, 111, 103176.. 2020

16. Sam, A. A., & Ghosh, P. (2020). Trailing edge loss analysis of high-speed cryogenic microturbines used in helium applications. **Cryogenics**, 106, 103052. 2020

17. Narayanan, J. K., Roy, A., & Ghosh, P. (2020). Computational fluid dynamics studies on unstable oscillatory direct contact condensation of subsonic steam jets in water cross-flow. **Journal of Heat Transfer**, 142(5), 051601. 2020

18. Jayachandran, K. N., Roy, A., & Ghosh, P. (2021). Numerical Investigation on Unstable Direct Contact Condensation of Steam in Subcooled Water. **Heat Transfer Engineering**, 42(7), 592-612. 2020

19. Dhillon, A. K., & Ghosh, P. (2020). Performance characteristics map using exergy analysis of reverse Brayton cryocooler for HTS applications: Selection, Optimization, Design and Operational guidelines. **Cryogenics**, 106, 103024. 2019

20. Maiti, T. K., Pal, S., Kundu, B., & Ghosh, P. (2019). Evaluation of an existing helium liquefier in refrigerator and mixed-mode operation through exergy analysis. Cryogenics, 103, 102977. 2019

21. Kunniyoor, K. R., Richter, T., Ghosh, P., Lietzow, R., & Neumann, H. (2017). A mathematical model for the characterization of superconducting level sensors. **IEEE Transactions on Applied Superconductivity**, 28(1), 1-11. 2018

22. Kunniyoor, K. R., Richter, T., Ghosh, P., Lietzow, R., Schlachter, S., & Neumann, H. (2018). Experimental Study on Superconducting Level Sensors in Liquid Helium. **IEEE Transactions on Applied Superconductivity**, 28(2), 1-10. 2018

23. Saha, B. K., Chakraborty, B., Sam, A. A., & Ghosh, P. (2018). Performance Analysis of Organic Rankine Cycle Technology to Exploit Low-Grade Waste Heat to Power Generation in Indian Industry. **International Journal of Energy and Environmental Engineering**, 11(10), 1078-1084. 2017

24. Dutta, R., Ghosh, P., & Chowdhury, K. (2017). Process configuration of Liquid-nitrogen Energy Storage System (LESS) for maximum turnaround efficiency. **Cryogenics**, 88, 132-142. 2017

25. Sam, A. A., Mondal, J., & Ghosh, P. (2017). Effect of rotation on the flow 5ehavior in a high-speed cryogenic microturbine used in helium applications. **International Journal of Refrigeration**, 81, 111-122. 2017

26. Sam, A. A., & Ghosh, P. (2017). Flow field analysis of high-speed helium turboexpander for cryogenic refrigeration and liquefaction cycles. **Cryogenics**, 82, 1-14. 2017

27. Joaquim Rebelo, N., & Ghosh, P. (2016). Pressure Drop Studies on Supercritical Helium Flowing in Horizontal Tubes. **Journal of Thermal Science and Engineering Applications**, 8(1). 2015

28. Dutta, R., Ghosh, P., & Chowdhury, K. (2014). Identification of critical equipment and determination of operational limits in helium refrigerators under pulsed heat load. **Cryogenics**, 59, 23-37. 2014

29. Thomas, R. J., Ghosh, P., & Chowdhury, K. (2013). Optimum number of stages and intermediate pressure level for highest exergy efficiency in large helium liquefiers. **International journal of refrigeration**, 36(8), 2438-2457. 2013

30. Dutta, R., Ghosh, P., & Chowdhury, K. (2013). A cycle configuration for large-scale helium refrigerator for fusion devices towards complete mitigation of the effects of pulsed heat load. **Fusion Engineering and Design**, 88(11), 2972-2982. 2013

31. Dutta, R., Ghosh, P., & Chowdhury, K. (2013). Mitigation of effects of pulsed heat load from fusion devices on helium refrigerator: A novel technique using vapor compression cycle. **International journal of refrigeration**, 36(6), 1776-1789. 2013

32. Nandi, B. R., & Ghosh, P. (2012). Centrifugal stress analysis on small cryogenic turboexpander. **International Journal of Mechanical Engineering and Research**, 1(1), 29-33. 2012

33. Dutta, R., Ghosh, P., & Chowdhury, K. (2012). Mitigation of effects of pulsed heat loads in helium refrigerators for fusion devices using supercritical helium storage. **IEEE transactions on applied superconductivity**, 22(6), 4203712-4203712. 2012

34. Thomas, R. J., Dutta, R., Ghosh, P., & Chowdhury, K. (2012). Applicability of equations of state for modeling helium systems. **Cryogenics**, 52(7-9), 375-381. 2012

35. Thomas, R. J., Ghosh, P., & Chowdhury, K. (2012). Exergy based analysis on different expander arrangements in helium liquefiers. **International journal of refrigeration**, 35(4), 1188-1199. 2012

36. Thomas, R. J., Ghosh, P., & Chowdhury, K. (2012). Exergy analysis of different cold end configurations for helium liquefiers. **Journal of Thermal Science and Engineering Applications**, 4(2). 2012

37. Thomas, R. J., Ghosh, P., & Chowdhury, K. (2012). Role of heat exchangers in helium liquefaction cycles: Simulation studies using Collins cycle. **Fusion Engineering and Design**, 87(1), 39-46. 2012

38. Thomas, R. J., Ghosh, P., & Chowdhury, K. (2012). Application of exergy analysis in designing helium liquefiers. **Energy**, 37(1), 207-219. 2012

39. Dutta, R., Ghosh, P., & Chowdhury, K. (2011). Application of parallel heat exchangers in helium refrigerators for mitigating effects of pulsed load from fusion devices. **Fusion engineering and design**, 86(4-5), 296-306. 2011

40. Dutta, R., Ghosh, P., & Chowdhury, K. (2011). Customization and validation of a commercial process simulator for dynamic simulation of Helium liquefier. **Energy**, 36(5), 3204-3214. 2011

41. Thomas, R. J., Ghosh, P., & Chowdhury, K. (2011). Role of expanders in helium liquefaction cycles: Parametric studies using Collins cycle. **Fusion Engineering and Design**, 86(4-5), 318-324. 2011

42. Thomas, R. J., Ghosh, P., & Chowdhury, K. (2011). Exergy analysis of helium liquefaction systems based on modified Claude cycle with two-expanders. **Cryogenics**, 51(6), 287-294. 2011

National Journal Publications (18)

1. Bhuvana, R. G., Ghosh, P., & Ganesh, P. (2021). Numerical analysis of Fluid Transient during ground testing of cryogenic propellant feed system. **Indian Journal of Cryogenics**, 2021 (**Under Review**) 2021
2. Garva, A., Kunniyoor, K. R., & Ghosh, P. (2020). A mathematical model for the characterization of fluid transients in cryogenic propellant feedlines. **Indian Journal of Cryogenics**, Vol. 45(1), 2021**. (In Press)** 2020
3. Mishra, A., Mondal, J., Roy, A., Lakkaraju, R., & Ghosh, P. (2020). Jet and shock characteristics of collapsing cavitating bubble in cryogenic environment. **Indian Journal of Cryogenics**, Vol. 45(1), 2021. 2020
4. Kadbane, S., Mishra, A., & Ghosh, P. (2020). Analytical investigation of the cryogenic propellant outflow from a cryogenic storage tank for different ground test conditions. **Indian Journal of Cryogenics,** Vol. 45(1), 2021. 2020
5. Mondal, J., Mishra, A., Lakkaraju, R., & Ghosh, P. (2020). Application of multiple interacting bubbles for particle fragmentation at cryogenic temperature. **Indian Journal of Cryogenics,** Vol. 45(1), 2021. 2020
6. Jayachandran, K. N., Prajapati, A., Roy, A., & Ghosh, P. (2019). A Volume-of-Fluid (VOF) methodology for prediction of Direct Contact Condensation (DCC) of gaseous oxygen jets in subcooled flowing liquid oxygen. **Indian Journal of Cryogenics**, Vol. 44(1), pp. 117-122, 2019. DOI: 10.5958/2349- 2120.2019.00020.7 2019
7. Kunniyoor, K. R., Richter, T., Ghosh, P., Lietzow, R., Schlachter, S., & Neumann, H. (2019). Performance analysis of a NbTi level sensor while filling Lhe into a cryostat. **Indian Journal of Cryogenics**, 44(1), 161-165. 2019
8. Bajpai, A., Dutta, R., & Ghosh, P. (2019). Parameter estimation of equipment for development of an experimental setup of a reverse brayton cryocooler for cooling HTS cables. **Indian Journal of Cryogenics**, 44(1), 83 2019
9. Jayachandran, K. N., Roy, A., & Ghosh, P. (2018). Numerical investigations on direct contact condensation (DCC) of oxygen vapour in a staged combustion cycle based rocket engine. **Indian Journal of Cryogenics**, Vo. 43, 2018, pp. 124-130. DOI: 10.5958/2349-2120.2018.00021.3. 2018
10. Dhillon, A. K., & Ghosh, P. (2017). Performance analysis of cryocoolers based on reverse Brayton cycle and its modifications for cooling HTS devices. **Indian Journal of Cryogenics**, Vol. 42, 2017, pp.-61-67. DOI: 10.5958/2349-2120.2017.00009.7. 2017
11. Mishra, A., & Ghosh, P. (2017). CFD analysis of axial pump of lox booster turbo pump for a staged combustion cycle based rocket engine. **Indian Journal of Cryogenics**, Vol. 42, 2017, pp.-91-97. DOI: 10.5958/2349-2120.2017.00014.0 2017

12. Sam, A. A., & Ghosh, P. (2016). Performance validation of a large scale helium turboexpander for cryogenic applications through CFD analysis. **Indian Journal of Cryogenics** Volume 41, pp 26-31, 2016. 2016
13. Dutta, R., Roy, S., Ghosh, P., & Chowdhury, K. (2014). Evaluation of a technique to mitigate effects of pulsed heat load of fusion devices on helium refrigerator. **Indian Journal of Cryogenics** Volume 39, pp 1-7, 2015. 2015
14. Verma, R., Dutta, R., Ghosh, P., Sahu, A. K., & Chowdhury, K. (2015). Analysis of various liquid nitrogen pre-cooling schemes for large-scale helium liquefiers/refrigerators. Published in **Indian Journal of Cryogenics** Volume 40, pp 81-86, 2015. (DOI:10.5958/2349-2120.2015.00014.X) 2015
15. Chowdhury, K., Thomas, R. J., Ghosh, P., & Sarkar, B. (2010). Large-scale helium liquefier/refrigerator for fusion devices: a global review and Indian perspective planning. **Indian Journal of Cryogenics**, Vol. 35, No. 1-4, pp. 321-326, 2010. 2010
16. Thomas, R. J., Basak, S., Ghosh, P., & Chowdhury, K. (2010). Thermodynamic properties of helium: a comparative study on different equations of state. **Indian Journal of Cryogenics**, Vol. 35, No. 1-4, pp. 240-245, 2010. 2010
17. Dewangan, A. k., Ghosh, P. (2010). An Experimental Setup for Thermodynamic and Rotordynamic Performance Study of Cryogenic Turboexpander. **Indian Journal of Cryogenics** Special Issue, 35A, pp. 442-447, 2010. 2010
18. Thomas, R. J., Basak, S., Ghosh, P., & Chowdhury, K. (2008, December). Helium liquefaction/refrigeration system based on Claude cycle: A parametric study. **Indian Journal of Cryogenics**, Vol. 34, No. 1-4, pp. 33-38, 2009. 2009

International Conference Proceedings (55)

1. Mishra, A., Garva, A., Roy, A. and Ghosh, P., (2022). Bubble-pair: A tool for the cell perforation and particle fragmentation. **Bulletin of the American Physical Society** 2022
2. Suresh, A., Sam, A. A., Dutta, R., and Ghosh, P. (2021). Conceptual design of 4.2 K cold-compressors for large scale helium refrigerators used in fusion devices for mitigation of pulsed heat load. GTINDIA2021-76032, **ASME Gas Turbine India Conference**, Virtual Conference, India, December 2–3 2021
3. Mishra, A., Bourquard, C., Lakkaraju, R., Supponen, O., & Ghosh, P. (2021). Jets from interacting cavitation bubbles. Bulletin of the **American Physical Society**. 2021
4. Dhillon, A. K., & Ghosh, P. (2021). Advanced exergy analysis of reverse Brayton cryocooler for 10 kW cooling capacity at 65 K. Accepted for publication in **IOP conference series** (CEC-ICMC 2021). 2021
5. Lohar, K., Kunniyoor, K. R., Ventateshwaran, K.S., & Ghosh, P. (2021). "Three-dimensional fluid-structural interaction and thermal analysis of a large diameter horizontal cryogenic transfer line". Presented at **Cryogenic Engineering Conference** (CEC/ICMC 21), USA, July 19 – 23, 2021 2021
6. Bhuvana, R.G., Ghosh, P. & Gour, A. S. (2021). Experimental Investigation of Valve Driven Transient Effect in Liquid Nitrogen Pipeline. Presented at Cryogenic Engineering Conference (CEC/ICMC 21), USA, July 19 – 23, 2021.**IOP Conference Series: Materials Science and Engineering, Advances in Cryogenic Engineering**. (Under Review) 2021

7. Garva A., Mishra A., & Ghosh P. (2021). Numerical investigation of two-phase fluid-transient induced cavitation in the cryogenic propellant feedlines. **Cryogenic Engineering Conference and International Cryogenic Materials Conference**, **2021.** 2020
8. Bhuvana, R. G., & Ghosh, P. (2020). A Scaling Procedure for Predicting Pressure Fluctuations caused by Fluid Transient in Cryogenic Systems. **International Conference on Recent Advances in Computational and Experimental Mechanics** (ICRACEM 2020) 2020
9. Mishra, A., Mondal, J., Roy, A., Lakkaraju, R., & Ghosh, P. (2020). Effect of curved rigid surface on the collapsing cavitating bubble in cryogenic environment. 2020 **IOP Conf. Ser.: Mater. Sci. Eng**. 755 012067 2020
10. Mondal, J., Mishra, A., Lakkaraju, R., Ashokkumar, M., & Ghosh, P. (2020). Effect of curved rigid surface on the collapsing cavitating bubble in cryogenic environment. 2020 **IOP Conf. Ser.: Mater. Sci. Eng.** 755 012066 2019
11. Dhillon, A. K., & Ghosh, P. (2019). Exergoeconomic optimization of reverse Brayton Cryocooler for different heat load conditions from HTS power cables. **Presented at 3rd International Workshop on Cooling System for High-Temperature Superconductor Applications**, Oct 15 – 17, 2019, Niskayuna, USA.
12. Dhillon, A. K., & Ghosh, P. (2019). Thermodynamic analysis of reverse Brayton cycle-based cryocoolers for cooling HTS cables. **IOP Conference Series Materials Science and Engineering** 04/2019; 502:012029., DOI:10.1088/1757-899X/502/1/012029 2019
13. Garva, A., Mishra, A., & Ghosh, P. (2019). Numerical analysis of Fluid Transients Induced by Valve Operation in Cryogenic Feed Lines, **Cryogenic Engineering Conference and International Cryogenic Materials Conference**, Hartford, Connecticut, USA. 2019
14. Bajpai, A., Dhillon, A. K., Dutta, R., & Ghosh P. (2019). Root Cause Analysis of Early Performance Deterioration of an Existing Helium Liquefier using Process Simulation. **The 15th Cryogenics 2019, IIR Conference**, Prague, Czech Republic. 2019
15. Dhillon, A. K., Bajpai, A., & Ghosh, P. (2019). The Effect of HTS heat rejection conditions on the performance of reverse Brayton cryocooler. **The 15th Cryogenics 2019, IIR Conference Proceeding,** Prague, Czech Republic. 2019
16. Jayachandran, K. N., Roy, A., & Ghosh, P. (2019). CFD Analysis of Direct Contact Condensation (DCC) of Superheated Gas Jets into a Vertically Flowing Liquid Channel**," 12th European Congress of Chemical Engineering (ECCE12),** Florence, Italy. 2019
17. Mishra, A., Mondal, J., Lakkaraju, R., & Ghosh., P. (2018). Numerical Investigation of Erosive Strength of Collapsing Cavitating Bubble in Cryogenic Environment Near Rigid Wall. Presented at **AIChE Annual meeting 2018,** Pittsburgh, USA 2018
18. Mondal, J., Mishra, A., Lakkaraju, R., & Ghosh, P. (2018). Numerical Simulation for Multiple Bubble Interactions in Low-Temperature Fluids. Presented at **AIChE Annual meeting 2018,** Pittsburgh, USA. 2018

19. Mondal, J., Mishra, A., Lakkaraju, R., & Ghosh, P. (2018). Numerical Examination of Jets Induced By Multi-Bubble Interactions. **ASME International Mechanical Engineering Congress and Exposition**, Volume 7: Fluids Engineering: V007T09A067. DOI:10.1115/IMECE2018-87606. 2018

20. Jayachandran, K. N., Roy, A., & Ghosh, P. (2018). CFD Analysis of Direct Contact Condensation (DCC) of Subsonic Steam Jets in a Cross-Flow of Water using a Two-Fluid Model. **ASME International Mechanical Engineering Congress and Exposition**, Volume 8A: Heat Transfer and Thermal Engineering: V08AT10A058. DOI:10.1115/IMECE2018-87382. 2018

21. Sam, A. A., Kunniyoor, K. R., Jayachandran, K. N., Mishra, A., & Ghosh, P. (2018). Droplet Nucleation and Growth in Cryogenic Turboexpanders. **ASME International Mechanical Engineering Congress and Exposition**, Volume 7: Fluids Engineering: V007T09A068 DOI:10.1115/IMECE2018-88343. 2018

22. Dhillon, A. K., & Ghosh, P. (2018). Thermoeconomic Analysis of Reverse Brayton Cycle based Cryocooler. **ASME International Mechanical Engineering Congress and Exposition**, Volume 6B: Energy: V06BT08A058. DOI:10.1115/IMECE2018-87190. 2018

23. Jayachandran, K. N., Roy, A., & Ghosh, P. (2018). Effect of Multiport Vapor Injection on the Performance of a GOX-LOX Direct Contact Condenser. Presented at **AIChE Annual meeting 2018,** Pittsburgh, USA. 2018

24. Dhillon, A. K., & Ghosh, P. (2018). Thermoeconomic Optimization of Reverse Brayton Cycle Based Cryocooler for HTS Power Transmission Cable. **Presented at AIChE Annual meeting 2018,** Pittsburgh, USA. 2018

25. Dhillon, A. K., & Ghosh, P. (2018). Thermodynamic analysis of reverse Brayton cycle-based cryocooler for cooling HTS cables. **Presented at ICEC27-ICMC2018, Oxford**, England; 08/2018 2018

26. Gupta, S. K., Ghosh, P., & Nandi, T. K. (2018). Theoretical and CFD investigations on a 200 Hz thermoacoustic heat engine using pin array stack for operations in a pulse tube cryo-cooler. Published in the **proceedings of ICEC 27-ICMC 2018** 2018

27. Sam, A. A., & Ghosh, P. (2017). Assessment of Loss Correlations for Performance Evaluation of High-Speed Cryogenic Microturbine Used in Helium Applications. GTINDIA2017-4927, **ASME Gas Turbine India Conference,** Bangalore, India, December 7–8 2017

28. Mishra, A., Mondal, J., & Ghosh, P. (2017). Influence of Pre-Combustible Mixture Properties on the Performance of Nozzle set of Partial Admission Turbine used in Semicryogenic Engine. GTINDIA2017-4931, **ASME Gas Turbine India Conference,** Bangalore, India, December 7–8. 2017

29. Mishra, A., & Ghosh, P. (2017). Flow Field Investigation in A Partial Admission Supersonic Turbine of LOX Booster Turbopump for Staged Combustion Cycle Based Rocket Engine. GTINDIA2017-4502, **ASME Gas Turbine India Conference,** Bangalore, India, December 7–8. 2017

30. Dhillon, A. K., & Ghosh, P. (2017). Study of reverse Brayton cryocooler with helium-neon mixture for HTS cable. **IOP Conf. Series: Materials Science and Engineering** 278 (2017) 012084 DOI:10.1088/1757-899X/278/1/012084 2017

31. Mishra, A., Roy, A., & Ghosh, P. (2017). A Computational study for characterizing Cavitating flow in Hydrofoils operating at Cryogenic conditions. 14th **Cryogenics 2017 IIR International Conference** proceedings, pp-295-302, DOI: 10.18462/iir.cryo.2017.0072. 2017

32. Dhillon, A. K., Dutta, R., & Ghosh, P. (2017). Exergetic analysis of reverse Brayton cryocooler for different cooling loads at 65 k for HTS cables. 14th Cryogenics 2017 **IIR International Conference proceeding**s, pp-406-413 DOI: 10.18462/iir.cryo.2017.0027. 2017

33. Posa, L., Ghosh, P., & Chowdhury, K. (2017). Analysis for a safer design of high-pressure oxygen pressure reducing station in steel plants. 14thCryogenics 2017 **IIR International Conference proceedings,** pp-387-392, DOI: 10.18462/iir.cryo.2017.0091. 2017

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35. Sam, A. A., & Ghosh, P. (2017). Effect of trailing edge thickness on the performance of a helium turboexpander used in cryogenic refrigeration and liquefaction cycles. **IOP Conference Series: Materials Science and Engineering** 171, 012021, 2017. 2017

36. Mishra, A., & Ghosh, P. (2017). Effect of leading edge sweep on the performance of cavitating inducer of LOX booster turbopump used in semi cryogenic engine. **IOP Conference Series: Materials Science and Engineering** 171, 012062, 2017. 2017

37. Gupta, S. K., & Ghosh, P. (2017). Cycle Design of Reverse Brayton Cryocooler for HTS Cable Cooling Using Exergy Analysis. **IOP Conference Series: Materials Science and Engineering 171**, 012074, 2017. 2017

38. Jayachandran, K. N., Roy, A., & Ghosh, P. (2017). Numerical investigations on unstable direct contact condensation of cryogenic fluids. **IOP Conference Series: Materials Science and Engineering** 171, 012052, 2017. 2017

39. Sam, A. A., & Ghosh, P. (2016). Helium Turboexpanderfor Cryogenic Refrigeration and Liquefaction Cycles: Transient Analysis of Rotor – Stator Interaction. GT2016-56793, **ASME TURBO EXPO,** Seoul, South Korea, June 13-17, 2016. 2016

40. Sam, A. A., & Ghosh, P. (2015). Influence of thermophysical properties of working fluid on the design of cryogenic turboexpanders using $n_s d_s$ diagram. **IOP Conference Series: Materials Science and Engineering** 101, 012179, 2015. 2015

41. Mishra, A., & Ghosh, P. (2015). Predicting performance of axial pump inducer of LOX booster turbo-pump of staged combustion cycle-based rocket engine using CFD. **IOP Conference Series: Materials Science and Engineering** 101, 012180, 2015. 2015

42. Kochunni, S. K., Ghosh, P., & Chowdhury, K. (2015). Optimization of U.A. of heat exchangers and BOG compressor exit pressure of LNG boil-off gas reliquefaction system using exergy analysis. **IOP Conference Series: Materials Science and Engineering** 101, 012090, 2015. 2015

43. Verma, R., Sam, A. A., & Ghosh, P. (2015). CFD analysis of turboexpander for cryogenic refrigeration and liquefaction cycles. **Physics Procedia,** Volume 67, pp. 373–378, 2015.(DOI:10.1016/j.phpro.2015.06.043). 2015

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46. Rebelo, N., & Ghosh, P. (2012). Numerical simulation of mixed convection heat transfer to forced flow supercritical helium. **Proceedings of IIR Conference Cryogenics 2012**, Dresden, Germany, September 10-14, 2012, pp. 199-205. 2012

47. Dutta, R., Ghosh, P., & Chowdhury, K. (2012). Performance of large-scale helium refrigerators subjected to pulsed heat load from fusion devices. **ICEC 24**, Fukuoka Japan, May 14-18, 2012, pp. 625-628. 2012

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49. Ghosh, P., Nandi, B. R., & Sarangi, S. K. (2010). Prediction on Performance of Cryogenic Turboexpander Using Meanline Approach. **Proceedings of ICEC 23**, Wroclaw, July 19-21, 2010, pp. 977-984. 2010

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51. Ghosh, P., & Sarangi, S. K. (2004). Analysis of Centrifugal Stress in the Rotor of a Cryogenic Turboexpander. **Proceedings of ICEC 20, 20th International Cryogenic Engineering Conference**, Beijing China, 2004. 2004

52. Sen, P., Ghosh, P., Sahoo, D. J., Krishna, K. V., & Sarangi, S. K. (2004). An Improved Computer Program for Design of Cryogenic Expansion Turbine. Refrigeration Science and Technology **Proceedings of the Eighth Cryogenics IIR International Conference**, Prague, 2004. 2004

53. Ghosh, P., & Sarangi, S. K. (2000). Static Stress Analysis of a Cryogenic Turboexpander Using Finite Element Method. **Proceedings of ICEC 18** (Mumbai), Narosa Publication, 2000. 2000

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National Conference Presentations/ Proceedings (24)

1. Bhuvana, R. G., & Ghosh, P. (2019). Numerical Simulation of Control Strategy for Fluid Transient in Cryogenic Systems. **Proceedings of the 25th National and 3rd International ISHMT-ASTFE Heat and Mass Transfer Conference (IHMTC-2019)** December 28-31, IIT Roorkee 2019

2. Kunniyoor, K. R., Govind, R., Venkateswaran, K. S., & Ghosh, P. (2019). Investigation of Transfer Line Cool-down Transients Using Equilibrium Two-phase Models, **Proceedings of the National Conference on Cryogenics for Space** (NCCS-2019), December 12-14, 2019, LPSC, Thiruvananthapuram, India 2019

3. Bhuvana, R. G., Ghosh, P., & Ganesh, P. (2019). Numerical analysis of Fluid Transient during ground testing of cryogenic propellant feed system. **Proceedings of the National Conference on Cryogenics for Space** (NCCS-2019), December 12-14, 2019, LPSC, Thiruvananthapuram, India 2019

4. Garva, A., Kunniyoor, K. R., & Ghosh, P. (2019). A Mathematical Model for the Characterization of Fluid Transients in Cryogenic Propellant Feedlines, **Presented at 27th National Symposium on Cryogenics and Superconductivity,** IIT Bombay, January 16-18, 2019. 2019

5. Mondal, J., Mishra, A., Lakkaraju, R., & Ghosh, P. (2019). Application of multiple interacting bubbles for particle fragmentation at cryogenic temperature, **Presented at 27th National Symposium on Cryogenics and Superconductivity**, IIT Bombay, January 16-18, 2019. 2019

6. Mishra, A., Mondal, J., Roy, A., Lakkaraju, R., & Ghosh, P. (2019). Jet, and Shock characteristics of collapsing cavitating bubble in cryogenic environment, **Presented at 27th National Symposium on Cryogenics and Superconductivity,** IIT Bombay, January 16-18, 2019. 2019

7. Kunniyoor, K. R., Richter, T., Ghosh, P., Lietzow, R., Schlachter, S., & Neumann, H. (2019). Performance Analysis of a NbTi Level Sensor While Filling Lhe Into a Cryostat, **Presented at 27th National Symposium on Cryogenics and Superconductivity**, IIT Bombay, January 16-18, 2019. 2019

8. Kadbane, S., Mishra, A., & Ghosh, P. (2019). Analytical investigation of the collapse factor for a Cryogenic storage tank for different for propellant combinations, **Presented at 27th National Symposium on Cryogenics and Superconductivity,** IIT Bombay, January 16-18, 2019. 2019

9. Bajpai, A., Dutta, R., & Ghosh, P. (2019). Parameter Estimation of Equipment for Development of an Experimental Setup of a Reverse Brayton Cryocooler for Cooling High Temperature Superconducting Cables, **Presented at 27th National Symposium on Cryogenics and Superconductivity,** IIT Bombay, January 16-18, 2019. 2019

10. Jayachandran, K. N., Prajapati, A., Roy A.,, & Ghosh, P. (2019). A Volume-of-Fluid (VOF) Methodology for Prediction of Direct Contact Condensation (DCC) of Gaseous Oxygen Jets in Subcooled Flowing Liquid Oxygen. **Presented at 27th National Symposium on Cryogenics and Superconductivity,** IIT Bombay, January 16-18, 2019. 2019

11. Prajapati, A., Jayachandran, K. N., Roy, A., & Ghosh. P. (2018). CFD Analysis of Direct Contact Condensation (DCC) of Oxygen Vapor Jets in Subcooled Liquid Oxygen using Volume of Fluid (VOF) Method. Abstract accepted—**32nd National Convention of Aerospace Engineers,** BIT Mesra, Ranchi, India, October 27-28, 2018. 2019

12. Sam, A. A., & Ghosh, P. (2017). CFD Analysis of High Speed Cryogenic Helium Turboexpander with Splitter Blades. **26th National Symposium on Cryogenics**, Variable Energy Cyclotron Centre, Kolkata, India, February 22 – 24, 2017. (Awarded as Best Paper) 2017

13. Gupta, S. K., Ghosh, P., & Nandi, T. K. (2017). Application of thermoacoustic devices in cryogenic systems. A review since the year 2000. **26th National Symposium on** 2017

Cryogenics, Variable Energy Cyclotron Centre, Kolkata, India, February 22 – 24, 2017.

14. Jayachandran, K. N., Roy, A., & Parthasarathi Ghosh. (2017). Numerical studies on turbine drive gas recovery at the LOX booster turbopump exit of a staged combustion cycle-based rocket engine. **26th National Symposium on Cryogenics**, Variable Energy Cyclotron Centre, Kolkata, India, February 22 – 24, 2017. 2017
15. Mishra, A., Roy, A., & Ghosh, P. (2017). Numerical Modelling of Cavitation in Cryogenic fluids using OpenFoam and CFX. **26th National Symposium on Cryogenics**, Variable Energy Cyclotron Centre, Kolkata, India, February 22 – 24, 2017. 2017
16. Jayachandran, K. N., Roy, A., & Ghosh, P. (2015). An approach to the numerical study of direct contact condensation (DCC) in cryogenic fluids. **CHEMCON-2015**, IIT Guwahati, December 27-30, 2015. 2015
17. Thara, R. I. V., Mishra, A., Jayachandran, K. N., & Ghosh, P. (2014). CFD analysis of turbine nozzle set for booster turbo-pump system. **25th National Symposium on Cryogenics**, University of Hyderabad, India, December 8 – 10, 2014. 2014
18. Rebelo, N., & Ghosh, P. (2013). Pressure drop studies on supercritical helium flowing in horizontal tubes; **Proceedings of 22thNational and 11th International ISHMT-ASME Heat and Mass Transfer Conference** December 28-31, 2013, IIT Kharagpur, India. 2013
19. Dutta, R., Thomas, R. J., Ghosh, P., & Chowdhury, K. (2013). Designing process plant with pulsating loads: Exergy analysis of helium plants for fusion reactors. Presented in **National Conference on Energy Engineering, Analysis, Audit and Management**, NIT Agarpara, Kolkata, India, July 8-10, 2013 2013
20. Dutta, R., Ghosh, P., & Chowdhury K. (2013). Mitigation of effects of pulsed heat load to helium refrigerator in fusion devices: use of a cold-compressor. Presented in 24th National Symposium on Cryogenics, IPR, Gandhinagar, January 2013. 2013
21. Ghosh, P., Thomas, R. J., Dutta, R., & Chowdhury, K. (2010). Design and Analysis of Large-scale Helium Liquefiers/Refrigerators: Issues with Modeling and Simulation, Indian Journal of Cryogenics, Special Issue, **23rd National Symposium on Cryogenics (NSC 23)**, NIT Rourkela, India, Oct 28-30, 2010, pp. 9-16. 2010
22. Dutta, R., Thomas, R. J., Ghosh, P., & Chowdhury, K. (2010). Dynamic simulation of large-scale helium liquefier using Aspen Hysys®: Problems, solutions and prospect, **23rd National Symposium on Cryogenics**, NIT Rourkela, India, October 28-30. 2010
23. Kush, P. K., Ghosh, P., Ghosh, R., Sharma R., C., and Doohan R. S. (2004).Test results of Cryogenic Reciprocating-type Expansion Engine using Nitrogen as Process Gas in **Proceedings of National Seminar and Conference on Cryogenics and Its Frontier Applications** B. E. College, Sibpur, Howrah, India, 18-24. 2004
24. Ghosh, P., & Sarangi, S. K. (1997). Development of a Cryogenic Turboexpander: Problems and Prospects Proceedings of the **16th National Symposium on Cryogenics,** IIT Kharagpur. 1997

Invited Talks

1. Invited for attending "PM Gati Shakti Multimodal Waterways Summit 2022" by FICCI at Varanasi 2022

2. Written an article for "Cool Cryo Guest Column" at Cold Fact Newsletter of Cryogenic Society of America 2022

3. Invited colloquium talk at the Institute for Plasma Research (IPR), Gandhinagar under Azadi Ka Amrit Mahotsav. On"Recent activities of PED Laboratory, Cryogenic Engineering centre IIT Kharagpur" May 2022 2022

4. Parthasarathi Ghosh, "Next-Gen LNG Infrastructure and Technical Developments", Esteemed Speaker at the 6th Edition of LNG India Summit 2021, New Delhi, India 2021

5. Parthasarathi Ghosh, Two Phase Flow in Cryogenics, TEQIP-III sponsored three-day National Webinar on Cryogenic Engineering (NWCE-2020) Parala Maharaja Engineering College, Berhampur, Odisha 2020

6. Parthasarathi Ghosh, Arpit Mishra, KN Jayachandran, Joydip Mondal, and Keerthi K. Issues of Two-Phase Flow in Cryogenic Fluid Management Systems. 27th National Symposium on Cryogenics, IIT Mumbai, Bombay, India, January 16 – 19, 2017. 2019

7. Parthasarthi Ghosh, Cryogenic Engineering: Applications, Current Research Trends and Career Prospects, SRM Institute of Science and Technology, Chennai, India 2018

8. Parthasarathi Ghosh, Jubil Joy, Sarun Kumar Kochunni, and Kanchan Chowdhury.LNG Technology: Present Scenario and Future Possibilities in India.26th National Symposium on Cryogenics, Variable Energy Cyclotron Centre, Kolkata, India, February 22 – 24, 2017. 2017

9. Parthasarathi Ghosh, Jubil Joy, and Kanchan Chowdhury. Evaluation and comparison of selected thermodynamic systems for power generation using LNG cold energy. 2nd LNG SUMMIT INDIA, Sheraton hotel, New Delhi, India, Nov 3-4, 2016. 2017

10. Parthasarathi Ghosh, National Symposium on Cryogenics, NIT Rourkela, India 2010

Session Chair

Oral Sessions:

a) NSCS-28 IIT Kharagpur 2022
b) NAPC- 2018 IIT Kharagpur 2018
c) ICTACEM- 2017, IIT Kharagpur 2017
d) LNG India Summit at New Delhi, India 2016 2016
e) CEC- ICMC 2015, held at Tucson Arizona 2015
f) National Symposium on Cryogenics 24, IPR Ahmedabad, India 2013
g) ICEC 23 – ICMC 2010 at Wroclaw, Poland 2010 2010

Poster sessions:

a) NSC-26 at VECC, Kolkata, India 2017 2017
b) ICEC 26 – ICMC 2016 at New Delhi, India 2016 2016
c) CEC- ICMC 2015, held at Tucson Arizona 2015

Media outreach

2022 Cryogenic Bubble Interaction: Challenges, Motivation and Potential Benefits in Cryosurgery published in The magazine of Cryogenic Society of America (CSA) **Cold Facts** vol38 no4 2022 as *"Cool Cryo Guest feature"* (Page 24-25).

2022 Indian Institute of Technology, Kharagpur, "It is indeed a great pleasure to announce that Prof. Parthasarathi Ghosh ….."

2021 D-MAVT, ETH Zurich News release, 12 – 2021, "Award winning visualization of fluid motion"

2021 D Ehrenstein, "Complex Droplets and Interacting Bubbles Receive Video Prize", Physics 14, 167 | DOI: 10.1103/Physics.14.167.

2021 39th Annual Gallery of Fluid Motion Award winners announced "Interacting bubbles, sea-air gas exchange, and bacterial motion impress judges of flow visualizations" https://www.eurekalert.org/news-releases/935758, https://www.aps.org/newsroom/pressreleases/gfm-winners.cfm

2021 Nicole Sharp, "Cavitation-Induced Microjets", Celebrating the physics of all that flows FYFD

2021 Indian Institute of Technology, Kharagpur, "We are glad to inform that…."

2020 The KGP Chronicle, SPOTLIGHT INNOVATION: Indigenous development of PSA technology based medical grade oxygen plant

Other Professional Activities

a) **Convener** of "28th National Symposium on Cryogenics and Superconductivity (NSCS-28)" held at IIT Kharagpur

b) **Collaborator** of "ASME 2022 Summer Heat Transfer Conference (SHTC 2022)"

c) **Contribution** to "India Ranking 2022" conducted by NIRF on behalf of Ministry of Education, Government of India.

d) **Coordinator** of "ANSYS Mechanical and CFD Training" at IIT Kharagpur by Entuple Technologies

e) **Member** of the team from IIT Kharagpur for possible collaboration with ANSYS CFD

f) **Advisor** to INOX India Ltd. For "2K heater system"

g) **Committee member** of SRIC JRF Selection at IIT Kharagpur

h) **Contribution** to QS Top Universities Ranking 2022

i) **Senior Level Expert Member** of promotion committee of IPR, Gandhinagar

j) **Expert member of the review committees at International Thermonuclear Experimental Reactor, ITER, and ITER India**

ITER is an international collaborative effort among European Union, USA, China, Japan, India, Russia, and South Korea for building Tokamak based Fusion reactor for future clean energy generation. ITER-India is the domestic agency that has been formed with the responsibility to provide to ITER the Indian contribution. The deliverables from ITER-India for ITER cryogenics systems are cryodistribution systems and cryolines.

As an Expert member, my responsibilities are as follows:

- **Design Review Committee** for Torus cryostat and Cryoline of ITER, Cadarache, France
- Design Review Committee meeting of Cryodistribution of ITER Cadarache, France
- Design Review Committee of Cold Rotating machines ITER INDIA, Gandhinagar
- **Senior Expert member** of Review Committee of Prototype Cryoline of ITER India
- **Member of review panel** of PDR of Y group of cryolines
- **Member of the National Expert Panel of Integrated Technical Review (ITR)** of C32 and SC120 stages and LOX-CH4 engine development of ISRO

k) **Project Reviewer** for CPRI, BRNS, SERB projects

l) **Referee** for DAE "Young Engineer Award-2021"

m) **Evaluated Ph.D. thesis including those from SVNIT Surat, IIT Madras, IIT Roorkee, IISc Bangalore, and National University of Singapore**

n) **Reviewer of National and International Journals and Conference Proceedings**

o) **Expert member of BHEL (2014):** Enlisted as an expert in the directory of expert of BHEL for cryogenics and superconducting machine development.

p) **Member of Joint Programme Committee (JPC) of IIT Kharagpur Kalpana Chawla Space Technology Cell (STC of ISRO) from Dec 2022**

Collaborations

1. **Prof. J G Weisend II, Deputy Head of Accelerator Projects, European Spallation Source (ESS), Sweden (part of MoU between ESS & IIT Kgp)**
2. Prof **Muthupandian Ashokkumar**, University of Melbourne, **Australia. (Joint Ph.D. Guide under MIPA)**
3. Prof. **Holger Neumann**, Karlsruhe Institute of Technology, **Germany. (Through GIAN Course and DAAD student program M. Tech Project)**
4. **Prof. Dr.-Ing. Oskar J. Haidn,** Technical University of Munich**, Germany (Under DAAD Student Programme, M. Tech Project dissertation)**

Collaborations of Research Students of the laboratory

- Mr. Arpit Mishra: Prof. Fredric Ayela and Dr. Damien Colombet (under Raman Charpak), University of Grenoble, France
- Mr. Arpit Mishra: Prof. Outi Supponen (Under ETH4D Zurich research fellowship), ETH Zurich, Switzerland
- Mr. Arjun Garva: Prof. Sivaguru Ravindran, University of Alabama Huntsville (Under Fulbright-Nehru Doctoral Research (FNDR) fellowship) and NASA Marshall Research Centre

Affiliations and Memberships

1. National Advisory Committee member on "International Conference on Quantum Computing and Communications (QCC-2023)" at Baba Farid College, Bhatinda during 09-11 Feb, 2023
2. National Advisory Committee member of NSCS-28, IIT Kharagpur
3. Member of Program Committee, ICEC 26 – ICMC 2016 at New Delhi, India 2016.
4. Member of Editorial Board of Indian Journal of Cryogenics, Indian Cryogenic Council
5. Member of organizing committee 27th NSCS 2018
6. Executive council member of Indian Cryogenic Council
7. Faculty member at AI4ICPS Technology Innovation Hub at IIT Kharagpur
8. Member of ASME
9. Member of ASHRAE
10. Life Member, Plasma Science Society of India (PSSI)

Major Administrative responsibilities

1. Head, Cryogenic Engineering Centre, IIT Kharagpur — Jan 2016 –Dec 2019
   Introduced New Course Curriculum for M. Tech in Cryogenic Engineering from July 2017
   Up gradation of centre's infrastructure such as New LN2 Plant, initiation of new liquid helium plant purchase
2. Co-Professor in Charge, Refrigeration Unit, IIT Kharagpur — July 2015- July 2018
3. Professor in Charge, Refrigeration and Air-conditioning Unit, IIT Kharagpur — July 2018-till date

Prof. Parthasarathi Ghosh

Annexure-1

PhD Thesis Guidance

Sl No.	Name of the student	Thesis title/Broad area of research	Year of the award of the degree
1.	Dr. Rijo Jacob Thomas (Jointly with Prof. K Chowdhury)	Exergy approach in designing large-scale helium liquefiers	2012
2.	Dr. Rohan Datta (Jointly with Prof. K Chowdhury)	Dynamic simulation of helium refrigerators in fusion devices for mitigating the effects of Pulsed heat load	2013
3.	Dr. Ashish Alex Sam	Computational fluid dynamics analysis of helium turboexpander for cryogenic refrigeration and liquefaction cycles	2019
4.	Dr. Jayachandran K. N. (Jointly with Prof. A. Roy Dept. of Aerospace Engg)	Numerical investigations on direct contact condensation of vapor jets in subcooled liquid	2021
5.	Dr Aman Dhillon	Reverse Brayton cryocooler for high-temperature superconducting cables	2022
6.	Dr. Joydip Mondal (Jointly with Prof. R. Lakkaraju Dept. of Mechanical Engg and Prof. Ashokkumar Muthupandian, Dept of Chemistry, University of Melbourne)	Experimental and Numerical investigations of chemical and physical effects by oscillating bubbles	2022
7.	Mr. Arpit Mishra (Jointly with Prof. A. Roy Dept. of Aerospace Engg)	Experimental and Numerical investigations of high-speed jets ensuing from interacting cavitation bubbles	2023
8.	Mr. Keerthi Raj Kunniyoor	Chilldown investigations of cryogenic transferline	Ongoing
9.	Mr. Arjun Garva	Fluid transients in cryogenic systems	Ongoing
10.	Mr. Vinit Shukla	Process simulator for cryogenic liquefier and refrigerator	Ongoing
11.	Mr. Ananta Sahu	Experimental and numerical investigation of large-scale helium plants	Ongoing
12.	Mr. Nithin Krishnan S (Jointly with Prof. A. Roy Dept. of Aerospace Engg as a Joint Supervisor)	Numerical investigations on direct contact condensation of vapour jets in subcooled liquid using eddy resolving simulations	Ongoing

MS Thesis Guidance

1.	Mr. Arpit Mishra	Thermohydraulic simulation of LOX booster turbopump for semi cryogenic rocket engine	2017
2.	Ms. R G Bhuvana	Numerical and analytical studies on fluid transient at cryogenic temperature	2021