

BIODATA

Dr. Ranjit Kumar Sahoo	Tel. :	0091 661 2462519(O)
Professor(HAG)		0091 661 2463519(R)
Mechanical Engineering Department	(M) 9337056997(JIO) ; 9437144721(BSNL)	
National Institute of Technology	Fax:	0091 661 2472926/2462999
ROURKELA- 769 008 (Orissa)	Email:	rksahoo@nitrkl.ac.in
INDIA		rksahoonitr@gmail.com

Broad Areas of Research Interest:

Conduction and Convective Heat Transfer, Heat Exchangers, Refrigeration & Cryogenic Systems.

Details of the Research Interest:

Natural Convection in enclosures, Rewetting Analyses, Measurement of Thermo-physical Properties by Temperature Oscillation, Exergy Analyses, Non-Fourier Heat and Mass Dispersion in Solids and Fluids, Ozone-friendly Refrigeration, Analyses of Rotary Expanders and Adsorption.

Courses Taught:

A: Under-Graduate

Thermodynamics, Heat Transfer, Fluid Flow and Refrigeration

B: Post-Graduate

Thermodynamics, Computational Fluid Dynamics, Heat Transfer, Fluid Flow and Cryogenic Systems.

Academic Qualification:

Year	Name of the academic degrees	Name of the University	Place Country	Subject of Examination	Grade
1984	Ph.D. in Engineering	Indian Institute of Technology	Kharagpur India	Heat and Mass Transfer in Cryogenic Regenerators	-- (Direct Ph.D.)
1978	Bachelor of Technology B.Tech.(Hons)	Indian Institute of Technology	Kharagpur India	Mechanical Engineering	First Class with Honors

Experience/Employment Details:

Year	Position	Address of the employment
2011(02Dec)-Contd	Professor HAG	Mechanical Engg Dept. NIT, Rourkela
2002(23May)-2011	Professor	--do--
1989(Jan)-2002	Asst. Professor	--do--
1984(July)-1989	Lecturer	--do--
1979(Nov)-1984	Research Scholar	IIT Kharagpur
1978(August)-1979	Graduate Engineer	Mc Nally Bharat Engg Co. Ltd. Dhanbad

Academic Administration: (achievements)

- Dean, Sponsored Research, Industrial Consultancy and continuing Education (SRICCE), 2006 - 2008. Creation of a set of rules and procedures for Sponsored Research, Industrial Consultancy and Continuing Education cell.
- Head of the Department, Mechanical Engineering, July 2008 – June 2011.
- Member of Board of Governor, NIT Rourkela April 20, 2012-April 20 2014.
- Interim Director, NIT Rourkela, July 01,2016- Oct 11, 2016.
- Chairman of Financial Advisory Committee (FAC), NIT Rourkela) Oct 2016 – May 2020.
- Invited Senate Member, NIT Meghalaya, Nov 2018-contd

Award and Recognition:

(A) Distinction and Awards:

1. President, Indian Society for Heating Refrigerating &Air Conditioning Engineers (ISHRAE), Odisha Chapter (April, 2019-2020.)
2. President (Elect), Indian Society for Heating Refrigerating &Air Conditioning Engineers (ISHRAE), Odisha Chapter (April, 2018-2019.)
3. Fellow of Indian Cryogenic Council- Feb 2017.
4. Convener, 23rd National Symposium on Cryogenics, A Biennial Conference of Indian Cryogenic Council, held at Mechanical Engineering Dept., NIT Rourkela, Oct (28-30)2010.
5. Visiting professor to College of Engineering, Mechanical Science and Engineering, University of Illinois at Urban Champaign, USA in the year 2006.
6. Creation of Master degree program on Cryogenic and Vacuum Technology at NIT Rourkela. Development Cryogenic Laboratory, Vacuum Laboratory and installation of LN2 Plant, LHe2 Plant etc.
7. DAAD Fellow in Federal Republic of Germany at University of Federal Armed Forces Hamburg followed by visiting professor in the year 2000-2001.
8. Received the prestigious Ganesh Mishra Memorial Gold Medal of Institute of Engineers (Orissa State Centre), India for Best Published Research Paper in 1989.
9. Conferred with 'Samanta Chandra Sekhar' Award for the year 1995 in the field of Engineering and Technology in recognition of original and creative research by the Orissa Bigyan Academy, Govt. of Orissa on 17th Feb. 1997.

(B) Member of Professional Bodies:

1. Member of Indian Society of Heating Refrigerating and Air Conditioning Engineers (ISHRAE) (34561).
2. Life Member of Indian Cryogenics Council (LM-651).
3. Fellow of Institution of Engineers, India (F-112921-6).
4. Life member of Indian Society for Technical Education, India (LM 8968).

SUMMARY OF OTHER ACADEMIC ACHIEVEMENTS:

Sl. No.	Description	Quantity	Reference	
	Invited lectures:	---	ANNEXURE-I	
1.	List of Research Publications		ANNEXURE-II	
	(a) International Journal	50		
	(b) Book Chapters	03		
	(c) International/National Conference	54		
	(d) Research monogram/Report	09		
	Total	116		
2.	Research Guidance		ANNEXURE-III <i>*In progress</i>	
	(a) Doctoral Level	14+4*		
	(b) M. Tech. (Research)	03		
	(c) M.Tech./B.Tech.			
		Total		21
	(d) Dissertations (Ph. D./ M.Tech.(Res) Evaluated	26		
	Total	26		
3.	Sponsored Research Projects and Consultancy		ANNEXURE-IV	
	(a) Sponsored Research Projects	10		
	(b) Consultancy	02		
		Total		12

ANNEXURE-I
INVITED LECTURES

1. Exergy Analysis of Refrigeration System, International Conference on Innovations in Thermo-fluid Engineering and Sciences – 2020, (ICITFES-2020), 10-12 February, 2020, Mechanical Engg. Department, NIT Rourkela (Keynote Speaker)
2. Exergy Analysis of Vapor Compression System, Recent Advancement in Air-conditioning and Refrigeration, RAAR-2019, 28th -30th November, 2019, C.V. Raman College of Engineering, Bhubaneswar-752054.
3. Introduction to Advanced Refrigeration and Global Warming, GIAN Course on Advanced Refrigeration Systems, 17-22, Dec 2018.
4. Solar Thermal Energy Storage, A three days short term course on waste heat recovery and thermal energy storage, 24-26 February, 2017.
5. Refrigeration and Global Warming, AICTE Sponsored National Conference on Modern Trends in Engineering Solution, 21-22, Dec,2013, IGIT, Sarang.
6. Design and Analysis of Integral Stirling Cryocoolers, Theme meeting on CRYOCOOLERS & SUPERCONDUCTIVITY, VECC, Kolkata, March 19, 2010.
7. Compact Heat Exchangers: Dispersion in Heat Exchangers, International Workshop on Compact Heat Exchangers, IIT Madras, January 9-10, 2006.
8. Dynamic Response of Heat Exchangers with the concept of Third Sound Wave Propagation, Sixteenth National Symposium on Cryogenics and Workshop on Industrial Cryogenics, IIT Kharagpur, Dec. 10-12, 1997.
9. New Test Techniques in Heat Exchangers: Periodic temperature oscillation for parabolic and hyperbolic dispersion models, Workshop on recent Trends in Design and Analysis of Heat Exchangers, Mechanical Engg. Dept., IIT, Madras, August 17, 1996.
10. Special Power Plant Familiarisation and Simulation-Based Power Plant Operation Program on the topic entitled Principles of Combustion, Central Power Training Institute, SAIL, Rourkela, March 5-9, 1996.
11. Tribology in Nuclear Power Plants, Winter School on Design and Maintenance of Tribological Systems, Mechanical Engg. Dept., R.E.C., Rourkela, Dec. 12-24, 1994.
12. Workshop on Energy Planning and Conservation on the topic entitled Second Law Analysis of Thermal Energy Optimisation Electrical Engg. Dept., R.E.C., Rourkela, 18-24 June 1991.
13. Non-Fourier Heat Conduction and its Electrical Transmission Line Analogy, XIth National Symposium on Cryogenics (ENSC-90), I.I.T., Kharagpur, Jan 2-4 (1991).

ANNEXURE-II

LIST OF RESEARCH PUBLICATIONS

A. REFERRED INTERNATIONAL/NATIONAL JOURNAL :

1. Nandakishora Y, **Ranjit K. Sahoo** , Murugan S, A comparative study of modified Linde and cryogenic cooling for CO₂ separation, Int J Energy Res. 2021;1–18, . DOI: 10.1002/er.7348
2. Ajay K. Gupta, Manoj Kumar, **Ranjit K. Sahoo**, Sunil K. Sarangi, Analytical and Experimental Investigation of a Plate Fin Heat Exchanger at Cryogenics Temperature, International Journal of Heat and Technology, Vol. 39, No. 4, August, 2021, pp. 1225-1235, [https://doi.org/ 10.18280 /ijht.390420](https://doi.org/10.18280/ijht.390420).
3. JITESH KUMAR , DEBANSHU S KHAMARI, SURAJ K BEHERA and **R K SAHOO**, A methodology for performance prediction: aerodynamic analysis of axially loaded gas foil bearing, Sādhanā (2021) 46:193, Indian Academy of Sciences, <https://doi.org/10.1007/s12046-021-01721-1>
4. Mohd Waseem Siddiqui, Nishith Kumar Das and **R K Sahoo**, Performance Evaluation of Modified Low-Temperature Cascade (MLTC) Type Refrigeration System, International Journal of Air-Conditioning and Refrigeration, Vol. 29, No. 3 (2021) 2150023 (10 pages) DOI: 10.1142/S2010132521500231
5. Jitesh Kumar , Debanshu S Khamari , Suraj K Behera and **Ranjit K Sahoo**, Influence of slip-flow phenomenon on thermohydrodynamic behaviour of gas foil thrust bearings, Proc IMechE Part J:J Engineering Tribology, 1–16 © IMechE 2021, DOI: 10.1177/13506501211002962
6. Manoj Kumar, Suraj K. Behera, Amitesh Kumar, **Ranjit K. Sahoo**, Rotational Effect on Flow Field and Thermal Characteristics of a Turboexpander for Helium Liquefaction System: A Numerical Perspective, Journal of Heat Transfer (ASME), Vol. 142 (11), Nov 2020:112901 [DOI: <https://doi.org/10.1115/1.4047838>]
7. Debashis Panda, Manoj Kumar, A. K. Satapathy, S. K. Sarangi, **R. K. Sahoo**, Performance Evaluation of a GM-Type Double Inlet Pulse Tube Refrigerator Using Artificial Intelligence Approach with Experimental Validation, Arabian Journal for Science and Engineering, 2020, DOI: <https://doi.org/10.1007/s13369-020-04685-2>
8. Manoj Kumar, Rasmikanti Biswal, Ajay K. Gupta, Suraj K. Behera, **Ranjit K. Sahoo**, Effect of Wall Heat Flux on Fluid Flow and Thermal

Characteristics of a Turbulent Dual Jet, *Mathematical Modelling of Engineering Problems*, Vol. 7, No. 1, March, 2020, pp. 127-134 [\[DOI: https://doi.org/10.18280/mmep.0701161\]](https://doi.org/10.18280/mmep.0701161)

9. Manoj Kumar, Rasmikanti Biswal, Suraj K. Behera, Amitesh Kumar, and **Ranjit K. Sahoo**. "Experimental and numerical analysis to predict the performance of a turboexpander at cryogenic temperature" *Engineering Reports*, Wiley, 2020 [DOI: 10.1002/eng2.12346](https://doi.org/10.1002/eng2.12346)
10. Kumar, Manoj, Debashis Panda, Suraj K. Behera, and **Ranjit K. Sahoo**. "Experimental investigation and performance prediction of a cryogenic turboexpander using artificial intelligence techniques." *Applied thermal engineering* 162 (2019): 114273. <https://doi.org/10.1016/j.applthermaleng.2019.114273>
11. Kumar, Manoj, Suraj K. Behera, Amitesh Kumar, and **Ranjit K. Sahoo**. "Numerical and experimental investigation to visualize the fluid flow and thermal characteristics of a cryogenic turboexpander." *Energy* 189 (2019): 116267. <https://doi.org/10.1016/j.energy.2019.116267>
12. Kumar, Manoj, Debashis Panda, **Ranjit K. Sahoo**, and Suraj K. Behera. "Performance prediction, numerical and experimental investigation to characterize the flow field and thermal behavior of a cryogenic turboexpander." *Heat and Mass Transfer* (2019): 1-22. <https://doi.org/10.1007/s00231-019-02777-w>
13. Kumar, Manoj, Debashis Panda, Amitesh Kumar, **Ranjit K. Sahoo**, and Suraj K. Behera. "A methodology for the performance prediction: flow field and thermal analysis of a helium turboexpander." *Journal of the Brazilian Society of Mechanical Sciences and Engineering*, 41, no. 11 (2019): 484. <https://doi.org/10.1007/s40430-019-1989-z>
14. Kumar, Manoj, **R. K. Sahoo**, and S. K. Behera. "Design and numerical investigation to visualize the fluid flow and thermal characteristics of non-axisymmetric convergent nozzle." *Engineering Science and Technology, an International Journal* 22.1 (2019): 294-312. <https://doi.org/10.1016/j.jestch.2018.10.006>
15. Kumar, Manoj, Debashis Panda, A. Kumar, **Ranjit K. Sahoo**, and Suraj K. Behera. "Preliminary design, flow field, and thermal performance analysis of a helium turboexpander: a numerical approach." *SN Applied Sciences* 1, no. 11 (2019): 1482. [https://doi.org/10.1007/s42452-019-1503-3\[*\]](https://doi.org/10.1007/s42452-019-1503-3[*])
16. Kumar, Manoj, Biswal, Rasmikanti, Behera, S. K., **Sahoo, R. K.**, "Design and Numerical Investigation to Predict the Flow Pattern of Non-axisymmetric Convergent Nozzle: A Component of Turboexpander." *Journal of Traffic and Transportation Engineering*, Vol. 7, Issue 6, pp. 264-281 (2019). [https://doi.org/10.17265/2328-2142/2019.06.003\[*\]](https://doi.org/10.17265/2328-2142/2019.06.003[*])

17. A. K. Gupta, Kumar Manoj, Debashis Panda, **R. K. Sahoo**, "Experimental analysis to predict the performance of a plate fin heat exchanger at cryogenics temperature." *Instrumentation Measure Metrologie* 18(2):315-329. [https://doi.org/ 10.3166/i2m.17.315-329](https://doi.org/10.3166/i2m.17.315-329)[*]
18. Debashis Panda, Kumar, Manoj, A. K. Satapathy, **Ranjit K. Sahoo**, and S. K. Sarangi., "Numerical analysis of a single stage Gifford-McMahon type pulse tube refrigerator." *Indian Journal of Cryogenics*, Vol. 44, Issue 1, pp. 99-104 (2019). [https://doi.org/ 10.5958/2349-2120.2019.00017.7](https://doi.org/10.5958/2349-2120.2019.00017.7)[*]
19. A.K. Gupta, P.Kumar, **R.K.Sahoo**, A.K.Sahu, S.K.Sarangi, Performance measurement of plate fin heat exchanger by exploration: ANN, ANFIS, GA and SA, *Journal of Computational Design and Engineering* 4 (2017) 60–68. [*]
[https://doi.org/ 10.1016/j.jcde.2016.07.002](https://doi.org/10.1016/j.jcde.2016.07.002)
20. Choudhury B.K., **R.K. Sahoo**, S.K. Sarangi, Design of Backward Swept Turbine Wheel for Cryogenic Turboexpander, *Journal of Engineering Science and Technology* Vol. 9, No. 4 (2014) 423 - 431[*]
21. Rout S.K., Choudhury B.K., **R.K. Sahoo**, S.K. Sarangi, Multi-objective parametric optimization of Inertance type pulse tuberefrigerator using response surface methodology and non-dominated sorting genetic algorithm, *Cryogenics* 62 (2014) 71–83.
22. Rout, S.K., Choudhury B.K., **R.K. Sahoo**, S.K. Sarangi, "Numerical Study and Analysis of Inertance-Type Pulse Tube Refrigerator". *Wseas Trans on Heat Mass Transfer*, V9, pp 1-9 (2014). [*]
23. Subrat Kr. Ghosh, **R.K.Sahoo**, Sunil Kr. Sarangi, Mathematical Analysis for Off-Design Performance of Cryogenic Turboexpander, *J. Fluids Engineering*, ASME, V133, March 2011.
24. N. Sessaiah , **R.K. Sahoo**, S.K. Sarangi, Theoretical and experimental studies on oil injected twin-screw air compressor when compressing different light and heavy gases, *Applied Thermal Engineering*, V 30, pp327–339 (2010)
25. N. Sessaiah , **R.K. Sahoo**, S.K. Sarangi, Theoretical and experimental studies on oil injected twin-screw air compressor when compressing different light and heavy gases, *Applied Thermal Engineering*, V 30, pp327–339 (2010)
26. Y. P. Banjare, **R. K. Sahoo**, S. K. Sarangi, CFD simulation and experimental validation of a GM type double inlet pulse tube refrigerator, *Cryogenics* 50 (2010) 271–280.

27. Subrat Kr. Ghosh, **R.K.Sahoo**, Sunil Kr. Sarangi, A computational approach to the design of a cryogenic turbine blade profile, *Int. J. of Engineering, Science and Technology*, V1, n1, pp43-60 (2009). [*]
28. Y. P. Banjare, **R. K. Sahoo**, S. K. Sarangi, CFD Simulation of a Gifford-McMahon type Pulse Tube Refrigerator, *Int. J. Thermal Sciences, International Journal of Thermal Sciences* 48 (2009) 2280–2287
29. N. Sessaiah, Subrat Kr. Ghosh, **R.K.Sahoo**, Sunil Kr. Sarangi, Mathematical modeling of the working cycle of Oil Injected rotary twin screw compressor, *Applied thermal Engineering*, 27, pp145-155 (2007).
30. S. C. Haldar, G. S. Kochhar, K. Manohar, **R. K. Sahoo**, Numerical study of laminar free convection about a horizontal cylinder with longitudinal fins of finite thickness, *Int J Thermal Sciences*, 46, pp692-698 (2007).
31. S.K.Ghosh, N. Sessaiah, **R.K.Sahoo**, S.K.Sarangi, Design of Turboexpander for Cryogenic Applications, *Indian J. Cryogenics, Special Issue V-2*, pp75-81, (2005). [*]
32. N. Sessaiah, S.K.Ghosh, **R.K.Sahoo**, S.K.Sarangi, Mathematical Analysis of Oil Injected Twin Screw Compressor, *Indian J. Cryogenics, Special Issue V-2*, pp12-19, (2005). [*]
33. Subrat Das, **Ranjit.Kumar Sahoo**, and Yos S. Morsi, Natural Convection in Heat Generating Oval Porous Enclosures: A non-Darcian Model, *The Canadian Journal of Chemical Engineering*, V81 pp289-296 (2003).
34. A.K.Satopathy and **R.K.Sahoo**, Rewetting of an Infinite Tube with a uniform Heating, *Heat and Mass Transfer*, V38, n8, pp589-595 (2002).
35. A.K.Satopathy and **R.K.Sahoo**, Analysis of Rewetting of an Infinite Tube by Numerical Fourier Inversion, *Int. Communications in Heat and Mass Transfer*, V29, n2, pp279-288 (2002).
36. A.K.Satopathy and **R.K.Sahoo**, Rewetting of an Infinite Slab with Uniform Heating Under Quasi-Steady Conditions, *Trans. ASME, J. Heat Transfer*, V124, n5, pp875-880 (2002).
37. **R.K.Sahoo** and W.Roetzel, Hyperbolic Axial Dispersion Model for Heat Exchangers *Int. J. Heat and Mass Transfer*, V45, pp1261-1270 (2002).
38. **R. K. Sahoo** and A. K. Satopathy, Modeling and Analysis of Post Dryout Cooling in Heat Exchanger Tubes, *Int. J. of Heat Exchangers*, V2, n1, pp97-111 (2001).

39. A.K. Satapathy and **R. K. Sahoo**, Thermal Analysis of an Infinite Tube during Quenching, *J. Heat and Mass Transfer*, V 37, n 5, pp493-497 (2001).
40. A.K. Satapathy and **R.K. Sahoo**, Rewetting of an Infinite Tube with Internal Heating, *Int. J. Numerical Methods in Heat and Fluid Flow*, V11, n3, pp200-212 (2001).
41. S. Das and **R.K. Sahoo**, Effect of Darcy, Fluid Rayleigh and Heat Generation Parameters on Natural Convection in a Porous Square Enclosure: A Brinkmann- Extended Darcy Model, *Int. Comm. Heat and Mass Transfer* V26, n4, pp569-578 (1999).
42. S.K. Das and **R.K. Sahoo**, Second Law Analysis of A Cyclic Regenerator in Presence of Longitudinal Heat Conduction in Matrix, *Heat and Mass Transfer*, V34, pp359-403 (1999).
43. S. Das and **R.K. Sahoo**, Velocity-Pressure Formulation for Convective Flow inside Enclosure with Top Adiabatic Inclined Roof, *J. of Energy, Heat and Mass Transfer*, V20, pp59-64 (1998).
44. **R.K. Sahoo** and S. K. Das, Exergy Maximization in Cryogenic Regenerators, *Cryogenics*, V 34, n 6, pp475-482 (1994).
45. **R.K. Sahoo**, Propagation of Thermal Waves with Lateral Heat Transfer, *Cryogenics*, V34, n 3, pp203-212 (1994). [https://doi.org/10.1016/0011-2275\(94\)90170-8](https://doi.org/10.1016/0011-2275(94)90170-8)
46. S.K. Das and **R.K. Sahoo**, Thermodynamic Optimization of Regenerators, *Cryogenics*, V31, pp862-868 (1991).
47. **R.K. Sahoo**, Mathematical Modelling of Transient Response of Refrigeration Storage Systems with Internal Heat Generation, *Int. J. of Refrigeration*, V14, n 3, pp126-131 (1991). [https://doi.org/10.1016/0140-7007\(91\)90065-O](https://doi.org/10.1016/0140-7007(91)90065-O)
48. **R.K. Sahoo**, Exergy Maximization in Refrigeration Storage Units with Heat Leak, *Cryogenics*, V29, n1, pp59-64 (1989).
49. **R.K. Sahoo** and S. Sarangi, The Effect of Condensible Impurities in the Working Fluid on the Performance of Cryogenic Regenerators, *Trans. of ASME, J. Heat Transfer*, V110, n 1, pp77-83 (1988).
50. **R.K. Sahoo** and S. Sarangi, The Effect of Temperature Dependent Specific Heat of the Working Fluid on the Performance of Cryogenic Regenerators, *Cryogenics*, V25, n10, pp583-590 (1985).

B. BOOK CHAPTERS:

1. Kumar, Manoj, Kumar, P., **Sahoo, R.K.**, Design and Numerical Analysis to Visualize the Fluid Flow Pattern Inside Cryogenic Radial Turbine, Advances in Fluid and Thermal Engineering, Chapter No.: 17, Book ID: 461350_1_En, Book ISBN: 978-981-13-6415-0, https://doi.org/10.1007/978-981-13-6416-7_17.
2. Kumar, P., Kumar, Manoj, **Sahoo, R. K.**, CFD Analysis of GM Pulse Tube with Functional Gradient Regenerator, Advances in Fluid and Thermal Engineering, Chapter No.: 09, Book ID: 461350_1_En, Book ISBN: 978-981-13-6415-0, https://doi.org/10.1007/978-981-13-6416-7_9
3. Manoj Kumar, **Sahoo R.K.**, Panda D., Behera S.K. (2021) CFD Analysis to Envisage the Fluid Flow Inside a Turboexpander Operating at Cryogenic Temperature. In: Ramgopal M., Rout S.K., Sarangi S.K. (eds) Advances in Air Conditioning and Refrigeration. Lecture Notes in Mechanical Engineering. Springer, Singapore. https://doi.org/10.1007/978-981-15-6360-7_8

C. INTERNATIONAL/ NATIONAL CONFERENCE:

1. Manoj Kumar, **Ranjit K. Sahoo**, Debashis Panda, Suraj K. Behera, CFD Analysis to characterize the flow field of a Cryogenic Turboexpander, International Conference on Recent Advances in Airconditioning and Refrigeration (RAAR 2019), Paper Id: - RAAR_2019_14019, At: CVRCE Bhubaneswar, CVRCE Campus, Bhubaneswar, India.
2. [Manoj Kumar](#), D. Panda, [Suraj Kumar Behera](#), **R. K. Sahoo**, Design and Development of a Turboexpander for Liquefaction of Nitrogen Gas, 27th **National Symposium on Cryogenics and Superconductivity**, IIT Mumbai, India, January 15-18, 2019, Abstract ID No. 230.
3. Debashis Panda, Manoj Kumar, A. K. Satapathy, **R. K. Sahoo**, and S. K. Sarangi, Numerical and experimental investigations on a single stage GM-type double inlet pulse tube refrigerator for nitrogen liquefaction, *Proceedings of the 25th National and 3rd International ISHMT-ASTFE Heat and Mass Transfer Conference (IHMTTC-2019)*, December 28-31, 2019, IIT Roorkee, Roorkee, India, IHMTTC2019-CRY-0069.
4. Kumar, Manoj, Behera, S. K., **Sahoo, R. K.**, Design and numerical analysis of fluid flow characteristics in a nonaxisymmetric convergent nozzle, International Conference on Computational Methods for Thermal Problems, Issue 223309, 2018, Pages 489-493; IISc. Bengaluru; India; 9 July 2018 through 11 July 2018; Code 223309, ISSN: 23055995.
5. Manoj Kumar, Rohit R. Panchal, **R. K. Sahoo**, Numerical Investigation to Visualize the Fluid Flow Characteristics of Cryogenic Radial Turbine, Proceedings of the 7th International and 45th National Conference on Fluid

Mechanics and Fluid Power (FMFP), December 10-12, 2018, IIT Bombay, Mumbai, India, FMFP2018–PAPER NO. 23.

6. Manoj Kumar, Pankaj Kumar and **Ranjit Kumar Sahoo**, Design and Numerical analysis to Visualize the Flow pattern inside Cryogenic Radial Turbine, Paper ID – 46, Proceedings of the 1st International Conference on Future Learning Aspects of Mechanical Engineering (FLAME - 2018) October 3rd – 5th , 2018.
7. Pankaj Kumar, **R.K. Sahoo**, “CFD Analysis of GM Pulse Tube with Functional Gradient Regenerator.” in 1st International Conference on Future Learning Aspects of Mechanical Engineering (FLAME - 2018) October 3rd – 5th , 2018.
8. **Ranjit Kumar Sahoo**, Suraj K Behera, Design and development of bump-type gas foil journal bearings for cryogenic turboexpander, Proceedings of Asia International Conference on Tribology 2018, pp. 484-486, September 2018.
9. Suraj K Behera, **Ranjit Kumar Sahoo**, Development of gas foil thrust bearings for high-speed cryogenic turboexpander, Proceedings of Asia International Conference on Tribology 2018, pp. 466-468, September 2018.
10. A. K. Gupta, Manoj Kumar, P. Kumar, **R. K. Sahoo**, FLUID FLOW ANALYSIS OF HYDROELECTRIC TURBINE SYSTEM FOR TREATED WASTE WATER, National Conference on Recent Developments in Mechanical engineering, 27th – 29th July, 2018, National Institute of Technology Rourkela, INDIA.
11. Manoj Kumar, Pankaj kumar, A.K. Gupta, S. K. Behera, **R. K. Sahoo**, NUMERICAL ANALYSIS TO PREDICT THE FLUID FLOW PATTERN THROUGH CONVERGENT NOZZLE, National Conference on Recent Developments in Mechanical engineering, 27th – 29th July, 2018, National Institute of Technology Rourkela, INDIA.
12. Manoj Kumar, S. K. Behera, **R. K. Sahoo**, Design and numerical analysis of fluid flow characteristics in a non-axisymmetric convergent nozzle, Fifth International Conference on Computational Methods for Thermal Problems, THERMACOMP 2018, July 9-11, 2018, Indian Institute of Science, Bangalore, INDIA, N. Massarotti, P. Nithiarasu, Pradip Dutta and C. Ranganyakalu (Eds.)
13. Pankaj Kumar, Anjuni Kujur, Amitesh Kumar, **R.K. Sahoo**, “CFD Simulation of Inertance tube Pulse Tube Refrigerator with variable cross section of regenerator.” In 5th International Conference on Computational Methods for Thermal Problems, Indian Institute of Science, Bangalore, INDIA, July 9-11, 2018.
14. Dravida Krishnatreya, M. Kumar, S. K. Behera, **R. K. Sahoo**, Design and CFD Analysis to Visualize the Flow Pattern Inside Air Turbine: A Component

of Turboexpander, Fifth International Conference on Computational Methods for Thermal Problems, THERMACOMP2018, July 9-11, 2018, Indian Institute of Science, Bangalore, INDIA, N. Massarotti, P. Nithiarasu, Pradip Dutta and C. Ranganyakalu (Eds.)

15. Manoj Kumar, **R. K. Sahoo**, Development and numerical analysis to visualise the flow pattern of cryogenic radial turbine for helium gas, Proceedings of the 24th National and 2nd International ISHMT-ASTFE Heat and Mass Transfer Conference (IHMTTC-2017), December 27-30, 2017, BITS-Pilani, Hyderabad, India, IHMTTC2017-05-1618, pages 1241-1249 DOI: 10.1615/IHMTTC-2017.1720,
16. Suraj K Behera, Sunil K Sarangi, **Ranjit K Sahoo** and Trilok Singh, "Design of gas foil thrust bearing for vertically operated turboexpander used in cryogenic application", National Symposium on Cryogenic-26, Kolkata, February 2017.
17. Suraj K Behera, Sunil K Sarangi, **Ranjit K Sahoo** and Trilok Singh, "A methodology for fabrication gas foil bearing for turboexpander used in nitrogen liquefier", ICEC 26 - ICMC 2016, March 2016.
18. Debashis Panda, K.N.S. Manoj, Sunil K. Sarangi, **Ranjit K. Sahoo**. A Mathematical Model and Design Software for Pulse Tube Refrigerator. Proceedings of International Cryogenic Engineering Conference-International Cryogenic Materials Conference (ICEC26-ICMC 2016), March 2016, New Delhi, India.
19. K.N.S. Manoj, S. Panda, D. Panda, **R.K. Sahoo**, S.K. Sarangi. Design and Fabrication of a High Cooling Capacity G-M Type Pulse Tube Refrigerator. Proceedings of International Cryogenic Engineering Conference-International Cryogenic Materials Conference (ICEC26-ICMC 2016), March 2016, New Delhi, India.
20. P. Kumar, S.K. Rout, A.K. Gupta, **R.K. Sahoo** and S.K. Sarangi, Performance Prediction of Pulse Tube Refrigerator Using Artificial Neural Network, Advanced Materials Research Vols. 984-985 p. 1147-1149 (2014).
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51. **R.K.Sahoo**, et al., Temperature Model for a Continuous Hot Rolling Process, Technical Annual of Institution of Engineers (India), Orissa State Centre, Bhubaneswar (1989). Received the Ganesh Mishra Memorial Gold Medal.
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1. **R. K. Sahoo**, Development of KW Class Cryogenic Helium Turboexpander-Phase-1:Design Modelling. Board of Research in Nuclear Sciences, DAE, Government of India (2018).
2. **R. K. Sahoo** (Guest Editor), Indian Journal of Cryogenics, V36, n1-4, 2011& V37, n1-4, 2012; ISSN 0379-0479.
3. **R. K. Sahoo** and S. K. Sarangi, Development and Study of Helium Purifier based on Low Temperature High Pressure Adsorption of Impurities, Board of Research in Nuclear Sciences, DAE, Government of India (2012).
4. S. K. Sarangi and **R. K. Sahoo**, Development of turboexpander based Nitrogen Liquefier, Board of Research in Nuclear Sciences, DAE, Government of India (2011).
5. S. K. Sarangi and **R. K. Sahoo**, Development of Stirling Cryocooler for Infrared Imaging Systems, M/s HBL Power Systems Ltd., Hyderabad (2010).
6. S. K. Sarangi and **R. K. Sahoo**, Experimental and computational Studies on Oil Injected Twin-Screw Compressor, Board of Research in Nuclear Sciences, DAE, Government of India (2006).
7. **R.K.Sahoo** and W.Roetzel, Boundary Conditions for Hyperbolic Dispersion: An Analytical Foundation of the Propagation of Third Sound Wave, Institute of Thermodynamics, University of the Federal Armed Forces Hamburg, Germany (October' 2000).
8. **R.K.Sahoo**, Toward Energy Efficient Refrigeration, CANMET, Department of Natural Resources Canada, Ottawa, Ontario, ISBN. 0-662-22320-9, April (1994).
9. **R.K.Sahoo**, Industrial Refrigeration Systems: A report on energy saving and protection of environment in India , Mechanical Engineering Department, Regional Engineering College, Rourkela, India (1993).

ANNEXURE-III

RESEARCH GUIDANCE

A. GUIDANCE AT DOCTORAL LEVEL:

1. Sunil Rout, Turbulant Flow Modelling for a Jet, [Koustub Choudhury & RKS](Jan 2020)

2. NANDAKISHORA Y, Carbon Capture by Cryogenic Method in Power plants,[RKS & S Murugan] (July 2019)
3. Chinmay Mund, Heat Transfer Augmentation of Solar Air Heater using Impinging Jet [Sushil K Rathore & RKS](July 2018)
4. Jitesh Kumar, Thermo-hydrodynamic Analysis of Gas Foil Bearings for High Speed Turbo-machinery [SKB & RKS] (Dec2017)
5. Manoj Kumar, Numerical and Experimental Analysis of Cryogenic Turbo Expander, Ph.D. Dissertation, N.I.T., Rourkela, 23 Oct, 2020[RKS & SKB].
6. Pankaj Kumar, Analysis of Pulse Tube Refrigerator using CFD, Ph.D. Dissertation, N.I.T., Rourkela. March 2019 [RKS & SKS]
7. Ajaya K Gupta, Performance of Plate Fin Heat Exchanger at Cryogenic Temperature, Ph.D. Dissertation, N.I.T., Rourkela. Oct, 2018 [RKS & SKS]
8. Suraj K Behera, Tribology and Rotordynamics of Small High-Speed Cryogenic Turboexpander, Ph.D. Dissertation, N.I.T., Rourkela. Feb, 2018 [SKS & TS] Caretaker: RKS
9. Sachindra Ku Rout, Design and Analysis of Pulse Tube Refrigerator, Ph.D. Dissertation, N.I.T., Rourkela. 2016 [RKS & SKS]
10. B K Choudhury, Design and Construction of Turboexpander based Nitrogen Liquefier, Ph.D. Dissertation, N.I.T., Rourkela. Dec 16, 2014 [RKS & SKS]
11. S.A. Allur, Experimental Studies on Plate Fin Heat Exchangers, Ph.D. Dissertation, N.I.T., Rourkela. (2012). [RKS & SKS]
12. Y.P. Banjare, Theoretical and Experimental Analysis of Pulse Tube Refrigerator, Ph.D. Dissertation, N.I.T., Rourkela. (2009). [RKS & SKS]
13. Subrat Kumar Ghosh, Design and Performance Evaluation of Cryogenic Turboexpander, Ph.D. Dissertation, N.I.T., Rourkela (2008). [SKS & RKS]
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15. N. Sessaiah, Analytical and Experimental Investigation on Oil Injected Twin Screw Compressor, Ph.D. Dissertation, N.I.T., Rourkela. (2007). [SKS & RKS]

16. Ashok Kumar Satapathy, Analysis of Conduction Controlled Rewetting with Boundary Heat Flux, Ph.D. Dissertation, R.E.C., Rourkela, Sambalpur University (2002).
17. Subrat Das, Finite Element Analysis of Convective Heat Transfer in Porous Enclosures, Ph.D. Dissertation, R.E.C., Rourkela, Sambalpur University (2000).
18. Sarit Kumar Das, Irreversibilities in Regenerative Heat Exchanger and its Optimization, Ph.D. Dissertation, R.E.C., Rourkela, Sambalpur University (1994).

B. GUIDANCE AT MASTERS LEVEL (M. Tech. Res.):

1. Mohd. Waseem Siddiqui, Experimental Studies on Low temperature Cooler for Diffusion Pump Baffle cooling using two stage Vapor Compression Refrigeration (VCR) cycles (2014).
2. Sandeep Kumar Singh, Simulation of RF Window Brazing Process: Thermal Structural Analysis of Ceramic to Metal Vacuum Brazing Joints.(2013).
3. Shakuntala Ojha, CFD Analysis on Forced Convection Cooling of Electronic Chips (2009).

C. GUIDANCE AT MASTERS/BACHELOR LEVEL (M. Tech./B. Tech):

Academic Year; 2018-19

1. A comparative study to enhance the heat transfer rate using rectangular shape micro-channels using CFD, 115ME0405, DEEPAK KUMAR (B. Tech.)
2. CFD analysis of micro channel with circular cross section and optimizing the channel cross section, 115ME0436, VELAMPUDI JAWAHAR SARAN KISHORE (B. Tech.)
3. A NUMERICAL INVESTIGATION OF SEMI-CIRCULAR MICRO-CHANNEL TO COMPARE PERFORMANCE WITH CIRCULAR AND RECTANGULAR MICRO CHANNEL, 115ME0563, NARENDRA LAGURI (B. Tech.)
4. Effect of Heat Flux on Flow and Thermal Characteristics of a Turbulent Dual Jet Consisting of a Sinusoidal Wall Jet and a Parallel Offset Jet, 217ME3243, BILLA PRASANNA KUMAR (M. Tech.)
5. Design and Numerical Analysis to Predict Fluid Flow Characteristics of a Centrifugal Brake Compressor: A Component of Turboexpander, 217ME5355, ROHIT RAMESHBHAI PANCHAL (M. Tech.)

Academic Year; 2017-18

1. PARAMETRIC INVESTIGATION ON GM CRYOCOOLERS AND ANALYSIS OF SHELL AND TUBE HEAT EXCHANGER, 114ME0219, DIBYAJYOTI BEHERA (B.Tech.)
2. Design, Analysis and Optimization of Plate Fin Heat Exchanger, 114ME0466, PRADEEP KUMAR (B.Tech.)
3. DESIGN AND DEVELOPMENT OF REGENERATORS IN GM GRYOCOOLER, 114ME0492, PADALA SUDHISHA REDDY (B.Tech.)
4. Numerical Simulation of 3 Buffer type Pulse tube Cryocooler, 216ME5397, KOUSTUBH DHANANJAY BHOSARKAR (M.Tech.)
5. Numerical Analysis to Visualize the Flow Pattern Inside Air Turbine, 216ME5400, DRAVIDA KRISHNATREYA, (M.Tech.)
6. NUMERICAL STUDY OF SHELL AND TUBE HEAT EXCHANGER USING C.F.D. , 216ME5405, DEBASIS PARHI (M.Tech.)
7. CFD Analysis of Regenerator of a GM Cryocooler, 216ME5406, DIPTIMAYEE PRADHAN, (M.Tech.)
8. PERFORMANCE STUDY OF CRYOGENIC TURBOEXPANDER USING GAS FOIL BEARING, 216ME5410, AKASH KUMAR SAHU (M.Tech.)
9. CFD Analysis of Fluid Flow in Centrifugal Compressor, 216ME5412, PRASHANT MAHESH VIMAL (M.Tech.)

Academic Year: 2016-17

1. CFD ANALYSIS OF MULTI BY PASS PULSE TUBE REFRIGERATOR, 113ME0391, DUSMANTA KUMAR NAIK (B.Tech.)
2. Design and Analysis of Liquid He transfer line, 214ME5360, CHAKRESH YASHWANT SHENDE (M.Tech.)
3. Numerical Simulation of Dual Bell Nozzle for Rocket Engines, 215ME5222, ABEL CHRISTENA FRANCI (M.Tech.)
4. Development of MATLAB based dynamic model of the Helium Liquefier / Refrigerator, 215ME5225, RITESH MANDAL (M.Tech.)
5. Electrical and Thermal characterisation of HTS tape for SFCL application, 215ME5227, SAURAV KUMAR NAYAK (M.Tech.)
6. Design and Analysis of a Methane Pump for 10 Ton Class Rocket Engine, 215ME5228, SOUMYA RANJAN NAYAK (M.Tech.)
7. Design and Analysis of Diffuser for Helium Turboexpander, 215ME5229, SASWAT PUROHIT (M.Tech.)
8. Design and Development of Radial Turbine for a Helium Liquefier, 215ME5230, ABHRANIL ROY (M.Tech.)
9. Design and Analysis of Dual-Bed Helium-Purifier operating at 80K Temperature for Helium Refrigerator/ Liquefier, 215ME5414, VIVEKANAND PRAJAPATI (M.Tech.)
10. Design of Turbine for Turboexpander used for Helium Turboexpander, 215ME5417, UPENDRA KUMAR YADAV (M.Tech.)

Academic Year 2015-16

1. Design and analysis of the components of a cryogenic turboexpander, 112ME0367, BRABIM SAHOO, B.Tech.
2. Design and Analysis of Expansion Wheel For Low Temperature Helium Turbine, 214ME5327, SOURABH SADANAND JOGEE, M.Tech.
3. Design and Performance of Helium liquefier based on GM cryocooler, 214ME5333, LOKESH POSA, M.Tech.
4. CFD Analysis of Maldistribution in Mini-channel Heat Exchanger, 214ME5338, TANKADHAR BHOI, M.Tech.
5. CFD Analysis of Stirling Type Inertance Tube Pulse Tube Refrigerator, 214ME5353, ABINASH KHANDUAL, M.Tech.
6. computational flow analysis of cryogenic turboexpander, 214ME5437, SALIL MOHANTY, M.Tech.
7. Design of Blade Profile for inward flow radial turbine, 214ME5516, KALYANI DANSANA, M.Tech.

Academic Year-2014-15

1. CFD analysis of a Pulse Tube Cryocooler-I, 109ME0399, PARIKSHIT KUMAR PANDA, B.Tech.
2. CFD Analysis of a Pulse Tube Cryocooler-II, 111ME0311, BIJAYA KUMAR MEHER, B.Tech.
3. CFD Analysis of a Pulse Tube Cryocooler-III, 111ME0351, ARUN KUMAR VISHWAKARMA, B.Tech
4. ANALYSIS AND OPTIMIZATION OF PROCESS PARAMETERS OF HEAT EXCHANGERS AND TURBINES FOR HELIUM REFRIGERATOR/LIQUEFIER, 213ME5449, ASHUTOSH MISHRA, M.Tech
5. DESIGN AND ANALYSIS OF AEROSTATIC BEARINGS OF CRYOGENIC TURBINES FOR HELIUM REFRIGERATOR/LIQUEFIER, 213ME5450, DHIREN MOHAPATRA, M.Tech.
6. Numerical Analysis of Plate Fin Heat Exchanger at Cryogenic Conditions, 213ME5451, SANDEEP MUDGALA, M.Tech.
7. NUMERICAL ANALYSIS OF DOUBLE INLET PULSE TUBE REFRIGERATOR, 213ME5452, SAMARENDRA PANDA , M.Tech.
8. EXPERIMENTAL AND NUMERICAL STUDIES ON PLATE FIN HEAT EXCHANGER, 213ME5454, MITRAVANU SAHOO, M.Tech.
9. Design of Auxiliary Passive Magnetic Bearing for Cryogenic Turboexpander, 213ME5456, HULASH RAM SAHU, M.Tech.

Academic year-2013-14

1. Characterization, Rheological and Pipe Loop Test Studies on Fly Ash Samples, 211ME3356, RASHMIRANJAN BARIK, M.Tech.
2. Study on feasibility of coir dust as feedstock for entrained flow gasification system, 211ME3358, DEBABRATA SINGH, M.Tech.
3. Analysis of Cooling Capacity and Optimization of Compressor Outlet Pressure for kW Class Helium Refrigerator/Liquefier, 212ME5326, NISHIGANDHA SHIVAJI JADHAV, M.Tech.
4. Design and analysis of cold box and its internal component layout for kW class Helium Refrigerator/Liquefier, 212ME5327, PUNIT KAR, M.Tech.
5. Design and Analysis of Internal 20 K Helium Gas Purification System for the kW Class Helium Refrigerator/Liquefier, 212ME5403, ADARSH KUMAR BEHERA, M.Tech.
6. Design Of 3-Stream(He-He-He) Plate-Fin Heat Exchanger For Helium Plant, 212ME5408, OMSHREE MAHAPATRA, M.Tech.
7. Phasor Analysis of GM-type Double Inlet Pulse Tube Refrigerator, 110ME0297, MANISH KUMAR, B.Tech
8. Computational Fluid Flow analysis in Cryogenic Turbo expander, 110ME0647, RAVIKUMAR SENTHOORAN, B.Tech.

Other Guidance:

1. Analysis of Flow Maldistribution in Multichannel Heat Exchangers.
2. CFD Simulation of Pulse Tube Cryocoolers.
3. Estimation of Regenerator Effectiveness due to Specific Heat Variation of Working Fluid.
4. An Investigation on Strip Temperature Analysis in Hot Rolling Mills.
5. Exergy Maximisation in Refrigeration Storage Units by Entropy Generation.
6. Transient Analysis of Regenerative Thermal Storage Systems with Heat Losses and Heat Sinks.
7. Hyperbolic Heat Conduction in a Finite Medium.
8. Hyperbolic Heat Conduction and its Electrical Analogy.
9. Transient Response of Parallel Flow Heat Exchangers.
10. Transient Response of Semi-infinite System with Arbitrary Boundary Conditions.
11. Second Law Analysis of Explosion.
12. Optimization of Drainage Time in Storage Vessels.

13. Determination of Number of Trays Required in a Distillation Column for a given Purity of Oxygen and Nitrogen.
14. Analysis of Heat Balance in Cooling System of Continuous Casting Unit of Rourkela Steel Plant for Maximum Productivity.

D. Ph.D./M. Tech(Res) Dissertations Evaluated:

1. Mr. Ihab El-Katatny, Flow Field Characterization of AusIron Top Submerged Injection System , (30.10.2006), Swinburne Graduate Research School, John, Street Hawthorn, Victoria 3122 , AUSTRALIA
2. *PRASANT NANDA, ANALYSIS OF MULTIMODE HEAT TRANSFER IN PRESENCE OF RADIATIVELY PARTICIPATING MEDIUM WITHIN ENCLOSURES,(Dated 23.06.2006)Faculty of Engineering and Technology, Jadavpur University, Kolkata-700 032*
3. *Shambhu Nath Verma, An Analytical Investigation of Pressure Drop, Slip Ratio and Void Fraction with its Statistical Analysis for Two-phase Bubbly Flow, (14.09.99), In the Faculty of Engineering, Mechanical Engineering, Patna University, Bihar College of Engineering, Patna-800005.(Prof. Surendra Prasad)*
4. *S V Prayagi, Experimental Investigations on the Buoyancy Induced Flow in Ducts(06.08.2008), Department of Mechanical Engineering, VNIT, Nagpur.(Prof. S.D. Thombre)*
5. *Buddhadeb Duari, Cathodic Disbondment of Different External Pipe Coating Materials,2010, Department of Metallurgical & Material Engineering, Faculty of Engineering and Technology, Jadavpur University, Kolkata-700 032.(Prof. Bimal Chaudhuri)*
6. J Venkatesan, Modelling and Experimental Analysis of Automotive Reciprocating Air Compressor, 2012, Faculty of Mechanical Engineering, Anna University, Chennai-6000 025.(Prof. G. Nagarajan)
7. Sumit Kumar Swarnkar, Thermodynamic Studies on Vapour Absorption Refrigeration Systems Operating with Ionic Liquid and Refrigerant Combinations, July 2013, IIT madras, Chennai (M. Tech Research)
8. J Hussain, Experimental Investigation on Performance and Emission Characteristics of EGR Adopted Direct Injection Compression Ignition Engine with Insertion of Unburned Hydrocarbon Rich Exhaust, July 2013, Department of Mechanical Engineering, Pondicherry Engineering College, Puducherry-605 014.
9. Akshay Kumar Pramanick, Development of Enhanced Fracture Toughness of Silica-Nickel Nanocomposites, 2014, *Department of*

10. N Sozhan, Under the guidance of Dr. T. Senthilvelan, Parametric Optimization in Solar Gel Pond, November 2014, Mechanical Engineering, Pondicherry Engineering College, Puducherry-605 014.
11. Lakhbir Singh Brar, Some Investigations on the Optimum Design of Industrial Cyclone Dust Separator, May 2016, Department of Mechanical Engineering, Birla Institute of Technology, Mesrs, Ranchi (supervisors: Dr. RP Sharma and Dr. R Dwivedi) .
12. C. Suresh Kumar, Performance of Simple and Reheat Organic Rankine Cycles with MultiComponent Mixtures, May 2017, MS(by Research), Dept. of Mechanical Engg., R&Ac Laboratory, IIT Madras(supervisors: Prof. G. Venkatarathnam).
13. Bitan Kumar Sarkar, To study the Optimisation Process Schedule for Utilisation of Titanium Bearing Magnetite Ore for use in the Steel Industry, May 2017, *Department of Metallurgical & Material Engineering, Faculty Council of Engineering and Technology, Jadavpur University, Kolkata-700 032.(Prof.G C. Das &Dr.R. Dey)*
14. Ankit Kumar, Experimental Studied on Performance of Nitrogen Liquefier, May 2017, MS(by Research), Dept. of Mechanical Engg., R&Ac Laboratory, IIT Madras (supervisors: Prof. G. Venkatarathnam).
15. Animesh Biswas, Experimental and Numerical Analysis of GM Type Double Inlet Pulse Tube Refrigerator, July 2017, Ph.D. Thesis, Dept. of Mechanical Engg, IIT (ISM) Dhanbad (supervisors: Prof. Subrat Ghosh),
16. P. Chandru Deva Kannan, Extraction of Heat inside the Car Cabin Using Phase Change Material to Maintain Human Comfort, January 2018, Ph.D. Thesis, Mechanical Engineering, Pondicherry Engineering College, Puducherry-605 014.
17. Thakare Hitesh Ravindra, Investigation on Vortex Tube and Evaluation of its Industrial Utility, March 2018, Ph.D. Thesis, Mechanical Engineering, SVNIT, Surat, Gujarat (Supervisor: Ashok D Parekh).
18. Vishwanath Kumar Panangipalli, HYDRODYNAMICS AND HEAT TRANSFER STUDIES IN VACUUM FLUIDISATION, March 2019, Ph.D. Thesis, Dr. Daniel Fabijanic, Dr. Subrat Das and Prof. Peter Hodgson (super visors), Deakin University, AUSTRALIA.
19. Ravi Varman R., Study and analysis of non-standard gears with varied contact ratio for enhancement of wear resistance and performance” , February 2019, Ph.D. Thesis, Mechanical Engineering, Pondicherry Engineering College, Puducherry-605 014.

20. Sandip Kumar Mandal, MIXED CONVECTION WITH SURFACE RADIATION IN A RECTANGULAR CHANNEL WITH HEAT SOURCES IN PRESENCE OF VORTEX GENERATOR AND HEAT SPREADER, May 2019, (Supervisor: Dr.Dipak Sen),Department of Mechanical Engineering, National Institute of Technology Arunachal Pradesh.
21. T. Coumaessin, A STUDY ON NANOFUIDS AS REFRIGERANT IN REFRIGERATION SYSTEMS, July 2019, Ph.D. Thesis, (supervisor: Dr. K. Pajaniradja @ KICHENA)Mechanical Engineering, Pondicherry Engineering College, Puducherry-605 014.
22. Soumya Sri Sabyasachi Singh, Enhancement of thermal efficiency of boiling pot with surface modifications and skirt arrangements, August 2019, Ph.D. Thesis, (Supervisors Dr. K. B. Sahu & Dr. A. K. Rout) KIIT BBSR, Mechanical Engg. Dept.
23. Mrs. V. Yamunadevi, SYNTHESIS, CHARACTERIZATION AND TESTING OF EPOXY COMPOSITE REINFORCED WITH GLASS FIBRE AND CERIUM(IV)-ZIRCONIUM(IV) OXIDE & GRAPHITE NANO PARTICLE, August 2019, Ph.D. Thesis, (supervisor: Dr. K. Pajaniradja @ KICHENA)Mechanical Engineering, Pondicherry Engineering College, Puducherry-605 014.
24. Satyananda Tripathy, ENERGY, EXERGY AND EMISSION ANALYSIS OF IMPINGING FLAMES ON PLANE AND CURVED SURFACES, Sept. 2019, Ph.D. Thesis, (Supervisors Dr. Akshaya Kumar Rout & Dr. Manmatha K Roul) KIIT BBSR, Mechanical Engg. Dept.
25. Udaiyar Barath Adhithya Thennarasu, Unconstrained optimization method for performing flash calculation at specified Pressure and Temperature, , MS(by Research), Dec 2019, Dept. of Mechanical Engg.,R&Ac Laboratory, IIT Madras (supervisor: Prof. G. Venkatarathnam).
26. Bhuvana R G, Numerical and Analytical Studies on Fluid Transient at Cryogenic Temperature, MS(by Research), APRIL 2021, Cryogenic Engineering Centre, IIT Kharagpur(supervisor: Prof. Parthasarathi Ghosh).

ANNEXURE-IV

SPONSORED RESEARCH AND CONSULTANCY UNDERTAKEN

A. Sponsored Projects:

1. Development of a compact indigenous cryocooler based on single-stage GM type pulse tube refrigerator, PFRC, BRNS FY; April, 2018-2020 (2896800.00 INR), Co-PI

2. Development of Gas Foil Bearings for High Speed Turbo- expanders for Cryogenic Applications, BRNS FY; August 2017-Contd. (30, 54, 250 INR), Co-PI.
3. Design and Development of novel two and three dimensional oscillating heat pipes with connected headers for space applications, SERB, DST, August, 2017-Contd (28,83,100 INR), Co-PI.
4. Development of KW Class Cryogenic Helium Turboexpander-Phase-1 : Design Modelling. BRNS FY; August 10, 2015-2018 (Rs. 9,41, 250/-).
5. Development and Study of an Indigenous Helium Purifier based on Low Temperature High Pressure Adsorption of Impurities, BRNS (*Board of Research in Nuclear Sciences*), Department of Atomic Energy, FY: August 1,2007-July 31,2011 (Rs.34.00Lakhs).
6. Development of Turboexpander-Based Cryogenic Refrigerator and Liquefier, BRNS (*Board of Research in Nuclear Sciences*), Department of Atomic Energy, FY: August 1, 2007-July 31,2011 (Rs.43.00Lakhs).
7. Studies on Helium Screw Compressor and Associated Gas Purification System for Application in Large Cryogenic Refrigerators, BRNS (*Board of Research in Nuclear Sciences*), Department of Atomic Energy, FY: 2002-2006 (Rs.32.00Lakhs).
8. Development of Echo-friendly Refrigeration System, MHRD, FY: 1999-2002 (Rs.6.00Lakhs).
9. Industrial Refrigeration Systems for Energy Saving and Protection of Environment, MHRD, FY: 1997-2000 (Rs.10.00Lakhs).
10. Development of Heat Transfer Laboratory, MHRD, FY: 1996-1998 (Rs.10.00Lakhs).

B. Consultancy:

1. Development of Stirling Cycle Cryocooler for Infrared Imaging Systems, M/s HBL Power Systems Ltd., Hyderabad, January, 2009-June, 2010, Rs.5.00 Lakhs.
2. Design and Analysis of Cover Gas Purification System for Prototype Fast Breeder Reactor, IGCAR (*Indira Gandhi Centre for Atomic Research*), Kalpakkam (*Consultancy*), FY: 2003-2005 (Rs.7.00Lakhs).

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