Kamalakanta Satpathy, Ph.D.

Designation : Senior Assistant Professor
Department : Department of Basic Sciences and Humanities
(JOINED THE INSTITUTE IN 2020)
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RESEARCH INTERESTS

- Computational Fluid Dynamics
- Process optimization for drinking water applications
- Heat Transfer, Two Phase Flow, Bluff body dynamics
- Numerical modeling, Nuclear Thermal Hydraulics, CAD design
- Measurements using ADV techniques.

Academic Qualifications

Post Doctoral Researcher: Dept. of Mathematical modeling and Bioinformatics, Ghent University, Belgium and Dept. of Electrical, Electronics and Computer Sciences, University of Liege, Belgium.

Post-Doc Fellow/Project Scientist: Institute of Plasma Research, Gandhinagar

Ph. D. (Physics): Homi Bhabha National Institute (IGCAR Campus), Tamilnadu

M. Sc. (Physics): Ravenshaw University, Cuttack

Teaching Experience/Industrial Experience/Research Experience

Teaching Experience: 4 year
Research Experience: 12 years (including PhD)

PUBLICATIONS

Journal & Conferences

[1]. **K. Satpathy**, B. Cools, I. Nopens et al., Process analysis and optimization of a dissolved air flotation system using CFD, Water Science & Technology, 81(8), 1668 - 1681, 2020.

[2]. **K. Satpathy**, A. Duchesne, C. Dubois et al., Studies on buoyancy driven heat transport in silicon oils and liquid nitrogen in view of cooling applications, Int. J. of Heat & Mass Transfer, 118, 538 -550, 2018.

[3]. **K. Satpathy**, A. Duchesne, C. Dubois et al., Studies on convective cooling of cryogenic fluids towards superconducting applications, Computational Methods & Experimental Measurements, 117, 95 – 106, 2017.

[4]. S. Rimza**, K. Satpathy**, S. Khirwadkar, K. Velusamy, Optimal design of divertor heat sink with different geometric configurations of sectorial extended surfaces, Fusion Engineering & Design, 100, 581 – 595, 2015.

[5]. S. Rimza, **K. Satpathy**, S. Khirwadkar, K. Velusamy, Numerical studies on helium cooled divertor finger mock up with sectorial extended surfaces, Fusion Engineering & Design, 89, 2647 – 2458, 2014.

[6]. **K. Satpathy**, K. Velusamy, BSV Patnaik, P. Chellapandi, Numerical simulation of liquid fall induced gas entrainment and its mitigation, Int. J. of Heat & Mass Transfer, 60, 392 – 405, 2013.

[7]. **K. Satpathy**, K. Velusamy, BSV. Patnaik, P. Chellapandi, Numerical investigation of vortex shedding past a finite cylinder mounted on a flat plate, Numerical Heat Transfer-A, 59(11), 882 – 909, 2011.

[8]. **K. Satpathy**, K. Velusamy, P. Chellapandi, Computational fluid dynamics studies on gas entrainment in a fast breeder reactor, Energy Procedia, 7, 333 – 339, 2011.

[9]. K. Velusamy, P. Chellapandi, **K. Satpathy et al.**, A fundamental approach to specify thermal and pressure loadings on containment buildings of sodium cooled fast reactors during a core disruptive accident, Annals of Nuclear Energy, 38, 2475 – 2487, 2011.

Book Chapter:

[1]. K. Satpathy, I. Nopens, J. Talukdar, Measurement Campaign using the Acoustic Doppler Velocimetry in Dissolved Air Flotation Systems, Lecture Notes in Mechanical Engineering, 2023.

[2]. K. Satpathy, K. Velusamy, BSV. Patnaik, Studies on gas entrainment due to vortex activation at free surface of fast breeder reactor, IAEA-INIS Publications, 45, 34, 2014.

[3]. S. Rimza, K. Satpathy S.S. Khirwadkar & K. Velusamy, Numerical studies on finger mock-up of helium cooled divertor with sectorial extended surfaces, IAEA-INIS Publications, 45, 34, 2014.

A N Y   O T H E R

Conference attended/presented

[1]. K. Satpathy, H. Pothukuchi, B.S.V. Patnaik, Computational analysis of coolant flow through sub-chanels for liquid cooled breeder reactors, Indian National Conference on Applied Mechanics, NIT Waranal, July 2024.

[2]. M. Rout, P.K. Sahoo, K. Satpathy, Experimental and numerical analysis on tmd monolayer for future device application, International Conference on Functional Materials, IIT-Kharagpur, January 2024

[3]. K. Satpathy, I. Nopens, J. Talukdar, Measurement campaign using the acoustic doppler velocimetry (ADV) in the dissolved air flotation system's, Proceedings of 48th National Conference on Fluid Mechanics and Fluid Power, BITS Pilani, December 2021

[4]. K. Satpathy, B. Cools, L. Verdict et al., CFD-based process optimization of a dissolved air flotation system for drinking water production, 10th IWA Symposium Modeling and Integrated Assessment, Copenhagen, Denmark September 2019.

[5]. K. Satpathy, Process optimization of dissolved air flotation (DAF) systems, R^2T (Resource Recovery Technology) Consortium 2019, Ghent, Belgium

[6]. Nopens, J. Wicks, David F. del Pozo, J Bridgeman, K. Satpathy et al., Resource recovery and advanced CFD: a required marriage, 6th IWA/WEF Water Resource Recovery Modelling Seminar, Quebec, Canada, 2018

[7]. K. Satpathy, U. Rehman, W. Audenaert, I. Nopens et al., Towards optimization of dissolved air flotation using computational fluid dynamics, IWA World Water Congress and Exhibition, Tokyo, Japan, 2018

[8]. K. Satpathy, 16th Multiphase flow conference and short course, Dresden, Germany, Oct' 2017.

[9]. K. Satpathy, C. Dubois, A. Duchesne et al., Studies on convective cooling of cryogenic fluids towards superconducting applications, Advances in Fluid Mechanics, Ancona, Italy. 2016

[10]. K. Satpathy, C. Dubois, J.F. Fagnard et al., Studies on cooling enhancement of cryogenic fluids for superconducting applications, High Temperature Superconductivity Modeling, Bologna, Italy, 2016

[11]. S. Rimza, K. Satpathy et al., Numerical studies on finger mock-up of helium cooled divertor with sectorial extended surfaces, Int. Conference on Fluid Mechanics and Fluid Power, IIT-Kanpur, 2014

[12]. S. Khirwadkar, V. Menon, S. Rimza, K. Satpathy etal., Demo divertor readiness gaps and needed R&D, 1st IAEA-DEMO Program Workshop, Los Angles, US, 2012

[13]. K. Satpathy, K. Velusamy, BSV Patnaik, P. Chellapandi, Investigation of argon gas entrainment in liquid sodium at free surface during cross flow over cylindrical components, Int. Union of Theoretical and Applied Mechanics, IIT-Kanpur, 2011

[14]. K. Satpathy, Indo-European meeting on Instabilities in Shear Flows, Jan' 2011, JNCSAR, Bangalore.

[15]. K. Satpathy, K. Velusamy, BSV Patnaik, P. Chellapandi, CFD simulation of gas entrainment in a liquid pool by VOF method, Int. Conf. on Fluid Mechanics and Fluid Power, IIT-Madras, 2010

Invited Talk:

[1]. K. Satpathy 'Studies on Gas Entrainment Inception in Hot Pool of Liquid Metal Fast Reactors', Fast Reactor Aerosol Research Current Scenario and Future Directions (FARAR-2023), Indira Gandhi Centre for Atomic Research & Safety Research Institute, Kalpakkam, TN, October 26 - 27, 2023.

Industrial Reports:

[1]. K. Satpathy, I. Nopens et al., (2019) CFD modellering DAF en reinwaterkelder (Appendix I), Bedrijfstakonderzoek, BTO 2020.043, Juli 2020, KWR, The Netherlands

[2]. K. Satpathy, I. Nopens et al., (2020) Meetcampagne DAF (Appendix II), Bedrijfstakonderzoek, BTO 2020.043, Juli 2020, KWR, Netherlands

[3]. K. Satpathy, I. Nopens et al., (2020) CFD-studie van een waterreservoirkelder (Appendix III), Bedrijfstakonderzoek, BTO 2020.043, Juli 2020, KWR, Netherlands

Internal Reports:

[1].   K. Satpathy, Process optimization of dissolved air flotation systems, R^2T (Resource Recovery Technology Consortium) Newsletter, Ghent University, Jan' 2019.

[2].   K. Satpathy, S. Khirwadkar, Numerical studies on HHF test mono-block for divertor applications, Technical Report – IPR, 2015.

[3].   K. Satpathy, S. Khirwadkar, Benchmarking using STAR CCM+, TR-IPR, 2013.

[4].   S. Khirwadkar, K. Satpathy et al., (2013) Design of High heat Flux Test Facility, Annual Report in setting-up the high heat flux test facility at Institute of Plasma Research, Gandhinagar

[5].   K. Satpathy et al., Effect of manufacturing deviation in inner vessel on hot pool thermal hydraulics, Design Note – IGCAR, 2011.

[6].   K. Satpathy, K velusamy, P. Chellapandi, Condensation time and migration height of core bubble in primary sodium during a CDA, DN - IGCAR, 2011.

[7].   K. Satpathy et al., Benchmarking of OpenFOAM based CFD tool: Study-1, Numerical simulation of flow around bluff bodies, DN - IGCAR, 2010.

[8].   K. Satpathy et al., Benchmarking of OpenFOAM based CFD tool: Study–2, Forced convection heat transfer in external flow, DN - IGCAR, 2010.

Grants and Honors:

TARE Fellowship: SERB-DST, Govt. of India, 2022-2025

TEQIP-III funding from BPUT, Govt. of Odisha 2021

EMADES Postdoc Fellowship, University of Beira Interior, Portugal, 2019

Membership:

- Applied Fluid Mechanics (UK)

- Belgian Water Associations (BIWA-IWA)

- Indian Nuclear Society (INS, Mumbai)

Reviewer

- Journal of Water Science and Technology

- Engineering Applications on CFD

- Journal of Nuclear Science and Technology

Supervision:

M. Tech : 3, MS : 1, PhD : 2

Workshop Conducted:

Functional Materials with Emerging Technology (FMET), 2 – 3rd March 2021

Organizing Member: OPS (Odisha Physical Society) 2023, FMET-2023 and 2024.