



## Dr. Kamalakanta Satpathy, Ph.D.

**Name** : Kamalakanta Satpathy  
**Designation** : Assistant Professor  
**Department** : Department of Basic Science and Humanities  
(JOINED THE INSTITUTE IN 2020)  
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### RESEARCH INTERESTS

- ✓ Computational Fluid Dynamics
- ✓ Process optimization for drinking water applications
- ✓ Cryogenic cooling by Natural Convection
- ✓ Bluff body dynamics
- ✓ Multiphase flow analysis using the Discrete Phase Model
- ✓ Gas entrainment studies incorporating the volume of fluids approach
- ✓ Numerical modeling on the fluid flow and heat transfer analysis
- ✓ Measurement using the Acoustic Doppler Velocimetry
- ✓ Mathematical Modeling, Nuclear Engineering, CAD design.

### Academic Qualifications

Post Doctoral Researcher: Faculty of Bio-Science Engineering, Ghent University, Belgium

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

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

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

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

### Teaching Experience/Industrial Experience/Research Experience

- ✓ Teaching Experience: 1 year
- ✓ Research Experience: 6 years (excluding PhD)

## PUBLICATIONS

## JOURNAL

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.

## ANY OTHER

Book Chapter  
Conference/Workshop  
Attended

1. **K. Satpathy**, Workshop on Functional Materials for Emerging Technology, 13<sup>th</sup> – 15<sup>th</sup> Feb '2020, Silicon Institute of Technology, Bhubaneswar.
2. **K. Satpathy**, B. Cools, L. Verdict et al., CFD-based process optimization of a dissolved air flotation system for drinking water production, 10<sup>th</sup> IWA Symposium Modeling and Integrated Assessment, 1 - 4<sup>th</sup> Sept' 2019, Copenhagen, Denmark.

3. I. Nopens, J. Wicks, David F. del Pozo, Y. Amerlinck, **K. Satpathy** et al., Resource recovery and advanced CFD: a required marriage, 6<sup>th</sup> IWA/WEF Water Resource Recovery Modeling Seminar, 10 – 14<sup>th</sup> March 2018, Quebec, Canada.
4. **K. Satpathy**, 16<sup>th</sup> Multiphase flow conference and short course, 14 – 17<sup>th</sup> Oct' 2017, Dresden, Germany.
5. **K. Satpathy**, I. Nopens et al., Towards optimization of dissolved air flotation using computational fluid dynamics, IWA World Water Congress & Exhibition, 16 - 21<sup>st</sup> Sept' 2018, Tokyo, Japan.
6. **K. Satpathy**, C. Dubois, A. Duchesne et al., Studies on convective cooling of cryogenic fluids towards superconducting applications, 11<sup>th</sup> Int. Conference on Advances in Fluid Mechanics, Wessex Institute, 05 – 7<sup>th</sup> Sept' 2016, Ancona, Italy.
7. **K. Satpathy**, C. Dubois, J.F. Fagnard et al., Studies on cooling enhancement of cryogenic fluids for superconducting applications, 5<sup>th</sup> Int. Workshop on Numerical Modeling on High Temp. Superconductors, 15 – 17<sup>th</sup> June 2016, Bologna, Italy.
8. **K. Satpathy**, 9<sup>th</sup> International Workshop on Processing and Applications of Superconducting Large Grain Materials, 2 - 4<sup>th</sup> Sept' 2015, Liège, Belgium.
9. **K. Satpathy**, K. Velusamy, BSV Patnaik, Studies on gas entrainment due to vortex activation at free surface of fast breeder reactor, Int. Workshop on New Horizons in Nuclear Reactor Thermal Hydraulics & Safety, Mumbai, 14 - 15<sup>th</sup> Jan' 2014, India.
10. S. Khirwadkar, S. Rimza, **K. Satpathy** et al., Demo divertor readiness gaps and needed R&D, 1<sup>st</sup> IAEA-DEMO Program Workshop, 15 – 18<sup>th</sup> Oct' 2012, Los Angeles, US.
11. **K. Satpathy**, Indo-European meeting on Instabilities in Shear Flows, Jan' 2011, JNC SAR, Bangalore.
12. **K. Satpathy**, K. Velusamy, B.S.V. Patnaik et al., (2011) Investigation of argon gas entrainment in liquid sodium at free surface during cross flow over cylindrical components, IUTAM Symposium on Bluff Body Flows, 12 – 16<sup>th</sup> Dec 2011, IIT-Kanpur.
13. **K. Satpathy**, K. Velusamy, B.S.V. Patnaik et al., (2010) CFD simulation of gas entrainment in a liquid pool by VOF method, 4<sup>th</sup> Int. Conf. on Fluid Mechanics & Fluid Power, IIT-Madras, 16 – 18<sup>th</sup> Dec' 2010, Chennai.
14. **K. Satpathy**, K. Velusamy, P. Chellapandi, Computational Fluid Dynamic Studies on Gas Entrainment in Fast Breeder Reactors, Asian Nuclear Prospects, 10 – 13<sup>th</sup> Oct' 2010, Mamallapuram, Tamilnadu.
15. **K. Satpathy**, K. Velusamy, P. Chellapandi, Condensation behavior of fuel vapor in sub-cooled sodium during severe accident condition, Int. Conf. on Simulation and Modeling, 27 – 29<sup>th</sup> Aug' 2019, CIT Coimbatore, TN.

Industrial Reports:

1. **K. Satpathy**, S. Balemans, I. Nopens, Measurement campaign using the acoustic doppler velocimetry (ADV) in the DAF utilities, Report submitted to the **De Watergrope** (Belgium) and **KWR** (Netherland).
2. **K. Satpathy**, I. Nopens et al., CFD study of a water reservoir basement, Report submitted to the De Watergrope and KWR.

Internal Reports:

1. **K. Satpathy**, Process optimization of dissolved air flotation systems, R<sup>2</sup>T (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 (TR- IPR)/253, 2015.
3. **K. Satpathy**, S. Khirwadkar, Benchmarking using STAR CCM+, TR-IPR/246, 2013.
4. **K. Satpathy** et al., Effect of manufacturing deviation in inner vessel on hot pool thermal hydraulics, Design Note (DN – IGCAR)/1013, 2011.
5. **K. Satpathy**, K velusamy, P. Chellapandi, Condensation time and migration height of core bubble in primary sodium during a CDA, DN/1004, 2011.
6. **K. Satpathy** et al., Benchmarking of OpenFOAM based CFD tool: Study-1, Numerical simulation of flow around bluff bodies, DN/1106, 2010.
7. **K. Satpathy** et al., Benchmarking of OpenFOAM based CFD tool: Study-2, Forced convection heat transfer in external flow, DN/1110, 2010.

Grants and Honors:

**EMADES Postdoc Fellowship**, University of Beira Interior, Portugal, June' 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

Training:

Multiple trainings on the CFD and Mathematical Modelling Softwares, CAD Designs & Refresher Courses.

Student guidance:

- **PhD:** Sandeep Rimza, Institute of Plasma Research, Gujarat (Co Supervisor)  
PhD Dissertation: Studies on the Helium cooled divertors for fusion TOKAMAK application.
- **M. Tech:** B. Hanuma Reddy, IIT-Madras, Chennai (Co Supervisor)  
Thesis Title: Numerical studies on the Pool – Hydraulics.
- **B. Tech:** V. Leela Vinodhan, Sastra University, Tamilnadu (Co Supervisor)  
Project: Flow around a rectangular cylinder using the OpenFOAM.