

Abdusamad A. Salih

Education

- 2007 **Ph.D. (Computational Fluid Dynamics)**, *Department of Mechanical Engineering, Indian Institute of Technology Kharagpur, India.*
- 1989 **M.Tech. (Mechanical Engineering with specialization in Hydroturbomachines)**, *Indian Institute of Technology Madras, India.*
- 1986 **B.Tech. (Mechanical Engineering)**, *Regional Engineering College Calicut, India.*

Experience

Academic

- 2017 – Present **Professor**, *Department of Aerospace Engineering, Indian Institute of Space Science and Technology, Trivandrum, India.*
- 2011 – 2017 **Associate Professor**, *Department of Aerospace Engineering, Indian Institute of Space Science and Technology, Trivandrum, India.*
- 2008 – 2011 **Assistant Professor**, *Department of Aerospace Engineering, Indian Institute of Space Science and Technology, Trivandrum, India.*
- 1997 – 2008 **Senior Lecturer**, *National Institute of Technology Trichy, India.*
- 1991 – 1997 **Lecturer**, *National Institute of Technology Trichy, India.*

Administrative

- 2014 – 2017 **Head**, *Department of Aerospace Engineering, Indian Institute of Space Science and Technology, Trivandrum, India.*

Industry

- 1989 – 1991 **Design Engineer**, *Crompton Greaves Hydro-Division, Chandigarh, India.*

Research

Ph.D. Thesis

- Title *Numerical Simulation of Two-Fluid Flows with Sharp Interfaces Using Level Set Method*
- Supervisor Prof. S. Ghosh Moulic
- Description The thesis discusses a level set formulation for numerical simulation of multiphase fluid flow systems involving sharp interfaces. As the level set function does not follow any physical conservation law, it does not inherently conserve the mass of individual fluid phases. Numerical experiments show that for certain type of problems the conservation is a crucial issue with level

set method even when higher order discretization schemes are used for the solution of level set and reinitialization equations. In this work a new volume-reinitialization scheme has been proposed which when applied preserves the individual fluid volumes within the prescribed tolerance limit. The effectiveness of the method has been demonstrated by simulating a wide range of two-fluid systems including, the determination of equilibrium shape of free surface in a rotating cylinder, zero-gravity drop oscillations, surface tension induced evolution of a starfish interface, drop deformation in an extensional flow field, buoyancy driven bubble motion, and small amplitude oscillation of liquid in partially filled containers.

Research Interests

Numerical simulation of multiphase flows, level set methods, sloshing dynamics, bubble dynamics, and Rayleigh–Benard convection.

Teaching

At IIST-Trivandrum (2008 onwards)

AE213 Fluid Mechanics (fall 2024)
AE213 Fluid Mechanics (fall 2023)
AE222 Heat Transfer (spring 2023)
AE213 Computational Fluid Dynamics (spring 2023)
AE468 Fluid Mechanics (fall 2022)
AE222 Heat Transfer (spring 2022)
AE468 Computational Fluid Dynamics (fall 2021)
AE222 Heat Transfer (spring 2021)
AE468 Computational Fluid Dynamics (fall 2020)
AE222 Heat Transfer (spring 2020)
AE216 Thermodynamics (fall 2019)
AE468 Computational Fluid Dynamics (fall 2019)
AE216 Thermodynamics (fall 2018)
AE463 Advanced Fluid Mechanics (fall 2017)
AE216 Thermodynamics (fall 2017)
AE463 Advanced Fluid Mechanics (fall 2016)
AE213 Fluid Mechanics (fall 2016)
AE468 Computational Fluid Dynamics (fall 2014)
AE463 Advanced Fluid Mechanics (spring 2014)
AE213 Fluid Mechanics (fall 2012)
AE463 Advanced Fluid Mechanics (fall 2012)
AEM321 Gas Dynamics – Minor (spring 2012)
AE221 Gas Dynamics (spring 2012)
AEM311 Fluid Mechanics – Minor (fall 2011)
AE468 Computational Fluid Dynamics (fall 2011)
AE463 Advanced Fluid Mechanics (spring 2011)
AEM311 Fluid Mechanics – Minor (fall 2010)

- AE463 Advanced Fluid Mechanics (fall 2010)
- AE213 Fluid Mechanics (fall 2010)
- AE468 Computational Fluid Dynamics (spring 2010)
- AE213 Fluid Mechanics (fall 2009)
- AE222 Heat Transfer (spring 2009)
- AE213 Fluid Mechanics (fall 2008)
- AE215 Engineering Mechanics (fall 2008)
- AE121 Basic Mechanical Engineering II (Analysis of Experimental Data) (spring 2008)
- Master's AE625 [Computational Fluid Dynamics](#) (currently teaching)
- AE625 Computational Fluid Dynamics (spring 2024)
- AE601 Mathematical Methods in Aerospace Engineering (fall 2023)
- AE616 Computational Fluid Dynamics (spring 2019)
- AE616 Computational Fluid Dynamics (spring 2018)
- AE616 Computational Fluid Dynamics (spring 2017)
- AE616 Computational Fluid Dynamics (spring 2016)
- AE601 Mathematical Methods in Aerospace Engineering (fall 2015)
- AE813 Computational Fluid Dynamics (spring 2015)
- AE601 Mathematical Methods in Aerospace Engineering (Topics: PDE, Calculus of Variations, and Perturbation Methods) (fall 2014)
- AE813 Computational Fluid Dynamics (spring 2014)
- AE611 Advanced Fluid Mechanics (fall 2013)
- AE601 Mathematical Methods in Aerospace Engineering (Topics: PDE and Calculus of Variations) (fall 2013)
- AE813 Computational Fluid Dynamics (spring 2013)
- AE611 Advanced Fluid Mechanics (fall 2012)

At NIT-Trichy (1991 - 2008)

- Undergraduate Engineering Graphics, Fluid Mechanics, Gas Dynamics, Hydraulic Machinery, Heat Transfer, Thermal Engineering, Turbomachines, Computational Fluid Dynamics, and Finite Element Method.
- Master's Advanced Fluid Mechanics, Computational Fluid Dynamics, and Finite Element Method.

Publications

Journals:

1. Risha Raju, K. Joseph, K. Prabhakaran, and A. Salih. (2024). "Experimental Investigation of Mass Transfer and Pressure Drop in NH₃ SCR Over Self-Supporting Cu-ZSM-5 Foam." *Reaction Chemistry & Engineering*. 9, 2120-2134.
2. Venkatesh N., Deepak Kumar Agarwal, A. Salih, S. Sunil Kumar. (2024). "Effect of cryogenic feed line thermal mass distribution and orientation on chill-down performance." *Cryogenics*. 138, 103781.

3. Jatin Jangra, Vishruti Gohel, A. Salih, Vishesh Aggarwal, Pankaj Priyadarshi. (2023). "CFD Study on Water Impact of Spent Stage on Floats Using Overset Grid and Volume of Fluid Approach." *Journal of Aerospace Sciences and Technologies*. 25(2), 190-202.
4. Venkatesh N., Deepak Kumar Agarwal, A. Salih, S. Sunil Kumar. (2023). "Chilldown of cryogenic feed lines– An insight into the influence of feed line orientation and mass flux." *Cryogenics*. 130, 103644.
5. V. R. Adarsh, M. Deepu, and A. Salih. (2022). "The Effect of Curvature on the Heat Transfer Performance of Regenerative Cooling Passages for a High-Area Ratio-Nozzle." *Journal of Thermal Science and Engineering Applications*. 14(10).
6. Risha Raju, Gomathi N., K. Prabhakaran, K. Joseph, and A. Salih. (2022). "Selective catalytic reduction of NO over hierarchical Cu ZSM-5 coated on an alumina foam support." *Reaction Chemistry & Engineering*. 7, 929-942.
7. Jishnu Chandran R. and A. Salih. (2021). "The Adaptive Damping Technique: Improving the Simulation Accuracy of Hydraulic Transients." *International Journal of Mathematical, Engineering and Management Sciences*. 6(6), 1553-1564.
8. Jishnu Chandran R. and A. Salih. (2021). "Development of a benchmark solution in compressible liquid flows: analytical solution to the water shock tube problem." *Journal of Thermal Analysis and Calorimetry*. 147(8), 5279-5292.
9. Risha Raju, Jishnu Chandran R., A. Salih, and K. Joseph. (2020). "Numerical analysis of mixing chamber non-uniformities and feed conditions for optimal performance of urea SCR." *Reaction Chemistry & Engineering*. 5, 2236-2249.
10. Jishnu Chandran R. and A. Salih. (2020). "A comparative performance analysis of HLLC and AUSM+-up Riemann Solvers." *Cankaya University Journal of Science and Engineering*. 17(2), 108-117.
11. R. J. Chandran, R. Raju, and A. Salih. (2020). "An adaptively-damped compressible-liquid model for non-cavitating hydraulic surges." *International Journal of Engineering - Transactions A: Basics*. 33(10), 2047-2056.
12. Jishnu Chandran R. and A. Salih. (2020). "A Pressure-based Compressible-Liquid Flow Model for Computation of Instantaneous Valve Closure in Pipes." *Science and Technology Journal*. 7(2), 60-66.
13. Vijayan, S., P. Wilson, K. Prabhakaran, A. Salih, and K. Joseph. (2019). "Preparation of ceramic foam spheres by injection molding of emulsions." *Journal of Asian Ceramic Societies*, 8(1), 21-28.
14. Jishnu Chandran R. and A. Salih. (2019). "A modified equation of state for water for a wide range of pressure and the concept of water shock tube." *Fluid Phase Equilibria*, 483, 182-188.
15. Rahul Anand, P. R. Ajayalal, Vikash Kumar, A. Salih, and K. Nandakumar. (2016). "Spray and Atomization Characteristics of Gas-centered Swirl Coaxial Injectors." *International Journal of Spray and Combustion Dynamics*, 9(2), 127-140.
16. Yalagach, A. and A. Salih. (2016). "Study of Vortex Breakdown in a Cylindrical Cavity with a Rotating Endwall." *International Journal of Fluid Mechanics Research*, 43(3), 189-205.
17. Agarwal, D., P. Basu, T. J. Tharakan, and A. Salih. (2014). "Prediction of Gas-Core Vortices during Draining of Liquid Propellants from Tanks." *Aerospace Science and Technology*, 32(1), 60-65.

18. Salih, A. and S. Ghosh Moulic. (2013). "A Mass Conservation Scheme for Level Set Method Applied to Multiphase Incompressible Flows." *International Journal for Computational Methods in Engineering Science & Mechanics*, 14(4), 271-289.
19. Basu, P., D. Agarwal, T. J. Tharakan, and A. Salih. (2013). "Numerical Studies on Air-Core Vortex Formation during Draining of Liquids from Tanks." *International Journal of Fluid Mechanics Research*, 40(1), 27-41.
20. Salih, A. and S. Ghosh Moulic. (2010). "Numerical Simulation of Buoyancy-Driven Bubble Motion Using Level Set Method." *International Journal for Computational Methods in Engineering Science & Mechanics*, 11(4), 211-229.
21. Salih, A. and S. Ghosh Moulic. (2009). "Some Numerical Studies of Interface Advection Properties of Level Set Method." *Sadhana*, Indian Academy of Sciences, 34, Part 2, 271-298.
22. Salih, A. and S. Ghosh Moulic. (2006). "A Level Set Formulation for the Numerical Simulation of Impact of Surge Fronts." *Sadhana*, Indian Academy of Sciences, 31, 697-707.

Conferences:

1. Ashish Shinde, Amit Singh, and A. Salih. (2024). "CFD Analysis of Supersonic Combustion of Hydrogen Flow in Scramjet Combustor with Strut Injector", *10th Symposium on Applied Aerodynamics and Design of Aerospace Vehicles & SPICES Workshop – SAROD 2024*, Thiruvananthapuram, December 12-14.
2. Deep Kant Raj, Anant Singhal, Jophy Peter, Salih A., Deepak K. Agrawal. (2024). "Investigation of flow features in a vertical cryogenic feedline during non-flow conditions", *29th National Conference on Cryogenics and Superconductivity (NCCS-29)*, New Delhi, November 26-29.
3. Sajid Momin, Pradeep Kumar, P., and A. Salih. (2024). "Numerical simulation of cryogenic fluid sloshing in propellant tank and influence of damping with ring baffles under forced excitations", *Proceedings of the 10th World Congress on Mechanical, Chemical, and Material Engineering (MCM'24)*, Paper No. HTFF 270, Barcelona, Spain, August 22-24.
4. Venkatesh N., Deepak Kumar Agarwal, A. Salih, and S. Sunil Kumar. (2024). "Experimental investigation of flow structure and heat transfer in cryogenic vertical flows", *2nd International Conference on Fluid, Thermal and Energy Systems (ICFTES'24)*, NIT Calicut, June 06-08.
5. Venkatesh N., Anant Singhal, A. Salih, and S. Sunil Kumar. (2024). "CFD simulations on cryogenic feed line with different orientations", *International Conference on Advances in Aerospace and Energy Systems*, Paper No. IAES-2024-648, Liquid Propulsion Systems Centre (ISRO), April 04-06.
6. Sourabh Karmarkar, Deepak Kumar Agarwal, Gaurav Tomar, and A. Salih. (2024). "Mathematical model for simulating the effect of Interface motion on ullage pressure in a cryogenic propellant tank", *International Conference on Advances in Aerospace and Energy Systems*, Paper No. IAES-2024-354, Liquid Propulsion Systems Centre (ISRO), April 04-06.
7. Venkatesh N., Deepak Kumar Agarwal, A. Salih, and S. Sunil Kumar. (2023). "Experimental investigation on influence of thermophysical properties and coatings on cryogenic feed line chilldown performance", *27th National and 5th International ISHMT-ASTFE Heat and Mass Transfer Conference*, Poster Presentation, IIT Patna, December 14-17.

8. Venkatesh N., Anant Singhal, Deepak Kumar Agarwal, A. Salih, and S. Sunil Kumar. (2023). "Studies to investigate the effect of feed line orientation on chill-down performance of cryogenic feed lines", *5th ISSE National Conference (INAC-05) on "Systems Approach for Self-Reliance in Advanced Technologies (SASAT-2023)"*, Indian Society of Systems for Science and Engineering Hyderabad Chapter, DRDO, ISRO, and University College of Engineering, Osmania University, March 24-25.
9. Jishnu Chandran R., Risha Raju, A. Salih, and Senthil Kumar Arumugam. (2022). "Accurate Compressible Flow Modelling of Liquid Shock Tube Problems", *9th International and 49th National Conference on Fluid Mechanics and Fluid Power, FMFP2022*–Paper No. 9609, IIT Roorkee, December 14-16.
10. Jatin Jangra, Vishruti Gohel, Vishesh Aggarwal, A. Salih, and Pankaj Priyadarshi (2022). "Cfd Study on Water Impact of Spent Stage on Floats Using Overset Grid and Volume of Fluid Approach", *Proceedings of 23rd Annual CFD Symposium*, CFD Division (AeSI) and ADA, Bangalore, August 11-12.
11. Risha Raju, Jishnu Chandran R., and A. Salih. (2019). "Numerical Modelling of NOx Reduction on Cu-ZSM 5 Foam Reactor", *25th National and 3rd International ISHMT-ASTFE Heat and Mass Transfer Conference*, IHMTC-2019, IIT Roorkee, December 28-31.
12. Jishnu Chandran R. and A. Salih. (2018). "Equivalence of Density-Based and a Customized Pressure-Based Approach for Compressible Modelling of Instant Valve Closure in Irrigation Pipes", *7th International and 45th National Conference on Fluid Mechanics and Fluid Power, FMFP2018*–Paper No. 238, IIT Bombay, December 10-12.
13. Jishnu Chandran R. and A. Salih. (2017). "Water Shock Tube Simulation with Tait Equation of State", *24th National and 2nd International ISHMT-ASTFE Heat and Mass Transfer Conference (IHMTC-2017)*, BITS-Pilani, Hyderabad, India, December 27-30.
14. Jishnu Chandran R. and A. Salih. (2016). "A Comparative Study of AUSM Scheme with Some Common Finite Difference Schemes in Solving One-Dimensional Shock-Tube Problem", *6th International and 43rd National Conference on Fluid Mechanics and Fluid Power, FMFP2016*–Paper No. 88, Motilal Nehru National Institute of Technology Allahabad, December 15-17.
15. Rahul Anand, P. R. Ajayalal, K. Nandakumar, and A. Salih. (2015). "Parametric Study on the Performance of Gas Centered Swirl Coaxial (GCSC) Injectors", *24th National Conference on I.C. Engines and Combustion*, Dehradun, 30 Oct - 1 Nov.
16. Tambe, Sumit and A. Salih. (2013). "Numerical Study of Liquid Sloshing with Experimental Validation", *6th Symposium on Applied Aerodynamics and Design of Aerospace Vehicles – SAROD 2013*, Hyderabad, November 21-23.
17. Tharakan, T. J., P. Basu, D. Agarwal, and A. Salih. (2011). "Computational Investigations into Gas-Core Vortex Formation during Draining of Liquid from a Tank", *Proc. 38th National Conference on Fluid Mechanics and Fluid Power, FMFP2011*, National Institute of Technology, Bhopal, December 15-17.
18. Soni, K., K. Sankaranarayanan, A. Salih, and A. K. Das. (2007). "Modeling of Tank Fires", *Proc. National Conference on PETROSAFE 2007*, Kochi, Kerala, April 23-25.
19. Renjith, V. R., G. Madhu, and A. Salih. (2007). "Explosion Modeling of Hazardous Materials Stored in Udyogamandal Industrial Area – A Case Study", *Proc. National Conference on PETROSAFE 2007*, Kochi, Kerala, April 23-25.

20. Salih, A. and S. Ghosh Moulic. (2006). "Simulation of Rayleigh–Taylor Instability Using Level Set Method", *Proc. 3rd International and 33rd National Conference on Fluid Mechanics and Fluid Power*, NCFMFP2006–1303, IIT Bombay, December 07-09.
21. Salih, A. and S. Ghosh Moulic. (2005). "A Level Set Method for Simulation of Coalescence of Droplets", *Proc. ASME International Mechanical Engineering Congress and Exposition*, Orlando, Florida, USA, ASME Publications, 261, 723-732.
22. Salih, A. and S. Ghosh Moulic. (2002). "Oscillation of a Liquid Drop in a Zero-Gravity Environment – A Benchmark Problem for Two-phase Flow Computations", *Proc. 2nd International Conference on Fluid Mechanics and Fluid Power*, FMFP2002, IIT Roorkee, December 12-14.

Short-Term Course Organized

- One week short-term course titled "Numerical Methods in Fluid Flow and Heat Transfer" (Department of Aerospace Engineering, IIST Trivandrum, July 2010) – Co-coordinators: Dr. G. Rajesh and Dr. M. Deepu. About 60 people, including teachers from engineering colleges and scientists from ISRO attended the course.

Invited Talks/Lectures

- 2024 *Finite Element Analysis*: Invited lecture delivered under Visiting Faculty Scheme at the Govt College of Engineering, Barton Hill, Thiruvananthapuram, 19 March 2024.
- 2019 *Solution of Inviscid Burgers Equation: Method of Characteristics and Numerical Methods*: Invited lecture delivered in the Two days seminar on "Computer Methods on Applied Mathematics and Engineering (CMAME-2019)" at the National Institute of Technology Calicut, 16 May 2019.
- 2017 *Partial Differential Equations in Engineering*: Expert lecture delivered in the AICTE sponsored Short Term Course on "Applied Mathematics for Engineering Research" at the College of Engineering Trivandrum, 12 December 2017.
- 2016 *Introduction to Computational Fluid Dynamics*: Expert lecture delivered in the DTE sponsored Short Term Training Programme on "Computational Fluid Dynamics" at the Govt. College of Engineering Thrissur, 19 December 2016.
- 2016 *Galerkin Formulation of Finite Element Method*: Expert lecture delivered in the TEQUIP sponsored one-week Faculty Development Programme on "Finite Element Methods in Engineering" at the College of Engineering Adoor, 6 December 2016.
- 2014 *Hyperbolic Conservation Laws*: Expert lecture delivered in the Directorate of Technical Education (Kerala) sponsored Short Term Programme on "Introduction to CFD and Its Applications" at the College of Engineering College, Thiruvananthapuram, 11 December 2014.
- 2014 *Governing Equations in Fluid Dynamics and Their Discretization*: Invited talk delivered in the QIP Sponsored Short Term Course on "Computational Methods in Fluid Flow and Heat Transfer" at the Government Engineering College, Thrissur, 17 February 2014.
- 2014 *PDEs in Fluid Dynamics and Heat Transfer and Discretization Methods*: Invited talk delivered in the TEQUIP II sponsored Short Term Course on "Applications of CFD in Heat Transfer and Fluid Flow" at the NIT Tiruchirappall, 10 January 2014.

- 2013 *Introduction to Computational Fluid Dynamics*: Inaugural talk delivered in the TEQUIP II sponsored one-week Faculty Development Programme on “Computational Fluid Dynamics and Its Application” at the TKM College of Engineering, Kollam, 19 August 2013.
- 2013 *Introduction to Level Set Method and Its Applications*: Talk delivered in the Three day In-house Training Programme on “CFD in Propulsion” at the Vikram Sarabhai Space Centre, Trivandrum, 6 March 2013.
- 2012 *Introduction to Computational Fluid Dynamics and Meshing Basic Geometry*: Inaugural talk delivered in the “Three-day Workshop on Computational Fluid Dynamics” at the Department of Mechanical Engineering, Noorul Islam University, Thackalai, 27 September 2012.
- 2012 *Theoretical Solution to Boundary Layer Equations*: Keynote lecture delivered in the Directorate of Technical Education (Kerala) sponsored National Workshop on “Advances in Theoretical and Computational Fluid Dynamics (ATCFD-2012)” at the College of Engineering, Thiruvananthapuram, 2 February 2012.
- 2011 *Conservation Equations in Fluid Dynamics – Integral and Differential Formulations*: Invited lecture delivered at the Government Engineering College, Thrissur, 19 Oct 2011.
- 2011 *Navier–Stokes Equations*: Invited lecture delivered at Government Engineering College, Barton Hill, Thiruvananthapuram, March 2011.
- 2010 *Governing Equations of Fluid Dynamics*: Lecture delivered in the one-week short term course on “Numerical Methods in Fluid Flow and Heat Transfer” organized by Department of Aerospace Engineering, IIST, Thiruvananthapuram, July 2010.
- 2010 *Introduction to CFD*: Invited talk delivered in the AICTE sponsored winter course on “Quantitative Research Techniques for Engineers & Researchers”, organized by Department of Mechanical Engineering, NIT Tiruchirappalli, 21-12-2009 to 2-1-2010.
- 2007 *Galerkin Finite Element Method*: Talk delivered in the TEQUIP sponsored 2-day workshop on “Finite Element Method and Applications in Engineering Using ANSYS” at NIT Tiruchirappalli, November 26-27, 2007.
- 2007 *Navier–Stokes Equations and Its Development*: Lecture delivered in the TEQUIP sponsored 2-day workshop on “Computational Fluid Dynamics” conducted by Department of Mathematics at NIT Tiruchirappalli, September 18-19, 2007.
- 2007 *Numerical Solution of Navier–Stokes Equations*: Lecture delivered in the AICTE sponsored short term course on “Recent Trends in IC Engine Testing and Analysis” at NIT Tiruchirappalli, February 2007.
- 2004 *Finite Element Methods in Engineering*: Invited talk delivered in the AICTE sponsored winter school on “Recent Trends in Modelling and Analysis of PManufacturing Systems” at NIT Tiruchirappalli, December 2004.
- 2004 *Introduction to Computational Heat Transfer*: Invited lecture delivered in the AICTE sponsored summer school, “Latest Trends in Refrigeration with Special Emphasis on Food and Medical Preservation” at Dr. Mahalingam College of Engineering and Technology, Pollachi, March 2004.

Conference Session Chair

- Dec 2017 *44th National Conference on Fluid Mechanics and Fluid Power (FMFP – 2017)*, Amrita Vishwa Vidyapeetham, Amratapuri, India. 14-16 December 2017.

Dec 2015 *23rd National and 1st International ISHMT–ASTFE Heat and Mass Transfer Conference (IHMTTC2015)*, Trivandrum, India. 17-20 December 2015.

Dec 2013 *International Conference on Energy and Environment – ICEE 2013*, Rajiv Gandhi Institute of Technology, Kottayam, India. December 2013.

Committees

2017 Member, Advisory Committee, *44th National Conference on Fluid Mechanics and Fluid Power (FMFP – 2017)*, Amrita Vishwa Vidyapeetham, Amratapuri, India. 14-16 December 2017.

2015 Member, Technical Committee, *23rd National and 1st International ISHMT–ASTFE Heat and Mass Transfer Conference (IHMTTC2015)*, Trivandrum, India. 17-20 December 2015.

Research Projects

(1) Title *Development of N₂O₄ Scrubber System*

Investigators Kuruvilla Joseph (Principal Investigator), K. Prabhakaran (Co-investigator), and A. Salih (Co-investigator)

Amount 14 Lakhs INR

Duration 2017- on going

(2) Title *Numerical Simulation of Turbulent Reacting Flows in Semi-Cryogenic and Tri-Propellant Engines*

Investigators M. Deepu (Principal Investigator) and A. Salih (Co-investigator)

Amount 3.27 Lakhs INR

Duration 2009-12

Ph.D. Thesis Supervision

Current Scholars:

Joined in 2022 Saurab Karmarkar – Scientist, Liquid Propulsion Systems Center, Valiamala, Trivandrum.

Past Scholars:

2021 Jishnu Chandran R. – Thesis Title: *Development of a Mathematical Model for Compressible Liquid Transients and Its Numerical Implementation*

2023 Risha Raju – Thesis Title: *Experimental Studies of Selective Catalytic Reduction of NO_x with NH₃ on Cu-ZSM-5 Foam Catalysts*

2024 N. Venkatesh – Thesis Title: *Influence of Feedline Configuration and Its Thermal Mass Distribution on Cryogenic Chilldown Performance*

M.Tech. Project Supervision (IIST)

Current Students:

2024-25 Abhishek Singh – *Study of Geysering Effect in Cryogenic Piping*

Past Students:

- 2024 Sajid M. – *Numerical Simulation of Cryogenic Fluid Sloshing in Propellant Tank Under Forced Excitations* (Co-supervisor)
- 2023 Arpit Shrivastava – *Numerical Simulation of Sloshing of Liquid in Partially Filled Containers*, IIST Thiruvananthapuram. (Co-supervisor)
- 2019 Adarsh V. R. – *Numerical Simulation of Geometrical Aspects of Rectangular Regenerative Cooling Channels*, IIST Thiruvananthapuram. (Co-supervisor Dr. Deepu M.)
- 2019 Bebbhash S. Raj – *Study of Ground Effects in 2-D Aerofoils over Solid and Wavy Surfaces*, IIST Thiruvananthapuram.
- 2014 P. R. Ajayalal – *Spray Atomization Studies on Gas Centered Swirl Co-axial Injectors (GCSC)*, IIST Thiruvananthapuram.

M.Tech. Project Supervised (NIT Trichy)

- 2008 A. Aravind Kumar – *Study of Drop Deformation in an Extensional Flowfield*, NIT Trichy.
- 2008 CH. Durga Mallik – *Study of Heat Transfer in Micro and Mini Channels*, NIT Trichy.
- 2007 Soni Kuriakose – *Consequence Analysis of Hazardous Storage Facilities, Phase II*, NIT Trichy.
- 2006 K. Venkata Ravi Shankar – *Analysis of Buoyancy Driven Flow in a Lid Driven Square Cavity*, NIT Trichy.
- 2006 S. Anki Reddy – *Numerical Simulation of Forced Sloshing in a Partially Filled Cylindrical Container*, NIT Trichy.
- 2006 T. Rajeswary – *Numerical Simulation of Viscous and Forced Sloshing in a Partially Filled Rectangular Container*, NIT Trichy.
- 2005 K. Lakshmanan – *Numerical Simulation of Spin-Up in Rectangular Container*, NIT Trichy.
- 2005 V. R. Renjith – *Consequence Analysis and Disaster Management Plan for Udyogamandal Industrial Area in Kerala, Phase II*, NIT Trichy.
- 2005 A. Sarath Chandra – *Numerical Simulation of Couette–Taylor Flow*, NIT Trichy.
- 2004 M. K. Prabakaran – *Numerical Simulation of Two-Dimensional Incompressible Flow Using SIMPLE Algorithm*, NIT Trichy.
- 2004 K. Sreekanth – *Numerical Simulation of Buoyancy Driven Flow in a Square Cavity*, NIT Trichy.

B.Tech. Project Guided (IIST)

Past Students:

- 2024 Deep Kant Raj – (Internal Guide) *CFD simulation and numerical studies on the Geysering effect of cryogenic fluids during the rocket fuelling process*, IIST Thiruvananthapuram.
- 2024 Jai Vankadi – (Internal Guide) *Hybrid finite element / finite volume method for convection diffusion problems*, IIST Thiruvananthapuram.
- 2024 Ankit Bharadwaj – (Internal Guide) *Design, prototyping and testing of venturi based air gas mixer for dual fuel engine conversion*, IIST Thiruvananthapuram.

- 2023 Boddupalli Nagarjun – (Internal Guide) *Multi-disciplinary Analysis of Partially Rigidized Parachute*, IIST Thiruvananthapuram.
- 2023 Anirudh Thantry – (Internal Guide) *Structural Optimization and Aeroelastic Flutter Analysis of Drone Wing Configurations*, IIST Thiruvananthapuram.
- 2022 Aniket – (Internal Guide) *Development of parallel Laplace and Navier-Stokes solver using compact schemes*, IIST Thiruvananthapuram.
- 2022 Himanshu N. – (Internal Guide) *Thermal design of view port of a sub-orbital flight*, IIST Thiruvananthapuram.
- 2022 Jatin Jangra – (Internal Guide) *Multi-disciplinary Design Optimization of Launch Vehicle Stage Recovery in Sea and its Sub-scale Experimental Demonstration*, IIST Thiruvananthapuram.
- 2022 Muvvala Rahul – (Internal Guide) *Kerosene Chemistry for Scramjet Engine*, IIST Thiruvananthapuram.
- 2022 Gaurav Meena – (Co-guide) *Fabrication of CuNC@S,N-GQD based Electrochemical Sensor for Pb(II) Lead ion sensing*, IIST Thiruvananthapuram.
- 2022 Shravan Kumar – (Co-guide) *A portable filtration setup for the selective removal of Pb (II) from water*, IIST Thiruvananthapuram.
- 2022 Sandip Kumar – (Co-guide) *Study of Adsorption of heavy metal ions using carbonized Bio-materials from water*, IIST Thiruvananthapuram.
- 2022 Nitish Kumar – (Co-guide) *Sloshing in tanks*, IIST Thiruvananthapuram.
- 2021 Vishruti Gohel – *Transient Analysis of Floater for Spent Stage Recovery from Sea Water Surface*, IIST Thiruvananthapuram.
- 2018 Ajitha Nishma V. – *Numerical Simulation of Mixed Convection in Lid-Driven Cavity Flow*, IIST Thiruvananthapuram.
- 2018 Nakka Ramakrishnaiah Nagavarma – *Numerical Study of Natural Convection in Vertical Enclosure with Fins*, IIST Thiruvananthapuram.
- 2018 Gautam Kumar Jha – *Thermal Characterisation and Modelling of PCM Module and Suspended Plate in Phase Change Media*, IIST Thiruvananthapuram.
- 2015 Deepanshu Tiwari – *Study of Perturbation Techniques and Its Applications to the Parametrically Excited Systems*, IIST Thiruvananthapuram.
- 2014 Raja Sekhar Reddy and Jarpula Dharma Naik – *Numerical and Experimental Investigation on Supersonic Second-Throat Exhaust Diffuser for Evaluating Upper-Stage Rocket Motors*, IIST Thiruvananthapuram.
- 2013 Sumit Tambe – *Behaviour of Liquid Free-surface in a Partially Filled Container under Excitation*, IIST Thiruvananthapuram.
- 2013 Akash Yalagach – *Study of Vortex Breakdown in a Cylindrical Cavity with a Rotating End-Wall*, IIST Thiruvananthapuram.
- 2012 Aman Raj Verma – *Study of Effect of Gas Injection over a Torpedo on Flow-Field Using CFD*, IIST Thiruvananthapuram.
- 2012 Priyanka Bovad – *Study of Parasitic Currents in Level Set Method*, IIST Thiruvananthapuram.
- 2011 Prateep Basu and Dheeraj Agarwal – *Study of Gas-Core Vortex Formation during Draining of Liquid from a Tank*, IIST Thiruvananthapuram.

Memberships in Professional Societies

Since 1992 Life Member, The Indian Society for Technical Education (LM 12409).

Since 2017 Life Member, Indian Society for Heat and Mass Transfer (ISHMT 1156).