

Prudent and result-oriented Researcher with a Masters' degree in Thermal Science (Mechanical Engg) desiring to work in the field of Computational & Experimental investigations to explore the Physics of Nature.

**Research Interests:** *Droplet Dynamics, Bio-mimicry, Fluid-Structure interactions, Heat & Mass transfer, Aero-Dynamic Studies, Applied & Computational Mathematics*

## Research Background

### **Numerical Investigations on Bouncing Droplet impact over Hydrophobic Surfaces \***

Micro/Nano fluidics Research Laboratory/ College of Engg, Thiruvananthapuram      Master's Thesis / July,2018

- An In-silico investigation of droplet impact dynamics on hydrophobic surfaces under different wettability and impact conditions are examined using FVM method in conjunction with VOF method & Dynamic Contact angle.
- Assuming a single mass dashpot system to mimic the droplet impact, spreading, restitution & bouncing, a semi-analytic expression is developed to study analogy. Empirical correlations of contact time and restitution coefficients were developed for predicting droplet height evolution during compression & retraction of bouncing droplet.

#### \*Publication:

[K. Nandakumar Chandran, P. T. Naveen, R. Abhilash & S. Kumar Ranjith \(2021\)](#)

*Theoretical Modeling of Droplet Extension on Hydrophobic Surfaces, International Journal of Computational Fluid Dynamics DOI: [10.1080/10618562.2021.1998464](https://doi.org/10.1080/10618562.2021.1998464)*

### **Compact Heat Exchanger Design & Development Inspired from Human Lungs**

TRANE Air conditioners-Residential unit/ M/s Ingersoll Rand

Internship Project / June,2018

- Bio-mimicking Approach- Human Lung inspired design development and realization of compact heat exchanger for Residential Air Conditioner outdoor units. Replacement study for spine fin coil heat exchanger system
- Theoretical calculations on proposed model, numerical simulations and analysis to study on dimensional variations and parameter change effect. Prototype development and Study on Correlation establishment studies.

### **Experimental Study on Atmospheric Water extraction system using Wet Desiccants**

Thermal Laboratory/ Vidya Academy of Science & Technology, Thalakkottukara

Bachelor's Project / June,2014

- An In- situ investigation on heat and mass transfer involved in interaction of humid air and wet desiccants
- Design Development , Prototype realization & optimization studies by varying parameters of Desiccant concentrations and heat supply for effective water extraction within the given environment

## Works Under progress

### ***Exploring physics involved in compound droplet impact dynamics over coated concave surfaces***

Research focus : *Internal Flow and Secondary droplet generations, Morphology study, Spreading characteristics under iso- thermal & non iso- thermal conditions*

### ***Numerical study of droplet impact on convex/concave coated surface with unit curvature ratio***

Research focus : *Droplet Maximum Spreading conditions, Internal Flow characteristics and stream line studies, contact time and capillary effect studies under iso- thermal & non iso- thermal conditions*

## Educational Credentials

Master of Technology in Thermal Science  
College of Engineering, Trivandrum  
APJ Abdul Kalam Technological University

August, 2016- June, 2018  
**9.48 CGPA**

Bachelor of Technology in Mechanical Engineering  
Vidya Academy of Science and Technology  
University of Calicut

August, 2010- June, 2014  
**8.81 CGPA**

## Professional Experience

### ***Assistant Manager\_Senior Specialist in BIW Manufacturing/ M/s. Hyundai Motor India Ltd.***

*Passenger Car Manufacturing Engg Dept*

*July, 2019 to November,2021*

Responsible for New Car Project Planning, Management, Execution and Quality Stabilization for BIW. Defines the process flow and studies over cycle time constraint for Productivity improvement incorporating innovative ideas.

- Managed multi-disciplinary aspects of a FMC Project by Coordinating with various End user departments
- Conceptual development of new equipment , Design review (Jigs & Fixtures), Digital Pre Assembly Study,
- Process Analysis and Plant Efficiency & BIW/CBU Quality related problem analysis (RCA, FMEA)

### ***Post Graduate Engineer Trainee/ M/s. Hyundai Motor India Ltd.***

*Passenger Car Manufacturing Engg Dept*

*July, 2018 to July, 2019*

Assisted in BIW Manufacturing system developments and quality study of Body parts for Side LH/RH & Floor Lines. Countermeasure plan preparation for CBU Condition Gap & Flush non- conformance studies.

- Preparation of Cycle time charts, Spec error proof logic & Spot weld/Sealer application Design vs Actual Study.
- Equipment Realization: Design for Manufacturing Approach & Horizontal Deployment Approach
- Equipment Manufacturing Precision & accuracy monitoring. Design GDT mapping and corrections.
- Part Quality & Inspection fixture study, Vendor Process Study & improvement methods contribution

### ***Graduate Intern/ M/s. Ingersoll Rand Technologies & Services Pvt Ltd.***

*Residential Air Condition Team (Trane)*

*January, 2018 to June, 2018*

Responsible for Residential Air-conditioner Outdoor unit performance enhancement. Concept Development and Prototype fabrication & Testing, optimizing the design parameters to meet standards.

- Performing theoretical studies & inferring the results of mathematical model & Numerical simulations conducted
- Material selection and physical dimension freezing of HX for the specified refrigerant.
- Prototype development and realization for effectiveness and performance test.

### ***Graduate Apprentice/ M/s. Vikram Sarabhai Space Centre (ISRO)***

*Launch Vehicle Auxiliaries Fabrication*

*March, 2015 to March, 2016*

Responsible for providing Technical Assistance in realization of Precision Hardware for various systems of Launch Vehicles. Also, management of project schedule to ensure completion within the stipulated time period.

- Performed feasibility study of drawings and estimation of Machining and Material cost.
- Preparation of Indent for outsourcing and realization of hardware by developing schedule of activities in an optimized manner.
- Preparation of Process Plans for fabrication, which focuses on achievement of required GDTs.

## Skills

Computational Tools: OpenFOAM, ANSYS Fluent, COMSOL Multiphysics , Scilab

Experimental Tools: Wind Tunnel Testing, Image Processing, 3D printing

Modeling Softwares: Auto CAD, Solid works, CATIA V5

Programming Languages: C++, Python

## Accolades

- Best Young Talent Performer- Young Talent Programme 2019, HMI Ltd
- Runner Up -Small Group Innovators Programme 2018, HMI Ltd
- Top Scorer for Master's in Thermal Science, 2016-2018 batch
- Achieved Certificate of excellence from the University of Calicut, 2014

## References

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