

# Venu Madhav Hanumanthugari

PhD, Indian Institute of Science, Bangalore

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## EDUCATION

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### Indian Institute of Science, Bangalore

PhD (pursuing) in Heat Pipes and Phase Change Materials; GPA: 9.5/10 (best 12 credits)

Department of Mechanical Engineering (ME)

Karnataka, India

*August 2016 - Present*

### Indian Institute of Technology, Bombay

Master of Technology in Mechanical Engineering; GPA: 8.78/10

Department of Mechanical Engineering (ME)

Maharashtra, India

*2012 - 2014*

### Aurora's Engineering College, JNTUH, Hyderabad

Bachelor of Technology in Mechanical Engineering; Absolute Percentage: 81.3/100

Department of Mechanical Engineering (ME)

Telangana, India

*2008 - 2012*

### Narayana Junior College, Secunderabad

Board of Intermediate Education; Absolute Percentage: 92.6/100

Telangana, India

*2006 - 2008*

### Amaravathi Grammer High School, Secunderabad

Secondary School Certificate (SSC); Absolute Percentage: 89.83/100

Telangana, India

*2006*

## AREAS OF RESEARCH INTEREST

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- Thermal Management of Electronic devices, Heat Pipes, Two-Phase Cooling, Phase Change Material (PCM), Electronic Cooling, Heat Exchangers, Numerical and Mathematical modelling, CFD.

## RESEARCH EXPERIENCE

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### Numerical and Experimental Investigation of a Heat Pipes and PCM-Coupled Heat Pipe.

*PhD Supervisor: Prof. Pramod Kumar*

*August 2016 - Present*

- Our objective is to develop simple analytical models for cylindrical heat pipes and PCM - coupled heat pipes.
- Detailed CFD studies were used to develop analytical expressions for heat transfer coefficients in the evaporator and condenser sections of the heat pipe. These expressions were then used in coupled transport-thermodynamic models to estimate the wall temperatures at the heat pipe's evaporator section.
- In the second part, a comprehensive 3D transient heat diffusion equation with phase change is numerically solved to determine the PCM melt time in a PCM-coupled heat pipe. It was also demonstrated that a simple 2D model with reasonable assumptions can accurately predict the performance of a PCM-coupled heat pipe.
- Finally, the numerical results were validated using experiments on an axially grooved cylindrical heat pipe and Eicosane as PCM in a PCM coupled heat pipes.

### Stability and transient behavior of a customized natural circulation loop with a thermal storage tank replacing the condenser.

*M.Tech Supervisor: Prof. R.P. Vedula*

*May 2013 - June 2014*

- We looked at the effects of replacing the condenser's heat exchanger with a large tank. This passive heat cooling technology was proposed to remove decay heat in the event of a nuclear meltdown.
- To approximate the transient behaviour of this loop, a 2D finite volume code was developed. The acquired results were then confirmed by direct experimental observation.

## PUBLICATIONS

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- **H. V. Madhav**, V. Raghavendra, P. Kumar, A. Ambirajan and P. Dutta, "Development of a Canister Module for PCM Coupled Heat Pipe in Spacecraft Thermal Management," in IEEE Transactions on Components, Packaging and Manufacturing Technology, vol. 11, no. 11, pp. 1804-1815, Nov. 2021, doi: 10.1109/TCPMT.2021.3114195.
- **H. Venu Madhav**, Sujita Srichandana Dey, Venkata Raghavendra, Pramod Kumar, "CFD Simulations of a PCM Coupled Heat Pipe with Thermal Enhancers." 4th International ISHMT Heat and Mass Transfer Conference (IHMTTC-2021), IIT Madras, 2021, pp. 2489-2494, DOI: 10.1615/IHMTTC-2021.3760.
- **Venu Madhav. H**, K. G. M, V. Raghavendra, P. Kumar and A. Ambirajan, "Thermal Resistance-Capacitance Network Model for a PCM Coupled Heat Pipe," 2021 20th IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (iTherm), 2021, pp. 254-263, doi: 10.1109/ITherm51669.2021.9503239.
- **H. Venu Madhav**, V. Raghavendra, P. Kumar and A. Ambirajan, "Analytical Model for a Cylindrical Heat Pipe," 2019 18th IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (iTherm), 2019, pp. 251-260, doi: 10.1109/ITHERM.2019.8757290.
- **Venu Madhav. H**, Yasin Mohammed, R. P. Vedula, "Transient Behaviour of a Modified Natural Circulation Loop," 40th National Conference on Fluid Mechanics and Fluid Power (FMFP2013), December 2013, Hamirpur, India.

## WORK EXPERIENCE

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### Assistant Professor

*Vignan University*

Guntur, India

*July 2014 - June 2016*

- Courses such as Thermodynamics, Convective Heat Transfer, Advanced Fluid Mechanics, Heat Transfer, and Thermal Applications were designed, taught, and evaluated to graduate students.

## RELEVANT COURSES DONE

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Convective Heat and Mass Transfer, Computational Fluid Dynamics (CFD), Numerical Methods for Differential Equations, Turbulence, Computational Viscous Flows, Micro Fluidics, Mathematical Methods in Engineering.

## SKILLS

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**Programming skills:** Python, C/C++, Matlab, LaTeX

**Computational software:** ANSYS- Products (Workbench, Fluent, CFX, SpaceClaim, ICEEM Mesher) SolidWorks, COMSOL Multiphysics, EES

**Modelling Abilities:** , UDF (User Defined Macros) in Fluent, Multiphase simulations, Resistance Network Models.

## ACTIVITIES AND HONOURS

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- Awarded **Gold Medal** for standing as a branch topper in B.Tech.
- A TATA-TRUST travel grant receiver.
- ANSYS-IISc Co-convener from mechanical department, IISc Bangalore.
- Presented technical posters at the Mechanical Symposium (IISc Bangalore), iTherm 2019 (Las Vegas), and iTherm 2021 conferences.
- **Silver Medal** recipient at the Intra-IISc Chess Championship.

## HOBBIES

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I love playing chess, badminton & basketball, reading books, and listening to Indian pop songs.