

Curriculum Vitae

Personal Information

Name **Dr. Venugopal Arumuru**
Address Assistant Professor
School of Mechanical Sciences
Indian Institute of Technology, Bhubaneswar, India
Tel: +91 6742306235
Fax: +91 6742306283
venugopal@iitbbs.ac.in



Research Interest

Fluid Structure Interaction and unsteady Aero-Hydrodynamics, Turbulence and Flow control, Bluff Body flows, Multi-Phase Flow, Heat Transfer augmentation, Fluid Flow Metrology, Ultrasound

Education

PhD, Thermal and Fluids, Indian Institute of Technology Bombay, India (2014)
M.Tech, Energy Science, Indian Institute of Technology Bombay, India (2008)
B. E, Mechanical, National Institute of Technology Raipur, India (2006)

Professional experience

09/2014 – 02/2016 Lead Engineer/Technologist, GE Measurement & Control, India
06/2014 – 08/2014 Research Associate, National University of Singapore
08/2008 – 06/2010 Design and Development Engineer, Forbes Marshall Pvt. Ltd India

Publication

- Journal**
- Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Spatial correlations in the wake of a circular cylinder and a normal plate Placed inside a pipe." *Journal of Fluids and Structures*, 2015
 - Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Vortex cross-correlation flowmeter with improved turndown ratio". *Review of Scientific Instruments* 85.6 (2014): 066109.
 - Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Performance evaluation of piezoelectric and differential pressure sensor for vortex flowmeters". *Measurement* 50 (2014): 10-18.
 - Borkar, Kishor, **Venugopal, A** and S. V. Prabhu. "Study on the design and performance of a Bi-directional cone flowmeter". *Flow Measurement and Instrumentation*. 34 (2013): 151-159
 - Borkar, Kishor, **Venugopal, A** and S. V. Prabhu. "Pressure measurement technique and installation effects on the performance of wafer cone design". *Flow Measurement and Instrumentation* 30 (2013): 52-59.
 - Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Frequency detection in vortex flowmeter for low Reynolds number using piezoelectric sensor and installation effects". *Sensors and Actuators A: Physical* 184, (2012): 78-85.
 - Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Review on vortex flowmeter-Designer perspective". *Sensors and Actuators A: Physical* 170.1 (2011): 8-23.
 - Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Influence of blockage and shape of a bluff body on the performance of vortex flowmeter with wall pressure measurement". *Measurement* 44.5 (2011): 954-964.

9. **Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Influence of blockage and upstream disturbances on the performance of a vortex flowmeter with a trapezoidal bluff body". *Measurement* 43.4 (2010): 603-616.
10. **Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Vortex dynamics of a circular cylinder placed inside a pipe". *Journal of Fluid Mechanics (Under Review)*.
11. Lavish, O., **Venugopal, A.**, Amit Agrawal and S. V. Prabhu "Vortex shedding from a circular cylinder with a parallel slit. *Journal of Visualization (Revision Requested)*.
12. **Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Investigations on turbulent flow around bluff bodies placed in a circular pipe". *Flow, Turbulence and Combustion (Under Review)*.
13. **Venugopal, A.**, Amit Agrawal, and S. V. Prabhu. "Vortex Dynamics of Trapezoidal bluff body placed inside a pipe". *International Journal of Heat and fluid Flow (Under Review)*
14. Kapil M, **Venugopal, A.**, Amit Agrawal, and S. V. Prabhu. "Improvement in the performance of the vortex flowmeter using contraction cone" *Measurement (Submitted)*.

Under Preparation

1. **Venugopal A.**, Kaluri V Rangarao, Assessing Three-Dimensionality of vortex shedding from bluff bodies placed inside a circular pipe using instantaneous phase.
2. **Venugopal, A.**, Lavish, O., Amit Agrawal and S. V. Prabhu "Vortex shedding mechanism from bluff bodies placed inside a pipe".
3. H, Yadav., **Venugopal, A.**, Surya, T., Amit Agrawal and S. V. Prabhu. "Connecting tube dynamics for transient pressure measurements.
4. **Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "On the linearity, turndown ratio and shape of the bluff body for vortex flowmeter".

Conference

1. Kaluri V Rangarao, **Venugopal A** "A Novel High Accuracy Delay Time Estimation Algorithm to Compute Vortex Convection Velocity" *9th International Symposium on Fluid Flow Measurement*, Washington D. C USA, 14-17 April, 2015.
2. Isaac Sadovnik, Jed Matson, Selvakumaran S, **Venugopal A.**, Lei Sui "CFD Analysis for Ultrasonic Flow Meter Accuracy Improvement in Flare Gas Applications" *9th International Symposium on Fluid Flow Measurement*, Washington D. C USA, 14-17 April, 2015.
3. **Venugopal, A.**, Ordia, L., Agrawal, A., and Prabhu, S.V., Symmetric vortex shedding in the wake of circular cylinder placed inside a pipe, *66th Annual Meeting of the American Physical Society's Division of Fluid Dynamics (DFD)*, 24-26 November 2013, Pittsburg, USA.
4. **Venugopal, A.**, Lavish, O., Amit Agrawal and S. V. Prabhu. "Investigation on flow around cylinder with parallel slit in a circular pipe using flow visualization approach". *66th Annual Meeting of the American Physical Society's Division of Fluid Dynamics (DFD)*, 24-26 November 2013, Pittsburgh, United States
5. Amit Agrawal, **Venugopal, A.**, and S. V. Prabhu. "Spanwise correlation in the wake of circular cylinder and normal plate placed inside a pipe". *66th Annual Meeting of the American Physical Society's Division of Fluid Dynamics (DFD)*, 24-26 November 2013, Pittsburgh, United States.
6. Lavish O., **Venugopal, A.**, Amit Agrawal and S.V. Prabhu, "Influence of after body shape on the performance of blunt shaped bodies as vortex shedders". *ICFMA 2013: International Conference on Fluid Mechanics and Application*, 7-8 Oct 2013 Paris, France.
7. **Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Flow over a circular cylinder Placed Inside a Pipe". *14th European Turbulence Conference*, ENS Lyon France, 1-4 September 2013.
8. **Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Flow visualization studies on trapezoidal bluff for vortex flowmeter application". *XX IMEKO World Congress*, Busan, Republic of Korea, 9-14 September 2012.
9. **Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Vortex cross correlation flowmeter".

Towards Smarter and Greener Flow Measurement and Control, FCRI Global Conference and Exhibition, Flow Control Research Institute, Palakkad, 18-20 January 2012.

10. **Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Installation effects on the performance of vortex flowmeter with piezo-sensor". *Towards Smarter and Greener Flow Measurement and Control, FCRI Global Conference and Exhibition, Flow Control Research Institute, Palakkad, 18-20 January 2012.*
11. Kishore, B., **Venugopal, A.**, and S. V. Prabhu. "Study on effects of wafer cone design and presence of upstream pipe bends on the performance of wafer conical flowmeter". *Towards Smarter and Greener Flow Measurement and Control, FCRI Global Conference and Exhibition, Flow Control Research Institute, Palakkad, 18-20 January 2012.*
12. **Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Analysis of vortex flowmeter signal with empirical mode decomposition and autocorrelation function". *IUTAM Symposium on Bluff Body Flows, Indian Institute of Technology, Kanpur, 12-16 December 2011.*
13. **Venugopal, A.**, Amit Agrawal and S. V. Prabhu. "Comparison of piezo-sensor and differential wall pressure sensor for vortex flowmeter application". *11th Asian International Conference on Fluid Machinery, Indian Institute of Technology, Chennai, 21-23 November 2011*

Patents

1. **Vortex Cross-correlation Flowmeter** – Indian Patent Application No. 1763/MUM/2013
2. **Vortex Flowmeter for Measuring a fluid flow rate** – Indian Patent Application No. 2459/MUM/2015

Awards and Achievements

1. IIT Bombay Excellence in Thesis Work Award -2015
2. Selected as one of the IBC's TOP 100 ENGINEERS - 2014
3. American Physical Society /DFD Travel Grant – 2013
4. Department of Science and Technology & CSIR India, Travel Grant (2013)
5. Forbes Marshall Fellowship 2006-2008, IIT Bombay (Post graduate Studies)
6. All India Rank 338 GATE 2006
7. Merit Based Scholarship from S.E.C. Railway, India (2003, 2004 and 2005) for graduate studies

Professional Activity

Reviewer

ASME Journal, Sadhana - Academy Proceedings in Engineering Science