

Curriculum Vitae



Dr. Sathyanarayana Ayyalasomayajula,
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In my current position as Assistant Professor at the IIT Bhubaneswar, I am involved and developing active research programs in both fundamental & applied problems of Turbulence, Particle Laden Flows and Oceanic Turbulence & Flows using Experimental as well as HPC & Massively Parallel Computational Tools.

Educational Qualifications

Post Doctoral Fellow at Sibley School of Mechanical & Aerospace Engineering, **Cornell University**, Jan 2007 - Aug 2007

Ph.D. Aerospace Engineering, Cornell University, Jan 2007.
Degree Awarded August 2007. GPA 3.9/4.00.

Thesis: Experimental Eulerian and Lagrangian measurements in simple turbulent flows.

M. S. Aerospace Engineering, Cornell University, Aug 2004. GPA 3.9/4.0

B.Tech. Aerospace Engineering, Indian Institute of Technology - Madras, May 2001. GPA 8.9/10.0

Current Professional Experience

Assistant Professor, School of Mechanical Sciences, IIT Bhubaneswar, Orissa, India

Jan 2012 – current

- Teaching Post-graduate & Under-graduate courses in Turbulence, Fluid Mechanics, Gas Dynamics
- Development of Institute level HPC facility.
- Design & Development of Short-term and application oriented courses for computational fluid mechanics and heat-transfer at under-graduate and post-graduate level.
- Development on large-scale Fluid Mechanics Teaching & Research lab.

Current Research Initiatives & Projects

DNS of Particle Laden HI Turbulent Flow under Axis-symmetric Expansion – Collaboration with University of Reykjavik & University of California.

Micro-scale Turbulence Measurements in Bay of Bengal under Oceans, Monsoons & Mixing (OMM) & ASIRI Joint Collaboration – ONR, USA & MoES, Govt. of India

DNS of Contracting Turbulent Flows using Novel Fourier Space Algorithms – IIT Bhubaneswar Seed Grant

Facilities & Lab Development

Fluid Dynamics Lab for Graduate & Under-Graduate Teaching & Research for School of Mechanical Sciences, IIT Bhubaneswar – Estimated Budget Rs 6 Cr (USD 1 Million) – In Progress – IIT Institute Facilities Development

HPC facility for School of Earth, Ocean, Climate Science, IIT Bhubaneswar – Estimated Budget Rs 6 Cr (USD 1 Million) – In Progress – IIT Institute Facilities Development

Development of multi-platform multi-architecture flexible High Performance Computing Facility – Under Preparation

Academic Awards

- Recipient of Sibley School of Mechanical and Aerospace Engineering, **Cornell University Fellowship**, 2001
- 2006 Jayesh Prize for **Outstanding Student (Doctoral Thesis) Talk**, Sibley School of Mechanical & Aerospace Engineering, Cornell University
- Recipient of the National Talent Search Scholarship (NTSE) 1995, conducted by NCERT, India.

Citations & Indices*

Total number of citations: 241

h-index: 6

i10-index: 5

*As per Google Scholar Data

Journal Papers

E. W. Saw, R. A. Shaw R A, S. Ayyalasomayajula, P. K. Chuang and A. Gylfason. Inertial clustering of particles in high Reynolds-number turbulence **Phys. Rev. Lett.** **100** 214501 (2008).

S. Ayyalasomayajula, Z. Warhaft and L. R. Collins. Modeling inertial particle statistics in isotropic turbulence. **Phys. Fluids.** **20**, 095104 (2008).

S. Ayyalasomayajula, A. Gylfason, L. Collins, E. Bodenschatz and Z. Warhaft. Lagrangian Measurements of Inertial Particle Accelerations in Grid Generated Wind Tunnel Turbulence. **Phys. Rev. Lett.** **97**, 144507 (Oct 2006).

S. Ayyalasomayajula and Z. Warhaft. Nonlinear interactions in strained axis-symmetric high-Reynolds-number turbulence. **J. Fluid Mech.** **566**, 273-307 (2006).

A. Gylfason, S. Ayyalasomayajula, and Z. Warhaft 2004. Intermittency, Pressure and Acceleration Statistics from Hot-wire Anemometry in Wind Tunnel Turbulence. *J. Fluid Mech.* **501**, 213-229 (2005).

Book Chapters

S. Ayyalasomayajula, A. Gylfason and Z. Warhaft, Lagrangian Measurements of Fluid and Inertial Particles in Decaying Grid Turbulence. *IUTAM Symposium on Computational Physics and New Perspectives on Turbulence*. Ed Y Kaneda. **Springer**, pp171-175 (2008).

Conference Proceedings and Invited Lectures

S. Ayyalasomayajula, S. Banerjee and Z. Warhaft. *Gravitational Settling of Inertial Particles in a Turbulent Like Flow*. American Physical Society, Division of Fluid Dynamics Conference, San Diego, CA, Nov. 18-20, 2012.

S. Ayyalsomayajula. *Experiments in Homogenous, Isotropic Turbulent Flows*. Department of Mechanical Engineering, IIT Kharagpur, Jul. 27, 2012.

S. Ayyalasomayajula. *Eulerian and Lagrangian investigations in high Reynolds number flows*. Center for Turbulence Research, Stanford University, Aug. 24, 2007.

S. Neuscamman, S. Ayyalasomayajula, J. Salazar, S. Gerashchenko, L. Collins, Z. Warhaft. *Measurements of the radial distribution function of inertial particles in turbulent flows*. American Physical Society, Division of Fluid Dynamics Conference, Salt Lake City, UT, Nov. 18-20, 2007.

S. Gerashchenko, N. Sharp, S. Neuscamman, S. Ayyalasomayajula, Z. Warhaft. *Lagrangian measurements of inertial particle trajectories in a turbulent boundary layer*. American Physical Society, Division of Fluid Dynamics Conference, Salt Lake City, UT, Nov. 18-20, 2007.

S. Ayyalasomayajula, L. R. Collins and Z. Warhaft. *Experiments and models of inertial particles in high Reynolds number turbulence*. American Physical Society, Division of Fluid Dynamics Conference, Tampa, FL, Nov. 20-22, 2006.

E.W. Saw, R. A. Shaw, S. Ayyalasomayajula, P. Y. Chuang, A. Gylfason, Z. Warhaft. *Inertial clustering of droplets in high-reynolds-number laboratory turbulence*. 12th Conference on Cloud Physics, American Meteorological Society, Madison, WI, 2006

S. Ayyalasomayajula, A. Gylfason, J. Salazar, Z. Warhaft, L. R. Collins and E. Bodenschatz July 17-20, 2006. *Inertial Particle Accelerations in Turbulence: Experiments and Numerical Simulations*. ASME Fluids Conference, Miami FL.

A. Gylfason, S. Ayyalasomayajula and Z. Warhaft. *Lagrangian Measurements of Inertial Particles in Wind Tunnel Turbulence*. American Physical Society, Division of Fluid Dynamics Conference, Chicago, IL, Nov. 20-22, 2005.

E. W. Saw, R. A. Shaw, S. Ayyalasomayajula, P. Y. Chaung, A. Gylfason, Z. Warhaft. *Experimental study of scale-dependent droplet clustering in Turbulence*. American Physical Society, Division of Fluid Dynamics Conference, Chicago, IL, Nov. 20-22, 2005.

Z. Warhaft, A. Gylfason and S. Ayyalasomayajula. *Preliminary Lagrangian Measurements of Inertial Particles in Wind Tunnel Turbulence*. Invited lecture, Challenging Turbulent Lagrangian Dynamics Conference, Rome, Italy, Sept. 1-4, 2005.

S. Ayyalasomayajula & Z. Warhaft. *Multi-scale interactions in strained high Reynolds number turbulence*. Invited lecture, Multi-scale interactions in Turbulent flows, CNLS, Los Alamos National Laboratory, Santa Fe, July 18-21, 2005.

S. Ayyalasomayajula & Z. Warhaft. *Axi-symmetric strain and relaxation of High Reynolds number wind-tunnel turbulence*. American Physical Society, Division of Fluid Dynamics Conference, Seattle, WA, Nov 21-23, 2004.

S. Ayyalasomayajula, A. Gylfason & Z. Warhaft. *Experimental issues in determining higher order structure functions in active grid-turbulence*. American Physical Society, Division of Fluid Dynamics Conference, Meadowlands NJ, Nov 23-25, 2003.

A. Gylfason, S. Ayyalasomayajula, and Z. Warhaft. *Turbulence Intermittency Characteristics in the Reynolds Number Range $100 < R_\lambda < 1000$* . American Physical Society, Division of Fluid Dynamics Conference, Dallas, TX, Nov 24-26, 2002.

Teaching Interests

Turbulence & Turbulence Theory – Under Graduate & Graduate Levels
Fluid Mechanics – Under Graduate & Graduate Levels (selected topics)

Experimental Fluid Mechanics – Under Graduate & Graduate Levels

Past Professional Experience

Assistant Professor, School of Mechanical Sciences, IIT Bhubaneswar, Orissa, India

Jan 2012 – current

- Teaching Post-graduate & Under-graduate courses in Turbulence, Fluid Mechanics, Gas Dynamics
- Development of Institute level HPC facility.
- Design & Development of Short-term and application oriented courses for computational fluid mechanics and heat-transfer at under-graduate and post-graduate level.
- Development on large-scale Fluid Mechanics Teaching & Research lab.

India
Director (Projects) & Assistant Professor, Sri Sri University, Orissa,

Jan 2010 – Dec 2011

- Project phase development, implementation and project management of a world-class University
- Development of Curriculum & other Academic Requirements for various university academic programs including Engineering & Sciences program.
- Interacting with organizations, corporate & educational institutions, senior faculty and managers to create University team including Faculty & Staff, Adjunct & Visiting Faculty, Corporate & Institutional Tie-Ups

Faculty & Administrator – AOL Intl Centre, Bangalore, India

Jan 2008 – Jan 2010

- Administrator of the Centre – comprising of 100 acres of campus with over 700 full-time and volunteer staff

- Faculty of the Art of Living Adult & Youth Programs

Post Doctoral Fellow – Department of Mechanical and Aerospace Engineering, Cornell University, NY, USA

Jan 2007 – Aug 2007

- Developing particle-tracking system for full 3D tracking for high Reynolds number turbulence wind tunnel flows.

Research Assistant - Department of Mechanical and Aerospace Engineering, Cornell University, NY, USA

May 2002 - Jan 2007

- Developed a particle tracking system for following droplets in high Reynolds number turbulence wind tunnel flows using a precision pneumatic sled and high-speed CMOS camera (Vision Research Phantom v7.1 camera).
- Developed and executed laser flow diagnostics – Laser Doppler Anemometry and Phase Doppler Particle Analyzers.
- Developed experimental procedures for hot wire anemometry measurements for high Reynolds number turbulent flow in a wind tunnel.
- Investigated the non-linear behavior of turbulence when strained axi-symmetrically both via experimental analysis and theoretical models.
- Developed theoretical models including the new Vortex model to investigate the physics of inertial particle dynamics in turbulent flows.
- Data processing and statistical analysis of random time-series.
- Mentored and managed students of both the undergraduate and graduate levels.

Teaching Assistant – Department of Mechanical and Aerospace Engineering, Cornell University

Fall 2002, Spring 2003 and Spring 2005

- Thermodynamics – Under-Graduate Level
- Control Systems & System Dynamics – Under-Graduate Level

Keywords

Hot-wire anemometry, Experimental fluid mechanics, Turbulent flows, Lagrangian particle tracking, Laser flow diagnostics, Laser Doppler anemometry, Phase Doppler Particle Analyzers, LabVIEW, Particle laden flows, Statistical analysis of random data & signals, Flow modeling, Simulation, Cloud Physics, HPC, DNS, LES, Inertial Particles, Particle tracking, Wind tunnels, Contraction, High speed cameras, Q-switched Lasers, Project Management, Academic Administration