

Akshay Anand

PhD In Mechanical Engineering (Fluid Dynamics, Applied Mathematics, Machine Learning)

+1 (850)-756-6438 | Nationality: Indian | DOB: 09/23/1996 |
akshay2021anand@gmail.com | aanand@fsu.edu • a-anand.com
Google Scholar | LinkedIn |

Education

Program	Major	Institute	Year
Doctor of Philosophy (PhD)	Mechanical Engineering	Florida State University, USA	2021-2025*
Master of Science	Mechanical Engineering	Florida State University, USA	2021-2024
Master of Science	Aeronautics & Space (Turbulence)	Centrale Lille & ENSMA, France	2017-2019
Bachelor of Engineering	Mechanical Engineering	RGPV University, Bhopal, India	2013-2017

Key Courses

- Fluid Dynamics & Computational Fluid Dynamics
- Aerodynamics & Aeroacoustics
- Bayesian Statistics & Advanced Signal Processing
- Unsteady Simulations (DNS, URANS, LES) & HPC
- Fluid-Structure Interactions & Turbulence
- Advanced Numerical Methods & Turbulent Heat Transfer
- Machine Learning & Applied Mathematics
- Turbulence Modeling & Hydrodynamic Stability

Research Projects

- Modeling Peripheral Leakages from the Face Masks** **Nat. Sci. Foundation** **May 2021 - April 2022**
Advisor: K. Shoele | Keywords - Applied Mathematics, Fluid Dynamics, FSI, CFD| Florida State University, USA
- Research (Aerospace) Engineer, European Project Clean Sky 2** **Dec 2019 - Nov 2020**
Advisor: Dr.T. Zaidi | Keywords - Thermal, Deep L., Supersonic, A.I| CNRS & Georgia Tech, US & France Campus
- Aerodynamic Efforts of Propellers at High Inc Angle Using CFD [URANS]** **Mar 2019 - Sept 2019**
Advisor: Prof.Thierry Jardin | Keywords - HiFi CFD, LES, Turbulence Modeling| ISAE-Supaero, Toulouse, France
- Num & Expt Model to Study Transition to Turbulence in Oscillating Flows** **Oct 2018 - Feb 2019**
Advisors: Prof. Hélène Baillet & Dr. Islam Ramadan | Keywords - PIV, LDA| ISAE - ENSMA, Poitiers, France
- DNS Simulation to Study Dynamics of Diatoms in Turbulent Flows** **April 2018 - Aug 2018**
Advisors: Prof. E.Calzavarini & Prof. F.Schmitt | Thermal Convection Univ Lille & CNRS-ONERA, Lille, France
- A Solver for Turbulent Couette-Poiseuille Flow with Wall-normal Stretching** **Jan 2018 - Aug 2018**
Advisor: Prof. Jean-Philippe Laval | Keywords - Turbulence Modelling, CFD| École Centrale de Lille, France

Skills and Tools

- Languages & Web Programming** - FORTRAN, C/C++, Python 2.7/3.7, JavaScript, HTML, AWS
- Operating Systems** - Unix, Linux (CentOS, Ubuntu), Bash, Mac OS, Windows
- Software and Libraries** - MATLAB, OpenFOAM, STAR-CCM+, Fluent, SU2, Solidworks, CUDA, TensorFlow
- Version Control Documentation** - Git, L^AT_EX, Doxygen, LibreOffice, MSOffice

Publication and Presentation

- Akshay Anand, Kourosh Shoele 'Using reduced-order fluid model to quantify the effectiveness of face mask in large population'** submitted to Physics of Fluids Journal, April 2024
- Akshay Anand, Vahid Tavanashad, Kourosh Shoele 'Sedimentation of flexible particle suspensions and formation of particle clusters at finite Reynolds number'** in process of submission to Journal of Fluid Mechanics, May 2024

- **Akshay Anand**, Harleen Kaur, Turab Zaidi, Dimitri Mavris '**A Scenario-Based Evaluation of Global Urban Air Mobility Demand**' published by AIAA SciTech Forum, Jan 4, 2021, USA
- Madhukar Mayakonda, Cedric Y. Justin, **Akshay Anand**, Colby Weit, Jiajie Wen, Turab Zaidi, Dimitri Mavris '**A Top - Down Methodology for Global Urban Air Mobility Demand Estimation**' June 2020, AIAA Aviation Forum, (Virtual), United States
- Jiajie Wen, Colby Weit, **Akshay Anand**, Madhukar Mayakonda, Turab Zaidi, Dimitri Mavris '**A Methodology for Supersonic Commercial Market Estimation and Environmental Impact Evaluation (Part II)**' June 2020, AIAA Aviation Forum, (Virtual), United States
- Colby Weit, Jiajie Wen, **Akshay Anand**, Madhukar Mayakonda, Turab Zaidi, Dimitri Mavris '**A Methodology for Supersonic Commercial Market Estimation and Environmental Impact Evaluation (Part I)**' Feb 2020, Aerospace Europe Conference, Bordeaux, France

-
- **Anand, A.** 'Talking and Facemasks: Unveiling the Crucial Factors for Optimal Protection of Large Population' **Nov, 2023**, American Physical Society, Division of Fluid Dynamics, **APS Conference, Washington, USA**
 - **Anand, A.** 'Effectiveness of Facemasks for Large Virtual Cohort of Population ' **May, 2023**, Vortex Dominated Flows – **DisCoVor Conference, Colorado, USA**
 - **Anand, A.** 'Quantifying the role of face mask in airborne respiratory disease transmission in a large population' **May, 2023**, **Florida Fluids Symposium Conference, Orlando, USA**
 - **Anand, A.** 'A population-based study of the facemask fluid dynamics during talking activity ' **Nov, 2022**, American Physical Society, Division of Fluid Dynamics, **APS Conference, Indianapolis, USA**
 - **Anand, A.** 'A Mathematical Framework to Infer Mask Peripheral Leakage Pattern in Large Population' 19th U.S. National Congress on Theoretical and Applied Mechanics, Invited talk **June, 2022, Texas - Austin, USA**
 - **Anand, A.** 'Analytical Model to Infer Mask Peripheral Leakage Pattern in Large Population' **Nov 21, 2021**, American Physical Society, Division of Fluid Dynamics, **APS Conference, Phoenix, USA**

-
- **Anand, A.** 'A Scenario-Based Evaluation of Global Urban Air Mobility Demand' Jan 19, 2021, AIAA Scitech Forum, Virtual Conference, USA
 - **Anand, A.** 'A Top - Down Methodology for Global Urban Air Mobility Demand Estimation' June 2020, AIAA Aviation Forum, Virtual Conference, USA
 - **Anand, A.** 'Aerodynamic Efforts of Propellers at High Incidence Angle Using 3D URANS Computation' Sept 2019, École Centrale de Lille & ISAE Supaero, France
 - **Anand, A.** 'Transition to Turbulence in Oscillating Flows', Feb 2019, CNRS Institute Pprime, Poitiers, France
 - **Anand, A.** 'Dynamics of Diatoms in a Turbulent Flows', June & Aug 2018, CNRS Laboratoire d'Océanologie et de Géosciences, Dunkerque & LMFL, Lille, France
 - **Anand, A.** 'Geothermal Heating and Cooling System Using Peltier Device', June 2017, RGPV University, Bhopal, India

Positions of Responsibility

- Mentored High - School Students as part of FSU's Young Scholar Program - 2022
- Organised Tech-Fest at BIRT, Bhopal India, 2017
- Mentored UG Students from Georgia Tech for Research Project - 2020
- Volunteer for Summer School on Active Turbulence, 2019

Soft Skills and Languages

- Adaptability & Rigorous
- Italian: A2 (Basic) & French: B1 (Intermediate)
- Excellent Communication Skills & Team Work
- English: C2 (Fluent) & Hindi: Mother Tongue

○ ¹ Developed an analytical model able to infer mask peripheral leakage from a virtual cohort of faces, use of mathematical techniques such as principal component analysis and mode decomposition along with HiFi simulations using in-house codes

○ ³ Aerodynamic efforts of propellers using high fidelity URANS computations, [STAR-CCM+], In-house LES code for finer calculation HPC, measurement of (propeller) aerodynamic forces using low Re wind-tunnel, FSI analysis

○ ² Developed a system dynamics model using deep- learning algorithm capable of forecasting the demand of 'Urban Air Mobility', performed HiFi fuel burn analysis of supersonic aviation, environment impact analysis using HiFi CFD [In-house]

○ ⁴ Numerical & experimental fluid dynamics (PIV and LDA) used reduced order modelling and data assimilation techniques to compare two sets of velocity measurement using PIV and LDA during transition to turbulence phenomena

- ⁵ Direct numerical simulation (DNS), Ch4 Project, Diffusion Turbulent Flows, Eulerian and Lagrangian turbulence phenomena in the ocean and the microorganisms in ocean for this project used Lattice Boltzmann Code written in object oriented programming C++ and some libraries of Python
- ⁶ Developed a turbulent model in a simple case to compare the results with the theoretical solution in laminar case, and with experimental results for the turbulent case. As the case was simple, the effect of several parameters such as the number of grid points as well as the grid stretching near the wall were investigated.