

Dilip Kalagotla

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EDUCATION

University of Cincinnati, Cincinnati, Ohio, USA

- Ph.D. in Aerospace Engineering Apr 2025
 - Advisor: Dr. Paul D. Orkwis, Professor Emeritus, Aerospace Engineering
 - Research Focus: Multiphysics, Supersonic flows, Numerical analysis, Deep learning, CFD
- M.S. in Aerospace Engineering Apr 2018
 - Advisor: Dr. Paul D. Orkwis, Interim Dean, College of Engineering and Applied Sciences
 - Cumulative GPA: 3.89 / 4.00

Indian Institute of Technology (ISM), Dhanbad, Jharkhand, India

- B.Tech. in Mechanical Engineering Apr 2015
 - Advisor: Dr. Sanjoy K. Ghoshal, Associate Professor, Mechanical Engineering
 - Cumulative GPA: 8.18 / 10.00

PROFESSIONAL EXPERIENCE

Teaching Assistant, University of Cincinnati, Cincinnati, Ohio, USA 2021/ 2023/ 2024

- Developed instructional modules for Aerodynamic Simulations, focusing on numerical analysis.
- Created an educational API to introduce Deep Neural Networks (DNNs) to undergraduate students.
- Delivered several lectures covering the fundamentals of linear algebra, DNNs, and Python programming.
- Assisted in teaching Biostatistics-I, helping in delivering high quality lectures on various statistical concepts such as descriptive statistics, ANOVA, t-test, Rates/Proportions, and Confidence intervals.

Graduate Assistant, University of Cincinnati, Cincinnati, Ohio, USA May 2021 – Dec 2022

- Contributed to the supervision and maintenance of the computing infrastructure and provided support to the administrative team at CEAS, UC.
- Produced quarterly reports to simplify the comprehension of computing demands, leading to hundreds of thousands of cost savings for the IT team.

Research Assistant, University of Cincinnati, Cincinnati, Ohio, USA May 2016 – Dec 2020

- Engaged in advanced research at the graduate levels.
- Pioneered the development of an internal CFD data analysis and visualization tool to help with several projects at the Gas Turbine Simulation Laboratory (GTSL).
- Provided mentorship to numerous Master's and Ph.D. students, educating them on the use of Linux, git, and various programming languages along with assistance to technical aspects of fluid mechanics and deep learning.
- Maintained a collaborative repository of CFD solutions ranging from RANS to DNS to assist in the ongoing development of machine learning tools.

Research Assistant, Procter & Gamble Sim Center, Cincinnati, Ohio, USA May 2016 – May 2017

- Contributed to the modeling and simulation of a new production line for baby care products using ABAQUS and automated several processes using Fortran 95.
- Developed a universal air-based folding system, eliminating the requirement for separate machines. The impacts included meeting demand with varying customer needs and long-term cost savings in maintenance.

RESEARCH EXPERIENCE

Gas Turbine Simulation Laboratory, UC, Cincinnati May 2017 – Current

- Project-Arrakis/lptlib: Developed a highly parallelized Python-based tool for one-way coupled Lagrangian Particle Tracking (LPT) and Lagrangian-to-Eulerian transformation tailored for particle inertia bias uncertainty quantification in non-intrusive experiments. The auxiliary set of tools implemented includes grid and flow IO, grid manipulation, visualization, several drag models, and a particle response model to quantify the particle specifications used in supersonic Particle Image Velocimetry (PIV). This tool is published on PyPI.
- syPIV: Created a highly parallelized Python-based synthetic particle image velocimetry data generator.
- PIVnet: Engineered a bilateral convolutional neural network (CNN) to mitigate uncertainty stemming from particle dynamics in PIV. Successfully demonstrated its efficacy in an oblique shock case utilizing the aforementioned tools.
- Modified OpenFOAM: Adapted the SIMPLE algorithm in OpenFOAM to extract residuals from simulations. Used fine grid residuals to demonstrate a fine similar solution on a coarse grid.
- Modified-Visual3: Enhanced an existing streamline plotting code to accommodate solid particles, facilitating improved validation of an RANS-based code (OVERFLOW) with corresponding PIV data in a shock boundary layer interaction scenario.

PUBLICATIONS

- [1] D. Kalagotla, and P. Orkwis “Numerical Analysis of Drag Models and Particle Size Estimation for PIV in Supersonic Flows,” *AIAA AVIATION FORUM AND ASCEND 2024*, 29 July - 2 August 2024, Las Vegas, NV, (AIAA 2024-4382)
- [2] D. Kalagotla, and P. Orkwis “A New Approach to Synthetic PIV Data Based on Particle Dynamics History,” *AIAA SCITECH 2024 Forum*, 8-12 January 2024, Orlando, FL, (AIAA 2024-2667)
- [3] D. Kalagotla, and P. Orkwis “An Object-Oriented Approach to Tracking Particles in a Flow,” *AIAA Aviation 2023 Forum*, 12-16 June 2023, San Diego, CA, (AIAA 2023-3276)
- [4] D. Kalagotla, A. Karnam, and E. Gutmark, “Comparison of Flow Characteristics of Single and Twin Rectangular Jets Using OVERFLOW Code,” *AIAA SciTech 2020 Forum*, 6-10 January 2020, Orlando, FL, (AIAA 2020-1334)
- [5] D. Kalagotla, P. Orkwis, and M. Turner, “Methodology to Study the Behavior of Tracer Particles in the Flow Field of Rotor 37 Using CFD Data,” (*AIAA SciTech 2020 Forum*, 6-10 January 2020, Orlando, FL, (AIAA 2020-1809)
- [6] D. Kalagotla, P. D. Orkwis, and M. G. Turner, “Modeling Particle Drag in Accelerating Flows with Implications for SBLI in PIV - A Numerical Analysis,” *2018 Fluid Dynamics Conference, AIAA AVIATION Forum*, (AIAA 2018-3555), Atlanta, Georgia, USA, Jun 2018.
- [7] H. Chhabra, D. Kalagotla, and P. Orkwis, “Python based API to post-process CFD data,” (*AIAA SciTech 2023 Forum*, 23-27 January 2023, National Harbor, MD, (AIAA 2023-1225).
- [8] D. Kalagotla, P. Orkwis, and D. Cuppoletti, “PIVnet: A Deep Learning Based Particle Dynamics History Corrector for Particle Image Velocimetry,” (*AIAA SciTech 2025 Forum*, 06-10 January 2025, Orlando, FL (Accepted))
- [9] D. Kalagotla, D. Cuppoletti, and P. Orkwis, “Accessing Particle Dynamics History in Supersonic Jet Exhaust PIV Experiments,” (*AIAA Aviation 2025 (In Progress)*)

LEADERSHIP EXPERIENCE

Mentor, Aerospace Engineering, CEAS, UC Aug 2020 – Dec 2023

- Provided mentorship to several graduate students, facilitating their journey to a Master’s degree
- Played a pivotal role in improving the manipulation and visualization aspects of the grid by contributing to developing a project module.

UC Piloting Club, UC

- Founder and President Aug 2019 – Aug 2022
 - Established and led the UC Piloting Club, fostering piloting experiences for UC students through collaboration with Sporty’s Piloting Academy
 - Organized club events, managed budget allocation, and oversaw various operational aspects
- External Advisor Aug 2022 – Current
 - Continues to serve on the board, offering guidance to the Piloting Club team and providing strategic direction for a growing community of 300 piloting enthusiasts

Aerospace Engineering Graduate Student Association, UC

- Secretary Aug 2015 – Aug 2017
 - Orchestrated student events within the Aerospace Engineering department
 - Assumed responsibility for verifying travel reimbursement forms

Department of Mechanical Engineering, IIT(ISM) Dhanbad

- Prefect Aug 2013 – Apr 2014
 - Organized two national-level symposiums, showcasing exceptional leadership and event management skills
- Treasurer, Cultural Fest Feb 2014
 - Diligently managed the finances of the annual cultural fest, demonstrating strong financial management abilities

ACHIEVEMENTS

- Graduate student of the month, awarded by CEAS, UC May 2023
- UGS/GIA (Grad Incentive Scholarship), awarded by UC Aug 2015 – Apr 2020
- Merit Cum Means Scholarship, Awarded by the Indian Government Apr 2011 – Apr 2015

SKILLS

Python, Fortran, C++, Pointwise, NASA OVERFLOW, NUMECA FINE, Ansys Fluent, StarCCM+, OpenFOAM, Paraview, Tecplot, L^AT_EX, MATLAB, SIMULINK, Solidworks, Microsoft Office.

CERTIFICATIONS

Machine Learning, DNNs with PyTorch, Deep Learning Specialization, CUDA Programming, ABAQUS

[CV compiled on 2024-11-14]