Tejas Shripal Aerospace Graduate
Paris, France | +33 07 80 85 15 63 | tejasshripal@gmail.com | @tejasshripal

Education

Msc. Aeronautics, Mechanics and Energetics | *ISAE École Nationale Supérieure de Mécanique et d'Aérotechnique* ***Present***
BEng Mechanical Engineering | *Visvesvaraya Technological University* ***2018-2022***

Technical Skills

Languages : Python, C/C++, FORTRAN, Bash, MATLAB, Julia
Design Tools : CATIA, SolidWorks, SpaceClaim
Numerical Solvers : ANSYS Fluent/CFX, Star-CCM+, OpenFOAM
Pre and Post-processing tools : Gmsh, Paraview, Python
OS and Utilities : Linux (Ubuntu), Windows, Office Suite

Core Competencies

Numerical Methods for PDEs(FVM, FDM)	Numerical Modelling	Thermochemical Modeling
Technical Reporting and Documentation	Combustion and Reaction Kinetics	Data Analysis and Post-processing
Experimental Fluid and Combustion Diagnostics	Data-Driven Analysis with ML	High-Performance Computing (HPC)

Experience

Research Intern (M2) – Instability Analysis of Helical Vortices in Turbine Wakes | *Sorbonne Université* ***Present***

- Enhanced in-house solvers (HELIX/HELIX-LIN) through FFT optimization and parallelization, reducing computation time by 22% during baseflow generation.
- Designed and executed HPC workflows for parametric studies, including convergence checks, mesh refinement, and systematic sweeps across vortex pitch, core radius, and axial velocity.
- Performed direct numerical simulations and linear stability analyses of helical vortices using the linearized Navier–Stokes framework, identifying dominant instability modes and dispersion relations.
- Automated post-processing with Python/Matlab for mode extraction, dispersion curve construction, and parameter sensitivity, ensuring reproducible and scalable workflows.

Academic Projects

Numerical Finite Volume Analysis of Incompressible and Compressible Flows | *FVM, Python, FORTRAN* ***2025***

- Solved the 1D heat diffusion equation using finite difference methods in FORTRAN and Python; implemented finite volume schemes for linear advection and Burgers' equation in Python.
- Analyzed flow behavior across regimes, validating numerical stability and convergence with theoretical expectations and benchmark results.

Turbulent Combustion Simulation with OpenFOAM | *OpenFOAM, Gmsh, ParaView, Numerical Modelling, Linux* ***2025***

- Simulated turbulent premixed and non-premixed combustion in counterflow and combustor configurations using XiFoam and reactingFoam, improving physical model fidelity by 18–22%.
- Automated mesh generation and simulation workflows using Gmsh and Bash scripting, reducing case setup time by 40%.
- Analyzed flame stability, heat release zones, and pollutant formation via ParaView visualization, improving flame prediction accuracy.

Experimental Study of Supersonic Wing Profiles | *Wind Tunnel Testing, Numerical Validation* ***2024***

- Designed and conducted wind tunnel experiments to evaluate shock structures and flow separation for diamond and concave wing geometries at Mach 1.5–2.
- Captured high-speed flow phenomena using Schlieren imaging, identifying key shock reflections and boundary layer interactions.
- Assessed aerodynamic performance by measuring lift, drag, and pressure profiles across geometries under controlled test conditions.
- Complemented physical testing with CFD setup in STAR-CCM+ to contextualize experimental trends and aerodynamic efficiency.
- Delivered a comprehensive aerodynamic report synthesizing experimental observations with theoretical insights.

Experimental Investigation of Laminar Premixed Flames and Combustion Diagnostics | *Python* ***2024***

- Measured fundamental flame velocity of laminar premixed propane-air mixtures to study flame stability and dependence on equivalence ratio and pressure.
- Set up and operated a 3 m plexiglass combustion tube equipped with ignition systems, pressure sensors, and a turbulence generator to observe flame propagation and pressure evolution.
- Conducted controlled ignition tests at open and closed ends to compare the effects of boundary conditions and turbulence on flame speed and pressure fluctuations.

- Applied emission spectroscopy techniques using a Bunsen flame and spectrometer setup to identify reactive species, estimate flame temperature, and validate spectral data with theoretical models.

Experimental Analysis of Fundamental Flow Phenomena | *Flow Analysis, Python, PIV* ***2023***

- Conducted wind tunnel experiments on flow around a circular cylinder, measured pressure distribution.
- Set up and calibrated curved channel flow experiment with a grid inlet and multiple 90° bends; used dye injection to visualize flow separation and reattachment zones under controlled laminar inflow.
- Executed PIV-based trailing vortex visualization for a finite wing immersed in a seeded fluid; aligned laser sheet, synchronized cameras, and processed images to extract vorticity and circulation data.
- Post-processed and analyzed experimental results using Python.

Thermochemical Modeling with Cantera and Python | *Python, NumPy, Matplotlib* ***2023***

- Simulated constant-pressure and constant-volume combustion of CH_4-air and H_2-O_2 mixtures using Cantera with detailed chemical mechanisms (GRI-Mech 3.0, H_2-O_2 kinetics), tracking transient species and thermal profiles
- Retrieved thermodynamic properties (e.g., enthalpy, entropy, specific heats) from Cantera's mechanism files
- Tracked species evolution (e.g., OH, H_2O, CO) and temperature rise over time to identify ignition characteristics and analyze reaction zone behavior.

Languages

English | *C1 Native/Bilingual*
French | *B2 Intermediate*
German | *A1 Elementary*

Volunteering Experience

Section Leader | *Stanford University - Code in Place*
President | *International Student Association*
Campaigns Team Volunteer | *MakeADifference*