Biraj Khadka

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Objective

Highly enthusiastic aerospace postgraduate skilled in experimental and computational fluid dynamics through experience in multiple projects and consistently strong academic performance in lab work. Strongly motivated to pursue research in computational fluid dynamics and machine learning. Skilled in analysis and presentation of data

Education

IOE Pulchowk Campus, Tribhuvan University | Lalitpur, Nepal **November 2018 – April 2023**
Bachelor in Aerospace Engineering

Technical Skills

Programming: C++, Python, MATLAB, LaTeX
Platforms: Linux (Ubuntu), OpenFOAM
Software & Tools: Catia V5, Ansys, Inkscape
Communication: Technical reports, teaching skills, and presentations (large and small audiences)

Experience

FOSSEE, IIT Bombay **May 2023 – Present**
Research Assistant *Mumbai, India*

- Performed acoustic analysis of blood flow in the artery stenosis under the supervision of Dr.Janani Srree Murallidharan
- Written scripts and recorded the video for OpenFOAM Spoken Tutorials on bubble rise case
- Provided mentorship to interns and examined the case study reports of the project.

National Innovation Center **April 2021 – April 2022**
Mechanical Design Engineer *Kirtipur, Nepal*

- Designed and developed a converging-diverging nozzle of a sounding rocket made for the Spaceport America Cup 2021
- Performed external aerodynamics of sounding rocket in Ansys
- Prepared solid propellant grain and applied layers of fiberglass on the rocket's airframe impregnated with resin

Projects

CFD of single and multiphase(gas-liquid) flow in stirred tank reactor **May 2023 – July 2023**

- Compared the normalized radial and tangential velocities with experimental results in single-phase flow
- Validated the gas holdup, power number and pumping numbers of impeller against experimental results in gas-liquid flow in stirred tank reactor

Numerical study of air pollutants in urban street canyon **August 2022 – April 2023**

- Developed a solver and validated turbulence model against the experimental(codasc) data.
- Studied the effect of Aspect ratio and Balcony on pollutant dispersion in OpenFOAM
- Utilized the same turbulence model and studied pollutant dispersion in a street canyon in Bagbazar, Kathmandu

Feasibility study of Dream Chaser Landing in GBIA using GNSS system **October 2021 – June 2022**

- Utilized a Model-Based Systems Engineering (MBSE) approach for stakeholder analysis, requirements elicitation, functional analysis, and design synthesis.
- Conducted functional analysis for re-entry trajectory optimization, terminal area energy management, and final approach & landing phases based on the experiences of NASA's space shuttle missions
- Presented the work at the NAST conference in 2022

Unsteady simulation of a moving airfoil **March 2021 – August 2022**

- Studied the dynamic stall of moving airfoil(NACA 0012) using k-ω turbulence model in OpenFOAM and calculated the pressure fluctuation, forces, lift coefficient, and drag coefficient.

Publications

Under Review Journal Paper

- **Khadka Biraj**, Lohani Binayak, Parajuli Bibek "Numerical Study of Air pollutants dispersion in an urban street canyon" (2023), IOE Pulchowk Campus(Thesis)

Conference Presentation

- Dhital Naryan, Dhungana Ganesh, **Khadka Biraj**, Gaihre Anupama " A Feasibility Study of Dream Chaser Landing in an airport in Nepal" (2022), Nepal Academy of Science and Technology Conference

Relevant coursework

Numerical Methods, Computational Fluid Mechanics, Fluid Mechanics, Compressible Aerodynamics, Finite Element Method, Machine Learning, Heat Transfer and Thermodynamics, Flight Dynamics, Unmanned Aerial Vehicle

Awards

- Nancy Spirit Award in Spaceport America Cup 2021
- Merit Scholarship 2020