SUMAN SHEKHAR

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EDUCATION

Indian Institute of Technology (Indian School of Mines) Dhanbad *Expected May 2022*
BTech in Mechanical Engineering
Overall GPA: 6.9/10

RESEARCH EXPERIENCE

Melbourne University May 2021 - Present
Summer Internship *Melbourne, Australia*

- Investigating the role of double-diffusion in the formation of Antarctic offshore polynya.
- Developed a python script for Analysis of Argo float data which contain float hydro-graphic observations from Maud rise from 2011-2018.
- Plots with potential temperature, salinity, Buoyancy frequency were plotted for better visualization of Mixed layer depths and convection period.
- Large Eddy Simulation Modelling of open ocean convection with the initial condition extracted from Argo float data and Heat flux boundary conditions that were obtained by mooring data. The aim is to reproduce the event investigating the role of double-diffusion in the event.

Melbourne University November 2020 - February 2021
Winter Internship *Melbourne, Australia*

- Modelling Open ocean convection using open source solver Oceananigans.
- Performed Grid analysis to find optimized grid for the simulation.
- Developed Large Eddy Simulation Julia script that uses GPU for computation and analysed the Mixed Layer Depth results with serial code.
- Developed Python script that uses lazy computation using Dask(parallel computing package) to compute simulation data contained in NetCDF file.

Universiti Tecknologi Petronas December 2009 - October 2010
Research Internship *Malasiya*

- Performed Species transport and chemical reaction simulation of in a combustion chamber using ANSYS software.
- Developed a Python and MATLAB script which solves conservation equations describing convection, diffusion, diffusion and reaction sources for each component species in the fuel chamber.

National University of Singapore May 2020 - June 2020
Research Internship *Singapore*

- Learnt about Direct Numerical Simulation and FORTRAN programming language.
- Conducted a Numerical study on Stookian flow.

University of Nicosia April 2020 - May 2020
Research Internship *Nicosia, Cyprus*

- Developed a python script to simulate a virus transmission in population with varying wind speed.
- Analysed SIR virus transmission model. And pointed out that those model must incorporate fluid dynamics parameter that can govern virus transmission. Came up with humidity and wind speed to incorporate as a beta parameter in SIR model.

TEACHING EXPERIENCE

Computational Fluid Dynamics fall 2021
Department of Chemical Engineering, Indian Institute of Technology (ISM) Dhanbad

Introduced the concept of Global Spectral Analysis and introduced commercial software such as ANSYS, Converge CFD.

Aerodynamics spring 2020
Mechismu Racing Workshop, Indian Institute of Technology (ISM) Dhanbad

Workshop slides can be accessed here.

LAB EXPERIRNCE

Aero-Acoustic Lab February 2019 - August 2019
Department of Mechanical Engineering, Indian Institute of Technology (ISM) Dhanbad

Tests of leading edge serration on an Aerofoil, noise reduction capabilities/reverberation room sound-absorption coefficients, sound transmission loss.

High Performance Computing Lab May 2021 - present
Department of Mechanical Engineering, Indian Institute of Technology (ISM) Dhanbad

Development of High Accuracy Algorithm for scientific computing.

CONFERENCE PRESENTATIONS

OceanHackWeek 3 August 2021 - 6 August 2021

enisse Fierro Arcos, Shikha Singh, Suman Shekhar(August 2021).Project Presentation in OceanHack-Week organised by University of Washington on CMIP6 workflows, turning big climate projection data into useful inputs for modelling and analysis.

OTHER EXPERIENCES

Young Earth System Scientists community August 2021 - Present

Collaborating with researcher from three different continents on an Earth science project using Machine learning and will continue throughout the academic year.

Mechismu Racing(FSAE Team) February 2019 - Present
Mechismu Racing, Indian Institute of Technology (ISM) Dhanbad

Lead Aerodynamics expert of the team. Applied Fluid dynamics and software skills in analysing the design and optimization of the aerodynamics shape and Participated in Virtual Formula Bharat in 2021.

Kartavya NGO December 2018 - May 2019
Kartavya, Indian Institute of Technology (ISM) Dhanbad

Tutoring mathematics to unprivileged children for free of cost.

AIESEC NGO September 2018-January 2018
Indian Institute of Technology (ISM) Dhanbad

Attended various Leadership programs focused on Sustainable development goals.

· Volunteered for organising TedX talk.

TECHNICAL SKILLS

Programming Languages	Fortran, C++, Julia, matlab, Python, CUDA, MPI, git
Packages & APIs	Xarray, Dask, Pandas, Xgcm, Numpy, Metpy
Softwares	ANSYS, Converge CFD, Solidworks, StarCCM
Documentation Preparation Systems	LaTeX (document classes: article, beamer; packages: tikz)
Open Source Tools	Oceananigans, CMIP6 pangeo preprocessing
Scientific Computing skills	Global Spectral Analysis, Fourier Analysis, FEA, FDM
modeling skills	Large Eddy Simulations, DNS, RANS

REFERENCES

Tapan Sengupta — Undergraduate Thesis Advisor

High Performance Computing Lab, Department of Mechanical Engineering
Indian Institute of Technology (ISM) Dhanbad, India
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Bishakhdatta Gayen — Internship Advisor

epartment of Mechanical Engineering
University of Melbourne, Australia
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Aditi Sengupta — Undergraduate thesis Co-Advisor

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Thomas Moore — OceanHackWeek Mentor

Ocean Data Analyst
CSIRO, Australia
https://people.csiro.au/M/T/Thomas-Moore