Ashwin Vishnu **Mohanan**

Postdoc · Research Software Developer

Mårdstigen 2 lgh 1101, Solna 17075, Sweden

(+46) 761 85 65 03 | avmo@misu.su.se | https://ashwinvis.github.io | ashwinvis | ashwinvishnu | 0000-0002-2979-6327

"We are what we think. With our thoughts we make our world."

Experience

Stockholm University
Stockholm, Sweden

Postdoctoral Researcher — *Oct. 2019 - Present*

- Project: Improving sub-grid scale and wall models for LES of atmospheric boundary layer turbulence.
- Working within a multi-disciplinary team comprising of researchers with applied mathematics, meteorology and engineering backgrounds.

KTH Royal Institute of Technology
Stockholm, Sweden

Teaching Assistant — *Oct. 2014 - Sept. 2019*

- Taught and managed boundary layer, turbulence, vehicle aerodynamics, favourable pressure gradient labs.

Université Grenoble Alpes
Grenoble, France

Visiting Research Scholar — *May 2016 - Jul. 2016*

- Hands-on experience with Particle Image Velocimetry (PIV) experiments for MILESTONE (Mixing and Length Scales in Stratified Turbulence).
- Development of a new package FluidImage, a libre framework for scientific treatments of large sets of images.

Education

KTH Royal Institute of Technology
Stockholm, Sweden

Ph.D. in Engineering Mechanics — *Oct. 2014 - Sept. 2019*

- Thesis: Advancements in stratified flows through simulation, experiment and open research software development
- Core developer for FluidDyn project — a collection of open-source packages for research and teaching.
- Relevant courses: Turbulence, Advanced Compressible Flows, Geophysical fluid mechanics, General Circulation.

Indian Institute of Technology (IIT), Kanpur
Kanpur, India

M. Tech. in Aerospace Engineering (Aerodynamics) — *Aug 2012 - May 2014*

- Thesis: Mixed convection instablities with and without Boussinesq Approximation.
- Relevant courses: Introduction to scientific computing, Advanced computational fluid mechanics, Aerodynamics, Transition and turbulence.

Skills

Natural Languages	English, Malayalam, Hindi, Swedish
Programming Languages	Python, Fortran, C, C++, MPI, Awk, LaTeX, Bash, and several GNU/Linux commands
Programming Skills	Object-oriented programming, Functional programming, Version control, Continuous integration, Testing, Code Coverage, Python packaging, GUI designing with Qt, Basic web development
Python packages	Standard library, NumPy, SciPy, mpi4py, Cython, Pythran, Dask, requests, Jupyter, IPython, Matplotlib, h5py, h5netcdf, xarray, Sympy

Extracurricular Activity

Outreach and science communication
Reddit

Creator and moderator of reddit.com/r/FluidMechanics — *Apr 2015 - Present*

- An active community of approximately 6700 users, facilitating news and discussions around fluid mechanics.

Various open-source projects
Internet

Developer and contributor — *Aug 2014 - Present*

- Active participation in GitHub and Bitbucket in the form of development, bug reports, pull requests and code-review.
- Associated projects: FluidDyn, AeroPython, Pythran, Jupyterlab.
- Maintainer of a handful of packages in Python Package Index (PyPI) and Arch Linux User Repository (AUR).

Certificates & Achievements

International

2017 **Student travel grant**, American Geophysical Union (AGU) Fall Meeting — *New Orleans, USA*

2014 **317/340**, Graduate Record Examinations (GRE) — *Delhi NCR, India*

2014 **110/120**, Test Of English as a Foreign Language (TOEFL) — *Delhi NCR, India*

Domestic

2011 **All India Rank 390**, Graduate Aptitude Test in Engineering (Mechanical) — *India*

2007 **School topper, A1 grade in all subjects**, All India Secondary School Certificate Examination (AISSCE) — *India*

Research

Refereed Articles

FluidDyn: A Python Open-Source Framework for Research and Teaching in Fluid Dynamics by Simulations, Experiments and Data Processing
Pierre Augier, Ashwin Vishnu Mohanan, Cyrille Bonamy
Journal of Open Research Software 7.1 (Apr. 2019) p. 9. 2019

Shallow Water Wave Turbulence
Pierre Augier, Ashwin Vishnu Mohanan, Erik Lindborg
Journal of Fluid Mechanics 874 (Sept. 2019) pp. 1169–1196. 2019

FluidFFT: Common API (C++ and Python) for Fast Fourier Transform HPC Libraries
Ashwin Vishnu Mohanan, Cyrille Bonamy, Pierre Augier
Journal of Open Research Software 7.1 (Apr. 2019) p. 10. 2019

FluidSim: Modular, Object-Oriented Python Package for High-Performance CFD Simulations
Ashwin Vishnu Mohanan, Cyrille Bonamy, Miguel Calpe Linares, Pierre Augier
Journal of Open Research Software 7.1 (Apr. 2019) p. 14. 2019

A two-dimensional toy model for geophysical turbulence
Erik Lindborg, Ashwin Vishnu Mohanan
Physics of Fluids 29.11 (Nov. 2017) p. 111114. 2017

KdV Equation and Computations of Solitons: Nonlinear Error Dynamics
V. M. Ashwin, Kumar Saurabh, M Sriramkrishnan, PM Bagade, M. K. Parvathi, Tapan K Sengupta
Journal of Scientific Computing 62.3 (2015) pp. 693–717. Springer US, 2015

Conferences

Make Your Python Code Fly at Transonic Speeds!
Ashwin Vishnu Mohanan
PyCon Sweden, 2019, Stockholm

Measuring mixing efficiency in experiments of strongly stratified turbulence
P. Augier, A. Campagne, T. Valran, M. Calpe Linares, A. V. Mohanan, D. Micard, S. Viboud, A. Segalini, N. Mordant, J. Sommeria, E. Lindborg
AGU Fall Meeting Abstracts (Dec. 2017). 2017

Modifying shallow-water equations as a model for wave-vortex turbulence
A. V. Mohanan, P. Augier, E. Lindborg
AGU Fall Meeting Abstracts (Dec. 2017). 2017

FluidImage, a libre framework for scientific treatments of large sets of images
Pierre Augier, Cyrille Bonamy, Antoine Campagne, Ashwin Vishnu Mohanan
Congrès Francophone de Techniques Laser (CFTL), 2016

First report of the MILESTONE experiment: strongly stratified turbulence and mixing efficiency in the Coriolis platform
Antoine Campagne, Henrik Alfredsson, Rémi Chassagne, Diane Micard, Nicolas Mordant, Antonio Segalini, Joel Sommeria, Samuel Viboud, Ashwin V. Mohanan, Erik Lindborg
VIIIth International Symposium on Stratified Flows (ISSF), 2016

Invited Talks

A two-dimensional toy model for geophysical turbulence
A. V. Mohanan, P. Augier, E. Lindborg
MISU, Stockholm University (Mar. 2018). 2018

Modifying shallow-water equations as a model for wave-vortex turbulence
A. V. Mohanan, P. Augier, E. Lindborg
Annual FLOW meeting (Jan. 2018). 2018