

Ashwin Vishnu Mohanan

PH.D. STUDENT · RESEARCH SOFTWARE DEVELOPER

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

Education

KTH Royal Institute of Technology

Stockholm, Sweden

PH.D. IN GEOPHYSICAL FLUID MECHANICS

Oct. 2014 - Exp. Jun. 2019

- Study of geophysical turbulence using a combination of CFD simulations, theory and experiments.
- Simulated classical and modified shallow water equations using pseudospectral methods to understand how energy cascades and transfers across lengths scales of fluid motion.
- Core developer for FluidDyn project — an ecosystem of open-source packages for research and teaching in fluid mechanics.
- 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

- Studied instabilities and transition on flow over a flat plate subjected to heating.
- Hands-on experience in developing accurate finite-difference schemes, and analysing numerical error dynamics.
- Implemented Fortran based Navier-Stokes solvers, with and without Boussinesq approximation.
- Relevant courses: Introduction to scientific computing, Advanced computational fluid mechanics, Aerodynamics, Transition and turbulence.

Skills

Programming Python, Fortran, C, C++, MPI, Awk, \LaTeX , Bash, and several GNU/Linux commands

DevOps Git, Mercurial, Docker, Bitbucket Pipelines, Travis CI, Codecov, Python packaging

Python packages

Standard library, NumPy, SciPy, mpi4py, Cython, Pythran, Dask, requests, Jupyter, IPython, Matplotlib, h5py, h5netcdf, xarray, SymPy

GUI Qt Designer, PyQt / PySide

Front-end Pelican, Sphinx, Markdown, reStructured Text, HTML, CSS

Languages English, Malayalam, Hindi, Swedish

Experience

KTH Royal Institute of Technology

Stockholm, Sweden

TEACHING ASSISTANT

Oct. 2014 - Exp. Mar. 2019

- Responsible for administration and teaching of laborations in the Fluid Physics Laboratory at Department of Mechanics.
- 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).
- Developed an image preprocessing module for FluidImage, a libre framework for scientific treatments of large sets of images.

GS Engineering and Construction India, Pvt. Ltd.

Delhi NCR, India

GRADUATE ENGINEER TRAINEE (PIPING)

Jul. 2011 - Jun. 2012

- Prepared material take-off (MTO) and isometric drawings of piping lines.
- Conducted quality checks of pipe routings against piping and instrumentation diagrams (P&IDs) for Rabigh-II Refining and Petrochemical Project.
- Coordinated delivery of isometric drawings for Ruwais refinery expansion project.

Extracurricular Activity

Outreach and science communication

Reddit

CREATOR AND MODERATOR OF [REDDIT.COM/R/FLUIDMECHANICS](https://www.reddit.com/r/FluidMechanics)

Apr 2015 - Present

- An active community of approximately 3300 users, facilitating news and discussions around fluid mechanics.

Various open-source projects

DEVELOPER AND CONTRIBUTOR

Internet

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).

Music and dance

GUITARIST / DANCE CREW MEMBER

India

Aug. 2009 - May. 2014

- Performed as part of a hip-hop dance crew, winning prizes in several competitive events across south India.
- Performed for two student events as guitarist.

Certificates & Achievements

INTERNATIONAL

- 2017 **Student travel grant**, American Geophysical Union (AGU) Fall Meeting
- 2014 **317/340**, Graduate Record Examinations (GRE)
- 2014 **110/120**, Test Of English as a Foreign Language (TOEFL)

New Orleans, USA

Delhi NCR, India

Delhi NCR, India

DOMESTIC

- 2011 **All India Rank 390**, Graduate Aptitude Test in Engineering (Mechanical)
- 2007 **School topper, A1 grade in all subjects**, All India Secondary School Certificate Examination (AISSE)

India

India

Research

REFEREED ARTICLES

FluidDyn: a Python open-source framework for research and teaching in fluid dynamics (Accepted)

Pierre Augier, Ashwin Vishnu Mohanan, Cyrille Bonamy
Journal of Open Research Software (July 2018). 2018

Shallow water wave turbulence (Submitted)

Pierre Augier, Ashwin Vishnu Mohanan, Erik Lindborg
J. Fluid Mech. (Submitted) (2018). 2018

FluidFFT: common API (C++ and Python) for Fast Fourier Transform HPC libraries (Accepted)

Ashwin Vishnu Mohanan, Cyrille Bonamy, Pierre Augier
Journal of Open Research Software (July 2018). 2018

FluidSim: modular, object-oriented Python package for high-performance CFD simulations (Accepted)

Ashwin Vishnu Mohanan, Cyrille Bonamy, Miguel Calpe Linares, Pierre Augier
Journal of Open Research Software (July 2018). 2018

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

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

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