Andrew Mole

Email: andrew.mole@manchester.ac.uk
GitHub: github.com/admole

Education

University of Manchester
Ph.D. in Aerodynamics (Thesis Submitted) 2018–2022

Durham University
MEng in Engineering (1:1) 2014–2018

Research Experience

Postdoctoral Research Assistant with Dr. Alex Skillen 2022–2023
University of Manchester

- Multi-fidelity Modelling of a Natural Convection Loop
- Rolls Royce Funded Project
- Adaptively coupling 1D systems code with CFD.
- Applying multi-fidelity surrogate modelling.

PhD+ Research Assistant with Prof. Alistair Revell and Dr. Alex Skillen 2021–2022
University of Manchester

- Data Methods for Aerodynamics
- BAE Data Science Accelerator Project
- Multi-Fidelity Aerodynamic surrogate model development.
- Developing multi-fidelity GPR and MLP framework using sklearn in python.

PhD Student with Prof. Alistair Revell and Dr. Alex Skillen 2018–2021
University of Manchester

- Advanced Hybrid RANS-LES for Motorsport Applications
- McLaren/BEACON Studentship
- Coupling RANS and LES simulations using an embedded approach.
- Developed OpenFOAM libraries coupled using preCICE for use on HPC.

MEng Student with Dr. Sergii Veremieiev 2017–2018
Durham University

- Fluid Mechanics of Liquid Drops Spreading on Solid Surfaces
- Used the lubrication approximation of the Navier-Stokes equations.
- Implemented on an in house C++ code.

Summer Research Placement with Dr. Xuerui Mao 2016
Durham University

- Flow Induced Deformation of Deep Water Risers
- Investigated vortex induced vibration with filaments attached to a cylinder.
- Used the spectral element DNS code Semtex and the immersed boundary method for FSI.

Industry Experience

McLaren Racing Ltd. Jul –Oct 2021
CFD Methodology PhD Internship

- Implementing Embedded LES into Design Process Workflow
- Worked with CFD methodology and HPC teams to implement libraries with spack and git.
- Automating embedded LES set-up using python and bash scripting.

Culham Centre for Fusion Energy Aug 2013
Work Experience

- Engineering, Project Planning, and Remote Handling & Robotics departments.

Mercedes AMG Formula One Team Jul 2012
Work Experience

- Research & Development and Inspection departments.

Teaching Experience

- **Graduate Teaching Assistant** at The University of Manchester 2018–2021
  Presented, developed, and marked third year undergraduate ***Aircraft Aerodynamics*** *lab*
- **Graduate Teaching Assistant** at The University of Manchester 2020–2021
  Assisted in delivery of first year undergraduate ***Fluid Mechanics*** *lectures, labs and tutorials, managed online discussion forum and marked exam scripts*
- **Graduate Teaching Assistant** at The University of Manchester 2021
  Assisted in delivery of graduate ***Advanced CFD*** *lab*

Awards

- Best Presentation Prize at the MACE PGR Conference 2020
- Winner of the ARUP Engineering Design Prize 2017

Academic Service

- Reviewer for *Flow, Turbulence and Combustion* Journal
- Reviewer for *AIAA Journal*

Presentations

- **Multi-fidelity Methods for Aerodynamic Applications** May 2022
  UoM Modelling and Simulation Center Seminar Series
- **Multi-fidelity Surrogate Modelling for Aerodynamic Applications** Apr 2022
  BAE Systems Physics Informed Machine Learning Seminar
- **Addressing the Challenges of Confined Embedded LES** Sep 2021
  Engineering, Turbulence, Modelling and Measurements Symposium
- **Recent Developments in Embedded Large Eddy Simulation** Jun 2021
  UK Turbulence Consortium Fundamentals Series

- **Embedded LES of Streamwise Vortices Within a Turbulent Boundary Layer** Jun 2020
  MACE Postgraduate Conference
- **Embedded LES of Turbulent Boundary Layers** Sep 2019
  UK Fluids Network Special Interest Group Meeting
- **Embedded Large Eddy Simulation of a Spatially Developing Turbulent Boundary Layer** Sep 2019
  European Turbulence Conference

Publications

[1] **A. Mole**, A. Skillen, and A. Revell, "Multi-Fidelity Surrogate Modelling of Wall Mounted Cubes," *Flow, Turbulence and Combustion*, 2022.

[2] **A. Mole**, A. Skillen, and A. Revell, "The Interaction of Longitudinal Vortex Pairs with a Turbulent Boundary Layer," *Journal of Fluid Mechanics*, 2022.

[3] **A. Mole**, A. Skillen, and A. Revell, "Addressing Challenges of Confined Embedded LES on Tandem Wall Mounted Cubes," in *13th International Engineering, Turbulence, Modelling and Measurements Symposium*, 2021, pp. 1234–1235.

[4] A. Revell, I. Afgan, A. E. A. Ali, M. C. Santasmasas, T. Craft, A. de Rosis, J. Holgate, D. Laurence, B. E. O. Iyamabo, **A. Mole**, B. Owen, M. Savoie, A. Skillen, J. Wang, and X. Zhang, "Coupled Hybrid RANS-LES Research at The University of Manchester," *ERCOFTAC Bulletin*, Progress in RANS-based Scale-Resolving Flow Simulation Methods, vol. 120, p. 67, Feb. 2020.