

# Ashley Scillitoe

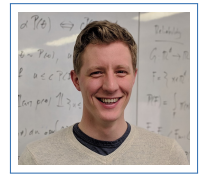
Postdoctoral researcher with experience in high-fidelity CFD methods for turbomachinery, data-driven turbulence modelling, and uncertainty quantification.

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## Experience

### Academic

- 2018-present **Research Associate**, *Data-Centric Aeronautics, The Alan Turing Institute*, UK.
- Exploring data-driven turbulence modelling, with machine learning used to learn the flow physics in high fidelity simulations, in order to augment turbulence models.
  - Using dimension reduction techniques and conjugate heat transfer simulations to design turbomachinery temperature probes - in collaboration with Rolls-Royce.
  - Created rapid flowfield estimation frameworks using deep learning and dimension reduction.
- 2019-present **Developer**, *Effective Quadratures*, UK.
- Developing machine learning capabilities in equadratures; an open source python library using polynomials for surrogate modelling, sensitivity analysis, and uncertainty quantification.
- 2017-2018 **Research Associate**, *University of Cambridge/Rolls Royce plc*, UK.
- Built upon PhD work in order to extend Rolls-Royce's high fidelity CFD capability to compressible flows.
  - Implemented a turbulence modelling uncertainty quantification framework in the code.
- 2013-2017 **PhD - Towards Predictive Eddy Resolving Simulations for Gas Turbine Compressors**, *University of Cambridge*, UK.
- Supervised by Professor Paul Tucker. Supported by Rolls-Royce Aerospace.
- Examined the application of Large Eddy Simulation (LES) to modern gas turbine compressors.
  - A novel self-adaptive smoothing scheme, advanced sub-grid scale models, unsteady boundary conditions and other extensions developed in the Rolls-Royce CFD software.
  - High fidelity LES used to study the complex flow physics in compressors, with findings informing compressor-specific turbulence modelling strategies.
  - Procured over £44,000 in HPC resource grants in order to run HPC simulations.
- 2011 **Research Assistant**, *University of Manchester*, UK.
- Built upon MEng dissertation work, designing a propulsion system for a Hexrotor MAV. Designed a static thrust test rig and DAQ system. Frequently used CAD and rapid prototyping (SLA).

### Industry

- 2011-2012 **Aerodynamics Intern**, *AgustaWestland Ltd*, Yeovil, UK.
- A one year internship split between two departments:
- **4 Months - Wind Tunnel Test Department**
    - Supported drag reduction testing for the AW159. Assisted with instrument calibration, model checks, preparation and rigging, tunnel operation, data acquisition and analysis.
    - Responsible for the production of test schedules, H&S documentation, and final test reports.
  - **8 Months - Fuselage Aerodynamics Department**
    - CFD analysis to investigate the application of exhaust shrouds on aircraft ventilation systems.
    - Produced an in-depth design guide, and acted as a consultant to Hyde Engineering Ltd for the design of two new aircraft cooling systems.

- 2010 **Systems Engineering Summer Intern**, *Thales Air Defence Ltd*, Belfast, UK.  
Created a Matlab/Simulink identification platform to identify black-box mathematical models of dynamical systems. This was then used to analyse and pre-process flight trial data.

### Knowledge Transfer

- 2019-present **Workshop Leader**, *Effective Quadratures*, UK.  
Prepare and run workshops on statistics and machine learning for engineers at the Culham Centre for Fusion Energy, Rolls-Royce, NPL, McLaren Automotive, Siemens,  $R^2$  Data Labs and others.
- 2020-present **Mentor**, *Google Summer of Code*, Worldwide.  
Mentor students on open source code development projects as part of GSoC.
- 2016-2019 **PhD/Undergrad Supervision**, *University of Cambridge*, UK.  
Supervised for the ThermoFluids course and numerous undergraduate projects, co-supervised PhD projects, and assisted in running CFD and flow visualisation labs.

### Conference Organisation

- 2020, 2021 **Programme Committee**, *CFDML Workshop at ISC 2020 and 2021*, Virtual.
- 2015 **Deputy Coordinator**, *Fluids Energy Turbo Expo 2015*, Cambridge, UK.

## Computing Skills

- Languages HPC in Fortran with MPI/OpenMP/Coarrays, C++, Python, L<sup>A</sup>T<sub>E</sub>X, HTML/CSS.
- CFD Tools Pointwise, Gambit, Gmsh, Ansys Fluent, SU2, OpenFOAM, Paraview.      Other Tools Git, Travis CI, Matlab, Inkscape, MS Office, SGE cluster config., Solidworks.

## Education

- 2008-2013 **MEng (Hons) Aerospace Engineering - 1st Class**, *University of Manchester*, UK.  
Graduated top of class with an 84% average. Elected student representative.
- 2001-2008 **Fortismere School**, London, UK.

## Interests and Hobbies

- Societies Active Affiliate of RAeS and AIAA.
- Sport Competitive road cyclist, ski mountaineer, and qualified swimming teacher.

## Publications

A selection of relevant publications are shown below. For a complete list, please see [ascillitoe.com](http://ascillitoe.com).

- 2021 Scillitoe, A., Seshadri, P., Girolami, M. “Uncertainty Quantification for Data-Driven Turbulence Modelling with Mondrian Forests”. *J. Comput. Phys.*
- 2020 Scillitoe, A., Ubald, B., Seshadri, P., Shahpar, S. “Design space exploration of stagnation temperature probes through dimension reducing subspaces”. *Proc. of ASME Turbo Expo*.
- 2019 Scillitoe, A., Tucker, P. G., Adami, P. “Large Eddy Simulation of Boundary Layer Transition Mechanisms in Gas-Turbine Compressor Cascades”. *ASME. J. Turbomach.*
- 2016 Scillitoe, A., Tucker, P. G., Adami, P. “Numerical Investigation of Three-Dimensional Separation in an Axial Flow Compressor...”. *ASME. J. Turbomach.*