
Plan Overview

A Data Management Plan created using DMPonline

Title: Development of modelling tools for vertical axis turbines

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Template: University of Manchester Generic Template

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Project abstract:

This project advances numerical modelling of vertical-axis wind and tidal turbines (VATs) through collaboration between the University of Manchester and the LUSAC laboratory at the University of Caen Normandie. The work develops and benchmarks actuator line and actuator cylinder frameworks enriched with sub-models capturing phenomena specific to VATs, including dynamic stall, flow curvature effects, and tip losses. Modelling approaches are compared and validated against site-representative turbulent inflow conditions characteristic of high-energy tidal sites such as Raz Blanchard, with thrust and wake characteristics analysed to inform parameterisation in shallow-water models. The collaboration builds on established joint work within the EU Interreg TIGER project and is aligned with the FloWatt tidal stream demonstrator, providing a pathway to industrial benchmarking. The project contributes to Supergen ORE Hub Theme A2 — *Improved modelling tools for resource and loading assessment*.

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Copyright information:

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Development of modelling tools for vertical axis turbines

Manchester Data Management Outline

1. Will this project be reviewed by any of the following bodies (please select all that apply)?

- None of the above

2. Is The University of Manchester collaborating with other institutions on this project?

- Yes - Part of a collaboration and not handling data

3. What data will you use in this project (please select all that apply)?

- Generate textual supporting information only

4. Where will the data be stored and backed-up during the project lifetime?

- University of Manchester Research Data Storage Service (Isilon)
- University of Manchester Data SafeHaven

5. If you will be using Research Data Storage, how much storage will you require?

- 1 - 8 TB

6. Are you going to be receiving data from, or sharing data with an external third party?

- Yes

7. How long do you intend to keep your data for after the end of your project (in years)?

- 21+ years

Guidance for questions 8 to 13

Highly restricted information defined in the [Information security classification, ownership and secure information handling SOP](#) is information that requires enhanced security as unauthorised disclosure could cause significant harm to individuals or to the University and its ambitions in respect of its purpose, vision and values. This could be: information that is subject to export controls; valuable intellectual property; security sensitive material or research in key industrial fields at particular risk of being targeted by foreign states. See more [examples of highly restricted information](#).

If you are using 'Very Sensitive' information as defined by the [Information Security Classification, Ownerships and Secure Information Handling SOP](#), please consult the [Information Governance Office](#) for guidance.

Personal information, also known as personal data, relates to identifiable living individuals. Personal data is classed as special category personal data if it includes any of the following types of information about an identifiable living individual: racial or ethnic origin; political opinions; religious or similar philosophical beliefs; trade union membership; genetic data; biometric data; health data; sexual life; sexual orientation.

Please note that in line with [data protection law](#) (the UK General Data Protection Regulation and Data Protection Act 2018), personal information should only be stored in an identifiable form for as long as is necessary for the project; it should be pseudonymised (partially de-identified) and/or anonymised (completely de-identified) as soon as practically possible. You must obtain the appropriate [ethical approval](#) in order to use identifiable personal data.

8. What type of information will you be processing (please select all that apply)?

- No confidential or personal data

9. How do you plan to store, protect and ensure confidentiality of any highly restricted data or personal data (please select all that apply)?

- Not applicable

10. If you are storing personal information (including contact details) will you need to keep it beyond the end of the project?

- Not applicable

11. Will the participants' information (personal and/or sensitive) be shared with or accessed by anyone outside of the University of Manchester?

- Not applicable

12. If you will be sharing personal information outside of the University of Manchester will the individual or organisation you are sharing with be outside the EEA?

- Not applicable

13. Are you planning to use the personal information for future purposes such as research?

- No

14. Will this project use innovative technologies to collect or process data?

- No

15. Who will act as the data custodian for this study, and so be responsible for the information involved?

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16. Please provide the date on which this plan was last reviewed (dd/mm/yyyy).

2026-03-30

Project details

What is the purpose of your research project?

This project advances numerical modelling of vertical-axis wind and tidal turbines (VATs) through collaboration between the University of Manchester and the LUSAC laboratory at the University of Caen Normandie. The work develops and benchmarks actuator line and actuator cylinder frameworks enriched with sub-models capturing phenomena specific to VATs, including dynamic stall, flow curvature effects, and tip losses. Modelling approaches are compared and validated against site-representative turbulent inflow conditions characteristic of high-energy tidal sites, with thrust and wake characteristics analysed to inform parameterisation in shallow-water models. The project contributes to Supergen ORE Hub Theme A2 — Improved modelling tools for resource and loading

assessment.

What policies and guidelines on data management, data sharing, and data security are relevant to your research project?

The following policies and guidelines are relevant:

- University of Manchester Research Data Management Policy
- EPSRC Policy Framework on Research Data
- University of Manchester Information Security Classification, Ownership and Secure Information Handling SOP
- Supergen ORE Hub data sharing and dissemination requirements as set out in the ECRRF award terms and conditions (ECRRF2025-1004)

Data will be managed and shared in accordance with EPSRC open access requirements, with simulation data underpinning publications deposited in an open repository at the point of publication.

Responsibilities and Resources

Who will be responsible for data management?

Dr Omar Sherif Mohamed (Postdoctoral Research Associate, Department of Civil Engineering and Management, University of Manchester, ID: 14212648) will act as the sole data custodian and will be responsible for all data management activities, including data storage, documentation, sharing, and archiving. Prof. Tim Stallard (Principal Investigator, University of Manchester) provides supervisory oversight in accordance with University policy.

What resources will you require to deliver your plan?

No additional resources are required beyond those already available. Data will be stored on the University of Manchester's existing institutional research data storage infrastructure (CSF4/RDSS), which provides secure, backed-up storage at no additional cost to the project. Post-processing and analysis will be carried out using existing licensed software and in-house tools (MATLAB, Python) available within the research group. Archiving of data underpinning publications will be carried out via Zenodo or the University of Manchester's institutional repository, both of which are freely accessible. No specialist data management tools or additional personnel are required.

Data Collection

What data will you collect or create?

What data will you collect or create?

The project will generate numerical simulation data from actuator line (AL) and actuator cylinder (AC) computational models of Darrieus-type vertical-axis tidal turbines. This includes time series of aerodynamic and hydrodynamic loads (thrust, torque, and blade forces), wake velocity fields, and turbulence statistics. Supplementary site-representative turbulent inflow profiles characterising high-energy tidal conditions at Raz Blanchard will be provided by the LUSAC group at the University of Caen Normandie. All data is of a scientific and engineering nature; no personal or sensitive data will be collected. Total data volume is expected to be modest, on the order of a few gigabytes of simulation output files.

How will the data be collected or created?

Data will be generated computationally using in-house and open-source CFD solvers implementing actuator line and actuator cylinder frameworks, run on the University of Manchester's high-performance computing facility (CSF4) and, where applicable, ARCHER2. Turbulent inflow conditions will be synthesised by the Caen group using their established site-scale modelling tools for Raz Blanchard and shared with Manchester in agreed file formats. Post-processing and analysis of simulation outputs will be carried out using MATLAB and Python scripts developed within the research group. All data will be documented with accompanying README files describing simulation parameters, software versions, and post-processing procedures.

Documentation and Metadata

What documentation and metadata will accompany the data?

All simulation datasets will be accompanied by README files describing the following: project and dataset title, date of creation, responsible researcher, software name and version, computational solver settings and numerical parameters, turbine geometry and flow condition inputs, and post-processing procedures applied. File naming conventions will follow a consistent and descriptive scheme agreed between the Manchester and Caen groups, encoding key simulation parameters (e.g. turbine type, flow condition, model variant) to ensure datasets are self-explanatory without reference to external documentation.

Where data is deposited in an open repository to underpin a publication, metadata will be provided in accordance with the repository's standard schema (e.g. Zenodo's DataCite-based metadata), including dataset title, authors, associated publication DOI, funder acknowledgement (EPSRC / Supergen ORE Hub, ECRRF2025-1004), licence, and a brief description of the dataset contents and structure.

Ethics and Legal Compliance

How will you manage any ethical issues?

Question not answered.

How will you manage copyright and Intellectual Property Rights (IPR) issues?

Question not answered.

Storage and backup

How will the data be stored and backed up?

Question not answered.

How will you manage access and security?

Question not answered.

Selection and Preservation

Which data should be retained, shared, and/or preserved?

Question not answered.

What is the long-term preservation plan for the dataset?

Question not answered.

Data Sharing

How will you share the data?

Question not answered.

Are any restrictions on data sharing required?

Question not answered.