

Dr. Aoife Hughes, MBCS, BS.c., Ph.D.

RESEARCH DATA SCIENTIST | SOFTWARE ENGINEER

London, UK

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Personal Profile

Friendly, engaging and always keen to learn new skills. My main passions are working with others on large, and difficult, problems. The greatest strength I bring to every challenge is my ability to adapt, discover new approaches, and then communicate clearly my results.

Education

John Innes Centre

Ph.D in computational modelling of information transfer between cells

England, UK

Sept 2018 - 2022

- Performed cutting edge research as part of a multidisciplinary team.
- Mentored M.Sc. and Undergraduate students.
- Published work in leading academic journals.
- Produced multiple open source projects.
- **Research focus:** Using computational methods to simulate signalling between plant cells.

Aberystwyth University

B.Sc. in Computer Science

Wales, UK

May 2014 - May 2018

- Graduated with first class honours.
- Dissertation resulted in two research publications.

Work Experience

The Alan Turing Institute

Principal investigator

England, UK

August 2023 - Current

- Leading a collaboration with industry partners in the health sector

The Alan Turing Institute

Research Data Scientist

England, UK

July 2022 - Current

- Worked on wide range of projects from climate change simulations to AI for pandemic policymaking.
- Provided high-quality consultation to academic partners.
- Produced reproducible pipelines for microsimulations of UK population for use in climate change predictions.
- Helped develop open source software engineering courses.
- Worked as a mentor for other staff through a Turing personal development scheme.
- Actively participated in group development via recruitment initiatives.
- Contributed to and spearheaded equality, diversity, and inclusivity initiatives. Led collaborations with external groups to promote diversity
- **Technical Skills:** C/C++, Python, Linux, Microsoft Azure, Scripting, Git.
- **Soft Skills:** Teamwork, Time Management, Communication, Mentoring, Logical Thinking, Collaboration.

Journal of Open Source Software (JOSS)

Journal Editor

Online

September 2022 - Current

- Performed in personal time on an invited volunteer basis.
- Reviewed potential journal submissions.
- Acted as editor and coordinator for in progress paper submissions.
- Made improvements and bug fixes to web portal for submitting articles to JOSS.
- **Technical Skills:** Git, Code reviewing.
- **Soft Skills:** Leadership, Time Management, Communication.

Doonan Lab

X-ray Image Analyst

Wales, UK

2017 - 2018

- Developed automated, high throughput systems for extracting data from x-ray images.

National Plant Phenomics Centre

Research Scientist

Wales, UK

2016 - 2017

- Performed data analysis on biological data.

Computer Science Department, Aberystwyth University

Teaching Assistant

Wales, UK

2015 - 2018

- Taught undergraduate programming practical lessons.

Belfast Metropolitan College

Systems Developer

- Organised a college-wide upgrade of systems.

Ireland

2013 - 2014

Salto National Gymnastics Centre

Gymnastics Coach

- Coached high-performing athletes to an international level.

Ireland

2012 - 2014

Highlighted Software Projects

Ethical Assurance Platform

England, UK

The Alan Turing Institute

2023

- A platform for assessing the ethical impact of AI systems
- Uses Django and React frameworks to enable non-technical users to create assurance cases
- <https://github.com/alan-turing-institute/AssurancePlatform>

Pandemia

England, UK

The Alan Turing Institute

2022

- Pandemic modelling framework written in C and Python
- Developed by researchers at Imperial University, my team was brought on to enhance and apply good software engineering to the project to encourage openness and reusability
- <https://github.com/PandemiaProject/pandemia>

X-ray analysis software for wheat grains

Wales, UK

National Plant Phenomics Centre

2018

- Open source library for automating the extraction of morphometric data from 3-D images of x-rayed plants
- https://github.com/NPPC-UK/microCT_grain_analyser

Narrow Escape Simulator

England, UK

John Innes Centre

2021

- A stochastic simulation package developed during my Ph.D, using efficient code this provides numerical approximations to the narrow escape problem
- <https://github.com/AoifeHughes/PyEscape>

Data Science Course

England, UK

The Alan Turing Institute

2022

- An open source project which provides both a taught course and self-learning notes for research data science skills.
- Contributed to as part of the research engineering team at the Turing.
- <https://github.com/alan-turing-institute/rds-course>

Skills

Programming

C/C++, C#, Python, R, PHP, Java, MATLAB, HTML/CSS, JavaScript, Lisp, Ruby, Haskell.

Computational Skills

Microsoft Azure, High Performance Computing, Docker, iOS/Android Development, Databases, Image Analysis, AI, Git.

Research Skills

Genomic and Transcriptomics, Stochastic Methods, Biological Systems, Statistics.

Soft Skills

Project/Time Management, Teaching, Teamwork, Problem-solving.

Achievements

2023 **Software Sustainability Institute Fellowship**, Awardee

England, UK

2022 **DigiEduHack Climate Change Contest**, Finalist

England, UK

2019 **UK Open Source Awards**, Winner

Wales, UK

2018 **Biotechnology and Biological Sciences Research Council**, Fully Funded Ph.D.

England, UK

2017 **Genetics Society Research Grant**, Awardee

Wales, UK

2016 **UK-RAS Field Robotics Contest**, 2nd Place

England, UK

2014 **Aberystwyth University Excellence Scholarship**, Awardee

Wales, UK

Charity and Volunteer work

Events coordinator

Special Effect

- Organising and coordinating outreach events
- Running stalls at conferences to promote charity

England, UK

2023 - Current

Alan Turing Podcast

The Alan Turing Institute

- Organising and coordinating schedules.
- Use of professional recording equipment and software.
- Research and preparation for interviewing.

England, UK

2022 - Current

Gender Equality Network Chair

The Alan Turing Institute

- Chaired and organised regular meetings
- Communicating issues from network members to Turing management
- Supporting women and non-binary people in the Turing

England, UK

2023 - Current

Equality, Diversity and Inclusivity

Various

- Performing data analysis on recruitment data at Turing and making reports and summaries.
- Running workshops and training courses aimed at diversifying STEMM.
- Appearing on panels at conferences.

England, UK

2020 - Current

Teacher

The Brilliant Club

- Course development.
- Teaching Ages 11-18 in schools.
- Homework marking, grading and feedback.

England, UK

2019 - Current

Scientific Outreach

Various

- Pint of Science talk.
- Appearing on Podcasts.
- Answering science questions on social media.
- Speaking at British Computer Society events.
- Main stage talk at FOSDEM on open source development in science.

UK

2018 - Current

Open Source Projects

Various

- Actively working to improve equality in Wikipedia articles
- Submitting pull requests and making bug reports in various open projects
- Answering questions on forums e.g., Stack Overflow.

Online

2017 - Current

Publications

- [1] Frederick Cook et al. "Barley lys3 mutants are unique amongst shrunken-endosperm mutants in having abnormally large embryos". In: *Journal of Cereal Science* (2018).
- [2] **Aoife Hughes**, Christine Faulkner, Richard J. Morris, and Melissa Tomkins. "Intercellular Communication as a Series of Narrow Escape Problems". In: *IEEE Transactions on Molecular, Biological and Multi-Scale Communications* (2021). DOI: 10.1109/TBMC.2021.3083719.
- [3] **Aoife Hughes**, Richard J Morris, and Melissa Tomkins. "PyEscape: A narrow-escape problem simulation implementation". In: *Journal of Open Source Software* (2020).
- [4] **Aoife Hughes** et al. "Grain depth increases during early domestication in small grain cereals". In: *The Plant Journal* (2019).
- [5] **Aoife Hughes** et al. "Non-Destructive, High-Content Analysis of Wheat Grain Traits Using X-Ray Micro Computed Tomography". In: *Plant Methods* (2017). DOI: 10.1186/s13007-017-0229-8.
- [6] Mina Ohtsu et al. "Colletotrichum Higginsianum Effectors Exhibit Cell to Cell Hypermobility in Plant Tissues and Modulate Intercellular Connectivity amongst a Variety of Cellular Processes". In: (2021). DOI: 10.1101/2021.01.13.426415.
- [7] Melissa Tomkins, **Aoife Hughes**, and Richard J Morris. "An Update on Passive Transport in and out of Plant Cells". In: *Plant Physiology* (2021). DOI: 10.1093/plphys/kiab406.

References available upon request.