

# 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

England, UK

Ph.D in computational modelling of information transfer between cells

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. Work undertaken with a specific view on communication during disease infections.

### Aberystwyth University

Wales, UK

B.Sc. in Computer Science

May 2014 - May 2018

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

## Work Experience

### The Alan Turing Institute

England, UK

Research Data Scientist

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 in STEM.
- **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)

Online

Journal Editor

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

Wales, UK

X-ray Image Analyst

2017 - 2018

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

### National Plant Phenomics Centre

Wales, UK

Research Scientist

2016 - 2017

- Performed data analysis on biological data.

## Computer Science Department, Aberystwyth University

Teaching Assistant

- Taught undergraduate programming practical lessons.

Wales, UK

2015 - 2018

## 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

### Pandemia

The Alan Turing Institute

- 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>

England, UK

2022

### X-ray analysis software for wheat grains

National Plant Phenomics Centre

- 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](https://github.com/NPPC-UK/microCT_grain_analyser)

Wales, UK

2018

### Narrow Escape Simulator

John Innes Centre

- 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/NarrowEscapeSimulator>

England, UK

2021

### Data Science Course

The Alan Turing Institute

- 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>

England, UK

2022

## 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 | <b>Software Sustainability Institute Fellowship</b> , Awardee                      | England, UK |
| 2022 | <b>DigiEduHack Climate Change Contest</b> , Finalist                               | England, UK |
| 2019 | <b>UK Open Source Awards</b> , Winner  | Wales, UK   |
| 2018 | <b>Biotechnology and Biological Sciences Research Council</b> , Fully Funded Ph.D. | England, UK |
| 2017 | <b>Genetics Society Research Grant</b> , Awardee                                   | Wales, UK   |
| 2016 | <b>UK-RAS Field Robotics Contest</b> , 2nd Place                                   | England, UK |
| 2014 | <b>Aberystwyth University Excellence Scholarship</b> , Awardee                     | Wales, UK   |

## Charity and Volunteer work

### 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

## Equality, Diversity and Inclusivity

England, UK

Various

2020 - Current

- Performing data analysis on recruitment data at Turing and making reports and summaries.
- Running workshops and training courses aimed at diversifying STEMM.
- Creating collaborations with various networks via my work at Turing.
- Giving talks at events.
- Appearing on panels at conferences.
- Participating in diversity focused groups such as PyLadies Slack channels.

## Teacher

England, UK

The Brilliant Club

2019 - Current

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

## Scientific Outreach

UK

Various

2018 - Current

- 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.

## Open Source Projects

Online

Various

2017 - Current

- 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.

## Publications

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- [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/TMBMC.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.