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

Research Data Scientist | Software Engineer

London, UK

aoife1hughes@gmail.com | May 5th, 1994 | aoifehughes.github.io/ | github.com/AoifeHughes | Scholar

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 STEMM.
- **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 Deptartment, Aberystwyth University *Wales, UK*

Teaching Assistant *2015 - 2018*

- Taught undergraduate programming practical lessons.

Belfast Metropolition College *Ireland*

Systems Developer *2013 - 2014*

- Organised a college-wide upgrade of systems.

Salto National Gymnastics Centre *Ireland*

Gymnastics Coach *2012 - 2014*

- Coached high-performing athletes to an international level.

Highlighted Software Projects

Pandemia *England, UK*

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 extration 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/NarrowEscapeSimulator`

Data Science Course *England, UK*

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

Alan Turing Podcast *England, UK*

The Alan Turing Institute *2022 - Current*

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

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

[1] **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.

[2] 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.

[3] 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.

[4] **Aoife Hughes**, Richard J Morris, and Melissa Tomkins. "PyEscape: A narrow-escape problem simulation implementation". In: *Journal of Open Source Software* (2020).

[5] **Aoife Hughes** et al. "Grain depth increases during early domestication in small grain cereals". In: *The Plant Journal* (2019).

[6] Frederick Cook et al. "Barley lys3 mutants are unique amongst shrunken-endosperm mutants in having abnormally large embryos". In: *Journal of Cereal Science* (2018).

[7] **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.

References available upon request.