

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

RESEARCH DATA SCIENTIST | SOFTWARE ENGINEER

London, UK

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Personal Profile

Dedicated and collaborative professional with a strong foundation in AI and a profound commitment to Equality, Diversity, and Inclusivity (EDI). With a penchant for tackling complex problems, I excel in adopting innovative solutions and methodologies. My expertise extends beyond technical prowess, as I emphasize clear communication, facilitating understanding and fostering inclusive environments. Passionate about leveraging AI for ethical and transformative purposes, I continually seek opportunities to advance knowledge and collaborate on impactful initiatives.

Education

John Innes Centre

Ph.D. in Computational Modelling of Cellular Information Transfer

England, UK

Sept 2018 - 2022

- Conducted forefront research on plant cell signalling in a multidisciplinary team.
- Mentored M.Sc. and undergraduate students, enhancing their academic progression.
- Published in prestigious academic journals and championed open-source software projects.

Aberystwyth University

B.Sc. in Computer Science, First Class Honours

Wales, UK

May 2014 - May 2018

- Dissertation led to two notable research publications, highlighting academic prowess.

Work Experience

Delta Solutions Consultancy

Chief Advisor

Online

July 2023 - Current

- Specialize in EDI data analysis, focusing on data science and AI consultations.
- Lead strategic consultations for diverse clients to promote inclusivity in the tech industry.

The Alan Turing Institute

Principal Investigator

England, UK

August 2023 - Current

- Directed collaborations with health sector industry partners.

The Alan Turing Institute

Research Data Scientist

England, UK

July 2022 - Current

- Managed projects ranging from climate simulations to AI-guided pandemic policies.
- Offered consultation to academic collaborators and mentored staff through Turing's development program.
- Developed reproducible pipelines for climate change projections and contributed to open-source software education.
- Championed EDI initiatives and fostered partnerships to further diversity goals.
- **Technical Skills:** C/C++, Python, Linux, Azure, Scripting, Git.
- **Soft Skills:** Teamwork, Time Management, Communication, Mentoring, Collaboration.

Journal of Open Source Software (JOSS)

Editor

Online

September 2022 - Current

- Volunteer position; reviewed submissions and coordinated publication processes.
- Enhanced and debugged the JOSS web portal for article submissions.
- **Technical Skills:** Git, Code Reviewing.
- **Soft Skills:** Leadership, Time Management, Communication.

Doonan Lab

Research Software Engineer (X-ray Image Analyst)

Wales, UK

2017 - 2018

- Pioneered novel methods for x-raying wheat to study morphometric traits, employing cutting-edge AI techniques.
- Developed automated systems for high-throughput x-ray image data extraction, crucial for understanding crop response to climate change variables like drought and temperature conditions.
- Facilitated research that contributed to significant findings on the domestication and evolution of crops, with results and developed methodologies made open-source.
- Worked collaboratively to address challenges in semantic segmentation and statistical analysis of large-scale 3-D image datasets.
- **Technical Skills:** Data Analysis, AI Solutions, Semantic Segmentation, Statistical Analysis.
- **Soft Skills:** Teamwork, Problem-solving, Interdisciplinary Collaboration.

National Plant Phenomics Centre Research Scientist <ul style="list-style-type: none"> Analyzed biological data for research studies. 	Wales, UK 2016 - 2017
Computer Science Department, Aberystwyth University Teaching Assistant <ul style="list-style-type: none"> Instructed undergraduates in programming practices. 	Wales, UK 2015 - 2018
Belfast Metropolitan College Systems Developer <ul style="list-style-type: none"> Led a comprehensive system upgrade across the college. 	Ireland 2013 - 2014
Salto National Gymnastics Centre Gymnastics Coach <ul style="list-style-type: none"> Trained elite gymnasts to achieve international recognition. 	Ireland 2012 - 2014

Highlighted Software Projects

AhLingo Delta Solutions <ul style="list-style-type: none"> Innovative platform harnessing LLMs and AI to facilitate language learning for users. Integrates advanced algorithms to provide intuitive and adaptive language lessons. https://github.com/aoifehughes/ahlingo 	Online 2023
Ethical Assurance Platform The Alan Turing Institute <ul style="list-style-type: none"> Platform designed to evaluate the ethical implications of AI systems. Employs Django and React frameworks for seamless assurance case creations by non-technical users. https://github.com/alan-turing-institute/AssurancePlatform 	England, UK 2023
Pandemia The Alan Turing Institute <ul style="list-style-type: none"> Framework for pandemic modeling using C and Python. Collaborated with Imperial University researchers to bolster software engineering practices, emphasizing openness and adaptability. https://github.com/PandemiaProject/pandemia 	England, UK 2022
Narrow Escape Simulator John Innes Centre <ul style="list-style-type: none"> Developed during Ph.D, this stochastic simulation offers numerical solutions to the narrow escape problem using efficient coding. https://github.com/AoifeHughes/PyEscape 	England, UK 2021
Data Science Course The Alan Turing Institute <ul style="list-style-type: none"> Open source initiative offering structured coursework and self-study resources for research data science. Contributed in collaboration with the Turing research engineering team. https://github.com/alan-turing-institute/rds-course 	England, UK 2022
X-ray Analysis Software for Wheat Grains National Plant Phenomics Centre <ul style="list-style-type: none"> Open-source toolkit to automate morphometric data extraction from 3-D x-ray plant imagery. https://github.com/NPPC-UK/microCT_grain_analyser 	Wales, UK 2018

Skills

Languages	Python, R, C/C++, Java, JavaScript, C#, PHP, MATLAB, Haskell, Ruby, Lisp, HTML/CSS.
Frameworks & Libraries	React, Django, Llama, Flask, TensorFlow, PyTorch.
AI & LLMs	ChatGPT API Development, Large Language Models, Machine Learning, Neural Networks.
Computational	Microsoft Azure, High Performance Computing, Docker, iOS/Android Development, Databases, Git, Image Analysis.
Research	Genomics, Transcriptomics, Stochastic Methods, Biological Systems, Statistics.
Soft Skills	Project Management, Time Management, Communication, Teaching, Teamwork.

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

- Led outreach events and promoted charity at conferences.

England, UK

2023 - Current

Podcast Organizer & Gender Equality Network Chair

The Alan Turing Institute

- Managed podcast schedules, recordings, and research for interviews.
- Advanced gender equality; bridged communication between network members and management.

England, UK

2022 - Current

Advocate for Equality, Diversity, and Inclusivity

Various

- Analyzed Turing recruitment data; conducted STEMM-diversity workshops and panel discussions.

England, UK

2020 - Current

Teacher

The Brilliant Club

- Developed courses, taught 11-18 age groups, and provided academic evaluations.

England, UK

2019 - Current

Science Communicator & Open Source Contributor

Various

- Delivered talks at events like Pint of Science and FOSDEM; engaged with audiences on podcasts and social media.
- Enhanced Wikipedia equality, contributed to open projects, and provided community support on forums like Stack Overflow.

UK & Online

2018 - 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/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.