Nathan Hughes

Nationality	Irish/British
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Personal Statement

I am an extremely driven and motivated PhD student. With a true thirst for knowledge and desire for understanding, it is my long-term goal to pursue a career in academia.

Employment History

Sept 2017 - Sept 2018	Doonan Lab - Bioinformatician In this role I analysed and prepared large data sets for publication. Typically working in crop traits and genetics. This involved a lot of collaboration and interaction with different research groups.
May 2016 - Aug 2017	National Plant Phenomics Centre - Systems Developer My role at the NPPC was extremely varied. I worked on building and designing a Gravimetrics system for plant phenotyping and data generation, writing image analysis software. A large part of my time was devoted to data analysis and statistical evaluation of data.
Sept 2015 - June 2018	Aberystwyth University - Demonstrator I was a mentor to first and second year students during their workshops. Specifically I helped to reinforce the knowledge students learn in their lectures.
May - Sept 2013	Belfast Metropolitan College - Systems Specialist I had been employed as an IS advisor/specialist by BMC to implement their multi-campus systems upgrade.
Feb 09 - March 2013	Salto National Gymnastics Centre - Gymnastics Coach Sports coach for national level athletes

Education

Current	**PhD**	Computation Biology	John Innes Centre	
June 2018	**BSc**	Computer Science	Aberystwyth University	**1:1**
May 2014	**Diploma**	Software Engineering	Belfast Metropolitan College	**Distinction**

Publications

- N. Hughes, K. Askew, C. P. Scotson, K. Williams, C. Sauze, F. Corke, J. H. Doonan, and C. Nibau. Non-Destructive, High-Content Analysis of Wheat Grain Traits Using X-Ray Micro Computed Tomography. *Plant Methods*, 13(1), 2017
- N. Hughes. Open access data of wheat grain traits using X-ray micro computed tomography. *Aberystwyth University Data Store*, 2017
- F. Cook, N. Hughes, C. Nibau, B. Orman-Ligeza, N. Schatlowski, C. Uauy, and K. Trafford. Barley lys3 mutants are unique amongst shrunken-endosperm mutants in having abnormally large embryos. *Journal of Cereal Science*, 82:16–24, 2018
- N. Hughes, N. Fradgley, H. Oliveira, F. Corke, J. Cockram, J. H. Doonan, and C. Nibau. Grain depth increases during early domestication in small grain cereals. *The Plant Journal*, 2019

Research Experience

My current project is focused on uncovering the mechanisms in which cell-to-cell communication operates, specifically in examining *plasmodesmata* and how molecules move from one cell to another.

Previously my work has been primarily focused on genomic and phenotypic research in crop science. Specifically computer vision analysis and QTL mapping of seed and grain traits. Additionally I have spent considerable time designing and building automated systems for gathering and generating scientific data.

Skills and Knowledge

Research skills:	Statistical analysis, Research methods, Image analysis, Academic writing
Practical skills:	Hardware design, Pneumatic construction, PCB design, Electrical engineering, Product invention
Experience:	Machine learning, Bayesian methods, Data mining, Artificial intelligence, Data modelling
Programming languages:	C/C++, Python, R, Java, MATLAB, BASH, LaTeX, Haskell, Ruby, HTML, PHP, Perl, Lisp

Awards

Genetics Society Research Grant 2017	**Recipient**
UK-RAS Field Robotics Contest 2016	**3rd place**
Aberystwyth Excellence Scholarship	**Recipient**

Research Talks / Lectures

Genetics Society	**Research presentation** | http://www.genetics.org.uk/
FOSDEM	**Lightning Talk** | https://fosdem.org/2017/schedule/
BCS	**Project update** | http://midwales.bcs.org/show-and-tell-events/
Aberystywth U	**Bioinformatics Conference** | www.users.aber.ac.uk/msn/abw/

Examples of work

Grain analysis software	To streamline a data analysis pipeline that I created, I developed a set of tools to allow for straight-forward analysis of 3D grain parameters. This software allows a user to run statistical analysis in a reproducible environment. (https://github.com/SirSharpest/Grain_Analyser_GUI)
Biology of the cell course	Having fallen in love with biology whilst studying computer science, I started a small project to make an openly available crash-course for anyone from a non-biology background. (https://github.com/SirSharpest/Bio-Cramming)
Image analysis software	For fun, I built a Rubik's cube solver which uses OpenCV and IDS to provide instructions for a user to complete a cube. This is in early stages, progress can be seen at my GitHub. (https://github.com/SirSharpest/Rubkis-Cube-Solver)

References

Prof R. Morris	**Plant Health Programme Leader, JIC** | Richard.Morris@jic.ac.uk
Prof J. Doonan	**Director, NPPC** | jhd2@aber.ac.uk
Dr H. Dee	**Senior Lecturer, Aberystwyth University** | hmd@aber.ac.uk
Dr C. Sauze	**Data Manager NPPC** | cos@aber.ac.uk
Mr P. Greenwood	**Project Manager, BMC** | PGreenwood@belfastmet.ac.uk