

Alan O'Callaghan

CURRICULUM VITAE

✉ alan.ocallaghan@outlook.com | 🏠 alanocallaghan.github.io | 📧 Alanocallaghan | 📄 alanocallaghan | 🎓 Alan O'Callaghan

Skills

- Programming: R, C++, Ruby, Java, Python.
- Statistics: Bayesian modelling, GLM, survival analysis, high dimensional statistics.
- Computing: Linux/Unix, HPC, \LaTeX , git, make, snakemake, unit testing, continuous integration.
- Web: HTML/CSS, JS, PHP, htmlwidgets (R).

Education

PhD, biomedical data science

MRC HUMAN GENETICS UNIT, UNIVERSITY OF EDINBURGH

PhD

2018 – 2022

- Statistical methods for, and applied statistical analysis of, single cell RNAseq with complex experimental designs.
- Implementation of scalable Bayesian inference (adaptive Metropolis within Gibbs, divide and conquer MCMC).
- Assisting other students and contributing to research and computing environment in the institute.

MSc, Bioinformatics and computational genomics

QUEEN'S UNIVERSITY BELFAST

MSc, (distinction)

2014 – 2015

- Dissertation: Java-based eye-tracking and image analysis of histopathology whole slide images.
- Lectures: programming, image analysis, statistical learning techniques.
- Programming projects: Implementation of alignment, clustering, linear regression and cross-validation algorithms in R; cell detection, Ki67 quantification and image segmentation in Java.

BSc (hons), biopharmaceutical chemistry

NATIONAL UNIVERSITY OF IRELAND, GALWAY

BSc (hons), 2.1

2008 – 2013

- Research Project: Structure elucidation and structure-activity relationship of bioactive marine compound.
- Lectures: (bio)chemistry, toxicology, pharmacology, molecular modelling, drug discovery and design.

Experience

Postdoctoral research associate

MRC BIOSTATISTICS UNIT, UNIVERSITY OF CAMBRIDGE

2022 – present

- Surely

Research assistant

UNIVERSITY OF EDINBURGH

Research assistant

April 2021 – September 2021

- Developing a Carpentries-style course in high-dimensional statistics.
- Certification as a trained Carpentries instructor (April 2021).

Bioinformatician

FIOS GENOMICS

Bioinformatician

October 2015 – August 2018

- Communicating regularly with clients to plan projects and explain results.
- Exploratory and statistical analysis for academics and commercial clients.
- Statistical analysis & visualisations for client publications & commercial research projects.
- Developer, author & maintainer of proprietary R packages.
- Minor system administration tasks.

Writing

Co-authorships

- *heatmaply: an R package for creating interactive cluster heatmaps for online publishing.*
Bioinformatics, 2017 (DOI)
- *Species-specific regulation of angiogenesis by glucocorticoids reveals contrasting effects on inflammatory and angiogenic pathways.*
PLoS One, 2018 (DOI)
- *Stress perception impacts on clinical signs of skin ageing and modifies the epigenome.*
Journal of Investigative Dermatology, 2016 (DOI)

In preparation

- Embracing heterogeneity in multi-donor single cell RNAseq data.
- Scalable Bayesian analysis of single-cell RNAseq data.
- A step-by-step analysis of expression variability using single cell RNA sequencing data.
- Variational inference for eQTL discovery with BaseQTL.

Teaching

Presenter/helper

CARPENTRIES WORKSHOPS

Online, 2021 – ongoing

- Data carpentries R for social sciences (presenter)
- Python Intro for Libraries (helper)
- Statistics with R (helper)
- Data analysis and visualisation with Python for Genomics (helper)

IGMM statistical seminar series

LECTURES

Online, 2020

- Exploratory data analysis
- Experimental design, hypothesis testing, statistical power

Applied analysis workshop for single cell RNAseq

ONE DAY WORKSHOP

IGMM, 2020

- Exploratory analysis
- Normalisation
- Feature selection
- Differential expression analysis
- Clustering

Teaching materials

AUTHOR/MAINTAINER

2021 – ongoing

- High dimensional statistics with R
- OSCA multisample

Software

Bioconductor

Maintainer: BASiCS, BASiCSStan, densvis, scater, snifter

CRAN

Maintainer: bayefdr, contrast

Contributor: heatmaply

Conferences and meetings

European Mathematical Genetics Meeting

PRESENTATION

Cambridge, 2022

Optimising eQTL discovery with BaseQTL using a screening approach

IGMM internal meetings

POSTER

Edinburgh, 2019 – 2020

Scalable Bayesian analysis of single cell RNAseq

Bayesian analysis of multi-donor scRNAseq data (2nd prize)

UoE Centre for Statistics conference

POSTER

Edinburgh, June 2019

Scalable Bayesian analysis of single cell RNAseq

Quantitative Genomics

PRESENTATION

Francis Crick Institute, June 2019

Scalable Bayesian analysis of single cell RNAseq

Genomic Medicine

POSTER

Edinburgh, May 2019

Scalable Bayesian analysis of single cell RNAseq

Edinbr (R user group)

PRESENTATION

Edinburgh, March 2019

Building interactive modules using htmlwidgets

Edinburgh Bioinformatics

PRESENTATION

Edinburgh, November 2018

Interactive data visualisation using R and plotly.

Extracurricular

Society committees

EDINBURGH/GALWAY

Various

- **IGMM Postgraduate Society (Edinburgh):** Organising student events, advocating for improvements in student working conditions and well-being.
- **IGMM social committee (Edinburgh):** Organising social events for students/postdocs/staff. Editor of noteworthy student Christmas movie, 2018.
- **Lotus society (Galway):** Organising yoga classes and events for students/postdocs/staff.

Honors & Awards

- Best savoury food (mattar paneer), IGMM Christmas Party, 2018
- School of Chemistry Medal (Molecular Modelling and Drug Design, NUI Galway, 2011
- Entrance Scholarship, NUI Galway, 2008