

Alistair Bailey

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Scientist specialising in antigen processing and presentation by major histocompatibility molecules. I have a PhD in Computational Biology and 12 years of research experience in cancer and infectious disease. I integrate mass spectrometry proteomics with NGS workflows and mathematical modelling to resolve complex biological questions. Most recently, I have been designing and developing microfluidic devices for time control.

SKILLS

Programming & tools R, Python, SQL, Bash, UNIX/Linux, Git, Docker

LLM & workflow automation Agentic LLM workflows for R (github.com/ab604/claude-code-r-skills); agentic LLM bioinformatics analysis framework covering NGS, RNAseq, and variant-calling workflows (internal tooling)

Machine learning XGBoost, TabNet, ExtraTrees, ensemble methods

Statistics & inference Bayesian multilevel modelling (brms/Stan), DAG-based causal inference

Bioinformatics RNAseq (HISAT2/StringTie/featureCounts, Salmon, kallisto, edgeR), scRNAseq (cellranger/Seurat), WES/WGS somatic variant calling (Mutect2/VarScan/Strelka), Peaks Studio/MSFragger (proteomics), multiomics integration

Experimental Microfluidics device design and fabrication, PDMS soft lithography, 3D printing, AutoCAD, fluid dynamics simulation, wet-lab molecular biology

EXPERIENCE

Cancer Sciences, University of Southampton

Research Fellow Microfluidic HDX-MS | Southampton, UK | 2025–2026

- Completed a droplet-based millisecond microfluidics HDX-MS project, enabling sub-second hydrogen–deuterium exchange measurements for structural biology.
- Designed and manufactured droplet-free millisecond time-control devices for MF-HDX-MS, encompassing fluid dynamics simulation, AutoCAD drafting, 3D printing and PDMS soft lithography.
- Work currently unpublished (manuscripts in preparation).

School of Biological Sciences, University of Southampton

Research Fellow | Southampton, UK | 2023

- Contract scRNAseq analysis of T-cell response to neutrophil exposure for an MRC-funded project.

Centre for Proteomic Research/Cancer Sciences, University of Southampton

Research Fellow | Southampton, UK | 2018–2022

- Cancer Research UK Accelerator project identifying treatment targets in hard-to-treat cancers (oesophageal, lung, neuroendocrine) using integrated multi-omics approaches.
- Designed and maintained variant calling (Mutect2/VarScan/Strelka) and RNAseq (HISAT2/StringTie/featureCounts, Salmon, kallisto) pipelines for somatic mutation discovery and transcript quantification.
- Performed mutational signature analysis and tumour mutation burden calculations.
- Integrated WES, RNAseq, and immunopeptidomics data for neoantigen prediction.
- Developed and maintained immunopeptidomics and proteomics pipelines using Peaks Studio and R.
- Data controller for multi-omics datasets deposited in PRoteomics IDentifications Archive and the European Phenome-Genome Archive.

Centre for Proteomic Research/Cancer Sciences, University of Southampton

Research Fellow | Southampton, UK | 2015–2018

- Developed peptidomics pipeline at the UoS for research into the role of MHC molecules in skin sensitisation to chemical allergy.

Cancer Sciences, University of Southampton

Research Fellow | Southampton, UK | 2013–2015

- MRC Centenary Fellow: Combining computational methods to understand the structural basis of MHC Class I antigen presenting function.

EDUCATION

University of Southampton

PhD, Computational Biology (Immunology Focus) | Southampton, UK | 2008–2013

- Thesis: Relating the structure, function and dynamics of the MHC Class I antigen presenting molecule.

University of Southampton

BEng, Civil Engineering | Southampton, UK | 2005–2008

- First Class Honours in Civil Engineering.

University of Southampton

Engineering, Science & Mathematics Foundation Year | Southampton, UK | 2004–2005

- Maths and physics foundation year preparation for undergraduate study.

Bournemouth & Poole College of Art & Design

BTEC ND Audio-Visual Production | Bournemouth, UK | 1992–1994

- Foundation course in film, photography, TV and radio production.

INDUSTRY

Microsoft Research

Internship | Cambridge, UK | 2012

- Contributed to the development of our computational model of MHC I peptide selection.

Globecast

Freelance Satellite Communications Engineer | London, UK | 2004–2012

- I continued to work as an engineer in broadcast TV from 2004 to 2012 on major events such as the Olympics and Football World Cup.

Globecast

Satellite Communications Engineer | London, UK | 2000–2004

- Full time engineer working in global broadcast TV primarily on sports, news and live entertainment events.

Telecine

Film and television post-production engineer | London, UK | 1995–2000

- I trained as an engineer to operate various TV & film post-production equipment.

TEACHING & TRAINING

University of Southampton

Learning Technologist | Southampton, UK | 2023–2024

- Part-time role supporting Engagement Librarians in the design, development and deployment of webpages and other electronic resources.

University of Southampton

Webpage Design | Southampton, UK | 2024

- I created a webpage design workshop and materials for Librarians at the University of Southampton

University of Southampton

BIOL 2013: Introduction to bioinformatics | Southampton, UK | 2021–2022

- I taught the undergraduate introduction to bioinformatics module on variant discovery using the University Galaxy Server.

University of Southampton

Coding Together | Southampton, UK | 2019–2020

- I created and taught an eight week series of collaborative workshops to teach foundational R coding and data science skills based on Carpentries materials.

IntoUniversity Millbrook

Academic Support Tutor | Southampton, UK | 2018–2019

- [IntoUniversity](#) supports young people from disadvantaged backgrounds to attain either a university place or another chosen aspiration. I volunteered as an academic support tutor for secondary school learners.

University of Southampton, Umeå University

Software Carpentry | UK, Sweden | 2017–2018

- Taught and assisted at Carpentries workshops (R, SQL, Python, git)

University of Bradford

[British Society for Proteomics 2018 Data Science Workshop](#) | Bradford, UK | 2018

- I created and taught a proteomics data science workshop including introduction to R, Volcano plots, heatmaps and peptide logos.

SELECTED PUBLICATIONS

Identification of natural Zika virus peptides presented on the surface of paediatric brain tumour cells by HLA class I (2025)

Matt Sherwood, José Ramos-Castañeda, Ben Nicholas, Alistair Bailey, Thiago Giove Mitsugi, Carolini Kaid, Oswaldo K. Okamoto, Paul Skipp, Rob M. Ewing

Droplet microfluidic hydrogen/deuterium exchange for investigating protein dynamics with millisecond precision (2025)

Dietmar Hammerschmid, Alistair Bailey, Jakub Sys, Simon I.R. Lane, Max Saito, Theo Hornsey, Niall Hanrahan, Andy van Hateren, Howard Broughton, Alfonso Espada, Eamonn Reading, Jonathan West

Comparative analysis of protein expression between oesophageal adenocarcinoma and normal adjacent tissue (2025)

Ben Nicholas, Alistair Bailey, Katy J. McCann, Robert C. Walker, Peter Johnson, Tim Elliott, Tim J. Underwood, Paul Skipp

Comparative analysis of transcriptomic and proteomic expression between two non-small cell lung cancer subtypes (2025)

Ben Nicholas, Alistair Bailey, Katy J McCann, Peter Johnson, Tim Elliott, Christian Ottensmeier and Paul Skipp

Immuno-peptidomics-guided identification of functional neoantigens in non-small cell lung cancer (2024)

Ben Nicholas, Alistair Bailey, Katy J McCann, Oliver Wood, Eve Currall, Peter Johnson, Tim Elliott, Christian Ottensmeier, Paul Skipp

Identification of neoantigens in esophageal adenocarcinoma (2022)

Ben Nicholas, Alistair Bailey, Katy J. McCann, Oliver Wood, Robert C. Walker, Robert Parker, Nicola Ternette, Tim Elliott, Tim J. Underwood, Peter Johnson, Paul Skipp

Operation Moonshot: rapid translation of a SARS-CoV-2 targeted peptide immunoaffinity liquid chromatography-tandem mass spectrometry test from research into routine clinical use (2022)

Jenny Hällqvist, Dan Lane, Andrew Shapanis, Kayleigh Davis, Wendy E. Heywood, Ivan Doykov, Justyna Śpiwak, Nana Ghansah, Brian Keevil, Pankaj Gupta, Rebekah Jukes-Jones, Raj Singh, Dominic Foley, Johannes P.C. Vissers, Rebecca Pattison, Samantha Ferries, Robert Wardle, Amy Bartlett, Lisa J. Calton, Leigh Anderson, Morteza Razavi, Terry Pearson, Matt Pope, Richard Yip, Leong L. Ng, Benjamin I. Nicholas, Alistair Bailey, Dan Noel, R. Neil Dalton, Simon Heales, Christopher Hopley, Andrew R. Pitt, Perdita Barran, Donald J. L. Jones, Kevin Mills, Paul Skipp and Rachel S. Carling

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