

# Conor M. Finlay

SENIOR RESEARCH FELLOW

Trinity Translational Medicines Institute, Trinity College Dublin

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*Cellular immunologist with bioinformatic skills*

## Research interests

I am a cellular Immunologist with three core skills: *in vivo* models of inflammation, bioinformatics and clinical research. My current research obsession is the regulation of mononuclear phagocyte differentiation during inflammation on a single cell level.

## Current Roles

### SENIOR RESEARCH FELLOW, TRINITY COLLEGE DUBLIN

- COVID19 Science Foundation Ireland-funded strategic partnership
- TCD Single cell Core development
- Trinity Kidney Health Centre, Prof. Mark A Little.

### HONORARY RESEARCH FELLOW, UNIVERSITY OF MANCHESTER

- Co-managing Medical Research Council programme grant with Prof Allen
- Bioinformatics collaborations
- Core facility engagement

## Past Employment

### Research Fellow

SUPERVISOR: PROF MARK LITTLE

- Hired to lead single cell RNA-sequencing aspect of the Science foundation Ireland COVID strategic partnership.

*Trinity College Dublin*

2021

### Research Associate

SUPERVISOR: PROF JUDITH ALLEN.

- Origin, heterogeneity, proliferation and effector function of macrophages during helminth infection and type 2 immune responses. Funding: Medical Research Council/Wellcome Trust

*University of Manchester*

2017-2021

### Lecturer (teaching relief)

SCHOOL OF BIOCHEMISTRY AND IMMUNOLOGY

- I took on the teaching duties for a senior professor for 1 year including undergraduate practice supervision, undergraduate and masters level teaching, examinations and corrections.

*Trinity College Dublin*

2016-2017

### Post-doctoral Researcher

SUPERVISOR: PROF KINGSTON HG MILLS.

- Research projects: 1. IP-protected translational project identifying and testing novel helminth-derived proteins as potential therapeutics for inflammatory disease. 2. Role of mast cells in the alternative activation of macrophages via IL-33. 3. Circadian regulation of autoimmune disease

*Trinity College Dublin*

2013-2016

### Pharmaceutical advertisement and event reviewer

PAID INTERNSHIP

- Reviewed 5 years of pharmaceutical advertisements for assessment of compliance. Created and managed database for reporting issues and producing analysis documents. Liaising with marketing and scientific teams to address and solve issues.

*Bristol-Myers Squibb*

2007

## Education

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### Informatics Training Scheme (Wellcome Trust TPA)

PROGRAMMING AND COMPUTATIONAL APPROACHES TO BIOLOGY MODULES

- Constituted 50% of taught component of MSc Bioinformatics and Systems Biology

University of Manchester

2020

### PhD in Immunology

IMMUNE MODULATION BY THE HELMINTH PARASITE FASCIOLA HEPATICA

- Supervisor: Kingston Mills

Trinity College Dublin

2013

### BA(Mod) in Natural Sciences

MAJOR: BIOCHEMISTRY WITH IMMUNOLOGY

- Grade: 1:1, graduated top of class

Trinity College Dublin

2007

## Skills

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**Animal models of Disease:** Experimental autoimmune encephalomyelitis, *Litomosoides sigmodontis* infection, OVA/Alum and dust mite-induced airway hypersensitivity, dextran sodium sulphate-induced colitis, circadian rhythm modulation, B16 melanoma, Sterile peritonitis, IL-4-complex administration, House airway hypersensitivity, *Fasciola hepatica* infection, *Bordetella pertussis* infection.

**Laboratory techniques:** In vitro cell culture, FACS & MACS cell sorting, flow cytometry (expert), mass cytometry, tissue digestion, ELISA, enzyme assays, RT-qPCR, confocal microscopy, Amnis Image Stream, sample preparation for mass spectrometry and single cell RNA-sequencing. Basic experience with PCR, genotyping, immunoblots and library preparation for Next Generation Sequencing.

**Clinical research:** Preparation of cells from human blood. Biobanking, clinical database management. Patient stratification and statistical analysis. Working in as part of a multi-disciplinary scientific-clinical research team. Data curation and integration.

**Programming, Data analysis, Statistics & Visualisation:** R (Fluent), Python (Intermediate), Unix/Bash (Beginner). Data analysis/visualisation in and in R using Tidyverse and ggplot2. Advanced user of Microsoft Office applications, TreeStar FlowJo and GraphPad Prism. Competent user of Adobe Illustrator and pathway analysis tools e.g. IPA. Strong background in statistics and its application to experimental design and interpretation of results. Database creation and maintenance. Creation of Shiny Apps. Basic knowledge of computer science and use of high-performance computer clusters.

**Bioinformatics.** Analysis of microarray/bulk RNA-seq datasets analysis using the DESeq2 and EdgeR packages. Single cell analysis using Scater within SingleCellExperiment, pySCENIC, Velocity, Seurat, FlowCore, FlowSOM, CytosKit. Dimensionality reduction: PCA, t-SNE and UMAP. Progression analysis using monocle3, Destiny and RNA velocity. Clustering using Phonograph, DevSM, FlowSOM hclust and treeclust.

## Funding

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### MR/V011235/1 Programme Grant

2.26 MILLION GBP CO-INVESTIGATOR (2 APPLICANTS)

- "Macrophages in type 2 immunity: unravelling susceptibility and resistance to tissue nematode infection". Funded, 2.26 million GBP. Co-wrote grant and provided scientific design and all preliminary data. I was awarded an honorary research fellow position at UoM to facilitate ongoing involvement in this project when I left Manchester to return to Ireland.

Medical Research Council

2021

### Building Engagements in Health Research Scheme

10K EUR, CO-APPLICANT

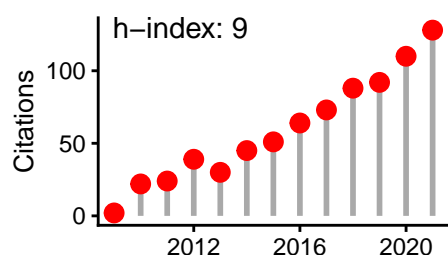
- Co-Applicant as scientific lead with Jennifer Scott (TCD, ICAT fellow) as medical lead. 'Nanoparticle modulation of neutrophil and monocyte responses to ANCA'

Internal TCD

2021

- Shortlisted for UKRI Innovation/Rutherford Fund Skills Development Fellowship (Computational Biology), Sep 2017.

1. Fiancette, R., Finlay, C. M., Willis, C., Bevington, S. L., Soley, J., Ng, S. T. H., Baker, S. M., Andrews, S., Hepworth, M. R., & Withers, D. R. (2021). Reciprocal transcription factor networks govern tissue-resident ILC3 subset function and identity. *Nature Immunology*, 22(10), 1245–1255. <https://doi.org/10.1038/s41590-021-01024-x>
2. Cunningham, K. T., Finlay, C. M., & Mills, K. H. G. (2021). Helminth Imprinting of Hematopoietic Stem Cells Sustains Anti-Inflammatory Trained Innate Immunity That Attenuates Autoimmune Disease. *The Journal of Immunology*, 206(7), 1618–1630. <https://doi.org/10.4049/jimmunol.2001225>
3. Finlay, C. M., Cunningham, K. T., Doyle, B., & Mills, K. H. G. (2020). IL-33-Stimulated Murine Mast Cells Polarize Alternatively Activated Macrophages, Which Suppress T Cells That Mediate Experimental Autoimmune Encephalomyelitis. *The Journal of Immunology*, 205(7), 1909–1919. <https://doi.org/10.4049/jimmunol.1901321>
4. Finlay, C. M., & Allen, J. E. (2020). The immune response of inbred laboratory mice to *Litomosoides sigmodontis* : A route to discovery in myeloid cell biology. *Parasite Immunology*, 42(7), e12708. <https://doi.org/10.1111/pim.12708>
5. Czajkowska, B. I., Finlay, C. M., Jones, G., & Brown, T. A. (2019). Diversity of a cytokinin dehydrogenase gene in wild and cultivated barley. *PLOS ONE*, 14(12), e0225899. <https://doi.org/10.1371/journal.pone.0225899>
6. McEntee, C. P., Finlay, C. M., & Lavelle, E. C. (2019). Divergent Roles for the IL-1 Family in Gastrointestinal Homeostasis and Inflammation. *Frontiers in Immunology*, 10. <https://doi.org/10.3389/fimmu.2019.01266>
7. Campbell, S. M., Knipper, J. A., Ruckerl, D., Finlay, C. M., Logan, N., Minutti, C. M., Mack, M., Jenkins, S. J., Taylor, M. D., & Allen, J. E. (2018). Myeloid cell recruitment versus local proliferation differentiates susceptibility from resistance to filarial infection. *eLife*, 7, e30947. <https://doi.org/10.7554/eLife.30947>
8. Sutton, C. E., Finlay, C. M., Raverdeau, M., Early, J. O., DeCoursey, J., Zaslon, Z., O'Neill, L. A. J., Mills, K. H. G., & Curtis, A. M. (2017). Loss of the molecular clock in myeloid cells exacerbates T cell-mediated CNS autoimmune disease. *Nature Communications*, 8(1), 1923. <https://doi.org/10.1038/s41467-017-02111-0>
9. Finlay, C. M., Stefanska, A. M., Coleman, M. M., Jahns, H., Cassidy, J. P., McLoughlin, R. M., & Mills, K. H. G. (2017). Secreted products of *Fasciola hepatica* inhibit the induction of T cell responses that mediate allergy. *Parasite Immunology*, 39(10), e12460. <https://doi.org/10.1111/pim.12460>
10. Finlay, C. M., Stefanska, A. M., Walsh, K. P., Kelly, P. J., Boon, L., Lavelle, E. C., Walsh, P. T., & Mills, K. H. G. (2016). Helminth Products Protect against Autoimmunity via Innate Type 2 Cytokines IL-5 and IL-33, Which Promote Eosinophilia. *The Journal of Immunology*, 196(2), 703–714. <https://doi.org/10.4049/jimmunol.1501820>
11. Bernard, N. J., Finlay, C. M., Tannahill, G. M., Cassidy, J. P., O'Neill, L. A., & Mills, K. H. (2015). A critical role for the TLR signaling adapter Mal in alveolar macrophage-mediated protection against *Bordetella pertussis*. *Mucosal Immunology*, 8(5), 982–992. <https://doi.org/10.1038/mi.2014.125>
12. Finlay, C. M., Walsh, K. P., & Mills, K. H. G. (2014). Induction of regulatory cells by helminth parasites: exploitation for the treatment of inflammatory diseases. *Immunological Reviews*, 259(1), 206–230. <https://doi.org/10.1111/imr.12164>
13. Coleman, M. M., Finlay, C. M., Moran, B., Keane, J., Dunne, P. J., & Mills, K. H. G. (2012). The immunoregulatory role of CD4 + FoxP3 + CD25 - regulatory T cells in lungs of mice infected with *Bordetella pertussis*. *FEMS Immunology & Medical Microbiology*, 64(3), 413–424. <https://doi.org/10.1111/j.1574-695X.2011.00927.x>
14. Walsh, K. P., Brady, M. T., Finlay, C. M., Boon, L., & Mills, K. H. G. (2009). Infection with a Helminth Parasite Attenuates Autoimmunity through TGF- $\beta$ -Mediated Suppression of Th17 and Th1 Responses. *The Journal of Immunology*, 183(3), 1577–1586. <https://doi.org/10.4049/jimmunol.0803803>



## Presentations

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### ORAL

2021	Cytokine and interferon society meeting	Cardiff
2019	Irish Society of Immunology	RCSI, Dublin
2019	BSI Type 2 Immunology Meeting	Manchester
2019	KU Leuven, UZ Gasthuisberg Campus	KU Leuven
2015	Molecular and cellular biology of helminth parasites IX	Hydra, Greece
2015	TBSI Post-Doc Research Day	TCD, Dublin
2015	1st TBSI-Weimann joint Immunology conference	Rehovot, Israel
2015	European Congress of Immunology	Vienna
2009	European Congress of Immunology	Berlin

### POSTER

2019	British Society of Immunology	Liverpool
2018	Type 2 Immunity in Homeostasis and Disease	Bruges
2017	British Society of Immunology	Brighton
2016	British Society of Immunology	Liverpool
2015	Frontiers in neurology	TCD, Dublin
2014	Cytokine and interferon society meeting	Melbourne
2012	Keystone: Biology of Cytokines	Colorado
2011	Cytokine and interferon society meeting	Florence

## Awards

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2019	Best presentation from selected abstracts - Irish Society of Immunology
2015	Visiting student training scheme - Weizmann Institute of Science
2015	TBSI Post-Doc Research Day - Runner up talk prize
2014	Milstein Travel Award - International Cytokine society
2007	Valdicotrian - Biochemistry with Immunology degree
2007	Best Undergraduate Research Poster Prize - School of Biochemistry and Immunology

## Outreach and organisation

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- **Discover Research Night**, Dublin Sep 2014. Marie Skłodowska-Curie-funded. I was the event organiser responsible for public engagement at Trinity Biomedical Sciences Institute, 8 weeks' full-time.
- **10th International Symposium on Bordetella**, Sep 2013. Logistics manager responsible for operations of the conference including registration, AV equipment and support for speakers.
- **Manchester Immunology Group Seminar Series**, May 2017 – Sep 2018. Co-lead organiser. Handling invitations, hospitality, communications, for renowned international speakers to visit University of Manchester.
- **School talk**, Oaklands Community College, Edenderry Co. Offaly, 2021. "The life of a scientist".
- **Single Cell TCD Core facility**. I formed a working group in 2021 in Trinity college dublin to address the competitive disadvantage of not having a working single cell RNA-sequencing. My aim is to deliver a single cell RNA-seq service to TCD researchers on a cost per service basis that will act as a platform to develop a full core facility service.

## Teaching

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2021	R programming, data visualisation and transcriptomic analysis (3 workshops)	MSc in Immunology
2016-2017	T cell differentiation, effector function and regulation (4 lectures)	BA(Mod)
2016-2017	Cancer immunology and immunotherapy (2 lectures)	BA(Mod)
2016-2017	EAE as a model for multiple sclerosis	BA(Mod)
2016-2017	T cell differentiation, effector function and regulation (2 lectures)	MSc in Immunology
2014-2017	Introduction to parasite and type 2 Immune responses (3 lectures)	MSc in Immunology

Other duties include Undergraduate practical supervision, tutorials, and organising visits of school students at various points between 2013-2016. Introduction to data scientists for immunologists course available [here](#). Acting as an official 'external mentor' of a PhD student in Wellcome Trust in Immunomatrix in Complex Disease PhD program in Manchester.

## Supervision

### 2 week student project

BACHELOR IN MEDICINE

Trinity College Dublin

2021

- Lab/statistical training. Continued Informal mentorship with one student.

### 3 month student project

BA(MOD)

Trinity College Dublin

2021

- Co-primary supervisor – lab/statistical training, writing mentorship. Ongoing collaboration with a co-first author paper in preparation together.

### Formal supervision

RESEARCH ASSISTANT

Trinity College Dublin

2021

- Direct supervision and training. Daily interaction.

### 6 month student project

MRES INFECTION BIOLOGY

University of Manchester

2020-2021

- Co-primary supervisor - project design and mentorship & direct supervision/training, student now in UK graduate Industry role.

### 6 month student project

MRES INFECTION BIOLOGY

University of Manchester

2018-2019

- Co-primary supervisor - project design and mentorship & direct supervision/training, student now a PhD Candidate in Leeds.

### Informal mentorship

PHD

Trinity College Dublin

2017-2021

- Informal supervisor. Project design and management and career mentorship. Two papers published together, awarded best presentation at ICS 2018. Now a Post-Doc in Glasgow.

### 3 month student project

MSC IMMUNOLOGY

Trinity College Dublin

2016

- Co-primary supervisor - project design and mentorship & direct supervision/training. Student now a PhD candidate in TCD.

### Informal mentorship

PHD

Trinity College Dublin

2015-2017

- Informal supervisor. Project design and management.

### 3 month student project

MSC IMMUNOLOGY

Trinity College Dublin

2015

- Co-primary supervisor - project design and mentorship & direct supervision/training. Project led to IRC-funded PhD that I co-wrote.

### 3 month student project

MSC IMMUNOLOGY

Trinity College Dublin

2014

- Co-primary supervisor - project design and mentorship & direct supervision/training. Student now in Biotech Industry role.

## Training

### FORMAL

#### Single Cell RNA-sequencing

1 WEEK COURSE

Earlham Institute

2018

- library preparation, sequencing, QC & analysis

#### Home Office personal animal licence

1 WEEK COURSE; ONGOING TRAINING

University of Manchester

2017

- PIL A, B & C

#### Fluorescent activated cell sorting

1 WEEK COURSE

University College Dublin

2014

- Theory and practical training using BD machines

### COURSES

#### UNIVERSITY OF MANCHESTER

- Data Protection
- Introduction to High Performance Computing
- Introduction to version control using Git
- Introduction to the UNIX shell
- Programming with Python
- Data analysis using R
- Introduction to Python

#### TRINITY COLLEGE DUBLIN

- Biological safety workshop
- Cryogenics safety workshop
- Radiological safety workshop
- LAST animal handling course (2009)

## Other Contributions

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### REVIEWING

2021	French National Research Agency (ANR) 2021 generic call	<i>Grant review</i>
2021	BBSRC Discovery Fellows award	<i>Grant review</i>
2018	Scientific Reports	<i>Article review</i>
2017-2020	Parasite Immunology	<i>Article review</i>

### SOCIETIES AND COMMITTEES

#### SOCIETY MEMBERSHIP

- British Society of immunology
- Irish Society of Immunology
- International Cytokine & Interferon Society

#### INTERNAL COMMITTEES

- STTAR Data Committee (COVID SPP)
- Single Cell TCD working group
- Financial services end user committee

## Referees

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### Prof Judi Allen

PROFESSOR OF IMMUNOBIOLOGY; JUDI.ALLEN@MANCHESTER.AC.UK

*University of Manchester*

*Lydia Becker Institute*

### Dr Matthew Hepworth

SIR HENRY DALE FELLOW; MATTHEW.HEPWORTH@MANCHESTER.AC.UK

*University of Manchester*

*Lydia Becker Institute*

### Prof Kingston HG Mills

PROFESSOR OF EXPERIMENTAL IMMUNOLOGY; KINGSTON.MILLS@TCD.IE

*Trinity College Dublin*

*School of Biochemistry and Immunology*

### Prof Cliona O'Farrelly

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*School of Biochemistry and Immunology*