

**Emeline Favreau** ef479@cam.ac.uk

**Bioinformatician** in the Department of Medicine (University of Cambridge) with Dr Chris Wallace on the INTREPID project focusing on rare disease. We are exploring clinical data (WGS, blood count, flow cytometry) from Primary Immunodeficient patients. Within an international and multidisciplinary team, I am responsible to explore data and develop pipelines to help diagnosing patients.

### Publications

**Favreau**, Cini, Taylor ... Sumner (2023) Putting hornets on the genomic map. *Sci Rep* 13, 6232.

Wyatt, Bentley, Taylor, **Favreau**, Brock, Taylor, Bell, Leadbeater, and Sumner (2023) Social complexity, life-history and lineage influence the molecular basis of castes in vespid wasps. *Nat Commun* 14, 1046.

Sumner, **Favreau**, Geist, Toth, and Rehan (2023) Molecular patterns and processes in evolving sociality: lessons from insects *Phil Trans.* 378: 20220076.

**Favreau**, Lebas, Stolle, Priyam, Pracana, Aron, Wurm (2022) No supergene despite social polymorphism in the big-headed ant *Pheidole pallidula*. *bioRxiv*.

**Favreau** & Geist, Rehan, Toth, Sumner (2022) Co-expression gene networks and machine-learning algorithms unveil a core genetic toolkit for reproductive division of labour in rudimentary insect societies. *Genome Biology and Evolution*, evac174

Priyam ... **Favreau** et al (2019) Sequenceserver: a modern graphical user interface for custom BLAST databases. *Molecular Biology and Evolution*.

Linard, ... **Favreau** et al (2018) The contribution of mitochondrial metagenomics to large-scale data mining and phylogenetic analysis of Coleoptera. *Molecular Phylogenetics and Evolution*. 128: 1-11.

**Favreau** et al (2018) Genes and genomic processes underpinning the social lives of ants. *Current Opinion in Insect Science*. 3926 (4):451-479.

Lyal and **Favreau** (2015) The Rectal Valve in Curculionoidea and other Coleoptera (Insecta). *Zootaxa*. 3926 (4):451-479.

### Research Background

2019-2023: **Postdoc** in evolutionary biology of social organisation, UCL. PI: Prof Seirian Sumner.

2015-2019: **PhD in ant genomics**, QMUL. Supervisors: Y. Wurm and M. Reuter. NERC DTP.

2013 – 2014: MRes Biosystematics at Imperial College London & Natural History Museum, London. Supervisor: Prof A. Vogler. Merit.

2008 – 2011: BSc Environmental Sciences at Oxford Brookes University, Oxford 1st Class (Hons).

### Technical

Bioinformatics for population genetics & genome/transcriptome wrangling

- Creating and running pipelines for comparative genomics (HPC): from QC to variant calling, genome annotation (genes, lncRNA, TE), genome assembly (MinION, PacBio, Illumina, Dovetail Hi-C), population genomics
- Current tools: R (ggplot, tidyverse, svm), Python (matplotlib, pandas, numpy), bash (tmux, vim, qsub)
- Reproducibility: RMarkdown reports, Github version control, Nextflow (nf-core/rnaseq), Singularity, Docker
- RNAseq QC and Transcriptome analyses: DESeq2, WGCNA
- Machine learning: Support Vector Machine (to predict caste from wasp RNAseq data)
- Data Management: I defined the strategy for long-term data storage for the Sumner Lab, and developed a system for all members to safely save their data (genomes, transcriptomes, annotations)

Knowledge of where the data come from: experienced fieldwork biologist, wet lab skills for RNA and DNA sequencing of short and long reads

### Talks & posters (selection)

- March 2022: **international invited talk** ("Wasp and Bee Evolution") for GRIB group at IMIM-Pompeu Fabra University (Barcelona)
- June 2021: postdoc presentation at UCL CLOE Seminar, in London (online)
- July 2020: V-poster at Arthropod Genomics Symposium ([online](#))
- Sept 2018: **international invited talk** for Ramírez's group, UC Davis, California (USA)
- Sept 2018: **international invited talk** at Social Insect Research Group, Arizona State University, Arizona (USA)
- Aug 2018: poster at international joint *ESEB* and *Evolution* conference, in Montpellier (France)

- Aug 2018: international talk at *IUSSI Brazil*, in Guarujá (Brazil)
- Aug 2017: international poster at *ESEB congress*, in Groningen (Netherlands)
- June 2017: international talk at *Evolution* conference, in Portland, Oregon (USA)
- Jan 2017: talk at *PopGroup*, in Cambridge

## Grants, honours & awards

- 2020: ESEB's Godfrey Hewitt Mobility award - €1600
- 2019: Genetics Society grant to give a talk at PopGroup - £150
- 2018: QMUL PostGraduate Research Fund for Arizona & California fieldtrip - £1200
- 2018: IUSSI North-Western Section grant to organise a symposium at IUSSI Brazil – £1000
- 2018: Royal Entomological Society grant to organise a symposium at IUSSI Brazil - £450
- 2018: Royal Society of Biology grant to organise a symposium at IUSSI Brazil - £500
- 2017: Genetics Society grant to give a talk at PopGroup - £150
- 2017: Genetics Society grant to present a poster at ESEB - £624

## Teaching

- Nov 2020-2021: Teaching “Molecular Tools for Ecologists” to 80-150 UCL Undergraduate students. Recorded lecture, led Q&A, exam preparation and marking.
- Nov 2019 - ongoing: mentoring students in Seirian Sumner's lab.
  - 1st year Undergraduate Summer project student Jadesada Schneider (bioinformatics)
  - 3rd year Undergraduate Autumn project student Shin Khan (R)
  - MRes Winter project student Phoebe Cunningham (R)
  - MSci project student Quinn Coxon (bioinformatics)
- Sept 2016 - Sept 2019: Teaching assistant for 8 cohorts of QMUL Undergraduates and Master's classes, including Fieldwork (Tropical Ecology in South Africa), Bioinformatics (R Basics, Advanced R, Bash for Genomics), Basic Biology lab skills (dilution, microscopy, PCR).

## Outreach

- 2022: invited talk at *Pint of Science* for a London pub crowd
- 2021: guest on Exolore podcast as social insect expert “The World of Migratory Wasps”.
- 2019-21: Science pen pal with a US-based teenage student from [Letters to a Pre-Scientist](#). Exchanging four letters a year.
- 2018: QMUL Festival of Communities in London, chatting about insects to local community