Yasmin Hilliam PhD
Research Scientist

RESEARCH EXPERIENCE

Research Scientist 2022 – present
PI: Jennifer Bomberger
Department of Microbiology and Immunology, Geisel School of Medicine at Dartmouth, United States
Project: Examining the impact of acute viral respiratory infections on microbial communities in the cystic fibrosis respiratory tract

- Responsible for liaising with clinical coordinators to organize collection and processing of sinus samples from cystic fibrosis patients
- Kept detailed, deidentified records of patient samples and carried out all stages of processing, from initial handling to sample extraction and purification to data analysis
- Utilized R and bash scripting to use existing software packages and write scripts for analysis of 16S rRNA microbiome, cytokine, and metallomic data
- Used mixed effect and multivariate analyses to test associations between microbiome, cytokine, viral infection, and demographic data
- Performed RNA sequence analysis of both human and bacterial sequences
- Helped in writing sections and producing figures for successful grant applications

Postdoctoral Associate 2020 – 2022
PI: Jennifer Bomberger and Vaughn Cooper
Department of Microbiology and Molecular Genetics, University of Pittsburgh, United States

- Managed collection and processing of clinical samples under supervision of another postdoc
- Carried out bench-marking experiments to determine viability of shotgun metagenomic sequencing for sinus and sputum microbiome analysis
- Developed skills in R and bash coding for analysis of shotgun metagenome data using existing tools

EDUCATION

PhD Medical Microbiology 2016 – 2020
PI: Craig Winstanley and Stephen Kaye
Institute of Infection and Global Health, University of Liverpool, United Kingdom

Resistance and tolerance to contact lens disinfection solutions in keratitis-associated *Pseudomonas aeruginosa*

MPhil Medical Microbiology 2014 – 2015
PI: Craig Winstanley
Institute of Infection and Global Health, University of Liverpool, United Kingdom

Genotyping of *Pseudomonas aeruginosa* isolates from pulmonary infections in non-cystic fibrosis bronchiectasis patients

BSc (Hons) Microbiology 2011 – 2014
School of Health and Life Sciences, University of Liverpool, United Kingdom

PUBLICATIONS

Hilliam Y, Armstrong S, Langendonk RF, Kaye S, Winstanley C (2025) *Journal of Medical Microbiology* [in press]

Induction of lipid A modification genes in *Pseudomonas aeruginosa* cells tolerant to a commercially available contact lens disinfection solution.

Hilliam Y, Armbruster C, Atteih S, Rapsinski G, Moore J, Koirala J, Krainz L, Gaston J, Williams J, Cooper V, Lee S, Bomberger J (2025) *bioRxiv* [preprint; under revision at *ERJ Open Research*]

Respiratory viral infection is associated with increased *Pseudomonas* abundance in cystic fibrosis airways. DOI: 10.1101/2025.07.08.663034

Duncan R, Lewin G, Cornforth D, Diggle F, Kapur A, Moustafa D, **Hilliam Y**, Bomberger J, Whiteley M, Goldberg J (2024) *Microbiology Spectrum*.

RNA-seq reproducibility of *Pseudomonas aeruginosa* in laboratory models of cystic fibrosis. DOI: 10.1128/spectrum.01513-24

Hilliam Y, Armbruster C, Rapsinski G, Marshall C, Moore J, Koirala J, Krainz L, Gaston J, Cooper V, Lee S, Bomberger J (2024) *Microbiology Spectrum*.

Cystic fibrosis pathogens persist in the upper respiratory tract following initiation of elexacaftor/tezacaftor/ivacaftor therapy. DOI: 10.1128/spectrum.00787-24

Armbruster C, **Hilliam Y**, Zemke A, Atteih S, Marshall C, Moore J, Koirala J, Krainz L, Gaston J, Lee S, Cooper V, Bomberger J (2024) *mBio*.

Persistence and evolution of *Pseudomonas aeruginosa* following initiation of highly effective modulator therapy in cystic fibrosis. DOI: 10.1128/mbio.00519-24

Atteih S, Armbruster C, **Hilliam Y**, Rapsinski G, Koirala J, Krainz L, Gaston J, DuPont M, Zemke A, Alcorn J, Moore J, Cooper V, Lee S, Forno E, Bomberger J (2024) *Pediatric Pulmonology*.

Effects of highly effective modulator therapy on the dynamics of the respiratory mucosal environment and inflammatory response in cystic fibrosis. DOI: 10.1002/ppul.26898

Zemke A, **Hilliam Y**, Stapleton A L, Kimple A J, Goralski J L, Shaffer A D, Pilewski J M, Senior B A, Lee S E, Cooper V S (2023) *International Forum of Allergy and Rhinology.*

Elexacaftor-Tezecaftor-Ivacaftor decreases *Pseudomonas* in the sinonasal microbiome in cystic fibrosis. DOI: 10.1002/alr.23288

Lane S†, **Hilliam Y**†, Bomberger J (2022) *Journal of Bacteriology*.

Microbial and immune regulation of the gut-lung axis during viral-bacterial coinfection. DOI: 10.1128/jb.00295-22

Hilliam Y, Kaye S, Winstanley C (2020) *Journal of Medical Microbiology*.

Pseudomonas aeruginosa and microbial keratitis: review. DOI: 10.1099/jmm.0.001110

Hilliam Y†, Moore M†, Lamont I, Bilton D, Haworth C, Foweraker J, Walshaw M, Williams D, Fothergill J, De Soyza A, Winstanley C (2017) *European Respiratory Journal.*

Pseudomonas aeruginosa adaptation and diversification in the non-cystic fibrosis bronchiectasis lung. DOI: 10.1183/13993003.02108-2016

This manuscript was considered by the journal to be of “outstanding educational value” and has subsequently received CME accreditation. This work has also been cited in the British Thoracic Society guideline for bronchiectasis in adults.

ORAL PRESENTATIONS

Invited speaker presentation and poster at *North American Cystic Fibrosis Conference*
October 2025, Seattle, WA, United States

Respiratory viral infection is associated with increased *Pseudomonas* abundance in the cystic fibrosis airway (2025) **Hilliam Y**, Armbruster C, Atteih S, Rapsinski G, Johnson M, Moore J, Koirala J, Krainz L, Gaston J, Williams J, Cooper V, Lee S, Bomberger J

Invited speaker presentation at the *Microbiology & Molecular Pathogenesis Program Annual Retreat*
February 2024, Fairlee, VT, United States

Persistence of bacterial pathogens in the sinuses following initiation of cystic fibrosis modulator therapy (2024) **Hilliam Y**, Armbruster C, Atteih S, Rapsinski G, Marshall C, Moore J, Koirala J, Krainz L, Gaston J, Cooper V, Forno E, Lee S, Bomberger J

Invited speaker presentation and poster at *North American Cystic Fibrosis Conference*
November 2023, Phoenix, AZ, United States

Bacterial pathogens persist in the upper respiratory tract following initiation of ETI therapy (2023) **Hilliam Y**, Armbruster C, Rapsinski G, Marshall C, Moore J, Koirala J, Krainz L, Gaston J, Cooper V, Lee S, Bomberger J

Flash talk and poster presentation at the *17th International Conference on Pseudomonas*
July 2019, Kuala Lumpur, Malaysia

Exposure to a sub-inhibitory concentration of contact lens disinfecting solution leads to the development of a tolerance phenotype in *Pseudomonas aeruginosa* (2019) **Hilliam Y**, Armstrong S, Kaye S, Winstanley C

Flash talk and poster presentation at the *Annual North West Microbiology Meeting*
March 2018, Salford, United Kingdom

Increased tolerance to contact lens disinfecting solution in clinical isolates of *Pseudomonas aeruginosa* from keratitis patients (2018) **Hilliam Y**, Kaye S, Winstanley C

COLLABORATIONS

Ryan Little, MD Dartmouth-Hitchcock Medical Center, Lebanon, NH

In close collaboration with Dr Little, Prof Bomberger, and clinical coordinators I am participating in the organization, collection, and analysis of clinical samples from cystic fibrosis patients for microbiome, cytokine, and olfactory threshold analysis. The aim of the project is to understand the long-term impacts of highly effective modulator therapy on olfaction, microbiota, and inflammation of the sinuses through multivariate analysis. We are utilizing regression and random forest modelling to elucidate the interactions between inflammatory response, resident bacterial populations, and olfactory proficiency in chronic airway disease.

Vaughn Cooper, PhD University of Pittsburgh, Pittsburgh, PA

Dr Cooper has been an important mentor to me throughout my postdoctoral research at the University of Pittsburgh. Dr Cooper has access to a unique collection of *Burkholderia cenocepacia* isolates from sibling pairs with cystic fibrosis and I am working to analyze variation observed in the genomes of isolates within and between sibling pairs during chronic lung infection. The analysis involves techniques in which the Cooper lab has extensive expertise, including hybrid genome assembly from long- and short-read sequencing using Unicycler, genome annotation using Prokka, and variant calling using breseq.

Chris Marshall, PhD Marquette University, Milwaukee, WI

Dr Marshall and I have met regularly throughout my time in the Bomberger lab in order to establish sequencing data analysis pipelines that will be used for the 16S amplicon, metagenome, and whole genome sequencing data that I will generate during my research.

Anna Zemke, MD, PhD University of Pittsburgh, Pittsburgh, PA

Dr Zemke and I have worked together to optimize QIIME2 and R pipelines for analysis of 16S amplicon sequencing data from her observational study investigating the effects of highly effective modulator therapy on the sinus microbiome of pediatric cystic fibrosis patients.

Chris van der Gast, PhD Northumbria University, Newcastle, United Kingdom

Dr van der Gast and I are collaborating on work to expand on a set of samples from multiple countries from people with cystic fibrosis pre- and post-modulator treatment with the aim of understanding how symptomatic improvements in the CF airway alter the community composition of the resident microbiota.

TEACHING EXPERIENCE

Course leader 2024 – present

Reproducible and FAIR Bioinformatics Analysis of Omics Data

The course is held annually at the Mount Desert Island Biological Laboratory and my role involves planning and teaching the curriculum for Dartmouth graduate students and other external applicants. I am responsible for preparing course materials and instructing students in basic and complex data visualization in R, data manipulation and analysis, and microbiome analysis in bash and R.

Workshop instructor 2024 – present

DartCF R Club Workshops

The Dartmouth Cystic Fibrosis Research Center runs weekly workshops to teach trainees how to manipulate, manage, analyse, and visualize data using R programming language. I teach sessions on both basic and complex data visualization and co-teach sessions on analysis of 16S rRNA amplicon data.

Postgraduate demonstrator 2015 – 2020

The role of a postgraduate demonstrator is to work with undergraduate students during practical modules to help develop the necessary research skills needed to complete their final year research project. I provided assistance to teaching staff on a range of taught modules including human physiology, experimental evolution, and advanced microbiological techniques. Demonstrating work also involves marking student assessments and giving both verbal and written feedback to students on a regular basis.

Postgraduate mentor 2016 – 2020

Throughout my PhD studies I was responsible for managing the day-to-day activities of undergraduate students, Master's students, and medical students during their time completing projects in our laboratory. This involved teaching basic laboratory techniques and ensuring that health and safety forms were completed correctly were adhered to. I also provided feedback on students' written work and poster presentations.

GRANTS AND AWARDS

Medical Research Foundation National PhD Training Programme in Antimicrobial Resistance (2018 – 2020)

I applied to be a member of the newly-established PhD training program that seeks to bring together postgraduate researchers with interests in different fields whose focus is on tackling the rising problem of antimicrobial resistance. The program offered attendance at a one-week residential training course and one-day conference at which I was able to meet and discuss my

research with a small group of PhD researchers under the guidance of a faculty member at the University of Bristol, United Kingdom.

Microbiology Society Conference Grant (2018)

I was awarded funds to cover part of the cost of my attendance at the *Microbiology Society Annual Conference* 2018 in Birmingham at which I presented a poster detailing work carried out on my PhD project so far.

Microbiology Society Education and Outreach Grant (2017)

Working in partnership with the Institute of Infection and Global Health Science Communication and Public Engagement Officer I applied for funds from the Microbiology Society to purchase recording and mixing equipment for the production of the Institute of Infection and Global Health Podcast which aims to raise awareness of the important and varied work carried out within the institute.

RELEVANT SKILLS

Laboratory skills:

Endpoint PCR	Quantitative PCR (qPCR)	PCR primer design
DNA extraction & purification	RNA extraction & purification	Bacterial culture methods
Phage propagation & isolation	Antimicrobial susceptibility testing	Clinical study organization
Clinical sample management	Clinical sample processing	

Computational skills:

Statistical analysis	Complex data visualization	Gene sequence analysis
Gene expression analysis	Metagenomic sequence analysis	Proteomic analysis
Whole genome assembly	16S rRNA amplicon sequence analysis	Variant calling
Transcriptional analysis	Differential expression analysis	