Tom Smith

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RESEARCH POSITIONS

2020 - present **Postdoctoral Research Associate**, Imperial College London
- *The potential of seagrasses for blue carbon storage.*
- *Impacts of the environment on SARS-CoV-2 transmission rates.*
- *Impacts of chemical stressors on freshwater microbes.*
- *Eco-evolutionary dynamics in wild bacterial communities.*
- *Holobiont microbiome assembly dynamics.*

2018: **Professional Internship Placement**, NatureMetrics
Developing new assays for eDNA surveys of protected animals.

2012 - 2014: **Research Technician**, Imperial College London
Sequencing plant and animal tissues for molecular phylogenetics.

2010 - 2012: **Research Technician**, University of Edinburgh
Characterization of transgenic mouse lines.

EDUCATION

2015 - 2019: **PhD** in Life Sciences, Imperial College London
Effects of Temperature on Microbial Metabolic Rates.

2014 - 2015: **MRes** Computational Methods in Ecology and Evolution, Imperial College London
Research project: *Horizontal Gene Transfer in Bdelloid Rotifers.*

2006 - 2010: **BSc** *(Honours)* Biological Sciences *(Biotechnology)*, University of Edinburgh
Honours project: *Investigation of insulin aggregation using mass spectrometry.*

TEACHING

Undergraduate teaching, Imperial College London

2025: 3rd Year BSc module: **The Microbiome** - Lecturing.
2024: 2nd Year BSc module: **Applied Molecular Biology** - Tutorials.

Master's teaching, Imperial College London

2021-24: MSc module: **Environmental Microbiology** - Teaching microbiology lab techiques. Engaging students in the conceptual foundations of microbial community ecology.
2015-18: MSc module: **Biological Computing in R** - Demonstrator for computer lab practical sessions. Preparing example code for model fitting.
2012-13: MSc module: **Molecular Ecology** - Designing experiments, preparing materials and teaching students in molecular ecology lab classes.
2012-13: MSc module: **Molecular Genetics and Genomics** - Instructing students on the use of computational tools for molecular genetics and genomics analyses.

Student project mentoring

2024: Jie Min (Imperial College London - MRes Project) *Domesticating wild microbial communities via a dilution-to-stimulation approach.*
2024: Loveline Martin (Imperial College London - MRes Project) *Impacts of temperature and resource complexity on the diversity of microbial communities.*
2024: Shuheng Wang (Imperial College London - MSc Project) *Machine learning methods to predict the presence of chemical pollutants in microbial communities.*
2024: Cindy Wu (Imperial College London - BSc Project) *Impacts of microbial community complexity on functional responses to perturbations.*
2023: Aiden Zhang (Imperial College London - MSc Project) *Bacteria as potential biosensors for chemical pollutants in the environment.*
2023: Shiyu Xu (Imperial College London - MSc Project) *Temperature and bacterial community dynamics.*
2023: * Rachel Hope (Imperial College London - BSc Project) *Growth responses of bacterial communities to pesticides.*
2022: Jiali Wang (Imperial College London - MSc Project) *Exploitative interactions among microbes vary with temperature.*
2022: Yuruo Lin (Imperial College London - BSc Project) *Effects of multiple chemical stressors on freshwater bacteria.*
2021: Danica Duan (Imperial College London - MSc Project) *The Role of Metabolic Strategies in Determining Microbial Community Richness along Temperature Gradients.*
2020: * Pablo Lechón (Imperial College London - MSc Project) *Coalescence of cohesive microbial communities.*
2020: Miles Nesbit (Imperial College London - MRes Project) *Deviation of growth rate and carrying capacity constraints from the metabolic theory of ecology in prokaryotes.*
2018: Hira Tanvir (Imperial College London - MSc Project) *Cell volume affects growth rates in microbes across all of life.*
2016: * Thomas J. Thomas (Imperial College London - BSc Project) *Is Hotter Better? A Meta-analysis of Prokaryotic Growth Rates.*

* = student was an author on a publication resulting from their work.

RESEARCH SKILLS

Molecular biology and microbiology
Bacterial culture and isolation, flow cytometry, DNA extraction, PCR, Sanger sequencing, Illumina library prep, Nanopore library prep.

Coding
R (extensive experience), LaTeX (extensive experience), Git (good experience), Python 2 & 3 (working knowledge), Bash (working knowledge), Ruby (basic knowledge).

Bioinformatics
Amplicon sequencing analysis pipelines for illumina & Nanopore data, genome and metagenome assembly, functional annotation, phylogenetics, selection and recombination analyses.

Computational ecology
Fitting mathematical models to biological and ecological data in R and Python, e.g. bacterial growth curves, thermal response curves.

Statistical modelling
Hierarchical Bayesian modelling, Bayesian statistics, epidemiological modelling.

PUBLICATIONS

h-index: 13 i10-index: 13 total citations: >700 Google Scholar profile: goo.gl/Ps8LgK

Peer reviewed

2025: **Thomas P Smith**, Rachel Hope, Thomas Bell - Phylogenetic clustering of microbial communities as a biomarker for chemical pollution. *FEMS Microbiology Ecology* doi: 10.1093/femsec/fiaf047

2025: Dania Albini, Emma Ransome, Alex J. Dumbrell, Samraat Pawar, Eoin O'Gorman, **Thomas P Smith**, Thomas Bell, Michelle C. Jackson, Guy Woodward - Minimal warming drives significant changes in zooplankton body-size distributions in a large field experiment. *Communications Biology* doi: 10.1038/s42003-024-07380-2

2024: **Thomas P Smith**, Swapnil Mishra, Ilaria Dorigatti, Mahika K. Dixit, Michael Tristem, Will Pearse - Differential responses of SARS-CoV-2 variants to environmental drivers during their selective sweeps. *Scientific Reports* doi: 10.1038/s41598-024-64044-1

2024: **Thomas P Smith**, Tom Clegg, Emma Ransome, Thomas Martin-Lilley, James Rosindell, Guy Woodward, Samraat Pawar, Thomas Bell - High throughput characterization of bacterial responses to complex mixtures of chemical pollutants. *Nature Microbiology* doi: 10.1038/s41564-024-01626-9

2022: **Thomas P Smith**, Shorok Mombrikotb, Emma Ransome, Dimitrios-Georgios Kontopoulos, Samraat Pawar, Thomas Bell - Latent functional diversity may accelerate microbial community responses to temperature fluctuations. *eLife* 11 e80867 doi: 10.7554/eLife.80867

2022: **Thomas P Smith**, Michael Stemkovski, Austin Koontz, William D Pearse - AREAdata: a worldwide climate dataset averaged across spatial units at different scales through time *Data in Brief* 43 108438 doi: 10.1016/j.dib.2022.108438

2021: Pablo Lechon, Tom Clegg, Jacob Cook, **Thomas P Smith**, Samraat Pawar - The role of competition versus cooperation in microbial community coalescence. *PLOS Computational Biology* 17(11) e1009584 doi: 10.1371/journal.pcbi.1009584

2021: **Thomas P Smith**, Tom Clegg, Thomas Bell, Samraat Pawar - Systematic variation in the temperature dependence of bacterial carbon use efficiency. *Ecology Letters* doi: 10.1111/ele.13840

2021: **Thomas P Smith**, Seth Flaxman, Amanda S. Gallinat, Sylvia P. Kinosian, Michael Stemkovski, H. Juliette T. Unwin, Oliver J. Watson, Charles Whittaker, Lorenzo Cattarino, Ilaria Dorigatti, Michael Tristem, William D. Pearse - Temperature and population density influence SARS--CoV-2 transmission in the absence of non-pharmaceutical interventions. *PNAS* 118(25):e2019284118 doi: 10.1073/pnas.2019284118

2020: Dimitrios-Georgios Kontopoulos, **Thomas P Smith**, Timothy G Barraclough, Samraat Pawar - Adaptive evolution shapes the present-day distribution of the thermal sensitivity of population growth rate. *PLOS Biology* 18(10):e3000894 doi: 10.1371/journal.pbio.3000894

2019: **Thomas P Smith**, Thomas JH Thomas, Bernardo García-Carreras, Sofía Sal, Gabriel Yvon-Durocher, Thomas Bell, Samraat Pawar - Community-level respiration of prokaryotic microbes may rise with global warming. *Nature Communications* 10:5124 doi: 10.1038/s41467-019-13109-1

2019: Alexander ST Papadopulos, Javier Igea, **Thomas P Smith**, Ian Hutton, William J Baker, Roger K Butlin, Vincent Savolainen - Ecological speciation in sympatric palms: 4. Demographic analyses support speciation of Howea in the face of high gene flow. *Evolution* 73(9):1996-2002 doi: 10.1111/evo.13813

2018: Reuben W Nowell, Pedro Almeida, Christopher G Wilson, **Thomas P Smith**, Diego Fontaneto, Alastair Crisp, Gos Micklem, Alan Tunnacliffe, Chiara Boschetti, Timothy G Barraclough - Comparative genomics of bdelloid rotifers: Insights from desiccating and nondesiccating species. *PLoS Biology* 16(4), e2004830 doi: 10.1371/journal.pbio.2004830

2018: Dimitrios-Georgios Kontopoulos, Bernardo García-Carreras, Sofía Sal, **Thomas P Smith**, Samraat Pawar - Use and misuse of temperature normalisation in meta-analyses of thermal responses of biological traits. *PeerJ* 6:e4363 doi: 10.7717/peerj.4363

2015: Isobel Eyres, Chiara Boschetti, Alastair Crisp, **Thomas P Smith**, Diego Fontaneto, Alan Tunnacliffe, Timothy G Barraclough - Horizontal gene transfer in bdelloid rotifers is ancient, ongoing and more frequent in species from desiccating habitats. *BMC Biology* 13:90 doi: 10.1186/s12915-015-0202-9

2015: Harriet Cole, Massimiliano Porrini, Ryan Morris, **Tom Smith**, Jason Kalapothakis, Stefan Weidt, C. Logan Mackay, Cait E. MacPhee, Perdita E. Barran - Early stages of insulin fibrillogenesis examined with ion mobility mass spectrometry and molecular modelling *Analyst* 140:7000-7011 doi: 10.1039/C5AN01253H

2014: Anna Liakhovitskaia, Stanislav Rybtsov, **Tom Smith**, Antoniana Batsivari, Natalia Rybtsova, Christina Rode, Marella De Bruijn, Frank Buchholz, Sabrina Gordon-Keylock, Suling Zhao, Alexander Medvinsky - Runx1 is required for progression of CD41+ embryonic precursors into HSCs but not prior to this. *Development* 141(17):3319-23 doi: 10.1242/dev.110841

In Review

2025: Duhita G. Sant*, **Thomas P Smith***, Edgar Wong*, Juli Cohen, Kayla King, Thomas Bell, Timothy G. Barraclough - Eco-evolutionary resilience of wild bacterial communities to experimental perturbation. *In review at ISME Journal*

2025 Quqiming Duan, William R Harcombe, Van Savage, Michael Phillip Mustri, **Thomas P Smith**, Samraat Pawar - A General Framework for Predicting the Temperature-Dependence of Microbial Interactions. *In review at PNAS* Preprint available here

Pre-prints

2024: Quqiming Duan, Tom Clegg, **Thomas P Smith**, Thomas Bell, Samraat Pawar - The role of metabolic strategies in determining microbial community diversity along temperature gradients. *bioRxiv* doi: 10.1101/2024.08.28.610078

AWARDS AND GRANTS

2023: £100 - MMEG 2023 Environmental Microbiome Best Poster prize.
2020: £287,120 - UKRI-NERC NE/V009710/1 "COVID 19 - Improving COVID-19 forecasts by accounting for seasonality and environmental responses" (named postdoc, awarded to William D. Pearse).

PRESENTATIONS AND MEETINGS

Conferences

2024: *Microbiology Society annual meeting 2024* - Edinburgh, UK
Poster: Evolutionary Dynamics of Wild Bacterial Communities.
2023: *Molecular Microbial Ecology Group meeting 2023* - London, UK
Poster: Evolutionary Dynamics of Wild Bacterial Communities.
Available here: https://smithtp.github.io/files/MMEG-2023.pdf
2022: *Molecular Microbial Ecology Group meeting 2022* - Glasgow, UK
Talk: Bacterial Responses to Chemical Stressors.
2021: *BES Ecology Across Borders meeting 2021* - Liverpool, UK
Talk: Environmental drivers of SARS-CoV-2 transmission: insights from an ecologist working with epidemiologists.
2018: *ISME 17th International Symposium on Microbial Ecology* - Leipzig, Germany
Poster: Selective Isolation of Soil Bacteria with Differing Thermal Niches.
2017: *BES Ecology Across Borders meeting 2017* - Ghent, Belgium
Poster: Metabolic Rates of Prokaryotes May Inevitably Rise With Global Warming.

Internal seminars

2022: *Silwood Park Social Seminars* - Imperial College London, UK
Talk: Bacterial responses to chemical stressors.
2022: *Silwood 75th Anniversary Young Researcher Talks* - Imperial College London, UK
Talk: COVID-19 Seasonality - Ecology meets Epidemiology at Silwood Park.
2020: *Life Sciences Departmental Seminar* - Imperial College London, UK
Talk: Microbial responses to temperature change: populations to communities.
2020: *Ecology & Evolution Seminar Series* - Imperial College London, UK
Talk: Effects of Temperature on Microbial Metabolic Rates: Linking Individual Responses to Ecosystem Impacts.
2019: *Silwood Park Social Seminars* - Imperial College London, UK
Talk: Effects of Temperature on Microbial Biological Rates.

Workshops & Symposia:

2024: London Centre for Ecology and Evolution Autumn Mixer, Queen Mary University, London. *Invited Speaker*
2024: Workshop on Climate Resilience of Arthropod Holobionts. Imperial College London, IISER Pune and Ahmedabad University. *ECR Presenter*
2022: IISc – Imperial College Ecology and Evolution workshop. *Discussion facilitator*
2020: International Virtual Symposium on Climatological, Meteorological and Environmental factors in the COVID-19 pandemic. World Meteorological Organization. *Attendee*

PROFESSIONAL SERVICE

Reviewing: *ISME Journal*; *Ecology Letters*; *Evolution Letters*; *Trends in Ecology and Evolution*; *Functional Ecology*; *European Journal of Soil Biology*; *Microbial Risk Analysis*.

Academic memberships:

2023-present: Applied Microbiology International
2022-present: Microbiology Society
2020-present: British Ecological Society (BES)

Departmental services:

2021-23: Organising and chairing Silwood Park Ecology & Evolution Seminar Series.
2017-18: Chairing for Frontiers in Ecology, Evolution and Conservation Symposium - Metabolic Ecology sessions.

PUBLIC ENGAGEMENT AND OUTREACH

Media Coverage

2024: BBC Radio 4 – *Panellist on Rare Earth episode "The Magic of Microbes"*
Recording available here: https://www.bbc.co.uk/programmes/m0023yfw

Outreach Events

2014-2024: Silwood "Bugs, Birds and Beasts" day – *Created and displayed various exhibits including: Winogradsky columns, microbial ecology, microscopic animals.*

2021: Science Museum: Future Explorers – *interactive display on endangered species ranges.*

2019 & '16: Great Exhibition Road Festival – *exhibiting interactive EcoBuilder teaching game alongside microscopic predator-prey demonstrations.*