

Personal details

Professor Kate Susan Baker

URLs: www.liverpool.ac.uk/infection-veterinary-and-ecological-sciences/staff/kate-baker/
scholar.google.co.uk/citations?user=KigrV9gAAAAJ&hl=en
baker-lab.github.io

Email: kbaker@liverpool.ac.uk

ORCID: 0000-0001-5850-1949

Education and training

2006 Bachelor of Veterinary Science (BVSc) University of Melbourne, Australia
2012 Doctorate of Philosophy, University of Cambridge
2016 Certificate of Teaching and Learning in HE (FHEA), University of Liverpool
2017 Leadership training: *Aurora, EMBO Management, SUSTAIN*

Current position

2022 Chair in Applied Microbial Genomics, University of Liverpool

Major external consultancies

2022 Lead, Genomics and Antimicrobial Resistance Working Group (0.5FTE, 6 months)
Surveillance and Epidemiology of Drug Resistant infections Consortium (SEDRIC)
2020 Expert Science Cell Adviser, Government Office for Science (0.8FTE, 5 months)
Scientific Advisory Group for Emergencies (SAGE) COVID19 response team

Previous positions

2019 – 2022 Senior Lecturer, University of Liverpool
2016 – 2020 Wellcome Trust Clinical Research Career Development Fellow
2016 – 2019 Tenure Track Fellow, University of Liverpool (*Maternity leave Jan 2018 – Oct 2018*)
2013 – 2016 Postdoctoral Fellow, Wellcome Sanger Institute (*Maternity leave Jul 2015 – Apr 2016*)
2012 – 2013 Postdoctoral Fellow, University of Cambridge
2010 – 2013 Wellcome Trust Clinical Research Training Fellow
2008 – 2010 Junior Research Fellow, Cambridge Infectious Diseases Consortium
2006 – 2008 Clinical Veterinarian, Emergency and critical care and companion animal work

Supervision of graduate students and postdoctoral researchers

2016 – 2021 6 PhD students, 4 postdoctoral fellows

Most important research grants Research grants (as principal investigator/research fellow)

Biotechnology and Biological Sciences Research Council <i>Convergent evolution of Enterobacteriaceae in epidemiological networks of high antimicrobial use</i>	£507,000	2021 –
Medical Research Council New Investigator Research Grant <i>Informing shigellosis treatment and management through pathogen genomics</i>	£313,610	2018 –
Academy of Medical Sciences Springboard award <i>Multi-species models of antimicrobial resistance emergence and persistence developed from real world epidemics</i>	£99,734	2017 –
Wellcome Trust Clinical Career Development Fellowship <i>Mathematical modelling frameworks for incorporating bacterial genomics into antimicrobial stewardship</i>	£305,729	2014 –
Wellcome Trust Clinical Research Training Fellowship <i>Evolutionary and transmission dynamics of henipavirus infection in the African straw-coloured fruit bat</i>	£263,000	2010-2013

Selected Research grants (as co-investigator)

Bill and Melinda Gates Foundation <i>Enterics for Global Health (Malawi site)</i>	£170,000	2020 –
National Institute for Health Research <i>Health Protection Research Unit Gastrointestinal Diseases</i>	£3,700,000	2020 –
Engineering and Physical Sciences Research Council <i>Impact of network structured populations on evolution</i>	£454,655	2021 –
Biotechnology and Biological Sciences Research Council <i>High quality long read sequencing from low input DNA</i>	£418,686	2020 –

External leadership roles

I hold significant esteem in the microbiology, genomics, and public health communities, as evidenced by the following:

- *Member, World Health Organisation Vaccines for AMR TAG* 2022 –
- *Editorial board member, Microbial Genomics* 2019 –
- *Publication reviewer* for numerous leading journals 2010 –
- *Grant reviewer* for Wellcome and Leverhulme Trusts, French, and Scottish National Research Agencies, Cambridge Colleges, UKRI 2015 – Swedish,
- *Research proposal reviewer* Public Health England, Institute Pasteur
- *Funder panel member* NIHR Local Authority Advisory Task and Finish group, cross-UKRI Data Innovation in Science funding panel 2020 –
- *Postgraduate degree examiner* Universities of Cambridge, York, Liverpool, and Edinburgh 2017 –
- *Conference organiser* organising committee and session chair 2016 – ‘Genome Science’, Microbiology Society session chair
- *Invited speaker* have delivered over 20 invited seminars, conference presentations, and plenary sessions for professional societies, academic research and higher education institutes.

Internal leadership roles

2016 – Present

I hold/have held a variety of leadership positions, including: microbial genomics theme leader at the Centre for Global Vaccine Development, IVES institutional fellowship committee member, Centre for Genomics Research affiliate, public engagement and communications committee member, research theme lead on major research initiatives (the GI-HPRU), co-director on application to renew WT Clinical PhD program. I also personally orchestrated local delivery of an external EMBO laboratory management leadership course. I further contribute to internal events through presenting, chairing, and organising collaboration days, grant funding, and training events, and external meetings.

Teaching

2014 – Present

I have a breadth of training, teaching and mentorship experience Including supervision of research projects (1 completed PhD, 3 current primary supervisor), formal coursework, and short course teaching in the areas of microbiology, genomics, and bioinformatics of undergraduates and postgraduates at the University of Liverpool, and the broader academic community through roles on the Wellcome Trust Advanced Courses (in person and online).

Impact and knowledge exchange

Setting policy strategy for genomic surveillance of AMR 2022

I am currently leading a genomics for AMR surveillance working group for the international thinktank SEDRIC (funded by Wellcome) as an external consultancy. The work of the group is already shaping research funding strategy at major funders and has an ambitious outputs plan.

Policy advice during the COVID-19 pandemic 2020

I completed a 5-month secondment to the award-winning civil service team orchestrating the Scientific Advisory Group for Emergencies (SAGE). In an independent capacity, I was also part of an expert advisory panel that consulted with Deloitte and the Office for Life Sciences on various aspects of testing infrastructure.

Industrial collaborations 2013 –

I was a member of an EU-consortium of industry and academic partners working toward developing vaccines for *Shigella* and Shiga-toxigenic *E. coli* as a postdoc and continue this focus as a principal investigator with the University of Maryland, Baltimore. I also collaborate on genomics with an enzymatic production company.

Public health impact: shaping practice and policy 2013 –

For the last 8 years I have worked closely with public health agencies during their transition to microbial genomics for routine public health surveillance. A large successful program of capacity building [work completed](#) with the regional Latin America surveillance network was recently cited as a case study for antimicrobial resistance surveillance by the [WHO](#). More locally, work I did with PHE on sexually transmissible shigellosis, aided the management of an ongoing shigellosis outbreak, and ultimately contributed to [updating treatment recommendations in the UK and the US](#).

Media engagement: across various projects 2009 –

I am confident dealing with the media about my ongoing work including local and national television, live and pre-recorded radio, newspapers, and popular science magazines including: reporting on COVID-19 in [the Scientist](#), multiple features in the New Scientist, and extensive coverage of a commemorative [WW1 dysentery story](#). My work has also been featured in the popular science book 'The Tangled Tree' by David Quammen and the [New York Times](#)

International network and community standing 2009 –

I collaborate across a broad, international scientific and public health network including both human and animal public health agencies, I have over 200 co-authors from across 6 continents and engage the scientific community and the public through [interviews](#), [podcasts](#), and [blogs](#).

Key scientific publications

Google scholar: 71 publications, 2180 citations, h-index 26, [complete record](#)

Bengtsson, R.J., Simpkin, A.J., Pulford, C.V., ... Hall, N., Barry, E.H., Tennant, S.M., **Baker, K.S.** (2022) Pathogenomic analyses of *Shigella* isolates inform factors limiting shigellosis prevention and control across LMICs *Nature Microbiology* 10.1038/s41564-021-01054-z

De Silva, P.M., Stenhouse, G.E., Bengtsson, R.J., Bennett, R.J., Mason, L.C.E., Pulford, C, V., Jenkins, C., Hall, J.P.H., **Baker, K.S.** (2021) A tale of two plasmids: contributions of plasmid-associated phenotypes to epidemiological success in *Shigella* bioRxiv 10.1101/2021.12.17.473221

Bengtsson, R.J., Dallman, T., ...*et al* ... Bennett, R.J., Jenkins, C., **Baker, K.S.**, (2021) Accessory genome dynamics and structural variation of *Shigella* from persistent infections. *mBio*. doi: 10.1128/mBio.00254-21

Hawkey, J., Paranagama, K., **Baker, K.S.**, Bengtsson, R.J., Weill, F.X., Thomson, N.R., Baker, S., Cerdeira, L., Iqbal, Z., Hunt, M., Ingle, D.J., Dallman, T.J., Jenkins, C., Williamson, D.A., Holt, K.E. (2021) Global population structure and genotyping framework for genomics surveillance of the major dysentery pathogen, *Shigella sonnei*. *Nature Communications*. In press. Preprint doi: 10.1101/2020.10.29.360040

Stenhouse, G.E., Jere, K., ... *et al* ... Cunliffe, N.A., Cornick, J. **Baker, K.S.** (2021) Whole Genome Sequence Analysis of *Shigella* from Malawi identifies fluoroquinolone resistance. *Microbial genomics*. doi: 10.1099/mgen.0.000532

Pulford, C.V., Perez-Sepulveda, B.M., ... Gordon, M.A., Feasey, N.A., **Baker, K.S.**, Hinton, J.C.D. (2020) The stepwise evolution of *Salmonella* Typhimurium responsible for bloodstream infection in Africa. *Nature Microbiology*

Mayers, C., **Baker, K.S.** (2020) Impact of false-positives and false-negatives in the UK's COVID-19 testing programme. [Policy advisory note](#) considered by SAGE.

Baker, K.S. (2020) Microbe hunting in the modern era: reflecting on a decade of microbial genomic epidemiology. *Current Biology*. 30(19) R1124 – R1130.

Bennett, R. J., & **Baker, K.S.** (2019). Looking backwards to move forward: The utility of sequencing historical bacterial genomes. *Journal of Clinical Microbiology*. 57(8). doi:10.1128/JCM.00100-19.

Baker, K.S.,[^] Dallman, T.J., Field, N., Childs, T., ...*et al* ... Jenkins, C., Thomson, N.R. (2018) Horizontal antimicrobial resistance transfer drives epidemics of multiple *Shigella* species. *Nature Communications*. (9/1:1462) [^] corresponding author

Baker, K.S.[^], Campos, J., Pichel M., ...*et al* ... Perez, E., Thomson, N.R.[^] [^]joint corresponding authors (2017) Whole genome sequencing of *Shigella sonnei* through PulseNet Latin America and Caribbean: advancing global surveillance of foodborne illnesses. *Clinical Microbiology and Infection*. Nov; 23(11): 845 – 853

Baker, K.S., Dallman, T., ... *et al* ... Weill, F.X., Jenkins, C., Thomson, N.R. (2015) Intercontinental dissemination of azithromycin-resistant shigellosis through sexual transmission: a cross sectional study. *The Lancet Infectious Diseases*. Aug (8) : 913 – 21.

Connor, T.*, Barker, C.R.*, **Baker, K.S.***, Weill, F.X., ... *et al* ... Keddy, K.H., Thomson, N.R. (2015) Species-wide whole genome sequencing reveals historical global spread and recent local persistence in *Shigella flexneri*. *eLife*. 4 e07335

Baker, K.S., Mather, A.E., ... *et al* ... Russell, J., Thomson, N.R. (2014) The extant World War 1 dysentery bacillus NCTC1: a genomic analysis. *The Lancet*. 384 (9955), 1691 – 1697

Baker, K.S., Ellington, M.E. (2014) TB or not TB? Genomic portraits provide some answers. *Nature Reviews Microbiology*, 12 (6), 398 – 398 (Commentary)

Baker, K.S., Suu-Ire, R., ...*et al* ... Cunningham, A.A., Wood J.L.N., (2014) Viral antibody dynamics in a chiropteran host, *Journal of Animal Ecology*, Volume 83, Issue 2, 415–428.

Baker, K.S., Leggett, R.M., ...*et al* ... Caccamo, M., Murcia, P.R. (2013) Metagenomic study of the viruses of African straw-colored fruit bats: detection of a chiropteran poxvirus and isolation of a novel adenovirus, *Virology*. Jul 5;441(2):95-106.

Baker, K.S., Todd, S., ...*et al* ... Wood, J.L. & Wang, L.F. (2013) Novel potentially zoonotic paramyxoviruses from the African straw-colored fruit bat, *Eidolon helvum*. *Journal of Virology*. 87(3):1348.