

Philip T. Leftwich

+44 7871 041 012 | p.leftwich@uea.ac.uk | philip-leftwich.github.io | [Philip-Leftwich](#) | [philip-leftwich-117052155](#) | [philipleftwich](#)

Education

PhD UNIVERSITY OF EAST ANGLIA • Thesis: Male Reproductive Success and Population Control in the Mediterranean Fruit Fly.	<i>Norwich</i> 2009 - 2013
BSc (Hons) / Zoology DURHAM UNIVERSITY	<i>Durham</i> 2004 - 2008

Employment

Associate Professor of Genetics and Data Science BIOLOGICAL SCIENCES, UNIVERSITY OF EAST ANGLIA	<i>Norwich</i> 2022 - Current
Lecturer BIOLOGICAL SCIENCES, UNIVERSITY OF EAST ANGLIA	<i>Norwich</i> 2019 - 2022
Postdoctoral Researcher/Project Manager ARTHROPOD GENETICS GROUP, PIRBRIGHT INSTITUTE	<i>Pirbright</i> 2016 - 2019
Lecturer in Ecology and Biodiversity BIOLOGICAL SCIENCES, UNIVERSITY OF EAST ANGLIA	<i>Norwich</i> 2015 - 2016
Postdoctoral Researcher BIOLOGICAL SCIENCES, UNIVERSITY OF EAST ANGLIA	<i>Norwich</i> 2012 - 2015

Qualifications

HEA Fellow HIGHER EDUCATION ACADEMY	<i>York</i> 2016
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Teaching

Module organiser	Data Science for Biologists; Genetics
Lecturer	Genes, Genomes and Genomics; Science Communication; Skills for Biologists; Microbiology; Biodiversity; Evolution, Behaviour and Ecology; Medical Entomology (LSHTM)
Tutor	Field Ecology; Evolution, Health and Disease
Outreach	Bioinformatics Virtual Coordination Network (https://biovcnet.github.io/); The Brilliant Club, Villier's Park Educational Trust, Royal Society Summer Science

Administrative Duties

Chair of Extenuating Circumstances Panel SCHOOL OF BIOLOGICAL SCIENCES	<i>University of East Anglia</i> 2021-present
Statistician - Animal Welfare Ethical Review Body FACULTY OF SCIENCE	<i>University of East Anglia</i> 2021-present
Student Partnership Officer SCHOOL OF BIOLOGICAL SCIENCES	<i>University of East Anglia</i> 2019-present

Professional Service

Article reviews

Behavioural ecology and sociobiology; BMC biology; Insects; Journal of Evolutionary Biology; Phil. Transactions of the Royal Society; PLoS Genetics; Proceedings of the Royal Society; Molecular Ecology

Grant reviews

BBSRC Fellowships; GWIS National Fellowships

Professional memberships

Genetics Society; Royal Statistical Society; Vectorbite; Nationwide Network of BioScience Educators; Advance HE; SORTEE

Panel memberships

Open University Programme Validation; SORTEE Education and Outreach Committee

Consultancy

OUP

AUTHOR

- Maths Skills for A-level Biology 2nd Edition: a practical handbook: <https://amzn.to/3xjUUIN>
- The Scientific Method and Experimental Design (In prep) - part of the Oxford Biology Primers book series

Oxford

2020-present

Benchling

CONSULTANT AND CONTENT DEVELOPER

- Consultancy and speaking
- Content developer: <https://www.benchling.com/educators/>

San Francisco

2020-2022

Physalia Courses

INSTRUCTOR

- An Introduction to Population Genomics: analysing NGS data and SNP calling
- An introduction to R and Statistics for Ecologists

Online

2019-present

OCR

PROGRAMME DEVELOPER

- Maths for Biology: Online workshops for secondary school teachers

Oxford

2016-present

Presentations

EDUCATION

Heads of University Biosciences

SPEAKER

- "The fundamentals of data management and analysis"

Norwich

2022

AMSCUE

SPEAKER

- "Online molecular biology labs"

Online

2021

OCR Science Forum

SPEAKER

- The impact of COVID-19, present and future

Online

2021

HUBS Bio-Summit

SPEAKER

- "Using electronic lab notebooks to improve reflective practises in learning"

Online

2020

Dry Labs Real Science

SPEAKER

- "Molecular biology tools for online teaching"

Online

2020

Higher Education Academy Talks

INVITED SPEAKER

- "Synchronous on-line teaching in the biomedical sciences - Discovering how coronavirus PCR testing works"

Online

2020

RESEARCH

UNIPI International Workshop on Multidisciplinary studies for sustainable agriculture

SPEAKER

- "Evolutionary biology and genetic pest control"

Pisa

2021

UEA CEEC Rebellion

PLENARY

- “Genetic pest management: knocking out pest species with applied genetics”

Online

2021

Entomological Society of America

INVITED SPEAKER

- “Localised gene drives for insect population control”

Vancouver

2018

Society of Molecular Biology & Evolution

SPEAKER

- “The microbiome of the Mediterranean fruit fly”

Vienna

2015

Department of Genetics

INVITED SPEAKER

- “An introduction to genetic pest management”

Cambridge

2014

Evolution

SPEAKER

- “What makes a successful male? Strategies for improved insect pest management”

Ottawa

2012

Grants

BBSRC

GIFTS THAT KEEP ON GIVING: MATERNAL EFFECTS AND INSECT PEST CONTROL

- PhD studentship
- Co-supervisor
- Funding amount 100,000 GBP

University of East Anglia

2020

BBSRC

CRISPR CAS9 BASED SEX-CONVERSION GENE DRIVES FOR PEST INSECT MANAGEMENT

- PhD studentship
- Co-supervisor
- Funding amount 100,000 GBP

University of East Anglia

2019

Entomological Society of America

ENTOMOLOGY PROGRAM ENHANCEMENT

- Travel
- Funding amount 1000 GBP

Pirbright Institute

2018

Infravec

INTRODUCTION TO BIOINFORMATICS RESOURCES FOR VECTOR GENOMICS STUDIES

- Training
- Funding amount 460 GBP

Pirbright Institute

2018

BBSRC

COLONIZATION, DOMESTICATION AND POPULATION CONTROL IN PEST INSECTS

- Research grant
- Researcher Co-I
- Funding amount 376,000 GBP

University of East Anglia

2012

Google Scholar metrics:

h-index: 14

publications: 27

REFEREED JOURNAL PAPERS

Harvey-Samuel, T., Feng, X., Okamoto, E. M., Purusothaman, D. K., & **Leftwich**, P. T. (2023). CRISPR-based gene drives generate super-mendelian inheritance in the disease vector *Culex quinquefasciatus*. *Nature Communications*, 2023.

Paladino, L. Z. C., Wilson, R., Tng, P. Y. L., Dhokiya, V., Keen, E., & Cuber, P. (2023). Optimizing CRE and PhiC31 mediated recombination in *Aedes aegypti*. *Frontiers in Biotechnology*, 2023.

Sprigg, C., **Leftwich**, P. T., Burton, E., Scholey, D., Bedford, M. R., & Brearley, C. A. (2023). Accentuating the positive and eliminating the negative: Efficacy of TiO₂ as digestibility index marker for poultry nutrition studies. *PLoS One*, 18(6).

Darrington, M., **Leftwich**, P., Holmes, N., Friend, L., Clarke, N., Worsley, S., Margaritopolous, J., Hogenhout, S., Hutchings, M., & Chapman, T. (2022). Characterisation of the symbionts in the Mediterranean fruitfly gut. *Microbial Genomics*.

Siddall, A., Harvey-Samuel, T., Chapman, T., & **Leftwich**, P. T. (2022). Manipulating insect sex determination pathways for genetic pest management: Opportunities and challenges. *Frontiers in Bioengineering and Biotechnology*, 10.

Xu, X., Harvey-Samuel, T., Siddiqui, H. A., Ang, J. X. D., Anderson, M. E., Christine M Reitmayer, E. L., **Leftwich**, P. T., You, M., & Alphey, L. (2022). Toward a CRISPR-Cas9-based gene drive in the diamondback moth *Plutella xylostella*. *The CRISPR Journal*.

Harvey-Samuel, T., Xu, X., Lovett, E., Dafa'alla, T., Walker, A., Norman, V., Carter, R., Teal, J., Akilan, L., **Leftwich**, P., & Alphey, L. (2021). Engineered expression of the invertebrate-specific scorpion toxin AaHIT reduces adult longevity and female fecundity in the diamondback moth *Plutella xylostella*. *Pest Management Science*, 77(7), 3154–3164.

Leftwich, P., Spurgin, L., Harvey-Samuel, T., Thomas, C., Paladino, L., Edgington, M., & Alphey, L. (2021). Genetic pest management and the background genetics of release strains. *Philosophical Transactions of the Royal Society B*, 376(1818).

Tully, B., Buongiorno, J., Cohen, A., Cram, J., Garber, A., Hu, S., Krinos, A., **Leftwich**, P., Marshall, A., Sieradzki, E., Speth, D., Suter, E., Trivedi, C., Valentin-Alvarado, L., Weissman, J., Lee, M., Alexander, H., Collins, R., Pachiadaki, M., Rhodes, A., & Decatur, W. (2021). The Bioinformatics Virtual Coordination Network: An open-source and interactive learning environment. *Frontiers in Education*.

Anderson, M., Purcell, J., Verkuijl, S., Norman, V., **Leftwich**, P., Harvey-Samuel, T., & Alphey, L. (2020). Expanding the CRISPR toolbox in Culicine mosquitoes: In vitro validation of pol III promoters. *ACS Synthetic Biology*, 9(3), 678–681.

Leftwich, P., Edgington, M., & Chapman, T. (2020). Transmission efficiency drives host-microbe associations. *Proceedings of the Royal Society B*, 287(1934).

Tng, P., Paladino, L., Verkuijl, S., Purcell, J., Merits, A., **Leftwich**, P., Fragkoudis, R., Noad, R., & Alphey, L. (2020). Cas13b-dependent and Cas13b-independent RNA knockdown of viral sequences in mosquito cells following guide RNA expression. *Communications Biology*, 3(1), 1–9.

Leftwich, P., Nash, W., Friend, L., & Chapman, T. (2019). Contribution of maternal effects to dietary selection in Mediterranean fruit flies. *Evolution*, 73(2), 278–292.

Redford, K., Brooks, T., Macfarlane, N., Adams, J., Alphey, L., Bennet, E., Delborne, J., Eggermont, H., Esvelt, K., Kingirl, A., Kokotovich, A., Kolodziejczyk, B., Kuiken, T., Mead, A., Oliva, M., Perello, E., Slobodian, L., Thizy, D., Tompkins, D., Winter, G., Campbell, K., Elsensohn, J., Holmes, N., Farmer, C., Keitt, B., **Leftwich**, P., Maloney, T., Masiga, D., Newhouse, A., Novak, B., ... Oppen, M. (2019). *Genetic frontiers for conservation: An assessment of synthetic biology and biodiversity conservation*.

Leftwich, P., & Chapman, T. (2018). Testing for assortative mating by diet in *Drosophila melanogaster*. *Bio-Protocol*, 8(20).

Leftwich, P., Clarke, N., Hutchings, M., & Chapman, T. (2018). Gut microbiomes and reproductive isolation in *drosophila* (vol 114, pg 12767, 2017). *Proceedings of the National Academy of Sciences*, 115(10).

Leftwich, P., Clarke, N., Hutchings, M., & Chapman, T. (2018). Reply to obadia et al.: Effect of methyl paraben on host-microbiota interactions in *Drosophila melanogaster*. *Proceedings of the National Academy of Sciences*, 201805499.

Leftwich, P., Edgington, M., Harvey-Samuel, T., Paladino, L., Norman, V., & Alphey, L. (2018). Recent advances in threshold-dependent gene drives for mosquitoes. *Biochemical Society Transactions*, 46(5), 1203–1212.

Leftwich, P., Hutchings, M., & Chapman, T. (2018). Diet, gut microbes and host mate choice: Understanding the significance of microbiome effects on host mate choice requires a case by case evaluation. *Bioessays*, 40(12).

Leftwich, P. T., Clarke, N. V. E., Hutchings, M. I., & Chapman, T. (2018). Reply to rosenberg et al.: Diet, gut bacteria, and assortative mating in *Drosophila melanogaster*. *Proceedings of the National Academy of Sciences*, <https://doi.org/10.1073/pnas.1805499115>.

Leftwich, P., Nash, W., Friend, L., & Chapman, T. (2017). Adaptation to divergent larval diets in the medfly, *Ceratitis capitata*. *Evolution*, 71(2), 289–303.

Longdon, B., Day, J., Schulz, N., **Leftwich, P.**, Jong, M., Breuker, C., Gibbs, M., Obbard, D., Wilfert, L., Smith, S., McGonigle, J., Houslay, T., Wright, L., Livraghi, L., Evans, L., Friend, L., Chapman, T., Vontas, J., Kambouraki, N., & Jiggins, F. (2017). Vertically transmitted rhabdoviruses are found across three insect families and have dynamic interactions with their hosts. *Proceedings of the Royal Society B: Biological Sciences*, 284(1847).

Leftwich, P., Bolton, M., & Chapman, T. (2016). Evolutionary biology and genetic techniques for insect control. *Evolutionary Applications*, 9(1), 212–230.

Leftwich, P., Koukidou, M., Rempoulakis, P., Gong, H.-F., Zacharopoulou, A., Fu, G., Chapman, T., Economopoulos, A., Vontas, J., & Alphey, L. (2014). Genetic elimination of field-cage populations of Mediterranean fruit flies. *Proceedings of the Royal Society B: Biological Sciences*, 281(1792).

Alphey, L., Ant, T., Koukidou, M., **Leftwich, P.**, Rempoulakis, P., Vontas, J., Economopoulos, A., & Chapman, T. (2012). Genetic improvements to sterile-male control of tephritid fruit flies. *Tephritid Workers of Europe and Middle East (TEAM)*, <https://Nucleus.iaea.org/Sites/Naipc/Twd/Newsletters/11th>, 2.

Leftwich, P., Edward, D., Alphey, L., Gage, M., & Chapman, T. (2012). Variation in adult sex ratio alters the association between courtship, mating frequency and paternity in the lek-forming fruitfly *Ceratitis capitata*. *Journal of Evolutionary Biology*, 25(9), 1732–1740.

WORKING PAPERS UNDER REVISION OR REVIEW

Anderson, M. A. E., **Leftwich, P. T.**, Wilson, R., Paladino, L. Z. C., & Basu, S. (2023). AePUB promoter length modulates gene expression in *aedes aegypti*. *bioRxiv*, 2023.

Leftwich, P. T., Purcell, J. C., Anderson, M. A. E., Fragkoudis, R., Basu, S., & Lycett, G. T. (2023). A synthetic biology approach to transgene expression. *bioRxiv*, 2023.

Meccariello, A., Hou, S., Davydova, S., Fawcett, J., Siddall, A., & **Leftwich, P. T.** (2023). Gene drive and genetic sex conversion in the global agricultural pest *ceratitis capitata*. *bioRxiv*, 2023.

Anderson, M. A. E., Gonzalez, E., Edgington, M. P., De Ang, J. X., Purusothaman, D.-K., Shackleford, L., Nevard, K., Verkuil, S. A., Harvey-Samuel, T., **Leftwich, P. T.**, Esvelt, K., & Alphey, L. (2022). A multiplexed, confinable CRISPR/Cas9 gene drive propagates in caged *aedes aegypti* populations. *bioRxiv*.

BOOKS

Penny, J., & **Leftwich, P.** (2018). *Maths skills for A-level biology* [Book]. OUP (Oxford).

Skills

Programming	R (advanced); Python (Intermediate); Julia
Reproducible Reports	Markdown/RMarkdown; R Shiny Apps, LaTeX, Binder, Pandoc
DevOps	Git, AWS
Front-End	HTML/CSS, WordPress
Back-end	Unix/Linux Shell
Quantitative	Linear Mixed Modelling; Supervised/Unsupervised Machine Learning; Bayesian; High-throughput data analysis, Dimensionality Reduction; Amplicon analysis; SNP analysis
Lab skills	Insect rearing; Behavioural Analysis; Transgenics; CRISPR/Cas9; Molecular cloning; Cell Culture; Microbiology

- This CV is a reproducible project; all the source code behind this CV is available on this [GitHub repo](#).

