

Thomas M. Houslay

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Nationality: British

Education

Ph.D. Biology, 2010-2014.
'Causes of adaptive differences in age-dependent reproductive effort'
Awarded 2014.
University of Stirling.
Advisor: Dr Luc F. Bussière.

M.Sc. Bioinformatics, 2004.
Awarded with distinction.
University of Manchester.

B.Sc. (Hons) Computer Science, 2002.
Upper second class.
University of Lancaster.

Research profile

My research focus is – very broadly – the creation and maintenance of phenotypic variation. I am particularly interested in traits that vary within individuals, and in how different traits vary and covary at different levels (within and among individuals, as well as at the genetic level), and how such (co)variation affects the potential response to selection. Prior to my Ph.D. I worked as a computational biologist, before leaving to focus on my own research in evolution and ecology. These skills have been useful in approaching the statistical programming and data handling needs of my current research.

Employment history

Postdoctoral research associate / postdoctoral research fellow, May 2015 – *present.*
Wilson Group, Centre for Ecology and Conservation.
University of Exeter.

My postdoctoral research focuses on the evolutionary genetics of the vertebrate stress response, working with Prof. Alastair Wilson. I use the Trinidadian guppy, *Poecilia reticulata*, with studies of behaviour and stress-related hormones to determine phenotypic, among-individual and genetic trait (co)variances. This research is performed in collaboration with Dr. Ryan Earley (University of Alabama), and Dr. Andy Young (University of Exeter). I also spend part of my time as a visiting researcher at the University of Cambridge, hosted by Prof. Rebecca Kilner.

Statistics course instructor, Dec 2014 – *present.*
'Advancing in R', various venues.
PR Statistics.

Alongside Dr. Luc Bussière, I teach a 5-day residential workshop on statistical analysis using R, aimed at ecologists and evolutionary biologists. The course bridges the gap between basic R coding and more advanced statistical modelling, providing an introduction to model selection and simplification, mixed

effects models, generalised linear models, and nonlinear models. I write and deliver course material, and provide instruction and assistance to attendees.

Research assistant, Nov 2014 – April 2015.
Butterfly Genetics Laboratory, Dept. of Zoology.
University of Cambridge.

Editorial research assistant (part-time), Oct – Dec 2014.
Large Animal Research Group, Dept. of Zoology.
University of Cambridge.

Technician (part-time), Sept – Nov 2014.
Evolutionary Genetics Laboratory.
University of Cambridge.

Computational biologist, 2006–2010.
Advanced Science & Technology Laboratory.
AstraZeneca UK.

Research assistant, 2005–2006.
Bioinformatics Research Centre.
University of Glasgow.

Analyst programmer, 2004.
Bioinformatics Group.
Novartis CH.

Publications

Ecology & Evolution

Submitted manuscripts:

Styga J. M., **T. M. Houslay**, A. J. Wilson, R. L. Earley. Ontogeny of the morphology-performance axis in an amphibious fish (*Kryptolebias marmoratus*). *Journal of Experimental Zoology Part A: Ecological and Integrative Physiology* (Accepted).

White S. J., **T. M. Houslay**, A. J. Wilson. Evolutionary genetics of personality in the Trinidadian guppy II: Sexual dimorphism and genotype-by-sex interactions. *Heredity* (In review).

Maskrey D. M., A. J. Wilson, S. J. White, **T. M. Houslay**. Who dares doesn't always win: risk-averse rockpool prawns are better at controlling a limited resource. *Animal Behaviour* (In review).

Longdon B., J. P. Day, J. M. Alves, S. C. L. Smith, **T. M. Houslay**, J. E. McGonigle, F. M. Jiggins. Parallel genetic changes in viruses adapting to closely related hosts following a host shift. *PLoS Pathogens* (In review).

Peer-reviewed publications:

Duffield K. R., K. J. Hampton, **T. M. Houslay**, J. Hunt, J. Rapkin, S. K. Sakaluk, B. M. Sadd. (2018). Age-dependent variation in the terminal investment threshold in male crickets. *Evolution* (In press).

Houslay, T. M., M. Vierbuchen, A. J. Grimmer, A. J. Young, A. J. Wilson. (2017). Testing the stability of behavioural coping style across stress contexts in the Trinidadian guppy. *Functional Ecology* 32(2): 424-438.

Duarte, A., S. C. Cotter, O. de Gasperin, **T. M. Houslay**, G. Boncoraglio, M. Welch, R. M. Kilner. (2017). No evidence of a cleaning mutualism between burying beetles and their phoretic mites. *Scientific Reports* 7(1): 13838.

Jarrett, B. J. M., M. Schrader, D. Rebar, **T. M. Houslay**, R. M. Kilner. (2017). Cooperative interactions within the family enhance the capacity for evolutionary change in body size. *Nature Ecology & Evolution* 1: 0178.

Longdon, B., ..., **T. M. Houslay**, ..., F. M. Jiggins. (2017). Vertically transmitted rhabdoviruses are found across three insect families and have dynamic interactions with their hosts. *Proceedings of the Royal Society B* 284: 20162381.

Houslay, T. M. and A. J. Wilson. (2017). Avoiding the misuse of BLUP in behavioural ecology. *Behavioral Ecology* 28(4):948-952.

Houslay, T. M., K. F. Houslay, J. Rapkin, J. Hunt, L. F. Bussière. (2016). Mating opportunities and energetic constraints drive variation in age-dependent sexual signalling. *Functional Ecology* 31(3): 728-741.

Houslay, T. M., J. Hunt, M. C. Tinsley, L. F. Bussière. (2015). Sex differences in the effects of juvenile and adult diet on age-dependent reproductive effort. *Journal of Evolutionary Biology* 28(5): 1067-1079.

Houslay, T. M. and L. F. Bussière. (2012). Sexual Selection and Life History Allocation. *eLS 2012, John Wiley & Sons, Ltd: Chichester.*

Other peer-reviewed publications

Isherwood, B. J., R. E. Walls, M. Roberts, **T. M. Houslay**, S. R. Brave, S. T. Barry, N. O. Carragher. (2013). High-content analysis to leverage a robust phenotypic profiling approach to vascular modulation. *Journal of Biomolecular Screening* 18(10), 1246-1259.

Caie, P. D., R. E. Walls, A. Ingleston-Orme, S. Daya, **T. M. Houslay**, R. Eagle, M. E. Roberts, N. O. Carragher. (2010). High-content phenotypic profiling of drug response signatures across distinct cancer cells. *Molecular Cancer Therapeutics* 9(6), 1913–1926.

Xu T. R., G. S. Baillie, N. Bhari, **T. M. Houslay**, A. M. Pitt, D. R. Adams, W. Kolch, M. D. Houslay, G. Milligan. (2008). Mutations of beta-arrestin 2 that limit self-association also interfere with interactions with the beta(2)-adrenoceptor and the ERK1/2 MAPKs: implications for beta(2)-adrenoceptor signalling via the ERK1/2 MAPKs. *Biochemical Journal* 413, 51–60.

Smith, K. J., G. S. Baillie, E. I. Hyde, X. Li, **T. M. Houslay**, A. McCahill, A. J. Dunlop, G. B. Bolger, E. Klussmann, D. R. Adams, M. D. Houslay. (2007). H-1 NMR structural and functional characterisation of a cAMP-specific phosphodiesterase-4D5 (PDE4D5) N-terminal region peptide that disrupts PDE4D5 interaction with the signalling scaffold proteins, arrestin and RACK1. *Cellular Signalling* 19(12), 2612–2624.

Baillie, G. S., D. R. Adams, N. Bhari, **T. M. Houslay**, S. Vadrevu, D. Meng, X. Li, A. Dunlop, G. Milligan, G. B. Bolger, E. Klussmann, M. D. Houslay. (2007). Mapping binding sites for the PDE4D5 cAMP-specific phosphodiesterase to the N- and C-domains of beta-arrestin using spot-immobilized peptide arrays. *Biochemical Journal* 404, 71–80.

Huston, E., I. Gall, **T. M. Houslay**, M. D. Houslay. (2006). Helix-1 of the cAMP-specific phosphodiesterase PDE4A1 regulates its phospholipase-D-dependent redistribution in response to release of Ca²⁺. *Journal of Cell Science* 119(18), 3799–3810.

Huston, E., **T. M. Houslay**, G. S. Baillie, M. D. Houslay. (2006). cAMP phosphodiesterase-4A1 (PDE4A1) has provided the paradigm for the intracellular targeting of phosphodiesterases, a process that underpins compartmentalized cAMP signalling. *Biochemical Society Transactions* 34, 504–509.

Wallace, D. A., L. A. Johnston, E. Huston, D. MacMaster, **T. M. Houslay**, Y. F. Cheung, L. Campbell, J. E. Millen, R. A. Smith, I. Gall, R. G. Knowles, M. Sullivan, M. D. Houslay. (2005). Identification and characterization of PDE4A11, a novel, widely expressed long isoform encoded by the human PDE4A cAMP phosphodiesterase gene. *Molecular Pharmacology* 67(6), 1920–1934.

Talks & presentations

Post-doctoral research

The quantitative genetics of stress coping styles.

Talk presented at the Society for Integrative & Comparative Biology Annual Meeting 2018, San Francisco, USA.

Untangling variation in coping styles: individual and genetic variation in stress response.

Invited seminar at the University of Roehampton, UK (host: Dr. Harry Marshall); Behavioural Ecology seminar series, University of Cambridge, UK.

'Coping styles': Quantifying individual variation in stress response.

Talk presented at the Wild Animal Modelling BiAnnual Meeting (WAMBAM), Montreal, Canada.

How does danger affect personality?

Talk presented at the 30th Congress of the International Society for Behavioural Ecology, Exeter, UK.

PhD research

Savings plans or budget constraints? Causes and consequences of age-dependent allocation patterns in sexual signalling.

Talk presented at the 15th Congress of the European Society for Evolutionary Biology, Lausanne, Switzerland.

Savings plans or budget constraints? Causes and consequences of age-dependent allocation patterns in sexual signalling.

Invited seminar at the Evolutionary Genetics Laboratory, University of Cambridge, UK (host: Dr. Ben Longdon).

Causes and consequences of resource storage and allocation to a sexually selected display.

Talk presented at the Scottish Ecological Ageing Research Group Meeting, Glasgow, UK.

Savings accounts and ready cash: resource storage and allocation to a sexually selected behavioural display.

Talk presented at the Scottish Animal Behaviour Conference, Edinburgh, UK.

Does phenotypic plasticity undermine the reliability of sexual advertisement or help sustain adaptive mate choice?

Poster presented at the 14th Congress of the European Society for Evolutionary Biology, Lisbon, Portugal; the Royal Entomological Society International Symposium, St Andrews, UK.

Does phenotypic plasticity undermine the reliability of sexual advertisement or help sustain adaptive mate choice?

Invited talk at the University of Basel, Switzerland (host: Dr. Lukas Schärer).

The effect of juvenile and adult diet on age-dependent reproductive effort and mortality.

Talk presented at the 1st Joint Congress on Evolutionary Biology, Ottawa, Canada; the Scottish Ecological Ageing Research Group Meeting, Durham, UK; the Scottish Animal Behaviour Conference, Stirling, UK.

The effect of diet on ageing and reproductive effort in the decorated cricket *Gryllodes sigillatus*.

Invited talk given as part of the Behavioural Ecology seminar series, University of St Andrews, UK (host: Dr. Nathan Bailey).

The condition-dependence of calling effort in decorated crickets (*Gryllodes sigillatus*).

Poster presented at the 13th Congress of the European Society for Evolutionary Biology, Tuebingen, Germany.

Teaching

Lecturing, University of Exeter.

Developed and delivered lectures on life history evolution, sexual selection, and sexual conflict for undergraduate course BIO1424 (organised by Prof. Tom Tregenza).

Instructor, 'Advancing in R'.

5-day residential workshop teaching statistical analysis using R, aimed at ecologists and evolutionary biologists.

Workshop instructor.

Developed and delivered sections of workshops on phenotypic plasticity at the University of Exeter (led by Prof. Alastair Wilson) and ISBE 2016 (led by Prof. Suzanne Alonso & Dr. Nick Royle).

Teaching assistant, University of Stirling.

Animal physiology; Biodiversity; Evolution & genetics; Field and lab techniques; Phylogenetics; Proteomics; Statistics and data visualisation in R.

Overseas field course instructor, University of Stirling.

Ecology and animal biology in the Swiss Alps.

Skills

Statistical programming in R.

Including mixed-effects models and random regression, multivariate mixed-effects modelling, analysis of longitudinal datasets, and Bayesian inference.

Quantitative genetics.

Experience of quantitative genetic analyses (including the estimation of the heritability of traits, genetic correlations between traits, and genotype-by-environment interactions) using both maximum likelihood and Bayesian approaches.

Image analysis.

Trained to 'expert' level with the Definiens Developer XD system.

Computer programming.

Working knowledge of multiple programming languages, including Java and SQL.

Organisational skills.

Experience of running large-scale animal behaviour experiments, including quantitative genetic designs.

Workshops & courses attended

Mathematical modeling in evolutionary ecology. (2012).

Workshop at the 1st Joint Congress on Evolutionary Biology, Ottawa, Canada.

Communicating science to society. (2012).

Workshop at the 1st Joint Congress on Evolutionary Biology, Ottawa, Canada.

Evolutionary quantitative genetics. (2012).

Two-week residential course at Uppsala University, Sweden.

Standing up for science in the media. (2011).

Workshop organised by Sense about Science at the Royal Society of Edinburgh, UK.

R for biologists. (2011).

One-week course at the University of Stirling, UK.

Evolutionary biology in the Alps. (2011).

One-week residential course in Arolla, Switzerland.

Funding awarded

ESEB Outreach Initiative. (2014).

€900 awarded for the project 'Breaking Bio: video and audio podcasts with leading scientists.'

Public outreach

I have discussed my research in both live and pre-recorded interviews for television (BBC World News) and radio (including BBC Radio 4's 'Today' show, BBC Radio Scotland, BBC Radio Wales, and CBC's 'As it happens'). My research was also featured in a variety of international newspapers and magazines (including the Washington Post, the Independent, the Daily Mail, and Newsweek).

I am active amongst the scientific community on Twitter, and my period running the 'RealScientists' Twitter account (hosted by a different scientist each week) led to coverage in several international newspapers. I previously co-hosted the 'Breaking Bio' podcast, in which we interviewed academics of all career stages about their research. I am a firm believer in the importance of public engagement with science, and have volunteered at events such as the BBC's 'Bang Goes the Theory' exhibition at the Edinburgh Science Festival. I am also a keen wildlife photographer, specialising in macrophotography, and have contributed images to a number of articles in both scientific journals and the popular press.

Service to the profession

Invited and hosted external speakers, including Dr. Nathan Bailey (University of St. Andrews, UK), Dr. Susan Johnston (University of Edinburgh, UK), Dr. David Shuker (University of St. Andrews, UK), and Prof. Douglas Futuyma (State University of New York at Stony Brook, USA).

Assisted with the organisation of the 30th Congress of the International Society for Behavioural Ecology.

Ad hoc reviewer for journals including: *Animal Behaviour*, *Behavioural Ecology*, *Ecology & Evolution*, *Heredity*, *Journal of Animal Ecology*, *Journal of Evolutionary Biology*, *Journal of Experimental Biology*, *Proceedings of the Royal Society B: Biological Sciences*, *Royal Society Open Science*. *View my Publons profile.*