# Thomas Guillerme

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## RESEARCH INTERESTS

I'm interested in evolutionary biology across different scales: the stories behind the history of life and the methodologies with which it is investigated. By combining classical methods such as descriptive palaeontology or field ecology with modern bioinformatics tools and mathematical modeling, I work on understanding how to use traits in evolutionary biology: from phylogenetic theory to macroevolution and macroecology.

## ACADEMIC CAREER

2023 - present: NERC Independent Research Fellow

School of Biosciences

University of Sheffield, Sheffield, UK

2020 - 2023: Research Associate in Gavin Thomas' group

Department of Animal and Plant Sciences University of Sheffield, Sheffield, UK

2017 - 2019: Postdoctoral Research Fellow in Vera Weisbecker's group

School of Biological Sciences

University of Queensland, St Lucia, Australia

2016 - 2017: Research Associate in Martin Brazeau's group

Faculty of Natural Sciences, Department of Life Sciences Silwood Park Campus, Imperial College London, UK

## **EDUCATION**

2012 - 2015: PhD in Zoology, Trinity College Dublin

Macroevolution with living and fossil species

Awarded as it stands.

http://dx.doi.org/10.6084/m9.figshare.1583337

2010 - 2012: MSc in Palaeontology (honours), Université de Montpellier

2<sup>nd</sup> year project: Molecular clocks and evolutionary rates among primates: a palaeontological and genomic approach. 1<sup>st</sup> year project: Southern France Upper Cretaceous Theropod

teeth variability.

2007 - 2010: BSc in Biology, Université de Montpellier

## **PUBLICATIONS**

My work has been published in **21 peer-reviewed papers** (including 9 as a first author) on macroevolution, macroecology and new statistics methods and implementations. My research has been published in high profile generalist journals such as *Nature ecology and evolution, Science Advances, The American Naturalist* or *Biology Letters* as well as specialist ones such as *Systematic Biology, Methods in Ecology and Evolution* or *Palaeontology*. This work has been **cited in over 1300** publications with an **h-index of 17** and received a median attention score of 54 (95% CI: 16-609) corresponding to the top 5% of all research outputs tracked by altmetrics. The detailed list of my publications is available below.

## AWARDS AND GRANTS

2023: NERC Independent Research Fellowship (£52500)

2017: Royal Society International Scientific Seminar Award (£5000)

co-awarded to Prof. Phillip Donoghue FRS and Dr Natalie Cooper

2017: Marie Skłodowska-Curie Action Seal of Excellence

2016: Biology Letters Top reviewer.

2014: BES Photo Competition Student Prize (Ecology and Society)

2012: Trinity Postgraduate Research Studentship (€46800)

# COMPUTER SKILLS

I mostly work on projects in R and C. You can find my list of current repositories and contributions on my github profile. I am the main contributor on 6 different R packages, namely the dispRity package (> 100 citations - 38k downloads) and co-author on several other R packages namely ape (>11k citations - 4M downloads). I am the co-main contributor on one C library morphylib.

Coding:  $\mathbf{R}^*$ ,  $\mathbf{C}^*$ ,  $\mathbf{C}^{++}$ ,  $\mathbf{Bash}^*$ ,  $\mathbf{HTML}$ ,  $\mathbf{L}^*\mathbf{T}_{\mathbf{E}}\mathbf{X}^*$ ,  $\mathbf{git}^*$ 

Phylogenetics: PAUP, MrBayes\*, BEAST\*, RAxML, PhyloBayes, CoEvol

MACSE, MAFFT, SEAview, Tracer, Mesquite, R{ape} R{phytools}, R{diversitree}, R{MCMCglmm}, R{caper}, ...

Morphometrics: R{geomorph}, MorphoJ, TPS

Graphics: Adobe Illustrator, Adobe Photoshop, Gimp, Inkscape

## Developed software:

R{ape}: Analyses of Phylogenetics and Evolution Role: contributor.

Project page: ape-package.ird.fr/

R{Claddis}: Measuring Morphological Diversity and Evolutionary Tempo Role: contributor.

GitHub page: github.com/graemetlloyd/Claddis

R{dispRity}: Measuring disparity in R. Role: main author.

GitHub page: github.com/TGuillerme/dispRity

R{landvR}: Tools for measuring landmark position variation. *Role: main author.* 

GitHub page: github.com/TGuillerme/landvR

Morphy: A C library for phylogenetic analysis of morphological characters. *Role: co-author*.

Project page: www.morphyproject.org/

R{mulTree}: Performs MCMCglmm on multiple phylogenetic trees. *Role: main author*.

GitHub page: github.com/TGuillerme/mulTree

R{SIDER}: Stable Isotope Discrimination Estimation in R. Role: co-author.

GitHub page: github.com/healyke/SIDER

R{treats}: Simulating trees and traits in R. Role: main author.

GitHub page: github.com/TGuillerme/treats

# **PRESENTATIONS**

Invited seminars (13)

<sup>\*</sup> Skills taught at workshops or courses (see below)

2023:	Palaeobiology	Discussion	Group -	University	of Bristol,	UK
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Talk: Which bird has the most special beak?

Ecology and Evolution seminar series - University if York, UK 2022:

Talk: Which bird has the most special beak?

2022: University College Dublin, Ireland

Talk: Which bird has the most special beak?

Palaeobiology Discussion Group - University of Bristol, UK 2021:

Talk: Why are there disparate ways to run disparity analysis?

Workshop: Disparity analyses in R with dispRity?

National University of Ireland, Galway, Ireland 2020:

online-talk: Using new multidimensional methods to understand what was the

effect of the K-Pg extinction on mammalian evolution.

NERD Club - Trinity College Dublin, Ireland 2020:

**online**-talk: From Dublin to Sheffield: trying to finish a quick paper.

Paläontologisches Institut und Museum, ETH, Zürich, Switzerland 2019:

Talk: A big step through (morpho)space and time? The effect of the K-Pg extinction on mammalian morphological evolution.

Ecology and Evolution Seminar Series - Australian National University, Australia 2019: Talk: A big step through (morpho)space and time? The effect of the K-Pg extinction on mammalian morphological evolution.

Statistical Society of Australia - University of Queensland, Australia 2019:

Talk: Shiny moms: interactive tool for measuring occupancy in multidimensional spaces

University of Bath seminar series - University of Bath, UK 2018:

Talk: New approaches for measuring disparity and testing disparity hypothesis:

a journey through mammalian morphological evolution.

ISEM seminar series - Université de Montpellier, France 2017:

Talk: Disparate views on mammalian disparity at the K-Pg.

Silwood Social Seminars Series - Imperial College London, UK 2017:

Talk: Multidimensionality in morphology.

2016: Palaeobiology Discussion Group - University of Bristol, UK

Talk: Do we still need morphological characters data?

#### International Conferences (19)

2022: ESEB 2022 - Prague, Czech Republic

Poster: Which bird has the most special beak?

Available here: https://bit.ly/2Ot1sMf

PalAss annual meeting - Valencia, Spain

Talk: moms: how to measure occupancy in multidimensional space (disparity)?

Available here: https://bit.ly/2Ot1sMf

2019 VP Redux - Brisbane, Australia 2019:

Talk: How to summarise trait-space occupancy (disparity)? moms: a tool for measuring occupancy

in multidimensional spaces

Available here: https://bit.ly/2Ot1sMf

ARC Boden conference: major transitions in vertebrates - Melbourne, Australia

Talk: How to summarise trait-space occupancy (disparity)? moms: a tool for measuring occupancy in multidimensional spaces

Available here: https://bit.ly/2Ot1sMf

2018: CPEG 2018 - Leeds, UK

Talk: Timespines: does predator-prey arms race interaction drives

morphological adaptation through time?

Evolution 2018 - Montpellier, France 2018:

Talk: The Rise of the Age of Mammals? Total Evidence tip-dated trees and disparity

models to assess the effect of the K-Pg extinction on mammalian evolution.

Available here: https://bit.ly/2PFPlJQ

Australian Mammal Society 2018 - Brisbane, Australia

Symposium presentation (invited talk): Form, Function and Evolution of Australasian Mammals

A major step through (morpho)space a time? The effect of the K-Pg extinction

on mammalian morphological evolution.

Reconciling disparate perspectives on the evolution of disparity - Royal Society

International Scientific Meeting - Chicheley Hall, UK - Organiser

2017: BES Macro SIG meeting 2017 - London, UK

## conference co-organiser

2017: Evolution 2017 - Portland OR, USA

Talk: Blue tail, red tail: a solution to inapplicable data in phylogenetics

Available here: goo.gl/g68NTZ

BES Macro SIG meeting 2016 - Oxford, UK 2016:

Talk: Moving away from the consensus in Phylogenetic Comparative Methods

Available here: goo.gl/1PsRfi

2016: Evolution 2016 - Austin TX, USA

Palaeobiology/macroevolution session chair

Talk: New approaches to disparity-through-time analysis

Available here: goo.gl/nnSpVS

2015: Systematics Association Biennial - Oxford, UK

Talk: Total evidence phylogenies, the data issue

Available here: goo.gl/MVwMTY

2014: SVP annual meeting - Berlin, Germany

Symposium presentation (invited talk): Putting fossils in trees

Talk: Total evidence phylogenies and missing data

Available here: goo.gl/CBqSVJ

2014: BES Macroecology SIG meeting - University of Nottingham, UK

Talk: Trees with fossil and living species: the data issue

Available here: goo.gl/Sdcxon

2014: Evolution 2014 - Raleigh NC, USA

Symposium presentation: Ernst Mayr Symposium

Talk: Total evidence phylogenies: the missing data issue

Available here: goo.gl/oPfHZE

2014: Challenges in Macroecology: Scaling the Time Barrier - Natural History Museum

London, UK

Talk: Trees with fossil and living species: the missing data issue

Available here: goo.gl/c1RBER

2013: European Society for Evolutionary Biology Congress - Lisbon, Portugal

Poster: Combining fossils and molecular phylogenies

Available here: goo.gl/3HcRGH

2013: 11th International Mammalogy Congress - Queen's University, Belfast, UK

Poster: Combining fossils and molecular phylogenies

Available here: goo.gl/3HcRGH

# PROFESSIONAL SERVICE

#### Associate Editor for Ecology and Evolution and Evolutionary Journal of the Linnean Society.

**Reviewer for:** American Naturalist, Biology Letters (Top reviewer for 2016), Communications Biology, Ecology and Evolution, Evolution, Evolutionary Biology, Evolutionary Journal of the Linnean Society, Functional Ecology, Global Ecology and Biogeography, Journal of Biogeography, Journal of Evolutionary Biology, Lethaia, Methods in Ecology and Evolution, Molecular Phylogenetics and Evolution, Nature Communications, Palaeontologica Electronica, Palaeontology, Peer Community In: Evol Biol, PLoS ONE, Proceedings of the Royal Society B: Biological Sciences, The R Journal, Science Advances, Scientific Reports, Systematic Biology.

## Workshops:

2018:

2021: Disparity analyses in R with dispRity? organiser

Palaeobiology Discussion Group - University of Bristol, UK

2018: How to write a kick-ass DECRA fellowship — co-organiser

Invited speakers: Dr V. Weisbecker and Dr A. Niehaus

The University of Queensland - Brisbane, Australia Postdoc Q&A panel for PhD students — panel member

The University of Queensland - Brisbane, Australia

2018: Repeatability workshop: Organize your research from the get-go! — organiser

Australian Mammal Society Annual meeting - Brisbane, Australia

2014: Tip-Dating workshop — *helper* 

Nicholas Matzke & April Wright, SVP Annual meeting - Berlin, Germany

2014: Software Carpentry Bootcamp - R and UNIX — helper

Devasena Inupakutika & Aur Saraf - Nottingham, UK

## Conferences organisation:

2023-24: Sheffield EEB symposium - Sheffield, UK — co-organiser

2022: BES MacroFest 2022 - Sheffield, UK — main organiser

2021: BES Macro 2021 e-conference - Online — main organiser

2018: Reconciling disparate perspectives on the evolution of disparity - Royal Society

International Scientific Meeting - Chicheley Hall, UK — main organiser

2017: BES Macro SIG meeting 2017 - London, UK — co-organiser

## Academic memberships:

2018-present: Member of the Australian Mammal Society

2017-present: Member of the Society for the Study of Evolution

2015-present: Member of the Systematic Association

2014-present: Member of the Society of Vertebrate Palaeontology

2013-present: Member of Society of Systematic Biologists

2013-present: British Ecological Society (BES) including Macroecology Special Interest Group

#### Departmental services:

2019-2021: University of Sheffield, ecology and conservation seminars organiser.

2019: University of Queensland School of Biology Three minutes thesis competition organiser.

2019: Postdoc rep. on the UQ biology seminar committee.
2018-2019: UQ Bioinformatics coding and debates co-organiser.
2018-2019: UQ Biology Postdocs monthly meetings co-organiser.

2016-2017: Silwood Ecology and Evolution Seminar Series organiser

Biweekly Silwood Park Campus computer workshops organiser (IATEX, version control,

webpages, R packages, etc.)

2013-2015: Trinity Zoology Postgraduate student social committee chair

I am also active on the Stack Overflow community, regularly answering coding questions.

## **TEACHING**

#### Academia

All my teaching material is available on the following GitHub page.

2023: 2nd year students: Open Research

Guest lecture, 2 hours, University of Sheffield - UK

2019-2022: 3rd year students: Disparity through time

Guest lecture, 3 hours, University of Sheffield - UK

2017: MSc students: C for biologists

Co-teacher, 30 hours, Imperial College - UK

2017: MSc students: Phylogenetic Comparative Methods

Teaching assistant, 6 hours, Natural History Museum - UK

2017: MSc students: morphometrics

Co-teacher, 6 hours, Natural History Museum - UK

2016: MSc students: Rocks 'n' clocks (including a MrBayes practical)

Teacher, 6 hours, Imperial College London - UK

2014: MSc students: Timing Evolution

Teacher, 6 hours, Trinity College Dublin - IE

2014 : Software Carpentry Bootcamp - R and UNIX

Helper, full day, University of Nottingham - UK

2013-14: 2<sup>nd</sup> year MSc students: Statistics with R

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Teaching assistant, full semester, Trinity College Dublin - IE

2013-14: 4<sup>th</sup> year undergraduate students: Evolution

Teaching assistant, full semester, Trinity College Dublin - IE

2012-13: 4<sup>th</sup> year undergraduate students: Statistics with R

Teaching assistant, full semester, Trinity College Dublin - IE

2012-13:  $1^{st}$  year undergraduate students: Introduction to Biodiversity Evolution and the Environment

Teaching assistant, full semester, Trinity College Dublin - IE

## Student supervision

2017: Joe Craig (Imperial College London - MSc project) *How does adding data change node age estimation in morphological phylogenies?* 

2017: Danielle Moraviec & Hayley Swalund (Imperial College London - MSc mini projects)

2016: Victoria Stanley Tsui (Imperial College London - MSc) A preliminary study on the suture morphology of skull roofs in early gnathostomes and their ancestors. - Co-supervised with Martin Brazeau.

2016: Asiem Sanyal (Imperial College London - MSc mini project)

2014-2015: Luke Hannon (Trinity College Dublin - $4^{th}$  year project) Orbit size and nocturnality in living and fossil primates. - Co-supervised with Natalie Cooper.

2013-2014: Maura Judge (Trinity College Dublin -4<sup>th</sup> year project) Bite force and diet in mammals.

- Co-supervised with Natalie Cooper.

## FIELDWORK AND DATA COLLECTION

2013-14: Museum data collection: Smithsonian Institute Natural History Museum (Washington DC),

American Museum of Natural History (New York), Museum of Comparative Zoology (Cambridge, MA),

Muséum National d'Histoire Naturelle (Paris)

2011-12: Excavations in Cruzy, France

Southern France, Continental Cretaceous

2011: Excavations in Krasiejów, Poland

Southern Poland, Continental Trias

2009-10: Excavations in Espéraza, France - Site fore-person

Southern France, Continental Cretaceous

## PUBLIC ENGAGEMENT AND OUTREACH

- Regular contributor to EcoEvo@TCD blog; rated best Irish Science and Technology blog (2014) and Bronze Award Irish Blog (2015).
- Complete list available here: goo.gl/MAq9oA
- Featured posts: How do lego cars evolve?; If you please draw me a dino...; The more the better?.
- Threesis video (early stage thesis project explained in three minutes winner of the NERD club threesis award 2013).

#### **Outreach Events**

2015 & 2014 & 2013: Trinity College Dublin Zoology Department, Researcher's night – participant

2014: 1<sup>st</sup> Soapbox Science Ireland – *helper* 

2014: "What can we learn from skeletons", comparative anatomy practical – Co-organiser

2013: Trinity College Zoology Museum guided tours – tour guide

2010: Introduction to palaeontological excavations, Musée des Dinosaures (FR) – animator

# PUBLICATIONS LIST

Peer reviewed - Google Scholar profile: Thomas Guillerme - 1300 citations, h-index: 17.

- 21. 2024: Guillerme T. treats: a modular R package for simulating trees and traits. Methods in Ecology and Evolution DOI:10.1111/2041-210X.14306
- 20. 2023: **Guillerme T**, Bright JA, Cooney CR, Hughes EC, Varley ZK, Cooper N, Beckerman AP, Thomas GH. Innovation and elaboration on the avian tree of life. *Science Advances* DOI: 10.1126/sciadv.adg1641
- 19. 2023: Weisbecker V, Beck RMD, Guillerme T, Harrington AR, Lange-Hodgson L, Lee MSY, Mardon K, Phillips MJ. Multiple modes of inference reveal less phylogenetic signal in marsupial basicranial shape compared with the rest of the cranium. *Philosophical Transactions of the Royal Society B* DOI: 10.1098/rstb.2022.0085
- 18. 2023: Monadjem A, Healy K, **Guillerme T**, Kane A. Dispersal ability is associated with contrasting patterns of beta diversity in African small mammal communities. *Journal of Biogeography* DOI: 10.1111/jbi.14532
- 17. 2021: Mammola S, Carmona CP, **Guillerme T**, Carmona CP. Concepts and applications in functional diversity. *Functional Ecology* DOI: 10.1111/1365-2435.13882
- 16. 2020: Brazeau MD, Giles S, Dearden RP, Jerve A, Ariunchimeg Y, Zorig E, **Guillerme T**, Castiello M. Endochondral bone in an Early Devonian 'placoderm' from Mongolia. *Nature Ecology and Evolution* DOI: 10.1038/s41559-020-01290-2
- 15. 2020: Marcy AE, **Guillerme T**, Sherratt E, Rowe KC, Phillips MJ, Weisbecker V. Australian rodents reveal conserved Cranial Evolutionary Allometry across 10 million years of murid evolution. *American Naturalist* DOI: 10.1086/711398.
- 14. 2020: Viacava P, Blomberg SP, Sansalone G, Phillips MJ, **Guillerme T**, Cameron SF, Wilson RS, Weisbecker V. Skull shape of a widely distributed, endangered marsupial reveals little evidence of local adaptation between fragmented populations. *Ecology and Evolution* DOI: 10.1002/ece3.6593
- 13. 2020: Puttick MN, Guillerme T, Wills MA. The complex effects of mass extinctions on morphological disparity. *Evolution* DOI: 10.1111/evo.14078
- 12. 2020: **Guillerme T**, Puttick MN, Marcy AE, Weisbecker V. Shifting spaces: which disparity or dissimilarity measurement best summarise occupancy in multidimensional spaces? *Ecology and Evolution* DOI: 10.1002/ece3.6452

- 11. 2020: **Guillerme T**, Cooper N, Brusatte SL, Davis KE, Jackson AL, Gerber S, Goswami A, Healy K, Hopkins MJ, Jones MEH, Lloyd GT, O'Reilly JE, Pate A, Puttick MN, Rayfield E, Saupe EE, Sherratt E, Slater GJ, Weisbecker V, Thomas GH and Donoghue PCJ. Disparities in the analysis of morphological disparity. *Biology Letters* DOI: 10.1098/rsbl.2020.0199
- 10. 2019: Weisbecker V, Guillerme T, Speck C, Sherratt E, Mehari Abraha H, Sharp A, Terhune CE, Collins S, Johnston S, and Panagiotopoulou O. Individual variation of the masticatory system dominates 3D skull shape in the herbivory-adapted marsupial wombats. Frontiers in Zoology, 16, 41 DOI: 10.1186/s12983-019-0338-5
- 9. 2018: Brazeau MD\*, **Guillerme T**\*, Smith MR\*. An algorithm for morphological phylogenetic analysis with inapplicable data. *Systematic Biology*, DOI: 10.1093/sysbio/syyo83

  \* All authors contributed equally.
- 8. 2018: **Guillerme T**. dispRity: a modular R package for measuring disparity.

  Methods in Ecology and Evolution, DOI: 10.1111/2041-210X.13022. Part of a Virtual Issue in Methods in Ecology and Evolution: Phylogenetics and Comparative Methods: The Dark and Bright Sides.
- 7. 2018: **Guillerme T** and Cooper N. Time for a rethink: sub-sampling methods in disparity-through-time analysis. *Palaeontology*, DOI: 10.1111/pala.12364
- 6. 2017: Healy K, **Guillerme T**, Kelly SBA, Inger R, Bearhop S, Jackson AL. SIDER: an R package for predicting trophic discrimination factors of consumers based on their ecology and phylogenetic relatedness. *Ecography*, DOI: 10.1111/ecog.03371
- 5. 2017: Turvey SA, Crees JJ, Hansford J, Jeffree TE, Crumpton N, Kurniawan I, Setiyabudi E, Guillerme T, Paranggarimu U, Dosseto A, van den Bergh GD. Quaternary vertebrate faunas from Sumba, Indonesia: implications for Wallacean biogeography and evolution *Proceedings of the Royal Society B*, 284 20171278, DOI: 10.1098/rspb.2017.1278
- 4. 2016: Kane A, Healy K, **Guillerme T**, Ruxton G, and Jackson AL. A Recipe for Scavenging the natural history of a behaviour. *Ecography*, 39:001–011, DOI: 10.1111/ecog.02817
- 3. 2016: **Guillerme T** and Cooper N. Assessment of available anatomical characters for linking living mammals to fossil taxa in phylogenetic analyses. *Biology Letters*, 12 20151003 DOI: 10.1098/rsbl.2015.1003
- 2. 2016: **Guillerme T** and Cooper N. Effects of missing data on topological inference using a Total Evidence approach. *Molecular Phylogenetics and Evolution* 94:146–158, DOI: 10.1016/j.ympev.2015.08.023
- 1. 2014: Healy K, **Guillerme T**, Finlay S, Kane A, Kelly SBA, McClean D, Kelly DJ, Donohue I, Jackson AL and Cooper N. Ecology and mode-of-life explain lifespan variation in birds and mammals. *Proceedings of the Royal Society B*, 281(1784). DOI: 10.1098/rspb.2014.0298

In review/in press - see more details on my publications page.