MAURICIO GONZÁLEZ-FORERO

16 NOVEMBER 2023

EDUCATION

2007 – 2013 **PhD** in Ecology and Evolutionary Biology
Also, took 6 postgraduate courses in Mathematics or Statistics:
Mathematical Ecology I-II, Mathematical Evolutionary Theory, Stochastic Modelling, and Statistical Inference I-II.
University of Tennessee, Knoxville, USA.
Thesis: Evolution of acquiescence to manipulation.
Advisor: Sergey Gavrilets.

1999 – 2006 **BSc** in Biology
Also, took 10 courses in Mathematics or Physics (equivalent to a **minor in Mathematics**):
Calculus I-III, Linear Algebra I-II, Ordinary Differential Equations, Vectorial Geometry, Mathematical Logic, Set Theory, and Physics I.
University of Antioquia, Medellín, Colombia.
Thesis: Species: a mathematical formalization.
Advisors: Luís Fernando Echeverri (maths), Joao Muñoz (biology), and Ricardo Callejas (biology).

RESEARCH POSITIONS

2018 – present **Research Fellow**
Supervisor: Andy Gardner.
University of St Andrews, UK.

2020 – 2021 ~3.8 months of furlough due to increased childcare responsibilities during the COVID pandemic. Overall, I estimate the pandemic delayed my work by ~7 months.

2016 – 2018 **Marie Skłodowska-Curie Individual Fellow**
Supervisor: Andy Gardner.
University of St Andrews, UK.

2013 – 2016 **Postdoctoral researcher**
Supervisor: Laurent Lehmann.
University of Lausanne, Switzerland.

2010 – 2012 **Graduate research associate**
Funded by the National Institute of Mathematical and Biological Synthesis (NIMBioS).
University of Tennessee, Knoxville, USA.

TEACHING

2018 – 2019, 2023 **Giving lectures**
1 lecture on Brain evolution: comparative neuroanatomy and controversies (3rd year Evolution course).
3 lectures on Social Evolution (3rd year Evolution course).
Essay setting, marking, and providing feedback (2nd and 3rd Evolution courses).
University of St Andrews, UK.

2013 – 2016 **Teaching assistant**
Grading master-student projects, mentoring students in the Experimental Design course, and assisting exercise sections of the Population genetics course.
University of Lausanne, Switzerland.

2010 **Designing and giving a full semester of lectures**
In complete charge of lectures, exams, and grading of the semester-long course Mathematics for Life Sciences.
University of Tennessee, Knoxville, USA.

2007 – 2009 **Graduate teaching assistant**
Teaching lab sections of the courses Biology, Genetics, and Mathematics for Life Sciences.
University of Tennessee, Knoxville, USA.

PREPRINTS

González-Forero M. Evo-devo dynamics of human brain size. In revision at *Nature Human Behaviour* (submitted: 20 Mar 2023; decision (major revision): 5 Jun 2023; revision submitted: 25 Aug 2023).
Preprint: https://www.biorxiv.org/content/10.1101/2023.03.20.533421v2.

González-Forero M. A mathematical framework for evo-devo dynamics. In revision at *Theoretical Population Biology* (submitted: 8 Oct 2021; 1st decision (major revision): 22 Jun 2022; revision submitted: 8 Sep 2022; 2nd decision (minor revision): 4 Jul 2023; 2nd revision submitted: 31 Jul 2023; 3rd decision (minor revision): 3 Nov 2023; 3rd revision submitted: 10 Nov 2023).
Preprint: https://www.biorxiv.org/content/10.1101/2021.05.17.444499v5.

PEER-REVIEWED PUBLICATIONS

González-Forero M. (2023) How development affects evolution. *Evolution*. 77, 562-579.

***González-Forero M**, *Peña J. (2021) Eusociality through conflict dissolution. *Proc. R. Soc. B*. 288, 20210386.

González-Forero M, Gardner A. (2018) Inference of ecological and social drivers of human brain-size evolution. *Nature* 557, 554-557.

González-Forero M, Faulwasser T, Lehmann L. (2017) A model for brain life history evolution. *PLoS Computational Biology* 13, e1005380.

González-Forero M. (2015) Stable eusociality via maternal manipulation when resistance is costless. *Journal of Evolutionary Biology* 28, 2208-2223.

González-Forero M. (2014) An evolutionary resolution of manipulation conflict. *Evolution* 68, 2038-2051.

González-Forero M, Gavrilets S. (2013) Evolution of manipulated behavior. *American Naturalist* 182, 439-451.

González-Forero M. (2009) Removing ambiguity from the biological species concept. *Journal of Theoretical Biology* 256, 76-80.

*Equal contribution

RESEARCH GRANTS, AWARDS, AND HONOURS

Total awarded (at current exchange rates): ~ £210k.

2016 – 2018 Marie Skłodowska-Curie Individual Fellowship (**€ 195,000**): Brain growth under social pressure: mathematical modelling of brain growth when individuals face social challenges.
By the EU European Commission.

2010 – 2012 Graduate Research Assistantship (**US$ 40,000**): Evolution of eusociality mediated by maternal induction.
By the USA National Institute for Mathematical and Biological Synthesis, NIMBioS.

2009 Funded attendance to the Santa Fe Institute Complex Systems Summer School
By the Santa Fe Institute, Santa Fe, NM, USA (**US$ 550**).

2006 Undergraduate thesis award for "Species: a mathematical formalization".
By the Faculty of Natural and Exact Sciences, University of Antioquia, Colombia.

2005 Third place in the National Biology Exam for Undergraduates in Colombia (ECAES).
By the Ministry of Education, Colombia.

CONSULTANCY

2023-2024 Sensitivity of human mortality rates to perturbation. University of Basque Country, Spain.

INVITED TALKS

2024 Royal Society meeting "Natural Selection Shapes Animal Cognition" in Bath, UK, organised by Elli Leadbeater and Alex Thornton. As an invited speaker, I will also be asked to contribute to a themed issue of *Philosophical Transactions of the Royal Society B*.

2023 Institute Seminar. Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany.

Salguero-Gómez lab meeting, Department of Biology, University of Oxford, UK.

Applied Mathematics Seminar series, School of Mathematics & Statistics, University of St Andrews, UK.

2022 Research Away Day, School of Biology, University of St Andrews, UK.

2020 Institute for Advanced Studies, Toulouse, France. Online due to pandemic.

2019 School of Biological Sciences, University of Aberdeen, UK.

Evolutionary Anthropology Research Group, Department of Anthropology, Durham University, UK.

Applied Mathematics Seminar series, School of Mathematics & Statistics, University of St Andrews, UK.

2018 Stochastic Models for the Inference of Life Evolution group at the Collège de France in Paris.

2017 Department of Zoology, University of Cambridge.

Department of Human Behavior, Ecology and Culture at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany.

2016 Centre for Biological Diversity, School of Biology, the University of St Andrews, UK.

2015 Department of Evolutionary Theory, Max Planck Institute for Evolutionary Biology, Plön, Germany.

2012 Joshua Plotkin group, University of Pennsylvania, USA.

ORGANISED WORKSHOPS AND SYMPOSIA

2020 Co-organiser of Fellowship writing workshop for the School of Biology. 10 speakers from the University of St Andrews. University of St Andrews, UK.

2019 Co-organiser of the symposium "Life history evolution: bridging theory and data". Congress of the European Society for Evolutionary Biology (ESEB2019), Turku, Finland.

SERVICE

2022 — Early Career Representative of the School of Biology for the Institute of Behavioural and Neural Sciences (IBANS), University of St Andrews.

2019 — 2021 Postdoctoral representative for the Biology Equality and Diversity Committee, School of Biology, University of St Andrews.

REVIEWER FOR

American Naturalist, Biological Reviews, Evolution, Evolution Letters, Journal of Evolutionary Biology, Journal of Theoretical Biology, Nature, Nature Communications, Nature Ecology and Evolution, *PLoS ONE*, *Proceedings of the Royal Society B*, *Science Advances, Theoretical Population Biology*.

GRANTS REVIEWED FOR

Research Foundation - Flanders (Belgium).

CONTRIBUTED CONFERENCE PRESENTATIONS

2022	Talk. Mathematical Models in Ecology and Evolution conference. Reading, UK.
	Talk. Euro Evo-Devo. Naples, Italy.
	Talk. Population Genetics Group. Online.
2021	Talk. Evolution conference. Online.
2019	Talk. Mathematical Models in Ecology and Evolution conference. Lyon, France.
	Talk. European Human Behaviour and Evolution Association conference. Toulouse, France.
2018	Talk. Models in Population Dynamics, Ecology, and Evolution conference. Leicester, UK.
2017	Talk. European Human Behaviour and Evolution Association conference. Paris, France.
2016	Talk. Institute of Behavioural and Neural Sciences mini symposium. St Andrews, UK.
	Talk. European section of International Union for the Study of Social Insects conference. Helsinki, Finland.
	Talk. Swiss Biology ’16 conference. Lausanne, Switzerland.
2015	2 posters. European Society for Evolutionary Biology conference. Lausanne, Switzerland.
	Talk. Mathematical Models in Ecology and Evolution conference. Paris, France.
	Poster. 3rd Economics and Biology Workshop of the Institute of Advanced Study. Toulouse, France.
2012	Talk. Society for Mathematical Biology conference. Knoxville, TN, USA.
	Talk. Evolution conference. Ottawa, Canada.
2011	Talk. Evolution conference. Norman, OK, USA.
2010	Talk. Biocompletixy^{XI} conference: The evolution of cooperation. Bloomington, IN, USA.
2007	Talk. South Eastern Population Ecology and Evolutionary Genetics meeting. Tremont, TN, USA.
2005	Poster. European Conference on Mathematical and Theoretical Biology. Dresden, Germany.

ATTENDED WORKSHOPS

2017	2 workshops. Mean field games, and Numerical methods for optimal control problems. Sapienza University. Rome, Italy.
2015	Workshop. 3rd Economics and Biology Workshop, Institute for Advanced Study. Toulouse, France.
2014	Workshop. Social evolution: merits and limitations of inclusive fitness theory. Arolla, Switzerland.
2010 – 2012	Working group. Large scale demographic, network and behavioral trait analyses of sociality. Four meetings at National Evolutionary Synthesis Center, Durham, USA.
2009	Summer Program. Mathematical Biosciences Institute Summer Graduate Program. Columbus, OH, USA.
2009	Complex Systems Summer School. Santa Fe Institute. Santa Fe, NM, USA.

2004 Workshop. Bases in Studies of Entomologic Diversity in Ibero-America. Quito and Yasuni National Park, Ecuador.

ADDITIONAL FUNDING

2015 Travel grant. **€500** by the Institute for Advanced Study, Toulouse, France to attend the Institute's 3rd Economics and Biology Workshop.

2012 Travel grant. **US$1000** by the National Institute of Mathematical and Biological Synthesis and **US$350** by the Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville to attend the Evolution conference in Ottawa, Canada.

2011 Travel grant. **US$500** by the National Institute of Mathematical and Biological Synthesis, **US$200** by the Graduate Researchers in Ecology, Behavior and Evolution of UTK, and **US$200** by the Department of Ecology and Evolutionary Biology to attend the Evolution conference in Norman, OK, USA.

2010 Travel grant. **US$400** by the workshop committee and **US$500** by the National Institute of Mathematical and Biological Synthesis to attend Biocompletixy[XI].

Travel grant. **US$650** by NIMBioS to visit Gro Amdam and James Hunt at Arizona State University.

2009 Travel grant and stipend. **US$400** of travel support and a stipend of **US$300** by the Mathematical Biosciences Institute to attend their Summer Graduate Program.

Travel grant. **US$ 800** by the Department of Ecology and Evolutionary Biology of the University of Tennessee, Knoxville, to attend the Santa Fe Institute Summer School and the Mathematical Biosciences Institute Summer Program. Declined.

2005 Undergraduate thesis improvement grant. **~US$30** by the Research Development Committee (CODI) of the University of Antioquia.

Travel grant. **US$1040** by the Society for Mathematical Biology and **€950** by the European Society of Mathematical and Theoretical Biology to attend the European Conference on Mathematical and Theoretical Biology and the Society of Mathematical Biology conference in Dresden, Germany.

OUTREACH PUBLICATIONS

González-Forero M. (2018) The human brain from ecology and seemingly culture. Behind the paper blog post at *Nature Ecology and Evolution Community*. https://natureecoevocommunity.nature.com/users/92985-mauricio-gonzalez-forero/posts/33491-the-human-brain-from-ecology-and-seemingly-culture

González-Forero M. (2018) Why do humans have such large brains? Our study suggests ecology was the driving force. *The Conversation*. https://theconversation.com/why-do-humans-have-such-large-brains-our-study-suggests-ecology-was-the-driving-force-96873

SELECTED MEDIA COVERAGE

2023 I F*cking Love Science, among others. https://www.iflscience.com/we-may-finally-know-why-humans-have-such-big-brains-70453.

2021 Brain evolution work featured in article by Science Illustrated (Sweden).

2019 Article by the European Commission research press. https://ec.europa.eu/research-and-innovation/en/projects/success-stories/all/why-humans-have-very-big-brains

Article by Discover Magazine. State of Science: Finding Human Ancestors in New Places. https://www.discovermagazine.com/planet-earth/state-of-science-finding-human-ancestors-in-new-places

2018 Interviewed by The Associated Press (USA), the AFP (France), New Scientist (UK), Dagens Nyheter (Sweden), LA Times (USA), Vox (USA), La Vanguardia (Spain), TBS eFM Radio (Korea), Weekendavisen (Denmark), among others.

Article by the Associated Press. Study offers new look at why our brains evolved to be so big. https://apnews.com/7fe4e81cbb114ee2adf42c6e49f19b45/Study-offers-new-look-at-why-our-brains-evolved-to-be-so-big

Article by LA Times. Can simulating evolution on a computer explain our enormous brains? http://www.latimes.com/science/sciencenow/la-sci-sn-human-brain-evolution-20180523-story.html

Article by Vox. Why do humans have such huge brains? https://www.vox.com/science-and-health/2018/5/23/17377200/human-brain-size-evolution-nature

Article by New Scientist. We may have got the evolution of our big brains entirely wrong. https://www.newscientist.com/article/2169862-we-may-have-got-the-evolution-of-our-big-brains-entirely-wrong/

Radio interview by TBS eFM Radio This Morning program. http://cdn.podbbang.com/data1/tbsadm/thism180529002.mp3

2017 Interviewed by PBS Newshour (USA). Why did humans evolve big brains? We don't know, but math can help. http://www.pbs.org/newshour/rundown/humans-evolve-big-brains-dont-know-math-can-help/

ScienceDaily. How big brains evolved could be revealed by new mathematical model. https://www.sciencedaily.com/releases/2017/03/170309142339.htm

EOS Wetenschap. Wiskundig model helpt de evolutie van grote breinen beter begrijpen. https://www.eoswetenschap.eu/psyche-brein/wiskundig-model-helpt-de-evolutie-van-grote-breinen-beter-begrijpen

ANSA Scienza&Tecnica. Un modello matematico ricostruisce l'evoluzione dei grandi cervelli. http://www.ansa.it/canale_scienza_tecnica/notizie/fisica_matematica/2017/03/10/un-modello-matematico-ricostruisce-levoluzione-dei-grandi-cervelli-_1be94a2f-bcb9-43d5-a0ea-e70c8e7d6e46.html

2013 Nature World News. How manipulation becomes altruism: a study. http://www.natureworldnews.com/articles/3548/20130820/manipulation-becomes-altruism-study.htm

Business Standard. Altruism may have origins in manipulation. http://www.business-standard.com/article/news-ani/altruism-may-have-origins-in-manipulation-113082000973_1.html

Science World Report. The evolution of manipulation: altruism created by manipulated behaviour. http://www.scienceworldreport.com/articles/8899/20130819/evolution-manipulation-altruism-created-manipulated-behavior.htm

Der Standard. Manipulation könnte Wurzel für selbstloses Verhalten sein. http://derstandard.at/1376533943228/Manipulation-koennte-Wurzel-fuer-selbstloses-Verhalten-sein