

# MAURICIO GONZÁLEZ-FORERO

21 OCTOBER 2021

Research Fellow  
School of Biology  
University of St Andrews  
Dyers Brae House  
St Andrews, UK, KY16 9TH  
Email: mgf3@st-andrews.ac.uk  
Website: mgforero.info  
Twitter: @MauricioGForero

## EDUCATION

- 2007 – 2013 **PhD** in Ecology and Evolutionary Biology  
University of Tennessee, Knoxville, USA.  
Thesis: Evolution of acquiescence to manipulation.  
Advisor: Sergey Gavrilets.
- 1999 – 2006 **BSc** in Biology  
University of Antioquia, Medellín, Colombia.  
Thesis: Species: a mathematical formalization.  
Advisors: Luís Fernando Echeverri, Joao Muñoz, and Ricardo Callejas.

## RESEARCH POSITIONS

- 2018-2023 **Research Fellow**  
Supervisor: Andy Gardner  
University of St Andrews, UK.
- 01/05/2020-  
31/07/2020 ~3.8 months of furlough due to increased childcare responsibilities during COVID pandemic.  
Overall, I estimate the pandemic has delayed my work by ~7 months.
- 01/02/2021-  
22/02/2021
- 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  
University of Tennessee, Knoxville, USA.

## TEACHING

- 2019 **Contributing lecturer**  
Delivering 3 1-hour lectures on Social Evolution in the 3rd year “Evolution” course.  
University of St Andrews, UK.
- 2018 **Teaching assistant**  
Grading undergraduate student essays in the “Evolutionary Biology” course.  
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 **Graduate teaching associate**  
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

## RESEARCH GRANTS, AWARDS, AND HONORS

Total awarded (at current exchange rates): ~ 250k Euros.

- 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 of 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.

## PREPRINTS

**González-Forero M**, Gardner. How development affects evolution. Submitted. Preprint: <https://www.biorxiv.org/content/10.1101/2021.10.20.464947v1>.

**González-Forero M**, Gardner. A mathematical framework for evo-devo dynamics. Submitted. Preprint: <https://www.biorxiv.org/content/10.1101/2021.05.17.444499v2>.

## RESEARCH PUBLICATIONS

†**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.

News and views: McElreath, R. (2018) Sizing up human brain evolution. *Nature* 557, 496-497.

**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.

†Contains significant supplementary information.

## 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>

## INVITED TALKS

- 2020 Institute for Advanced Studies, Toulouse, France.
- 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 Center 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.

## CONTRIBUTED CONFERENCE PRESENTATIONS

- 2021 Talk. Evolution conference.
- 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. 3<sup>rd</sup> Economics and Biology Workshop of the Institute of Advanced Study. Toulouse, France.
- 2012 Talk. Society for Mathematical Biology conference. Knoxville, USA.  
Talk. Evolution conference. Ottawa, Canada.
- 2011 Talk. Evolution conference. Norman, OK, USA.

- 2010 Talk. Biocompleti<sup>XI</sup> conference: The evolution of cooperation. Bloomington, USA.
- 2007 Talk. South Eastern Population Ecology and Evolutionary Genetics meeting. Tremont, USA.
- 2005 Poster. European Conference on Mathematical and Theoretical Biology. Dresden, Germany.

#### **ORGANISED WORKSHOPS AND SYMPOSIA**

- 2020 Fellowship writing workshop for School of Biology. 10 speakers from University of St Andrews. University of St Andrews, UK.
- 2019 Co-organizer of the symposium “Life history evolution: bridging theory and data”. The 2019 Congress of the European Society for Evolutionary Biology (ESEB2019), Turku, Finland.

#### **ATTENDED WORKSHOPS**

- 2017 2 workshops. Mean field games, and Numerical methods for optimal control problems. Sapienza Rome, Italy.
- 2015 Workshop. 3<sup>rd</sup> 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 the Amazon, Ecuador.

#### **ADDITIONAL FUNDING**

- 2015 Travel grant. **€500** by the Institute for Advanced Study, Toulouse, France to attend 3<sup>rd</sup> 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 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 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 Biocompleti<sup>XI</sup>.  
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 MBI to attend the MBI Summer Graduate Program.  
Travel grant. **US\$ 800** by the Department of Ecology and Evolutionary Biology of UTK to attend the SFI Summer School and the MBI Summer Program. Declined.
- 2005 Undergraduate thesis improvement grant. ~**US\$30** by the Research Development Committee (CODI) of the Universidad de 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 ECMBT and SMB conference in Dresden, Germany.

#### **CONTRIBUTIONS TO DIVERSITY**

2019 — Postdoctoral representative for the Biology Equality and Diversity Committee, School of Biology,  
2021 University of St Andrews. Co-leading neurodiversity initiative.

#### REVIEWER FOR

*American Naturalist, Biological Reviews, Evolution, Journal of Theoretical Biology, 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).

#### LANGUAGES

Spanish (native), English (fluent), German (grammar proficient).

#### SELECTED MEDIA COVERAGE

2021 Article by Science Illustrated (Sweden).

2019 Article by the European Commission research press.  
[https://ec.europa.eu/research/infocentre/article\\_en.cfm?artid=50565](https://ec.europa.eu/research/infocentre/article_en.cfm?artid=50565)

Article by Discover Magazine. State of Science: Finding Human Ancestors in New Places.  
<http://discovermagazine.com/2019/january/human-origins>

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](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](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>