

# MAHAN GHAFARI, DPHIL

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*(last updated: 13 Oct, 2024)*

## EDUCATION

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DPhil in Interdisciplinary Bioscience, University College, University of Oxford 2022  
Thesis: “Quantitative analysis of the mode and tempo of virus molecular evolution”  
Supervisors: Aris Katzourakis and Oliver G Pybus

MSc in Physics, Emory University 2018  
Thesis: “Quantitative analysis of adaptive evolution”  
Supervisor: Daniel B Weissman

BSc in Physics, Sharif University of Technology 2015

## EMPLOYMENT AND RESEARCH EXPERIENCE

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Wellcome Trust ECR Fellow, Department of Biology, University of Oxford 2025–

Postdoctoral Researcher, Pandemic Sciences Institute, University of Oxford 2022–2025  
Supervisor: Katrina Lythgoe

Visiting Graduate Student, Department of Genetics, University of Cambridge 2017–2018  
Supervisor: Christopher J Illingworth

Undergraduate Researcher, Department of Physics, Sharif University of Tech. 2014–2015  
Supervisor: Shahin Rouhani

## RESEARCH FUNDING AND SELECTED AWARDS

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Wellcome Trust Early Career Research Fellowship [[link](#)] (£553K) 2025–2030

Accelerating Impact Award, Interdisciplinary Bioscience Doctoral Training Centre, University of Oxford (£4K) May 2022

Doctoral Training Impact Award, jointly awarded by the BBSRC & Oxford University Innovation, University of Oxford (£250) Nov 2021

European Society for Evolutionary Biology conference travel award (£300) Jun 2019

Oxford-Radcliffe Scholarship, University College, University of Oxford (£175K) 2018–2022

Marie Curie Actions Research Fellowship, IST Austria (€146K; Declined) 2018-2022

Communicate Your Science Award, Genetics Society, UK (£250)

Apr 2018

Laney Graduate School Scholarship, Emory University (\$269K)

2015–2018

## PUBLICATIONS

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(In anti-chronological order; \*=equal contribution; †=corresponding author)

### *Peer reviewed*

**Ghafari M**†, Hall M, Golubchik T, Ayoubkhani D, House T et al. (2024) Prevalence of persistent SARS-CoV-2 in a large community surveillance study. *Nature* 626, 1094-1101. [[link](#)]

**Ghafari M**†, Somera M, Sarmiento C, Niehl A, Truve E et al. (2024) Revisiting the origins of the *Sobemovirus* genus: A case for ancient origins of plant viruses. *PLoS Pathogens* 20: e1011911. [[link](#)]

Lythgoe KA, Golubchik T, Hall M, House T, Cahuantzi R, MacIntyre-Cockett G, Fryer H, Thomson L, Nurtay A, **Ghafari M** et al. (2023) Lineage replacement and evolution captured by 3 years of the United Kingdom Coronavirus (COVID-19) Infection Survey. *Proceedings of the Royal Society B* 290: 20231284. [[link](#)]

**Ghafari M**†, Hosseinpour S, Rezaee-Zavareh MS, Dascalu S, Rostamian S et al. (2023) A quantitative evaluation of the impact of vaccine roll-out rate and coverage on reducing deaths: insights from the first 2 years of COVID-19 epidemic in Iran. *BMC Medicine* 21, 429. [[link](#)]

Francisco NM, Wyk SV, Moir M, San J, Sebastiao C, Tegally H, Xavier J, Maharaj A, Neto Z, Afonso P, Jandondo D, Paixão J, Miranda J, David K, Inglês L, Pereira A, Paulo A, Carralero R, Freitas H, Mufinda F, Lutucuta S, **Ghafari M** et al. (2023) Insights into SARS-CoV-2 in Angola during the COVID-19 peak: Molecular epidemiology and genome surveillance. *Influenza and Other Respiratory Viruses* 17: e13198. [[link](#)]

Markov PV, **Ghafari M**, Beer M, Lythgoe K, Simmonds P, Stilianakis NI, and Katzourakis (2023) A The evolution of SARS-CoV-2. *Nature Reviews Microbiology* 21, 361-379. [[link](#)]

**Ghafari M**\*†, Watson OJ\*, Karlinsky A, Ferretti L, and Katzourakis A† (2022) A framework for reconstructing SARS-CoV-2 transmission dynamics using excess mortality data. *Nature Communications* 13, 3015. [[link](#)]

**Ghafari M**, Liu Q, Dhillon A, Katzourakis A, and Weissman DB (2022) Investigating the evolutionary origins of the first three SARS-CoV-2 variants of concern. *Frontiers in Virology* 2: 942555. [[link](#)]

Hinch R, Panovska-Griffiths J, Probert WJ, Ferretti F, Wymant C, Di Lauro F, Baya N, **Ghafari M**, Abeler-Dorner L, and Fraser C (2022) Estimating SARS-CoV-2 Variant Fitness and the Impact of Interventions in England using Statistical and Geo-Spatial Agent-Based Models. *Philosophical Transactions of the Royal Society A* 380: 20210304. [[link](#)]

**Ghafari M**, du Plessis L, Raghvani J, Bhatt S, Xu B, Pybus OG, and Katzourakis A (2022) Purifying selection determines the short-term time dependency of evolutionary rates in SARS-CoV-2 and pH1N1 influenza. *Molecular Biology and Evolution* 39, msac009. [[link](#)]

**Ghafari M**, Pybus OG, Simmonds P, and Katzourakis A (2021) A mechanistic evolutionary model explains the time-dependent pattern of substitution rates in viruses. *Current Biology* 31, 4689-4696e5. [[link](#)]

Dascalu S, Flammer PG, **Ghafari M**, Henson SC, Nascimento R, and Bonsall MB (2021) Engaging Religious Institutions and Faith-Based Communities in Public Health Initiatives: A Case Study of the Romanian Orthodox Church During the COVID-19 Pandemic. *Frontiers in Public Health* 9: 768091. [[link](#)]

**Ghafari M**, Rezaee-Zavareh MS, Dascalu S, and Katzourakis A (2021) Iran's covid-19 vaccination programme: using transparency to build public trust in immunisation. *The BMJ Opinion*. [[link](#)]

**Ghafari M**†, Kadivar A, and Katzourakis A† (2021) Estimates of anti-SARS-CoV-2 antibody seroprevalence in Iran. *Lancet Infectious Diseases* 21, 602-603. [[link](#)]

**Ghafari M**†, Kadivar A, and Katzourakis A† (2021) Excess deaths associated with the Iranian COVID-19 epidemic: A province-level analysis. *International Journal of Infectious Diseases* 107, 101-115. [[link](#)]

**Ghafari M**†, Hejazi B, Karshenas A, Dascalu S, Kadvidar A, Khosravi MA, Abbasalipour M, Heydari M, Zeinali S, Ferretti L, Ledda A, and Katzourakis A† (2021) Lessons for preparedness and reasons for concern from the early COVID-19 epidemic in Iran. *Epidemics* 36, 100472. [[link](#)]

**Ghafari M**\*, Lumby CK\*, Weissman DB, Illingworth CJR (2021) Inferring transmission bottleneck size from viral sequence data using a novel haplotype reconstruction method. *Journal of Virology* 94:10.1128/jvi.00014-20. [[link](#)]

Wikramaratna PS, Paton RS, **Ghafari M**, and Lourenco J (2020) Estimating the false-negative test probability of SARS-CoV-2 by RT-PCR. *Eurosurveillance* 25: 2000568. [[link](#)]

**Ghafari M** and Weissman DB (2019) The expected time to cross extended fitness plateaus. *Theoretical Population Biology*: 129, 54-67. [[link](#)]

**Ghafari M** and Mashaghi A (2017) On the role of topology in regulating transcriptional cascades. *Physical Chemistry Chemical Physics* 19, 25168-25179. [[link](#)]

Holmes CM, **Ghafari M**, Anzar A, Saravanan V, and Nemenman I (2017) Luria-Delbruck revisited: The classic experiment does not rule out Lamarckian evolution. *Physical Biology* 14: 055004. [[link](#)]

**Ghafari M**, Ranjbar M, and Rouhani S (2015) Observation of a crossover in kinetic aggregation of Palladium colloids. *Applied Surface Science* 353, 1143-1149. [[link](#)]

*Preprint/in review*

**Ghafari M**†, Kemp SA, Hall M, Clarke J, Ferretti L et al. (2024) Determinants of SARS-CoV-2 within-host evolutionary rates in persistently infected individuals. *medRxiv* 2024.06.21.24309297. [[link](#)]

Ferretti L, Golubchik T, Di Lauro F, **Ghafari M** et al. (2023) Biased estimates of phylogenetic branch lengths resulting from the discretised Gamma model of site rate heterogeneity. *bioRxiv* 2024.08.01.606208. [[link](#)]

**Ghafari M**, Simmonds P, Katzourakis A (2023) Reconstructing the evolutionary history of human, simian, and prosimian immunodeficiency viruses. *bioRxiv* 2023.06.28.546833. [[link](#)]

Li Y, **Ghafari M**, Holbrook AJ, Boonen I, Amor NMS et al. (2023) The evolutionary history of hepaciviruses. *bioRxiv* 2023.06.30.547218. [[link](#)]

Pekar JE, Lytras S, **Ghafari M**, Magee AF, Parker E, et al. (2023) The recency and geographical origins of the bat viruses ancestral to SARS-CoV and SARS-CoV-2. *bioRxiv* 2023.07.12.548617. [[link](#)]

de Oliveira T, Lutucuta S, Nkengasong J, Morais J, Paxiaco JP, Neto Z, Afonso P, Miranda J, David K, Inglas L, Katzourakis A, **Ghafari M**, Singh L, Tshiabuila D, Martin D, Lessells RJ (2021) A novel variant of interest of SARS-CoV-2 with multiple spike mutations detected through travel surveillance in Africa. *medRxiv* 2021.03.30.21254323. [[link](#)]

### Invited Talks

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TIDE Symposium, Max Planck Institute for Evol. Anthropology, Germany	Apr 2024
Plant Health Institute Montpellier seminar series, France	Apr 2023
TRACE working group, FNIH, USA	Mar 2023
Graduate Student Talks, University of Oxford, UK	Jul 2022
DTP Annual Symposium, Oxford Brookes University, UK	Jun 2022
Interdisciplinary approaches to public health conference, Ian Ramsey Centre, University of Oxford, UK	Mar 2022
5th Uppsala Transposon Symposium, Sweden	Oct 2020
Contemporary Iran Forum, MacMillan Center, Yale University, USA	May 2020
IBC Webinar, University of Oxford, UK	May 2020
Q-bio Summer School Symposium, Colorado State University, USA	Jun 2016

### Contributed Presentations

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Oral, 5 <sup>th</sup> VGE(B) Conference, Wellcome Connecting Science, UK	Nov 2024
Oral, UK International Coronavirus Network Annual General Meeting, UK	Sep 2024
Oral, 31 <sup>st</sup> International Dynamics & Evolution of Human Viruses, Canada	Jun 2024
Oral, 1 <sup>st</sup> International Pandemic Sciences Conference 2023, UK	Jul 2023
Oral, 30 <sup>th</sup> International Dynamics & Evolution of Human Viruses, Germany	Apr 2023
Oral, 4 <sup>th</sup> VGE Conference, Wellcome Connecting Science, UK	Nov 2022
Poster, Epidemics8, virtual	Nov 2021

Oral, 3 <sup>rd</sup> VGE Conference, Wellcome Connecting Science, UK	Sep 2021
Poster, Molecular Basis to Predictability and Control of Evolution Workshop, Nordita Institute, Sweden	Jul 2019
Poster, Stochastic Models of Evolving Populations from Bacteria to Cancer Workshop, ICMS Edinburgh, UK	Jun 2018
Poster, 2 <sup>nd</sup> VGE Conference, Wellcome Connecting Science, Cambridge, UK	Apr 2018
Poster, EGGS 2018, Department of Genetics, University of Cambridge, UK	Mar 2018
Oral, 10 <sup>th</sup> Annual q-bio Conference, Vanderbilt University, USA	Jul 2016

### **Research Supervision**

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Wenyang Lyu, DPhil student (Associate supervisor)	2023-
George Lister, Kornelija Aleksejeva, Christopher Chung, Hannah Lemon (DPhil research project supervisor)	2023
Arushi Dhillon, undergraduate student (Project supervisor)	2022

### **Teaching**

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Guest lectures, Modelling in Global Health (postgraduate level) Centre for Tropical Medicine and Global Health, University of Oxford	2023-2024
Module leader, Statistics & Data Management (postgraduate level) Doctoral Training Centre, University of Oxford	2023
College tutor, Introduction to Statistics and Programming with R University College, University of Oxford	2021-2022
Demonstrator, Infectious Disease Modelling (undergraduate level) Department of Zoology, University of Oxford	2019–2020
Demonstrator, Introduction to Programming (undergraduate level) Department of Zoology, University of Oxford	2019–2020
Demonstrator, Evolutionary Biology and Bioinformatics (postgraduate level) Doctoral Training Centre, University of Oxford	2019
Teaching assistant and assessor, Statistical Physics (postgraduate level) Department of Physics, Emory University	2017
Laboratory Instructor, Introductory Physics (undergraduate level) Department of Physics, Emory University	2016–2017
Teaching assistant and assessor, Statistical Physics (undergraduate level) Department of Physics, Sharif University of Technology	2013–2014

## **Outreach Services**

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Creator and host of Covid Cast podcast, a bi-weekly science podcast in Persian, discussions around covid-19-related research findings	2021
Guest contributor and content-writer on covid-19-related topics for BBC Asian Network, BBC Persian, Euronews Persian, Voice of America, Radio Free Europe, Iran International, and Manoto TV	2020–2021
Mentor, UNIQ+ access programme for students, University of Oxford	2020
Volunteer science teacher, North Cambridge Academy, Schools Plus programme (Cambridge Hub), University of Cambridge, UK	2017–2018
Mentor, Student Educational Experience Development (SEED) programme for under-served students in local Atlanta area, Emory University, USA	2017–2018
Advisory board member, Student Supporters Organization (SSO), Iran	2010–2012

## **Professional Service**

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Alumni interviewer for Emory University, London	2019
Referee for The BMJ, Nature, Nature Ecology and Evolution, Molecular Biology and Evolution, Virus Evolution, PLOS Computational Biology, Nature Communications, International Journal of Infectious Diseases, Tropical Medicine and Health, and Virology Journal	

## **Media Interviews**

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Science – Iranian researchers fear for science after hardline cleric takes important post	Jan 2023
Washington Post – Amid covid surge, Iran cut corners to approve yet-unproven vaccine	Aug 2022
Nature – What Omicron’s BA.4 and BA.5 variants mean for the pandemic	June 2022
New Scientist – Nearly every person in Iran seems to have had covid-19 at least once	Oct 2021
NPR – A new study sheds light on the elusive idea of herd immunity	Oct 2021
University of Oxford News & Events – Coronavirus Epidemics first hit more than 21,000 years ago	Sep 2021