Arnau Quera-Bofarull

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EDUCATION

Ph.D.	Astrophysics, Durham University, UK, 2022
M.S.	Physics, Heidelberg University, Germany, 2017
B.S.	Physics, University of Barcelona, Spain, 2015
B.S.	Mathematics, University of Barcelona, Spain, 2015

RESEARCH EXPERIENCE

2022–	Department of Computer Science, Oxford University, UK Calibration of agent-based models
2022–	Institute of New Economic Thinking, Oxford University, UK Agent-based models for macro-economics
2017-22	Institute for Computational Cosmology, Durham University, UK Development of HPC code to calculate black hole outflows.
2020–	United Nations Global Pulse, USA Modelling the spread of Covid-19 in refugee camps with agent-based simulations.
2020-22	Institute for Data Science, Durham University, UK Main developer of the JUNE codebase, an agent-based model to simulate the spread of Covid-19 with fine grained population data.
2019	Centre for Computational Sciences, Tsukuba University, Japan Modelling of Active Galactic Nuclei accretion discs with HPC simulations.
2019	Centre for Research on Education and Social Justice, York University, UK Application of Machine Learning algorithms to predicting progression to postgraduate studies in England.
2019	Boeing Digital Aviation & Analytics, Germany Computer vision for process tracking in aircraft ground operations.
2018	Ibex Innovations, UK Computer vision for X-ray medical image segmentation.

PUBLICATIONS

Journal Articles [1]

2022 I. Vernon, J. Owen, J. Aylett-Bullock, C. Cuesta-Lazaro, J. Frawley, A. Quera-Bofarull, A. Sedgewick, D. Shi, H. Truong, M. Turner, J. Walker, T. Caulfield, K. Fong, and F. Krauss. Bayesian emulation and history matching of JUNE. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 380(2233):20220039, Oct. 2022

2022† A. Quera-Bofarull, C. Done, C. G. Lacey, M. Nomura, and K. Ohsuga. Qwind3: UV line-driven accretion disc wind models for AGN feedback. *Monthly Notices of the Royal Astronomical Society*, 518(2):2693–2711, Jan. 2023

2022 J. Aylett-Bullock, R. T. Gilman, I. Hall, D. Kennedy, E. S. Evers, A. Katta, H. Ahmed, K. Fong, K. Adib, L. A. Ariqi, A. Ardalan, P. Nabeth, K. von Harbou, K. H. Pham, C. Cuesta-Lazaro, A. Quera-Bofarull, A. G. K. Maina, T. Valentijn, S. Harlass, F. Krauss, C. Huang, R. M. Jimenez, T. Comes, M. Gaanderse, L. Milano, and M. Luengo-Oroz. Epidemiological modelling in refugee and internally displaced people settlements: Challenges and ways forward. *BMJ Global Health*, 7(3):e007822, Mar. 2022

2021† J. Aylett-Bullock, C. Cuesta-Lazaro, A. Quera-Bofarull, A. Katta, K. H. Pham, B. Hoover, H. Strobelt, R. M. Jimenez, A. Sedgewick, E. S. Evers, D. Kennedy, S. Harlass, A. G. K. Maina, A. Hussien, and M. Luengo-Oroz. Operational response simulation tool for epidemics within refugee and IDP settlements: A scenario-based case study of the Cox's Bazar settlement. *PLOS Computational Biology*, 17(10):e1009360, Oct. 2021

2020† J. Aylett-Bullock, C. Cuesta-Lazaro, A. Quera-Bofarull, M. Icaza-Lizaola, A. Sedgewick, H. Truong, A. Curran, E. Elliott, T. Caulfield, K. Fong, I. Vernon, J. Williams, R. Bower, and F. Krauss. June: Open-source individual-based epidemiology simulation. *Royal Society Open Science*, 8(7):210506

2020† A. Quera-Bofarull, C. Done, C. Lacey, J. C. McDowell, G. Risaliti, and M. Elvis. Qwind code release: A non-hydrodynamical approach to modelling line-driven winds in active galactic nuclei. *Monthly Notices of the Royal Astronomical Society*, 495(1):402–412, June 2020

2018† C. Cuesta-Lazaro, A. Quera-Bofarull, R. Reischke, and B. M. Schäfer. Gravitational corrections to light propagation in a perturbed FLRW universe and corresponding weak-lensing spectra. *Monthly Notices of the Royal Astronomical Society*, 477(1):741–754, June 2018

Conference Proceedings

2023† A. Quera-Bofarull, A. Chopra, J. Aylett-Bullock, C. Cuesta-Lazaro, A. Calinescu, R. Raskar, and M. Wooldridge. Don't simulate twice: one-shot sensitivity analyses via automatic differentiation. In *AAMAS*, 2023

2023 A. Chopra, A. Rodríguez, J. Subramanian, A. Quera-Bofarull, B. Krishnamurthy, A. Prakash, and R. Raskar. Differentiable agent-based epidemiology. In *AAMAS*, 2023

2019† J. Bullock, C. Cuesta-Lázaro, and A. Quera-Bofarull. XNet: A convolutional neural network (CNN) implementation for medical x-ray image segmentation suitable for small datasets. In *Medical Imaging 2019: Biomedical Applications in Molecular, Structural, and Functional Imaging*, volume 10953, pages 453–463. SPIE, Mar. 2019

[1] †First author contribution

INVITED TALKS

2020 "JUNE: Modelling the spread of Covid-19 in England". Public Health England modelling group, Cambridge, UK. Jul 3.

2020 "Simulating UV line-driven winds in AGNs." Hokkaido University, Japan. Feb 5.

2019 "Computer vision for X-ray medical image segmentation." Rutherford Appleton Laboratory, UK, Mar 5.

Campus Talks

2021 "10 reason why I use (and love) Julia" Institute for Computational Cosmology, Durham, UK, Mar 29.

2019 "Deep Learning and graph networks" Institute for Data Science, Durham, UK, Oct. 17

2018 "Simulating AGN feedback." Institute for Computational Cosmology, Durham, UK, Dec 18.

CONFERENCE ACTIVITY

Talks

2022 "JUNE: large-scale agent-based modelling" Conference on Complex Systems. Palma de Mallorca, Spain.

2021 "UV line-driven winds: Dependence on black hole properties." Black hole accretion disc winds. Durham, UK.

2019 "Computer vision for X-ray medical image segmentation." Beyond the Lab. Edinburgh, UK.

Poster presentations

2019 "UV line-driven winds". Feedback and its role in galaxy formation. Spetses, Greece.

Sessions Organized

2021 STFC Data Intensive Science Summer School 2021. Durham, UK.

GRANTS AND AWARDS

Awards and Honors

2021 RAMP Early Career Investigator Award (RECIA), Royal Society

2020 Department of Physics Award for Excellence 2020, Durham University

2019 No-Bull award (Carmen Optimization Workshop), Boeing

Grants and Fellowships

2019 JSPS Short Term Pre/Postdoctoral Fellowship (£6,500).

2017- STFC CDT Scholarship

TEACHING

Oxford University

Electromagnetism (2022)

Durham University

Planets and Cosmology (2017,2018,2020)

Version control with Git (2020, 2021)

OUTREACH

2019 "Changing Cosmic Percetions". Durham, UK.

2018,19 "Celebrate Science". Durham, UK.

2018 "From Atoms to Galaxies". Durham, UK.

LANGUAGES

Catalan (Native)

English (Fluent)

German (Intermediate)

Japanese (Elementary)

Spanish (Native)

Updated March 2023