

Ana I.R. Bento

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Employment

Odum School of Ecology, University of Georgia

Athens, GA, USA

POSTDOCTORAL RESEARCH ASSOCIATE WITH PROF. PEJMAN ROHANI

2015 - PRESENT

- Ecology, Immunology and Evolution of childhood diseases. Developing mathematical and statistical models to provide a coherent link between theory and data to explain disease transmission and effects of strategic control policies

Infectious Disease Epidemiology, Imperial College London

St Mary's Campus, London, UK

MRC POSTDOCTORAL RESEARCH FELLOW WITH PROF. CHRISTL DONNELLY, FRS, OBE

2012 - 2015

- Modeling herd dynamics and bovine tuberculosis transmission in the context of vaccine strategies
- Studying emerging infectious diseases - PREDEMICS consortium - Preparedness, Prediction and Prevention of Emerging Zoonotic Viruses with Pandemic Potential using Multidisciplinary Approaches

Education

Imperial College London

Silwood Park, Ascot, UK

PHD ECOLOGY. ADVISOR: PROF. MICK CRAWLEY, FRS

2012

- Thesis: Climate variation, plant productivity, herbivore performance and population dynamics
- Brief Synopsis of Research: Determining the direct and indirect effects of local weather on forage productivity and the ecology of red deer on Rum and Soay sheep on St.Kilda and elucidating changes in fitness and the role of phenological change in the contrasting population dynamics

Imperial College London

S. Kensington, London, UK

BSC (HONORS) & ARCS IN BIOLOGY. HONOURS THESIS ADVISOR: PROF. TIM COULSON

2007

- Upper Second Class Honours

Publications

PUBLISHED

- 2019** Bento, A.I., Donnelly, C.A. (2019) Epidemiological impact of control and immunisation activities on within-herd bovine tuberculosis outbreaks. Forthcoming in *Scientific Reports*
- 2018** Bento, A.I., Riolo, M.A., Choi, Y.H., King, A.A. & Rohani, P. (2018) Core Pertussis transmission groups in England and Wales: A tale of two eras. *Vaccine* 36(9):1160-1166. doi.org/10.1016/j.vaccine.2018.01.046
- Bento, A.I., King, A.A. & Rohani, P. (2018) Quantifying relative role of age groups under differing pertussis transmission scenarios. *BioRxiv* doi:https://doi.org/10.1101/247007
- 2017** Bento, A.I., King, A.A. & Rohani, P. (2017) Maternal pertussis immunisation: clinical gains and epidemiological legacy. *Eurosurveillance* 22(15):30510. doi:10.2807/1560-7917.ES.2017.22.15.30510
- Garnier, R., Bento, A.I., Pemberton, J.M. & Graham, A.L. (2017) Physiological proteins in resource-limited herbivores experiencing a population die-off. *The Science of Nature* 104(7):68-72. doi:10.1007/s00114-017-1490-4
- 2016** Bento, A.I., Rohani, P. (2016) Forecasting epidemiological consequences of maternal immunization. *Clinical Infectious Diseases* 63(Suppl 4):S205-S212. doi:10.1093/cid/ciw557
- Finnie, T.J.R., Bento, A.I., South, A., Sherrard-Smith, E. & Jombart, T. (2016) EpiJSON: A unified data-format for epidemiology. *Epidemics* 15:20-26. doi:10.1016/j.epidem.2015.12.002
- 2015** Van Kerkhove, M.D.*, Bento, A.I.*, Mills, H.L., Ferguson, N.M. & Donnelly, C.A. (2015) A review of epidemiological parameters from Ebola outbreaks to inform early public health decision-making. *Scientific Data* 2:150019. doi: 10.1038/sdata.2015.19 (* joint first authors)

- 2015** Donnelly, C.A.*, **Bento, A.I.***, Goodchild, A.V. & Downs, S.H. (2015) Exploration of the power of routine surveillance data to assess the impacts of industry-led badger culling on bovine tuberculosis incidence in cattle herds. *Veterinary Record* 177(16):417-420. doi:10.1136/vr.103201 (* joint first authors)
- 2014** Stopher K.V., **Bento A.I.**, Clutton-Brock T.H., Pemberton J.M. & Kruuk L.E.B. (2014) Multiple pathways mediate the effects of climate change on maternal reproductive traits in a red deer population. *Ecology* 95:3124-3138. doi:10.1890/13-0967.1
- 2011** **Bento A.I.**, Wilson A.J. (2011) Counting Sheep in a changing world. *Biodiversity Science* 4:1 <https://www.biodiversityscience.com/2011/11/01/counting-sheep-changing-world/>

SCIENTIFIC REPORTS

- 2015** **Bento, A.I.**, Donnelly, C.A. (2015) Impact of immunisation activities on within-herd bovine tuberculosis outbreaks. *Defra* Final Report SE3130: 35 Pages.
- 2013** **Bento, A.I.**, Donnelly, C.A. (2013) Impact of immunisation activities on within-herd bovine tuberculosis outbreaks. *Defra* Interim Report SE3130: 20 Pages.

MANUSCRIPTS SUBMITTED OR IN REVIEW

- 2019** Garnier R., **Bento A.I.**, Rohani P., Omer, S.B. & Bansal, S. Feeding the disparities: the geography and trends of breastfeeding in the United States. (in review)
- 2019** **Bento, A.I.**, Pemberton J.M., Clutton-Brock T.H., Coulson T.M. & Crawley M.J. *The grass is greener on the other side: Density feedbacks mediate effects of environmental change on Soay sheep survival.* (submitted)

NEARING SUBMISSION

- Bento A.I.**, King, A.A., Taujale, R., Bosch, T. & Rohani, P. *Bordetella pertussis* epidemiology, transmission and evolution in the vaccine era.
- Bento, A.I.**, Bansal, S., Omer, S.B. & Rohani, P. Heterogeneous vaccination and herd immunity erosion across scales.
- Linz B., **Bento A.I.**, Weigand M., Tondela M.L., Soumana I.H. & Harvil E.T *Competitive advantage of B. holmesii in highly pertussis-vaccinated populations.*

Awards & Grants

- 2019 **Georgia CTSA**, Submitted in collaboration with Pejman Rohani
- 2018 **NSF 2026 Big Ideas Competition**, Submitted in collaboration with John Drake and Sonia Altizer
- 2017-2021 **MIDAS Vaccine hesitancy - named postdoc** \$610K UGA, PI S. Bansal, Georgetown
- 2017 **Postdoctoral Research Award** \$2000, University of Georgia
- 2017 **Postdoctoral Fellowship- short listed**, Life Science Research Foundation
- 2016 **Travel grant** \$1000, from EEID, UGA for EEID Annual Meeting at Cornell University
- 2013 **Travel grant** £800, British Ecological Society for INTECOL congress
- 2012-2015 **Postdoctoral Fellowship** £481K, DEFRA - Transmission Modelling of Cattle Vaccination at a Herd Level
- 2011 **Travel grant** £750, British Ecological Society
- 2009-2011 **Teaching award** £100, Silwood Park, Imperial College UK
- 2010-2011 **Best student presentation award** £100, Macaulay Institute, Aberdeen, UK

2008-2012 **NERC-CASE studentship grant** £15K/ year, Phd studentship grant, Imperial College London
 2006 **BBSRC (UROP) summer grants** £2000, Undergraduate Research Project, Imperial College London
 2004 **BBSRC (UROP) summer grants** £2000, Undergraduate Research Project, Natural History Museum, London
 2003 **BBSRC (UROP) summer grants** £2000, Undergraduate Research Project, Imperial College London

Presentations

INVITED SPEAKER

<p>2019 College of Veterinary Medicine, Evolutionary signatures of disease re-emergence Biological Sciences, Evolutionary signatures of disease re-emergence School of Public Health, Understanding disease reemergence Department of Mathematics & Statistics, Dynamical signatures of disease reemergence School of Public Health, Bayesian approaches to assess & evo-epidemiological impacts on disease</p> <p>2018 Biology Department, Understanding disease reemergence through evolutionary signatures EDGE (Enthusiasts of Genetics Diversity & Evolution), Phylodynamic models of <i>B. pertussis</i> transmission RIVM : Netherlands Public Health, Drivers of evolution of <i>B. pertussis</i> Champalimaud Foundation, Re-emerging childhood diseases MIDAS (Models of Infectious Disease Agent Study) annual meeting, Integrating parallel data streams to understand disease resurgence</p> <p>2017 Odum School 50th Anniversary, Puzzling pertussis Bordetella symposium, <i>B. pertussis</i> evolution in the vaccine era</p>	<p><i>Univ. of Illinois</i> <i>UNC</i> <i>Indiana University</i> <i>Univ. of Vermont</i> <i>Georgia State Univ.</i> <i>SFSU</i> <i>Genetics, UGA</i> <i>The Netherlands</i> <i>Portugal</i> <i>Bethesda, MD</i> <i>UGA</i> <i>UGA & CDC</i></p>
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CONTRIBUTED TALKS

<p>2018 ESA (Ecological Society of America) annual meeting, <i>B. pertussis</i> evolution in the vaccine era EEID (Ecology and Evolution of Infectious Diseases) Conference, Integrating parallel data streams to identify drivers of <i>B. pertussis</i> resurgence</p> <p>2017 ESA annual meeting, Pertussis epidemiology, transmission & evolution in the vaccine era EEID conference, Covariates of <i>B. pertussis</i> selection</p> <p>2016 ESA annual meeting, Predicting the relative role of age groups in pertussis dynamics</p> <p>2013 INTECOL (International Association for Ecology) meeting, Effects of weather and phenology on primary production</p> <p>2011 BES (British Ecological Society) annual meeting, Weather effects on Soay Sheep demography</p> <p>2010 BES annual meeting, Weather impacts on ecological processes</p>	<p><i>New Orleans, LA</i> <i>Glasgow, UK</i> <i>Portland, OR</i> <i>Santa Barbara, CA</i> <i>Fort Lauderdale, FL</i> <i>London, UK</i> <i>Sheffield, UK</i> <i>Leeds, UK</i></p>
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Teaching

COURSE ORGANIZER

<p>2018 ECOL 8540 Scientific Programming, Graduate level, ILS</p> <p>2017 Intro to programming in R, Graduate level, Interdisciplinary Disease Ecology Across Scales program</p> <p>2015 Introduction to Machine Learning, MPH (Imperial College)</p> <p>2014 Mathematical modelling for the control of infectious diseases, Short course for public health professionals</p>	<p><i>UGA</i> <i>UGA</i> <i>Imperial College</i> <i>Imperial College</i></p>
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COURSE INSTRUCTOR

<p>2009-2014 Generalised Linear Modeling in R, Graduate level, Instructor for Prof. Mick Crawley</p> <p>2009-2012 Conservation Discussions, Tutor, MSc. In Conservation Ecology</p> <p>2008-2010 Introduction to computing in R, Undergraduate level, Instructor for Dr Tilly Collins</p>	<p><i>Imperial College</i> <i>Imperial College</i> <i>Imperial College</i></p>
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GUEST LECTURER

<p>2018 Ecol8515 Modeling Infectious Diseases, School of Public Health, Graduate Epidemiology course</p> <p>2018 Ecol 8030, Graduate Ecology course, Odum School of Ecology</p> <p>2013-2015 MSc. Public Health, Modeling infection diseases, Dept Infectious Disease Epidemiology</p> <p>2013 Matrix population models, II Southern-Summer School on Mathematical Biology - Brazil</p> <p>2012-2015 Infectious disease modeling, Population and Community Ecology, final year Biology BSc.</p> <p>2013 Introduction to Mathematical Models of Epidemiology & Control of Infectious Diseases, IDE</p>	<p><i>UGA</i> <i>UGA</i> <i>Imperial College</i> <i>UNESP</i> <i>Imperial College</i> <i>Imperial College</i></p>
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Research Mentoring & Supervision

2019	Hakon Jones , Research Assistant, Ecology UG student	UGA
2017-2018	Shahab Razvi , Research Assistant, Physics PhD student	UGA
2017	Yue Yun , ILS PhD rotation student	UGA
2016	Jonathan Waring , Population Biology of Infectious Diseases, Research Exp. Undergraduates (REU) program	UGA
2016	Jesus Cantu , Population Biology of Infectious Diseases REU program	UGA
2011	Emmanuela Karametta , MSc Conservation at Silwood Park	Imperial College

Ongoing External Collaborations

***Bordetella holmesii* evolution**

Infectious Diseases, UGA, USA

DR. BODO LINZ, PROF. ERIC HARVIL

September 2018 - PRESENT

- Understanding the impact of *B. pertussis* vaccination on *B. holmesii* evolution.

Evolution of resistance of influenza virus to Oseltamivir

Multi-Institution, USA

PROF. SAM SCARPINO & PROF. KATIA KOELLE

August 2018 - PRESENT

- Computationally test the hypothesis that increased HA binding avidity is associated with increased rates of Oseltamivir resistance.

***Bordetella pertussis* evolution**

RIVM, Bilthoven, The Netherlands

DR. THIJS BOSCH

June 2018 - PRESENT

- I am working with scientists at RIVM to develop a pertussis mechanistic model.
- I am using RIVM's extensive spatial explicit long term epidemiology and pathogen sequence data.

Influenza viral attributes

CVI, UGA, USA

DR. JAZMINA LUCZO & PROF. MARK THOMPSON

May 2018 - PRESENT

- Identification of attributes which influence tropism, pathogenicity, and evolution of influenza viruses.

Drivers of pertussis seasonality in Brazil

UNESP, São Paulo, Brazil

PROF. CLAUDIA PIO

December 2017 - PRESENT

- Climatic, epidemiological and demographic drivers of seasonality.

Computational Skills

Programming R, C, Python, Matlab, Perl, JavaScript, HTML5, CSS, JSON, XML, LaTeX

Software user BEAST, ArcGIS, BLAST, GATK, Picard Tools, SQL, MS Access, github

Software dev EpiJSON R (CRAN) package and bTB Cattle Risk application for the field for DEFRA (UK)

Workshops

Phylodynamics models

Odum School, UGA

INVITED WORKSHOP FOR CEID

2017

- Ran a CEID workshop in applications of phylodynamics models.

Hackout 2

Imperial College London, UK

CO - ORGANIZER GRAPHICAL RESOURCES FOR INFECTIOUS DISEASE EPIDEMIOLOGY IN R

2015

- Developed EpiJSON in a team, as part of the workshop.

Hackout

Imperial College London, UK

CO - ORGANIZER HACKATHON FOR THE ANALYSIS OF DISEASE OUTBREAKS IN R

2013

- Exploring ways of analyzing outbreak data.

Fieldwork Experience

2013-2015	Badger mark-recapture , Oxfordshire and Cornwall, UK	UK
2008-2015	Vegetation sampling and identification techniques , St Kilda, Isle of Rum, Parkgrass	UK
2008-2015	Soay sheep and deer mark-recapture , St Kilda & Isle of Rum	UK

Institutional Service

Advisory Board Member, Center for the Ecology of Infectious Diseases, UGA

2017-PRESENT

Section Officer, ESA Disease Ecology Section

2017-PRESENT

Board Member, Postdoctoral Association, UGA

2016-PRESENT

Judge, Odum School of Ecology: Graduate Student Symposium

2016-2019

Co-organizer, DIDE seminar series, Imperial College London

2014-2015

Recruitment & Retention for Diversity in STEM Service

Committee member, Diversity and Inclusion Committee, Odum School of Ecology, UGA

2018-2019

Safe Space Training, Microaggression Workshop at UGA

2018

Founding member, R-ladies Athens

2018-2019

Founding member, 500 Women Scientists Athens pod

2018

Mentor, WISci Mentoring program - I currently mentor 2 undergraduates & 1 graduate student

2016-PRESENT

Committee member, Athena Swan application (advancing gender equality in academia), Imperial College

2014

Outreach - Diversity in STEM

KIDS IN STEM

2018-2019 Skype a Scientist, Skype k-12 Schools to talk about science

Worldwide

2015-2019 Girls Who Code, Running after-school coding club for 6-12 year-olds

Athens, GA

2008-2015 Code Club, Ran weekend coding club for 9-13 year-olds in Lewisham

London, UK

2003-2007 Code Club, Ran weekend coding club for 9-13 year-olds in Wansdworth

London, UK

2013 The life game, MRC centenary: We ran a "who infect whom" game for 6-12 year-olds at the Nat Hist Museum

London, UK

WOMEN IN STEM

2018-2019 R-Ladies, President and co-founder of R-Ladies chapter

Athens, GA

2014-2015 Lean in circle, As a part of the Athena qualifications for the IDE at Imperial

Imperial College

Academic Service

Reviewer, Journal of Animal Ecology, Applied Ecology, Epidemics, PLoS Computational Biology, Proceedings of the Royal Society B., Vaccine, Nature Scientific Reports, Journal of Theoretical Biology, Royal Society Open Science, Open Forum Infectious Diseases

Abstract translator, The American Naturalist

Memberships

American Society of Naturalists, Ecological Society of America, British Ecological Society, European Platform of Women Scientists, R-ladies global, WISci (UGA), Women Who Code, 500 Women Scientists.

Languages

English (Fluent), Portuguese (native), Spanish (native), French (proficient)

References

Prof. Pejman Rohani

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- Odum School of Ecology, UGA, Athens GA, USA

Prof. Mick Crawley, FRS

M.CRAWLEY@IMPERIAL.AC.UK | PHONE: +44 (0)20 7594 2216

- Imperial College London, Silwood Park, UK

Prof. Aaron King

KINGAA@UMICH.EDU | PHONE: +1 734 936 7861

- University of Michigan, Ann Arbor, MI, USA