Dr. Willem Bonnaffé

Postdoctoral data scientist
Big Data Institute, Old Road Campus
Oxford, OX3 7LF, UK
00447874035210
willem.bonnaffe@nds.ox.ac.uk

WORK

2021-2023	**Postdoctoral Data Scientist** Morpho-molecular signature of prostate cancer Image analysis - Multi-instance learning - Segmentation	**University of Oxford** Big Data Institute
2021 4 months	**Research assistant in AI & remote sensing** Building ML tools to analyse forest canopy drone imagery Image processing - Image recognition - Classification	**University of Oxford** Department of Zoology
2020-2022	**Director & Lead on AI solutions** AI solutions to predict weather disruptions in ports Won 2020 Oxford AI impact hackathon for climate change	**Eltanin Martime Analytics** & Oxford University Innovation
2016-2017 10 months	**Research assistant in Mathematical Biology** *Modelling evolution of tropical fish communities* Bayesian modelling - MCMCMH/HMC - IBMs	**University of Arizona** Ecology and Evolutionary Biology Dpt.

EDUCATION

2017-2021	**DPhil in AI & Environmental Sciences** *Inferring eco-evolutionary feedbacks in nature* Expertise in AI analysis of time series data	**University of Oxford** NERC DTP & Department of Zoology Pr. B. Sheldon & Pr. T. Coulson
2013-2017	**Diploma in Socio-Environmental Sciences** Expertise in water and fish stock management Policy assessment - Agent-based modelling	**Ecole normale supérieure Ulm** Environmental Research and Teaching Institute
2013-2016	**MSc in Evolutionary Biology** $1^{st}/49$ written exams - Highest honors Advanced training in stat./mathematical modelling	**Ecole normale supérieure Ulm** & **Université Pierre et Marie Curie**
2009-2013	**BSc in Medical & Life Sciences** $5^{th}/505$ written exams - High honors General training in Chemistry, Physics, Biology	**Université Pierre et Marie Curie**

SKILLS

I.T.	Vim - LaTeX - Beamer - Word - Excel - Powerpoint
Programming	R - C/C++ - Bash - Python - NetLogo - MatLab - Julia - Mathematica
Machine learning	Classification - Time series - NODEs - ResNets - RNNs - CNNs
Languages	French/English - German (basics) - Dutch (basics)
Skills	Jazz guitar, performance, composition - Impressionist soft pastel painting - Fly fishing

CONFERENCES

2022 Dec.	**Human-AI interaction in healthcare** Co-organizer with Dr. Yang Hu	**The Alan Turing Institute** Oxford
2021 Dec.	**BES meeting** Poster (*Fast NODE fitting*)	**British Ecological Society** London
2020 Dec.	**Festival of Ecology** Speaker (*Eco-evo feedbacks in Darwin's finches*)	**British Ecological Society** London
2020 Oct.	**Evol. Demogr. Society's 7th annual meeting** Invited speaker (*AI applied to Evol. dynamics*)	**Norwegian University of Sc. and Tech.** Centre for Biodiversity Dynamics
2018 Dec.	**NERC grand challenges seminar series** Co-organized conference on Science and Politics	**University of Oxford** NERC DTP & Jesus College
2017 June	**Trophic network research showcase** Speaker (*Trophic networks and thermal gradients*)	**Université Pierre et Marie Curie** Institute of Ecology and Environmental Sc.
2017 April	**Uncertainity Quantification showcase** Speaker (*Bayesian analysis of ecological data*)	**University of Arizona** Department of Mathematics

TEACHING

2020 2 weeks	**Demonstrator in doctoral course** Machine learning modules	**University of Oxford** Doctoral Training Center
2019-2020 6 months	**Tutor and demonstrator in undergrad. course** Quantitative methods (2nd year BSc in Biology)	**University of Oxford** Dpt. of Zoology
2018 6 weeks	**Demonstrator in doctoral course** Quantitative and computational methods	**University of Oxford** NERC DTP

EXPERIENCE

2016 5 months	**Internship in System Biology** *Trophic network topology along thermal gradients* Network theory - statistical modelling - bib. review	**Université Pierre et Marie Curie** Institute of Ecology and Environmental Sciences
2015 4 months	**Internship in Computational Biology** *Fisheries and trout meta-population dynamics* Agent-based models C_{++} - numerical simulations	**Ecole normale supérieure Ulm** Environmental Research and Teaching Institute
2014-2015 6 months	**Internship in Functional Ecology** *Ontogeny of body colouration in lizards* Spectrophotmetry - statistical modelling	**Université Pierre et Marie Curie** Institute of Ecology and Environmental Sciences
2014 5 months	**Internship in Behavioural Ecology** *Fitness consequences of sociality* Fieldwork - statistical modelling - network theory	**University of Oxford** Department of Zoology
2013 2 months	**Internship in Cognitive Ethology** *Detection of prosocial behaviour in rodents* Supervision of experiments - animal care	**Muséum national d'histoire naturelle** Laboratoire d'Ethologie Cognitive et Comparée

PUBLICATIONS

2023	*Inferring eco-evolutionary feedbacks from time series data with nonparametric Geber and Price equation* W. Bonnaffé & T. Coulson	In prep.
2023	*Beyond attention: deriving biologically interpretable insights from trained models* W. Bonnaffé et al.	Under review for MICCAI conference
2023	*Fast fitting of neural ordinary differential equations by Bayesian gradient matching to infer ecological interactions from time series data* W. Bonnaffé & T. Coulson	Methods in Ecology and Evolution (accepted with minor revision)
2022	*Single chain differential evolution Monte-Carlo for self-tuning Bayesian inference* W. Bonnaffé	arXiv
2021	*Species richness and network structure jointly drive total biomass and its temporal stability in fish communities* A. Danet, E.Thebault, W. Bonnaffé, M. Mouchet & O. Collin	Ecology Letters
2021	*Neural ordinary differential equations for ecological and evolutionary time series analysis* W. Bonnaffé, B.C. Sheldon & T. Coulson	Methods in Ecology and Evolution
2021	*Comparison of size-structured and species-level trophic networks reveals antagonistic effects of temperature on vertical trophic diversity at the population and species-level* W. Bonnaffé, S. Legendre, A. Danet, & E. Edeline	Oikos
2018	*Ontogenetic trajectories of body colouration reveal its function as a multicomponent non-senescent signal* W. Bonnaffé et al.	Ecology and Evolution