

# DR. ANTHONY CARAVAGGI

University of South Wales, 9 Graig Fach, Pontypridd CF37 4BB

**E-mail:** anthony.caravaggi@southwales.ac.uk | **Website:** <http://arcaravaggi.github.io>

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## CAREER HISTORY

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Date	Job Title	Department	Organisation
2019-	Lecturer in Conservation Biology	Applied Sciences	University of South Wales
2017-19	Postdoctoral Researcher	School of BEES	University College Cork
2017-18	Visiting Research Fellow	Biological Sciences	Queen's University Belfast

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## EDUCATION

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Date	Qualification	Topic	Organisation
2016	PhD	Conservation biology	Queen's University Belfast
2011	MRes	Biodiversity and conservation	University of Leeds
2009	BSc (Hons)	Zoology with conservation	Bangor University

### *Professional activities*

Associate Editor	<i>Remote Sensing in Ecology and Conservation.</i>
Peer reviewer	<i>African Journal of Ecology; Austral Ecology; Behavioural Ecology and Sociobiology; Biological Conservation; Bird Study; Canadian Journal of Zoology; Diversity and Distributions; Global Change Biology; Journal of Natural History; Journal of Zoology; Mammal Communications; Mammal Research; Mammal Review; PeerJ; PLOS One; Remote Sensing in Ecology and Conservation; Ringing and Migration; The European Zoological Journal; Zoo Biology.</i>
Funding review	British Ecological Society Grant Review College (2015 – present); Croatian Science Foundation; Alberta Conservation Association.
Consultant	The Hen Harrier Reintroduction Project (University of Exeter and Natural England); IUCN Outlook Assessment for Gough and Inaccessible Islands World Heritage Site.

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## RESEARCH

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I employ field and data-based experiments and analyses to answer specific questions relating to the ecology of species and ecological communities to inform conservation, management and policy-related processes. My current work is broadly interdisciplinary, highly collaborative and includes analyses of activity patterns, landscape-scale habitat and distribution modelling and an assessment of wildlife management practises.

**Research Interests** Conservation biology; invasive species; population & community ecology; movement & spatial ecology; rare and endangered species; sustainability; rewilding; citizen science; remote sensing.

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## PUBLICATIONS

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### *Peer-reviewed journals*

- 2020 Farrell S, Noble PJ-M, Linchbeck GL, Brant B, **Caravaggi A**, Singleton DA, Radford AD. (*in press*) Risk factors for myxomatosis in pet rabbits in Great Britain. *Journal of Veterinary Science*.
- Caravaggi A**, Irwin S, Lusby J, Mee A, Nagle T, McCarthy A, O'Halloran J. (*in press*) Forest management and Hen Harrier *Circus cyaneus* conservation in Ireland. *Irish Birds*.
- Caravaggi A**, Irwin S, Lusby J, Ruddock M, Mee A, Nagle T, O'Halloran J (*in press*) Anthropogenic pressures within the breeding range of the Hen Harrier (*Circus cyaneus*) in Ireland. *Bird Study*.
- 2019 **Caravaggi A**, Irwin S, Lusby J, Ruddock M, O'Toole L, Mee A, Nagle T, O'Neill S, Tierney D, O'Halloran J. (2019) Factors influencing Hen Harrier, *Circus cyaneus*, territory site selection and breeding success. *Bird Study*. 66:366-377.
- Hayward M, Scanlon RJ, Callen A et al. including **Caravaggi A**. Reintroducing rewilding to restoration – Rejecting the search for novelty. *Biological Conservation*. 233:255-259.
- 2018 **Caravaggi A**, Vallye M-C, Hogg K, Freeman M, Fadaei E, Reid N, Dick JTA, Tosh D. Seasonal and predator-prey effects on circadian activity of free-ranging mammals revealed by camera traps. *PeerJ*. 6:e5827
- Caravaggi A**, Cuthbert RJ, Ryan RG, Cooper J, Bond AL. The cumulative impacts of introduced house mice on the breeding success of nesting seabirds on Gough Island. *Ibis*. doi: 10.1111/ibi.12664.
- Caravaggi A**, Plowman A, Wright D, Bishop C. The composition of captive ruffed lemur (*Varecia* spp.) diets in UK zoological collections, with reference to the problems of obesity and iron storage disease. *Journal of Zoo and Aquarium Research*. 6: 51-49.
- Havlin P, **Caravaggi A**, Montgomery WI. The diet and abundance of an introduced insular population of Red-Necked Wallabies, *Macropus rufogriseus*. *Canadian Journal of Zoology*. 96(4): 357-365.
- 2017 O'Halloran J, Kelly TC, Quinn JL, Irwin S, Fernández-Bellón D, **Caravaggi A**, Smiddy P. Current ornithological research in Ireland: seventh Ornithological Research Conference, UCC, November 2017. *Irish Birds*. 10: 598–638.
- Caravaggi A**, Montgomery WI, Reid N. Management and control of invasive brown hares (*Lepus europaeus*): contrasting attitudes of selected environmental stakeholders and the wider rural community. *Proceedings of the Royal Irish Academy: Biology & Environment*. 117B:1-11.
- Tennant JP, Graziotin D, Jacques DC, *et al.*, including **Caravaggi A**. A multi-disciplinary perspective on emergent and future innovations in peer review. *F1000Research*. 6:1151.
- Caravaggi A**, Banks P, Burton C, Finlay CMV, Hayward M, Haswell, PM, Rowcliffe JM, Wood M. A review of camera trapping for conservation behaviour research. *Remote Sensing in Ecology and Conservation*. 3(3): 109-122.

**Caravaggi A.** remBoot: An R package for Random Encounter Modelling. *Journal of Open Source Software*. 2(10).

**Caravaggi A**, Leach K, Santilli F, Rintala J, Helle P, Tiainen J, Bisi F, Martinoli A, Montgomery WI, Reid N. Niche overlap of mountain hare subspecies and the vulnerability of their ranges to invasion by the European hare; the (bad) luck of the Irish. *Biological Invasions*. 19(2): 655-674.

2016 **Caravaggi A**, Zaccaroni M, Riga F, Schai-Braun SC, Dick JTA, Montgomery WI, Reid N. An invasive-native mammalian species replacement process captured by camera trap survey Random Encounter Models. *Remote Sensing in Ecology and Conservation*. 2: 45-58.

2015 **Caravaggi A**, Montgomery WI, Reid N. Range expansion and comparative habitat use of insular, congeneric lagomorphs: invasive European hares *Lepus europaeus* and endemic Irish hares *Lepus timidus hibernicus*. *Biological Invasions*. 17(2): 687-698.

### ***In review***

**Caravaggi A**, Burton CA, Clark DA, Fisher CJT, Grass A, Green S, Hobaiter C, Hofmeester TR, Kalan AK, Rabaiotti D, Rivet D. Potential impacts on animal behaviour should be considered when using camera traps for conservation-oriented studies. *Conservation Science and Practice*.

English H, **Caravaggi A**. The occurrence and distribution of introduced red-necked wallabies (*Notamacropus rufogriseus*) in Britain. *Mammal Review*.

Fernandez-Bellon D, Lusby J, Bos J, Schaub T, McCarthy A, **Caravaggi A**, Irwin S, O'Halloran J. Expert knowledge assessment of threats and conservation for breeding Hen Harrier and Short-eared Owl across Europe. *Bird Conservation International*.

McCarthy A, **Caravaggi A**, Fernandez-Bellon D, Irwin S, Lusby J, O'Halloran J. Bird and small mammal community composition and abundance in upland open habitats and early conifer forests. *Journal of Zoology*.

### ***Book chapters***

2018 **Caravaggi A**. Lagomorpha Life History. In: Vonk J, Shackelford TK (eds.) *Encyclopedia of Animal Cognition and Behavior*. Springer.

**Caravaggi A**. Lagomorpha Navigation. In: Vonk J, Shackelford TK (eds.) *Encyclopedia of Animal Cognition and Behavior*. Springer. doi: 10.1007/978-3-319-47829-6\_1164-1

### ***Technical reports***

2019 McGowan NE, McDermott N, Stone R, Lysaght L, Dingerkus SK, **Caravaggi A**, Montgomery WI, Reid N. National Hare Survey & Population Assessment 2017-2019. Irish Wildlife Manuals, no. 113. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

Irwin S, **Caravaggi A**, McCarthy A, Fernandez-Bellon D, Lusby J, Neville P, O'Halloran J. Supporting Hen Harrier in Novel Environments Final Research Project Report. Report commissioned by the National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

Ball S, **Caravaggi A**, Keogh G, Butler F. Managing hares at Dublin Airport – Annual Review 2018/19. Report produced for the Dublin Airport Authority, Dublin.

- 2018 McGowan N, Dingerkus K, Stone R, **Caravaggi A**, McDermott N, Montgomery WI, Reid N. Hare Survey of Ireland 2018/2019: Interim Report (June) 2018. Report produced for the Department of Arts, Heritage and the Gaeltacht.

### ***Other publications***

- 2019 Hayward M, Scanlon RJ, Callen A et al. including **Caravaggi A**. The search for novelty continues for rewilding. *Biological Conservation*. doi: 10.1016/j.biocon.2019.05.041. (*Letter to the Editor*)
- 2017 **Caravaggi A**, James K. Twittersphere: Conferencing in 140 characters. *Nature*. 549: 458. (*Letter*)

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## **TEACHING**

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As a teacher I aim to provide my students with skills, knowledge and confidence critical to their academic and personal development. I take an inclusive approach, developing strong relationships and encouraging discussion. I work to support my students in all aspects while respecting their individuality and independence.

### ***Qualifications***

- 2019- Postgraduate Certificate in Teaching and Learning in Higher Education (*ongoing*).

### ***Module Leader***

- 2019-20 GE1S008 – Observational Fieldwork  
GE2S008 –Biodiversity and Biogeography  
GE2S017 – Research Methods in Natural History  
GE3S009 – Mediterranean Field Expedition  
ES4S011 – European Field Expedition
- 2017-18 BL6024 - Quantitative Skills for Biologists Using R (UCC).

### ***Lecturing and field-based teaching***

- 2018- BI3D104 – Natural History Research Project  
BI3S109 – Community and Population Ecology  
GE0S04 – Foundation in Natural History  
GE1S008 – Observational Fieldwork  
GE1S010 – Natural History  
GE2S008 - Biodiversity & Biogeography  
GE2S017 – Research Methods in Natural History

- GE3S008 – Natural History Field Expedition
- GE3S009 Mediterranean Field Expedition
- ES4H001 – Environmental Management and Legislation
- ES4H002 – Wildlife Surveying
- ES4S009 – Restoration Ecology
- ES4S010 - Terrestrial and Aquatic Conservation
- ES4S011 – European Field Expedition
- ES4T001 - MSc Research Projects
- 2018 BL6024 - Quantitative Skills for Biologists Using R.  
BL5014 - Conservation Biology.
- 2017 BL6024 - Quantitative Skills for Biologists Using R.
- 2015 Introduction to GIS (*Teaching Assistant*)  
Animal Biology (*Teaching Assistant*)  
Undergraduate residential field course
- 2014 Undergraduate residential field course

### ***Student supervision***

I currently supervise the research projects of nine BSc and five MSc students at USW. I am also on the supervisory team for three PhDs, one based at USW and two at UCC. I have previously supervised two exchange (Erasmus and SWB), five BSc, six MSc and one MRes student.

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### **FELLOWSHIPS, FUNDING AND AWARDS**

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<b>Date</b>	<b>Award</b>	<b>Value</b>	<b>Organisation</b>
2018	Funded PhD programme	€96,000	Irish Research Council
2017	Project tender	€150,000	National Parks and Wildlife Service
	Postdoctoral research	€174,000	National Parks and Wildlife Service
	Visiting Research Fellow	-	Queen's University Belfast
2015	Training and Travel grant	£500	British Ecological Society
2014	Research grant	£2,000	People's Trust for Endangered Species
2012	PhD studentship	£82,720	Northern Ireland Environmental Agency
2010	Master's scholarship	£7,500	Natural Environment Research Council

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### **PRESENTATIONS**

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#### ***Conferences (oral presentations)***

- 2018 Environ 2019: Engagement for Climate Action, Carlow.
- 2019 Invasive Species Conference, Belfast
- 2017 International Congress for Conservation Biology, Cartagena.  
World Seabird Twitter Conference, online.  
The Mammal Society, Newcastle (*invited keynote*).  
Mammal Society Spring Conference, Cambridge.
- 2016 British Ecological Society Annual Meeting, Liverpool.  
North Wales Mammal Symposium, Bangor

- The Mammal Society, Lancaster (*invited keynote*).  
Mammal Society Spring Conference, Yarnfield  
2015 7th European Congress of Mammalogy, Stockholm, Sweden.  
Vth International Wildlife Management Congress, Sapporo, Japan.  
Mammal Society Spring Conference, Lancaster.  
2014 Mammal Society Spring Conference, Birmingham.  
2013 11th International Mammal Congress, Belfast.  
Mammal Society Student Conference, Staffordshire.  
2012 2nd All Ireland Mammal Symposium (AIMS), Dublin  
4th World Lagomorph Conference, BOKU, Vienna.  
2009 11th BIAZA Research Symposium, Blackpool.

### ***Invited seminars***

- 2019 Biological Sciences, Cardiff University.  
School of BEES Seminar Series, University College Cork.  
Bangor University Zoological Society, Bangor University.  
2018 Research Group seminar on Science Communication, University College Cork.  
Keynote, Mammal Society Student Conference, Worcester.  
2014 Biological Sciences, Bangor University.

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## **CONFERENCE ORGANISATION**

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- 2018 2<sup>nd</sup> Biotweeps Twitter Conference (*principal organiser*).  
2017 7<sup>th</sup> Irish Ornithological Congress, Cork (*scientific committee*).  
Biotweeps Twitter Conference (*principal organiser*).  
2014-18 Mammal Society Student Conferences, various (*principal organiser*).

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## **PERSONAL DEVELOPMENT**

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### ***Training and workshops***

- 2019- Postgraduate Certificate in Teaching and Learning in Higher Education (ongoing)  
2018 Better Biosecurity (University of Leeds)  
Research funding (UCC)  
Unconscious bias awareness (UCC)  
Developing Horizon 2020 grant applications (UCC)  
2017 Advanced Training in Systematic Review and Meta-Analysis (NERC)  
Level 3 Teaching Assistant (e-learning)  
Engagement and Public Outreach (BES)  
Remote mammal surveying (*workshop*; Vincent Wildlife Trust)  
2016 Mentorship for academic ecologists (BES)  
Developments in conservation ecology (*workshop*; BES)  
Acoustic analysis of marine mammal vocalisations (*workshop*; NWMG)  
2012 Lagomorph systematics (*workshop*)

### ***Licenses and certification***

- 2019    Emergency first aid  
          Field first aid  
          Mental health first aid
- 2018    LAST Ireland (animal welfare in research)  
          License to ring/mark wild animals (NPWS; License no: 09-2018)
- 2014    ASPA laboratory animal handling license (TSA/47/14)
- 2012    BTO bird ringing 'C' license
- 2008    Marine mammal medic, BDMLR
- 2002    Full manual UK driving license, held without incident or penalty

### ***Societal memberships (since)***

- 2017    British Ornithologist's Union
- 2015    South Wales Mammal Group  
          Welsh Ornithological Society
- 2013    Society of Conservation Biology (SCB)
- 2012    British Ecological Society
- 2009    The British Trust for Ornithology

### ***Organisational and working groups (since)***

- 2017    SCB Participatory and Citizen Science working group
- 2016-17 South Wales Mammal Group (*committee*)
- 2015-18 Mammal Society Council (*committee*)
- 2012    SCB Urban Ecology working group

### ***Additional roles***

- 2019    BES Wales Policy Group  
          USW Athena SWAN Champion  
          BES Education and Careers Committee
- 2018    UCC BEES Education and Public Engagement Committee
- 2016-18 University Mammal Challenge coordinator, The Mammal Society
- 2016    Session chair, British Ecological Society Annual Meeting  
          British Ecological Society Women in Ecology (WIE) mentor
- 2015-17 Lagomorph consultant, The Mammal Society
- 2016    Community Ecology session chair, British Ecological Society Annual Meeting
- 2013    Wildlife consultant, Biological records for the North East of Scotland (NESBReC)
- 2012-15 EBEE postgraduate representative, Queen's University Belfast  
          SBS Athena SWAN committee, Queen's University Belfast
- 2007-09 Undergraduate student representative, Bangor University  
          Founding committee, Bangor University Zoological Society

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## **SCIENCE COMMUNICATION**

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I am a strong advocate of science communication and outreach and believe that it is important to encourage an interest in science and the natural world in people of all ages. I am the creator and sole curator of the Twitter-based science communication project, Biotweeps, that hosts a

different biologist every week and has a current following of > 16,000. Biotweeps has also hosted two global virtual conferences featuring dozens of scientists from around the world and with audiences numbering in the millions. I have given talks to over 20 school, local interest, community and natural history groups in the UK, USA and Canada, in-person and via video calls.

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## MEDIA ENGAGEMENTS

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### *Radio and podcasts*

- 2018    BBC Radio Wales, UK  
           BBC Radio Derby, UK  
           MostlyScience live (*podcast*)
- 2017    BBC Coventry & Warwickshire, UK  
           The Edgar Ortega Radio Show, North America (*podcast*)
- 2016    SciComm with Dr. Mike, UK (*podcast; 2 shows*)
- 2015    BBC Radio Ulster, Northern Ireland  
           BBC Radio Ulster, *Good Morning Ulster*, UK
- 2013    RTE Radio 1, *Mooney Goes Wild*, UK

### *Television*

- 2015    Countryfile, BBC
- 2013    River Bann, RTE Television

### *Other media*

- 2019    Earther (*contributor*)
- 2018    BBC Wildlife (*invited article*)
- 2017    The Washington Post (*interview*)
- 2016    National Geographic advisor (*mammal expert*)  
           Biotechn.asia (*interview*)  
           Featured research - Camera traps reveal a hare-raising situation, *RSEC blog*, ZSL
- 2015    ScienceNews (*interview*)  
           BBC News (*interview and featured article*)  
           Nature News (*interview*)  
           Crastine.se (*interview*)
- 2014    Species profiles: Mountain hare and Irish hare, The Mammal Society
- 2013    Mid-Ulster Mail (*interview*)

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## SKILLS

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| Analytical software | R, SPSS, Minitab, Distance, MARK, ArcGIS, QGIS, MaxEnt, NetLogo, MAVIS NVC, Patch Analyst, GeneMapper, bespoke software. |
| Additional tools    | Microsoft Office, GitHub, RMarkdown, graphics packages (e.g. Adobe creative suite), website creation.                    |



Statistical	General linear and mixed-effects models, Principal Components Analysis, Species Distribution Modelling, Discriminant Function Analysis, diversity indices, Mahalanobis and Euclidean distance, cross-correlation functions, model averaging, Random Encounter Models, meta-analysis, other parametric and non-parametric tests.
Field	Off-road driving (4x4), multi-taxa (mammal, bird, invertebrate, reptile, amphibian; UK coastal, marine and terrestrial) surveys (e.g. mark and recapture, distance sampling, camera traps, quadrats, scan/focal sampling;) and identification, habitat surveys, animal handling (amphibians, reptiles, invertebrates, and small-to-large birds and mammals), orienteering.
Laboratory	Multi-taxa dissection (mammal, bird, amphibian, invertebrate), species identification via microscopy, ethological studies, tissue sampling, DNA manipulation, electrophoresis, atomic absorption and colourimetric spectroscopy, specimen preparation, soil chemical and biological analysis.

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## REFEREES

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Prof. John O'Halloran	Deputy President & Registrar's Office, University College Cork, Cork, Ireland Postdoctoral study Principal Investigator Email: j.ohalloran@ucc.ie      Telephone: +353 (0)21 490 2407
Dr. Sandra Irwin	School of Biological Earth and Environmental Sciences, University College Cork, Distillery Field, N Mall, Cork, Ireland Postdoctoral study Project Manager Email: s.irwin@ucc.ie      Telephone: +353 (0)21 490 4595
Dr. Neil Reid	School of Biological Sciences, Medical Biology Centre, 97 Lisburn Road. Belfast BT9 7BL PhD supervisor Email: neil.reid@qub.ac.uk      Telephone: +44 (0)28 9097 2746
Prof. Ian Montgomery	School of Biological Sciences, Medical Biology Centre, 97 Lisburn Road. Belfast BT9 7BL PhD supervisor Email: i.montgomery@qub.ac.uk      Telephone: +44 (0)28 9097 2214