

DR. ANTHONY CARAVAGGI

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CAREER HISTORY

Date	Job Title	Department	Organisation
2017-	Postdoctoral Researcher	School of BEES	University College Cork
2017-18	Visiting Research Fellow	Biological Sciences	Queen's University Belfast

EDUCATION

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; 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; The European Zoological Journal; Zoo Biology.</i>
Funding review	British Ecological Society Grant Review College; Croatian Science Foundation.
Consultation	The Hen Harrier Reintroduction Project; University of Exeter and Natural England.

RESEARCH

I employ field and laboratory-based experiments, along with archival data, 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, quantification of the impacts of invasive species on islands and an assessment of wildlife management practises.

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

PUBLICATIONS

Peer-reviewed journals

- 2018 **Caravaggi A**, Cuthbert RJ, Ryan RG, Cooper J, Bond AL. (*In press*). 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. (2018) 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.
- 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.
- 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.
- 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, Waldner F, Dugan JM, Mietchen D, Elkhatib Y, Collister LB, Pikas CK, Crick T, Masuzzo P, **Caravaggi A**, *et al.* 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, Vallely 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*.

Caravaggi A, Irwin S, Lusby J, Ruddock M, O'Toole L, Mee A, Nagle T, O'Neill S, Tierney D, O'Halloran J. Factors affecting territory site selection and breeding parameters of Hen Harriers, *Circus cyaneus*. *Ibis*.

Caravaggi A, Irwin S, Lusby J, Ruddock M, O'Toole L, Mee A, Nagle T, O'Neill S, Tierney D, O'Halloran J. A review of anthropogenic pressures within the breeding range of the Hen Harrier (*Circus cyaneus*) in Ireland. *Bird Conservation International*.

Book chapters

2018 **Caravaggi A**. Lagomorpha Life History. In: Vonk J, Shackelford TK (eds.) *Encyclopedia of Animal Cognition and Behavior*. Springer. doi: 10.1007/978-3-319-47829-6_1206-1

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

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

Other publications

2017 **Caravaggi A**, James K. Twittersphere: Conferencing in 140 characters. *Nature*. 549: 458. (Letter)

TEACHING

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.

Qualifications

2018 Postgraduate Certificate in Teaching and Learning in Higher Education, University of London (*ongoing*).

Module development

- 2017 BL6024 *Quantitative skills for biologists using R*.
Quantitative skills required by postgraduate students to successfully conduct and publish their research, with a focus on data analysis and graphing, statistics, and basic modelling, as generally implemented by zoologists and ecologists.

Lecturing

- 2018 Quantitative skills for biologists using R.
Conservation biology.
2017 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

Field-based teaching

- 2016 South American rainforest biodiversity and conservation (*Ecuador*).
2015 Undergraduate residential field course, Northern Ireland
2014 Undergraduate residential field course, Northern Ireland
Bird survey techniques

Student supervision

Date	Degree	Name	Organisation
2018-22	PhD	Samantha Ball	University College Cork
2018	Erasmus+	Enrique Da Paz	University College Cork/University of Barcelona
2017-19	MRes	Alan McCarthy	University College Cork
2017	BSc	Chloe O'Mahoney	University College Cork
2015	MSc	Ashley Irwin	Queen's University Belfast
	MSc	Lauren Finley	Queen's University Belfast
	BSc	Paige Havlin	Queen's University Belfast
	SWB*	Lazaro Silva	Queen's University Belfast
2014	BSc	Mengyi Liu	Queen's University Belfast
	BSc	Claire Molloy	Queen's University Belfast
2013	BSc	Ashley Irwin	Queen's University Belfast

* Science Without Borders

External course delivery

I have developed materials for and delivered courses in bird identification, camera trapping and social media for ecologists.

FIELDWORK EXPERIENCE

Date	Activity and habitat(s)
2018	Camera trapping, small mammal trapping, bird point counts. Upland habitats.
2017	Hen Harrier nest surveys. Upland areas. Breeding Bird Survey (BTO). Upland areas; windfarm-adjacent.
2016	Bird, bat and reptile surveys and camera trapping. South American rainforest.
2015	Camera trapping for otters. Rivers and riparian areas.
2014	Badger sett surveys. Broadleaved woodlands.
2012-15	Hare surveys (distance sampling, camera traps, fecal). Uplands and agricultural.
2013	Coastal biodiversity surveys. Tidal pools.
2012	Wader and gull surveys. Tidal flats.
2011	Small mammal trapping. Agricultural fields. Reptile surveys. Clearfell areas in coniferous forests. Bird point count, reptile, mammal and invertebrate surveys. Marsh and fen. Bat roost surveys (visual and detector). Urban areas. Great crested newt surveys. Agricultural areas. Bird surveys. Broadleaved woodland.
2009-11	Breeding Bird Surveys (BTO). Upland areas.
2007-18	Bird ringing (mist, whoosh and cannon nets and traps). Woodland, fen, marsh, grassland, coastal and agricultural areas.
2007-09	Pine marten surveys. Coniferous woodland.
2007	Passerine bird and invertebrate surveys. Shrub and broadleaved woodland. Moth trapping. Botanic gardens.
2006-08	Bird surveys and nestbox monitoring. Broadleaved woodland.

FELLOWSHIPS, FUNDING AND AWARDS

Date	Award	Value	Organisation
2018	Funded postgraduate programme (PhD)	€96,000	Irish Research Council
2017	Project tender – <i>Hare Survey of Ireland</i>	€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

PRESENTATIONS

Conferences (oral presentations)

2017	International Congress for Conservation Biology, Cartagena. World Seabird Twitter Conference. The Mammal Society, Newcastle (<i>invited keynote</i>). Mammal Society Spring Conference, Cambridge.
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- 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 (*scheduled*).
School of BEES Seminar Series, University College Cork (*scheduled*).
Bangor University Zoological Society, Bangor University (*scheduled*).
- 2018 Keynote, Mammal Society Student Conference, Worcester.
- 2014 Biological Sciences, Bangor University.

CONFERENCE ORGANISATION

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

PERSONAL DEVELOPMENT

Training and workshops

- 2018 Postgraduate Certificate in Teaching and Learning in Higher Education
Unconscious bias awareness
Developing Horizon 2020 grant applications
- 2017 Advanced Training in Systematic Review and Meta-Analysis
Level 3 Teaching Assistant
Engagement and Public Outreach
Remote mammal surveying (*workshop*)
- 2016 Mentorship for academic ecologists
Developments in conservation ecology (*workshop*)
Acoustic analysis of marine mammal vocalisations (*workshop*)
- 2012 Lagomorph systematics (*workshop*)

Licenses and certification

- 2018 LAST Ireland (animal welfare in research; License no: 09-2018)
- 2014 ASPA laboratory animal handling license (TSA/47/14)
Emergency first aid; field first aid
- 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 The Mammal Society
British Ecological Society
- 2011 Royal Society of Biology
- 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*)
- 2016 Mammal Society Council
- 2012 SCB Urban Ecology working group

Additional roles

- 2018- UCC BEES Education and Public Engagement Committee
- 2016- 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

SCIENCE COMMUNICATION

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.

Outreach

- 2018 UCC BEES Committee for Education and Public Engagement
BBC Wildlife magazine feature on wallabies (*invited expert*)
I'm a Scientist Get Me Out of Here! Careers Zone expert
- 2017 Sanger Institute 25 Genomes (*species champion – St. Kilda wren*)
Culture Night, University College Cork
Blog post - A brief history of an Early Career Researcher, *Errant Science*
Conservation & ecology expert on the sub-reddit /r/AskScience
Blog post - Rejected by the Rainforest, *IF-ing Love Conservation*
Science communication article, CBS (*#bestcarcass, contributor*)
Rabaiotti D, Caruso N 2017. Quercus books, ISBN: 9781786488275 (*contributor*)
Student Science Partnerships, USA
Bird song workshop and ringing demonstration, Parc Slip Nature Reserve, Wales
- 2016-18 Skype a Scientist (*5 classrooms across the US*)
- 2016 Blog post - On closer inspection, it looks like a hare transplant, *QUBio*
Magazine article - Is there intelligent life on Earth? *Save our Souls* (*author*)
Letters to a Pre-scientist (*correspondent*)
- 2015 Blog post - Putting wildlife in the frame, *QUBio*
Blog post - Communities and conservation in developing countries, *QUBio*
Nature News (*invited comment*)
Bird ringing demonstration, Parc Slip Nature Reserve, Wales
Blog post - Dear Alice, the hare might be sane after all, *QUBio*
Blog post - What's in a name? *QUBio*
- 2014-16 Local Mammal Group newsletters (*invited author*)
- 2014 Blog post - A receding hare line and a brown toupee. *QUBio*
Created @Biotweeps, a science communication Twitter project (>16k followers)
Multi-school careers advice and speed-networking event (*invited expert*)
- 2013-17 UK STEM Ambassador
- 2013 I'm a Scientist Get Me Out of Here! Enquiry Zone expert
Science outreach event, Techniquet, Cardiff (*presenter for RSPB*)

MEDIA ENGAGEMENTS

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

- 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*)

SKILLS

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.

REFEREES

- Prof. John O'Halloran Deputy President & Registrar's Office, University College Cork,
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