Dr Danielle Orrell

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Key strengths

- Strong leadership and people management skills, with a proven track record in the development and deliverance of innovative conservation science projects, including leading animal tagging programs across range of aquatic species and climes
- Experience collaborating with partners in academia, government, and private and local shareholders
- Analytical experience handling large datasets using a range of programs and tools, including R and QGIS
- Fundraising experience: awarded $450,000 in funding since 2018

Education

2018-2022 PhD in Integrative Biology - University of Windsor, Canada 98.5% Grade Average
Thesis: Utilising an integrated approach to understand niche in complex equatorial systems. Conducted a nine-month field research project on Ascension Island

2016-2017 MRes Ecology and Environmental Biology – University of Glasgow, Scotland Distinction
Thesis: Survival and movement behaviour of Atlantic salmon smolts (*Salmo salar* L.) migrating through impounded lakes and natural waters. Conducted a five-month field research project in the northwest highlands, Scotland

2013-2016 BSc (Honours) Marine Biology – University of Liverpool, England 1st Class
Thesis: The effectiveness of European protective legislation. A case study of the Dee Estuary Special Area of Conservation

Professional Experience

11/2023 – Present Senior Postdoctoral Researcher, Unviersity College Cork, Ireland

- Project Manager of the CETUS Project (budget in excess of €800k)
- Managing the elasmobranch component of the CETUS project, which aims to explore hotspots of elasmobranch (shark, skate and ray) movement, in relation to Threatened species, and potential areas of interaction with renewable energy developments.
- Coordinating and leading the electronic tagging of elasmobranchs including flapper skate (*Dipturus intermedius*), lesser-spotted catshark (*Scyliorhinus canicula*), tope (*Galeorhinus galeus*), and porbeagle shark (*Lamna nasus*).
- Principle Investigator of the 'Beyond the Bay: using satellite telemetry and offshore acoustic gates to elucidate the movements of a Critically Endangered Irish elasmobranch' project (€200k budget).
- Member of the Tintreach project, which aims to study the effects of electromagnetic fields on small shark species using an experimental mesocosm.
- Part of the Marine Advisory Group established by the Minister for Housing, Local Government and Heritage in Ireland to conduct an ecological sensitivity analysis of the southern Celtic Sea to inform future potential designation of Marine Protection Areas in the region. This involved working alongside a group of marine experts from a number of Institutions across Ireland. This work will culminate in a Governmental report to be published in June 2024.
- Co-supervising two PhD students in elasmobranch related projects.

11/2022 – 11/2023 Postdoctoral Researcher, Unviersity College Cork, Ireland

- Managing the elasmobranch component of the CETUS project.
- Coordinating the electronic tagging on the CETUS project and co-designing acoustic arrays to track the movements of elasmobranchs around offshore wind farms and within ecologically important areas.
- Worked as part of the Marine Advisory Group established by the Minister for Housing, Local Government and Heritage in Ireland to conduct an ecological sensitivity analysis of the western Irish Sea to inform future potential designation of Marine Protection Areas in the region. This involved working alongside a group of marine experts from a number of Institutions across Ireland. This work culminated in a Governmental report published in June 2023.

09/2018 – 05/2023 Graduate Teaching Assistant, University of Windsor, Canada

- Delivered classes on Cell Biology, Biodiversity and Ecology to around 1000 undergraduate students across a variety of learning environments. Duties included delivering seminars, teaching laboratory techniques, leading discussions, and invigilating examinations.
- Designed the online learning materials for two undergraduate courses, Cell Biology (Winter 2020) and Biodiversity (Winter 2022), which were distributed to over 1200 students, which included presentations, worksheets, activities and virtual quizzes.

08/2018 – 09/2018 Field Researcher, University of Windsor, Canada

- Worked as part of a small field team focused on acoustic and satellite tagging grey reef sharks (*Carcharhinus amblyrhynchos*) to understand their movements within the Protected Area surrounding Vamizi Island, Mozambique.

06/2018 – 08/2018 Field Researcher, University of Windsor, Canada

- Worked as part of a small field team in the Northwest Territories of Canada acoustic and satellite tagging Arctic char (*Salvelinus alpinus*) and Greenland cod (*Gadus ogac*) to understand their movements in the Prince Albert Sound.

03/2018 – 06/2018 Researcher and Environmental Educator, Cape Eleuthera Institute, The Bahamas

- Assisted and managed marine conservation research projects: pelagic fish movement using deep ocean fish aggregation devices (FADs), bonefish physiology, reef fish and benthic surveys, sea cucumber stock assessments and crab physiology and behaviour studies. Also assisted with management of the wet laboratory.
- Lead and taught an Island School research class to students ages 16-18. Mentored CEI interns, gap year students in a range of topics stemming from marine ecology and sustainability.

12/2017 – 03/2018 Research Technician, Cape Eleuthera Institute, The Bahamas

- Assisted with research projects in areas including the deployment of FADs, pelagic fish movement, stone crab fishery sustainability and bonefish reproductive ecology.
- Mentored CEI interns to provide support for wet-laboratory and field-based activities

09/2017 – 12/2017 Graduate Research Assistant for the University of Glasgow, Scotland

- Quantification of salmon population density in relation with nutrient levels within the Conon system using electrofishing, PIT tagging, electrobugging, algal scrape sampling and other quantitative field techniques.

Research Grants and Awards

2024 • Marine Institute equipment grant to deploy a Slocum glider to track elasmobranchs in the western Irish Sea

2023 • EUR $200,000 Department of Local Government and Housing for the Beyond the Bay Tracking Project
• EUR $1,100 awarded by University College Cork for the AURORA Women in Leadership programme
• EUR €100 Research Poster award, Wind Energy Ireland conference
• Secured loan of $88,530 of tracking equipment from the Ocean Tracking Network
• EUR €100 Research Poster award, Wind Energy Ireland conference

2022 • CAN $100 Honourable mention, University of Windsor Faculty of Science Showcase (poster)
• CAN $500 Biology Graduate Leadership Award for Excellence
• US $500 Women of Fisheries Early Career Award recipient

2020 • US $2,000 Animal Behaviour Society small research grant to facilitate PhD research

2018 • CAN $40,000 annual Ontario Trillium Scholarship to support PhD research
• US $80,000 grant awarded March 2018 by The Moore Foundation to further Fish Aggregation Research

2017 • £1,000 travel grant awarded by the Fisheries Society of the British Isles to carry out research in Eleuthera

2016 • £95,000 subsidisation by the University of Glasgow to facilitate Masters research
• £43,000 grant, December 2016 by Scottish & Southern Energy towards Masters research project
• £3,000 grant, December 2016 by the Scottish Environmental Protection Agency towards Masters research
• Accommodation bursary awarded by the University of Glasgow to live at the Scottish Centre for Ecology & the Natural Environment research station during postgraduate study

Skills

Analytical Techniques

- Proficient in R, QGIS and ArcGIS
- Cleaning, filtering and evaluating large telemetric datasets (over 2,000,000 million animal detections) to explore animal movement within freshwater and open ocean systems
- Constructing mixed-effect models (GLMMs) and generalised additive mixed models (GAMMS) to explore biological relationships, including remote biological sensor data and acoustic tracking data
- Using Bayesian isotope mixing models to explore dietary (isotopic) niche and reconstruct aquatic food webs
- Experience analysing remote underwater video footage using a range of biodiversity metrics

Fieldwork

- Fieldwork experience: Celtic and Irish Sea (2023-2024), Ascension Island, South Atlantic Ocean (2019-2021), Quirimbas Archipelago, Mozambique (2018); Prince Albert Sound, North West Territories (2018), Eleuthera, The Bahamas (2016-2017), Northwest Scotland (2013-2017); Veli Losinj, Croatia (2015).
- Physiological experiments: investigated stone crab (*Menippe mercenaria*) fisheries practices using simulated fishery scenarios in the laboratory (first author publication in 2019) using intermittent flow respirometry to estimate metabolic rate and controlled feeding experiments to investigate animal behaviour.
- Sampling techniques: biological sampling techniques (in laboratory and community settings), zooplankton hauls, plankton light trapping, electrofishing, seine netting, gill netting, electrobugging, algal scrape sampling, kick sampling, sweep net sampling, aquatic invertebrate trapping, grab sampling from a vessel, CTD testing.
- Tagging techniques: dart, PIT, acoustic, satellite and radio tagging of teleosts, elasmobranchs and crustaceans.
- Fish-related sampling: ultrasound, fin clipping, cannulations, blood extraction, otolith extractions, lipid measurements, complete dissections.
- Survey experience: river pressure surveys, observational surveys (from small boats and research vessels), use of research diving for sublittoral, benthic and reef surveys, remote underwater video surveys in open-ocean and lab environments, use of remote operated vehicles (ROVs), drone surveys, habitat assessments and bathymetric mapping using side-scan SONAR and GPS.

Other Experience

- BSAC Practical SCUBA Diving Instructor with training in oxygen administration, dive management and rescue scenarios. Over 300 logged dives, including drysuit diving and scientific diving experience.
- BSAC Diver Coxswain (RYA Level II equivalent) and Boat Handler (RYA Level I equivalent): Over 200 hours of boat handling experience. Powerboat handling for research activities including gillnetting, acoustic receiver deployments, lake surveys, and open ocean equipment deployment.
- First Aid: Rescue Emergency Care Level 3 (2023), Personal Survival Techniques (2023), Security Awareness (2023; Specialised maritime training required for large ship work), Emergency First Responder (2018).
- Animal welfare: Individual and Project HPRA Licence for skate and shark surgery and tagging work (2023-2026), LAST Ireland Species Wildlife Core Modules (Legislation, History, Theories of Euthanasia etc.), UK Home Office Licence for salmonid surgery work (2017-2018).
- Animal husbandry and laboratory aquaria management and maintenance experience.
- AURORA Women in Leadership Porgram (2024).
- Ocean SLOCUM Glider Training Course (2021).

Publications

L. Allock, P. Breen, A. Conway, T. Crowe, H. R. Dolton, D. Haberlin, K. Heney, M. Johnson, J. Maxwell, C. Nolan, **D. L. Orrell,** M. Power, O. Tully (2024) Ecological sensitivity analysis of the Celtic Sea to inform future designation of Marine Protected Areas (MPAs). Report for the Department of Housing, Local Government and Heritage, Ireland. https://doi.org/10.13140/RG.2.2.13202.67528.

D. L. Orrell, D. Sadd, K. L. Jones, K. Chadwick, T. Simpson, D. E. Philpott, N. E. Hussey (2024) Coexistence, resource partitioning and fisheries management: a tale of two mesopredators in equatorial waters. Journal of Fish Biology. https://doi.org/10.1111/jfb.15744.

H. Pettitt-Wade, N. E. Hussey, C. P. Gallagher, E. V. Lea, **D. L. Orrell**, L. Liseto (2023) Contrasting intra-individual variation in size-based trophic and habitat shifts for two coastal Arctic fish species. Oecologia. https://doi.org/10.1007/s00442-023-05423-9.

T. Crowe, L. Allcock, P. Breen, A. Conway, T. Doyle, D. Gillen, D. Haberlin, K. Heney, M. Johnson, E. Kamjou, C. Morris, C. Nolan, **D. Orrell**, D. O'Sullivan, O. Tully. Marine Protected Area Advisory Group (2023). Ecological sensitivity analysis of the western Irish Sea toinform future designation of Marine Protected Areas (MPAs). Report for the Department of Housing, Local Government and Heritage, Ireland. https://www.gov.ie/en/publication/4bc80-ecological-sensitivity-analysis-of-irish-sea-main-report/

D. L. Orrell, D. Webber, N. E. Hussey (2023) A standardised framework for the design and application of fine-scale acoustic tracking studies in aquatic environments. Marine Ecology Progress Series. 706: 125-151. https://doi.org/10.3354/meps14254.

D. L. Orrell, J. Questel, C. Smoot, T. Simpson, N. E. Hussey (2023) *Alebion carchariae* (Copepod: Caligidae) host plasticity and distribution: a new host and locality record from Ascension Island. Journal of the Marine Biological Association of the United Kingdom, 103, E3. doi: https://doi.org/10.1017/S0025315422001060.

D. L. Orrell, N. E. Hussey (2022). Using the VEMCO Positioning System (VPS) to understand the fine-scale movements of aquatic species: Applications, analytical approaches and future directions. *Marine Ecology Progress Series Series*. 687: 195-216.

H. M. Honkanen‡, **D. L. Orrell‡**, M. Newton, S. McKelvey, A. Stephen, A. R. Duguid, C. E. Adams (2021) The downstream migration success of Atlantic salmon (*Salmo salar*) smolts through natural and impounded standing waters. *Ecological Engineering*.161. (‡ indicates joint first-authorship).

D. Orrell, E. V. C. Schneider, O. Eisenbach, A. Garg, B. Bigelow, H. Hauptman, O. O'Shea, I. J. McGaw, T.E. Van Leeuwen (2019) Evaluation of Stone Crab (*Menippe mercenaria*) Fisheries Practices Using Simulated Fishery Scenarios in the Laboratory. *Caribbean Naturalist.*

C. A. K. Daly, **D. Orrell**, I.M. Silva, J. P. F. Macuio, T. N. Hempson, M. Zimbicki, N. E. Hussey, Daly, R. (2019) New host and distribution record of *Pontobdella macrothela* (Schmarda, 1861) (Annelida, Hirudinea) from a Grey Reef Shark *Carcharhinus amblyrhynchos* (Bleeker, 1856), in Mozambique, Western Indian Ocean. *Check List*. 15(2): 265-268.

S. K. Auer, G. J. Anderson, S. McKelvey, R. D. Bassar, D. McLennan, J. D. Armstrong, K. H. Nislow, L. McKelvey, T. A. J. Morgan, K. Salin, **D. L. Orrell**, T. C. Reid, N. B. Metcalfe. (2017) Nutrients from salmon parents alter selection pressures on their offspring. *Ecology Letters.* 21(2). DOI: 10.1111/ele.1289.

Conference Presentations and Media

2024
- Popular press article for The Skipper and Marine Times, " Underwater treasure in Irish waters: researchers urge skippers to help in the search for rare skate mermaids' purses".
- Popular press article for the Ascension Island newspaper, and Ascension Island Government press release, "Newly published research on the movement and diet of Ascension's grouper and spotted moray".
- Environmental Interactions of Marine Renewables conference, presentation entitled, "Elasmobranch movements around wind turbine infrastructure" (in-person)
- Popular press article for the Irish Examiner, "A ray (or skate) of hope: Tracking the world's largest skates in the waters off County Cork".

2023
- European Tracking Network Meeting (in-person)
- Regional Skate Working Group (in-person)
- Wind Energy Ireland conference poster (in-person) – awarded Best Research Poster

2022
- British Ecological Society Pride Blog series, 2nd installment

2021
- Society of Integrative Biology presentation (oral, virtual)
- British Ecological Society Pride Blog series
- University of Windsor Biology Graduate Symposium presentation (oral, virtual)

2020
- Ocean Tracking Network Research Rodeo (in-person)
- Waiʻanae High School, Hawaii Careers Fair presentation (oral, virtual)
- British Ecological Society Quantitative Biology (oral, virtual)
- Skype a Scientist, East New York Elementary School of Excellence (oral, virtual)
- LGBTQ+ in STEM 2020 conference moderator (virtual)

2019
- Ocean Tracking Network conference (oral, virtual)

Memberships

- European Tracking Network Committee: Integration & Embedding co-lead. 2023 – Present
- British Sub Aqua Club. 2013 – Present
- Animal Behaviour Society. 2021 – Present
- Volunteer Reviewer: Journal of Fish Biology, Marine Ecology Progress Series.