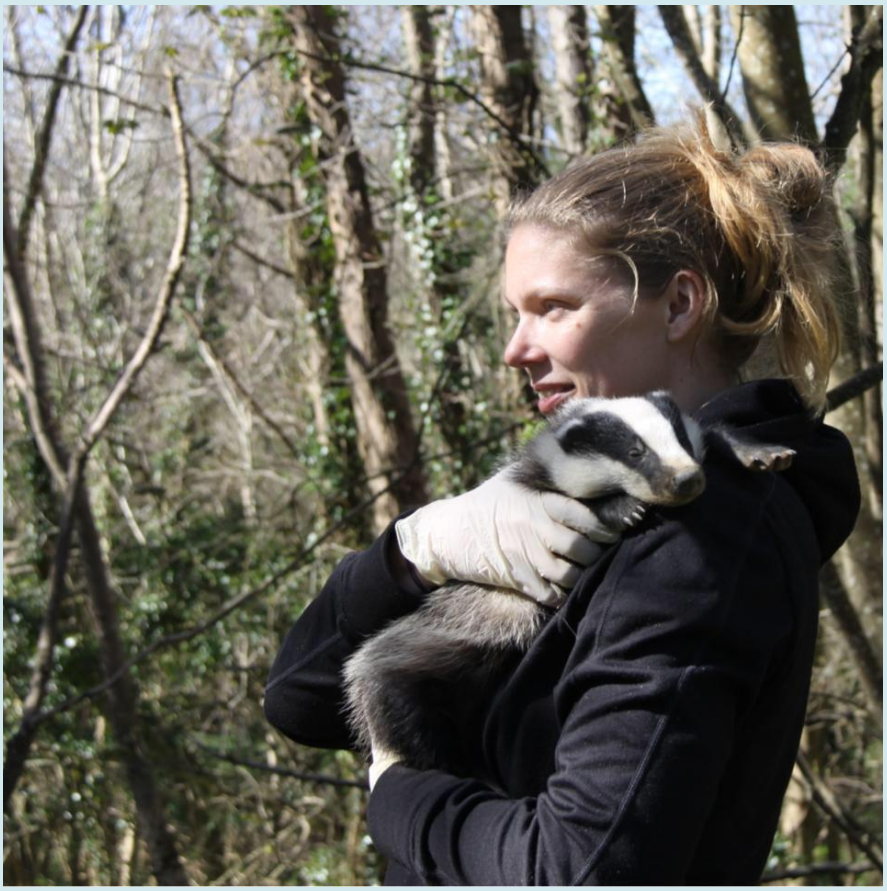
ZOOBYTES

Winter 2021

Newsletter of the Department of Zoology
Trinity College Dublin

IN MEMORIAM

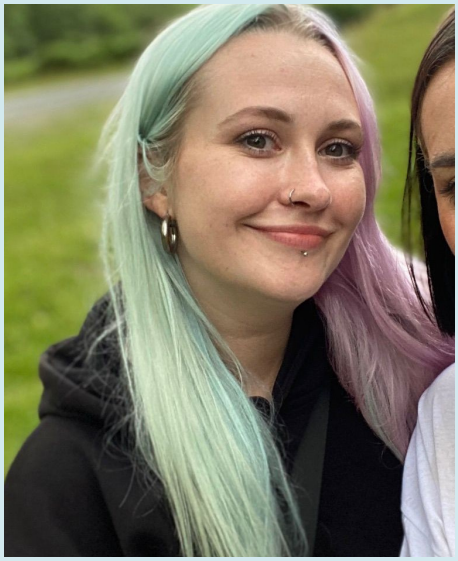
In memory of Dr Aoibheann Gaughran



In December, we lost our dear colleague and friend Dr Aoibheann Gaughran. There are no words to express how sad and shocked we are by Aoibheann's loss. She was a wonderful person whose positive and always joyful presence never failed to light up the Department.

Our thoughts and deepest sympathies to her partner Simon and her family and friends. Codladh sámh Aoibheann.

NEW PEOPLE

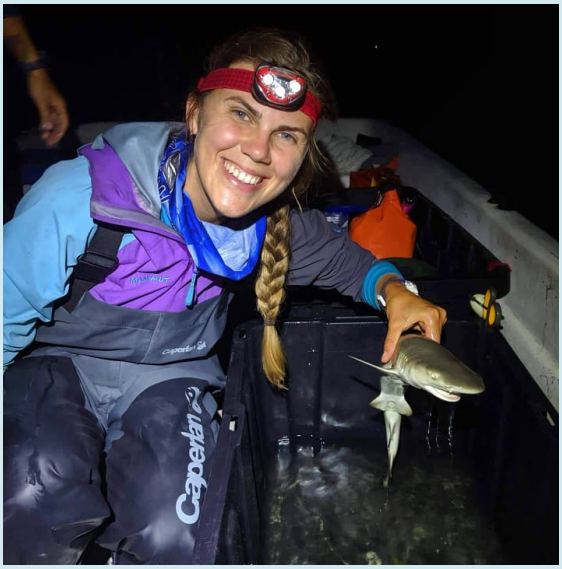


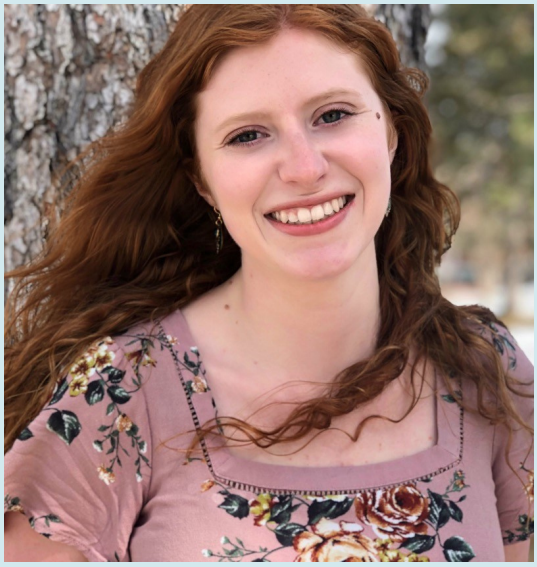
Niamh McCartan
PhD Student
Luijckx Group

Hi, I'm Niamh! I'm from Dublin, and my favourite animal is a red panda. I am just starting my PhD studying the effects of climate change on disease systems using the host *Daphnia magna*. I am no stranger to the Zoology Department, as I received my BSc in Zoology from TCD in 2019. Afterwards, I got my MSc in Parasitology from Queen's University before moving back to Dublin. I am excited to be back and am ready for the challenges ahead!

Grace McNicholas
PhD Student
Payne Group

I'm Grace McNicholas, and I'm originally from the UK. I am just starting my PhD at Trinity investigating 'The Ecology of Irish Tunas, including their space use and post-release behaviour. My primary base is in Westport, Co. Mayo, where I will be working closely with staff at the Marine Institute facility nearby. After completing my BSc at the University of Exeter and MSc at the University of York, I spent a few years gaining field experience in Australia and the Bahamas.





Whitney Parker
PhD Student
Luijckx Group

My name is Whitney, and I am a new PhD student in Dr. Pepijn Luijckx's lab. I will be conducting research on how genetic diversity and changes in host density affect the spread of diseases by using *Daphnia magna* as a model organism. Before entering the PhD program, I completed my master's degree in Biodiversity & Conservation at TCD.

Emma King
Research Assistant
Donohue Group

Hi, my name's Emma and I'm a new research assistant on the Nature+Energy project. Before joining the Nature+Energy team, I received my bachelor's degree in Zoology from NUIG and then completed my MSc in Biodiversity & Conservation in Trinity College where I conducted research investigating conservation measures for pollinators within urban environments.

OPEN POSITIONS

PhD Opportunity

The Developmental Biology group have funding available for a PhD student for a four-year period. The research will contribute to the international collaborative project **Design of Genetically Engineered Tensile Load-Bearing Soft Tissues Inspired by Embryonic Tendon Development** announced here: https://www.tcd.ie/news_events/articles/scientists-secure-e1-million-grant-to-develop-synthetic-tendon-and-ligament-implants-modelled-on-embryonic-tendons/. For more information about the research and the application process please contact **Paula Murphy** (paula.murphy@tcd.ie).

Zoology in the News

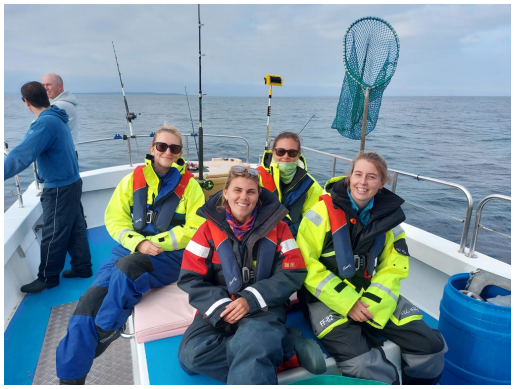
The 9th of December marks the 150th anniversary of the appointment of the first Chair of Zoology. There have been six Chairs of Zoology over this period with an median "lifespan" of 20 years. There are currently two chairs in the Discipline of Zoology: **Yvonne Buckley** (Chair of Zoology) and **Celia Holland** (Personal Chair). Another historic first is that both are women. Here is an article in the Irish Times marking this anniversary and the importance of Zoology: https://www.irishtimes.com/news/science/zoology-can-save-lives-now-we-need-it-to-save-the-planet-1.4730290

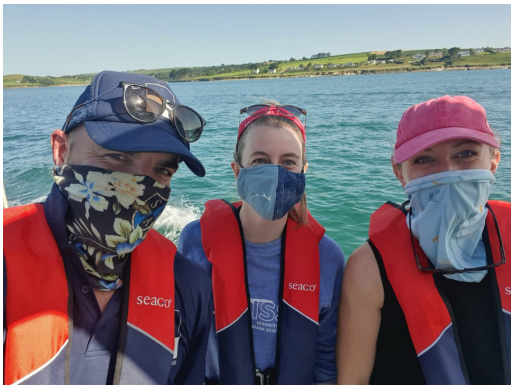
Yvonne Buckley was awarded the British Ecological Society President's medal (2021) which is awarded every two years by the President of the Society. She was also awarded the Irish Research Council Researcher of the Year Award (2021). Congratulations, Yvonne!

PROJECT FUNDING AND UPDATES

Payne Lab Field Work

The **Payne** lab blue shark research team completed the final trip of their very successful field season on November 5th. Throughout the summer, they were working closely with anglers in West Cork to study the Irish population of blue sharks, including their ecology, physiology and reproductive behaviours. This research will be included in the PhD theses of **Jenny Bortoluzzi** and **Lucy Harding** and is funded by the IRC and SFI. All work is carried out under ethical licensing by the HPRA. Find out more about this research at www.thepaynelab.com.





The role of helminth parasites in host invasion: a freshwater fish system

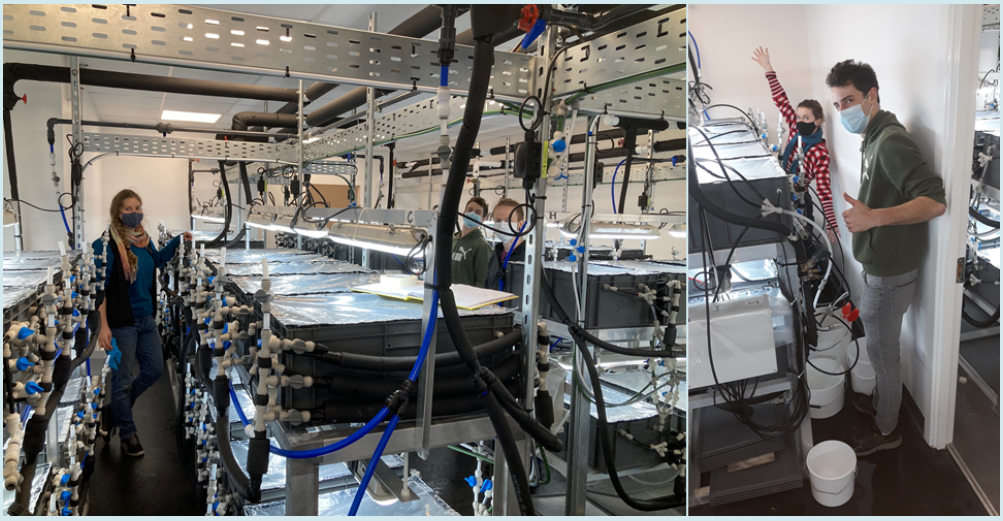
Dr. Paula Tierney was awarded her PhD entitled "The role of helminth parasites in host invasion: a freshwater fish system" on the 7th of December. Congratulations Paula!

2021 W.C. Campbell Postgraduate Teaching Award

Jenny Bortoluzzi, in the 4th year of her PhD, was awarded the 2021 W.C. Campbell Postgraduate Teaching award. This prize was established in 2017 by a gift from Professor William C. Campbell from his 2015 Nobel Prize in Physiology or Medicine and is a token of gratitude for Prof. Campbell's undergraduate education in the Natural Sciences. It is awarded annually, on the recommendation of the Head of Zoology to a postgraduate student in Zoology for excellence in teaching and mentoring undergraduate students. Congratulations, Jenny!

Mescosms on the move!

The E3 construction works at the Zoology building, and particularly the renovations of the basement, meant that a new home was needed for Zoology's recently installed experimental platform of marine mesocosms (QIMS). Moving the mesocosms required a huge effort from contractors, Zoology technical staff and **Dr Nessa O'Connor's** research group, and they are now at their new home in Park Lane, next to the Samuel Beckett Theatre. QIMS (Quantifying the Impacts of Multiple Stressors) is an experimental platform used to test for effects of of changing environmental conditions, such as those expected with climate change, on marine organisms. The system is comprised of 96 independent seawater tanks, which each hold 32 L seawater, that can be manipulated to investigate how the effects of multiple stressors, such as ocean warming and acidification, affect the structure and functioning of benthic marine species and model assemblages. The sophisticated control system allows users to control temperature and carbonate concentration in individual tanks and in combination with other factors such as nutrient levels can mimic a multitude of real-life scenarios in the tanks. At the moment, tests are being run to ensure that all tanks perform to the highest standards and an initial experiment with kelps (large brown seaweed) is planned for the new year. If you are interested to find out more about the facility or would like to visit, please get in contact with our group.



(Mesocosms in their new home at Park Lane)

The stability of ecosystems under global environmental change

Dr. Sam Ross successfully defended his PhD in November. Sam was supervised by **Dr. Ian Donohue** for his PhD entitled "*The stability of ecosystems under global environmental change*." Across several case studies, his work showed how various global change drivers (species extinctions, climate change, land-use) can erode ecological stability, but that biodiversity can provide resilience to global change. Sam collaborated with colleagues in Zoology and beyond, using a mix of methods including theory, a field experiment in Northern Japan (in collaboration with Hokkaido University), and high-resolution acoustic monitoring data from Okinawa, Japan (in collaboration with Okinawa Institute of Science & Technology Graduate University [OIST]). Sam's PhD was funded by the Irish Research Council with support from a Trinity College Dublin Ussher scholarship and the National Geographic Society. Sam is now a Postdoctoral Scholar in a new research group at OIST, where he is continuing his work on ecological stability with a sea view.

All-Island Climate and Biodiversity Research Network

Yvonne Buckley is a co-chair of the All-Island Climate and Biodiversity Research Network (www.aicbrn.net) and has received funding from the National Park & Wildlife Service for a network officer to coordinate the AICBRN activities following the successful launch by the Taoiseach and deputy First Minister of Northern Ireland. https://www.youtube.com/watch?v=VPNSzdm-RtU

Design of Genetically Engineered Tensile Load-Bearing Soft Tissues Inspired by Embryonic Tendon Development

The **Murphy** group has been awarded a four-year grant from SFI for a collaborative project with Penn State University and Queens University on tendon development. The project is entitled Design of Genetically Engineered Tensile Load-Bearing Soft Tissues Inspired by Embryonic Tendon Development. This builds on current work collaborating with Penn State funded by the NIH. The new project is funded under a US-Ireland Partnership Programme with SFI providing funding to the **Murphy** group, the National Science Foundation (US) providing funding to the Szczesny group in Penn State and the NI Department of Finance providing funding to the McCarthy group in Queens University Belfast. The project will investigate how tendons develop and explore how to apply that knowledge to the building of tensile load-bearing tissue in vitro that could be used to repair diseased and damaged tendons and ligaments. See press release here. https://www.tcd.ie/news_events/articles/scientists-secure-e1-million-grant-to-develop-synthetic-tendon-and-ligament-implants-modelled-on-embryonic-tendons/

UNI-ECO Update

The EU funded project UNI-ECO is a partnership between five EU Universities (Trinity, U Montpellier, Utrecht University, U Barcelona and Etvos Lorand Univ, Budapest) and aims to build capacities for more sustainable campuses, sharing knowledge and experiences and building a road map for other Universities to follow. Trinity project leadership comes from the Zoology Department (**Paula Murphy**), and we were proud to host the first UNI-ECO Summer School from July 19th to 22nd. Over 270 participants registered from across six European countries. Guest presenters included Dr Shane Timmons, Behavioural Psychology Unit of the ESRI, Mindy O'Brien, co-ordinator of VOICE Ireland and our own Prof **Marcus Collier**. The Summer School launched a number of E-learning modules that will be made available to all staff and students across the Universities and showcased Green Challenge projects being carried out by student and staff teams. The winning Green Challenge project is being carried out by a Trinity team entitled Sustainable Period Products.

LATEST PUBLICATIONS

Buckley, Y.M. and **Puy, J.** (2021). The macroecology of plant populations from local to global scales. *New Phytologist*. https://doi.org/10.1111/nph.17749

Gilson, A.R., Smale, D.A., Burrows, M.T. and **O'Connor, N.E.** (2021). Spatio-temporal variability in the deposition of beach-cast kelp (wrack) and inter-specific differences in degradation rates. *Marine Ecology Progress Series* 674, 89-102. https://doi.org/10.3354/meps13825

Holland, C.V. and Else, K.J. (2021). Editorial. Lessons from studying roundworm and whipworm in the mouse: common themes and unique features. Parasitology 148(14), 1717–21. DOI: https://doi.org/10.1017/S0031182021001451

Holland, C.V. and Nesheim, M. (2021). In Memoriam Lani Stephenson (1948–2021): a scientific pioneer of human nutrition and parasitic disease studies. *Parasitology* 148(9), 1116 – 17. https://doi.org/10.1017/S0031182021000731

McManus, A., **Holland, C.V.**, Henttonen, H. and Stuart, P. (2021). The invasive Bank Vole (Myodes glareolus): a model system for studying parasites and ecoimmunology during a biological invasion. *Animals* 11(9), 2529. DOI: https://doi.org/10.3390/ani11092529

Morgado, J.M.S. and Brønstad, A. (2021). Experimental Design and Reproducibility in Preclinical Animal Studies. https://link.springer.com/book/10.1007/978-3-030-66147-2

Murren, C.J., **Puy, J.**, Kohler, C., Malo, J.E. and Sancho, G. (2021). Root variation in common gardens: divergent responses in native and non-native field sites of an annual ruderal Mediterranean plant. *International Journal of Plant Sciences*, 183(1), https://doi.org/10.1086/717295

Peterson, B.E., Rolfe, R.A., Kunselman, A., **Murphy, P.** and Szczesny, S.E. (2021). Mechanical stimulation via muscle activity is necessary for the maturation of tendon multiscale mechanics during embryonic development. *Frontiers in Cell and Developmental Biology*, 2471. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8446456/

Puy, J., Carmona, C.P., Hiiesalu, I., Öpik, M., de Bello, F., Moora, M. (2021). Mycorrhizal symbiosis alleviates plant water stress within and across plant generations via phenotypic plasticity. *Journal of Ecology*. https://doi.org/10.1111/1365-2745.13810

Rolfe, R.A., Shea, C.A., and **Murphy, P.** (2021). Geometric analysis of chondrogenic self-organisation of embryonic limb bud cells in micromass culture. *Cell and Tissue Research*. In Press. Full text available through TARA here http://www.tara.tcd.ie/handle/2262/97615

Ross, S.R.J., **Arnoldi, J.F.**, Loreau, M., White, C.D., Stout, J.C., **Jackson, A.L.** and **Donohue, I.** (2021). Universal scaling of robustness of ecosystem services to species loss. *Nature Communications* 12(1), 1-7. doi: https://doi.org/10.1038/s41467-021-25507-5

Ross S.R.J., **García Molinos, J.**, Okuda, A., Johnstone, J., Atsumi, K., Futamura, R., **Williams, M.W.**, Matsuoka, Y., Uchida, J., Kumikawa, S., Sugiyama, H., Kishida, O., **Donohue, I.** (2021). Predators mitigate the destabilising effects of heatwaves on multitrophic stream communities. *Global Change Biology*. In Press. doi: https://doi.org/10.1111/gcb.15956

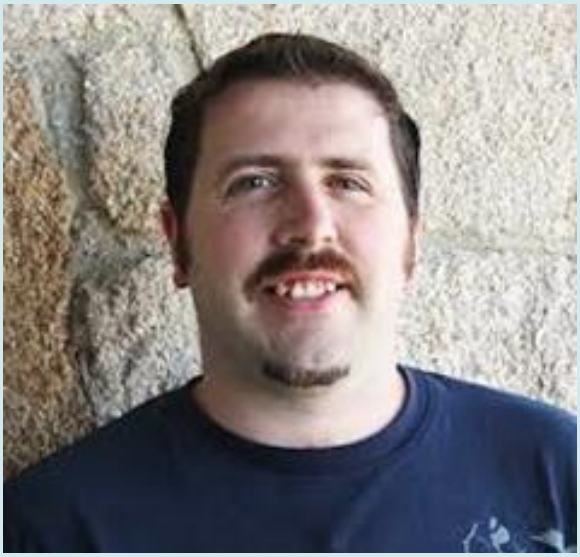
Shea, C.A. and **Murphy, P.** (2021). The primary cilium on cells of developing skeletal rudiments; distribution, characteristics and response to mechanical stimulation. *Frontiers in Cell and Developmental Biology* 9. https://www.frontiersin.org/articles

OTHER ACTIVITIES

Yvonne Buckley is now a Board member of the Zoological Society of Ireland and a member of the Conservation & Research committee. She is looking forward to exploring teaching programmes with Dublin Zoo & Fota and also contributing to their new conservation & research strategy. If anyone would like to discuss any links (teaching or research) with the Zoo and how they can be deepened and developed please get in touch with Yvonne.

Congratulations to **Jessie Dolliver** who has successfully completed her MSc thesis, "*Evaluating the status and prospects of blue carbon in Ireland and the NE Atlantic*", and has now started a PhD at the Department of Plant Sciences, University of Oxford.

WHERE ARE THEY NOW?

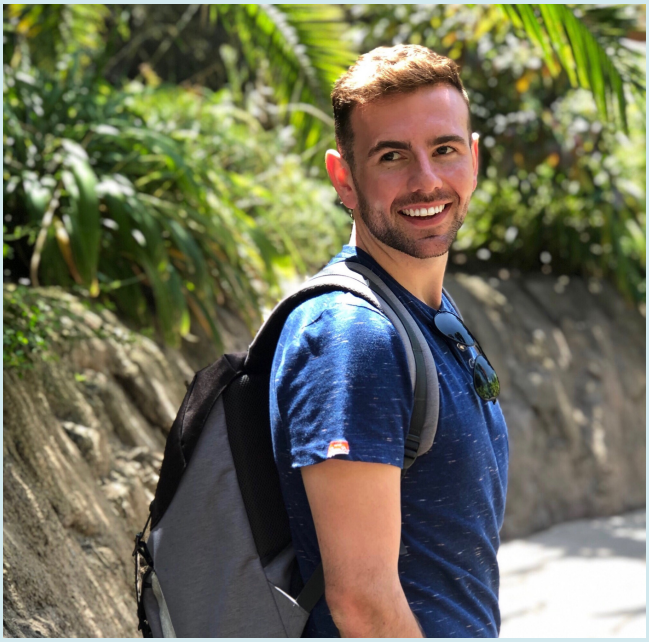


Dr. David Duffy

Dr. David Duffy obtained a B.A. in natural sciences from Trinity College Dublin, Ireland. He earned his Ph.D. in zoology from the National University of Ireland, Galway, and held postdoctoral and research fellow positions at University College Dublin's Systems Biology Ireland, the University of Florida's Whitney Laboratory and Bangor University's Environment Centre Wales. He started his own lab at the University of Limerick, Ireland, and he recently moved to the Whitney Laboratory as an Assistant Professor of Wildlife Disease Genomics.

Dr. Andrew Mooney

Andrew completed his PhD with Prof. **Yvonne Buckley** in 2020 and is now a Conservation and Research Officer at Dublin Zoo, helping to manage Dublin Zoo's conservation and research activities both locally and globally. His PhD focused on how we can use globally shared zoo and aquarium data to promote species conservation and enhance population management, so the jump to 'industry' was a logical one for him following his PhD. His role is an integral part of the zoo's 10-Year-Vision and ensures that a coordinated and evidence-based approach is applied to Dublin Zoo's conservation and research activities moving forward, including a greater focus on native species conservation and building key educational and research partnerships with third-level institutions. If you would like to get in touch please email him at Andrew.Mooney@dublinzoo.ie.



Edited by Whitney Parker (@whitneyk127)

Do you have news to share in the next issue of ZooBytes? Whether staff or student, if you have news (big or small!) get in touch with me at parkerw@tcd.ie using the email subject “ZooBytes.”

Are you a Zoology Alumnus doing something interesting? We’d love to hear what you’re up to and include you in the next issue’s "Where are they now?" section.

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