## Academic curriculum vitae and publication list

### Dr. John Joseph Cawley

Research Institution Institut für Paläontologie, University of Vienna, Althanstrasse 14 (UZA II); 1090 Vienna, Austria. E-mail: <u>cawleyj84@univie.ac.at</u> Phone: +43 6645633659 <u>https://orcid.org/0000-0002-3703-4138</u> http://evomorg.org <u>https://www.researchgate.net/profile/John-Cawley-2</u>

#### **EDUCATION**

November 2016 – October 2021: University of Vienna, Department of Palaeontology

**PhD in Natural Sciences.** Taught units: Evolution of Vertebrata, Methods of Palaeobiology, Topics in Palaeontology, Comparative Anatomy and Morphology of Native Fishes.

**Thesis:** New perspectives on pycnodont fishes (Neopterygii, Pycnodontiformes) concerning evolutionary success, niche partitioning, extinction and taxonomy.

**Research Project:** Various topics relating to pycnodont fishes are discovered here. The primary aim was to investigate both the evolutionary success and extinction of this diverse clade of Mesozoic bony fishes. Pycnodonts were compared to numerous fish clades in a morphospace analysis to measure the degree of competition with these groups and overall morphological disparity through time. The diversity of pycnodonts was also compared to abiotic factors such as climate ansd sea level to see if they played any part in diversification/extinction. Results showed that pycnodonts was little affected by competition with other clades and had the highest disparity of any non teleost fish group studied. Abiotic factors studied were not correlated with extinction but a new hypothesis is produced based on evidence of changes in reef area over time that habitat loss could have played a part in pycnodont extinction. Additional findings form this PhD was the description of three new pycnodont species from the Late Cretaceous, sexual dimorphism in a gladiopycnodontid and using geometric morphometrics to resolve the taxonomic status of *Pycnodus* from the Bolca Lagerstätte of the Eocene.

October 2010 - October 2011: University of Bristol, Department of Earth Sciences

**MSc in Palaeobiology (Distinction).** Taught units: Vertebrate Palaeobiology and Evolution, Scientific Communication, Current Controversies, Research and Systematic Methods, Early Human Origins, Taphonomy and Palaeoecology.

Thesis: The *Pachycormus* of Strawberry Bank and its relationship to the teleost fishes.

**Research Project:** I studied in detail the anatomy of 100 exquisitely preserved specimens of the genus *Pachycormus*, from the Upper Lias of llminster, Somerset, one of the most ancient teleost fishes. This revision of the family Pachycormidae allowed the revision of the phylogeny of basal teleosts. The work involved systematic description and detailed drawing of the anatomy of these fishes and cladistic analysis. The results showed that aspidorhynchids were basal teleosts with pachycormids as the closest sister group.

June 2009: National University of Ireland, Galway (NUIG).

**BSc degree in Zoology.** 2:1 honours. Taught units: Mammal Evolution, Wildlife Conservation, Fresh Water Ecology, Phylogenetics, Climate Change Effects on Marine Habitats, Stem Cell Research and Evolutionary Development.

My subjects in previous years included: botany, chemistry, zoology, microbiology, and marine ecology.

**Thesis:** Benthic Habitat Quality of the Barrow Estuary in Co. Waterford, Ireland.

**Synopsis:** The environmental quality of the Barrow Estuary was assessed by collecting and counting benthic fauna. Environmental variables such as grain size, salinity, organic carbon content was measured and data models were created from the results using the computer program PRIMER 6. A biotic index of habitat quality e.g AMBI (AZTI Marine Biotic Index), was then applied to each station; low scores suggested organisms sensitive to ecological change thrived, therefore the habitat was undisturbed, whereas high scores suggested tolerant organisms which lived in extremely disturbed habitats. The results show that it was hard to distinguish between man-made and naturally occurring causes in waters with mixed salinity. Biodiversity was highest in waters with low levels of pollution and was predominantly freshwater or saltwater.

## WORK EXPERIENCE

**November 2016-November 2019:** University of Vienna, Faculty of Earth Sciences, Geography and Astronomy, Department of Palaeontology, UZA 2, Geocentre, Althanstr. 14, 1090 Vienna **Position:** Palaeontologist.

**Responsibilities:** I wrote taxonomic descriptions of three new species of pycnodont fish, performed geometric morphometrics on both body and jaw shape to answer both taxonomic and ecological questions regarding pycnodont success and competition, perfommed disversity analyses of pycnodotn fishes in R and published my research in peer reviewed articles qwhich is listed below.

**August 2013-November 2013**: Bristol Regional Environmental Records Centre (BRERC), St Nicholas Church, St Nicholas Street, Bristol, BS1 1UE.

**Position:** Data entry.

Responsibilities: I investigated old ecological surveys from the Bristol/Bath/Gloucestershire area and combed through them to see if data could be added to the BRERC database. This data includes Species present, Priority habitats, Badger setts present, etc. Whatever new species data I obtained from these reports were also added onto the species database.

**April – September 2008:** Galway Atlantaquaria, National Aquarium of Ireland, the Prom, Salthill, Galway, Ireland.

**Position:** Tour guide.

Responsibilities: I gave tours to people around the rock pool and touch pool area and answered visitors' questions on the animals in the aquarium and in the local area. Additionally I also showed people the correct way to interact with animals such as crabs and starfish. During science week in the aquarium, I assisted teachers by going on beach walks with the classes and showing the children the animals found around the shore line, and explaining their behaviour.

# ACADEMIC PUBLICATIONS

**Cawley, J.J.,** Villalobos-Segura, E., Kriwet, J., in prep. Is Coccodontoidea valid? The phylogenetic placement of the armoured pycnodonts of Lebanon within Pycnodontiformes and the utility of homoplasy in resolving relationships within a phylogeny.

**Cawley, J.J.,** Kriwet, J., 2024. The Fossil Record and Diversity of Pycnodontiform Fishes in Non-Marine Environments. *Diversity*, 16, p.225.

**Cawley, J.J,** Marramà, G., Carnevale, G., Villafaña, J.A., López-Romero, F., Kriwet, J., 2021. The rise and fall of †Pycnodontiformes: Diversity, competition and extinction of a successful fish clade. *Ecology and Evolution*, 11: 1769-1796.

**Cawley, J.J.,** Lehmann, J., Wiese, F., Kriwet, J., 2020. Some like it hot: A new early Turonian pycnodont fish, *Njoerdichthys schultzei*, advocates climate-mediated northward migration as response to global warming during the Cretaceous thermal maximum. *Cretaceous Research*, 116, p.104590.

**Cawley, J.J.,** Kriwet, J., 2019. A new genus and species of pycnodontid fish *Flagellipinna rhomboides*, gen. et sp. nov.(Neopterygii, Pycnodontiformes), from the Upper Cretaceous (Cenomanian) of Lebanon, with notes on juvenile form and ecology. *Journal of Vertebrate Paleontology*, p.e1614012.

**Cawley, J.J.,** Kriwet, J., Klug, S., Benton, M.J., 2018. The stem group teleost *Pachycormus* (Pachycormiformes: Pachycormidae) from the Upper Lias (Lower Jurassic) of Strawberry Bank, UK. *PalZ*, pp.1-18.

**Cawley, J.J.,** Marramà, G., Carnevale, G., Kriwet, J. 2018. A quantitative approach to determine the taxonomic identity and ontogeny of the pycnodontiform fish *Pycnodus* (Neopterygii, Actinopterygii) from the Eocene of Bolca Lagerstätte, Italy. *PeerJ*, 6, p.e4809.

**Cawley, J.J.,** Kriwet J. 2018. A new pycnodont fish, *Scalacurvichthys naishi* gen. et sp. nov., from the Late Cretaceous of Israel. *Journal of Systematic Palaeontology*, 16, pp 659–673.

**Cawley, J.J.,** Kriwet J. 2017. Possible sexual dimorphism in *Pankowskichthys libanicus* (Neopterygii, Pycnodontiformes) from the Cenomanian of Lebanon. *Research and Knowledge*, 3, pp 33-35.

## **CONFERENCE ABSTRACTS**

**Cawley, J.J.** & Kriwet, J. 2018. Pycnodonts: Could they be the true sister group to teleost fishes?. – In: Schwarz, C., Zimmermann, D. & Kriwet, J. (eds): 19. Jahrestagung Gesellschaft für Biologische Systematik, Abstract volume: 12; Verlag Dr. Friedrich Pfeil, Munich.

Kriwet, J., Marramà, G. & **Cawley, J.J.** 2018. Predicting competition between †Pycnodontiformes and Ginglymodi (Osteichthyes, Neopterygii) through geologic time based on quantitative analyses of lower jaw features. – 5 th International Paleontological Congress, Abstract Volume: 440, Paris.

Kriwet J., Marramà, G., Carnevale, G. & **Cawley, J.J.** 2019. Drivers of taxonomic and functional diversity in extinct non-teleostean neopterygians (Osteichthyes, Actinopterygii). – Journal of Morphology, Supplement 280 (International Congress of Vertebrate Morphology (ICVM) Abstract Issue): 156.

Kriwet, J., Marramà, G., Carnevale, G. & **Cawley, J.J.** 2019. Success and demise of pycnodont fishes (Neopterygii, †Pycnodontiformes). – In: Nützel, A., Reichenbacher, B. & Krings, M. (eds): Paleo & Life – Abstracts of the 90 th Annual Meeting of the Paläontologische Gesellschaft, Munich: 85; SNSB-BSPG, München.

**Cawley, J.J.,** Marramà, G., Carnevale, G. & Kriwet, J. 2019. Investigation of the evolutionary success and extinction of pycnodont fishes using quantitative methods. Abstracts of the 79th Annual Meeting of the Society of Vertebrate Paleontology: 76.

## ACADEMIC GRANTS

2017: SYNTHESYS FR-TAF-6568: Visit to the MNHN, Paris as part of my PhD research on pycnodont fishes.