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Curriculum vitae

Academic studies and career

Maternity leave: 2019-2021 and 2022-2024

09/2020 – 08/2023	employed in FWF project P 33736 (PI: P. Mitteröcker; Unit of Theoretical Biology): Evolvability of inner and middle ear in birds and mammals
since 05/2017	Head of micro-CT facility
2009 – 2012	Research Associate (Institute of Palaeontology & Unit of Theoretical Biology, University of Vienna, Austria) Lecturer (Institute of Palaeontology, Institute of Integrative Zoology, University of Vienna, Austria)
2012 – 2017	Postdoctoral Assistant (Institute of Palaeontology, University of Vienna, Austria)
since 7/2012	Postdoctoral assistant at the Institute of Palaeontology, University of Vienna, Austria
2009 – 2012	Dissertation at the Steinmann-Institut für Geologie, Mineralogie und Paläontologie, University of Bonn, Germany <u>PhD thesis (online published):</u> Phylogenetic and functionalmorphological adaptations of the ear region in the squirrel-related clade (Rodentia: Mammalia)
2002- 2008	University of Tübingen, Germany

Diploma degree in biology

Major subject: zoology

Minor subjects: animal physiology, clinical pharmacology

Diploma thesis:

Functionalmorphological and ecomorphological adaptations of a locomotory specialist: the musculotendinous system of *Carapus acus* (Teleostei: Carapidae)

Academic awards and grants

01/2016	Scientific & Technological Cooperation with France (Amandée: OED: No: FR 09/2016): 2 years (2016-2017) in cooperation with N. Schnell (Museum national d'Histoire naturelle Paris, France) Topic: 'Diel vertical migrations: how does it affect the musculotendinous system of mesopelagic fishes.'
09/2011	One of the best ranked candidates for <i>Zukunftspreis für junge Paläontologen</i> at the 82 nd Annual meeting of the <i>Paläontologische Gesellschaft</i> , Vienna, Austria
10/2011	Travel grant of FAZIT-foundation (<i>Frankfurter Allgemeine Zeitung</i>) to Las Vegas, USA (Meeting of the Society of Vertebrate Paleontology)
10/2010	Travel grant of FAZIT-foundation to Pittsburgh, USA (Meeting of the Society of Vertebrate Paleontology)
03/2010	PhD-grant of FAZIT-foundation (2 years)

Public relations activities

- 'Lange Nacht der Forschung' in 2014, 2016, 2018 (University of Vienna)
- 'Campus Festival' (650th Anniversary of the University of Vienna): Paläontologie – Die Entschlüsselung der Natur
- Special exhibition of the Natural History Museum Vienna: 'Das Wissen der Dinge'

Scientific recognitions

Co-Organisation of the ‘Arbeitskreistreffen der Wirbeltierpaläontologie in der Paläontologischen Gesellschaft’ 2019 (Vienna, Austria)

Organisation of symposium at the 5th ‘International Palaeontological Meeting’ 2018 (IPC; Paris, France): Functional Morphology of the head in Vertebrates’

Head-Organisation of the 18th Annual Meeting of the ‘Gesellschaft für Biologische Systematik’ 2018 (Vienna, Austria)

Organisation of symposium at the 11th ‘International meeting of Vertebrate morphology’ 2016 (Washington, DC): Show me your ear – The inner and middle ear in vertebrates

Organisation of symposium at the 87th Annual Meeting of the ‘Paläontologische Gesellschaft’ (Dresden, Germany): Evolutionary aspects of vertebrate functional morphology.

Organisation of the ‘6th International Meeting of Mesozoic Fishes – Diversification and Diversity Patterns’ in 2013 (Vienna)

Language Skills

- English (excellent command)
- Spanish (basic communication skills)
- French (basic communication skills)

Additional Skills

- Micro-CT expert: micro-CT devices vltomeX (GE phoenix), SkyScan 1173 (Bruker)
- Software: 3D software (Amira, Avizo, Drishti, Skyscan Software, Polyworks, Mimics, Meshlab, Dragonfly); Analysing software (R, Mesquite, PAUP, MacClade)

Memberships/Editor

- since 2020: Board member of Gesellschaft für Biologische Systematik', Germany (Rensch-person in authority)
- 2017-2020: Chief executive of the 'Gesellschaft für Biologische Systematik', Germany
- Associate Editor of 'Organism, Diversity and Evolution' for Vertebrates
- 2017-2019: Member of advisory board of the 'Paläontologische Gesellschaft', Germany

Publications: Peer reviewed articles (pdfs on demand)

2024

Grunstra, N.D.S., Hollinetz, F., Bravo Morante, G., Zachos, F., **Pfaff, C.**, Winkler, V., Mitteroecker, P., Le Maître, A. Convergent evolution in Afrotheria and non-afrotherians demonstrates high evolvability of the mammalian inner ear. *Nature Communications*, 15: 7869

2023

Lambert, O., Wanzenböck, G., **Pfaff, C.**, Louwyd, S., Kriwet, J., Marx, F.G. First eurhinodelphinid dolphin from the Paratethys reveals a new family of specialised echolocators. *Historical Biology*, 35: 1074-1091.

Felix, E.J., Mánuel, J.M. Litrán, R., Rodríguez, M.A., Román-Sánchez, S., Lahoz, R., Natividad, E., Fernández-Ponce, C., Garcia-Cozar, F., Llaguno-Munive, M., Abasolo, I., Yeste, P., **Pfaff, C.**, Kriwet, J., Bomati-Miguel, O. Scanning pulsed laser ablation in liquids: An alternative route to obtaining biocompatible YbFe nanoparticles as multiplatform contrast agents for combined MRI and CT imaging. *Cermaics International*, 49: 9324-9337

2022

Yeste, M.P., Fernández-Ponce, C., Felix, E., Tinoco, M., Fernández-Cisnal, R., García-Vilar, C., **Pfaff, C.**, Kriwet, J., Natividad, E., Cauqui, M.A., García-Cózar, F., Litrán, R.

& Bomati-Miguel, O. Solvothermal Synthesis and Characterization of Ytterbium/Iron Mixed Oxide Nanoparticles with Potential Functionalities for Applications as Multimodal Contrast Agent in Medical Image Techniques. *Ceramics International*, 48: 31191-31202

Happ, J., Elsler, A., Kriwet, J., **Pfaff, C.** & Bochenksi, Z.M. Two passeriform birds (Aves: Passeriformes) from the Middle Miocene of Austria. *PalZ*, 96: 313-321.

Schnell, N.K., Kriwet, J., López-Romero, F.A., Lecointre, G. & **Pfaff, C.** The musculotendinous system of mesopelagic fishes, part I: Stomiiformes (Teleostei). *Journal of Anatomy*, 240: 1095-1126.

Schade, M., Stumpf, S., Kettler, C., Kriwet, J. & **Pfaff, C.** 2022. Neuroanatomy of the nodosaurid *Struthiosaurus austriacus* (Dinosauria: Thyreophora) supports potential ecological differentiations within Ankylosauria. *Scientific Reports*, 12, 144.

2021

Feichtinger, I., Ivanov, A.O., Winkler, V., Dojen, C., Kindlimann, R., Kriwet, J., **Pfaff, C.**, Schraut, G. & Stumpf, S. 2021. Scarce ctenacanthiform sharks from the Mississippian of Austria with an analysis of Carboniferous elasmobranch diversity in response to climatic and environmental changes. *Journal of Vertebrate Paleontology*, 41: e192590 (14 pp.).

2020

Le Maître, A., Grunstra, N.D.S., **Pfaff, C.**, & Mitteroecker, P. Evolution of the mammalian ear: An evolvability hypothesis. *Evolutionary Biology*, 47: 187-192.

López-Romero, F., Stumpf S., **Pfaff, C.**, Marramà G., Johanson, Z. & Kriwet, J. Evolutionary trends of the conserved neurocranium shape in angel sharks (Squatiniformes, Elasmobranchii). *Scientific Reports*, 10: 12582

Jambura, P.L., Türtscher, J., Kindlimann, R., Metscher, B., **Pfaff, C.**, Stumpf, S., Weber, G. & Kriwet, J. Evolutionary trajectories of tooth histology patterns in modern sharks (Chondrichthyes, Elasmobranchii). *Journal of Anatomy*, 236: 753-771

Ferreira, G.S., Lautenschlager, S., Evers, S.W., **Pfaff, C.**, Kriwet, J., Raselli, I. & Werneburg, I. Feeding biomechanics suggests progressive correlation of skull architecture and neck evolution in turtles. *Scientific Reports*, 10, 5505.

2019

Pfaff, C., Kriwet, J., Johanson, Z. Ontogenetic development of the otic region of the new model organism, *Leucoraja erinacea* (Chondrichthyes, Rajidae). *Earth and Environmental Science Transactions of the Royal Society of Edinburgh*, 109, 1-2, 105- 114.

Pfaff, C., Kriwet, J., Kyle, M. & Johanson, Z. 3D models related to the publication: Ontogenetic development of the otic region in the new model organism, *Leucoraja erinacea* (Chondrichthyes; Rajidae). *M3 Journal*, 5: e78

Schwab, J. A., Kriwet, J., Weber, G. W., **Pfaff, C.** Carnivoran hunting style and phylogeny reflected in bony labyrinth morphometry. *Scientific reports*, 9, 70.

Kriwet, J. & **Pfaff, C.** Evolutionary development of the appendicular skeleton in fishes. In Johanson, Z., Underwood, C. & Richter, M. (eds.). *Evolution and Development of Fishes*. Cambridge University Press, Cambridge. S. 188-209.

Schnetz, L., **Pfaff, C.**, Libowitzky, E., Johanson, Z., Stepanek, R. & Kriwet, J. Morphology and evolutionary significance of phosphatic otoliths within the inner ears of cartilaginous fishes (Chondrichthyes). *BMC Evolutionary Biology*, 19, 238: 1-13

Jambura, P.L., Kindlimann, R., Marramà, G., **Pfaff, C.**, Stumpf, S., Türtscher, J., Underwood, C.J., Ward, D.J. & Kriwet, J. Micro-computed tomography imaging reveals the development of a unique tooth mineralization pattern in mackerel sharks (Chondrichthyes; Lamniformes) in deep time. *Scientific Reports*, 9, 9652: 1-13

2018

Pfaff, C., Schultz, A. J., Schellhorn, R. The Vertebrate Inner and Middle Ear: A short overview. *Journal of Morphology*. doi:10.1002/jmor.20880

Jambura, P., **Pfaff, C.**, Underwood, C. J., Ward, D. J. Kriwet, J. Tooth mineralization and histology patterns in extinct and extant snaggletooth sharks, *Hemipristis* (Carcharhiniformes, Hemigaleidae) – Evolutionary significance or ecological adaptations? PlosOne 13(8):e0200951.

Fuchs, I., Engelbrecht, A., **Pfaff, C.**, Kriwet, J. Identifying hidden secrets of shark teeth (Chondrichthyes, Elasmobranchii) using sophisticated approaches. Berichte der Geologischen Bundesanstalt 128.

Jambura, P., **Pfaff, C.**, Türtscher, J., Underwood, C. J., Ward, D., Kriwet, J. The phylogenetic relevance of the unique tooth histology in lamniform shark teeth. Pfeil Verlag (19. Jahrestagung der Gesell. für Biologische Systematik 2018). 22-22.

Türtscher, J., **Pfaff, C.**, Jambura, P., Kriwet, J. Using tooth histology to distinguish morphological similar shark teeth. Pfeil Verlag (19. Jahrestagung der Gesell. für Biologische Systematik 2018). 51-51.

2017

Pfaff, C., Czerny, S., Nagel, N., Kriwet, J. Functional morphological adaptations of the bony labyrinth in marsupials (Mammalia, Theria). Journal of Morphology. DOI: 10.1002/jmor.20669

Johanson, Z., Smith, M., Sanchez, S., Sender, T., Trinajstic, K., **Pfaff, C.** Questioning hagfish affinities of the enigmatic Devonian vertebrate *Palaeospondylus*. Royal Society Open Science 4:179214. DOI: 10.1098/rsos.170214

Stumpf, S., Ansorge J., **Pfaff, C.**, Kriwet, J. Early Jurassic diversification of pycnodontiform fishes (Actinopterygii, Neopterygii) after the end-Triassic extinction event: Evidence from a new genus and species, *Grimmenodon aureum*. Journal of Vertebrate Palaeontology, 37(4).

Huber, C., Abert, C., Bruckner, F., **Pfaff, C.**, Kriwet, J., Groenefeld, M., Teliban, I., Vogler, C. & Suess, D. Topology optimized and 3D printed polymer-bonded permanent magnets for a predefined external field. Journal of Applied Physics, 122: 053904

Schnetz, L., **Pfaff, C.**, Libowitzky, E., Stepanek, R., Kriwet, J. The Evolutionary Significance of Phosphatic Otoliths in Cartilaginous Fishes (Chondrichthyes, Elasmobranchii). Zitteliana, 91:81

2016

Kriwet, J., Engelbrecht, A., Mörs, T., Reguero, M., **Pfaff, C.** 2016. Ultimate Eocene (Priabonian) chondrichthyans (Holocephali, Elasmobranchii) of Antarctica. *Journal of Vertebrate Paleontology* (accepted)

2015

Pfaff, C., Martin, T., Ruf, I. 2015. Bony labyrinth morphometry indicates locomotor adaptations in the squirrel-related clade (Rodentia, Mammalia). *Proceedings of the Royal Society London, Biological Series*. DOI 10.1098/rspb.2015.0744

Pfaff, C., Martin, T., Ruf, I. 2015. 'Septal compass' and 'Septal Formula': A New Method for Phylogenetic Investigations of the middle ear region in the Squirrel-related clade. *Organisms, Diversity, and Evolution* 15: 721-730. DOI:10.1007/s13127-015-0222-x

Smith, M. M., Riley, A., Fraser, G. J., Underwood, C., Welten, M., Kriwet, J., **Pfaff, C.**, Johanson, Z. 2015. Early development of rostrum saw-teeth in a fossil ray tests classical theories of the evolution of vertebrate dentitions. *Proceedings of the Royal Society London, Biological Series* 282: 20151628.

2012

Billet, G., Hautier, L., Asher, R. J., **Schwarz, C.**, Crumpton, N., Martin, Th. & Ruf, I. 2012. High morphological variation of vestibular system accompanies slow and infrequent locomotion in three-toed sloths. *Proceedings of the Royal Society London, Biological Series* 279: 3932-3939.

Schwarz, C., Parmentier, E., Wiehr, S., Gemballa, S. 2012. The locomotory system of pearlfish *Carapus acus*: What morphological features are characteristic for highly flexible fishes? *Journal of Morphology* 273(5): 519-529

Published conference presentations

Fuchs, I., Engelbrecht, A., **Pfaff, C.**, Kriwet, J. 2018. Identifying hidden secrets of shark teeth (Chondrichthyes, Elasmobranchii) using sophisticated approaches. Berichte der Geologischen Bundesanstalt 128.

Jambura, P., **Pfaff, C.**, Türtscher, J., Underwood, C. J., Ward, D., Kriwet, J. 2018. The phylogenetic relevance of the unique tooth histology in lamniform shark teeth. Pfeil Verlag (19. Jahrestagung der Gesell. für Biologische Systematik 2018). 22-22.

Türtscher, J., **Pfaff, C.**, Jambura, P., Kriwet, J. 2018. Using tooth histology to distinguish morphological similar shark teeth. Pfeil Verlag (19. Jahrestagung der Gesell. für Biologische Systematik 2018). 51-51

Türtscher, J., **Pfaff, C.**, Sato, K., Tomita, T., Jambura, P., Kriwet, J. 2017. Dental ontogeny of embryonic tiger sharks (*Galeocerdo cuvier*): a link between tooth development and ovoviparous reproduction. 21st European Elasmobranch Association. Annual Scientific Conference: abstract volume. 107

Schwab, J. Kriwet, J., **Pfaff, C.** 2017. Dogs: Lifestyle Change from Arboreal to Terrestrial. 3D Reconstruction of the Bony Labyrinth. Zitteliana 91.

Schnetz, L. **Pfaff, C.**, Libowitzki, E., Kriwet, J. 2017. On the occurrence of phosphatic otoliths in cartilginous fishes (Chondrichthyes, Elasmobranchii). 21st European Elasmobranch Association. Annual Scientific Conference: abstract volume. 106

Jambura, P., **Pfaff, C.**, Underwood, C. J., Ward, D. J., Kriwet, J. 2017. Tooth mineralization and histology in the rare snaggletooth sharks, *Hemipristis elongata* (Hemigaleidae, Carcharhiniformes) – evolutionary significance or an ecological adaptation? 21st European Elasmobranch Association. Annual Scientific Conference: abstract volume. 95.

Pfaff, C., Kaineder, G., Czerny, S., Nagel, D. Kriwet, J. 2016. Functional morphological adaptations of the bony labyrinth in marsupials (Mammalia: Theria). Anatomical record (ISSN: 1932-8494).

Johanson, Z., Underwood, C. J., Fraser, G. J., Welten, M., Kriwet, J., **Pfaff, C.**, Smith, M. 2016. Diversity of skin denticles in fossil and extant rays and the origins of vertebrate dentitions. Journal of Vertebrate Palaeontology 162.

Pfaff, C., Kriwet, J. 2015. Macroevolutionary patterns of the locomotor system in non-muraenoid eels (Teleostei: Elopomorpha). Journal of Vertebrate Palaeontology. Program and abstracts 2015: 194.

Bastl, K., Nagel, D., Gunnell, G., Weber, G., Morlo, M., **Pfaff, C.** 2015. The bony labyrinth of *Hyaenodon exiguus* and a revised descriptions of the middle ear of a derived hyaenodont (Mammalia). Journal of Vertebrate Palaeontology. Program and abstracts 2015: 86.

Schwarz, C., Kriwet, J., Petrasco, M., Nagel, D. 2014. Morphological shape diversification and evolutionary history of the bony labyrinth in aeluroid carnivorans (Mammalia, Ferae). Journal of Vertebrate Paleontology. Programm and abstracts 225.

Mörs, T., Engelbrecht, A., Kriwet, J., **Schwarz, C.**, Reguero, M. 2014. Origin of Modern Antarctic Ice-Fishes (Teleostei, Notothenioidei) and the Identity of Eocene Fish Remains from Seymour Island, Antarctica. 4th International Palaeontological Congress - The history of life: A view from the Southern Hemisphere: 2019. Mendoza, Argentina

Engelbrecht, A., Kriwet, J., Mörs, T., **Schwarz, C.**, Reguero, M. 2014. Origin of Antarctic Ice-Fishes (Teleostei, Notothenioidei): Current controversies and facts. XXXIII SCAR Open Science Conference and COMNAP Symposium Success through International Cooperation: 716. Auckland, New Zealand

Engelbrecht, A., Kriwet, J., Mörs, T., **Schwarz, C.**, Reguero, M. 2014. New information on diversity pattern of Eocene Antarctic elasmobranchs (Chondrichthyes, Elasmobranchii). XXXIII SCAR Open Science Conference and COMNAP Symposium Success through International Cooperation: 407. Auckland, New Zealand

Engelbrecht, A., Kriwet, J., Mörs, T., Reguero, M. & **Schwarz, C.** 2013. New information on the cranial anatomy of ice-fishes (Teleostei, Notothenioidei) from Antarctica based on micro-CT analyse. 10. Tagung der Gesellschaft für Ichthyologie (GfI): 15.

Engelbrecht, A., Kriwet, J., Mörs, T., **Schwarz, C.**, Reguero, M. & Tambussi, C. 2013. A revision of Eocene Antarctic fishes (Vertebrata: Neopterygii: Teleostei). In Reitner, J., Qun, Y., Yongdong, W. & Reich, M. (eds): Palaeobiology and Geobiology of Fossil Lagerstätten through Earth History: 42.

Kriwet, J. & **Schwarz, C.** 2013. Phylogenetic implications of tooth replacement patterns in stem group teleosts (Neopterygii). In Reitner, J., Qun, Y., Yongdong, W. & Reich, M. (eds): Palaeobiology and Geobiology of Fossil Lagerstätten through Earth History: 91.

Schwarz, C. & Kriwet, J. 2013. New information about the palaeobiology of Enchodus sp. (Actinopterygii, Teleostei) from the Cenomanian of Lebanon. In Schwarz, C. & Kriwet, J. (eds): Abstracts 6th International Meeting on Mesozoic Fishes: 59.

Schwarz, C. & Kriwet, J. 2013. Invasive and non-invasive methods to investigate the musculotendinous system in teleost fishes (e.g. the pearlfish). Bruker microCT User Meeting 2013: 1 p. Hasselt, Belgium.

Schwarz, C. 2012. "Septal compass" and "septal formula" - a new method for phylogenetic investigations of the ear region in sciromorphs (Rodentia, Mammalia). *Terra Nostra* 2012 (3): 162.

Schwarz, C., Ruf, I. & Martin, Th. 2011. Show me your ear: Locomotory adaptations in the inner ear of Sciromorpha (Rodentia, Mammalia). *Journal of Vertebrate Paleontology* 31 (SVP Programm and Abstracts Book): 190A.

Schwarz, C., Ruf, I. & Martin, Th. 2011. Funktionsmorphologische Anpassungen des Innenohres bei Sciromorpha. *Beiträge zur Paläontologie* 32: 36.

Schwarz, C., Ruf, I. & Martin, Th. 2010. Micro-CT analysis of the ear region in *Heteroxerus costatus* (Rodentia, Mammalia). *Journal of Vertebrate Paleontology* 30 (supplement 2): 160A.

Schwarz, C., Ruf, I. & Martin, Th. 2010. 3D analysis of the inner ear in the Oligocene fossil ground squirrel *Heteroxerus costatus* (Rodentia, Mammalia). *Zitteliana B*