

CURRICULUM VITAE

Dipl.-Biol. Dr. Cathrin Pfaff

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Academic studies and career

- since 05/2017 Head of micro-CT facility
- 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)
- 2009 – 2012 Dissertation (Steinmann-Institut für Geologie, Mineralogie und Paläontologie, University of Bonn, Germany; granted by FAZIT-foundation; supervised by T. Martin)

2002- 2009 Diploma degree in Biology (University of Tübingen, Germany)

Major subject: Zoology; Minor subjects: Animal Physiology, Clinical Pharmacology

Theses

PhD thesis (online published and as separate papers): Phylogenetic and functionalmorphological adaptations of the ear region in the squirrel-related clade (Rodentia: Mammalia)

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

Academic Grants and Awards

09/2020 – 08/2023: employed in FWF Project P 33736; PI- P. Mitteröcker [Unit for Theoretical Biology]: Evolvability of inner and middle ears in birds and mammals;

01/2016 – 09/2016: Scientific & Technological Cooperation with France (Amandée: OEAD: No: FR : 2 years (2016-2017) in cooperation with N. K. Schnell-Aurahs (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 'Zukunftspreis für junge Paläontologen' at the 82nd Annual meeting of the Paläontologische Gesellschaft, Vienna, Austria

10/2011 Travel grant of FAZIT-foundation (Frankfurter Allgemeine Zeitung)

10/2010	Travel grant of FAZIT-foundation
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'
- Permanent exhibition at the Department of Palaeontology: 'The ear region: functionalmorphological and phylogenetical aspects'

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 vltomel xs (GE phoenix), SkyScan 1173 (Bruker)
- Software: 3D software (Amira, Avizo, Dristhi, Skyscan Software, Polyworks, Mimics, Meshlab); Analysing software (R, Mesquite, PAUP, MacClade)

Memberships/Editor

- 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)

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.

Schnetzer, 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., Trinajstić, 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

Pfaff, C., Zorzin, R., Kriwet, J. Evolution of the locomotory system in eels (Teleostei: Elopomorpha). *BMC Evolutionary Biology*, 16(1):159.

Pfaff, C., Nagel, D., Gunnell, G., Weber, G., Kriwet, J., Morlo, M., Bastl, K. Paleobiology of European *Hyaenodon exiguus* (Hyaenodonta, Mammalia) based on the first Computed Tomography reconstruction of the bony labyrinth. *Journal of Anatomy*. DOI: 10.1186/s12862-016-0728-7

Schnetz, L., Pfaff, C., Kriwet, J. Tooth development and histology patterns in lamniform sharks (Elasmobranchii, Lamniformes) revisited. *Journal of Morphology*, 277(12).

Schnetz, L., Kriwet, J., Pfaff, C. Virtual reconstruction of the skeletal labyrinth of two lamnid sharks (Elasmobranchii, Lamniformes). *Fish Biology*, 90(3).

Kriwet, J., Engelbrecht, A., Mörs, T., Reguero, M., Pfaff, C. Ultimate Eocene (Priabonian) chondrichthyans (Holocephali, Elasmobranchii) of Antarctica. *Journal of Vertebrate Paleontology* e1160911. DOI 10.1080/02724634.2016.1160911.

2015

Pfaff, C., Martin, T., Ruf, I. Bony labyrinth morphometry indicates locomotor adaptations in the squirrel-related clade (Rodentia, Mammalia). *Proceedings of the Royal Society London, Biological Series*. 282. DOI 10.1098/rspb.2015.0744

Pfaff, C., Martin, T., Ruf, I. '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. 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. 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. 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 (pdfs on demand)

Fuchs, I., Engelbrecht, A., Pfaff, C., Kriwet, J. Identifying hidden secrets of shark teeth (Chondrichthyes, Elasmobranchii) using sophisticated approaches. 2018. 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 ovoviviparous 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 cartilaginous 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 description of the middle ear of a derived hyaenodont (Mammalia). Journal of Vertebrate Palaeontology. Program and abstracts 2015: 86.

Schwarz, C., Kriwet, J., Petrasko, M., Nagel, D. 2014. Morphological shape diversification and evolutionary history of the bony labyrinth in aeluroid carnivora (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, Nothothenioidei) 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, Nothothenioidei): Current controversies and facts. XXXIII SCAR Open Science Conference and COMNAP Symposium Success through International Cooperation: 716. Aukland, 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. Aukland, 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 peralfish). 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 sciuriforms (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 Sciuromorpha (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 Sciuromorpha. 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 29: 95.

Conferences and Symposia

2018

talk: 5th Meeting of International Palaeontological Congress, Paris, France

poster: 5th Meeting of International Palaeontological Congress, Paris, France

2017

talk: 15th Annual Meeting of the European Association of Vertebrate Palaeontologists, Munich, Germany

talk: 44nd Meeting of the German working-group Vertebrate Palaeontology, Münster, Germany

poster: 88th Annual Meeting of the Paläontologische Gesellschaft, Münster, Germany

2016

talk: 11th International Congress of Vertebrate Morphology, Washington D.C, USA;
symposium: Show me your ear

talk: 87th Annual Meeting of the Paläontologische Gesellschaft, Dresden, Germany

2015

poster: 42nd Meeting of the German working-group Vertebrate Palaeontology, Laimering, Hamburg, Germany

poster: Annual Meeting of the 'Gesellschaft für Biologische Systematik', Bonn, Germany

two posters: 75th Meeting of the Society of Vertebrate Paleontology, Dallas, U.S.A.

poster: Annual Meeting of the 'Gesellschaft für Ichthyologie', Berlin, Germany

two posters: Annual Meeting of NOBIS Austria, Eggenburg, Austria

2014

poster: 74th Meeting of the Society of Vertebrate Paleontology, Berlin, Germany

2013

poster: 6th Meeting of Mesozoic Fishes, Vienna, Austria

talk: 8th Bruker Micro CT Meeting, Hasselt, Belgium

talk: 40th Meeting of the German working-group Vertebrate Palaeontology, Laimering, Germany

2012

talk: 83rd Annual Meeting of the Paläontologische Gesellschaft, Berlin, Germany

2011

talk: 71st Meeting of the Society of Vertebrate Paleontology, Las Vegas, USA

talk: 82nd Annual Meeting of the Paläontologische Gesellschaft, Vienna, Austria;
award winner

talk: 38th Meeting of the German working-group Vertebrate Palaeontology, Eichstätt, Germany

2010

poster: 70th Meeting of the Society of Vertebrate Paleontology, Pittsburgh, USA

poster: 81st Annual Meeting of the Paläontologische Gesellschaft, Munich, Germany

poster: 37th Meeting of the German working-group Vertebrate Palaeontology, Vienna, Austria

poster: 1st Symposium of the High-resolution X-Ray CT by GE phoenix, Dresden, Germany

2009

poster: 9th Meeting of the International Society of Vertebrate Morphologists, Punta del Este, Uruguay