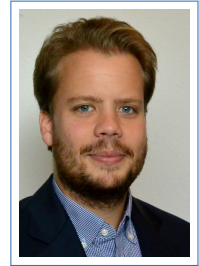


Peter T. Rühr

Curriculum vitae

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Education

- 2018–present **Ph.D.**, *Working title: "Head shape evolution of biting-chewing insects"*, University of Cologne & University of Bonn, Germany. During that time: accident and subsequent rehabilitation with sick leave January - August 2023.
- 2013–2017 **M.Sc.**, *"Organismic Biology, Evolutionary Biology and Palaeobiology (OEP-B)"*, University of Bonn & Zoological Research Museum A. Koenig (ZFMK), Bonn, Germany.
Grade: 1.2
- 2013 **Lab course**, *"Research techniques for embryological studies on primary wingless hexapods"*, Sugadaira Montane Research Center, University of Tsukuba, Japan.
- 2009–2013 **B.Sc.**, *"Biologie"*, University of Bonn, Germany.
Grade: 2.0
- 2012 **Lab and field course**, *"Marine Zoology"*, HYDRA Institute, Centro Marino, Fetovaia, Elba, Italy.
- 2012 **ERASMUS Intensive Program**, *"Origin, Evolution and Future of the Biosphere"*, Observatoire Océanologique, Banyuls-sur-Mer, France.

Employment History

- 2023-present **Research assistant**, University of Cologne, Germany.
- 2018-2023 **Research assistant (EU funded PhD position)**, University of Cologne & University of Bonn, Germany.
- 2016 - 2018 **Student assistant**, *" μ CT scanning, reconstruction, data analysis, visualization and maintenance of μ CT systems"*, ZFMK, Bonn, Germany.
- 2015 **Student assistant**, *"Scientific analysis of SR- μ CT data in the project 'Biomechanics of biting in dragonflies, mayflies and silverfish'"*, ZFMK, Bonn, Germany.
- 2015 **Student assistant**, *"Screening and sorting of ZFMK in-house publication library"*, ZFMK, Bonn, Germany.

Teaching Experience

University Courses

- 2021 **OEP M.Sc. Thesis**, *"The evolution of vision in earwigs (Hexapoda: Dermaptera)"*, University of Bonn, Germany.
Supervisor.
- 2021 **OEP-Free A IND**, *"Analysis of vision in a compound eye"*, University of Bonn, Germany.
Organizer and supervisor.

- 2016 **OEP-Free A IND**, "*Image processing, segmentation of SR- μ CT sections, and 3D-rendering of the stylet-like mouthparts of *Neanura muscorum* (Hexapoda: Collembola)*", ZFMK, Bonn, Germany.
Organizer and supervisor.
- 2015–2017 **OEP-Free 1 E**, "*Evolution, Diversity and Biology of Arthropods*", ZFMK, Bonn, Germany.
Yearly lecture on "Modern Morphology".
- Workshops**
- 2016–2018 **Regular workshops**, " *μ CT scanning, image processing, manual & semiautomatic segmentation, volume rendering and visualization of 3D data*", ZFMK, Bonn, Germany.
Leader.
- 2013 **Workshop**, "*Image processing and three-dimensional reconstruction of serial histology sections*", Laboratory for the Comparative Arthropod Embryology, Sugadaira Montane Research Center, University of Tsukuba, Japan.
Leader.

Programming and Software Skills

Selected Projects

- 2022 **forceR**: Force Measurement Analyses. R package on [CRAN](#).
- 2022 **PiscAnt**: Python code to control the scAnt 3D-scanning setup with a Raspberry Pi. Available on [GitHub](#).

Programming Languages

Working knowledge:

- R, ImageJ macro language, \LaTeX , (R)markdown

Basic knowledge:

- Python, Perl

Software

Working knowledge:

- ImageJ/Fiji, Biomedisa, Drishti, ITK-SNAP, VOX-FE2
- Meshroom, MeshLab, Checkpoint, Blender, Fusion 360
- GIMP, Scribus, MS Office

Basic knowledge:

- COMSOL

Languages

- German **Native**
- English **Fluent (TEOFL iBT 104/120 points – 86.7 %)**

Community Outreach

- 2020-present **Regular short field trips**, *Collection and identification of arthropods*, Taxonomiewerkstatt, ZFMK, Bonn, Germany.
- 2017 **Workshops**, " *μ CT-scanning and three-dimensional visualization*", "*Morphological data-banks*", and "*Comparison of fish shapes through 2-dimensional landmark analysis*", Alexander-Koenig-Science-Club (AKSC), ZFMK, Bonn, Germany.

Field Work

- 2019 5 weeks field trip to measure bite forces of insects, Queensland and New South Wales, Australia.
- 2018–2021 Regular field trips to measure bite forces of insects in the Cologne/Bonn area, Germany.

Honors and Recognitions

- 2022 2nd talk prize for 'Measuring and analysing animal closing forces: a mobile setup and new R package' at the *SEB Annual Conference 2022*, Montpellier, France.
- 2018 3rd poster prize for 'Die Biomechanik eines Springschwanzkopfes' at the *60. Phylogenetisches Symposium*, Tübingen, Germany.
- 2016 1st poster prize for 'A New ImageJ – FIJI Plugin for Counting Objects in Bi-Color Images' at the *World Congress of Malacology*, Penang, Malaysia.

Other Skills and Qualifications

- 2013–2019 **Synchrotron- μ CT of arthropods**, Deutsches Elektronen Synchrotron, Hamburg, Germany; Karlsruhe Institute of Technology, Karlsruhe, Germany; Swiss Light Source, Paul Scherrer Institute, Villigen, Switzerland; SPring-8, Hyogo Prefecture, Japan.
- 2014 & 2015 **Hexapod embryology**, *Laboratory for the Comparative Arthropod Embryology, Sugadaira Montane Research Center, University of Tsukuba, Sugadaira Kogen Ueda, Japan*, 2 x 1 month research stay funded by the DAAD.
- German driver's license category B.**
- Certificate "Strahlenschutz Fachkundegruppe R3".**
- Open Water Diver (OWD) certificate.**
- Arduino and Raspberry Pi programming and electronics.**
- 3D scanning and printing with self-built devices.**

Media Appearances

- Iselt, L. (2022): "Wie stark beißen Insekten zu?". Radio interview with *Frührausch*, Köln, Germany.
- Wong, C. (2022): "Australian raspy cricket has the strongest bite of 650 insect species". Interview with *New Scientist* **253** (3374).
- Schlömer, K. (2019): "Glänzende Idee: Gold macht unsichtbare Oberflächen sichtbar". TV feature at *Lokalzeit Bonn*, WDR, Germany.
- Knoll, D. (2016): "Unbekannte Mückenart im Bernstein entdeckt". Radio interview with *Logo*, NDR Info, Germany.

Society Memberships

- Deutsche Zoologische Gesellschaft (DZG). Since 2017.
- Deutsche Gesellschaft für allgemeine und angewandte Entomologie (DGaaE). Since 2017.
- International Society for Invertebrate Morphology (ISIM). 2014 – 2017.

Academic Service

Manuscript Reviews

- *Journal of Morphology*

Publications

Peer-Reviewed

- Rühr, P.T.**, Edel, C., Frenzel, M., & Blanke, A. (**accepted**): A bite force database of 654 insect species. *Scientific Data*. preprint at: [10.1101/2022.01.21.477193](https://doi.org/10.1101/2022.01.21.477193).
- Beurel, S., Bachelier, J. B., Hammel, J.U., Shi, G., **Rühr, P.T.** & Sadowski, E.-M. (**2023**): Flower inclusions of *Canarium* (Burseraceae) from Miocene Zhangpu amber (China). *Palaeoworld*. doi: [10.1016/j.palwor.2023.02.006](https://doi.org/10.1016/j.palwor.2023.02.006).
- Rühr, P.T.** & Blanke, A. (**2022**): forceX and forceR: a mobile setup and R package to measure and analyse a wide range of animal closing forces. *Methods in Ecology and Evolution* **13**(9): 1938-1948. doi: [10.1111/2041-210X.13909](https://doi.org/10.1111/2041-210X.13909).
- Rühr, P.T.**, van de Kamp, T., Faragó, T., Hammel, J.U., Wilde, F., Borisova, E., Edel, C., Frenzel, M., Baumbach, T. & Blanke, A. (**2021**): Juvenile ecology drives adult morphology in two insect orders. *Proceedings of the Royal Society B* **288** (1953): 20210616. doi: [10.1098/rspb.2021.0616](https://doi.org/10.1098/rspb.2021.0616).
- Strauß, J., Moritz, L. & **Rühr, P.T.** (**2021**): The subgenual organ complex in stick insects: Functional morphology and mechanical coupling of a complex mechanosensory organ. *Frontiers in Ecology and Evolution* **9**: 632493. doi: [10.3389/fevo.2021.632493](https://doi.org/10.3389/fevo.2021.632493).
- Schucht, P.J., **Rühr, P.T.**, Geier, B., Glaw, F., & Lambertz, M. (**2020**): Armored with skin and bone: A combined histological and μ CT-study of the exceptional integument of the Antsingy leaf chameleon *Brookesia perarmata* (Angel, 1933). *Journal of Morphology* **281** (7): 754–764. doi: [10.1002/jmor.21135](https://doi.org/10.1002/jmor.21135).
- Rühr, P.T.** & Lambertz, M. (**2019**): Surface contrast enhancement of integumentary structures in X-ray tomography. *Journal of Anatomy* **235** (2): 379-385. doi: [10.1111/joa.13008](https://doi.org/10.1111/joa.13008).
- Strith Peljhan, N, **Rühr, P.T.**; Buh, B., & Strauß, J. (**2019**): Low-frequency vibration transmission and mechanosensory detection in the legs of cave crickets. *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology* **233**: 89-96. doi: [10.1016/j.cbpa.2019.04.003](https://doi.org/10.1016/j.cbpa.2019.04.003).
- Mail, M., Klein, A., Bleckmann, H., Schmitz, A., Scherer, T., **Rühr, P.T.**, Lovric, G., Fröhlingsdorf, R., Gorb, S.N. & Barthlott, W. (**2018**): A new bioinspired method for pressure and flow sensing based on the underwater air retaining surfaces of the backswimmer *Notonecta*. *Beilstein Journal of Nanotechnology* **9**: 3039–3047. doi: [10.3762/bjnano.9.282](https://doi.org/10.3762/bjnano.9.282).
- Liu, W., **Rühr, P.T.** & Wesener, T. (**2017**): A look with μ CT technology into a treasure trove of fossils: The first two fossils of the millipede order Siphoniulida discovered in Cretaceous Burmese amber (Myriapoda, Diplopoda). *Cretaceous Research* **74**: 100-108. doi: [10.1016/j.cretres.2017.01.009](https://doi.org/10.1016/j.cretres.2017.01.009).
- Stebner, F., Szadziowski, R., **Rühr, P.T.**, Singh, H., Hammel, J.U., Kvifte, G.M. & Rust, J. (**2016**): A fossil biting midge (Diptera: Ceratopogonidae) from early Eocene Indian amber with a complex pheromone evaporator. *Scientific Reports* **6**: 34352. doi: [10.1038/srep34352](https://doi.org/10.1038/srep34352).
- Laetz, E.M.J., **Rühr, P.T.**, Bartolomaeus, T., Preisfeld & Wägele, H. (**2016**): Examining the retention of functional kleptoplasts and digestive activity in sacoglossan sea slugs. *Organisms Diversity & Evolution* **17**: 89-99. doi: [10.1007/s13127-016-0308-0](https://doi.org/10.1007/s13127-016-0308-0).
- Sato, Y., **Rühr, P.T.**, Schmitz, H., Egas, M. & Blanke, A. (**2016**): Age-dependent male mating tactics in a spider mite — A life-history perspective. *Ecology and Evolution* **6**: 7367–7374. doi: [10.1002/ece3.2489](https://doi.org/10.1002/ece3.2489).
- Blanke, A., **Rühr, P.T.**, Mokso, R., Stampanoni, M., Wilde, F., Machida, R. & Misof, B. (**2015**): Structural Mouthpart Interaction Evolved Already in the Earliest Lineages of Insects. *Proceedings of the Royal Society B* **282** (1812): 20151033. doi: [10.1098/rspb.2015.1033](https://doi.org/10.1098/rspb.2015.1033).

Non Peer-Reviewed

- Edel, C., **Rühr, P.T.**, Frenzel, M., van de Kamp, T., Faragó, T., Hammel, J.U., Wilde, F., & Blanke, A. (**2023**): Bite force transmission and mandible shape in grasshoppers, crickets, and allies is largely dependent on phylogeny, not diet. *bioRxiv*. doi: [10.1101/2023.03.28.534586](https://doi.org/10.1101/2023.03.28.534586).
- Rühr, P.T.**, Blanke, & Lambertz, M. (**2020**): How gold plasma can make hidden structures visible. Article for [q&more / chemurope.com](https://q&more.chemurope.com).

Conference Presentations

Talks

- Rühr, P.T.** & Blanke, A. (2023): Measurement and Analysis of Animal Closing Forces: Unlocking Insights into Micro- and Macroeolution. *115th Annual Meeting of the DZG*, Kassel, Germany.
- Rühr, P.T.**, Chesters, D., Edell, C., Frenzel, M. & Blanke, A. (2022): Macroevolutionary patterns of bite performance in insects. *114th Annual Meeting of the DZG*, Bonn, Germany.
- Rühr, P.T.** & Blanke, A. (2022): The evolution of bite force in insects. *26th International Congress of Entomology (ICE)*, Helsinki, Finland.
- Strauß, J. & **Rühr, P.T.** (2022): Evolution and function of an elaborate mechanosensory organ: the subgenual organ complex in the tibia of stick insects. *26th International Congress of Entomology (ICE)*, Helsinki, Finland.
- Rühr, P.T.** & Blanke, A. (2022): Measuring and analysing animal closing forces: a mobile setup and new R package. *SEB Annual Conference 2022*, Montpellier, France.
- Rühr, P.T.**, & Blanke, A. (2022): The evolution of bite force in insects. *27th Annual DZG Graduate Meeting in Evolutionary Biology*, Bielefeld, Germany.
- Pande, A., Blanke, A., & **Rühr, P.T.** (2022): Allometry in Earwig Vision. *27th Annual DZG Graduate Meeting in Evolutionary Biology*, Bielefeld, Germany.
- Rühr, P.T.** & Blanke, A. (2021): Juvenile ecology drives adult head shape evolution in earwigs and stoneflies. *113th Annual Meeting of the DZG*, organized by the University of Würzburg, Würzburg, Germany.
- Rühr, P.T.** & Blanke, A. (2020): Complex life cycles do not necessarily result in adaptive decoupling. *6th Graduate Meeting Evolutionary Biology of the DZG*, organized by the Institute of Population Genetics, Vetmeduni, Vienna, Germany.
- Rühr, P.T.** & Blanke, A. (2019): Nymphal life history influences adult head shape variation in Dermaptera and Plecoptera. *1st combined conference of the Australian Entomological Society (AES), the Society of Australian Systematic Biologists (SASB) and the Australasian Arachnological Society (AAS)*, Brisbane, Australia.
- Rühr, P.T.** & Blanke, A. (2018): The evolution of biting-chewing effectivity in non-holometabolan insects. *111th Annual Meeting of the DZG*, Greifswald, Germany.
- Rühr, P.T.**, Fagan, M.J., Misof, B. & Blanke, A. (2017): Die Biomechanik eines Springschwanzkopfes. *30th Westdeutscher Entomologentag*, Düsseldorf, Germany.
- Rühr, P.T.**, Fagan, M.J., Misof, B. & Blanke, A. (2017): Head Biomechanics of a Springtail. *110th Annual Meeting of the DZG*, Bielefeld, Germany.
- Rühr, P.T.**, Koch, M., Blanke, A., Shigekazu, T., Fukui, M., Machida, R. & Misof, B. (2016): CT is not enough: Understanding the collembolan endoskeleton. *9th Graduate Meeting Morphology of the DZG*, Laboratorium für Applikationen der Synchrotronstrahlung, Karlsruhe Institute of Technology, Karlsruhe, Germany.
- Rühr, P.T.**, Blanke, A. & Misof, B. (2014): Synchrotron- μ CT-scans allow an unprecedented insight into insect morphology and evolution. *Science 3D Workshop*, Deutsches Elektronen Synchrotron (DESY), Hamburg, Germany
- Rühr, P.T.**, Blanke, A. & Misof, B. (2014): Die cephalic Morphologie von *Pogonognathellus flavescens* (Hexapoda: Collembola): Eine 3D-Rekonstruktion. *6th Graduate Meeting Morphology of the DZG*, Universität Ulm, Germany.
- Rühr, P.T.**, Blanke, A. & Misof, B. (2013): The cephalic structure of *Tomocerus flavescens* (Hexapoda: Collembola): A 3D-reconstruction. *49th Annual Meeting of the Arthropodan Embryological Society of Japan (AES)*, Tsukuba, Ibaraki, Japan.

Posters

- Strauß, J., Moritz, L. & **Rühr, P.T.** (2023): Functional morphology of a leg mechanoreceptor complex in stick insects. *Annual Meeting of the Centre for Mind, Brain and Behavior (CMBB)*, Marburg, Germany.
- Schucht, P.J., **Rühr, P.T.**, Moritz, L., Ludwig, J. & Lambertz, M. (2022): Functional Morphology and Ontogeny of the Swim Bladder–Vertebrae Association in *Pantodon buchholzi* Peters, 1876. *114th Annual Meeting of the DZG*, Bonn, Germany.
- Pande, A., Blanke, A. & **Rühr, P.T.** (2021): Visual Ecology of Earwigs. *113th Annual Meeting of the DZG*, organized by the University of Würzburg, Würzburg, Germany.
- Strauß, J., Moritz, L. & **Rühr, P.T.** (2021): Neuroanatomy and postembryonic development of the subgenual organ complex in stick insects. *14th Göttingen Meeting of the German Neuroscience Society (NWG)*.
- Rühr, P.T.** & Lambertz, M. (2019): Unveiling the invisible: surface contrast enhancement in X-ray tomography with a thin layer of gold. *1st combined conference of the Australian Entomological Society (AES), the Society of Australian Systematic Biologists (SASB) and the Australasian Arachnological Society (AAS)*, Brisbane, Australia.
- Rühr, P.T.** & Lambertz, M. (2019): Unveiling the invisible: a new approach for the selective contrast enhancement of integumentary structures in X-ray tomography. *12th International Congress of Vertebrate Morphology*, Prague, Czech Republic.
- Schucht, P.J., **Rühr, P.T.**, Geier, B., Glaw, F. & Lambertz, M. (2019): Armored with Skin and Bone: The Integumentary Morphology of the Antsingy Leaf Chameleon *Brookesia perarmata* (Iguania: Chamaeleonidae). *12th International Congress of Vertebrate Morphology*, Prague, Czech Republic.
- Rühr, P.T.** & Lambertz, M. (2018): Das Tiefste, was uns interessiert, ist manchmal schon die Oberfläche - Computertomographische Erfassung kontrastarmer Integumentstrukturen. *60. Phylogenetisches Symposium*, Tübingen, Germany.
- Rühr, P.T.**; Fagan, M.J.; Misof, B. & Blanke, A. (2018): Die Biomechanik eines Springschwanzkopfes. *60. Phylogenetisches Symposium*, Tübingen, Germany.
- Lambertz, M., Zuber, M., van de Kamp, T., Baumbach, T. & **Rühr, P.T.** (2018): High-resolution x-ray tomography of large chelonians: A case study on *Rafetus swinhoi* (Gray, 1873). *6th Turtle Evolution Symposiums*, Tokyo, Japan.
- Mail, M.; Scherer, T.; **Rühr, P.T.**; Moosmann, M.; Walheim, S.; Bleckmann, H. & Barthlott, W. (2018): The air retaining surface of the backswimmer *Notonecta* - A new sensory system for pressure and flow measurement. *Karlsruhe Nano Micro Facility User Meeting*, Karlsruhe, Germany.
- Rühr, P.T.**, Liu, W. & Wesener, T. (2017): First Fossils of the Order Siphoniulida (Myriapoda, Diploppoda). *7th International Congress of Myriapodology*, Krabi, Thailand.
- Rühr, P.T.**; Fagan, M.J.; Misof, B. & Blanke, A. (2017): Head biomechanics of a springtail. *Entomology Congress of the DGaE*, Freising, Germany.
- Sato, Y., **Rühr, P.T.**, Schmitz, H., Egas, M. & Blanke, A. (2017): Coexistence of late-hawk strategy and hawk strategy for male competition in the two-spotted spider mite. *23rd Congress of the European Society for Evolutionary Biology*, Groningen, Netherlands.
- Rühr, P.T.**, Laetz, E.M.J. & Wägele, H. (2016): A New ImageJ – FIJI Plugin for Counting Objects in Bi-Color Images. *World Congress of Malacology*, Penang, Malaysia
- Rühr, P.T.**, Blanke, A. & Misof, B. (2015): Collembolan head musculature revisited: How 3D-reconstructions of synchrotron- μ CT-scans can reveal muscle homologies. *3rd International Congress on Invertebrate Morphology*, Berlin, Germany.