

Karen Meusemann

Curriculum Vitae

Personal data

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Date of birth April 9, 1976
Nationality German

Academic Degree & scientific career

since 05/2016 Scientific Coordinator of the Research Group FOR 2281 (DFG) "Sociality and the reversal of the fecundity/longevity trade-off" (Phase I and II) at the University of Freiburg, Department of Evolutionary Biology & Ecology, Freiburg (Brsg.), Germany

07/2013–04/2016 Postdoctoral Fellow (Schlinger) at the Australian National Insect Collection, CSIRO National Research Collections Australia, Canberra, ACT, Australia

03/2012–06/2013 Postdoctoral Fellow (DFG) at the Centre for Molecular Biodiversity Research (ZMB), Zoological Research Museum A. Koenig; Rheinische Friedrich-Wilhelms-Universität, Bonn, Germany

03/2012 Dr. rer. nat. (*summa cum laude*), ZMB, Zoological Research Museum A. Koenig; Rheinische Friedrich-Wilhelms-Universität, Bonn, Germany

10/2005–03/2012 Ph.D. at the ZMB, Zoological Research Museum A. Koenig: Ph.D. thesis: The 'Atelocerata' - A vanishing hypothesis? Molecular phylogeny of arthropods with focus on primary wingless hexapods. (DFG priority program SPP1174 "Deep Metazoan Phylogeny"). Supervisor: Prof. Dr. B. Misof. Published online: <https://bonndoc.ulb.uni-bonn.de/xmlui/handle/20.500.11811/5363>

09/2002–09/2003 Diploma thesis (M.Sc. equivalent) at the Zoological Research Museum A. Koenig. Caryology of the subgenus *Agrodiætus*, *Polyommatus* Latreille, 1804 (Lycaenidae, Lepidoptera, Insecta): Caryology as potential criterion for species differentiation? [originally in German]. Supervisors: Prof. Dr. C. Naumann, PD Dr. B. Misof

10/1996–09/2003 Graduate student (Diplom Biology: Zoology, Cell Biology and Soil Science) at the Rheinische Friedrich-Wilhelms-Universität, Bonn, Germany

1996–1998 Undergraduate student at the Rheinische Friedrich-Wilhelms Universität, Bonn in Biology, Germany: Zoology, Cell biology, Genetics and Botany

Current projects

- since 2016 So-Long - Sociality and the reversal of the fecundity/longevity trade off (DFG: FOR 2281)
URL www.so-long.org
- since 2012 1KITE - 1000 Insect Transcriptome Evolution
URL www.1kite.org

Research interests

My research interests are insect and animal evolution and biodiversity. I am interested in phylogenetics and -genomics in general. My current research focus is genome and transcriptome evolution, biodiversity, differential gene expression, functional genomics. I am in particular interested in pitfalls, challenges and improvement of methodological approaches with respect to “big” NGS data and its quality assessment. Beyond research, I deeply involved in project organisation and coordination since 2012. Additionally, I am interested in the biology of bats.

National and international cooperations; partially involvement in acquisition of third-party grants

- since 2020 “High end genomics of neglected arthropod lineages (Pauropoda, Symphyla) to bring unprecedented insights in the evolution of terrestrial arthropods”, LOEWE TBG project (M. Balint, N. Szucsich)
- since 2019 “AG Rice fish” (J. Schwarzer), ZMB, Zoological Research Museum A. Koenig, Bonn
- since 2018 DFG project “A comparative approach to the fecundity/longevity trade-off across two origins of eusociality in the bees” (R. Paxton), (co-supervision) within the Research Unit FOR 2281, Phase II
- since 2017 “Evolution of Dexiarchia” (A. Donath), ZMB, Zoological Research Museum A. Koenig, Bonn
- since 2016 DFG Research Unit (RU) FOR 2281: “Sociality and the reversal of the fecundity-longevity trade-off”, Phase I and II
- since 2012 1KITE: The 1K Insect Transcriptome Evolution project (co-coordination) and lead of the 1KITE “Basal Hexapods” subproject
- 2010–2015 DFG project “The evolution of Endopterygota - reconstructing the phylogeny of the most successful lineage of organisms with phylogenomic and morphological data”
- 2005–2013 DFG priority program SPP1174 “Deep Metazoan Phylogeny”; The “Atelocerata” - A vanishing hypothesis?

Organisation of workshops & symposia - selection

- 10/2020 Workshop So-Long (FOR 2281): Workshop for PhD students and PostDocs: “Transcriptome *de novo* assembly and orthology”, University of Freiburg, Germany
- 02-03/2020 Help in organising and lecturing: DZG Workshop “The battle of species tree estimation - a coalescent-based approach or concatenation?” (lead: S. Simon, M. Sann), University of Freiburg, Germany

- 06/2019 Workshop So-Long (FOR 2281): Workshop for PhD students and PostDocs: "Transcriptome data analyses & differential gene expression", University of Freiburg, Germany
- 08/2018 Co-organiser of the Workshop "Biodiversity and Bioinformatics" (with R. Casalla), Universidad del Norte, Barranquilla, Colombia
- 08/2017 Co-organiser of the Symposium "Major transitions in evolution" (FOR 2281), XVI Congress of the European Society of Evolutionary Biology, Groningen, Netherlands
- 04/2017 Co-organiser of the Workshop So-Long (FOR 2281): "Orthology and its importance for differential gene expression analyses", in collaboration with the IEB, University of Münster, Germany
- 10/2016 Workshop So-Long (FOR 2281): Workshop for PhD students: Analysing transcriptome data & differential gene expression, University of Freiburg, Germany
- 09/2014 Co-organiser of the Symposium "Phylogenomics - a peek over the horizon at big data" (with D. K. Yeates), Annual Conference of the Australian Entomological Society 2014, Canberra, Australia
- 10/2014 Co-organiser of the Workshop "DNA target enrichment in phylogenomics" (with O. Niehuis and M. Sann), Australian National University, Canberra, Australia
- 02/2014 Phylogenetics with "Big Data" Workshop, Rutgers University, New Brunswick NJ, USA
- 09/2013 1st 1KITE Workshop, Jena, Germany
- 09/2013 Co-organiser of the "Big Data" Workshop, Hobart, Tasmania Australia

Attended workshops - selection

- 09/2020 Workshop "Laterale Führung": Führen mit Ergebnisverantwortung, ohne formale Weisungsbefugnis, University of Freiburg, Freiburg, Germany
- 11/2014 Queensland Facility for Advanced Bioinformatics (QFAB): "Extended RNA Analysis", Brisbane St. Lucia University, Brisbane, Australia
- 08/2013 "UCSC Genome Browser Advanced Workshop", CSIRO and Australian National University, Canberra, Australia
- 07/2013 Workshop "3D Reconstruction", CSIRO and Australian National University, Canberra, Australia
- 07/2013 "Phylogenomics using BEAST", Australian National University, Canberra, Australia

Research visits - selection

- 02/2020 Universidad Autónoma de Yucatán (UADY), Departamento de Apicultura, Dr. José Javier G. Quezada Euán, Mérida, Yucatan, Mexico
- 07/2017 University of Regensburg, Dr. Abel Bernadou, Regensburg, Germany
- 06/2015 California Academy of Sciences, Dr. Michelle Trautwein, CA, USA
- 04/2015 University of Adelaide, Dr. Andy Austin, Adelaide, SA, Australia
- 01/2015 National University of Singapore, Prof. Dr. Rudolf Meier, Singapore
- 07/2014 Sugadaira Montane Research Center, University of Tsukuba, Prof. Dr. Ryuchido Machida, Ueda, Nagaon, Japan
- 02/2014 Rutgers University, Dr. Paul Frandsen, New Brunswick, NJ, USA

- 02/2014 North Carolina State University and North Carolina Museum of Natural Sciences, Dr. Michelle Trautwein, Raleigh, NC, USA
- 08/2010 Synchrotron Paul-Scherrer-Institut (PSI), Villigen, Switzerland
- 07/2009 Synchrotron DESY, Hamburg, Germany: study of arthropods

Supervision

- 2017-2020 Co-supervision of four Master theses (M.Sc.) at the University of Freiburg
- 2018, 2019 Lectures and practical exercises in modules of the Bachelor and Masterprogramme, University of Freiburg
- since 2016 Help in scientific and organisational aspects of all PhD students in the framework of the Research Unit FOR 2281, Phase I and II
- since 2014 Scientific and organisational consultant for more than 30 PhD students at international level
- since 2014 Help with analyses reconstructing molecular phylogenies of various animal groups (Bachelor, Master, PhD) at the Zoological Research Museum A. Koenig (ZFMK)
- since 2013 Support of scientific researchers with data management and analyses within all 1KITE subprojects and collaborators
- 02-03/2011 Supervision of graduate students in a course for Master students: Theory and practice of phylogenetic systematics
- 2006–2007 Co-supervision of a Diploma thesis at the ZFMK

Awards

- 2013 Ph.D Award 2012: Dissertationspreis der Alexander-Koenig-Gesellschaft e.V.
- 2009 Systematics 2009: 1st meeting of Biosyst EU, Leiden, Netherlands. Award winner category "talks"
- 2007 9th Annual Meeting of the Gesellschaft für Biologische Systematik, Vienna, Austria. Award winner category "talks"

Reviewer activities

Reviewer for scientific journals *BMC Evolutionary Biology, Systematic Biology, Soil Organisms, Plos ONE, Molecular Phylogenetics and Evolution, International Journal of Biological Science, Journal of Zoological Systematics and Evolutionary Research, Systematic Entomology, Science, Frontiers in Ecology & Evolution*

Field Trips - selection

- 05/2015 Daintree and Iron Range (Queensland, Australia), sampling of various hexapods (1KITE follow-up project)
- 12/2014 Northern Brisbane, Rainforest (Queensland, Australia), sampling Diplura (1KITE project)
- 11/2012 Sicily (Italy), sampling of various hexapods and myriapods (1KITE project)
- 2011 & 2012 Pevestorf (Northern Germany), sampling of various insects (1KITE project)

Miscellaneous Activities

- 12/2004 Assistant at the Bundesamt für Naturschutz (BfN): Update of “Red Lists” (Lepidat database): group of the Macrolepidoptera
- 10–11/2004 Assistant at the Bundesamt für Naturschutz (BfN): Update of the database WISIA for Cnidaria (taxonomy and biogeography)
- 02/2003 Assistant at the tagging center for bats, Zoologisches Forschungsmuseum A. Koenig, project “Bat Migrations in Europe”
- 01–06/2002 Assistance in organization of the project “Diskurs Grüne Gentechnik” (Initiative of the Federal Ministry of Food, Agriculture and Consumer Protection)
- 11/2001 Support of the ZFMK during the of the “Woche der Biologischen Vielfalt” (week of biodiversity), Senckenbergmuseum Frankfurt
- 2001–2002 Student assistant at the Zoologisches Forschungsinstitut und Museum A. Koenig: Section Lepidoptera (caryology and morphology of higher Lepidoptera, SEM)
- 1999–2004 Student assistant at the German Reference Center for Ethics in the Life Science (DRZE) and graduate assistant at the Ethics Institute (IWE), Bonn: library system, organization of conferences, public relations, web administration

Voluntary activities

- 1997–2002 Member of the “Fachschaft Biologie”, University of Bonn, 2 years chairmanship
- since 1999 Member of the “Bonn group for conservation of bats”, field-grown methods for bat detection, public relations “Monitoring of the Greater mouse-eared bat in Germany”

Computer & software skills

advanced skills in Linux, Windows, various Officesoftware (OpenOffice/LibreOffice, MS Office), various graphic software (Gimp, Inkscape etc), Social Media (Facebook, Twitter, Slack, GoogleGroups), github, HPC Clusters, application of various phylogenetic software and software for the analysis of RNASeq data and genomic molecular sequence data, good skills in command line based software, L^AT_EX, basic skills in Perl, R and web-page design

Languages

- German Native language
- Dutch 2nd native language
- English Fluent in spoken and written

Publications - selection

A full list of publications can be found on Google Scholar:

<http://scholar.google.com.au/citations?user=uK45QqgAAAAJ&hl=en>.

- Szucsich NU, Bartel D, [...], **Meusemann K** (2020). Four myriapod relatives – but who are sisters? No end to debates on relationships among the four major myriapod subgroups. *BMC Evol. Biol.* Accepted.
- **Meusemann K**, Korb J, Schughart M, Staubach F (2020). No evidence for single-copy immune-gene specific signals of selection in termites. *Front. Ecol. Evol.* 8:26.

- Kutty SN, **Meusemann K**, et al. (2019) Phylogenomic analysis of Calyptratae: resolving the phylogenetic relationships within a major radiation of Diptera. *Cladistics* 35:605-622.
- Kawahara AH, Plotkin D, Espeland M, **Meusemann K**, et al. (2019) Phylogenomics reveals the evolutionary timing and pattern of butterflies and moths. *Proc. Natl. Acad. Sci. U.S.A.* 116:22657-22663.
- Elsner D, **Meusemann K**, Korb J (2018). Longevity and transposon defense, the case of termite reproductives. *Proc. Natl. Acad. Sci. U.S.A.* 21:5504-5509.
- Simon S, Blanke A, **Meusemann K** (2018). Reanalyzing the Palaeoptera problem—the origin of insect flight remains obscure. *Arthropod Struct. & Dev.* 47 (4), 328-338.
- Wu C, Jordan MD, Newcomb RD, Gemmell NJ, Bank S, **Meusemann K***, et al. (2017). Analysis of the genome of the New Zealand giant collembolan (*Holacanthella duospinosa*) sheds light on hexapod evolution. *BMC Genomics* 18:795.
- Petersen M, **Meusemann K***, et al. (2017). Orthograph: a versatile tool for mapping coding nucleotide sequences to clusters of orthologous genes. *BMC Bioinformatics* 18:111.
- Suring W, **Meusemann K**, et al. (2017). Evolutionary ecology of beta-lactam gene clusters in animals. *Mol. Ecol.* 26:3217-3229.
- Peters RS, Krogmann L, Mayer C, [...] **Meusemann K**, et al. (2017). Evolutionary history of the Hymenoptera. *Curr. Biol.* 27:1013-1018.
- Rix ADA MG, Cooper SJB, **Meusemann K***, et al. (2017). Post-Eocene climate change across continental Australia and the diversification of Australasian spiny trapdoor spiders (Idiopidae: Arbanitinae). *Mol. Phylogen. Evol.* 9:302-320.
- Dowling D, Pauli T, Donath A, **Meusemann K***, et al. (2016). Phylogenetic origin and diversification of RNAi pathway genes in insects. *Genome Biol. Evol.* 8:3784-3793.
- Misof B, Liu S, **Meusemann K**, et al. (2014). Phylogenomics resolves the timing and pattern of insect evolution. *Science* 346 (6210):763-767.
- Peters RS, **Meusemann K***, Petersen M, Mayer C, Wilbrandt J, Ziesmann T, Donath A, Kjer KM, Aspöck U, Aspöck H, Aberer AJ, Stamatakis A, Friedrich F, Hünefeld F, Beutel RG, Misof B, (2014). The evolutionary history of holometabolous insects inferred from transcriptome-based phylogeny and comprehensive morphological data. *BMC Evol. Biol.* 14:52.
- Dell’Ampio E, **Meusemann K**, Szucsich NU, et al. (2014). Decisive data sets in phylogenomics: Lessons from studies on the phylogenetic relationships of primarily wingless insects. *Mol. Biol. Evol.* 31 (1):239-249.
- Misof B, Meyer B, von Reumont BM, Kück P, Misof K, **Meusemann K** (2013). Selecting informative subsets of sparse supermatrices increases the chance to find correct trees. *BMC Bioinformatics* 14:348.
- Niehuis O, Hartig G, Grath S, [...], **Meusemann K**, et al. (2012). Genomic and Morphological Evidence Converge to Resolve the Enigma of Strepsiptera. *Curr. Biol.* 22:1309-1313.
- **Meusemann K**, von Reumont BM, Simon S, [...], Wägele J, Misof B (2010). A phylogenomic approach to resolve the arthropod tree of life. *Mol. Biol. Evol.* 27(11):2451-64.
- Kück P, **Meusemann K**, Dambach J, Thormann B, von Reumont B, Wägele W, Misof B (2010). Parametric and non-parametric masking of randomness in sequence alignments can be improved and leads to better resolved trees. *Front. Zool.* 7:10.

- von Reumont BM, **Meusemann K**, Szucsich NU, Dell’Ampio E, Gowri-Shankar V, Bartel D, Simon S, Letsch HO, Stocsits RR, Luan Y, Wägele J-W, Pass G, Hadrys H, Misof B (2009). Can comprehensive background knowledge be incorporated into substitution models to improve phylogenetic analyses? A case study on major arthropod relationships. *BMC Evol. Biol* **9**:119.

International talks - selection

- 09/2019 9th International Dresden Meeting on Insect Phylogeny, Dresden, Germany (*invited*). S. Simon & K. Meusemann: Reviewing and reanalyzing the Paleoptera problem.
- 08/2019 The 2019 Congress of the European Society for Evolutionary Biology (ESEB 2019), Turku, Finland. J. Korb & K. Meusemann: The “So-Long project”: Ageing and the fecundity/longevity trade-off in social insects: a comparative approach.
- 08/2018 18th Congress of the International Union for the Study of Social Insects (IUSI 2018), Guarujá, Brazil. K. Meusemann, J. Korb et al.: Why do social insect queens live so long? Workers take on the queens’ burdens.
- 07/2018 XIth European Congress of Entomology, Naples, Italy (*invited symposium-keynote*). K. Meusemann: Insect phylogenomics: current status, challenges & some implications for morphology.
- 09/2017 110th Annual Meeting of the German Zoological Society (DZG), Bielefeld, Germany (*invited keynote*). K. Meusemann: A decade of cutting edge insect phylogenomics.
- 02/2015 The Interface of Mathematics and Biology: 19th New Zealand Phylogenomics Conference 2015, Portobello, Otago Peninsula, New Zealand. K. Meusemann, D. K. Yeates: Fly phylogenomics based on more than 2,000 orthologous genes: preliminary results and challenges.
- 08/2014 Xth European Congress of Entomology, York, United Kingdom (*invited*). K. Meusemann, D. Bartel, on behalf of the 1KITE consortium: Phylogenomics and the evolution of insects.
- 09/2013 UTAS Big Data Workshop, University of Tasmania, Hobart, Tasmania, Australia (*invited*). K. Meusemann, on behalf of the 1KITE consortium: The 1000 Transcriptome Evolution project (1KITE): An example of handling "Big Data" with regard to Evolutionary Biology.
- 08/2012 XXIVth International Congress of Entomology, ICE 2012, Daegu, South Korea (*invited*). K. Meusemann & B. Misof: Phylogenomics of apterygote hexapods - Can we ever hope for a robust backbone tree of insects? A team talk.

Freiburg, October, 2020
Karen Meusemann