PROFILE

I am a behavioral and evolutionary ecologist with a focus on animal behavior, cognition, and visual signals. My experience spans from invertebrate to vertebrate systems and I am interested in anti-predator adaptations, the ecology of fear as well as sleep in previously unstudied organisms. My focus on natural history has recently led to the discovery of a REM sleep-like state in spiders with strong parallels to REM sleep in mammals and birds challenging existing views on the origin and evolution of this behavioral state. I use interdisciplinary and integrative approaches in both the laboratory and the field using neural network-based video tracking methods to validate and quantify behavioral data.

KEY SKILLS

Animal behavior | Diversity | Natural history | Sleep research | Predator-prey interactions | Sensory ecology | Evolutionary ecology | Discovery

RESEARCH METRICS

Years since PhD: Total number of publications: Total number of citations: H-index: **10**

INSTITUTE ADDRESS

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Dr. Daniela C. Rößler

POSTDOCTORAL RESEARCHER | BEHAVIORAL ECOLOGIST

RESEARCH & TEACHING POSITIONS

Since 06/2021 | Postdoctoral Researcher, University of Konstanz & Max Planck Institute of Animal Behavior

In this independent fellowship from the Zukunftskolleg at the University of Konstanz, I am focusing on spider sleep research. I am leading a research group with student research assistants and an animal facility. I currently supervise several thesis projects addressing questions in animal sleep research as well as in predator-prey interactions.

01/2020 – 06/2021 | Postdoctoral Researcher, Harvard University

I was a postdoctoral research fellow in Dr. Paul Shamble's lab at the John Harvard Distinguished Science Fellows Program. My research there centered on behavior, visual signals, and cognition in jumping spiders with a focus on predator-prey interactions.

10/2017 – 12/2019 | Lecturer, Trier University

During this lectureship I gave both the lecture and the practical courses in Animal Physiology as well as Animal Anatomy for undergraduate biology students.

07/2014 – 06/2019 (submission) | PhD in Behavioral Ecology, Trier University

Title: Visual ecological aspects in interspecific communication – Examples from predator-prey and parasite-host interactions.

Supervisors: Prof. Dr. Stefan Lötters (Trier University) and Prof. Dr. Heike Pröhl (University of Veterinary Medicine Hannover). I defended my dissertation on 22/11/2019 and passed my PhD with highest distinction (summa cum laude).

02/2014 - 04/2015 | Teaching Assignments, Trier University

Practical Courses on Animal Physiology for undergraduate biology students.

HIGHER EDUCATION

Trier University, Doctoral Studies 2014 – 2019 | Dr. rer. nat. (summa cum laude) Trier University, Master of Education 2011 – 2014 | Master of Education in Anglistics and Biology (Gymnasium) Trier University, Bachelor of Education 2008 – 2011 | Bachelor of Education in Anglistics and Biology (Gymnasium)

FIELD RESEARCH & RESEARCH VISITS	01/2024 – 02/2024 Research Visit to Smithsonian Tropical Research Institute (STRI), Panama Since 2014 Tropical Field Research I was involved in as well as led several field expeditions to the tropics including to Peru, Brazil, French Guiana, Panama, Rwanda and Uganda. 02/2018 Research Visit to Prof. Dr. Johanna Mappes, Jyväskylä, Finland
TENURE TRACK APPLICATION	10/2023 Shortlisted for Maria Sibylla Merian Professorship (W1, Tenure Track) at the University of Münster (219 applicants)
LEADERSHIP & MENTORSHIP EXPERIENCE	Since 2021 Active as a mentor in the <i>Animal Behavior Collective</i> to two female mentees. Since 06/2021 Leading an independent research group. Supervising theses and projects as well as welcoming international interns for short-term projects at Uni Konstanz / MPI Animal Behavior.
EQUITY, DIVERSITY & INCLUSION	Belonging to the LGBTQ+ community, equity, diversity, and inclusion (EDI) are key elements in my understanding of good and fair science. Acknowledging my privileged position of being a white woman from a high-income nation, my aim is to listen to and amplify voices of underrepresented groups. I want to contribute to make science fairer and accessible to all. In effort of this, I published a correspondence article in <i>Nature</i> on EDI issues in the publication system and how scientific journals can contribute to lead a much-needed change. In response to this, numerous high-impact journals now ask authors about this information and publish it alongside the manuscripts (e.g. Cell).
	Rößler, D.C. , Lötters, S., Marin Da Fonte, L.F., 2020. Author declaration: have you considered equity, diversity and inclusion? Nature , 585(7822). https://doi.org/10.1038/d41586-020-02429-8
SUPERVISED THESES	 2022 Hidden in plain sight? Testing eye camouflage in jumping spiders (Zoe Umbach, BA, University of Konstanz) * 2021 Assessing predation in aposematic poison frogs: an eDNA -based approach with clay models in <i>Ameerega trivittata</i> (Christopher Heine, BA, Trier University) 2021 Defense mechanisms in a neotropical poison frog (Hannes Heister, BA, Trier University) 2021 Do jumping spiders distinguish different types of conspecifics based on static visual stimuli? (Anna Stanton, BA, University of Konstanz) * 2020 The function of bright coloration in prey capture and predator avoidance behaviour in the wasp spider <i>Argiope bruennichi</i> (Milena Greis & Eva Schmitt, BA, Trier University, 2020)
	 2019 Color traits in the neotropical toad genus <i>Atelopus</i>: connections to morphology and habitat (Linda-Mali Weißenfels, BA, Trier University) 2019 Are fire salamanders (<i>Salamandra salamandra</i>) aposematic? A pilot study using clay models to genetically assess potential predators (Tatjana Walter, MA, Trier University) * 2019 Is the fire salamander (<i>Salamandra salamandra</i>) aposematic? A predation experiment using clay models-a pilot study (Charlene Peters, BA, Trier University) * 2019 The function of fire salamander coloration (Michèle Fugmann, MA, Trier University) * 2017 Conspicuousness of dorsal patterns of Amazonian <i>Atelopus</i> populations in relation to body size (Katrin Puffay, MA, Trier University) * * not an official referee, but contributed significantly to study design and realization

WORKSHOPS & OUTREACH	 2023 2-day project on the scientific method including field and lab work, Max-Planck-Gymnasium Trier, Germany 2023 Outreach seminar on rainforests for kindergarten children, KiTa Trier, Germany 2022 Outreach seminar on spiders for 6th graders at the IGS Hermeskeil, Germany 2021 Visual signals and their function: Introduction to scientific research. Max-Planck-Gymnasium Trier, Germany (online workshop). For all pupils in advanced biology courses. 2019 Workshop on invertebrate biodiversity (Kinder-Uni, Trier University) 2014 Workshop on marine plastic pollution (Ozeaneum Stralsund) 2013 Workshop on marine plastic pollution (Girls Day, Trier University & several schools)
ATTENDED WORKSHOPS & TRAINING	 2023 Wilderness first aid course (via Max Planck Institute of Animal Behavior) 2020 Supporting a Harassment-Free Community (Harvard University) 2020 Laboratory Biosafety & General Laboratory Safety (Harvard University) 2018 Advanced Training in University Didactics (Trier University) ('E-Learning', 'Project-oriented learning' and 'Key competences in teaching')
LANGUAGE & SKILLS	LanguagesSoftware & Programming SkillsEnglish, excellentRStats Python Adobe Illustrator MeshmixerFrench, goodTechnical SkillsPortuguese, basic3D printing (resin & filament) Laser cuttingGerman, mother tongueAnimal HusbandryPoison frogs Harlequin toads Jumping spiders
AWARDS, GRANTS, FUNDING & SCHOLARSHIPS	 Total grant income, > 85.000€ + three years postdoctoral salary (TVL E13 100%) 2023 Finalist of the 2022 PNAS Cozzarelli Prize (National Academy of Sciences) recognizing publications of outstanding scientific quality and originality. 2023 Co-funding by the Zukunftskolleg (total 17.800€) 2022 Co-funding by the Zukunftskolleg (total 6.300€) 2022 Young Scholar Fund (9,200€) 2021 Investment Programme for Research (10.820€) 2021 Co-funding by the Zukunftkolleg (1.450€) 2021 Co-funding by the Zukunftkolleg (1.450€) 2022 Outstanding disertation award, Trier University (2.000€) 2020 Outstanding disertation award, Trier University (2.000€) 2019 Best poster award, ESEB meeting in Turku, Finland (European Society for Evolutionary Biology) (ca. 300€) 2015 – 2017 PhD fellowship from the Scholarship foundation Rhineland-Palatinate (total 34.000 €) 2014 – 2018 Several travel & conference grants awarded by the research fund of Trier University (total 3.400 €)
SCIENTIFIC OUTPUT TOP 5 PUBLICATIONS	 Rößler, D.C., Kim, K., De Agrò, M., Jordan, A., Galizia, C.G., Shamble, P.S., 2022. Regularly occurring bouts of retinal movements suggest an REM sleep-like state in jumping spiders. PNAS, 119(33). https://doi.org/10.1073/pnas.2204754119 Rößler, D.C., De Agrò, M., Kim, K., Shamble, P.S., 2022. Static visual predator recognition in jumping spiders. Functional Ecology, 36(3). https://doi.org/10.1111/1365-2435.13953

- Rößler, D.C., De Agrò, M., Biundo, E., Shamble, P.S., 2021. Hanging by a thread: unusual nocturnal resting behavior in a jumping spider. Frontiers in Zoology, 18(1). https://doi.org/10.1186/s12983-021-00410-3
- Rößler, D.C., Lötters, S., Veith, M., Fugmann, M., Peters, C., Künzel, S., Krehenwinkel, H., 2020. An amplicon sequencing protocol for attacker identification from DNA traces left on artificial prey. Methods in Ecology and Evolution, 11(10). https://doi.org/10.1111/2041-210X.13459
- Rößler, D.C., Lötters, S., Mappes, J., Valkonen, J., Menin, M., Lima, A.P., Pröhl, H., 2019. Sole coloration as an unusual aposematic signal in a Neotropical toad. Scientific Reports, 9(1). https://doi.org/10.1038/s41598-018-37705-1

further Publications

- Plate, J. & Rößler, D.C., (2024). Variation in predator recognition across three species of jumping spiders (Salticidae). Animal Behavior and Cognition, 11(1). https://doi.org/10.26451/abc.11.01.03.2024
- Plewnia, A., Lötters, S., Gomides, S., De Agrò, M. & Rößler D.C. (2024). Sex-specific ventral dichromatism and melanization in harlequin toads (*Atelopus*): a common but overlooked character of unknown function. Evolutionary Ecology. https://doi.org/10.1007/s10682-024-10288-2
- Lötters, S., Plewnia, A., [...], **Rößler, D.C.,** [...] & La Marca, E. (2023). The amphibian extinction crisis is still an emergency. **Communications Earth & Environment**, 4(1). https://doi.org/10.1038/s43247-023-01069-w
- Kikuchi, D.W., [...] Rößler, D.C., Rowe, C. Rowland, H.M., Roy, A., Schaal, K.A., Sherratt, T.N., Skelhorn, J., Smart, H.R., Stankowich, T., Stefan, A.M., Summers, K., Taylor, C.H., Thorogood, R., Umbers, K., Winters, A.E., Yeager, J., Exnerová, A., (2023). The evolution and ecology of multiple antipredator defences. Journal of Evolutionary Biology, 36(7). https://doi.org/10.1111/jeb.14192
- Longbottom, C., Falk, J., Greenway, E.V., Johnson, M., Rößler, D.C., Somjee, U., 2022. Why does the matador bug (*Anisoscelis alipes*) wave its brightly-colored legs? Journal of Insect Behavior, 35.
- De Agrò, M., **Rößler, D.C.,** Kim, K., Shamble, P.S., 2021. Perception of biological motion in a jumping spider. Preliminarily accepted in **PLOS Biology**, 19(7). https://doi.org/10.1371/journal.pbio.3001172
- Ringler, M., Himmel, T., Werner, P., Luger, M., **Rößler, D.C.**, Ringler, E., Lötters, S., 2022. Male life history of a harlequin toad from French Guiana. **Salamandra**, 58(3).
- Rößler, D.C., Ogan, S., Curio, E., Krehenwinkel, H., 2019. Ability makes a thief: vision, learning and swift escape help kleptoparasitic hover wasps (*Parischnogaster* sp.) not to fall prey to their spider hosts. Behavioral Ecology and Sociobiology, 73(152). https://doi.org/10.1007/s00265-019-2767-8
- Portik, D.M., Bell, R.C., Blackburn, D.C., Bauer, A.M., Barratt, C.D., Branch, W.R., Burger, M., Channing, A., Colston, T.J., [...] Rößler, D.C., Sinsch, U., Rödel, M.O., Veith, M., Vindum, A.G., Zassi-Boulou, J., McGuire, J.A., 2019. Sexual dichromatism drives diversification within a major radiation of African amphibians. Systematic Biology, sys023. https://doi.org/10.1093/sysbio/syz023
- Mebs, D., Lorentz, M., Yotsu-Yamashita, M., Rößler, D.C., Ernst, R., Lötters, S., 2018. Geographic range expansion of tetrodotoxin in amphibians – First record in *Atelopus hoogmoedi* from the Guiana Shield. Toxicon, 150. https://doi.org/10.1016/j.toxicon.2018.05.011
- **Rößler. D.C.**, Pröhl, H, Lötters, S., 2018. The future of clay model studies. **BMC Zoology**, 3(1). https://doi.org/10.1186/s40850-018-0033-6

	Lorentz, M.N., Stokes, A.N., Rößler, D.C. , Lötters, S., 2016. Tetrodotoxin. Current Biology , 26(19).
	Rößler, D.C. , 2017. <i>Atelopus spumarius</i> (Pebas Stubfoot Toad). Behavior. Herpetological Review , 48(3).
	Schulte, L.M. & Rößler, D.C. , 2013. Do poison frogs recognize chemical cues of the other sex or do they react to cues of stressed conspecifics? Behavioural Processes , 100. https://doi.org/10.1016/j.beproc.2013.07.016
PREPRINTS	Rößler, D.C. & Herberstein, M.E. (2023). A state with increased arousal threshold in <i>Araneus diadematus</i> (Araneidae) measured in the wild: new evidence for sleep in spiders. BioRxiv. https://doi.org/10.1101/2023.10.19.563109
	De Agró, M., Rößler, D.C. & Shamble, P.S. (2023). Eye-specific detection and multi-eye integration model of biological motion in jumping spiders. BioRxiv. https://doi.org/10.1101/2023.09.24.559175
UNDER REVIEW / IN REVISION	De Agró, M., Rößler, D.C. & Shamble, P.S. (in revision). Eye-specific detection and multi-eye integration model of biological motion in jumping spiders. In revision in Journal of Experimental Biology .
	Rößler, D.C. & Herberstein, M.E. (2023). A state with increased arousal threshold in <i>Araneus diadematus</i> (Araneidae) measured in the wild: new evidence for sleep in spiders. Under review in Animal Behaviour .
CONFERENCE CONTRIBUTIONS ORGANIZATION	Symposium organization at the international <i>Behaviour</i> conference in Bielefeld in August 2023. Title: <i>Embracing diversity: comparative sleep research in non-model organisms</i> , invited speaker: Prof. Dr. Niels Rattenborg. Lead organizer: Daniela C. Rößler , co-organizers: Meg Crofoot, Pritish Chakravarty
INVITED PLENARY	Rößler, D.C. , 02/2024. The spider sleeps tonight: an exceptional framework for comparative sleep research. Plenary talk at the meeting of the Ethological society. Invited by Prof. Dr. Melanie Dammhahn
INVITED SYMPOSIUM TALK	Rößler, D.C. , 09/2022. Strong behavioral evidence of an REM sleep-like state in jumping spiders. Hot Topic Symposium at the closing session of the European Sleep Research Society (ESRS) conference in Athens, Greece. Invited by Prof. Dr. Tom de Boer
CONTRIBUTED TALKS	Rößler, D.C. , Kim, K., De Agrò, M., Jordan, A., Galizia, C.G., Shamble, P.S., 2022. Dream research! Evidence for REM-like sleep in jumping spiders. Animal Behavior Society (ABS) 2022 Virtual Meeting. Online Conference.
	Rößler, D.C. , De Agrò, M., Kim, K., Shamble, P.S., 2021. Arachno-Arachnophobia! Static visual predator recognition in jumping spiders. European Society for Evolutionary Biology (ESEB), Satellite Symposium – Evolution of multiple prey defenses: from predator cognition to community ecology. Online Conference
	Rößler, D.C. , De Agrò, M., Kim, K., Shamble, P.S, 2021. Arachno-Arachnophobia! Static visual predator recognition in jumping spiders. Animal Behavior Society (ABS) 2021 Virtual Meeting. Online Conference.
	Rößler, D.C. , Lötters, S., Mappes, J., Valkonen, J., Menin, M., Lima, A.P., Pröhl, H., 2018. These soles are made for warning: an uncommon case of aposematism in a Neotropical toad. ISBE (International Society for Behavioral Ecology), Minneapolis, USA.

POSTERS Umbach, Z. & **Rößler D.C.**, 2023. Hidden in plain sight? Testing eye camouflage in jumping spiders. Behaviour conference in Bielefeld. This poster won second place for best poster.

Hirschkorn, C., Uyehara, K.I. & **Rößler D.C.**, 2023. Shake that thing! Abdominal bobbing as a dynamic visual signal in a jumping spider. Behaviour conference in Bielefeld.

Rößler, D.C., Lötters, S., Fugmann, M., Peters, C., Veith, M., Krehenwinkel, H., 2019. Bite me!
 Predator identification from salivary DNA left on artificial prey. ESEB (European Society for Evolutionary Biology), Turku, Finland. This poster won the first prize by public choice.
 10.6084/m9.figshare.9698618.v1

INVITED SEMINARS & LECTURES

Rößler, D.C., 04/2024. The spider sleeps tonight: an exceptional framework for comparative sleep research. Seminar at the University of Hamburg. Invited by Prof. Dr. Jutta Schneider

Rößler, D.C., 04/2024. The spider sleeps tonight: an exceptional framework for comparative sleep research. Seminar at the VetMedUni Vienna. Invited by Prof. Dr. Bibiana Rojas

Rößler, D.C., 11/2023. Sleep diversity–what can we learn from non-model organisms? *An eight-legged example*. Seminar series Center for Chronobiology, University of Basel. Invited by Dr. Carolin Reichert

Rößler, D.C., 06/2023. Sleep diversity–what can we learn from non-model organisms? *An eight-legged example*. Seminar series at the Max Planck Institute for Chemical Ecology in Jena. Invited by Dr. Alfonso Aceves

Rößler, D.C., 05/2023. Sleep diversity–what can we learn from non-model organisms? *An eight-legged example*. Lecture Series in Behavioral, Theoretical, and Evolutionary Biology at University of Bern. Invited by Prof. Dr. Eva Ringler

Rößler, D.C., 12/2022. All animals sleep–do all animals *dream*? Biological seminar series Trier University. Invited by Prof. Dr. Stefan Lötters

Rößler, D.C., 10/2022. All animals sleep—do all animals *dream*? Seminar series at the Centre for Behaviour and Evolution at Newcastle University, UK (online seminar). Invited by Dr. Vivek Nityananda

Rößler, D.C., 02/2022. All animals sleep–do all animals *dream*? Invited lecture in Contemporary Questions in Behavioral Ecology course at LMU Munich, Germany (online lecture). Invited by Prof. Dr. Niels Dingemanse

Rößler, D.C., 10/2022. All animals sleep–do all animals *dream*? Biology colloquium at Goethe University Frankfurt, Germany. Invited by Prof. Dr. Lisa Schulte

Rößler, D.C., 06/2021. Unusual or simply overlooked? Natural history lessons from common jumping spiders. Smithsonian Tropical Research Institute (STRI) Behavior group, Gamboa, Panama (online seminar). Invited by Dr. Ummat Somjee

Rößler, D.C., 05/2020. Arachno-Arachnophobia! Visual predator recognition in jumping spiders. Stonehill College, Boston, USA (online seminar). Invited by Prof. Dr. Bronwyn Bleakley

REVIEWER ACTIVITY JOURNALS Animal Conservation | Animal Behaviour | Behavioral Ecology | Biotropica | Ecological Entomology | Functional Ecology | Journal of Animal Ecology | Methods in Ecology and Evolution | PeerJ | Proceedings of the Royal Society B | Sleep Advances

GRANTS & 2023 | ZUKOnnect Fellowships FELLOWSHIPS 2022 | ZUKOnnect Fellowships 2022 | ABS Student Research Grants

EDITORIAL	Guest editor in the not-for-profit, open access journal In&Vertebrates for a special issue called:
ACTIVITY	"Undocumented animal behaviors—reviving natural history"
SOCIETY	Animal Behavior Society (ABS), Association for the Study of Animal Behaviour Society (ASAB),
MEMBERSHIPS	International for Behavioral Ecology (ISBE)
RESEARCH NETWORK	 Prof. Dr. Barrett Klein (University of Wisconsin LaCrosse, USA) Prof. Dr. Giovanni Galizia (Konstanz University, Germany) Prof. Dr. Marie Herberstein (Macquarie University, Australia) Dr. Paul Shamble (Yale University, USA) Dr. Ummat Somjee (Smithsonian Tropical Research Institute, Panama) Dr. Jay Stafstrom (Cornell University, USA) Dr. Massimo De Agrò (Sant'Anna Institute of Advanced Studies, Italy) Prof. Dr. Johanna Mappes (Helsinki University, Finland) Prof. Dr. Bibiana Rojas (Vetmed University Vienna, Austria) Dr. Jonas Wolff (University of Greifswald, Germany) Dr. Lauren Sumner-Rooney (MfN Berlin, Germany) Prof. Dr. Armin Bahl (Konstanz University, Germany) Prof. Dr. Meg Crofoot (Max Planck Institute of Animal Behavior, Germany) Dr. Alex Jordan (Max Planck Institute of Animal Behavior, Germany)
MEDIA	 08/2023 Do spiders dream? What about cuttlefish? Bearded dragons? Knowable Magazine 07/2023 Sleep like a log; What the duck?! ABC Podcast, hosted by Ann Jones 02/2023 Mentioning of my research in the popular German Quiz show ("Wer weiß denn sowas?" on ARD (episode aired February 1st 2023) 12/2022 Appearance in the German popular science TV show "Galileo" on ProSieben (episode aired December 7th 2022) 12/2022 Listed among National Geographic's "22 most amazing discoveries of 2022" 09/2022 Podcast on jumping spider sleep research (Tiny Matters) 08/2022 Numerous (> 300) international news articles on my research on an REM sleep-like state in jumping spiders including The New York Times, National Geographic, Science, Wall Street Journal, Scientific American, Popular Science, Harvard Gazette. 10/2021 Interview about my research on static visual predator recognition on the science podcast Short Wave by NPR (National Public Radio) 05/2021 Several news articles covered the finding from our paper on nocturnal resting in a jumping spider including Popular Science, NPR (National Public Radio) and Ethologisch 01/2021 Coverage of Cell's implementation of the "Inclusion and Diversity Statement" in Science 11/2020 Blogpost in the "Methods in Ecology and Evolution"-Blog on our eDNA-clay protocol