

Aileen Berasategui

Vrije Universiteit Amsterdam | Amsterdam Institute for Life and Environment (A-LIFE)
Section Ecology & Evolution

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I am broadly interested in the chemical ecology and evolution of species interactions. I focus on the interplay between animals, their associated microbes, and the secondary metabolites that govern their interactions.

Appointments

Vrije Universiteit Amsterdam, Amsterdam Institute for Life and Environment (A-Life)

Assistant Professor, Section Ecology & Evolution

*Amsterdam,
The Netherlands*
2023 - Present

**Department of Microbiology/Biotechnology, University of Tübingen
Mutualisms Research Group, Max Planck Institute for Biology**

Early Career Researcher, Cluster of Excellence “Controlling Microbes to Fight Infections”

Tübingen, Germany
2022 - 2023

- Ecology and evolution of natural products driving host-parasite specificity in fungus growing ants.
- Novel defensive symbiosis between the tortoise leaf beetle *Chelymorpha alternans* and the ascomycete *Fusarium oxysporum*.

Department of Biology, Emory University

German Research Foundation (DFG) Postdoctoral Fellow

Atlanta, GA, USA
2017 – 2021

- Chemical ecology of host-parasite interactions in fungus-growing ants.

Education

Department of Biochemistry, Max Planck Institute for Chemical Ecology

Ph.D.

Jena, Germany

2012-2017

- Thesis: “Conserved microbiota of a herbivorous insect mediates the degradation of host plant defenses”.

University of Bremen

M.Sc.

Bremen, Germany

2010-2012

- Thesis: “Horizontal transmission of *Wolbachia* between different Hymenopteran host-parasitoid pairs”.

University of Oviedo

B.Sc.

Oviedo, Spain

2005-2010

Publications

Published

- 2024** **Berasategui A**, Salem H, Moller J, Christopher Y, Vidaurre-Montoya Q, Conn C, Read T, Rodrigues A, Ziemert N, Gerardo N.
Genomic insights into the evolution of secondary metabolism of *Escovopsis* and its allies, specialized fungal symbionts of fungus-farming ants.
mSystems, in press.
- Srivastava V, Pai H, Aguilar Pontes MV, **Berasategui A**, Kamble A, Di Pietro A, Redkar A
Molecular dialogue during root manipulation by fungal vascular-wilt *Fusarium oxysporum*
Annual Review of Pathology, in press.
- García-Lozano M, Henzler C, González Porras MA, Pons I, **Berasategui A**, Lanz C, Budde H, Ogushi K, Matsuura Y, Pauchet Y, Goffredi S, Fukatsu T, Windsor D, Salem H
Paleocene origin of a streamlined digestive symbiosis in leaf beetles.
Current Biology, 31, 1-14, doi.org/10.1016/j.cub.2024.01.070
- 2023** **Berasategui A**, Jagdale S, Salem H
Fusarium phytopathogens as insect mutualists
PLOS Pathogens, 19(7): e1011497.
- Berasategui A**, Salem H.
Synergy in symbioses.
eLife, 12: e85565.
- Yılmaz T, Mungan D, **Berasategui A**, Ziemert N.
FunARTS, the Fungal Antibiotic Resistant Target Seeker, an exploration engine for target directed genome mining in fungi.
Nucleic Acids Research, gkad386
- Rogowska-van der Molen M, **Berasategui A**, Coolen S, Jansen R, Welte C
Degradation of plant toxins by environmental microbes.
Environmental Microbiology, doi.org/10.1111/1462-2920.16507.
- Berasategui A**, Breitenbach N, García-Lozano M, Pons I, Sailer B, Lanz C, Rodriguez V, Hipp K, Ziemert N, Windsor D, Salem H.
The leaf beetle *Chelymorpha alternans* propagates a plant pathogen in exchange for pupal protection,
Current Biology, 32, 4114-4127.
- 2022** Gotting K, May D, Sosa-Calvo J, Khadempour L, Francoeur CB, **Berasategui A**, Thairu MW, Sandstrom S, Carlson CM, Chevrette MG, Rodrigues A, Pupo MT, Bugni TS, Schultz TR, Johnston JS, Gerardo NM, Currie CR.
Genomic diversification of the specialized parasite of the fungus-growing ant symbiosis.
Proceedings of the National Academy of Sciences USA, 119 (51) 2213096119.
- Han Z, Sieriebriennikov B, Susoy V, Lo WS, Igreja C, Dong C, **Berasategui A**, Witte H, Sommer RJ.
Horizontally acquired cellulases assist the expansion of dietary range in *Pristionchus* nematodes.
Molecular Biology and Evolution, 39(2): msab370.

- 2022 Stoy K, Chavez J, de las Casas V, Talla V, **Berasategui A**, Morran L, Gerardo NM
Evaluating the role of coevolution in a horizontally transmitted mutualism.
Evolution, qpaco09.
- Berasategui A**, Moller J, Weiss B, Bauchiero C, Beck C, Reed T, Gerardo N, Salem H.
Symbiont genomic features and localization in the bean beetle, *Callosobruchus maculatus*.
Applied and Environmental Microbiology, 87, 12:1-13.
- 2021 Acevedo TS, Fricker GP, Garcia JR, Alcaide T, **Berasategui A**, Stoy KS, Gerardo NM.
The importance of environmentally-acquired bacterial symbionts for the squash bug (*Anasa tristis*), a significant agricultural pest.
Frontiers in Microbiology, 12:719112. doi.org/10.3389/fmicb.2021.719112
- Salem H, Kirsch R, Pauchet Y, **Berasategui A**, Fukumori K, Moriyama M, Cripps M, Windsor D, Fukatsu T, Gerardo N.
Symbiont digestive range reflects host plant breadth in herbivorous beetles.
Current Biology, 30, 1-12.
- 2020 **Berasategui A**, Salem H
Microbial determinants of folivory in insects
Hadfield, M.G., and Bosch, T. (ed.): *Cellular Dialogues in the Holobiont*. CRC Press.
- Lu X, Zhang J, Brown B, Li R, Rodríguez-Romero J, **Berasategui A**, Liu B, Xu M, Lue D, Pan Z, Baerson SR, Gershenson J, Li Z, Sesma A, Yang B, Peters RJ.
Inferring roles in defense from metabolic allocation with rice diterpenoids.
The Plant Cell, 30: 1119-1131.
- 2018 **Berasategui A.**, Salem H, Paetz C, Santoro M, Gershenson J, Kaltenpoth M, Schmidt A. Gut microbiota of the pine weevil degrades conifer diterpenes and increases insect fitness.
Molecular Ecology, 26, 15: 4099-4110.
- 2017 Salem H, Bauer E, Kirsch R, **Berasategui A**, Weiss B, Cripps M, Koga R, Fukumori K, Vogel H, Fukatsu T, Kaltenpoth M.
Drastic genome reduction in an herbivore's pectinolytic symbiont.
Cell, 171, 7:1520-1531.
- Li H, Li T, **Berasategui A.**, Zhang X, Li C, Xiao Z, Li X.
Gut region and host species shape the diversity and interactions of bacterial communities in pikas (*Ochotona curzoniae* and *Ochotona daurica*).
FEMS Microbiology Ecology, 93 (12).
- Berasategui A**, Axelsson A, Norlander G, Borg-Karlson A, Schmidt A, Gershenson J, Terenius O, Kaltenpoth M.
The gut microbiota of the pine weevil is similar across Europe and resembles that of other conifer-feeding beetles.
Molecular Ecology, 25, 16: 4014-4031.
- 2016 Dohet L, Gregoire J, **Berasategui A**, Kaltenpoth M, Biedermann P.
Bacterial and fungal symbionts of parasitic *Dendroctonus* bark beetles.
FEMS Microbiology Ecology, 92, 9: 129.

- 2016 **Berasategui A**, Shukla S, Salem H and Kaltenpoth M.
Potential applications of insect symbionts in biotechnology.
Applied Microbiology and Biotechnology, 100, 4: 1567-77.
- 2014 Nagel R, **Berasategui A**, Paetz C, Gershenzon J, Schmidt A.
Overexpression of an isoprenyl diphosphate synthase in spruce leads to unexpected terpene diversion products that function in plant defense.
Plant Physiology, 164, 2: 555-569.

Fellowships & Awards

- 2022-2024 **German Research Foundation**, 'CMFI' Early Career Research Grant
- 2020 **Science ATL Communication** Fellowship
- 2019-2021 **German Research Foundation** Postdoctoral Fellowship
- 2017 **DAAD (Deutscher Akademischer Austauschdienst)** Travel Award
- 2012-2017 **Max Planck Institute for Chemical Ecology** Graduate Research Fellowship
- 2015 **European Campus of Excellence** Scholarship

Teaching Experience

Mentoring

- | | | |
|--------------|---------------------------------------|---|
| 2024 | Regina Magaña, MSc Thesis | <i>Vrije Universiteit Amsterdam, The Netherlands</i> |
| | Marilou Flinniaux, MSc Thesis | <i>Vrije Universiteit Amsterdam, The Netherlands</i> |
| | Hanna Zandstra, MSc Thesis | <i>Vrije Universiteit Amsterdam, The Netherlands</i> |
| | Alice Douglas, MSc Lit. Thesis | <i>Vrije Universiteit Amsterdam, The Netherlands</i> |
| | Ellis Kaaijn, BSc Project | <i>Vrije Universiteit Amsterdam, The Netherlands</i> |
| | Ole Astro, BSc Project | <i>Vrije Universiteit Amsterdam, The Netherlands</i> |
| 2022-2023 | Lioba Willmes, Bachelor's Thesis. | <i>Coburg University of Applied Sciences, Germany</i> |
| 2021-2022 | Noa Breitenbach, Bachelor's Thesis. | <i>University of Tübingen, Germany</i> |
| 2020-Present | Jacoby Robinson, PhD student. | <i>Emory University, USA</i> |
| 2020-2021 | Elizabeth Liang, research for credit. | <i>Emory University, USA</i> |
| 2019-2020 | Jacoby Robinson, Bachelor student. | <i>Emory University, USA</i> |
| 2019-2020 | Tylor Lee, research for credit. | <i>Emory University, USA</i> |
| 2019-2020 | Elizabeth Liang, research for credit. | <i>Emory University, USA</i> |
| 2018-2019 | Mahal Bugal, Honor's Thesis | <i>Agnes Scott College, USA</i> |
| 2018-2019 | Ali Büyüm, Honor's Thesis. | <i>Emory University, USA</i> |
| | Caroline Bauchiero. | <i>Emory University, USA</i> |

2018	Jonathan Pathmanabhan	<i>Emory University, USA</i>
Teaching		
2024	Behavioral Biology Lecturer	<i>Vrije Universiteit Amsterdam</i>
	Evolutionary Genetics Lecturer	<i>Vrije Universiteit Amsterdam</i>
2023	Cooperation Behavioral Biology Guest lecturer	<i>Vrije Universiteit Amsterdam</i>
2023	Beetle Symbiosis Symbiosis course Guest lecturer	<i>Vrije Universiteit Amsterdam</i>
2023	Genomics and natural products Genomics and natural products Guest lecturer	<i>University of Tübingen</i>
2022	Mikrobielle Wirkstoffsynthese: History of Antibiotics Guest lecturer	<i>University of Tübingen</i>
	Genomics and natural products Genomics and natural products Guest lecturer	<i>Emory University</i>
2021	Mikrobielle Wirkstoffsynthese: Ecological roles of natural products in bacteria Guest lecturer	<i>University of Tübingen</i>
2018	BIOL247 Ecology: Community Ecology. Guest lecturer	<i>Emory University</i>

Presentations

2024	Gordon Research Conference on Cellular and Molecular Fungal Biology , Origin and evolution of a beetle-fungal defensive symbiosis. (Invited Speaker)	<i>Holderness, USA</i>
	International Congress of Entomology , Origin and evolution of a beetle-fungal defensive symbiosis. Symposium: "How do insects evolve to manage symbioses with microbes?" (Invited Speaker)	<i>Kyoto, Japan</i>
	University of Vienna, University Seminar . Origin and evolution of a beetle-fungal defensive symbiosis. (Invited Speaker)	<i>Vienna, Austria</i>

2023	<p>The Sainsbury Laboratory, Leaf beetle propagates a phytopathogen in exchange for pupal protection. (Invited Speaker)</p> <p>Gordon Research Conference on Plant-Herbivore Interactions, Leaf beetle propagates a phytopathogen in exchange for pupal protection. (Invited Speaker)</p> <p>IMPRS Symposium, Max Planck Institute for Chemical Ecology, Leaf beetle propagates a phytopathogen in exchange for pupal protection. (Invited Speaker)</p>	<p>Norwich, UK</p> <p>Ventura, CA, USA</p> <p>Jena, Germany</p>
2022	<p>Entomological Society of America, Leaf beetle propagates a phytopathogen in exchange for pupal protection. (Invited Speaker)</p> <p>Radboud University, Leaf beetle propagates a phytopathogen in exchange for pupal protection. (Invited Speaker)</p> <p>Microbiology and Infection Biology Day, Institute of Tropical Medicine, University of Tübingen, Secondary metabolites of <i>Escovopsis</i>, a parasite of fungus-farming ants, may underlie host-pathogen coevolution</p> <p>International Symbiosis Society (ISS), Secondary metabolites of <i>Escovopsis</i>, a parasite of fungus-farming ants, may underlie host-pathogen coevolution</p>	<p>Vancouver, BC, Canada</p> <p>Nijmegen, The Netherlands</p> <p>Tübingen, Germany</p> <p>Lyon, France</p>
2019	<p>International Society for Chemical Ecology (ISCE), Host secondary metabolites drive parasite specificity in fungus-growing ants. (Invited Speaker)</p>	<p>Atlanta, GA, USA</p>
2016	<p>Evolution, Conserved microbiota in a herbivorous beetle mediates the degradation of host plant defenses.</p> <p>VAAM Conference, Evidence of terpene degradation by pine weevil (<i>Hylobius abietis</i>) microbiota and its effects on host fitness.</p>	<p>Austin, TX, USA</p> <p>Jena, Germany</p>
2015	<p>International Symbiosis Society (ISS), Plant secondary metabolites, the pine weevil and its microbes: A three-way interaction.</p> <p>IMPRS Symposium, Geographical stability of endosymbiotic gut bacteria of the large pine weevil and their role in the detoxification of terpenes.</p>	<p>Lisbon, Portugal</p> <p>Dornburg, Germany</p>
2014	<p>Evolution, Geographical stability of endosymbiotic gut bacteria of the large pine weevil and their role in the detoxification of terpenes.</p> <p>ICE Symposium, MPI for Chemical Ecology, Geographical stability of endosymbiotic gut bacteria of the large pine weevil and their role in the detoxification of terpenes.</p>	<p>Raleigh, NC, USA</p> <p>Jena, Germany</p>
2013	<p>KTH Chemical Science and Engineering Seminar, How does <i>Hylobius abietis</i> cope with terpenes in its diet?</p>	<p>Stockholm, Sweden</p>

Ad hoc reviewer

Natural Products Reports, Nucleic Acids Research, The ISME Journal, Molecular Ecology, BMC Plant Biology, Biological Control, Environmental Microbiology, Environmental Entomology, Microbial Ecology, PeerJ, Scientific Reports, PlosOne, IJSM, Entomologia Experimentalis et Applicata, Frontiers in Microbiology, Animal Microbiome, Communications Biology.

Conference Session Organization

2019 **International Society for Chemical Ecology (ISCE)**, The chemical ecology of symbiotic interactions. *Atlanta, GA, USA*

Service

2021 **Online Q&A: What do we do in an entomology lab?** (International Day of Women and Girls in Science) K3-5 students, Colegio El Salvador, Spain | 2021

2019 **International Society for Chemical Ecology**, Conference Session Organizer: “The chemical ecology of symbiotic interactions”.

Skype a Scientist, Skype K-12 students to talk about science.

- Muskego Lakes Middle School, WI, USA.

2019 **Atlanta Science Festival**, Local Science Festival.

Science. Art. Wonder. Creating art that intersects with science. Collaboration with artist Bonnie J Woolger.

2018 **Contributing author in Emory’s Postdoc Magazine**, Microbiome Issue: “Herbivory is not easy, but this beetle has a tiny helper”.

Skype a Scientist, Skype K-12 students to talk about science.

- I.S. 187, Brooklyn, NY, USA.

2017 **Mycrobes**, Outreach at K-12 Morningside Middle School (Atlanta).

2013 **5th Long Night of Science, Max Planck Institute for Chemical Ecology**, “Insekten und Mikroben-Partnerschaft mit Niveau”.

2012-2016 **PhD Representative, Max Planck Institute for Chemical Ecology**. Represented students for the Research Group Insect Symbiosis and Research Groups Mass Spectrometry/Proteomics/Biosynthesis/NMR.