



Exploration of Ecological  
Interactions with Molecular  
and Chemical Techniques

## ***5 Doktorandenstellen in molekularer und chemischer Ökologie und Evolution***

### ***International Max Planck Research School: “The Exploration of Ecological Interactions with Molecular and Chemical Techniques”***

Die Doktorandenschule am Max-Planck-Institut für chemische Ökologie schreibt **5 Doktorandenstellen** aus, die im Zeitraum September 2018 – Januar 2019 besetzt werden sollen. Zentrales Forschungsthema unserer Schule ist die experimentelle Untersuchung ökologischer Wechselbeziehungen unter Zuhilfenahme molekularer, chemischer und neuroethologischer Methoden. Im Mittelpunkt stehen die Beziehungen zwischen Pflanzen, Herbivoren, Mikroben und ihrer Umwelt sowie der Einfluss dieser Wechselbeziehungen auf Entwicklung und Verhalten der beteiligten Organismen. Wir bieten **14 interessante Projekte** an, die sich auf verschiedene Organismen und Methoden konzentrieren. Die vollständige Liste aller Projektangebote inklusive der Projektbeschreibungen findet man auf unserer Website ([http://imprs.ice.mpg.de/ext/index.php?id=420#header\\_logo](http://imprs.ice.mpg.de/ext/index.php?id=420#header_logo)).

Die IMPRS geht aus einer Zusammenarbeit des Max-Planck-Instituts für chemische Ökologie, der Friedrich-Schiller-Universität und dem Leibniz-Institut für Naturstoff-Forschung Infektionsbiologie in Jena hervor. Wir bieten eine moderne Ausstattung, ein hervorragendes Forschungsumfeld, individuelle Betreuung durch ein Promotionskomitee und ein strukturiertes Weiterbildungsprogramm, das wissenschaftliche Kurse, Softskillkurse und interne Konferenzen und Veranstaltungen beinhaltet. Erfolgreiche Bewerber erhalten einen Max Planck Doktorandenvertrag. Es gibt keine Studiengebühren und die Studiensprache ist Englisch.

Wir suchen hochmotivierte Bewerber mit großem Interesse an den oben beschriebenen Themen. BewerberInnen sollten einen Master bzw. Diplomabschluss in einem der folgenden Felder haben: Ökologie, Evolutionsbiologie, Bioinformatik, analytische Chemie, Entomologie, Neurobiologie, Molekularbiologie, Biochemie, Pflanzenphysiologie und Genetik. In Ausnahmefällen finden auch herausragende Bewerber mit Bachelorabschluss Berücksichtigung. All unsere Projekte sind breitgefächert und es wird vorausgesetzt, dass die Studierenden gewillt sind, eng mit Wissenschaftlern aus verschiedenen Forschungsbereichen zusammenzuarbeiten.

**Bewerbungsschluss ist der 16. Mai 2018.**

Für mehr Informationen zur IMPRS, den Projektangeboten und Bewerbungsvoraussetzungen besuchen Sie bitte unsere Website: <http://imprs.ice.mpg.de/>. Sie können sich unter folgendem Link ab dem 28. März 2018 online bewerben: <https://imprs-reg.ice.mpg.de/>.

## Projekte 2018

Es folgt eine Übersicht aller ausgeschriebenen Projekte (Titel Englisch). Alle Projekte sind interdisziplinäre ausgerichtet und erfordern Bereitschaft zu fächerübergreifender Zusammenarbeit. Bewerber können bis zu 3 Projekte auswählen. Während des Rekrutments in Jena kann die Projektpräferenz bei Bedarf noch angepasst werden.

*[Project 1: Surfing the surface: Hydrophobins on fungal hyphae](#)*

**Supervisors:** [Prof. Dr. Erika Kothe](#), Institute for Microbiology, Friedrich Schiller University Jena; [Prof. Dr. Jonathan Gershenzon](#), Department of Biochemistry, Max Planck Institute for Chemical Ecology; [Dr. Aleš Svatoš](#), Research Group Mass Spectrometry, Max Planck Institute for Chemical Ecology; [Prof. Dr. Wilhelm Boland](#), Department of Bioorganic Chemistry, Max Planck Institute for Chemical Ecology;

*[Project 2: Towards GC-MS: Adapting SIRIUS and CSI:FingerID for Electron Ionization fragmentation](#)*

**Supervisors:** [Prof. Dr. Sebastian Böcker](#), Chair of Bioinformatics, Friedrich Schiller University Jena; [Prof. Dr. Georg Pohnert](#), Chair of Instrumental Analytics, Friedrich Schiller University Jena; [Dr. Aleš Svatoš](#), Research Group Mass Spectrometry, Max Planck Institute for Chemical Ecology

*[Project 3: Symbiotic interaction of root-colonizing fungi with Arabidopsis thaliana under stress](#)*

**Supervisors:** [Prof. Dr. Ralf Oelmüller](#), Institute for Plant Physiology, Friedrich Schiller University Jena; [Dr. Karin Groten](#), Department of Molecular Ecology, Max Planck Institute for Chemical Ecology

*[Project 4: 2-Phenylethanol and its derivatives in poplar-insect and poplar-microbe interactions](#)*

**Supervisors:** [Dr. Tobias Köllner](#), Department of Biochemistry, Max Planck Institute for Chemical Ecology; [Dr. Sybille Unsicker](#), Department of Biochemistry, Max Planck Institute for Chemical Ecology

*[Project 5: Specificity, phylogeny and fitness contributions of phytoplasma effector proteins](#)*

**Supervisors:** [Prof. Dr. Günter Theißen](#), Genetics, Matthias Schleiden Institute, Friedrich Schiller University Jena; [Prof. Dr. Jonathan Gershenzon](#), Department of Biochemistry, Max Planck Institute for Chemical Ecology; [Dr. Axel Mithöfer](#), Department of Bioorganic Chemistry, Max Planck Institute for Chemical Ecology

*[Project 6: Imaging of volatile compounds emission and lateral distribution by mass spectrometry](#)*

**Supervisors:** [Dr. Aleš Svatoš](#), Research Group Mass Spectrometry, Max Planck Institute for Chemical Ecology; [Prof. Dr. Erika Kothe](#), Institute for Microbiology, Friedrich Schiller University Jena

*[Project 7: Drugs from bugs: Venomics of predatory Heteroptera](#)*

**Supervisors:** [Dr. Heiko Vogel](#), Department of Entomology, Max Planck Institute for Chemical Ecology; [Prof. Dr. Andreas Vilcinskas](#), Institute for Insect Biotechnology, Justus Liebig University, Gießen ; [Prof. Dr. David Heckel](#), Department of Entomology, Max Planck Institute for Chemical Ecology

*[Project 8: How hardwired is the olfactory circuitry?](#)*

**Supervisors:** [Dr. Silke Sachse](#), Research Group Olfactory Coding, Max Planck Institute for Chemical Ecology; [Dr. Markus Knaden](#), Department of Evolutionary Neuroethology, Max Planck Institute for Chemical Ecology

*[Project 9](#): Predators that eat toxic food*

**Supervisors:** [Dr. Hannah Rowland](#), Research Group Predators and Prey, Max Planck Institute for Chemical Ecology; [Dr. Christian Paetz](#), Research Group Biosynthesis/NMR, Max Planck Institute for Chemical Ecology

*[Project 10](#): The insect mustard oil bomb: A chemical weapon against predators and pathogens?*

**Supervisors:** [Dr. Franziska Beran](#), Research Group Detoxification and Sequestration in Insects, Max Planck Institute for Chemical Ecology; [Dr. Hannah Rowland](#), Research Group Predators and Prey, Max Planck Institute for Chemical Ecology

*[Project 11](#): Recruitment and maintenance of the *Nicotiana attenuata* root microbiome*

**Supervisors:** [Dr. Rayko Halitschke](#), Department of Molecular Ecology, Max Planck Institute for Chemical Ecology; [Prof. Dr. Ian Baldwin](#), Department of Molecular Ecology, Max Planck Institute for Chemical Ecology

*[Project 12](#): Deorphanization of chemosensory neurons in *D. melanogaster**

**Supervisors:** [Dr. Sofia Lavista-Llanos](#), Department of Evolutionary Neuroethology, Max Planck Institute for Chemical Ecology; [Dr. Markus Knaden](#), Department of Evolutionary Neuroethology, Max Planck Institute for Chemical Ecology

*[Project 13](#): Molecular basis of balanced color polymorphisms in grasshoppers*

**Supervisor:** [Prof. Dr. Holger Schielzeth](#), Institute of Ecology and Evolution, Friedrich Schiller University Jena

*[Project 14](#): Molecular analysis of the wound response in the liverwort, *Marchantia polymorpha**

**Supervisors:** [Priv. Doz. Dr. Axel Mithöfer](#), Department of Bioorganic Chemistry, Max Planck Institute for Chemical Ecology; [Dr. Stefan Bartram](#), Department of Bioorganic Chemistry, Max Planck Institute for Chemical Ecology; [Dr. Heiko Vogel](#), Department of Entomology, Max Planck Institute for Chemical Ecology; [Prof. Dr. Ralf Oelmüller](#), Plant Physiology, Matthias Schleiden Institute, Friedrich Schiller University Jena



## Exploration of Ecological Interactions with Molecular and Chemical Techniques

### ***5 PhD positions in Molecular and Chemical Ecology and Evolution***

#### ***International Max Planck Research School: "The Exploration of Ecological Interactions with Molecular and Chemical Techniques"***

The International Max Planck Research School (IMPRS) "The Exploration of Ecological Interactions with Molecular and Chemical Techniques" in Jena, Germany, invites applications for **5 PhD positions** beginning in September 2018 – January 2019. The overarching research topic is the use of molecular, chemical and neurobiological techniques to experimentally explore ecological interactions under natural conditions. The main focus is on the relationship between plants, microbes and herbivores, and their environment, as well as the evolutionary and behavioral consequences of these interactions. We offer **14 exciting projects** focusing on different organisms and approaches. The complete list of projects offered including project descriptions is available on our website ([http://imprs.ice.mpg.de/ext/index.php?id=420#header\\_logo](http://imprs.ice.mpg.de/ext/index.php?id=420#header_logo)).

We are looking for enthusiastic PhD students with strong interests in the above-described central topic. Applicants should have or be about to obtain a Masters or equivalent degree in one of the following fields: entomology, neurobiology, molecular biology, biochemistry, analytical chemistry, plant physiology, genetics, ecology, evolutionary biology, bioinformatics, and mathematics and computer science. Exceptional candidates with a Bachelor's degree may also be considered. All our projects are highly integrative and require willingness to closely collaborate with researchers of different backgrounds.

The Research School is a joint initiative of the Max Planck Institute for Chemical Ecology and the Friedrich Schiller University. We offer state-of-the art equipment, an excellent research environment, supervision by a thesis committee and a structured training program including scientific courses, training in transferable and outreach skills and participation in research symposia. Successful candidates will receive a Max Planck support contract. There are no tuition fees and the working language is English.

**Application deadline is May 16th, 2018.**

For detailed information on the IMPRS, projects offered and application requirements, please visit our website: <http://imprs.ice.mpg.de/>.

Please apply online from March 28, 2018, at: <https://imprs-reg.ice.mpg.de/>.

## Projects offered in 2018

Please find below a list of projects we offer for this year's recruitment. All projects are highly integrative and require the collaboration between different research groups. Applicants can identify up to three projects of interest. It is possible to change project preferences during the recruitment in Jena.

*[Project 1: Surfing the surface: Hydrophobins on fungal hyphae](#)*

**Supervisors:** [Prof. Dr. Erika Kothe](#), Institute for Microbiology, Friedrich Schiller University Jena; [Prof. Dr. Jonathan Gershenzon](#), Department of Biochemistry, Max Planck Institute for Chemical Ecology; [Dr. Aleš Svatoš](#), Research Group Mass Spectrometry, Max Planck Institute for Chemical Ecology; [Prof. Dr. Wilhelm Boland](#), Department of Bioorganic Chemistry, Max Planck Institute for Chemical Ecology;

*[Project 2: Towards GC-MS: Adapting SIRIUS and CSI:FingerID for Electron Ionization fragmentation](#)*

**Supervisors:** [Prof. Dr. Sebastian Böcker](#), Chair of Bioinformatics, Friedrich Schiller University Jena; [Prof. Dr. Georg Pohnert](#), Chair of Instrumental Analytics, Friedrich Schiller University Jena; [Dr. Aleš Svatoš](#), Research Group Mass Spectrometry, Max Planck Institute for Chemical Ecology

*[Project 3: Symbiotic interaction of root-colonizing fungi with Arabidopsis thaliana under stress](#)*

**Supervisors:** [Prof. Dr. Ralf Oelmüller](#), Institute for Plant Physiology, Friedrich Schiller University Jena; [Dr. Karin Groten](#), Department of Molecular Ecology, Max Planck Institute for Chemical Ecology

*[Project 4: 2-Phenylethanol and its derivatives in poplar-insect and poplar-microbe interactions](#)*

**Supervisors:** [Dr. Tobias Köllner](#), Department of Biochemistry, Max Planck Institute for Chemical Ecology; [Dr. Sybille Unsicker](#), Department of Biochemistry, Max Planck Institute for Chemical Ecology

*[Project 5: Specificity, phylogeny and fitness contributions of phytoplasma effector proteins](#)*

**Supervisors:** [Prof. Dr. Günter Theißen](#), Genetics, Matthias Schleiden Institute, Friedrich Schiller University Jena; [Prof. Dr. Jonathan Gershenzon](#), Department of Biochemistry, Max Planck Institute for Chemical Ecology; [Dr. Axel Mithöfer](#), Department of Bioorganic Chemistry, Max Planck Institute for Chemical Ecology

*[Project 6: Imaging of volatile compounds emission and lateral distribution by mass spectrometry](#)*

**Supervisors:** [Dr. Aleš Svatoš](#), Research Group Mass Spectrometry, Max Planck Institute for Chemical Ecology; [Prof. Dr. Erika Kothe](#), Institute for Microbiology, Friedrich Schiller University Jena

*[Project 7: Drugs from bugs: Venomics of predatory Heteroptera](#)*

**Supervisors:** [Dr. Heiko Vogel](#), Department of Entomology, Max Planck Institute for Chemical Ecology; [Prof. Dr. Andreas Vilcinskas](#), Institute for Insect Biotechnology, Justus Liebig University, Gießen ; [Prof. Dr. David Heckel](#), Department of Entomology, Max Planck Institute for Chemical Ecology

*[Project 8: How hardwired is the olfactory circuitry?](#)*

**Supervisors:** [Dr. Silke Sachse](#), Research Group Olfactory Coding, Max Planck Institute for Chemical Ecology; [Dr. Markus Knaden](#), Department of Evolutionary Neuroethology, Max Planck Institute for Chemical Ecology

*[Project 9](#): Predators that eat toxic food*

**Supervisors:** [Dr. Hannah Rowland](#), Research Group Predators and Prey, Max Planck Institute for Chemical Ecology; [Dr. Christian Paetz](#), Research Group Biosynthesis/NMR, Max Planck Institute for Chemical Ecology

*[Project 10](#): The insect mustard oil bomb: A chemical weapon against predators and pathogens?*

**Supervisors:** [Dr. Franziska Beran](#), Research Group Detoxification and Sequestration in Insects, Max Planck Institute for Chemical Ecology; [Dr. Hannah Rowland](#), Research Group Predators and Prey, Max Planck Institute for Chemical Ecology

*[Project 11](#): Recruitment and maintenance of the *Nicotiana attenuata* root microbiome*

**Supervisors:** [Dr. Rayko Halitschke](#), Department of Molecular Ecology, Max Planck Institute for Chemical Ecology; [Prof. Dr. Ian Baldwin](#), Department of Molecular Ecology, Max Planck Institute for Chemical Ecology

*[Project 12](#): Deorphanization of chemosensory neurons in *D. melanogaster**

**Supervisors:** [Dr. Sofia Lavista-Llanos](#), Department of Evolutionary Neuroethology, Max Planck Institute for Chemical Ecology; [Dr. Markus Knaden](#), Department of Evolutionary Neuroethology, Max Planck Institute for Chemical Ecology

*[Project 13](#): Molecular basis of balanced color polymorphisms in grasshoppers*

**Supervisor:** [Prof. Dr. Holger Schielzeth](#), Institute of Ecology and Evolution, Friedrich Schiller University Jena

*[Project 14](#): Molecular analysis of the wound response in the liverwort, *Marchantia polymorpha**

**Supervisors:** [Priv. Doz. Dr. Axel Mithöfer](#), Department of Bioorganic Chemistry, Max Planck Institute for Chemical Ecology; [Dr. Stefan Bartram](#), Department of Bioorganic Chemistry, Max Planck Institute for Chemical Ecology; [Dr. Heiko Vogel](#), Department of Entomology, Max Planck Institute for Chemical Ecology; [Prof. Dr. Ralf Oelmüller](#), Plant Physiology, Matthias Schleiden Institute, Friedrich Schiller University Jena