PLANTS CHALLENGE

DFG RU 5640

Physiological and evolutionary adaptation of plants to co-occurring abiotic and biotic challenges

OPEN POSITIONS

PlantsCoChallenge is a newly established Research Unit funded by the DFG. The consortium, comprising 12 Principal Investigators, aims to increase our understanding of plant stress adaptations. An overarching objective of the program is to characterize physiological and evolutionary plant adaptations to co-occurring stress in aquatic and terrestrial ecosystems while integrating the role of plant microbiota in stress resistance. Research in the program will include five distinct plant species, adapted to different environmental conditions, allowing us to conduct innovative comparative analyses.

The PlantsCoChallenge program includes plant scientists from six research institutes:

The Christian-Albrechts University, Kiel (CAU)
The Helmholtz Institute GEOMAR, Kiel
The Leibniz-Institute of Freshwater Ecology (IGB), Berlin
The University Münster, Münster
The Eberhard Karls Universität, Tübingen (EKUT)

1 COORDINATOR, 6 PHD POSITIONS AND 1 POST DOC POSITIONS ARE NOW TO BE FILLED IN THE PLANTSCOCHALLENGE PROGRAM.

LIST OF SUBPROJECTS AND ASSOCIATED OPEN POSITIONS

Coordination of the Research Unit PlantsCoChallenge

PlantsCoChallenge is organised into five subprojects (SP1-5), two central research projects (Z1, Z2) and a coordination project (C1). A primary objective of coordination project is to coordinate and organize scientific activities associated with the Research Unit, including the planning of small and larger events, both with and without invited speakers. C1 will facilitate the scientific exchange with other collaborative research centres and partners both locally and internationally. Furthermore, the coordination project will support financial and general administration as well as support recruitment procedures and create training and coaching opportunities for RU members. Finally, the coordination project will be the base for planning of outreach activities and ensure dissemination of RU-related activities.

1 coordinator position at Kiel University

We seek a highly motivated and creative person to fill the coordinator position with a base at Kiel University. The position is funded as EG 13 TV-L for the duration of the first funding period of the research unit, i.e. four years. It is a 50% position (19,35 hours per week).

Your profile:

We are looking for a person who enjoys working in a dynamic scientific environment, who can work independently and who contributes to the development of the research group with their own ideas and initiatives. In addition, you should be willing to co-operate with colleagues from different countries. You should be able to deal with enquiries at short notice, even under high time pressure, with composure, but with the necessary in-depth understanding of the facts.

Specific qualifications:

- Completed scientific university degree (preferably in plant biology); a doctorate is a prerequisite,
- Sound practical experience in science and project management,
- Good command of written and spoken English,
- Good knowledge of university administrative procedures.
- Communication skills in German will be an advantage

Application:

For further information or questions, please contact Prof. Eva Stukenbrock, Kiel University +49 431 800 6338 ESTUKENBROCK@BOT.UNI-KIEL.DE . Please follow the application guidelines.

SP1: Habitat-dependent regulation of cellular respiration in plant oxygen stress- and elicitor responses

Research in the SP1 project will build on a collaboration with the research group of Prof. Markus Schwarzländer at the University of Münster and Prof. Jennifer Selinski at the University of Kiel. Barley and seagrass will be used as model plants to investigate how oxygen availability in different habitats influences the regulation of cellular respiration and the interaction between plants and microbes.

1 PhD position at Münster University

The Plant Energy Biology Lab in Münster specializes in examining regulatory mechanisms of energy metabolism in plant cell compartments under changing environmental conditions and using fluorescent biosensors in vivo.

Your profile:

- Enthusiasm for fundamental and mechanistic questions of energy metabolism and plant-environment interactions
- A completed Master's degree in the molecular life sciences with a focus on plant sciences
- Excellent command of the English language
- High degree of intrinsic motivation
- Outstanding communication and organisational skills, initiative and an independent working style
- Responsible analytical and scientific thinking and writing
- Enjoyment of interaction and collaboration with other research groups, as well as supervising students

Your work tasks:

- Planning and conducting laboratory experiments on the response of barley and seagrass to hypoxia and elicitor exposure
- Measuring physiological, biochemical, and molecular responses, particularly at the levels of respiration, metabolome, and transcriptome
- Developing methods for measurement using genetically encoded biosensors
- Conducting joint experiments, sample collection, and measurements at the University of Kiel and GEOMAR in Kiel
- Presenting research findings at national and international workshops and conferences
- Writing and submitting manuscripts for publication in scientific journals
- Actively participating in courses and project meetings of the research group
- Supervising MSc and/or BSc students

We offer:

- A working environment with appreciation, commitment, openness, and respect—these are values that are important to us.
- With a wide range of flexible working time models, we enable you to work flexibly, including from home.
- Whether it is caregiving or childcare, our Family Service Office offers concrete support to help you balance your personal and professional life.
- As an educational institution, your individual and tailored professional development is not just important to us; it is a matter of personal commitment.

- From Aikido to Zumba, our extensive range of sports and health offerings ensures your work-life balance.
- You will benefit from numerous public service advantages, such as an attractive occupational pension scheme (VBL), an annual special payment, and a job that is hardly affected by economic fluctuations.

Application:

For further information or questions, please contact Prof. Markus Schwarzländer, Institute of Plant Biology and Biotechnology (IBBP), markus.schwarzlander@uni-muenster.de.

SP2: Genetic and metabolic determinants of biotic and abiotic stress responses in quinoa

In this project, we will address the traits defining biotic and abiotic stress tolerance in quinoa. We will first identify quinoa lines with different resistance/susceptibility to downy mildew infection and tolerance/susceptibility to drought stress. Based on detailed phenotyping, transcriptome analysis and genotyping, we will identify genetic loci controlling drought tolerance and downy mildew resistance. Moreover, based on metabolome analysis, we will identify the biotic- and abiotic-stress-responsive metabolites and specifically characterize the role of flavonoids during combined stress treatments. Additionally, we will investigate the impact of biotic stress on microbiome composition in quinoa lines.

1 PhD position at CAU Kiel

(follow link to full position announcement)

Your profile:

- An above-average master's degree in agriculture (or a comparable subject),
- In-depth knowledge of eucaryote genetics, plant breeding, and plant molecular biology,
- Experience with molecular biology techniques such as DNA isolation, PCR, quantitative real-time PCR,
- Experience with field work and plant phenotyping is desirable,
- Basic knowledge of GWAS, RNA-seq, and metabolome analyses is desirable,
- Very good English language skills, both written and spoken
- Experience with software R is desired,
- Motivation, commitment, and willingness to work in an international team,

Your work tasks:

- Conducting greenhouse, climate chamber, and field experiments with quinoa plants
- Conducting a genome-wide association study for drought tolerance and mildew susceptibility
- Analysis of RNA-seq data and identification of differentially expressed genes in response to biotic and/or abiotic stress factors
- Metabolome analysis and identification of differentially accumulated metabolites in response to stress
- Writing and publishing articles in peer-reviewed international journals
- presenting your scientific results at national and international conferences

We offer:

- a well-equipped workplace and work in a highly motivated team,
- an exciting and challenging research activity with many opportunities to contribute your ideas, and
- further qualification opportunities including career planning and attendance at national and international scientific events.

Application:

For further information or questions, please contact Dr. Nazgol Emrani, Plant Breeding Institute, Kiel University at 0431 880 2016 or email n.emrani@plantbreeding.uni-kiel.de.

SP3: Endophytes and local adaptation modulate aquatic plant responses to warming and anoxia stress

Our subproject will focus on the adaptation of freshwater and marine plants to warming and hypoxia. Field studies and laboratory experiments will be conducted to elucidate the potential role of endophytes and the abundance of associated microbes across a gradient of anoxia and warming. Combinations of warming and hypoxia will be tested for their effects on growth and physiology of pondweed, *S. pectinata* and sea grass *Zostera marina.*

1 PhD Position at IGB Berlin

(follow link to full position announcement)

- A university degree (Master or equivalent) in biology or related subjects (top 10%)
- Strong interest in fundamental plant ecology/physiology
- Proficiency in English
- Experience in scientific writing and presentations
- Experience in plant stress ecology
- Experience with statistics, R
- Interest in team work
- Willingness to work in Kiel during joint experiments

Your work tasks:

- Conduct laboratory and field experiments on the response of *S. pectinata* to warming and hypoxia in Berlin
- Measure *S. pectinata* biomass, photosynthesis and different physiological parameters
- Conduct joint experiments and measurements with freshwater and marine plants at GEOMAR in Kiel
- Present research results at national and international workshops and conferences
- Write and submit three manuscripts to scientific journals
- Attend courses, summer schools and project meetings of the Research Unit and IGB doctoral program
- Supervise MSc and/or BSc student(s)

We offer:

We offer an interesting position in an international and dynamic scientific environment. The position is intended for full-time doctoral research and is paid according to the German salary scheme for the public sector (TVöD Bund at 65 % E13). It is a fixed-term position for 3 years with a possible 1-year extension.
We foster your career development by providing qualification and training opportunities. We actively support the reconciliation of work and family life. The IGB is committed to diversity. We welcome every qualified application, regardless of sex and gender, origin, nationality, religion, belief, health and disabilities, age or sexual orientation. Disabled applicants with equal qualification and aptitude will be given preferential consideration

Application:

For further information or questions, please contact PD Dr. Sabine Hilt, IGB, +49 30 641817677, SABINE.HILT@IGB-BERLIN.DE. Please follow the application guidelines.

1 PhD Position at GEOMAR Kiel

Follow link to full position announcement

Your profile:

Requirements for successful application are:

- A university degree (Master or equivalent) in biology, biotechnology, bioinformatics or in a related subject
- Experiences with metabolomic or transcriptomic analyses
- Basic knowledge in plant physiology or plant stress ecology
- Basic skills in scripting languages such as Python or PERL, or in multivariate statistics (R-package)
- Proficiency in English

Desirable qualifications would be:

- Experience in the design and execution of eco-evolutionary experiments
- Experience with microbiological techniques
- Knowledge on seagrasses or other macrophytes
- Knowledge in the basics of (coastal) marine ecology
- Research diving qualification

The project:

Our model species is the widespread seagrass *Zostera marina* (eelgrass) which features broad tolerances to adverse abiotic conditions such as warming, as well as reducing, oxygen-free sediments. In contrast, the interacting role of biotic stressors, in particular pathogens and grazing, is currently not well understood. The objective of this project will be to examine how the plant integrates, responds and allocates resources to multiple stressors as a function of its local microhabitat. The successful candidate will closely cooperate with another doctoral candidate in the group of Prof. Sabine Hilt at IGB Berlin on similar questions in the freshwater plant *Stuckenia pectinata*.

We offer:

- Knowledge in the basics of (coastal) marine ecology
- Research diving qualification
- An exciting and international work environment in a topic of global importance
- Work in the field of marine and climate research, a forward-looking area with social significance
- Integration into the PlantCoChallenge network with the opportunity for attending different workshops and courses offered by the Principal Investigators
- Attention to questions of work-life balance, including the possibility of working remote and other flexible working time arrangements

Application:

For further information or questions, please contact Prof. Thorsten Reusch, GEOMAR, +49 431 600-4550, TREUSCH@GEOMAR.DE. Further questions will be answered by e-mail to bewerbung@geomar.de. In doing so, please refer to the keyword "Seagrass Stress Ecology". Please follow the application guidelines

SP4: Local co-adaptation of plants and their microbiota to climatic stress

SP4 aims at studying adaptive trait divergence among Northern and Southern European populations of Sea Rocket (*Cakile maritima*) and its specific microbiome. Our holistic approach comprises a field study to characterize systematic latitudinal variation of the metaorganism and its natural abiotic environment; a well replicated greenhouse experiment testing for adaptive latitudinal divergence of the metaorganisms abiotic stress responses; and a reciprocal transplant experiment testing for crossing reaction norms in fitness. Our focus is on functional traits broadly representing the host plants abiotic stress resistance and fitness **(1 PhD position CAU Kiel)** as well as on interactions with locally co-evolving microbiota causing positive or negative feedback on plant fitness under abiotic stress **(1 PhD position EKUT Tübingen)**.

1 PhD position at CAU Kiel

Please follow this link for the full position announcement

Your profile:

- a good Master of Science in biology or a related science with a focus on plant ecology (a thesis in the fields of plant population ecology or plant molecular interaction ecology is an advantage)
- practical experience in experimental plant ecology (is mandatory) and plant eco-metabolomics (is an advantage) or population genomics (is an advantage)
- solid experience in statistical data analyses (preferably in R)
- very good language skills in English (is mandatory) and German (is an advantage) or French (is an advantage)
- strong organizational and communication skills
- initiative and independent working style and a high intrinsic motivation for plant ecological research

Your work tasks:

- self-dependent organization and implementation of a field sampling and survey trip through Europe; a controlled greenhouse experiment manipulating diurnal temperature courses, watering regimes and soil microbial communities; and a reciprocal common garden experiment located in Kiel (Germany) and Montpellier (France)
- acquisition of data on plant growth, morpho-functional traits, physiology, metabolome (fingerprinting and profiling), and population genomics
- bioinformatic and statistical analyses of data
- writing and publishing articles in peer-reviewed international journals
- presenting your scientific results at national and international conferences

We offer:

- excellent technical facilities for controlled ecological experiments (Fitotrons, modern greenhouses, field experimental stations) and metabolome analyses (FT-ICR-MS, UPLC-MS/MS, NMR)
- excellent links with national and international research networks
- the opportunity to collect practical working experience in different European countries

- optimal training *via* the Kiel Plant Center, the Graduate Center of CAU Kiel and a PhD thesis advisory committee

Application:

For further information or questions, please contact Karin Schrieber, Institute for Ecosystem Research, Kiel University, Tel. +49-431-880-4082, e-mail kschrieber@ecology.uni-kiel.de. Please follow the application guidelines as described in the full job description.

1 PhD position at EKUT Tübingen

(follow link to full position announcement)

Your profile:

- Master of Science in biology, bioinformatics or closely related fields (top 15 %) with a focus on plant-microbe interactions, microbiology and microbiome research.
- practical experience in plant research and microbiology (is mandatory) and bioinformatics (is an advantage)
- solid experience in statistical data analyses (preferably in R)
- very good language skills in English (is mandatory) and German (is an advantage)
- strong organizational and communication skills
- initiative and independent working style and a high intrinsic motivation for plant research in all perspectives

Your work tasks:

- self-dependent organization and implementation of a field sampling and survey trip through Europe, including participation in a reciprocal common garden experiment located in Kiel (Germany) and Montpellier (France)
- controlled greenhouse experiment and gnotobiotic plant systems
- high throughput microbiome sequencing and sterile cultivation of fungi, bacteria and protists from plants
- working with complex microbial communities under sterile and greenhouse conditions
- bioinformatic, data management and statistical analyses of data
- writing and publishing articles in peer-reviewed international journals
- presenting your scientific results at national and international conferences

We offer:

- excellent technical facilities for basic and advanced microbiology, sterile plant cultures, controlled plant experiments and molecular biology.
- excellent computational resources including high performance computing and advanced data management.
- excellent links with national and international research networks
- the opportunity to collect practical working experience in different European countries
- optimal training *via* the Interfaculty Graduate School of Infection Biology and Microbiology (IGIM) in Tübingen and/or the Graduate Program for Cellular and Molecular Biology of Plants at the ZMBP

- an interdisciplinary PhD thesis advisory committee

Application:

For further information or questions, please contact Eric Kemen, Interfaculty Institute of Microbiology and Infection Medicine Tuebingen (IMIT), Microbial Interactions in Plant Ecosystems, ZMBP, Eberhard Karls University Tübingen, Tel. +49-7071-29-78725, e-mail to eric.kemen@uni-tuebingen.de. Please follow the application guidelines.

Z2: Capturing the diversity of stress related microbiota from plant endophytic niches

The Z2 project aims to investigate the role of plant-associated microorganisms in stress responses at the metaorganism level. It will collect and characterize microbes from five different plant species under natural conditions, analyze their microbial communities using deep sequencing, and identify core microbial taxa shared between the plant species. Using computational tools such as machine learning algorithms or structural equation models, the project aims to identify properties, mechanisms and functions of complex plant associated microbial communities under various stresses and in different habitats. This project will improve our understanding of microbial behavior and its implications in the context of environmental fluctuations. It will further involve phenotypic characterization of core and host-specific microbes, quantification of microbial growth dynamics, assembly of microbial communities for stress experiments, and identification of stress-related beneficial and detrimental microbes. Further to this, research data management will be an important part of this project.

1 Post Doc position EKUT Tübingen

(follow link to full position announcement)

Your profile:

- A PhD in biology, bioinformatics, informatics or closely related research fields with a focus on microbiology and microbiome research.
- practical experience in bioinformatics and microbiology (is mandatory).
- practical experience in plant and microbial ecology, plant molecular research and plant-microbe interactions (is an advantage).
- solid experience in statistical data analyses (preferably in R) and knowledge in Python
- very good language skills in English (is mandatory) and German (is an advantage)
- strong organizational and communication skills
- initiative and independent working style and a high intrinsic motivation for microbiology and plant research in all perspectives

Your work tasks:

- self-dependent organization and implementation of field samplings for microbial isolation and high throughput sequencing of microbes in collaboration with the other groups of the Research Unit.
- high throughput microbiome sequencing and sterile cultivation of fungi, bacteria and protists from various plant species.
- bioinformatics, data management and statistical analyses of integrative big data sets
- assembly and analyses of synthetic microbial communities including fungi, bacteria and protists.
- setting up gnotobiotic systems and analyses.
- writing and publishing articles in peer-reviewed international journals
- presenting your scientific results at national and international conferences

We offer:

- excellent technical facilities for basic and advanced microbiology, sterile plant cultures, controlled plant experiments and molecular biology.
- excellent computational resources including high performance computing and advanced data management systems.
- strong computational support and knowledge landscape (connections to the cluster of excellence in machine learning for science in Tübingen are highly encouraged)
- excellent links with national and international research networks

Application:

For further information or questions, please contact Eric Kemen, Interfaculty Institute of Microbiology and Infection Medicine Tübingen (IMIT), Microbial Interactions in Plant Ecosystems, ZMBP, Eberhard Karls University Tübingen, Tel. +49-7071-29-78725, e-mail to eric.kemen@uni-tuebingen.de.

We welcome your applications regardless of your age, gender, cultural and social background, religion, ideology, disability or sexual identity. As we promote gender equality, women are given priority in cases of equal suitability, ability and professional performance. Our Institutions are committed to the employment of people with disabilities: Applications from severely disabled persons and their equals will be given preferential consideration if they are suitable. We expressly welcome applications from people with a migration background.