

Focusing Research

The Focus Areas at Freie Universität Berlin

Dahlem Centre of Plant Sciences (DCPS)



Focus Area Dahlem Centre of Plant Sciences (DCPS)



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Focus Areas of Freie Universität Berlin

One special feature of the excellent, broad-based research performed at Freie Universität Berlin is the university's targeted formation of research alliances called Focus Areas.

Within the Focus Areas, scholars and scientists from different subjects, disciplines, and institutions at Freie Universität work together over a longer period on complex research topics related to subjects of great importance to society.

The Focus Areas help to strengthen the areas of emphasis within the university's research activities and further develop these areas in cooperation with social, political, and economic players.

The Focus Areas can be arranged differently, depending on the specific disciplines, the issues currently being studied, and the individuals involved. The options range from platforms fostering the discussion of ideas, with multifaceted courses and events – such as the Transregional Studies Salon series within the Center for Area Studies (CAS), one of the Focus Areas – to compact alliances dedicated to studying one key area of focus in current research activities, such as nanotechnology in the NanoScale Focus Area.

Goals of the Focus Areas

- ▶ Taking up research trends and exploring them in interdisciplinary alliances
- ▶ Pooling skills and expertise to answer current research questions
- ▶ Initiation of new projects and solicitation of funding

The Concept of the Focus Areas is Based on Three Key Principles

- ▶ Excellence in research across disciplines – for society, the political sphere, and the economy
- ▶ Networking and cooperative arrangements – regional, national, and worldwide
- ▶ Support for junior scholars and scientists – well structured, thorough, and comprehensive

Structure and Organization of the Focus Areas

The Focus Areas are platforms for the development of research ideas growing out of interdisciplinary and interdepartmental initiatives. They represent the very highest level of quality in research activities – guaranteed through ongoing evaluations. Each Focus Area has a spokesperson, who represents that Focus Area within the university and beyond.

The three strategic centers of Freie Universität provide crucial support to the Focus Areas:

- ▶ **The Center for Cluster Development (CCD)** – which will continue as the Center for Research Strategy (CRS) within the scope of the university's new institutional strategy – supports and monitors the initial development, management, and evolution of the Focus Areas.
- ▶ **The Center for International Cooperation (CIC)** supports the Focus Areas with regard to worldwide cooperative arrangements and international visibility.
- ▶ **Dahlem Research School (DRS)** offers advice and assistance for the Focus Areas with regard to measures in support of junior researchers.



Growing and thriving: DCPS is to become a multidisciplinary center of research at Freie Universität with a high international profile. Photo: M. Rillig



The Dahlem Centre of Plant Sciences (DCPS) has been one of the Focus Areas of Freie Universität Berlin since 2009. Photo: B. Wannemacher

The Henry Ford Building at Freie Universität, lecture hall building and conference center. Photo: B. Wannemacher



The Dahlem Centre of Plant Sciences: an Overview

The existence of animals and human beings on Earth depends on plant life. Species and climate protection, food security and renewable energies are important concerns for the entire planet, and thus central areas of research for plant scientists.

In light of current global changes, such as climate change, soil salinization, species extinction, and shrinking agricultural land, plant sciences will continue to grow in importance into the future. Covering a broad spectrum of plant research in terms of both methods and focus, DCPS is helping to find solutions to these issues. Research topics at DCPS range from the functions of genes to the evolutionary connections in the origins of biodiversity and beyond, to the interaction between plants and their biotic or abiotic environments.

Goals of DCPS

- ▶ DCPS aims to achieve a detailed, broad-based understanding of plant life and plant diversity.
- ▶ DCPS also plans to use current research findings as the basis for developing new methods and tools to enable effective protection and sustainable use of plant diversity.



“We are bringing the many different branches in plant science together, thereby opening up new fields of research. It’s thrilling to work in this kind of cooperative environment and find solutions that would have been out of reach with just your own specific discipline as background.”

Professor Thomas Schmülling,
Director of the Focus Area

Photo: D. Ausserhofer

Research at DCPS covers a broad spectrum in terms of content and methodology: Experts from the molecular, ecological, and phylogenetic plant sciences work together here.

Photo: B. Wannemacher

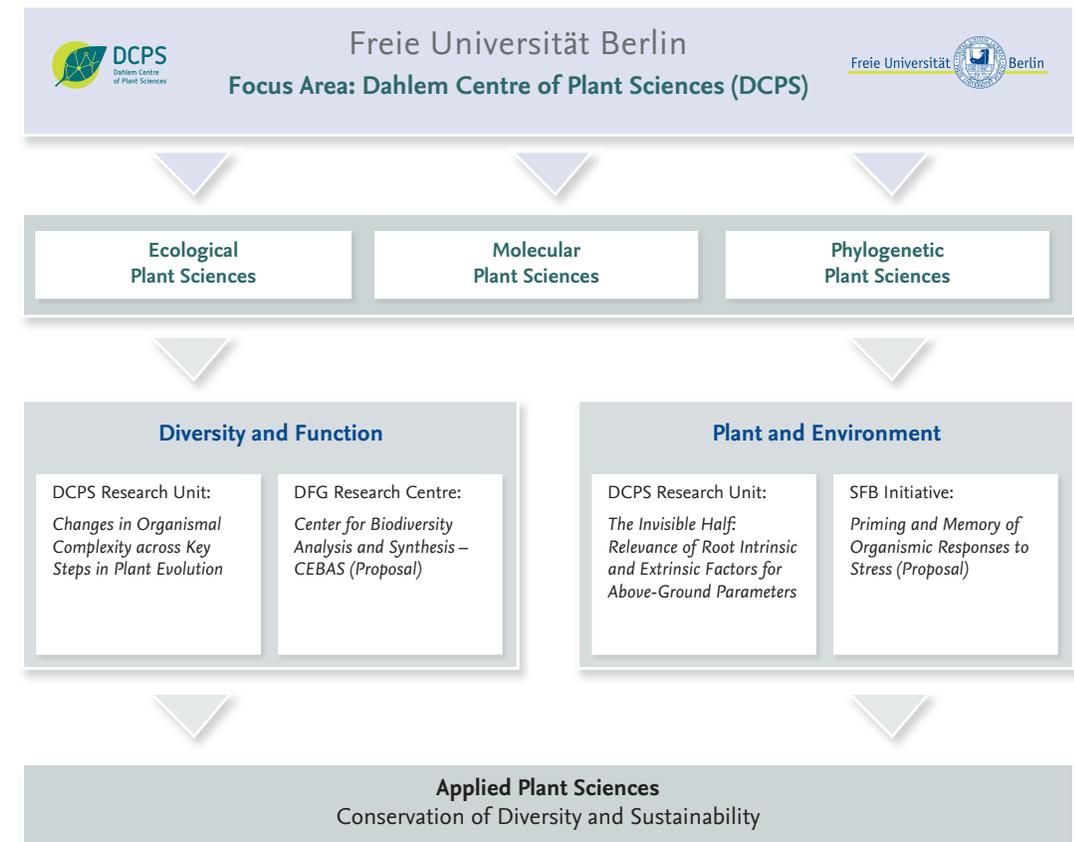


Research at DCPS

Researchers in the molecular, ecological, and phylogenetic plant sciences work together at DCPS on two major topics: “Diversity and Function” and “Plant and Environment.”

DCPS intends to use the results of the research performed in both areas of focus, as a foundation for work on unresolved research issues in the applied plant sciences.

Organizational Chart of DCPS



Disciplines Represented at DCPS

Plant life is affected by a large number of different factors. To be able to look at all of these many aspects within its research activities, DCPS covers a broad range of plant sciences, from applied plant genetics to pharmaceutical biology. More than 160 scientists, about 300 staff members in all, cooperate in the DCPS's currently 20 research groups.

When implementing research projects on environmental themes, it is also essential to include geoscientists, legal specialists, and political scientists. Computer scientists and mathematicians make vast amounts of data available and provide support in processing and interpreting the data. Complex issues and facts regarding DCPS that are to be disseminated to the public are prepared together with specialists in education and teaching methodology.

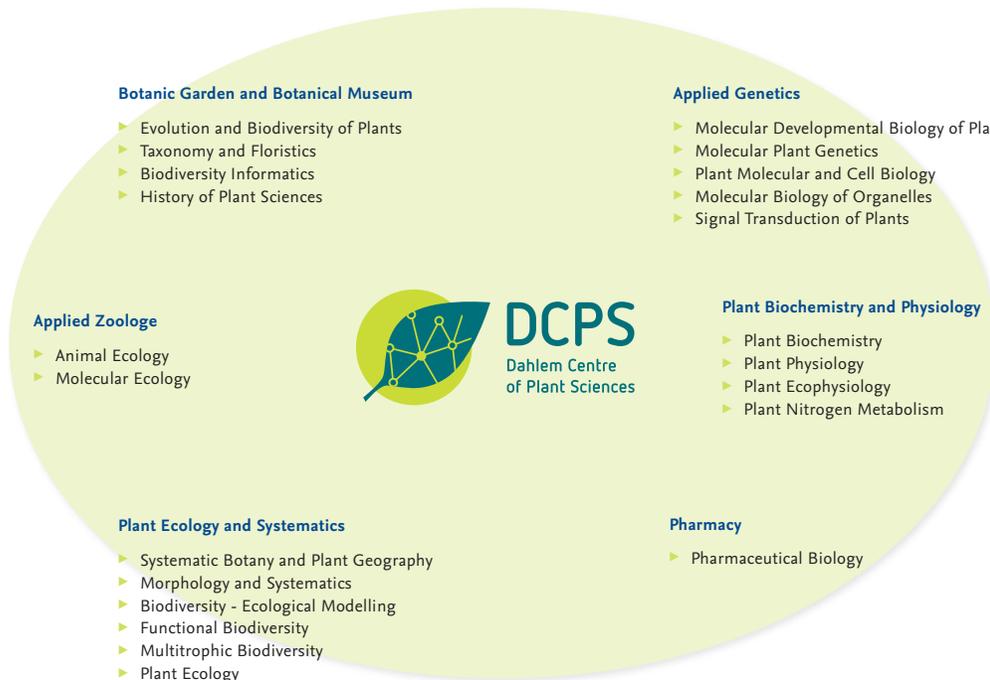


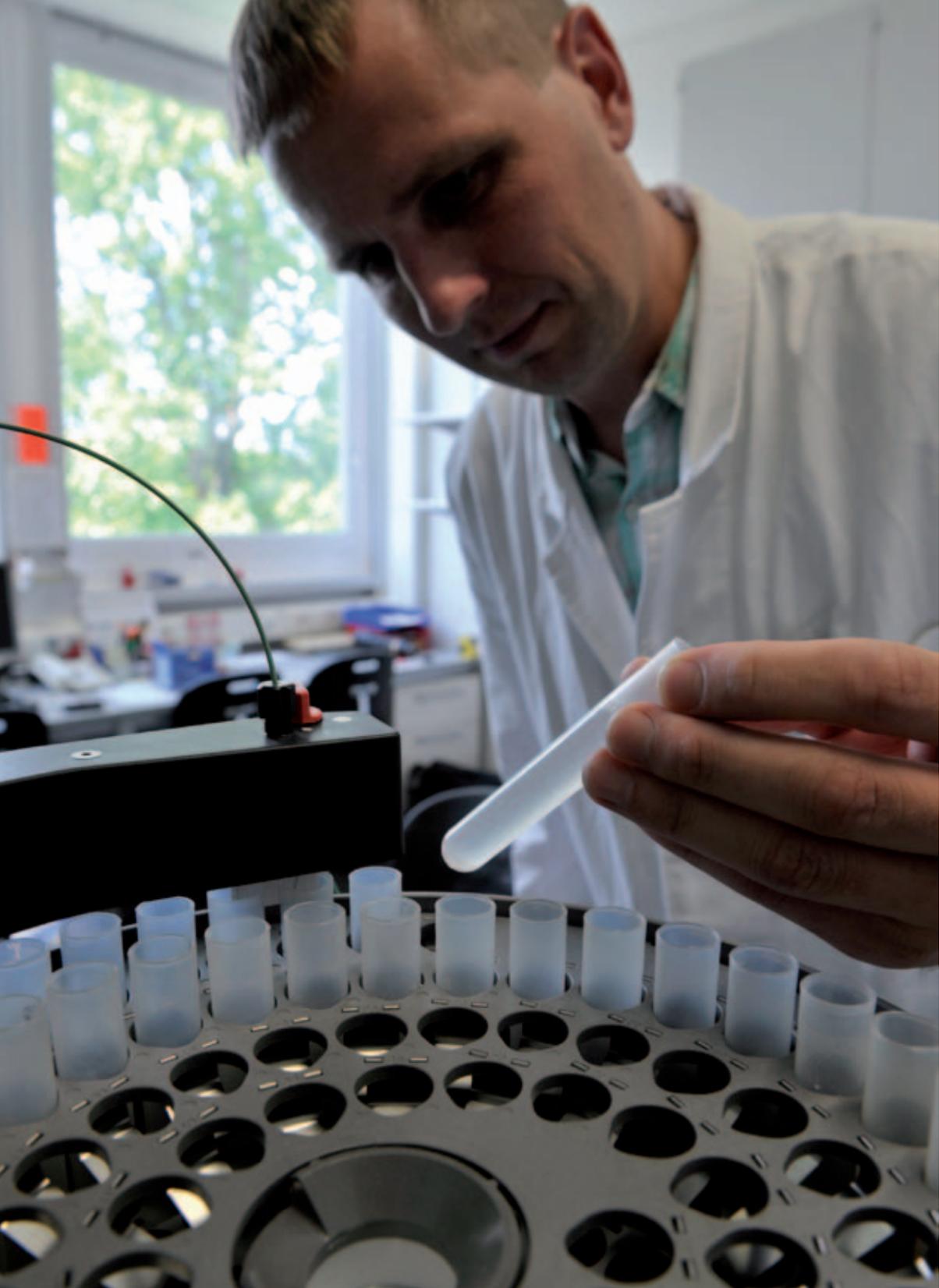
Researchers also study the relationships among different plant taxa all over the world. Shown here, *Cynoglossum columnae*. Photo: H. Hilger

DCPS: Facts and Figures

Term of funding	October 1, 2009 – December 31, 2014
Funding volume within institutional strategy	€ 1,800,000
Number of research groups involved	20
Scientists involved	about 165
of which, doctoral candidates	about 70
Freie Universität departments involved	Biology, Chemistry, Pharmacy
Regional cooperation partners	18
International cooperation partners	about 20

DCPS scientists work together with experts all over the world. The centre maintains cooperative relationships with more than 20 institutions in Europe, Asia, Africa, and Latin America. Photo: B. Wannemacher





Postdoc in Plant Physiology Dr. Martin Frenkel

“DCPS is still very young, and it always takes time for a large number of researchers spread across multiple institutions to grow together. I’m making efforts in that direction because I think DCPS has a huge amount of potential. Our fundamental research is helping us unlock a detailed understanding of plants, and the many cooperative arrangements at DCPS put us on a broad basis, supplementing our own expertise and saving resources as well as opening up new ideas and allowing us to study larger contexts. And – and this is important in itself – we can also publish more this way.”

Martin Frenkel studied biology at Johannes Gutenberg University Mainz. During an ERASMUS exchange, he attended Umeå Plant Science Centre (UPSC) in Sweden. He earned his doctorate in the Department of Ecology and Environmental Science at Umeå University, in close cooperation with UPSC, and then moved to the Institute of Botany at Heinrich Heine University Düsseldorf. Since 2010, he has been a research associate at the Institute of Biology at Freie Universität.

Within the institute, Martin Frenkel is part of the Plant Physiology research unit, investigating the stress physiology of plants. He studies how stress caused by light affects the interactions between animals and plants – an aspect that has barely been studied thus far anywhere in the world.

His goals: successful collaborative research and a professorship.



Dr. Martin Frenkel

left: For his research, Dr. Martin Frenkel uses fast protein liquid chromatography (FPLC), a method of separating and purifying proteins.



A pulse-amplitude modulation (PAM) fluorometer is used to study the efficiency of photosynthesis.

Photos: B. Wannemacher

Current Fields of Research at DCPS

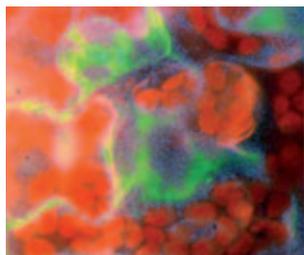
The research performed at DCPS focuses on two main key themes “Diversity and Function” and “Plant and Environment.”

Diversity and Function

In their research on diversity and function, the scientists at DCPS aim to produce new insights into the evolution of the morphological and functional diversity of plants.

The topics addressed include the evolution and function of signal transfer processes in plant cells, the roles of the numerous secondary metabolic products of plants, such as plant-based antibiotics or insecticides, the uptake and utilization of nutrients, and the development of morphological features.

The work performed in this research area is based on the rapidly growing information available from genome sequencing. By now, this information goes far beyond the model plant *Arabidopsis*, previously the focus of much research, and opens up numerous approaches that contribute to a better understanding of gene functions and the evolution



Detail of the epidermis of an *Arabidopsis* leaf. The activity of gene expression becomes visible through the use of GFP (green fluorescent protein). The red fluorescence is due to chlorophyll activation. Photo: M. Baier



Researchers hope findings from current research at DCPS will enable sustainable use of plant diversity.

Photo: M. Riefler

of biological diversity. During their research into genome sequence and structure, researchers at DCPS work closely with the newly established Berlin Center for Genomics in Biodiversity Research.

Plant and Environment

Unlike people and animals, plants are bound to a single location. Owing to the way they live, and in the context of constantly changing environmental conditions, plants have developed a wide range of functions and adaptive reactions. Research into these complex connections is the second major topic of study at DCPS.

The research concentrates on plant reactions to such abiotic stress factors as light intensity, extremes of temperature, lack of water and nutrients, and biotic interactions between plants and other organisms, such as insects or fungi.

The DCPS research groups are working on such diverse themes as, for instance, the responses of plants to pests, plants' cellular memory of environmental stress, the role of root architecture in fungi colonization and its significance for crop yield, and the mechanisms by which neighboring plants communicate with each other.



Growing tobacco plants on artificial growth media in plant chambers.

Photo: M. Riefler



One topic of research at DCPS is how plants react to pests. Shown here is a beet armyworm (*Spodoptera exigua*) caterpillar, a member of the Noctuidae, or owl moth, family, a frequent pest on crops. Photo: A. Steppuhn

Junior Professor at the Institute of Biology

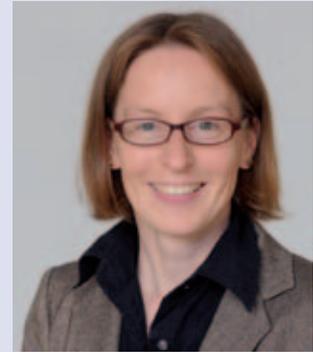
Dr. Susanne Wurst, Junior Professor

“DCPS connects individual research groups with each other, giving rise to more cooperative initiatives within the university. All benefit from the expertise of colleagues from other disciplines and from shared equipment. Research topics are discussed from different viewpoints; this leads to synergies and, together with start-up funding for innovative projects, to progress in research.”

Susanne Wurst studied biology at the University of Göttingen and holds a Ph.D. from the Technical University of Darmstadt. Afterwards, she worked for three years at the Netherlands Institute of Ecology, in Heteren, in the EU-funded Marie Curie research and training network BIORHIZ. She moved to Freie Universität in 2008 and was appointed a junior professor at the Institute of Biology in March 2009.

Within DCPS, Susanne Wurst is the head of the Functional Biodiversity research group. With her team, she studies how organisms in the soil affect individual plants and plant communities. From the perspective of global change, the team is exploring the impact of intensified agricultural systems and exotic species invasions on the diversity and function of ecosystems.

Her goals: to continue to combine ecological research and teaching activities and be appointed to a permanent professorship.



Junior Professor Susanne Wurst

Photo: D. Ausserhofer

left: A look into the main tropical greenhouse at the Botanic Garden in Berlin's Dahlem district. With about 22,000 species, it is one of the world's three most prominent botanical gardens and is considered a major site of biodiversity research. The garden draws more than 300,000 visitors each year, including researchers from all over the world. Photo: BGBM



Experiments in the greenhouse: Plant communities – affected by herbivores and arbuscular mycorrhizal fungi.

Photo: M. Rillig

A Look at the Centre's Research Activities

The many research projects pursued at the DCPS Focus Area are all marked by interdisciplinary cooperation among scientists. For a closer look at one example of this approach in action and the opportunities arising from collaborative research, we turn to one project of the many under way within the Focus Area.

Multitasking in Plants

When people and animals experience stress, their bodies produce adrenaline, which enables them to flee or attack. Plants also experience stress, due to abiotic factors, such as too much or too little water, heat, or cold, or due to biotic factors, such as caterpillars, bacteria, and fungi. Unlike animals and people, though, plants cannot move from where they are. They have developed other mechanisms of surviving outside attacks, whether above or below the ground.

What specific defense mechanisms are involved, and how plants determine how to defend themselves successfully, are the questions three researchers at DCPS are studying in their interdisciplinary project, "Multitasking Plants." All of them are working on the same plant species, but from different perspectives: Working with a model comprising a tobacco plant, the tobacco hornworm, and a specific root fungus, they study how plants deal with multiple factors and problems at once.



Professor Tina Romeis studies signal transmission processes in plants under stress. Photo: D. Ausserhofer

Tobacco hornworm larvae feeding, as the name suggests, on tobacco.

Photo: A. Steppuhn



Professor Tina Romeis, studies the connections from a biochemical perspective, examining the early signal transfer processes. "Plant behavior under stress is multifaceted," she says. "A plant responds to a fungal infection or to being eaten by caterpillars differently from how it does to drought or heat."

Professor Anke Steppuhn, in turn, studies whether these reactions can affect the way the plant interacts with other organisms. Steppuhn, a junior professor of molecular ecology, studies how tobacco plants defend themselves from herbivores.

As for how biotic interactions taking place below the ground affect the plant, that is what Professor Susanne Wurst, is studying. Wurst, a junior professor of functional biodiversity, and her research group study whether the presence of a fungus in the plant's roots, for instance, also affects how the leaves defend against consumption by herbivores.

Results and Outlook

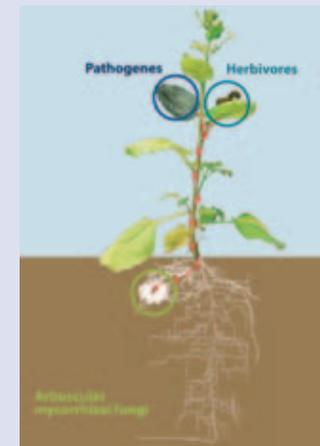
The results indicate that previous biotic stress, such as bacterial infections in the leaves or inoculation of the roots with a fungus, changes the plant's defensive reactions to herbivores.

The results of this research are particularly interesting for the field of agriculture, where there is an urgent need to identify crops that are able to cope well with stress – and, ideally, are able to multitask as well.



Professor Anke Steppuhn studies how plants interact with other life forms.

Photo: D. Ausserhofer



Abiotic and biotic factors alike can cause stress in plants. Researchers study how different plants respond to different stresses. Figure: A. Steppuhn

Regional, National, and Global Networks

The Focus Area is a platform for regional and international interdisciplinary collaborative research projects. DCPS promotes cooperation among those working in the plant sciences throughout Berlin and Brandenburg and highlights their activities internationally.

Plant sciences have a long history in Berlin's Dahlem district. As a result, the scientific networks existing in this area are extensive and well developed: Researchers at DCPS work with cooperation partners affiliated with the higher education sector and beyond – within the region, throughout Germany, and abroad.

Current Research at a Location with a Long History

This Focus Area builds on a historic foundation: As early as the dawn of the 20th century, Berlin's Dahlem district was an important international center of activity in the plant sciences. It hosted researchers such as Carl Correns, who rediscovered the rules of Mendelian genetics, and Otto Heinrich Warburg, who was awarded the Nobel Prize for his discovery of cell respiration. The Pharmaceutical Institute was founded back in 1902, followed in 1914 by the Institute of Heredity Research and the Institute of Plant Physiology.

The history of the Botanic Garden and Botanical Museum (BGBM) of Freie Universität Berlin stretches back more than 300 years. The institutions have made their home in Dahlem since 1907. With 43 hectares of space, more than 20,000 plant species, and extensive collections, the BGBM is among the largest and most important botanical garden complexes in the world and represents a major draw for many scientists and researchers. Each year, more than 300,000 visitors come to the BGBM, where exhibits and lecture series also offer insight into current developments in plant research.

DCPS also draws on the site's history, pooling the skill and expertise represented in the disciplines involved in the Centre and leveraging the dense regional network of relevant institutions – a set of circumstances found nowhere else – to achieve excellence in plant research.



The Mayweed (*Cota triumfettii*), a member of the order Asterales, an area of focus in the research performed at the BGBM. The largest family within this order of flowering plants is the Asteraceae, with around 25,000 species, including important crop plants such as lettuce and sunflowers. Photo: BGBM



Carl Erich Correns headed the Kaiser Wilhelm Institute of Biology, founded in 1912, and is considered one of the rediscoverers of the rules of Mendelian genetics. Photo: Scherl Archive (former)

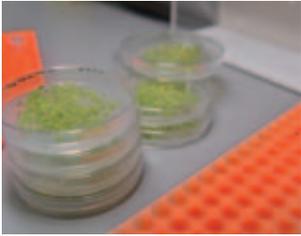
Regional Cooperation Partners

Berlin's Dahlem research campus and the fertile academic and scientific environment in the wider Berlin-Brandenburg region, which is home to a large number of research institutions, offer ideal conditions for cooperative projects. The scientists at DCPS work with 18 partner institutions in the region, both within the higher education sector and outside it, pursuing groundbreaking research issues. The Focus Area supports interdisciplinary research projects, making it an important starting point for soliciting funding.

Cooperation partners of DCPS in the Berlin-Brandenburg region, home to many academic institutions

- 1 Technische Universität Berlin
- 2 Humboldt-Universität zu Berlin
- 3 University of Potsdam
- 4 Berlin Centre for Genomics in Biodiversity Research
- 5 Julius Kühn Institute for Ecological Chemistry, Plant Analysis and Stored Product Protection
- 6 Max Planck Institute for Molecular Genetics
- 7 Max Planck Institute for Molecular Plant Physiology
- 8 Max Planck Institute for the History of Science
- 9 Max Delbrück Centre for Molecular Medicine
- 10 Leibniz-Institute of Freshwater Ecology and Inland Fisheries
- 11 Institute of Vegetable and Ornamental Crops
- 12 Institute for Zoo and Wildlife Research
- 13 Centre for Agricultural Landscape Research
- 14 Institute for Molecular Pharmacology
- 15 Museum für Naturkunde
- 16 Potsdam Institute for Climate Impact Research
- 17 Federal Institute for Materials Research and Testing
- 18 State Office for Environment, Health and Consumer Protection of the Federal State of Brandenburg





Plants can be cultivated *in vitro* on various growth media, allowing scientists to study and select them for specific traits. Photo: B. Wannenmacher

Cooperation Partners throughout Germany

The members of this Focus Area cooperate on the national level with in Germany with various partners at institutions within and outside the higher education sector. The Plant Ecology research group, for example, is involved in the nationwide German Research Foundation (DFG) Research Unit entitled “Biodiversity and Sustainable Management of a Mega-diverse Mountain Ecosystem in South Ecuador,” in which it works together with teams of researchers at the University of Göttingen. Within the scope of the DFG Priority Program “Biodiversity Exploratories,” researchers work together extensively with the University of Potsdam. Another example is the involvement of the Molecular Plant Genetics research group in the DFG Research Unit entitled “Nitrogen uptake, metabolism and remobilization in leaves during plant senescence.” The cooperation partners involved in this unit include researchers at the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), located in Gatersleben, and at the Universities of Hohenheim, Hanover, Tübingen, and Graz.

Worldwide Cooperation Partners

Research at DCPS takes place in a number of different countries, in cooperation with local partner institutions. DCPS works with more than 20 institutions in Europe, Asia, Africa, and Latin America. As a result, DCPS maintains extensive and varied networks with centers of expertise around the world – such as the Flanders Institute of Biotechnology (VIB), in Ghent, Belgium, the Russian Academy of Sciences, and the National Herbarium in Ethiopia.

International exchange is also a feature of life on the Dahlem research campus: Each year, DCPS hosts more than 100 scientists from about 40 different countries.

Dr. Eswar Ramireddy extracting RNA from fresh plant material. The post-doc, a native of India, came to Freie Universität Berlin to write his dissertation and now is doing research in the Molecular Developmental Biology of Plants research group.

Photo: B. Wannenmacher



DCPS Graduate Student in the Functional Biodiversity Group

Marco Cosme

“Extensive sharing of information at DCPS results in innovative new ideas. That is highly appealing, especially to young scientists. We complement and support each other, either conceptually or analytically, which enhances the quality of our research. I don’t have to perform my experiments or trials alone; instead, I work in cooperation with others, which helps us to achieve promising results faster.”

Marco Cosme studied forestry and natural resources at the Technical University of Lisbon. As an ERASMUS student, he attended the University of Joensuu, in Finland, and then Swedish University of Agriculture Sciences, in Uppsala. He first put his knowledge to work at forestry companies in Portugal, and then, in 2008, he participated in a research project on forest management at the University of Copenhagen. In 2010, the Portuguese forest engineer completed his master’s degree at the Technical University of Lisbon, writing his master’s thesis within the framework of DCPS.

Cosme is currently doing research within the Functional Biodiversity research group as a doctoral student and is supported by fellowships from DCPS and CIC within the Functional Biodiversity research group. In various projects, he is studying the function of microorganisms in soil and their influence on crop quality and resistance, which is an ecological question with practical application for human nutrition.

His goals: engaging an even more effective exchange of ideas with other junior scientists, finishing his doctorate, and continuing to perform successful research.



Marco Cosme



Marco Cosme works on ecological questions, looking for answers that can be used in practical applications – by using microorganisms to enhance the nutritional quality of crops, for example. Photo: B. Wannenmacher

International Projects on Global Issues in Plant Sciences

DCPS, founded in 2009, aims to raise its international profile as a multidisciplinary research center at Freie Universität Berlin.

The global networks of DCPS allow the Centre to engage in research projects that transcend national borders. In this way, DCPS contributes to finding the answers to global issues, as a number of examples illustrate.

International Plant Research

Researchers at DCPS have succeeded in modifying root growth in plants such that the plants are better able to absorb nutrients from the soil and to survive drought conditions. In the “ROOT – Root enhancement for crop improvement” collaborative research project, the group of researchers is now working with partners in Germany, France, and Spain to study whether the results of its fundamental research can be applied to crops, and what the economic and ecological benefits of so doing might be. The project is to receive 1.5 million euros in funding over three years from the German Federal Ministry of Education and Research (BMBF) for its international plant genome research.

Bilateral Research with China

Rice, an important crop plant and staple of diets all over the world, is at the heart of a joint German-Chinese project initiated at DCPS in 2009: In rice production, urea is a major nitrogenous fertilizer. The group of researchers of Plant Biochemistry is studying urea degradation in rice. In their research, the DCPS researchers and their partners in Beijing set out to identify ways of improving urea fertilizer use, thus minimizing the ecological impact of intensive agriculture. This project is to receive 1.35 million euros in funding from the BMBF over five years.

Data Accessible Worldwide

For several hundred years, Berlin botanists have been making significant contributions to describing and understanding the diversity of the plant kingdom. They have collected plants from all over the world, analyzing, describing, naming and categorizing them, and depositing reference specimens at institutions in Berlin. Today, activities in biodiversity informatics at the Botanic Garden and Botanical Museum focus on facilitating the accessibility, networking, and visualization of these data and collections.



Together with international partners, researchers at DCPS study whether findings from basic research can be applied to crops such as rice or corn, along with the potential economic and ecological benefits of doing so.

Photo: R. Kunze



A larva of the rice water weevil (*Lissorhoptrus oryzophilus*), a pest found all over the world. Researchers at DCPS are studying whether certain soil organisms can be used to protect rice plants from this pest.

Photo: B. Wannenmacher

International Conferences

To foster exchange of ideas and information at the international level, DCPS is involved in organizing international conferences and conventions and regularly holds lecture series.

Biosystematics Berlin 2011

More than 600 biologists from 55 countries attended this international convention, held at Freie Universität in 2011 on the topic of biodiversity.

The Biosystematics conference is considered one of the most important expert forums dedicated to the critical question of the evolution, conservation, and sustainable use of plant diversity. The five-day event offered more than 300 presentations and 50 symposia on this topic.

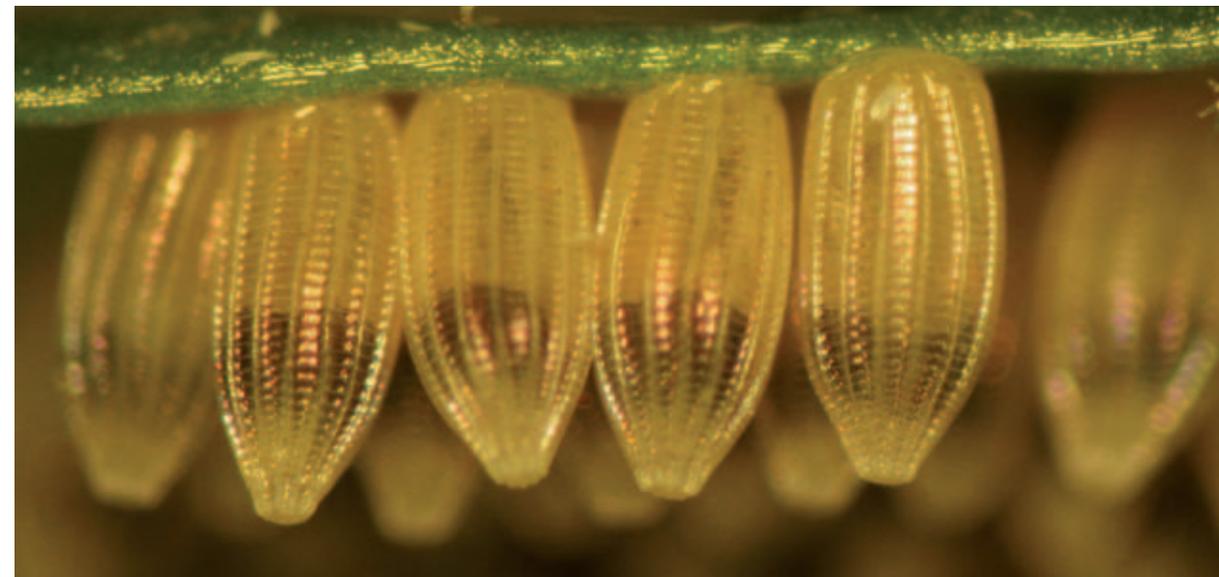
www.biosyst-berlin-2011.de

Botanikertagung 2011

This international conference is the biggest and best-known convention of the plant sciences in Germany. It is held every two years, under the auspices of the German Botanical Society (DBG) – in 2011 drawing about 900 participants to the Henry Ford Building, the central lecture hall building of Freie Universität Berlin.

www.botanikertagung2011.de

Eggs of a butterfly (*Pieris brassicae*) on an *Arabidopsis* leaf. Photo: M. Hilker



Support for Students and Junior Researchers at DCPS

The extensive cooperation between this Focus Area and the departments involved results in comprehensive education for excellence among junior scientists. Structured doctoral programs with extensive supervision and support and the opportunity to participate in interdisciplinary networks open up a whole range of possibilities for students and researchers.

Studying

DCPS involvement in four programs at Freie Universität

Many of the researchers working at DCPS are involved in teaching. Right from the start, students can gain insight into the current status of research and are included in the networks of DCPS.

Bachelor's degree programs

- ▶ Biology
- ▶ Biology with teaching
- ▶ Biology with teaching credential (Lehramt option)

Master's degree programs

- ▶ Biodiversity, Evolution, Ecology
- ▶ Biology

Doctoral Studies

Graduate School of Plant Sciences

The doctoral program in plant sciences was set up in 2009, initially with a focus on plant molecular biology, within Dahlem Research School (DRS) at Freie Universität, and was expanded in 2011 to include the other branches of plant sciences represented within this Focus Area. The goal is to provide a structured program for doctoral candidates in the various subjects encompassed by the plant sciences:

- ▶ Molecular biology and genetics
- ▶ Developmental and cell biology
- ▶ Biochemistry of plants and plant physiology
- ▶ Ecology of plants and animals
- ▶ Functional biodiversity and molecular ecology
- ▶ Systematic botany and plant geography
- ▶ Bioinformatics

The doctoral program, offered in German and English, is organized as a cooperation of 14 research groups at the Institute of Biology. It is embedded into the structure of DRS, with its education programs and additional course options. The program also includes the teaching of transferable skills, such as knowledge transfer, scientific management, and foreign language skills. The DRS program in plant sciences offers its participating doctoral candidates, of which there are currently 60, not only solid subject-specific knowledge based on current research, but also targeted support and intensive supervision. While completing the doctorate, candidates also learn the skills they need for later positions of leadership in academia and the sciences.

Research

The research groups involved in the Graduate School of Plant Sciences are integrated into national and international research programs. The range of topics covered reflects the diversity of the research groups present at DCPS and includes studies of how plants perceive biotic and abiotic stimuli, transmission of information within plants through hor-

Right from the start, students are given insight into the current status of research. Doctoral candidates receive a structured education in the plant sciences.

Photo: B. Wannemacher



In 2009 DCPS established the Graduate School of Plant Sciences as part of Dahlem Research School.

Photo: B. Wannemacher





Dahlem Research School (DRS) launched a special funding program for international postdocs in 2011.

Photo: DRS

mones and other signal molecules, and how that information is translated in physiological reactions, genetic control of plant development, how plants interact with other organisms, plant relationships, and the evolution of traits and new plant species.

Financing

Doctoral candidates can finance their studies through various collaborative research centers (SFBs), priority programs, research units, networks, and the individual grants program of the German Research Foundation (DFG), the German Federal Ministry of Education and Research (BMBF), the European Union, the German Academic Exchange Service (DAAD), and the Volkswagen Foundation. Some doctoral students also receive support from other sources, including Berlin Funding for Graduates (Elsa-Neumann-Stipendium des Landes Berlin).

www.mps.fu-berlin.de

Pointing the way forward: the POINT support program in the Focus Areas

In 2011, Dahlem Research School (DRS) launched a special aid program for postdocs: Postdoc International, or POINT. Each year, the program makes it possible for five outstanding researchers from other countries to spend a total of twelve months pursuing research projects in the Focus Areas at Freie Universität. Each POINT fellow's objective is to get his or her project ready to apply for aid and then to raise funding for the project.

The fellows are integrated into the research networks existing within the Focus Areas. They participate in an individualized weeklong orientation program and in the DRS qualification program and receive access to the mentoring and career development programs offered by DRS.

For further information, please contact fellowship-drs@fu-berlin.de

Doctoral Student in Applied Genetics

Stefanie Zintl

"At DCPS, I can share information and ideas with colleagues from other disciplines, which sometimes gives me completely new ideas for my own research. I have made many valuable contacts through non-public conferences, colloquia, and events organized by the doctoral school. I get to know well-known researchers and scientists, see who is behind the research, and learn new things from ongoing research activities – by talking to people directly, and not just through the literature."

When she was just eleven, Stefanie Zintl completely dismantled her bike – and then put it back together, all because even back then, she wanted to know how things work, individually and together. Nowadays, Zintl studies how plants work. After completing her degree at LMU Munich, she moved to DCPS in 2007 to pursue her doctoral studies.

Zintl studies how light interacts with the plant hormone cytokinin in plant germination. Fundamental research in applied genetics helps achieve a better understanding of plant development and growth.

Her goals: to continue in the field of plant research and go on to teach – because she also wants to pass along her knowledge to others.



Stefanie Zintl



The doctoral candidate is engaged in fundamental research, studying the influence of light and certain plant hormones on plant germination within the Department of Applied Genetics.

Photos: B. Wannemacher

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