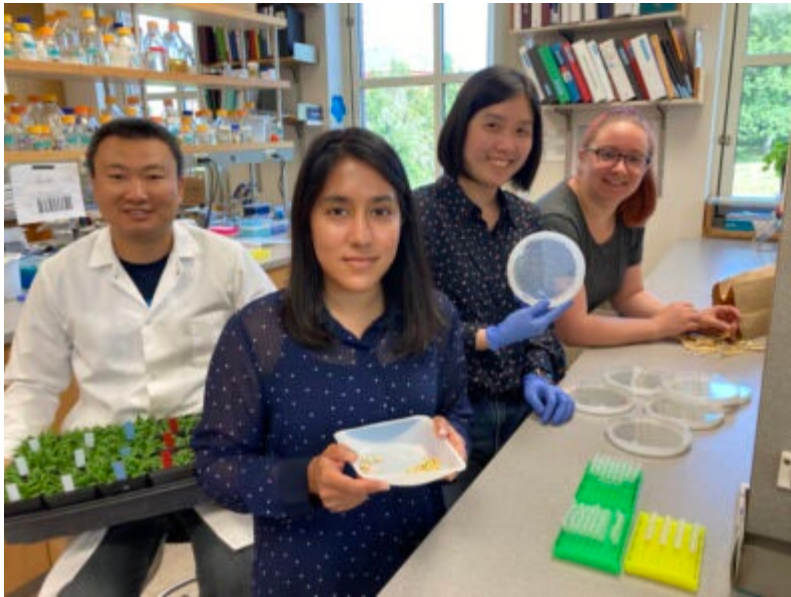


Summer Plant Biology Research at Top-Notch German Research Cluster in North Rhine-Westphalia



Apply today through the [program application portal](#).

Application Deadline: November 20th, 2023.

Navigation

[Overview](#) – [2023 Student Cohort Feedback](#) – [Research Projects](#) – [CEPLAS Research Groups](#) – [Professional Development](#) – [Cultural Program](#) – [Broader Impacts](#) – [Student Eligibility Requirements](#) – [Application Documents](#) – [Timeline](#) – [Questions](#)

Overview

Undergraduate and graduate students will participate in a plant-biology summer research program to become globally educated students for international leadership in scientific research aimed at fostering sustainable cultivation of food, fodder, and energy plants. The first offering of this program successfully concluded in May 2023. The next offering of the program will take place in May 2024. Students will:

- perform a well-defined research summer program at one of the participating Cluster of Excellence on Plant Sciences (CEPLAS) research groups
- identify new plant traits that can enhance growth, crop yield, and the use of natural resources
- understand the molecular and genetic foundations of these traits
- receive fellowships to participate in this research program in Germany

Sponsored by [NSF's IRES](#) initiative, this research program in Germany will last three years and involve a total of 24 diverse WSU students. During each summer, 8 students will travel to Germany and complete plant biology research projects over a period of 10 weeks; each participating student will receive a fellowship totaling \$9,000, covering travel, accommodation, insurance, living expenses, etc.



The students will be hosted by the [Cluster of Excellence on Plant Sciences](#) (CEPLAS) in [Cologne](#), which integrates research institutes from the Universities of Düsseldorf ([HHU](#)) and Cologne ([UoC](#)), the [Forschungszentrum Jülich](#) research center, and the [Max Planck Institute for Plant Breeding Research](#) (MPI), also located in Cologne.

The participating WSU scientists belong to the [School of Biological Sciences](#) in [CAS](#) as well as the Departments of [Plant Pathology](#), [Horticulture](#), and [Crop and Soil Sciences](#), and the [Institute of Biological Chemistry](#) in [CAHNRS](#). The PIs in this program are Prof. Dr. [Helmut Kirchhoff](#) ([CAHNRS](#)) and Prof. Dr. [Mechthild Tegeder](#) ([CAS](#)). The overseas-site director of the project is Prof. Dr. [Stan Kopriva](#), Professor of Plant Sciences at the University of Cologne and CEPLAS Associate Director.

2023 Student Cohort Feedback

“Overall, the program was a very good experience! I got to learn and do a lot of things that were new to me in the lab, and I enjoyed the experience of living in Germany.”

“The research experience was immensely positive for me. While I was assigned a challenging project, I very much enjoyed the research challenges and learning new methods and techniques. I also want to highlight that the lab members were very friendly and accommodating. I was able to make new professional relationships.”

“Enjoyed working on stimulating and challenging projects while also allowed flexibility to explore other parts of Germany and Europe. Also honed important lab skills and presenting research in public.”



Research Projects

Over the three years of this IRES program the specific research projects will vary, but the focus will remain on a comprehensive understanding of complex biological processes and traits in plants, and their regulation and inheritance. The following are sample projects:

- Dissection of plant defense mechanisms against symbiotic and pathogenic microorganisms
- Computational model of photosynthesis
- Elucidating the role of organic nitrogen (N) and sulfur (S) transport processes in plant performance
- Tailoring microbiomes to improve plant growth and resilience
- Utilizing a heterologous effector delivery system to probe the integrated sensory domain hypothesis

CEPLAS Research Groups

Research Projects may be arranged with the following CEPLAS research groups, listed by principal investigator. Click on the link of each investigator for research details.

- [Klau, Gunnar \(HHU\)](#)
- [Bauer, Petra \(HHU\)](#)
- [Stich, Benjamin \(HHU\)](#)
- [Usadel, Björn \(HHU\)](#)
- [Döhlemann, Gunther \(UoC\)](#)
- [Zuccaro, Alga \(UoC\)](#)
- [Pauly, Markus \(HHU\)](#)
- [Matuszynska, Anna \(HHU\)](#)
- [Ebenhöh, Oliver \(HHU\)](#)
- [Zeier, Juergen \(HHU\)](#)
- [Bucher, Marcel \(UoC\)](#)
- [Weber, Andreas \(HHU\)](#)
- [Groth, Georg \(HHU\)](#)
- [Höcker, Ute \(UoC\)](#)
- [Hacquard, Stéphane \(MPI\)](#)
- [Kopriva, Stanislav \(UoC\)](#)



Professional Development

The desired overarching outcomes of this program are substantial contributions to the students' formation as plant science researchers and globally engaged professionals for leadership in globalized societies. Through this program, accordingly, the students will develop not only novel research abilities, but also additional professional skills and networks that will differentiate them in a competitive employment market both in industry and at universities. These abilities and skills include:

- Communication, presentation, and organization skills
- Mediation of additional faculty-to-faculty collaborations between WSU and CEPLAS
- Development and exploration of new and alternative research approaches for examining scientific problems
- Management of research collaborations in eminently international multicultural environments
- Networking-building skills to foster a community of international scholars and sustain long-term relationships
- Initiation, establishment, and management of international scientific collaborations
- Appreciation of culturally different mindsets and research approaches in international research collaborations

Cultural Program

Beyond expanding their research skills and widening their professional network, the participating students will take part in beneficial cultural activities to learn about the cultural, economic, and social aspects of Germany and its people. Cologne is the largest city on the Rhine River. As a major cultural center for the Rhineland, Cologne hosts more than 30 museums and hundreds of galleries, with exhibitions that range from local ancient Roman archeological sites to contemporary graphics and sculpture. Among many attractions, the students will visit the "[Flora und Botanischer Garten Köln](#)", the city's formal park and main botanical garden, the "Forstbotanischer Garten Köln", an arboretum and woodland botanical garden, and the [Köln Turm](#) (Cologne Tower), which is 542.91 ft in height. Particularly significant will be visits to the

Roman-Germanic Museum, featuring art and architecture of ancient Roman and Germanic culture, and the [Kölner Rathaus](#) (Cologne City Hall), which was founded in the 12th century and is still used as the city hall.



Broader Impacts

The participating diverse students will take part in potentially transformative research to improve production systems and crop plants with more environmentally resilient photosynthesis as well as metabolism, and enhanced interactions with beneficial microbes and defenses against pathogens. The students will be supervised by an extensive group of world-class investigators and mentors and thereby deepen their knowledge in plant science and increase their competency about crop and model plants. The

direct cooperation between the European and US scientists who will supervise the students' research will expand society's knowledge about these beneficial crops, fostering improved food security while protecting the environment.

Students will internalize the knowledge, skills, and attitudes necessary to operate effectively in an interconnected changing world of diverse ethnicities, religions, languages, institutions, and cultures.

Through these experiences, the students will develop skills international attitudes to adapt their behavior to interact effectively with those who are culturally different from them, interpret issues and situations from more than one cultural perspective, accept cultural differences as well as manage cultural ambiguity, seek out international or intercultural opportunities, and use diverse cultural frames of reference and alternative perspectives to think critically and solve plant science problems that transcend national boundaries.

By living in a different country and culture, the participants will also sharpen their interaction, resilience, and resourcefulness skills in navigating distinct cultures, expectations, and processes. These transferable skills are highly valued by employers and multinational corporations (e.g. Bayer), which provide chemical and biological agricultural products and equipment. In order to continue to deliver services and products to their markets and sustain local economies, these corporations need to engage globally educated and multi-culturally oriented professionals, who have had personal direct experiences with the cultures of these corporations' home and host countries. These benefits to local economies are realistic not only for the U.S., but also for Germany in view of the multitude of U.S. and German agriculture related corporations that successfully operate in both countries.

Student Eligibility Requirements

- WSU undergraduate and graduate students currently performing research in 16 participating plant science laboratories in WSU's School of Biological Sciences, in CAS, as well as Departments of Plant Pathology, Horticulture, and Crop and Soil Sciences, and Institute of Biological Chemistry in CAHNRS
- Each application needs to be supported by a WSU scientist who collaborates with CEPLAS's researchers
- Distinguished academic standing with GPA > 3.0 and progress in their research

- Senior standing for undergraduate students
- Ongoing research for graduate students

Application Documents (Combined in one single PDF file)

1. Evidence of US citizenship, nationality, or permanent residence (required by NSF)
2. Resume and WSU transcript
3. List of remaining courses prior to graduation, endorsed by the applicant's academic advisor
4. Name and contact information of a professor who taught the applicant a plant science related course and who is willing to provide a recommendation letter discussing the applicant's technical skills and potential for research success
5. One-page motivation letter to describe:
 - career goals
 - rationale to conduct plant science research in Germany
 - any prior experience with research, internships, international education
 - any prior experience with languages and cultures other than American_

Timeline

- Student recruitment during fall semester
- Complete application due by the middle of October
- 8 IRES scholars selected by the middle of November
- First meeting between IRES scholars and program organizers towards the end of November to discuss overall program organization and travel

- Second meeting in January between IRES scholars and program organizers to discuss research preparation and expectations
- Third meeting at the beginning of February between IRES scholars, program organizers and CEPLAS' program directors to discuss research projects and logistics of stay in Germany
- Fourth meeting towards the end of February between IRES scholars and program organizers to discuss research plan and final logistics as well as post-travel survey, reports, and workshop
- Departure to Germany by the second week of May
- Residence in Germany during the following 10 weeks
- Return to WSU
- Post-Travel survey
- Submittal of a technical research summary and a cultural report
- Student-organized workshop

Questions

For questions or further information, please communicate with [Prof. Dr. Helmut Kirchhoff](#) (CAHNRS) or [Prof. Dr. Mechthild Tegeder](#) (CAS).