

The Rheinische Friedrich-Wilhelms-Universität Bonn is an international research university that offers a wide range of degree programs. With 200 years of history, about 38,000 students, over 6.000 employees, and an excellent domestic and international reputation, Bonn University is among Germany's leading universities. It was awarded the status of a University of Excellence in 2019.

The Cluster of Excellence **PhenoRob – Robotics and Phenotyping for Sustainable Crop Production** seeks to employ, beginning February 2020, **max. until December 31, 2023**

2 Doctoral Students (100%) (TV-L 13)

The Cluster of Excellence “PhenoRob” is a large-scale research initiative that has been funded in the context of the Excellence Strategy of the German Federal and State Governments since January 1, 2019. One of the greatest challenges for humanity is to produce sufficient food, feed, fiber, and fuel for an ever-growing world population while simultaneously reducing the environmental footprint of agricultural production. Productive arable land is limited, and the input of agro-chemicals needs to be reduced to curb environmental pollution and halt the decline in biodiversity. In order to achieve this, Bonn University together with the Forschungszentrum Jülich uses two approaches: 1) multi-scale monitoring of plants and their environment using autonomous robots with automated and individualized intervention and big data analytics combined with machine learning to improve our understanding of the relation between input and output parameters of crop production, and (2) assessing, modeling, and optimizing the implications of the developed technical innovations in a systemic manner.

The technology-driven novel approach of PhenoRob is characterized by the integration of robotics, digitalization, and machine learning on one hand, and modern phenotyping, modeling, and crop production on the other. The international network of outstanding scientists in the afore-mentioned disciplines is unique in Bonn and cannot be found anywhere else in Germany. Our research group is part of Core Project 4 within PhenoRob – “Autonomous In-Field Intervention” – which pursues two core developments: 1) autonomous robotic weeding at the individual plant level and 2) precise application of nitrogen fertilizer. Within this content, the focus of our research group will be to develop methods to perform in-field understanding and intervention to achieve these objectives in an *autonomous* way, with minimal human intervention. Our goal is to develop methods in environmental field mapping and path planning to enable robots to act as *active* agents making sensing/intervention decisions on the farm, rather than *passive* devices for data collection. The work of the doctoral students is divided in terms of the two fundamental tasks required for decision-making: *mapping* and *planning*. The mapping project will focus on developing probabilistic multi-scale, multi-agent mapping methods as a basis for planning and decision-making. The planning project will focus on developing information-based multi-agent path planning strategies for monitoring and intervention.

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| Your tasks: | <ul style="list-style-type: none"> • Conducting an independent research project in the area of active decision-making for agricultural robots • Acquisition and application of scientific methods • Publications (e.g. of scientific results) • Acquisition of skills and experiences in project/research management |
| Your profile: | <ul style="list-style-type: none"> • An excellent degree in robotics, mechatronics, computer science or a related subject at Masters level or equivalent • An independent scholar who wants to shape research in Core Project 4 • An interest in interdisciplinary and collaborative research |
| We offer: | <ul style="list-style-type: none"> • Participation in the international research hub <i>The Cluster of Excellence “PhenoRob – Robotics and Phenotyping for Sustainable Crop Production”</i> • The opportunity of conducting independent research and the support that is necessary to do so |

- An open, stimulating and interdisciplinary work environment where good ideas are encouraged and supported
- An advanced training program that will give you a competitive advantage when seeking a permanent position and help you balance work and family life
- Mentoring by two experienced professors from The Cluster of Excellence
- Institutional support for applicants with families and for women
- TV-L E 13 on the salary scale

Applicants must submit: (1) a curriculum vitae (CV); (2) the names and contact details of two referees (position, professional address, and e-mail); (3) a letter of motivation (max. 1 page); (4) a copy of your master's degree (including transcripts). It is highly recommended to include samples of your work (reports, previous publications, videos, code, etc.).

The University of Bonn is committed to diversity and equal opportunity. It is certified as a family-friendly university and aims to increase the number of women employed in areas where women are under-represented and to promote their careers. To that end, it urges women with relevant qualifications to apply. Applications will be handled in accordance with the *Landesgleichstellungsgesetz* (State Equality Act). Applications from suitable candidates with a certified disability or equivalent status are particularly welcome.

If you are interested in this position, please submit your **complete application documents by December 6, 2020** to Dr. Nora Berning (administration@phenorob.de) (Kennziffer 89-20-3.202)