

# Leibniz ScienceCampus Phosphorus Research Rostock

## Graduate Concept including Phosphorus Graduate School (PGS)

### 1 Graduate concept

The graduate concept of the ScienceCampus Rostock is directed to an excellent, structured graduate education of young researchers in the field of phosphorus research along with an extending internationalization. It integrates Bachelor-, Master- and Doctoral studies and the scientific work of postdocs. In addition to the individual (BSc, MSc) and bilateral (PhD) tutoring by the workgroup leaders and scientists responsible for the projects, a thematic programme is offered (see 3 'Thematic programme'). The Phosphorus Graduate School (PGS) with doctoral students forms the core of the concept (see 2.1). In addition, other thematically related doctoral students can be associated to the PGS and thereby use the offered programme, which is also in large parts open to thematically related MSc- and BSc-students and postdocs.

| Graduate Concept                     |   |         |
|--------------------------------------|---|---------|
| Postdocs                             | PhD / <u>Phosphorus Graduate School</u> | MSc/BSc |
| Thematic training/study programme    |   |         |
| Soft skills incl. knowledge transfer |   |         |
| Internationalisation & Networking    |   |         |

Figure 1: Graduate concept of the Leibniz ScienceCampus Phosphorus Research Rostock

### 2 Members

Members are participants within the graduate concept programme of the ScienceCampus Rostock and include doctoral students of the Phosphorus Graduate School (PGS) and other thematically related BSc, MSc and doctoral students and postdocs.

#### 2.1 Phosphorus Graduate School (PGS)/doctoral students

The core of the graduate concept of the ScienceCampus Rostock forms a thematic graduate school. This Phosphorus Graduate School (PGS) has the overall aim of an excellent graduate education with new and innovative phosphorus themes. Each doctoral student will contribute and participate in the structured graduate education. The PGS will provide opportunities of interdisciplinary exchange and training as well as courses promoting soft skills. With an excellent research-intensive environment, this target group-oriented programme offers its doctoral students optimal conditions for a doctorate and a tailor-made preparation on time after graduation, both academic and non-academic careers.

Key aspects are

- Acquisition and improvement of skills for research and interdisciplinary work
- Deepening of methodological skills

- Acquisition of key skills/competences for further career development

The programme emphasizes particularly approaches to promote interdisciplinarity. These approaches are based on the teaching of social and communication skills. The curriculum of an increasing level of self-serving organization, joint participation in a summer school, interdisciplinary seminars and workshops and the prevention of scientific misconduct support that goal.

### 2.1.1 The thesis

All doctoral students will be supported by pairs of supervisors from at least two partner institutions of the ScienceCampus Rostock (e.g. IOW and University of Rostock). The doctoral students are enrolled at the Faculty of Mathematics and Natural Sciences, the Faculty of Agricultural and Environmental Sciences or the Faculty of Law of the University of Rostock. The PhD-theses must meet the formal requirements by the PhD regulations of the respective faculties involved. The enrolment gives the students the opportunity to participate in courses offered by the Graduate Academy of the University of Rostock (see 4.1).

For all doctoral students of the PGS the general scheme of work units is listed in figure 2. All these steps will be done jointly by the doctoral students and their supervisors. In addition, the doctoral students are supposed to discuss their PhD thesis with the supervisors (committee) at least three times per year and additionally have a career talk at least in the 2<sup>nd</sup> year. A supervisor and doctoral student agreement following the recommendations of the DFG shall be signed in the first months of work ([www.graduiertenakademie.uni-rostock.de/fileadmin/UniHome/Forschung/Reinheckel/Dokumente/Empfehlungen\\_der\\_DFG.pdf](http://www.graduiertenakademie.uni-rostock.de/fileadmin/UniHome/Forschung/Reinheckel/Dokumente/Empfehlungen_der_DFG.pdf) and [www.graduiertenakademie.uni-rostock.de/fileadmin/Graduiertenakademie/MBV.pdf](http://www.graduiertenakademie.uni-rostock.de/fileadmin/Graduiertenakademie/MBV.pdf)). This agreement contains rights and obligations on both sides. In addition, subject and work programme are recorded. Later modifications are not excluded, but should be mentioned in the agreement (update).

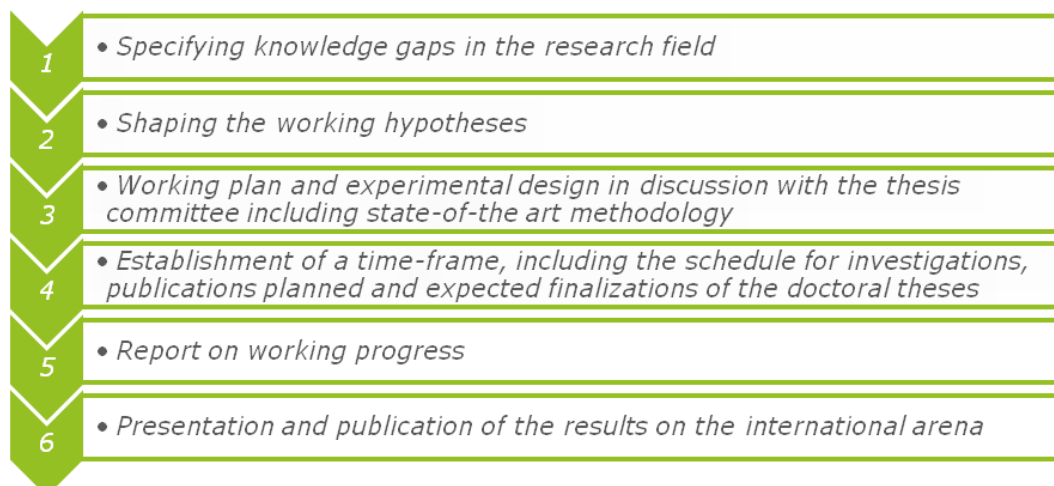


Figure 2: General scheme of work units for the PhD theses

### 2.1.2 Additional skills

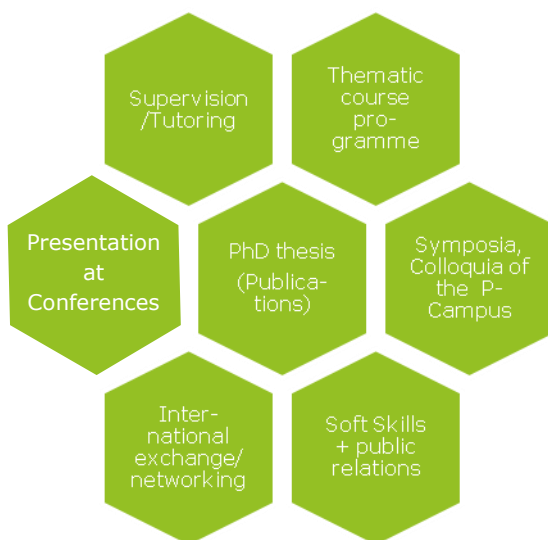
Besides the individual scientific work on the thesis, the doctoral students of the PGS are expected to (list of issues including ECTS can be found in the intranet of the website of the ScienceCampus Rostock)

- complete at least 2 thematic workshops<sup>1</sup>
- attend the annual group seminars<sup>1</sup>

- attend 80% of the symposia, colloquia and lecture series of the ScienceCampus Rostock<sup>1</sup>
- participate (and present) in the department and laboratory meetings and seminars as well as the institute's colloquia<sup>1</sup>
- complete at least 2 soft skill courses<sup>2</sup>
- participate in at least 1 public relation-issues<sup>3</sup>
- tutor at least 1 BSc or MSc thesis

(<sup>1</sup> see 3; <sup>2</sup> see 4.1; <sup>3</sup> see 4.2)

The main part of requirements shall be completed in the first and second year. In the third year, a minimized course load gives students the opportunity to concentrate upon their research topic and to write their thesis. This enables the students to conduct research at the most advanced level. In addition to the curriculum training, students will contribute to scientific excellence by presenting results at national and international workshops and conferences and by publishing their data in international journals. Each doctoral student should have at the end of the PhD period published or submitted manuscripts of their results in international peer-reviewed journals. The guidelines of the Leibniz Association concerning open access publication have to be followed and the ScienceCampus Rostock mentioned in the acknowledgments.



*Figure 3: Curriculum of the Phosphorus Graduate School*



*Figure 4: Time schedule for doctoral students of the Phosphorus Graduate School*

## 2.2 Thematically related BSc, MSc and doctoral students and postdocs

The graduate programme offers young scientists with thematically relevant ongoing projects the opportunity to participate in the programme. As members can apply:

- Doctoral students from the partner institutions of the ScienceCampus Rostock working on a thesis that deals substantially with phosphorus research
- BSc and MSc students from the partner institutions of the ScienceCampus working on a thesis that deals substantially with phosphorus research
- Postdocs from the partner institutions of the ScienceCampus, whose research exhibits a substantial part on phosphorus research
- Visiting undergraduate and graduate students, postdocs that are working on phosphorus topics

Doctoral students of the partner institutions of the ScienceCampus can apply to become associate members of the PGS. They should be enrolled at faculties of the University of Rostock, to be able to participate in courses offered by the Graduate Academy of the University of Rostock. After successful application these doctoral students have the same rights and obligations as the doctoral students of the PGS.

The ScienceCampus Rostock awards scholarships for the length of two to three months to (external) scientists with thematically relevant phosphorus research topics to allow a research stay at the ScienceCampus Rostock. The visiting fellows should link their research interests and work with the thematic priorities of the ScienceCampus and contribute to discussions and workshops etc. within the graduate programme.

## 2.3 Regulations/Membership conditions

The members agree to participate in the programme (colloquia, workshops etc. see 3) and to comply with the rules of good scientific practice of the Leibniz Association ([www.leibniz-gemeinschaft.de/forschung/gute-wissenschaftliche-praxis](http://www.leibniz-gemeinschaft.de/forschung/gute-wissenschaftliche-praxis)). The members shall present their projects in a seminar/workshop at least once a year.

Application procedure for membership: The following documents shall be submitted to the coordination office of the ScienceCampus: a letter of motivation (1-2 pages) in which the interest in the membership is explained, curriculum vitae, list of publications, if appropriate, short synopsis of the research project. The selection of the applicants is made by a majority vote of the steering committee of the ScienceCampus. Doctoral students of the PGS do not have to apply, they are automatically members.

Duration: The membership ends after three years or by the end of the proposed research projects; for doctoral candidates with the publication of the thesis, for postdocs with the publication of relevant publications or end of their project. It is recommended that doctoral research projects will be completed within a period of three years.

Certificates: The ScienceCampus Rostock is not a PhD degree-awarding body itself. However, the doctoral degree can be supplemented with a graduate school certificate (obligations see 2.1.2). For the submission of the PhD thesis and the final exams the rules for a PhD degree of the relevant faculty apply. Also, the BSc, MSc, other doctoral students (who are not associate members of the PGS with extended obligations) and postdocs can get a certificate with the documentation of their activities within the graduate programme of the ScienceCampus Rostock.

Travel expenses: Each member can apply for travel expense reimbursement. The conditions and application procedure can be found on the website ([www.wissenschaftscampus-rostock.de/intern.html](http://www.wissenschaftscampus-rostock.de/intern.html)).

Publications: Support for publication costs can be requested to the scientific coordination/steering committee of the ScienceCampus. The conditions and application procedure can be found on the website ([www.wissenschaftscampus-rostock.de/intern.html](http://www.wissenschaftscampus-rostock.de/intern.html)).

Visiting Fellowship: Visiting Fellows receive a stipend of 1000 € per month and a mobility and material fee of 200 €, but no further allowances. There are up to three months per year per person possible. A grant from the ScienceCampus does not constitute an employment or service relationship. The Visiting Fellows are advised to take necessary health insurance at own expense according to the DAAD recommendations. For the duration of the stay, visiting fellows get a computer work place. The visiting term will be carried out in two or three consecutive months and not divided. No later than two months after the end of the scholarship, a written final report on the gained results must be submitted to the coordination office of the ScienceCampus Rostock. Application Procedure: Awarding of scholarships to Visiting Fellows will be selected according to the ability to connect to the ScienceCampus on the criteria of excellent scientific work. Applications can be submitted to the coordination office of the ScienceCampus any time and must include the following documents: a short letter of motivation with the justified interest in a research stay at the ScienceCampus, curriculum vitae including list of publications, short synopsis (3-5 pages) for the proposed research project including host working group and a work plan for the stay.

### 3 Thematic programme

The programme includes the following phosphorus research related activities:

**Colloquia (public):** will be organised by the ScienceCampus Rostock at least twice a year; invitation of external scientists with phosphorus research topics.

**Group Seminars (doctoral students of the PGS present and discuss their work):** The doctoral students present their theses and results internally to their fellow students and to the supervisors, thereby getting hints for their practical work and for presenting scientific results once a year. The 'start workshop' will be the first in this series.

**International P-Campus Symposia (public):** internationally oriented symposia will support the international network of research students and the PGS; they will be a forum for discussions with invited experts such as the members of the International Scientific Advisory Council of the ScienceCampus Rostock. Students are required to attend all symposia: passive participation in the 1<sup>st</sup> and active participation in the 2<sup>nd</sup> and 3<sup>rd</sup> year in form of an oral presentation and/or poster. In addition, the students are asked to suggest external speakers for the symposia. One key activity in the internationalization will be the 'International Phosphorus Workshop 2016 (IPW8)', which will be held in Rostock and hosted by the ScienceCampus Rostock.

**Lecture Series (public):** weekly (anticipated for winter term 2015/2016).

**Seminars** at the Institutes/University: the students shall present their results in the institutes' seminars and will get advice for their practical work and for presenting scientific results.

**Summer School for doctoral students of the PGS:** summer school organized together with the doctoral students of the ScienceCampus Rostock with own and external teachers. The doctoral students will present their research results and methodological approaches and techniques of quantitative and qualitative research will be addressed.

The summer school aims at more detailed discussions of cross-cutting issues on the current state of research and to raise the profile of the doctoral students.

**Thematic Workshops (open to all members):** Specific workshops are the preferred forum to stimulate exchange between internal and external scientists once or twice per year on current research themes as well as theories or methods of phosphorus research. The students will be integral partners in these workshops with presentations and practical exercises. These workshops are also meant as team-building measures and can be carried out e.g. at the Biological Research Station Zingst (University of Rostock). Examples of envisaged workshops:

- 'Phosphorus Boot Camp' course: provides the general background in phosphorus research/chemistry necessary for all PhD projects in general. It is aimed to give a brief overview of the main concepts and methods used in phosphorus research.
- Workshop 'Innovative analytical methods in P research'
- Workshop 'Technology transfer opportunities'

## 4 Soft skills

### 4.1 Graduate Academy of University of Rostock

The Phosphorus Graduate School (PGS) is embedded in the Graduate Academy of the University Rostock ([www.uni-rostock.de/forschung/graduieretenakademie](http://www.uni-rostock.de/forschung/graduieretenakademie)). The Graduate Academy offers complementary education of soft skills and career development in a broad range (courses only partly in English). Furthermore, the Graduate Academy organizes a meeting once a year, called 'Tag der Promovierenden' that stimulates mutual information and transdisciplinary linking and networking among the doctoral students. The network of the Graduate Academy allows an exchange of knowledge and experiences with other doctoral students at the University of Rostock. Also the Graduate Academy follows the recommendations of the DFG to complete care agreements between doctoral students and supervisors. The doctoral students of the PGS are automatically members of the Graduate Academy (fulfilling all requirements).

The graduate academy's objectives:

- Central organization to accompany qualification measures aiming to support doctoral candidates
- Improvement of the individual supervision of doctoral candidates
- Enabling an intensive scientific exchange in a network of doctoral candidates

Courses offered include:

- Support for the dissertation: coaching and self-management for doctoral students (start, hang on, graduation phase).
- Scientific core competences/methods: slide writing, writing scientific English, improved reading, academic writing and presentation skills, good practice in science
- Research and careers: application cycle, project management, career planning, exploitation of research results
- Communication and presentation: doctoral thesis defence, rhetoric, design of scientific posters, conflict management

It is also possible to organise courses on demand.

### 4.2 Public relations and knowledge transfer

Excellence in science communication is an essential aspect for a career in academia but also useful for many other professionals. Thus, all students of the PGS shall participate in



public relation activities at least twice during their doctoral studies. This can either be achieved by giving lay presentations to the public e.g. high school students, teachers, journalists, or by publishing articles e.g. in newspapers, non-scientific journals or at websites.

Another important topic for graduates and scientists is the technology transfer as a means of dissemination and promotion of results and innovations emerging from the activities in the ScienceCampus Rostock. Screening workshops will be offered for all members of the ScienceCampus in cooperation with the technology transfer departments of the partner institutes. During these workshops new results or developments should be presented by the different working groups and will be evaluated by a board of technology transfer experts from the different partner institutes regarding the potential of economic exploitation. This board will give advice to the scientists on subsequent steps. According to the stage of market maturity the proposed ideas can be validated further or the related institute can do market research for the transfer potential. This would, for example, include tasks concerning IP-rights, search for business partner(s) or generation of roadmaps for further development of ideas and products. Moreover, the partners aim at encouraging especially young scientists to use their ideas or results as a base for building up start-ups or spin-offs. To raise the awareness for this special career, information events for all scientists involved in the ScienceCampus Rostock will be organized and provided, for example, by the University Centre for Entrepreneurship.

## **5 Internationalization and networking**

The Campus strives to promote the networking among graduate students and scientists. Besides the workshops and other events, young researchers meet at a 'phosphorus breakfast' for exchange of ideas several times per year (every third month).

The graduate concept/thematic graduate school and the ScienceCampus Rostock as a whole contribute to the internationalization efforts and strategies of the Leibniz Institutes and the University. Research topics are offered at the international level to attract also international students and scientists. Upon start of their work at Rostock the doctoral students/scientists can use all relevant infrastructure of the University for foreign students and guest scientist like the 'Welcome Center' ([www.welcome-center.uni-rostock.de](http://www.welcome-center.uni-rostock.de)).

During research work all students are embedded in the manifold international networks of the supervisors and hosting institutes. The following few examples for institutional partnerships illustrate what a broad and diverse range of international collaborations is offered to the doctoral students at the ScienceCampus Rostock: IOW has established a scientific network with focus on the Baltic Sea with numerous research institutions in the Baltic Sea area, i.e. the Baltic NEST Institute of the Stockholm University or the Institute of Oceanology of the Polish Academy of Science in Sopot, but also globally, i.e. with the Universidad de Concepcion, Chile, the Guangzhou Marine Geological Survey, China, and the Instituto Nacional de Investigacao Pesqueira de Republica de Angola. As member of the Euromarine+ Consortium. LIKAT collaborates with the Istituto di Chimica Composti Organo Metallici (ICCOM, Firenze, Italy) and with the Saudi Basic Industries Corporation (SABIC). FBN is involved in large European research initiatives, e.g. ECO-FCE (A whole-systems approach to optimize and reduce the ecological footprint of monogastrics with 17 partners from 9 countries) and the EU COST Action METHAGENE (31 partners from 17 countries). IPK is actively involved in the European Cooperative Programme for Plant Genetic Resources (ECPGR) and INP has established collaborations via visiting

professorships to various universities overseas. The University of Rostock has established international collaborations with 55 universities all over the world and collaborates with 175 universities in the frame of the EU Erasmus program. Besides these rather general activities, members of the ScienceCampus Rostock actively participate in thematic P oriented networks or expand existing ones. One key example is the European Sustainable Phosphorus Platform (ESPP, [www.phosphorusplatform.org](http://www.phosphorusplatform.org)) in which the ScienceCampus Rostock is an active member.

The doctoral students will participate with their research in these scientific networks, e.g. by visiting collaborating foreign laboratories. Furthermore, they will be encouraged to present intermediate results at international conferences. Finally, the doctoral theses represent cumulative works consisting of a number of peer-reviewed publications in highly-ranked international journals.

## **6 Equal opportunities**

Equal opportunity concepts such as the cascade model of the Leibniz Association, the concepts of the partnering Leibniz Institutes and the University of Rostock, which promote e.g., women in scientific leading positions, will also be fully applied in the graduate programme of the ScienceCampus Rostock. The ScienceCampus Rostock greatly values strong involvement of women in the projects, both in practical work and in management. Moreover, the Leibniz Institutes and the University have established concepts of reconciling work and family life that will fully apply in the ScienceCampus.

Equally important is particularly the support of female applicants and later the female candidates in planning for a high level academic career in order to increase the share of women in leading academic positions. Mentoring programs are offered at e.g. the IOW and the Leibniz organization. Good practice examples are available at all partner institutes.

## **7 Quality management/Evaluation**

Quality management in the Phosphorus Graduate School takes place through the thesis committees with at least two supervisors from different partner institutions. They will have regular meetings with the doctoral students to guarantee successful final examination of the doctoral thesis within three years. Annual thematic workshops, symposia and other events with members of all partner institutes as well as with researchers from other national and international research institutes plus representatives from the ministries will assure intensive exchange on the state of the art research in the ScienceCampus Rostock. The doctoral students present their research results in form of talks and posters at international workshops and conferences, thereby ensuring a better classification and integration of own data, exchange and information on state of the art of the research results. Once a year, each doctoral candidate reports in the form of a lecture on the progress of the work available to all members of the Phosphorus Graduate School.

External evaluation of the ScienceCampus including the PGS will take place by the International Scientific Advisory Council for the ScienceCampus Rostock.