Activity Report
2013–2014
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1 Development of the Leibniz ScienceCampus Phosphorus Research Rostock

In 2013, the Leibniz ScienceCampus Phosphorus Research Rostock (hereinafter: ScienceCampus Rostock) received support and initial funding by the Leibniz Association. This permitted not only financial support of phosphorus research topics through five research projects (listed in tab. 1) but also increased networking among partners and enhanced discussions on relevant research themes up to project applications. In addition, the necessary structures for a Leibniz ScienceCampus were created, including e.g. the steering committee. Furthermore, the members were compiled and information on thematically assigned projects and publications collected. In addition to creating the logo and the website, a demand plan was developed and a cooperation agreement designed. Information about the ScienceCampus Rostock has been prepared such as posters, presentation slides, hand-outs and website references. Relevant networks were, if not yet done, contacted.

In 2014, the structures of the ScienceCampus Rostock were consolidated. The steering committee met regularly to discuss the latest developments. The members of the Scientific Advisory Council were identified and invited to an international symposium of the ScienceCampus Rostock (March 2015). The scientific results such as publications are presented in chapter 3. In several workshops joint project proposals were developed and finally submitted to funding agencies. A great success was the raising of funds for a graduate school as a strategic measure in the context of the recent advancements in the Leibniz Association (start: spring 2015). Another important milestone was the signature of the cooperation agreement between the Leibniz Association, the Ministry of Agriculture, Environment and Consumer Protection Mecklenburg-Vorpommern, the Ministry of Education, Science and Culture of Mecklenburg-Vorpommern, the University of Rostock and the participating Leibniz Institutes. For this purpose, a press conference was performed in August 2014. In addition, the website has been released and is now regularly informing about news from the ScienceCampus Rostock as well as from the entire field of research. Further material for publicity of the ScienceCampus Rostock was prepared (roll-ups, posters etc.).

2 Goals and concept

The ScienceCampus Rostock focuses on the exploration of the essential and irreplaceable element phosphorus and its diverse chemical compounds. The overall aim of the interdisciplinary collaboration in the ScienceCampus Rostock is to explore options for a more sustainable management of phosphorus by means of focused thematic networking. We investigate specific modes of action in agricultural and environmental systems as well as in technical and industrial processes. In addition to basic and applied research, development and transfer of technologies shall contribute to economic development. Furthermore, cooperation and research regarding this essential element will be intensified and strong national and international networks shall be established.

The following research institutions are partners in the ScienceCampus Rostock:

- Leibniz Institute for Catalysis (LIKAT) at the University of Rostock
- Leibniz Institute for Farm Animal Biology (FBN), Dummerstorf
Leibniz Institute for Baltic Sea Research Warnemünde (IOW)
Leibniz Institute for Plant Genetics and Crop Plant Research (IPK), Satellite Collections North, Groß Lüsewitz
Leibniz Institute for Plasma Research and Technology (INP), Greifswald
University of Rostock (UoR; Faculty of Agricultural and Environmental Sciences, Interdisciplinary Faculty, Faculty of Law, Faculty of Mathematics and Natural Sciences, Rostock University Medical Centre)

3 Research

3.1 Research foci

The ScienceCampus Phosphorus Research is divided into four areas of research (clusters):

- Cluster I: Phosphorus cycles and fluxes in the environment
- Cluster II: Sufficiency and efficiency of phosphorus utilisation, phosphorus recycling
- Cluster III: Phosphorus as an element in and as a result of catalytic processes
- Cross-cutting activity: The development of advanced phosphorus analysis methods

3.1.1 Cluster 1: Phosphorus cycles and fluxes in the environment

Cluster I of the ScienceCampus Rostock has as its focus phosphorus fluxes and cycles in the environment. Phosphorus ends up in the environment through open-ended industrial cycles and along river flows, reaching the sea. The aim is a better understanding of P fluxes and cycles in the environment in order, on the one hand, to analyse the effects of high P inputs and, on the other, to enable discussion of protection and/or rehabilitation measures. This starts at the "sources", for example with the application of fertilizer on agricultural land and the effects of artificial drainage (drain systems), but also at the river outlets of small and large wastewater treatment plants. And it continues through phosphorus fluxes in different ecosystems, from special soil crusts to coastal waters and into the large Baltic Sea basin. Methodological approaches in Cluster I include measurements on the smallest scale up to the Baltic Sea ecosystem modelling over a wide range of scales and instrumentation.

3.1.2 Cluster 2: Sufficiency and efficiency of P utilisation, P recycling

The goal is to formulate a scientific basis with which to derive the necessary legal framework and policy recommendations for the sustainable management of regional and global closed P-fluxes in accordance with the principles of sufficiency and efficiency. Sufficiency means to limit the application rates of P for the production of plant and animal foods to the level actually required. This requires critical evaluations of existing P-fertilisation and feed recommendations with the aim of reducing P-use in agriculture. Research to improve P-efficiency includes:

1. Elucidation of the genetic basis of P-efficiency (uptake and utilisation efficiency)
2. Unlocking the accumulated but not available or not used P-stores in topsoil and the subsoil
3. Utilisation of alternative P sources and development / refinement of practice-relevant P-recovery technologies including research into the properties and potential of alter-
native P sources and technically recovered phosphates and extending to recommendations for practical applications.

The interdisciplinary nature of the cluster, which covers all sub-areas of the agricultural P cycle (soil, plant, animal, water, process engineering ...), enables a realistic assessment of the portion of the P application rates that in the future are replaceable with renewable P sources.

3.1.3 Cluster 3: Phosphorus as an element in and as result of catalytic processes

This cluster is primarily concerned with research into underlying structural and reactive properties as well as theoretical issues in phosphorus chemistry. This reflects the formally possible oxidation states, which for phosphorus range from −3 to +5, the extraordinarily high structural diversity of phosphorus compounds. As a central element in achiral and chiral ligands for organometallic and coordination chemistry catalytic processes, phosphorus plays a unique role in catalysis research and as a reagent in organic syntheses. This is also true for some areas of industrial chemistry, mainly in the manufacture of fine chemicals, which often have a high added value. In addition, phosphorus-based organocatalysts are gaining increasing importance.

3.1.4 Cross-cutting activity: The development of improved P analysis methods

This cross-sectional task focuses on the improvement and development of methods to address the number of research questions within the ScienceCampus. Moreover, this cluster holds a number of projects to answer the question of relevant phosphorus compounds and their dynamics in the environment.

The methodological spectrum available in this cluster includes state-of-the-art analytical technology as liquid and gas chromatography coupled to mass spectrometric detection (GC-MS, LC-MS/MS).

In particular, the Institute for Baltic Sea Research Warnemünde maintains the Secondary Ion Mass Spectrometer CAMECA NanoSIMS 50 L for elementary and isotopic compositional analyses of smallest particles and single cells. Thus, detailed investigations on the P metabolism of Baltic Sea and soil microorganisms could depict the presence of P-storage vacuoles in cyanobacteria.

3.2 Research projects

Currently already around 30 disciplinary and interdisciplinary projects are thematically assigned to the ScienceCampus Rostock (Tab. 1). Furthermore, funding for several projects was applied and some of these applications already approved. For example, the Leibniz Association approved the proposal of the ScienceCampus Rostock for a graduate school. This graduate school consists of 11 PhD projects which will start in spring 2015.
<table>
<thead>
<tr>
<th>Project</th>
<th>Project duration and funding</th>
<th>Participating partners of the ScienceCampus</th>
<th>Research focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquaponik</td>
<td>12/2011-10/2015 (UoR)</td>
<td></td>
<td>I, II</td>
</tr>
<tr>
<td>BACOSA: Baltic Coastal System Analysis and Status Evaluation</td>
<td>04/2013-03/2016 (BMBF)</td>
<td>UoR</td>
<td>I</td>
</tr>
<tr>
<td>BALTIC IMTA - Integrated multitrrophic Aquaculture in the Baltic Sea</td>
<td>09/2013-10/2015 (BMBF)</td>
<td>UoR</td>
<td>I, II</td>
</tr>
<tr>
<td>BioAcid II: Biological Impacts Of Ocean Acidification</td>
<td>09/2012-08/2015 (BMBF)</td>
<td>UoR, IOW</td>
<td>I</td>
</tr>
<tr>
<td>CRUSTFUNCTION</td>
<td>2014-2016 (DFG)</td>
<td>UoR</td>
<td>I</td>
</tr>
<tr>
<td>DIP, POP and DOP analytics in the Baltic Sea and river inputs</td>
<td>Running project (IOW)</td>
<td>IOW</td>
<td>I, Q</td>
</tr>
<tr>
<td>ECO-FCE: A whole-systems approach to optimising feed efficiency and reducing the ecological footprint of monogastrics</td>
<td>2013-2017 (EU-FP7)</td>
<td>FBN</td>
<td>II</td>
</tr>
<tr>
<td>Evaluation of different P-digestion methods for diverse environmental materials (EvaPhoN)</td>
<td>2014 (ScienceCampus)</td>
<td>UoR</td>
<td>I, Q</td>
</tr>
<tr>
<td>EXCALIBOR: Empirical and experimental calibration of the clumped isotope (paleo)thermometer for bioapatites</td>
<td>04/2014-06/2015 (DFG)</td>
<td>IOW</td>
<td>I, Q</td>
</tr>
<tr>
<td>Fischglashaus: Modulares Gewächshausanbausystem zur aquaponischen Produktion von Warmwasserfischarten unter minimalem Ressourcenverbrauch in Mecklenburg-Vorpommern – Eine Innovationsinitiative zur energie- und nährstoffeffizienten Nahrungsmittelproduktion</td>
<td>06/2013-01/2015 (European Fisheries Fund)</td>
<td>UoR</td>
<td>I, II</td>
</tr>
<tr>
<td>Genetic and nutritional effects on the efficiency of P use of monogastric animals (P-Eff-Mo)</td>
<td>2014 (ScienceCampus)</td>
<td>FBN, UoR, LIKAT</td>
<td>II</td>
</tr>
<tr>
<td>GENUS Geochemistry and Ecology of the Namibian Upwelling System</td>
<td>05/2012-04/2015 (BMBF)</td>
<td>IOW</td>
<td>I</td>
</tr>
<tr>
<td>GLYPHOSAT: Method Development for the Determination of particulate Glyphosate in Marine Water; Bioavailability of Glyphosate</td>
<td>2014 (ScienceCampus)</td>
<td>IOW, UoR</td>
<td>I, Q</td>
</tr>
<tr>
<td>Hohe Phosphor-Ausnutzung aus Gärresten unter Berücksichtigung der Fest-Flüssig-Trennung – ein Beitrag zum Förderschwerpunkt Humus- und Nährstoffwirkung organischer Reststoffe aus Biomassekonversionsanlagen</td>
<td>08/2012-07/2015 (FNR)</td>
<td>UoR, LIKAT</td>
<td>II</td>
</tr>
<tr>
<td>Project</td>
<td>Project duration and funding</td>
<td>Participating partners of the Science-Campus</td>
<td>Research focus</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
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<tr>
<td>Langzeitmonitoring Nährstoffe in der Darß-Zingster Boddenkette</td>
<td>Running since 1980 (LUNG, UoR)</td>
<td>UoR</td>
<td>I</td>
</tr>
<tr>
<td>Microbial phosphorus mobilisation by plant growth promoting fungi in cropping systems</td>
<td>2013-2014 (DAAD)</td>
<td>UoR</td>
<td>II</td>
</tr>
<tr>
<td>MOSSCO: Modular System for Shelves and Coasts</td>
<td>04/2013-03/2016 (BMBF)</td>
<td>IOW</td>
<td>I</td>
</tr>
<tr>
<td>Nachhaltiges Landmanagement Norddeutsches Tiefland (NaLaM-a-nT)</td>
<td>09/2010-08/2015 (BMBF)</td>
<td>UoR</td>
<td>II</td>
</tr>
<tr>
<td>Neue Organokatalysatoren und kooperative Katalysatorsysteme für die stoffliche Nutzung von CO2</td>
<td>2010-2015 (BMBF)</td>
<td>LIKAT</td>
<td>III</td>
</tr>
<tr>
<td>Optimierung der Düngewirkung von Reststoffen aus Biomassekonversionsanlagen – Ein Beitrag zum Ressourcen- und Umweltschutz</td>
<td>06/2014-05/2015 (BMBF)</td>
<td>UoR</td>
<td>II</td>
</tr>
<tr>
<td>Optimierung des Nährstoffaustrags und biologisches Nährstoffrecycling für Aquakulturen in Brackwasser</td>
<td>06/2013-10/2015 (EU FIAF, LFA-MV)</td>
<td>UoR</td>
<td>I, II</td>
</tr>
<tr>
<td>P-Recycling aus organischen Abfällen und Reststoffen – Stand, Potenziale und Perspektiven in M-V</td>
<td>2012-2015 (Scholarship)</td>
<td>UoR</td>
<td>II</td>
</tr>
<tr>
<td>P-Schadstoff-Wechselwirkungen infolge Applikation von Knochenkohle</td>
<td>09/2013-08/2016 (Scholarship MV)</td>
<td>UoR, LIKAT</td>
<td></td>
</tr>
<tr>
<td>Phenotypic and molecular characterization of P utilization and uptake efficiency of Solanum tuberosum (P-NUE)</td>
<td>2014 (Science-Campus)</td>
<td>UoR, IPK</td>
<td>II</td>
</tr>
<tr>
<td>Phosphite als Liganden für Hydroformylierungen</td>
<td>Until 2014 (Evronik)</td>
<td>LIKAT</td>
<td>III</td>
</tr>
<tr>
<td>Recycling of phosphorus based organocatalysts through nanofiltration (RON)</td>
<td>2014 (ScienceCampus)</td>
<td>LIKAT, UoR</td>
<td>III</td>
</tr>
<tr>
<td>Role of phosphorus as a key component for managing grasslands N-yield and phytodiversity in organic farming</td>
<td>09/2013-12/2016 (BÖLN)</td>
<td>UoR</td>
<td>II</td>
</tr>
<tr>
<td>SECOS: The Service of Sediments in German Coastal Seas</td>
<td>04/2013-03/2016 (BMBF)</td>
<td>UoR, IOW</td>
<td>I</td>
</tr>
<tr>
<td>Selektive Oligomerisierung von Ethylen mit P-N-Liganden-Systemen</td>
<td>2006-2015 (SABIC/Linde AG)</td>
<td>LIKAT</td>
<td>III</td>
</tr>
</tbody>
</table>

Abbreviations: BMF: Bundesministerium für Bildung und Forschung (Federal Ministry of Education and Research); BMEL: Bundesministerium für Ernährung und Landwirtschaft (Federal Ministry of Food and Agriculture); BÖLN: Bundesprogramm Ökologischer Landbau und andere Formen nachhaltiger Landwirtschaft (Federal Organic Farming Programme); DAAD: Deutscher Akademischer Austauschdienst (German Academic Exchange Service); DFG: Deutsche Forschungsgemeinschaft (German Research Foundation); EU-FP7: Seventh Framework Programme for Research and Technological Development; FIAF: Finanzinstrument für die Ausrichtung der Fischerei (Financial Instru-
3.3 Publications

2013


Siebers, N. & P. Leinweber (2013): Bone char – a clean and renewable phosphorus fertilizer with cadmium immobilization capability. J. Environ. Qual. 42, 405-411


2014


3.4 Theses

2013


Bissa, K. (2013): Das Wachstum von afrikanischen Buntbarschen und afrikanischen Welsen in einem ressourcenminimierten Aquaponiksystem. BSc, Supervisor: Prof. Dr. S. Glatzel, Prof. Dr. H. Palm.


Nievel, M. (2013): Räumliche Verteilung des Pflanzennährstoffs Phosphor (Orthophosphat) in einem Ebbe-Flut-Aggregatsystem einer Warmwasser-Aquaponikanlage. BSc, Supervisor: Prof. Dr. S. Glatzel, Prof. Dr. H. Palm.


2014


## 4 Networking

In addition to numerous interactions between individual scientists and research groups, the ScienceCampus Rostock is also a member of the European Sustainable Phosphorus Platform (ESPP) and has participated in events organized by the German Phosphorus Platform (DPP).

## 5 Events

The ScienceCampus Rostock has organized a number of external and internal events that are listed below.

### 5.1 Public events

Symposium ScienceCampus Phosphorus Research Rostock at Leibniz Institute for Baltic Sea Research Warnemünde, 16.5.2013

Official signature of the cooperation agreement with all partner institutions (Leibniz-Institutes, University of Rostock) and the Ministries, incl. press conference and poster presentation, 20.08.2014

### 5.2 Internal meetings and workshops

To promote networking and interdisciplinary cooperation within the ScienceCampus Rostock various working meetings were carried out, such as within individual research foci. For the application of the ScienceCampus Rostock as part of the new funding line 'strategic networking' of the Leibniz Association, several workshops took place (11/2013, 03/2014, 04/2014, 05/2014), in which, inter alia, the overall concept and the subprojects were discussed and selected. Also for other project applications, working meetings were carried out (e.g. within the BMBF funding programme REWAM).

The steering committee of the ScienceCampus Rostock met five times during the reporting period (08/2013, 11/2013, 02/2014, 09/2014, 12/2014), each time at a different partner institute, to discuss the thematic development of the ScienceCampus and overarching decisions.

In 2014, already two organizational meetings in preparation for the 8th International Phosphorus Workshop IPW8 took place (09/2014, 10/2014). The IPW8 will be carried out by the ScienceCampus Rostock 12th-16th September 2016.

For crosslinking of the PhD students who are working on phosphorus-related issues within the ScienceCampus Rostock, the first joint 'phosphorus breakfast' took place at IOW in October 2014. This meeting will be carried out regularly in future.
5.3 Lectures

In addition to the regular lectures of numerous members of the ScienceCampus Rostock, the following courses were carried out:

Phosphor als endliche Ressource: woher kommt er, wohin geht er? (UN-Dekadethema „Mobilität“). Komplexe Nachhaltigkeitsprobleme (Seminar), WS2013/2014 (I. Krämer)

Session within the KüNO Summer School: role play „Die Zukunft der Darß-Zingster Bodenkette (DZBK) - Sanierungsstrategien für dieses eutrophe Gewässer“, 19.9.2014 (R. Schumann, T. Leipe, F. Schmacka)

School project Musikgymnasium Rostock Käthe Kollwitz, Wirksamkeit des Phosphorrechtsrhalts verschiedener Filtermaterialien für Dränauslässe, September 2014 – February 2015 (F. Schmacka)

5.4 Others

Networking Cruises with the Research Vessel Elisabeth Mann Borgese, HanseSail, including also members of the ScienceCampus Rostock, 10.8.2013 and 9.8.2014


6 Presentation to the public

The ScienceCampus Rostock has been presented to external research groups, politics, government and the general public. Below a selection of the presentations is listed.

6.1 Oral presentations

Küstenforschung, Küstennutzung und Küstenschutz, Handelskammer Hamburg, 4.-6.3.2013 (U. Bathmann)

Parlamentarischer Informationsabend der Leibniz-Institute in Schwerin, 16.4.2013 (U. Bathmann)

Workshop der WissenschaftsCampi in der Geschäftsstelle der Leibniz-Gemeinschaft Berlin, 18.7.2013 (U. Bathmann, P. Leinweber)

Böden ohne Grenzen – Landnutzung und Bodenschutz als Herausforderungen im baltischen Raum. acatech, UoR and DBG, 12.9.2013 (U. Bathmann, P. Leinweber)

Gewässersymposium am Landesamt für Umwelt, Naturschutz und Geologie, 20.11.2013 (presented by B. Lennartz)

IFAT – Weltleitmesse für Wasser-, Abwasser-, Abfall- & Rohstoffwirtschaft München, 5.-9.5.2014 (J. Tränckner)

Workshop „Phosphor für die Landwirtschaft – Strategien für eine endliche Ressource“, ATB Potsdam Bornim, 11.6.2014 (presented by B. Eichler-Löbermann)

8. Rostocker Bioenergieforum 19./20.06.2014 (presented by B. Eichler-Löbermann)
9th International Symposium AgroEnviron, 03.-07.08.2014, Goiania, Brasilien (presented by B. Eichler-Löbermann)


Forum der DPP „Wie kritisch ist die Versorgung mit dem „Lebensmittel“ Phosphor, Berlin, 21.11.2014 (presented by P. Leinweber)

1st International Conference on Sustainable Phosphorus Chemistry, Florenz, Italien, 4.-5.12.2014 (presented by T. Werner)

6.2 Posters


ScienceCampus "Phosphorus Research Rostock" - A new multidisciplinary research platform in Northeast Germany. 7th International Phosphorus Workshop in Uppsala (IWP7), 9.-13.9.2013 (presented by B. Eichler-Löbermann, M. Nausch)

WissenschaftsCampus Phosphorfororschung Rostock. F² - Forschung trifft Forschung Forschungscamp, Prorektorin für Forschung und Forschungsausbildung und Zentrum für Projektkonzeption und Projektmanagement (UoR), 7.11.2013 (presented by I. Krämer, J. Kruse)

WissenschaftsCampus Phosphorfororschung Rostock. 18. Gewässersymposium – Landwirtschaft und Gewässerschutz am Landesamt für Umwelt, Naturschutz und Geologie, 20.11.2013 (presented by I. Krämer)

ScienceCampus "Phosphorus Research Rostock", PSP5 (Phosphorus in Soils and Plants) in Montpellier, 26.-29.8.2014 (presented by B. Lennartz)

ScienceCampus "Phosphorus Research Rostock", 4th Sustainable Phosphorus Summit (SPS4) in Montpellier, 1.-3.9.2014


6.3 Press


Wenn Phosphor knapp wird. Interview with Dr. Inga Krämer, 24.1.14, WGL-online (www.leibniz-gemeinschaft.de/forschung/junge-leibniz-wissenschaftler-im-interview/phosphor/)


Neue Wege der Phosphornutzung - Leibniz-WissenschaftsCampus Rostock gegründet. Press release of the Leibniz Association, 22.08.2014

PHOSPHOR – Eine endliche Ressource? Interview with Dr. Inga Krämer. ke:onda – Die Jugendzeitung der Naturfreundejugend Deutschlands 02/2014

6.4 Websites

Leibniz-ScienceCampus Phosphorus Research Rostock: www.wissenschaftscampus-rostock.de (www.sciencecampus-rostock.de; www.p-campus-rostock.de)


University Rostock/Interdisciplinary Faculty/Maritime Systems: www.inf.uni-rostock.de/mts/projekte/projekte-des-departments/wissenschaftscampus-rostock-phosphorforschung/

6.5 Input in Programming Processes, EU-Consultation

BMBF Agenda Process: Online questionnaire for Horizon 2020, Challenge 5 – Climate Action, Resource Efficiency and Raw Materials. 28.3.2013

Interreg/Baltic Sea Region Programme, Riga, 3.-4.9.2013

Program planning 2nd European Sustainable Phosphorus Conference, Berlin and Brussels

EU Consultative Communication on the Sustainable Use of Phosphorus: Statement of the ScienceCampus Rostock (1.12.2013)

7 Structure and committees

7.1 Structure

The ScienceCampus Phosphorus Research Rostock is assigned to the University of Rostock’s Interdisciplinary Faculty (INF), Department of Maritime Systems.

The organisation of the ScienceCampus Phosphorus Research Rostock is as follows: The Directorship is made up of the Directors of the participating Leibniz Institutes and the Rector of the University of Rostock. They can be represented by members of their institu-
tions. Through the **Steering Committee** representatives of the Leibniz Institutes and the University of Rostock assume direct leadership of the ScienceCampus. They are represented by a **Spokesperson**. Direct **coordination** is carried out by a staff scientist, supported by a secretary. An international **Scientific Advisory Council** oversees the ScienceCampus Phosphorus Research and in addition to advising has the task of evaluating the scientific work of the ScienceCampus. Currently, more than 72 scientists and 8 PhD students from 45 Working Groups are **Members** (see Partners and Members) of the ScienceCampus Rostock.

The Institute for Baltic Sea Research Warnemünde acts as beneficiaries and provides the coordination office.

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**Abb. 1: Structure of the ScienceCampus Rostock**

### 7.2 Committees

#### 7.2.1 Scientific Advisory Council
Prof. Dr. Emmanuel Frossard, ETH Zürich  
Prof. Dr. Ellery D. Ingall, Georgia Institute of Technology  
Prof. Dr. Christian Müller, FU Berlin  
Prof. Dr. Hisao Ohtake, Osaka University Japan  
Prof. Dr. Paul Withers Pifysgol, Bangor University/UK

#### 7.2.2 Directorship
Prof. Dr. Ulrich Bathmann, IOW  
Prof. Dr. Matthias Beller, LIKAT  
Prof. Dr. Andreas Graner, IPK  
Prof. Dr. Wolfgang Schareck, UoR  
Prof. Dr. Manfred Schwerin, FBN  
Prof. Dr. Klaus-Dieter Weltmann, INP

#### 7.2.3 Spokesperson
Prof. Dr. Ulrich Bathmann, IOW
7.2.4 Steering committee

Prof. Dr. Ulrich Bathmann, IOW  
Dr. Volker Brüser, INP  
Dr. Klaus Dehmer, IPK  
Dr. Marko Hapke, LIKAT  
Prof. Dr. Ulf Karsten, UoR  
Dr. Inga Krämer  
Prof. Dr. Udo Kragl, UoR  
Prof. Dr. Peter Leinweber, UoR (spokesperson UoR)  
Prof. Dr. Detlef Schulz-Bull, IOW  
Prof. Dr. Klaus Wimmers, FBN

Representatives:  
PD Dr. Tom Goldammer, FBN  
Dr. Stephan Reuter, INP  
Prof. Dr. Axel Schulz, UoR/LIKAT  
Evelin Willner, IPK

7.2.5 Coordination office

Dr. Inga Krämer, Dr. Franziska Schmacka (May-Dec 2014 during parental leave of I. Krämer)  
Daniela Derlet-Eichler (Secretariat)

7.2.6 Members

Leibniz Institute for Catalysis (LIKAT) at the University of Rostock

Prof. Dr. Matthias Beller  Applied Homogeneous Catalysis  Cluster III  
Hendrik Büttner  Organocatalysis  Cluster III  
Prof. Dr. Armin Börner  Asymmetric Catalysis  Cluster III  
Dr. Marko Hapke  Cycloadditions and Transition Metal Catalysis  Cluster III  
Dr. Dirk Michalik  Analytical Service  Cluster III  
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