IGB

Leibniz-Institute of
Freshwater Ecology
and Inland Fisheries

Annual Report

2014

Research for the future of our freshwaters

We are...

... innovative

... interdisciplinary

... curious

... interconnected

... committed

... outstanding

A vision for 2018

Dear readers,
friends and supporters of IGB,

I am delighted to present to you the annual report of IGB. It offers the opportunity to showcase the entire range of last year's exceptional IGB performance and activities. With the English version of our annual report we would like to cherish our growing group of international partners and colleagues and keep you informed about the exciting developments at IGB.

This year, the members of the scientific advisory board will audit our institute. The outcome will support our preparation for the international evaluation in 2018. Right now, we are working on a position paper 'IGB 2018'. This paper does not follow the classic scheme of developing a research plan for the upcoming years identifying research topics and milestones. Instead, we adjust, expand, and re-define the framework conditions for an even better exploitation of our creative potential at the institute and beyond in joint discussions. Without any doubt, IGB 2018 will differ from IGB 2010, and from IGB 2015. The institute is developing dynamically by creating new paths and directions for research and application.

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Several new initiatives at IGB contribute already to this dynamic development: We just started the initiative 'Frontiers in Freshwater Research' to provide inter-institutional and interdisciplinary support for innovative research ideas. Every year, we allocate considerable resources to support one particularly challenging and stimulating research idea. No standards are set for form and content. The search for visionary ideas with potentially significant public relevance is in full force. Our first call for ideas showed a very positive resonance. As a result eight ideas, which were as different as they were exciting, were presented. Subsequently, we invited three teams to develop a full proposal. In 2014, we also started an internal seed money programme. A total of 15 projects were presented to the entire IGB. After the presentations, all employees were invited to jointly select those projects that should receive financial support. By the end of 2015, the PIs of the five selected projects will present their achievements to the employees of the entire institute.

At the same time, we initiate and support regional and international research networks. In close collaboration with the World Sturgeon Conservation Society, we laid the foundation for a Europe-wide network, which intends to improve the coordination in research and management of the remaining wild

Photo: Andy Küchenmeister

sturgeon populations. All leading institutions in this domain already joined the network, and first projects are currently under way. In Berlin, IGB and the 'Technische Universität Berlin' were successful to jointly apply for a DFG (German Research Association)-financed post-graduate college 'Urban Water Interfaces'. Engineers and ecologists closely collaborate in this programme to better integrate the complementary performances of natural and technical systems.

It is our intention, to expand our leadership position through innovative research programmes and novel ways of collaboration. This does not only have an impact on the research projects we select but also influences how we want and can do research in the future. A solid financial base and institutional independence put us into a privileged position to fully exercise our creativity and to develop IGB to an internationally leading institute to meet our mission: 'Research for the Future of our Freshwaters'.

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This report must not conclude without expressing our sincere thanks to our national and international partners and friends. Among our key research partners are the closely collaborating universities, the dedicated members of the scientific advisory board, and the colleagues of the Leibniz Association and the Forschungsverbund Berlin (Research Network Berlin). Thank you all for your trust and fruitful collaboration! We are especially grateful for the financial support by the Berlin Senate and the BMBF (German Federal Ministry of Education and Research). Without this solid basic funding IGB could not maintain its advanced infrastructure and would not be able to fulfil its international leadership role in research, education, application and outreach activities. My special thanks go to all IGB employees, the administrative and technical staff, doctoral candidates, junior researchers as well as to the team leaders and department heads. Their motivation and efforts are the most important foundation of IGB's forward momentum.

I hope you will enjoy reading IGB's annual report 2014.

Yours sincerely, Klement Tockner

What drives us?

1
"More than 50 % of Europe's surface waters have not yet reached a good ecological status."
Markus Venohr

2
"Changes of energy, water, and mass fluxes at and within interfaces are critical for entire ecosystems and their reactions to climate change."
Jörg Lewandowski

3
"We aim to develop new methods for investigating how parasites and fungi influence the feeding of plankton. If successful this could change our understanding of ecosystem functioning in lakes and other aquatic environments."
Jens Nejstgaard

4
"The exchange between ecological research and nature preservation enhances the prospects of success of single measures. This gives interesting impulses that indicate new directions."
Peter Casper

5
"High temperatures, typical for tropical areas throughout the year, may increase the release of carbon from inland waters globally."
Katrin Premke

6
"In ten to twenty years, every fifth of today's free-flowing large rivers might be fragmented and thus unavailable for migrating freshwater species."
Christiane Zarfl

7
"Climate change is causing changes in the flow conditions of our rivers and we expect considerable pressure on benthic invertebrates, i.e. organisms that live in or on the bottom sediments of rivers, such as larvae of mayflies, caddisflies or stoneflies, mussels, snails, or worms."
Sonja Jähnig

8
"The rapidly changing environment causes organisms to evolve and adapt."
Justyna Wolinska

9
"The majority of the public does not perceive an urgent demand to improve animal welfare in recreational fisheries; the public also has a more balanced attitude towards catch-and-release than many veterinary and fisheries agencies."
Robert Arlinghaus

10
"Variation within aquatic food webs, and therefore also within populations, may promote speciation."
Kristin Scharnweber

11
"The threshold for sulphate concentrations in drinking water of 250 mg/l is already exceeded drastically in a few tributaries of the River Spree."
Dominik Zak


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Photos: IGB/David Ausserhofer (8), IGB/Andy Küchenmeister (2), privat (1)

innovative.

Stress Testing of European Water Bodies

Thanks to the successful implementation of numerous European directives, the organic and chemical stress on many European water bodies has considerably decreased in the last 20 years. In many locations, this has improved the ecological status and functions of ground water, rivers, lakes, and coastal waters.

At the same time, however, increasing urbanisation and intensified land use have taken their toll on water quality. As individual stressors are no longer dominant, a plethora of combined minor stressors have become increasingly apparent and relevant. Among various other consequences, these multiple stressors prevent 50 % of the water bodies in Europe from reaching a good ecological status.

MARS evaluates Human Impacts on Surface Waters

For the first time, the project MARS (Managing Aquatic Ecosystems and Water Resources under Multiple Stress), funded by the EU Commission and involving three teams at IGB, investigates the occurrence and combination of multiple stressors and their effects on the ecological status of European water bodies. A range of regionally significant factors are analysed and evaluated. These include extreme weather events, water scarcity and river flow alterations in Southern Europe, stress due to hydrological modifications, structural changes of water bodies, increasing nutrient loads in Central Europe, changes in river morphology and hydrology as well as increasing temperatures. The joint impacts of multiple stressors will be qualitatively assessed through analyses of various aquatic animal and plant communities, which are directly or indirectly stressed and limited by degraded habitat conditions.

Scientists at IGB will develop a Scenario Analysis Tool and fine-tune their Models

The MARS project consortium consists of 24 European research institutes contributing their specific expertise to the biological assessment of surface waters, the inter-calibration and standardisation of assessment methods, uncertainty estimates, modelling, and the ecological restoration of inland waters. Three IGB teams are involved in several tasks of the project. The team led by Markus Venohr will model the nutrient fluxes for the rivers Elbe, Danube, and all other major European rivers. The model MONERIS, which had previously been developed at IGB, will be used for this purpose. The results generated by MONERIS will then be used in a scenario analysis tool, which will also be developed at IGB. This tool will be particularly useful to investigate effects of global change and management measures at the river-basin and European scale. Furthermore, Ute Mischke and Christian Wolter will improve current models for evaluating phytoplankton growth and fish stocks, respectively, and apply these to analyses of the Middle Elbe catchment. Mark Gessner and Ute Mischke have teamed up with Anne Lyche-Solheim at the Norwegian Institute of Water Research (NIVA) in Oslo to investigate the combined effects of increased humic substances, nutrient loads and summer storms on lakes in a large experimental facility, the IGB LakeLab in Lake Stechlin. The experiment planned in 2015 will receive much additional support by many other colleagues at NIVA and IGB, including the LakeLab Scientific Coordinator, Jens Nejstgaard, and the LakeLab manager, Stella Berger.

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Blog: http://freshwaterblog.net

Roshni Arora from India is a doctoral candidate at IGB. Here she is installing temperature data loggers in the Löcknitz River, a tributary of the Spree River south of Berlin, Germany.

Photo: IGB/Markus Venohr

IMPact-Vector: New Graduate School with IGB Participation

Kick-off meeting of the IMPact-Vector Graduate School in Frankfurt/Main, Germany.

IGB is one of the founders of the new Leibniz Graduate School IMPact-Vector. As a result, IGB will be even more active in the field of scientific training. The goal of the graduate school is to educate a new generation of highly qualified scientists and optimally prepare them for their work in the fields of parasitology and vector biology.

In our environment and elsewhere, the increasing globalisation as well as factors such as climate change, increasing population density, and the loss of biodiversity give rise to new epidemics and infectious diseases. The current state of knowledge concerning the global diversity of medically important organisms is highly divergent. Consequently, the core topics of doctoral theses at the IMPact-Vector Graduate School cover a wide spectrum, ranging from the identification and description of new increasingly important pathogens, vectors (disease-transmitting organisms), and reservoir hosts and their present distributions, phenotypic and genetic evolution of their dispersal capabilities and climatic tolerance. Another central topic is the experimental and fieldwork-based elucidation of pathogenicity and vector capacity. The objective is the up-to-date training in vector-borne and parasitic diseases and their foundations in parasitology, entomology, molecular biology, and epidemiology.

IMPact-Vector is a Joint Programme of SGN, BNITM, IZW, and IGB

The Leibniz Association sponsors the IMPact-Vector Graduate School with a grant of one million Euros. The undertaking is coordinated by the Senckenberg Research Institute and Natural History Museum (SGN) in Frankfurt/Main; partners are the Leibniz institutes in Hamburg (Bernhard Nocht Institute for Tropical Medicine, BNITM) and Berlin (Leibniz Institute for Zoo and Wildlife Research, IZW and IGB). The number of scientists entering the fields of infection biology and parasitology keeps declining. The graduate school was established to stem this decline and to ensure that the much needed scientific expertise in these fields will be available in the future.

Training in Step with Actual Practice

Our special emphasis is on the joint training of doctoral candidates, which integrates all involved institutes. The targeted teaching of soft skills in addition to the content of training programmes provided by the involved institutes will prepare scientists for scientific careers. Visiting Sanofi-Pasteur (Lyon) and Bayer HealthCare (Monheim) allows young scientists to learn about working in an industrial setting and to use methods, which were established in these companies. The joint excursion to the SGN research station in Bolivia will definitely be a programme highlight.

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www.impact-vector.de

Photo: Universität Frankfurt/Main

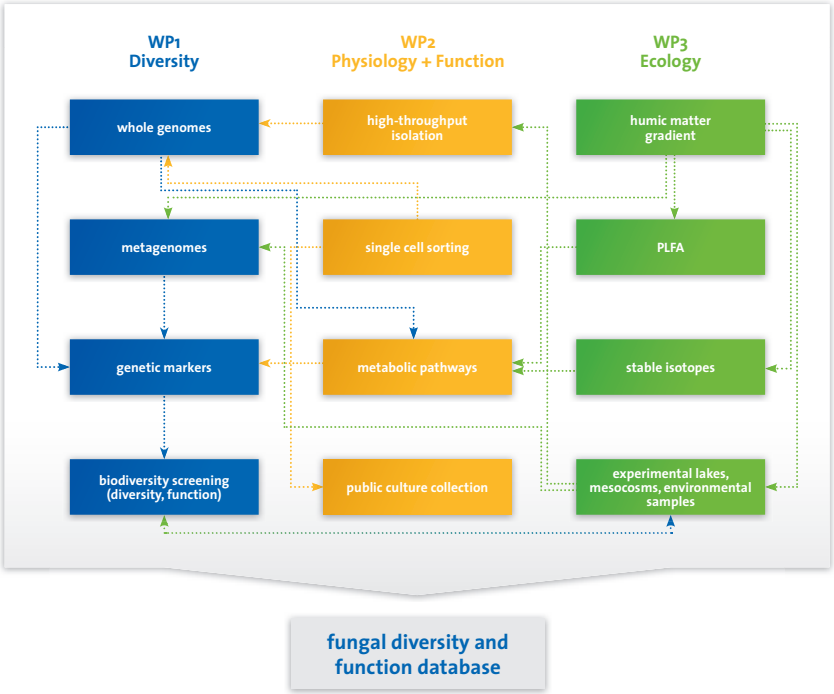
Diving for Fungi

Mushrooms that we see growing in forests and meadows are only a small fraction of fungi that exist in almost all habitats. Fungi are a very large and diverse group of organisms, many of which live in freshwater ecosystems. In the MycoLink project, in cooperation with scientists of the Leibniz Institute – German Collection of Microorganisms and Cell Cultures (Deutsche Sammlung von Mikroorganismen und Zellkulturen) and the Leibniz Institute for Zoo and Wildlife Research (Leibniz-Institut für Zoo- und Wildtierforschung), we investigate the biodiversity of aquatic fungi and the role that they play in carbon cycling in lakes. MycoLink is sponsored by the Leibniz Association and began in July 2014.

Fungi play an important role in the functioning of many ecosystems. In freshwater ecosystems, they are particularly important for the turnover of organic carbon and the recycling of nutrients. Little attention has been paid to the diversity, physiology, and metabolic profiles of aquatic fungi, although scientific interest in carbon budgets has increased in the face of global change. The study of aquatic fungi requires the development of new methods and the adaptation of methods developed in other disciplines. In the MycoLink project, scientists pursue an interdisciplinary approach by combining the development of new genomic methods with the cultivation and experimentation in the field and laboratory. Based on existing expertise in several institutes with advanced infrastructure, one aim is to establish a Leibniz-wide 'Aquatic Mycology' initiative.

Finding the Keys to Unlocking the Secret World of Fungi

The objective of the MycoLink project is to establish the technical and structural foundation for a world-leading initiative into the study of aquatic fungi. To launch this initiative, we are developing new molecular genomic and microbiological tools, a phylogenetic database, and a public collection of key aquatic fungal taxa. A range of approaches are applied to analyse the metabolic potential of aquatic fungi and to elucidate the biodiversity and ecological functions of these organisms on a large scale. For MycoLink, we are developing a unique tool set for the analyses of fungi isolates, mesocosm set-ups (partially closed experimental field set-ups), and natural ecosystems. These set-ups give us insights into various bio-geographic regions ('ecoregions') and help us to define environmental variables (e. g. temperature and pH) as well as the qualities and masses of organic materials. The objective of the MycoLink project is to better predict the effect of climate change on the structure and function of this important group of microorganisms, and to predict how this may influence carbon cycling.



MycoLink Structure and Sub-Projects: The umbrella objectives of the project are the developments of model systems and general ecological concepts by way of (1) establishing the necessary tools including databases and culture collections (2) compiling data on the biodiversity and the ecological role of aquatic fungi on a global level (3) and establishing an international network of scientists and communications between scientists researching aquatic fungi.

CSP (Conservation Stewardship Programme) – Fungal DNA Sequencing Project

Closely related to the objectives of the MycoLink project is another project with the aim to provide the complete genome sequence of 25 selected fungal isolates from various aquatic ecosystems. These fungi either represent a particular phylogenetic group or have special metabolic characteristics. This project is financially supported and executed by the Joint Genome Institute (JGI) of the US Department of Energy. IGB scientists will analyse the metabolic systems of this broad range of fungi in order to better understand how they break down organic materials in their aquatic environment.

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Starting Capital for New Ideas

In 2014, IGB established its own seed money programme. All scientists working at IGB were eligible to apply for seed money for the development of their project ideas. In October, IGB scientists introduced 15 ideas in the form of short presentations. All IGB employees voted on the merits of the presented ideas. The top five projects in this vote received seed money. Below, we introduce three of them:

Anthropogenic Influences on Land/Water Coupling:

The overlooked importance of human-induced feeds on eco-evolutionary processes in aquatic systems

The significance of the natural coupling of land and water for water ecology is well documented through the work of researchers at IGB and other institutes. However, many aquatic ecosystems are also influenced by targeted input of feed stuff caused by humans (bait offered by fishers, feeding with bread and residual feed in aquaculture). Such feed inputs have the potential of influencing entire ecosystems by way of direct and indirect effects on the food web. We presume that in many ecosystems targeted anthropogenic feed may exceed the natural inflow of organic materials from the land. We want to establish this and similar topics of significant interest and high ecological and social impact at IGB and further aim to prove the above introduced hypothesis. To this effect, we plan a lake experiment to quantify for the first time the bait input caused by recreational anglers and its effect on the food web in the lake. Using stable isotopes in a 'before and after' design, we want to analyse on which trophic levels we can detect experimental feed inputs and how feeds change the behaviour of the consumers. We will use the 3-D telemetry equipment at Lake Döllnsee for these experiments. In our project, we work closely together with Julien Cucherousset (CNRS, Université Paul Sabatier, Laboratoire Évolution and Diversité Biologique, Toulouse) and with Jari Syväranta (Universität Jyväskylä, Finland).

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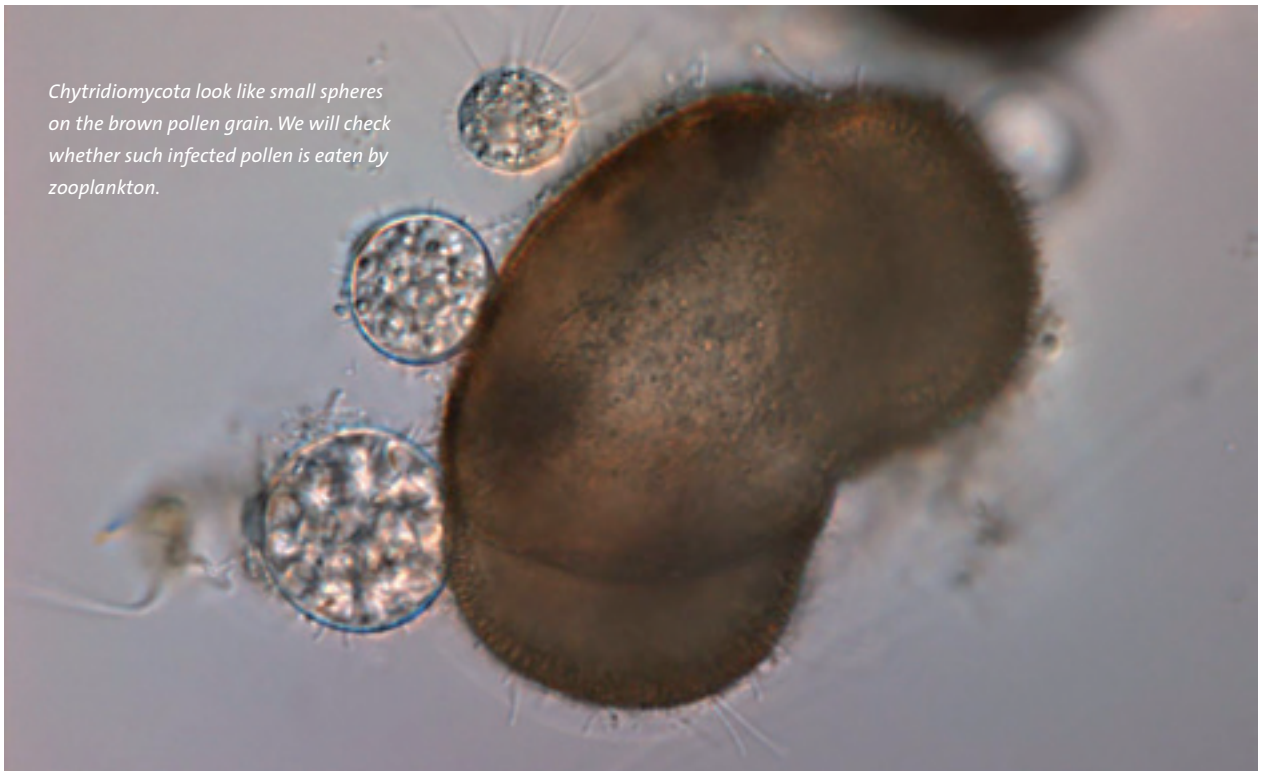
ZPAM:

The significance of interactions between zooplankton, predation, and associated microbes for lake ecosystems

How is feeding in plankton affected by parasites? Jens Christian Nejstgaard and seven IGB scientists (Maria Belayeva, Stella A. Berger, Hans-Peter Grossart, Peter Kasprzak, Michael Monaghan, Justyna Wolinska, and Sabine Wollrab) want to answer this question together with Maiko Kagami at the Toho University in Japan and Bastiaan Ibelings at the Université de Genève in Switzerland. The team investigates how the nutrition (feeding) is affected in microscopic freshwater organisms when fungi or other parasites infect the predator or the prey. To investigate these complex interactions, the scientists will first develop new molecular methods that allow investigating this directly in natural ecosystems, rather than in laboratory experiments. Countless species of these small (micro- to millimetre-sized) organisms exist in inland waters in huge numbers. To create a comprehensive picture of the entire ecosystem the

In a field experiment we study how fish food affects food webs.

Photo: Christopher Monk



Chytridiomycota look like small spheres on the brown pollen grain. We will check whether such infected pollen is eaten by zooplankton.

scientists analyse how these organisms interact with the surrounding ecosystem. If the scientists succeed with their project, the newly developed methods can also be used to address many ecological questions in a wide range of aquatic ecosystems from rivers to oceans.

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Individuals of Culex pipiens forma molestus *in a rearing cage.*

Mosquitoes (Culex pipiens, common house mosquito): How Hybridization may lead to novelty

To most people, mosquitoes are nothing but a biting, blood-sucking nuisance. But mosquitoes also have important roles in natural ecosystems. Mosquitoes number approximately 3000 species worldwide, but only a small proportion bite humans. Their larvae live in freshwaters where they feed on small particles including algae, and where they can be an important food source for other animals including fish. The adults serve as pollinators of certain plants and food for birds. Only the females bite, needing a blood meal for the eggs to fully develop.

A less well known fact is that they are good model organisms to study evolutionary processes like speciation and hybridization. The common mosquito species *Culex pipiens* exists in the form of two biotypes, known as molestus and pipiens forms. While both biotypes look the same, with regard to ecological characteristics they are clearly different. The pipiens needs blood to reproduce, and feeds on many different hosts. In contrast, the molestus form does not need blood to reproduce. In nature, hybrids of both biotypes are common. These hybrids are particularly effective in transmitting diseases such as West-Nile virus. The team around Michael Monaghan wants to use experimental breeding methods to find out under what conditions these biotype hybrids are formed, providing insights into how hybridization can even lead to new species in nature.

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Photos: Stella A. Berger und Hans-Peter Grossart (1), Ann-Christin Honnen (1)

Getting Wise to Harmful Trace Substances

IGB has assumed the leadership of the EU-financed project HypoTRAIN. The project started in the beginning of 2015. In this project, the focus is on investigating the hydrological, geo-chemical, and biological mechanisms which control shifts in nutrients and harmful substances, which are present in the sediments of flowing waters.

The sediment on the bottom of rivers is called the hyporheic zone. It consists of much more than sand, gravel, and mud. Surface water keeps whirling into the riverbed and then surfaces again. As the water hits the riverbed, the sediment acts like a filter, which collects nutrients as well as harmful substances. Additionally, adjacent groundwater seeps into the hyporheic zone and mixes with the river water. These processes contribute to a large complexity of physical, biological, and chemical processes in this transition zone. These processes are significant for the effective decay of harmful substances in the hyporheic zone. Today, many of these processes are still unknown or only known in sweeping terms. HypoTRAIN aims at filling significant knowledge gaps regarding hyporheic zones. The results of the project will contribute to our understanding of the processes which determine the retention, transport, and degradation of nutrients and harmful substances in moving water. On a practical note, the results can also be used to improve the management of our water resources.

Contributions to Linked Topics

The EU will support the Innovative Training Network (ITN) HypoTRAIN for four years (2015 to 2018) as part of its Horizon 2020 Programme. HypoTRAIN is a contraction of the full title 'Hyporheic Zone Processes – A Training Network for Enhancing the Understanding of Complex Physical, Chemical and Biological Process Interactions in Hyporheic Zones'. A total of twenty partner institutions participate in the project. They will be a rich source of skills and knowledge in many scientific disciplines. The lively spirit of sixteen doctoral candidates (three of them at IGB) will move the linked project topics forward. One topic, for example, is the transformation of organic trace materials in the hyporheic zone. The focus is on the role of microorganisms or plant roots in this transformation and the streaming of water in the transitional zone. Suitable tools will have to be developed to allow proper measurements.

Training is Everything! Summer School Kick-off at IGB

As 'Innovative Training Network' the EU-financed project is characterized by a mature concept for the doctoral training. Included in the project are several visits to research participants in other research institutes or companies. Also part of the programme are two central joint field experiments. All sixteen doctoral candidates will convene at the study sites where they will work together. A one-week summer school at IGB in June 2015 will kick off the research.

hypo TRAIN

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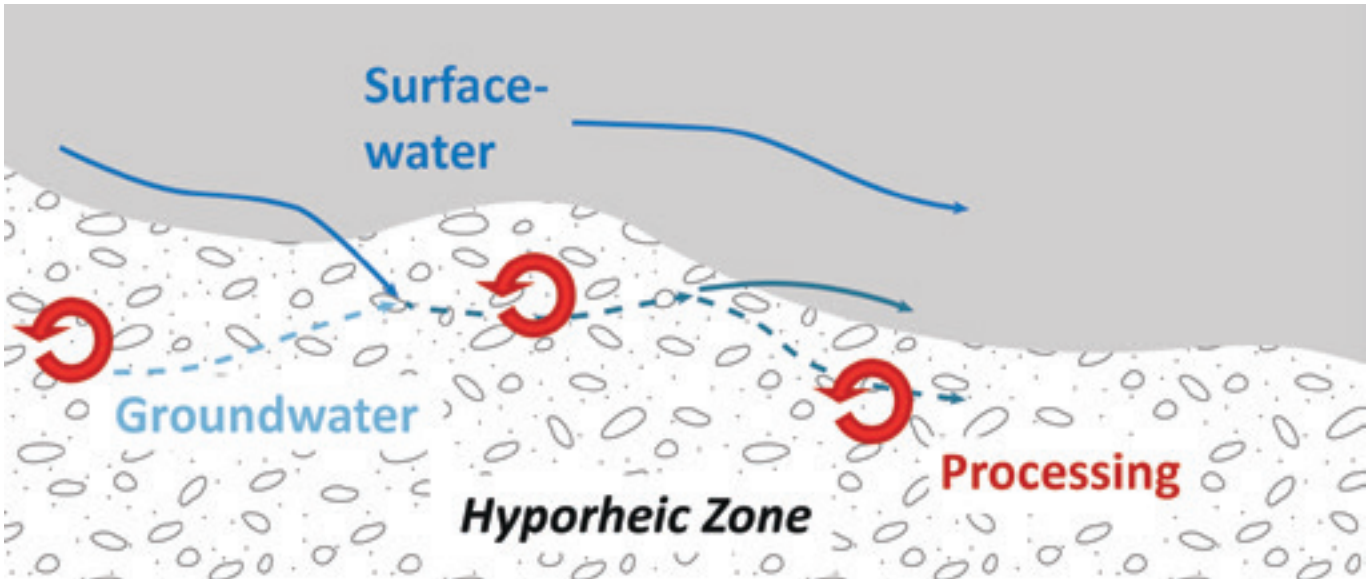
Karin Meinikmann | meinikmann@igb-berlin.de

Transport and processing in the riverbed.



Graphic: Karin Meinikmann

curious.

Department 1 – Ecohydrology

The overall research objective of the Department of Ecohydrology is to quantify fundamental physical and biogeochemical mechanisms and to investigate their interactions with ecological processes. This will help us to better understand aquatic ecosystems and also to find better ways to manage inland water bodies. Our studies pursue predominantly ecohydrological methods and objectives but also integrate approaches from other scientific fields. Our scientists focus particularly on processes in/at aquatic interfaces and on transport and turnover between water and land. Such interfaces or transitional zones exist between surface and ground water, between rivers and their riverbeds, between aquatic plants and the surrounding water, and even within water bodies, for examples during stratification of lakes separating Epi- and Hypolimnion. Sharp physical and biogeochemical gradients exist in these interfacial aquatic zones; this turns these interfaces into highly reactive and ecologically sensitive zones.

Our Research Teams

Lake physics
(Christof Engelhardt/Georgiy Kirillin)

Ecohydraulics
(Alexander Sukhodolov)

Groundwater-surface water interactions
(Gunnar Nützmann/Jörg Lewandowski)

Light pollution and ecophysiology
(Franz Hölker)

Nutrient balances in river basins
(Markus Venohr)

Ecology of stream ecosystems
(Gabriel Singer)

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Selected Projects

MARS (2014-2018): Managing Aquatic ecosystems and water Resources under multiple Stress (EU-FP7; Markus Venohr, Ute Mischke, Christian Wolter, Mark Gessner).

UWI (2014-2018): Urban Water Interfaces (DFG Graduate School with TU Berlin; Gunnar Nützmann, Jörg Lewandowski, Sabine Hilt, Michael Hupfer, Mark Gessner).

Interfaces (2014-2017): Ecohydrological interfaces as critical hot spots for fluxes and transformations of water, energy and solutes (EU; Jörg Lewandowski, Gunnar Nützmann).

PlanktoTrait (2014-2017): Trait-based biodiversity and multitrophic dynamics under external forcing: a combined planktotron and modelling approach (DFG; Co-PI Gabriel Singer).

SU 405/7-1 (2014-2017): Transport and mixing processes at river confluences (DFG; Alexander Sukhodolov, Tatiana Sukhodolova).

Selected Publications

Hering, D., Carvalho, L., Argillier, C., Beklioglu, M., Borja, A., Cardoso, A. C., Duel, H., Ferreira, T., Globevnik, L., Hanganu, J., Hellsten, S., Jeppesen, E., Kode, V., Lyche Solheim, A., Nõges, T., Ormerod, S., Panagopoulos, Y., Schmutz, S., Venohr, M., Birk, S. (2014): Managing aquatic ecosystems and water resources under multiple stress – an introduction to the MARS project. Science of the Total Environment, 503-504: 10-21.

Widder, S., Besemer, K., Singer, G. A., Ceola, S., Bertuzzo, E., Quince, C., Sloan, Rinaldo, W. T., Battin, T. J. (2014): Fluvial network organization imprints on microbial co-occurrence networks. Proceedings of the National Academy of Sciences, 111 (35): 12799-12804.

Sukhodolov, A., Sukhodolova, T. (2014): Shallow wake behind wood-induced bar in a gravel-bed river. Environmental Fluid Mechanics, 14: 1071-1083.

Bernhardt, J., Kirillin, G., Hupfer, M. (2014): Periodic convection within littoral lake sediments on the background of seiche driven oxygen fluctuations. Limnology and Oceanography : – Fluids and Environments, 4(1): 17-33.

Krause, S., Boano, F., Cuthbert, M. O., Fleckenstein, J. H., Lewandowski, J. (2014): Understanding process dynamics at aquifer-surface water interfaces – An introduction to the special section on new modeling approaches and novel experimental technologies. Water Resources Research, 50: 1847-1855.

Photo: Andy Küchenmeister

Selected Projects

UWI (2015-2020): Urban water interfaces (DFG Graduate School with TU Berlin; Sabine Hilt).

RESI (2015-2018): River Ecosystem Service Index (BMBF; Martin Pusch).

MycoLink (2014-2017): Linking aquatic fungal diversity to ecosystem function (Leibniz Competition; Michael T. Monaghan).

Novel species communities (2014-2017): Formation and ecological and evolutionary consequences (DFG Heisenberg Professorship; Jonathan Jeschke).

GLANCE (2014-2018): Global change effects in river ecosystems (BMBF; Sonja Jähnig).

Selected Publications

Brothers, S., Köhler, J., Meyer, N., Attermeyer, K., Grossart, H.-P., Mehner, T., Scharnweber, K., Hilt, S. (2014): A feedback loop links brownification and anoxia in a temperate, shallow lake. Limnology and Oceanography, 59: 1388-1398.

Kuemmerlen, M., Schmalz, B., Guse, B., Cai, Q., Fohrer, N., Jähnig, S. C. (2014): Integrating catchment properties in small scale species distribution models of stream macroinvertebrates. Ecological Modelling, 277: 77-86.

Toussaint, E. F. A., Hall, R., Monaghan, M. T., Sagata, K., Ibalim, S., Shaverdo, H. V., Vogler, A. P., Pons, J., Balke, M. (2014): The towering orogeny of New Guinea as a trigger of arthropod megadiversity. Nature Communications, 5: 4001.

Vasseur, D. A., Fox, J. W., Gonzalez, A., Adrian, R., Beisner, B E., Helmus, MR., Johnson, C., Kratina, P., Kremer, C., De Mazancourt, C., Miller, E., Nelson, W. A., Paterson, M., Rusak, J. A., Shurin, J., Steiner, C. F. (2014): Synchronous dynamics of zooplankton competitors prevail in temperate lake ecosystems. Proceedings of the Royal Society B., 281: 20140633.

Wolinska, J., Petrusek, A., Yin, M., Koerner, H., Seda, J., Giessler, S. (2014): Population structure of a microparasite infecting Daphnia – spatio-temporal dynamics. BMC Evolutionary Biology, 14 (1): 247.

Department 2 – Ecosystem Research

The Ecosystem Research Department focusses on the effects of changes in hydromorphological, climatic, and nutrient conditions on lake and river ecosystems. We study interactions between biotic ecosystem components (algae, zooplankton, macrophytes, macroinvertebrates, and parasites) and their physical and chemical environment as well as processes like primary production, evolution or carbon cycling. Long-term data of lakes and rivers are used to detect non-linear behaviour such as tipping points, and changes in their biodiversity. We predominantly employ techniques used in molecular biology, genomics, laboratory and field research, exploit long-term databases and use statistical and deterministic models. Furthermore, we develop rational management strategies and new methods, test and advance ecological concepts. High-frequency long-term data are recorded for Lake Müggel and River Spree which will then be entered into an international data management system.

Our Research Teams

Photosynthesis and growth of phytoplankton and macrophytes
(Jan Köhler)

Molecular ecology – evolution and biodiversity in freshwater
(Michael T. Monaghan)

Host-parasite coevolution
(Justyna Wolinska)

Ecology of macrophytes – aquatic-terrestrial coupling
(Sabine Hilt)

Functional ecology and management of rivers and lakeshores
(Martin T. Pusch)

Global change effects on river ecosystems
(Sonja Jähnig)

Ecological novelty and theoretical ecology
(Jonathan Jeschke)

Long-term development of lakes and climate impact research
(Rita Adrian)

Photo: David Ausserhofer

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Department 3 – Experimental Limnology

What are the consequences of global environmental change on aquatic ecosystems and their biodiversity? This is the central question of our research, which we pursue by using a variety of approaches, including large-scale experiments in the field. The location of our department directly on the shore of Lake Stechlin, a deep clear-water lake of glacial origin about 80 km north of Berlin, offers excellent opportunities for this purpose. Specifically, we conduct experiments in the IGB LakeLab, a unique experimental platform worldwide (www.lake-lab.de), where we assess the responses of lake ecosystems to environmental conditions expected in the face of climate change. Much of our efforts is devoted to micro-organisms and processes mediated by microbial activities. Apart from bacteria in both water and sediments, we investigate the dynamics of algae, zooplankton, fungi and viruses. Particular emphasis is given to interactions between organisms. In addition, we are increasingly involved in analyses of long-term data and develop numerical models to integrate results. Based on the new knowledge that we generate, concepts and methods are devised for a sustainable management of lake ecosystems.

Our Research Teams

Biodiversity and aquatic microbial ecology
(Hans-Peter Grossart)

Ecosystem processes
(Mark Gessner)

Microbial ecology of sediments
(Peter Casper)

Systematics and ecology of phytoplankton
(Lothar Krienitz, until autumn 2014)

Water management and zooplankton ecology
(Peter Kasprzak)

Ecological modelling
(Sabine Wollrab, since autumn 2014)

Contact:
Prof. Dr. Mark Gessner

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Selected Projects

LakeLab (2013-2016): An experimental platform for climate impact research in lakes (DFG; Mark Gessner).

TemBi (2011-2014): Climate driven changes in the biodiversity of microbiota (Leibniz Competition; Peter Casper, Hans-Peter Grossart).

Seven Lakes (2008-2014): Long-term development of trophic state and the sutainability of restoration measures in seven lakes of Mecklenburg-Vorpommern (Ministry of Agriculture, Environment and Consumer Protection of Mecklenburg-Vorpommern; Peter Kasprzak, Peter Casper).

Innovate (2012-2016): Interplay among multiple uses of water reservoirs via innovative coupling of substance cycles in aquatic and terrestrial ecosystems (BMBF Sustainable land management; Peter Casper).

Inka-BB (2009-2014): Sustainable management strategies for glacial lakes in Brandenburg under climate change – Innovation Network Climate Adaption Berlin/Brandenburg (BMBF; Peter Kasprzak).

Selected Publications

Bižić-Ionescu, M., Amann, R., Grossart, H.-P. (2014): Massive regime shifts and high activity of heterotrophic bacteria in an ice-covered lake. PLoS One, 9: e113611.

Dadheech, P. K., Selmeczy, G. B., Vasas, G., Padisák, J., Arp, W., Tapolczai, K., Casper, P., Krienitz, L. (2014): Presence of potential toxin-producing cyanobacteria in an oligo-mesotrophic lake in Baltic Lake District, Germany – an ecological, genetic and toxicological survey. Toxins, 6: 2912-2931.

Handa, I. T., Aerts, R., Berendse, F., Berg, M. P., Bruder, A., Butenschoen, O., Chauvet, E., Gessner, M. O., Jabiol, J., Makkonen, M., McKie, B. G., Malmqvist, B., Peeters, E. T. H. M., Scheu, S., Schmid, B., van Ruijven, J., Vos, V. C. A., Hättenschwiler, S. (2014): Consequences of biodiversity loss for litter decomposition across biomes. Nature, 509: 218-221.

Schaller, J., Hines, J., Brackhage, C., Bäucker, E., Gessner, M. O. (2014): Silica decouples fungal growth and litter decomposition without changing responses to climate warming and N enrichment. Ecology, 95: 3181-3189.

Tang, K. W., McGinnis, D. F., Frindte, K., Brüchert, V., Grossart, H.-P. (2014): Paradox reconsidered: Methane oversaturation in well-oxygenated lake waters. Limnology and Oceanography, 59: 275-284.

Photo: David Ausserhofer

Selected Projects

B-types (2013-2016): Ecological consequences of fish behavioural types (Leibniz Competition; Max Wolf, Robert Arlinghaus, Jens Krause, Thomas Mehner, Georg Staaks).

INAPRO (2014-2017): Innovative model and demonstration based water management for resource efficiency in integrated multitrophic agriculture and aquaculture systems (EU FP7 CP GA: 619137; Coordination: Werner Kloas (Dept. 5), Daniela Baganz (Dept. 4)).

Besatzfisch (2009-2014): Protection of aquatic biodiversity based upon the example of fish stocking (Robert Arlinghaus).

SalmoInvade (2014-2016): Causes and consequences of invasions of aquatic ecosystems by non-native salmonids (DFG; Robert Arlinghaus).

REFORM (2011-2015): REstoring rivers FOR effective catchment Management (FP 7, EU grant 282656; Christian Wolter).

Selected Publications

Kurvers, R. H. J. M., Krause, J., Croft, D. P., Wilson, A. D. M., Wolf, M. (2014): Ecological and evolutionary consequences of social networks – emerging topics. Trends in Ecology and Evolution, 29: 326-335.

Scharnweber, K., Syväranta, J., Hilt, S., Brauns, M., Vanni, M., Brothers, S., Köhler, J., Knežević-Jarić, J., Mehner, T. (2014): Whole-lake experiments reveal the fate of terrestrial particulate organic carbon in benthic food webs of shallow lakes. Ecology, 95: 1496-1505.

Radinger, J., Wolter, C. (2014): Patterns and predictors of fish dispersal in rivers. Fish and Fisheries, 15: 456-473.

Hühn, D., Lübke, K., Skov, C., Arlinghaus, R. (2014): Natural recruitment, density-dependent juvenile survival, and the potential for additive effects of stock enhancement: an experimental evaluation of stocking northern pike *(Esox lucius)* fry. Canadian Journal of Fisheries and Aquatic Sciences, 71: 1508-1519.

Wilson, A. D. M., Croft, D. P., Krause, J. (2014): Social networks in Elasmobranchs and Teleost fishes. Fish and Fisheries, 15: 676-689.

Department 4 – Biology and Ecology of Fishes

In our department, we aim to understand the ecological and evolutionary processes that structure freshwater fish communities and affect their functions; and we use this knowledge to improve management and conservation of wild fish populations. Freshwater fishes do not only serve as ideal model systems for fundamental research in ecology and evolution, but also provide important ecosystem services (such as fishery yields and bio-indicators for the ecosystem status). In this context we focus on the interactions between natural and anthropogenic ecological factors and their effects on the dynamics of fish populations. Our methodological approaches include hypothesis-driven laboratory research, mesocosmos experimentation, lake manipulation, comparative field studies, and theoretical modelling.

Our Research Teams

Recreational fisheries, fish ecology, fish behaviour
(Robert Arlinghaus)

Reintroduction of the European and Baltic sturgeons to Germany
(Jörn Geßner)

Collective behaviour and social networks
(Jens Krause)

Evolutionary ecology of fish, fish communities and trophic interactions in lakes; linkage of aquatic and terrestrial ecosystems
(Thomas Mehner)

Integrated measurement and analysis of behavioural und physiological parameters of fish
(Georg Staaks)

Causes and consequences of behavioural types, collective intelligence
(Max Wolf)

Structure and dynamics of fish assemblages in large rivers and water-ways, river revitalization
(Christian Wolter)

Photo: Andy Küchenmeister

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Department 5 – Ecophysiology and Aquaculture

Scientists in the Ecophysiology and Aquaculture Department investigate the ecophysiological impacts of multiple environmental factors of natural and anthropogenic origin on aquatic vertebrates, e.g. fishes and amphibians. Our goal is to create the foundation for a sustainable aquaculture. Aquatic vertebrates are exposed to biotic and abiotic factors both in waters polluted by human activity and aquacultures. We want to elucidate how such factors stress or influence the various physiological functions of individual vertebrates. We investigate these effects on organisms on all levels, ranging from genetics and gene expression, to biochemical and physiological parameters of cell and organ cultures, up to histopathology and behaviour. In this way, we can determine the effects that various environmental factors have upon reproduction, stress, development, growth, and the behaviour of aquatic vertebrates.

Our Research Teams

Environmental effects of endocrine disruptors
(Ilka Lutz/Werner Kloas)

Ecotoxicology in fish – disinfection in aquaculture
(Thomas Meinelt)

Parasitology and the immune system of fish
(Klaus Knopf)

Genetics and phylogeography of fish
(Klaus Kohlmann)

Fish reproduction and nutrition
(Sven Würtz)

Sturgeon reintroduction
(Jörn Geßner)

Aquaponics
(Werner Kloas/Sven Würtz)

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Selected Projects

INAPRO (2014-2017): Innovative model and demonstration based water management for resource efficiency in integrated multitrophic aquaculture and horti-culture systems (EU; Werner Kloas/Georg Staaks/Daniela Baganz).

IMPRESS – Marie Sklodowska-Curie Actions (H2020-MSCA-ITN) (2014-2017): Improved production strategies for endangered freshwater species (EU-COST; Sven Würtz, Robert Arlinghaus).

EU-COST (2014-2017): Aquaponics HUB: Realising sustainable integrated fish and vegetable production for the EU (EU; Sven Würtz).

DFG Heisenberg Fellowship (2012-2015): Evolution of sex chromosomes (DFG; Matthias Stöck).

IMPact-Vector Graduate School (2014-2017): Two subprojects: Impact of coevolution on susceptibility and resistance to the swimbladder nematode *Anguillicola crassus* in eels (Leibniz Competition; Klaus Knopf, Michael T. Monaghan); Impact of parasites on top-down control of periphyton in lakes (Leibniz Competition; Klaus Knopf, Sabine Hilt).

Selected Publications

Dibo, L., Steinberg, C. E.W., Straus, D. L., Pedersen, L.-F., Meinelt, T. (2014): Salinity, water hardness, and dissolved organic carbon affect peracetic acid (PAA) degradation in aqueous solutions. Aquacultural Engineering, 60: 35-40.

Kroupova, H., Trubiroha, A., Lorenz, C., Contardo-Jara, V., Lutz, I., Grabic, R., Kocour, M., Kloas, W. (2014): The progestin levonorgestrel disrupts gonadotropin expression and sex steroid levels in pubertal roach *(Rutilus rutilus)*. Aquatic Toxicology, 154: 154-162.

Dufresnes, C., Bonato, L., Novarini, N., Betto-Colliard, C., Perrin, N., Stöck, M. (2014): Inferring the degree of incipient speciation in secondary contact zones of closely related lineages of Palearctic green toads (Bufo viridis subgroup). Heredity, 113: 9-20.

Geßner, J., Jaric, I. (2014): A life-stage population model of the European sturgeon (*Acipenser sturio L.*, 1758) in the Elbe River – Part II. Assessment of the historic population decline. Journal of Applied Ichthyology, 30(2): 267-271.

Van der Kraak, G., Hosmer, A., Hanson, M., Kloas, W., Solomon, K. (2014): Effects of atrazine in fish, amphibians, and reptiles: An analysis based on quantitative weight of evidence. Critical Reviews in Toxicology, 44(Suppl.5): 1-66, Suppl.: 5.

Photo: Andy Küchenmeister

Department 6 – Analytical Chemistry and Biogeochemistry

Our research concerns fundamental and applied research questions regarding the biogeochemical transformation of substances in aquatic boundary zones (freshwater and wetlands) and of the carbon flux between terrestrial and aquatic ecosystems; this includes the greenhouse gas emission from inland waters. Another important task is the development and introduction of ***in situ*** techniques for measuring matter flow in high temporal and/or spatial resolution. Our research results are the basis for recommendations on lake restoration and wetlands revitalization as well as for the reduction of the non-point nutrient pollution of freshwater.

The staff members of the department provide the service for important parts of the chemical analytics, including the implementation of measuring programmes for long-term research at IGB (lakes, rivers, wetlands). These activities also include scientific advice for PhD or other students in their planning of experiments and the support of their analytical research in lab and field experiments. With the help of the available equipment in our lab (e.g. AAS, ICP-OES, HPLC, HPLC-MS, GC-MS, LC-OCD-OND, IR, fluorescence spectrometer, and laser spectrometer) it is possible to determine the concentrations of nutrients, metals, different carbon compounds as well as stable isotopes in freshwater, biota, sediments or organic soils.

Selected Projects

Aqualink (2012-2016): Aquatic boundaries and linkages in a changing environment, International Leibniz Graduate School (Leibniz Competition; Gunnar Nützmann, Michael Hupfer).

Landscale (2012-2015): Interconnection of carbon cycles between terrestrial and aquatic ecosystems (Leibniz Competition; Katrin Premke (IGB/ZALF), Arthur Gessler (ZALF)).

RedoxPhos (2011-2016): How do physical and biogeochemical conditions in pelagic boundaries control vertical transport and generation of phosphorus species? (DFG; application together with Koblenz-Landau University and UFZ Magdeburg; Michael Hupfer, Andreas Kleeberg).

Respiration processes in fen (2014-2017): (DFG; together with the University of Münster University; Dominik Zak (IGB), Klaus H. Knorr (University of Münster)).

TOC-Aqua (2013-2016): Transformation of organic carbon in the terrestrial-aquatic interface (DFG; Michael Mutz (BTU), Katrin Premke (IGB)).

Selected Publications

Attermeyer, K., Hornick, T., Kayler, Z. E., Bahr, A., Zwirnmann, E., Grossart, H.-P., Premke, K. (2014): Enhanced bacterial decomposition with increasing addition of autochthonous to allochthonous carbon without any effect on bacterial community composition. Biogeosciences, 11(6): 1479-1489.

Cabezas, A., Pallasch, M., Schoenfelder, I., Gelbrecht, J., Zak, D. (2014): Carbon, nitrogen, and phosphorus accumulation in novel ecosystems – shallow lakes in degraded fen areas. Ecological Engineering, 66: 63-71.

Kleeberg, A., Herzog, C. (2014): Sediment microstructure and resuspension behavior depend on each other. Biogeochemistry, 119: 199-213.

Rothe, M., Frederichs, T., Eder, M., Kleeberg, A., Hupfer, M. (2014): Evidence for vivianite formation and its contribution to long-term phosphorus retention in a recent lake sediment: a novel analytical approach. Biogeosciences, 11(18): 5169-5180.

Zak, D., Gelbrecht, J. (2014): Die Bedeutung der Moore für den Schutz der Gewässer – Stoffretentions- und Stofffreisetzungsprozesse in Mooren des Nordostdeutschen Tieflandes. In: Luthardt, V. u.a. (Hrsg.): Moore in Brandenburg und Berlin. Natur und Text, Rangsdorf: Kap. 7.4.1, 218-224.

Photo: Andy Küchenmeister

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interdisciplinary.

Selected Projects

MycoLink (2014-2017): Linking aquatic fungal diversity to ecosystem function (Leibniz Competition; Michael T. Monaghan, Hans-Peter Grossart, Katrin Premke).

AquaMeth (2013-2015): Examination of the methane paradox in lakes (Hans-Peter Grossart).

FFII (2013-2016): Forecasting Future Invasions and their Impacts (BiodivERsA; Jonathan Jeschke)

MikrOMIK (2014-2017): The role of microplastics as carriers of microbial populations in Baltic Sea ecosystems (Leibniz Competition; PI: Matthias Labrenz (IOW), Co-PI Hans-Peter Grossart (IGB)).

Whole genome sequencing of aquatic fungi responsible for the degradation of recalcitrant substrates (2014-2015): US Dept Energy-Joint Genome Institute, Community Sequencing Programme (PI: Christian Wurzbacher, Michael T. Monaghan).

Selected Publications

Bižić-Ionescu, M., Zeder, M., Ionescu, D., Orlić, S., Fuchs, B.M., Grossart, H.-P., Amann, R. (2014): Comparison of bacterial communities on limnic versus coastal marine particles reveals profound differences in colonization. Envion. Microbiol., DOI: 10.1111/1462-2920.12466.

Dadheech; P. K., Selmeczy, G. B., Vasas, G., Padisák, J., Arp, W., Tapolczai, K., Casper, P., Krienitz, L. (2014): Presence of Potential Toxin-Producing Cyanobacteria in an Oligo-Mesotrophic Lake in Baltic Lake District, Germany – An Ecological, Genetic and Toxicological Survey. Toxins, 6: 2912-2931.

Dijkstra, K.-D. B., Monaghan, M. T., Pauls, S. U. (2014): Freshwater biodiversity and aquatic insect diversification. Annual Review of Entomology, 59: 143-163.

Toussaint, E. F. A., Hall, R., Monaghan, M. T., Sagata, K., Ibalim, S., Shaverdo, H. V., Vogler, A. P., Pons, J., Balke, M. (2014): The towering orogeny of New Guinea as a trigger of arthropod megadiversity. Nature Communications, 5: 4001.

Wurzbacher, C., Rösel, S., Rychla, A., Grossart, H.-P. (2014): Importance of Saprotrophic Freshwater Fungi for Pollen Degradation. PLoS One, 9(4): e94643.

Yin, M., Giessler, S., Griebel, J., Wolinska, J. (2014): Hybridizing Daphnia communities from ten neighbouring lakes: spatio-temporal dynamics, local processes, gene flow and invasiveness. BMC Evolutionary Biology, 14: 80.

Research Domain 1 – Aquatic Biodiversity

This research domain provides an IGB platform for the development of new top-level concepts covering the broad field of 'Aquatic Biodiversity' and a systematic approach to biodiversity research. Biodiversity research at IGB spans both fundamental and applied science. The primary research objectives are: 1) Biodiversity research (genetic and species diversity) on various spatial and temporal scales, 2) investigation of environmental factors which determine the structure and ecological functions of aquatic communities, 3) improvement of our insights into the structure and ecological functions of aquatic communities (biocoenosis) and 4) development of methods and analyses in biodiversity research with emphasis on molecular technologies. Recently, we had the pleasure of welcoming many new IGB scientists working on this fascinating research topic. Based on this expansion, we organised our research domain into the following key points: 'Functional Biodiversity', 'Genomics and Evolution' and 'Stress and Resilience of Ecosystems'.

Our Research Topics

Understanding the biogeographic patterns of structural and functional biodiversity

The influence of anthropogenic stressors (e.g., global warming, invasive species, economic land use, etc.) on the biodiversity and related evolutionary and ecological consequences (including ecosystem functions)

Evaluation of environmental factors influencing the evolution of genes, species, populations, and entire biological communities

Development of new concepts for obtaining biodiversity records and for the management of aquatic systems, especially ecosystems influenced by humans

It is our goal to improve the networking opportunities for biodiversity researchers inside and outside IGB. Therefore, we will invite scientists to the international workshop 'The Next Generation of Biodiversity Research: Theory, Traits and Methods', which will take place from 7 to 9 October, 2015. Participants in this workshop will discuss current progress in methodology and concepts of biodiversity research, but also open questions and challenges. Jointly, we will search for new paths in aquatic biodiversity research. Together with leading international researchers we aim to publish the workshop results in the form of two opinion papers.

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Photo: David Ausserhofer

Research Domain 2 – Aquatic Boundaries and Linkages

In the 'Aquatic Boundaries and Linkages' research domain, scientists from four departments explore the mechanisms controlling the state of aquatic ecosystems and their role in the matter fluxes in the landscape. The research on boundary zones as highly reactive compartments is focused on wetlands and ponds, the transition zone between ground and surface water, the littoral of lakes, and the sediment-water interface.

In the research domain, we work on topics and projects concerning nutrient and carbon cycles, which require the collaboration of various scientific disciplines, such as hydrology, lake physics, geochemistry, and biology. Process studies with novel experimental methods under lab and field conditions are staged in order to allow model-based transfer to the ecosystem level and for simulations. Basic scientific research data are absolutely necessary to solve acute problems with water resources, to predict the long-term behaviour of aquatic ecosystems, and to develop sustainable management concepts.

The interdisciplinary training of PhD students is an important aspect of this research domain. The initiation and administration of post-graduate schools is therefore part of the programme. Such training initiatives are the International Graduate School AQUALINK, the coordination of the EU's Marie Curie Initial Training Network HypoTRAIN, and the already granted DFG Research Training group 'Urban Water Interfaces'. We took the latter initiative together with the 'Technische Universität Berlin'. The post-graduate schools strengthen collaborations with European and regional partner institutes and lead to sustainable network formations. Young scientists profit from these developments.

Our Research Topics

The importance of ground water and the hyporheic zone for the nutrient loads of surface waters

The role of inland waters for carbon cycle in the landscape

The importance of the physical structure and the climate change for the lake internal matter cycle

Biotic and abiotic interactions in littoral

The function of wetlands for water and nutrient balance in the landscape Investigating and managing urban water systems

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Selected Projects

AQUALINK (2012-2016): Aquatic boundaries and linkages in a changing environment, International Leibniz Graduate School (Leibniz Competition; Gunnar Nützmann, Michael Hupfer).

Landscale (2012-2015): Interconnection of carbon cycles between terrestrial and aquatic ecosystems (Leibniz Competition; Katrin Premke (IGB), Arthur Gessler (ZALF)).

Nitrolimit (2010-2016): Nitrogen limitation in freshwaters: Is nitrogen reduction ecologically meaningful and economically feasible? (BMBF; PI at IGB: Jan Köhler).

HypoTRAIN (2015-2018): A training network for enhancing the understanding of complex physical, chemical and biological process interactions in hyporheic zones (EU Marie Curie Initial Training Network; Jörg Lewandowski).

Interfaces (2013-2017): Ecohydrological interfaces as critical hotspots for transformations of ecosystem exchange fluxes and biogeochemical cycling (EU Marie Curie Initial Training Network; PI at IGB: Jörg Lewandowski, Gunnar Nützmann).

Selected Publications

Gessner, M. O., Hinkelmann, R., Nützmann, G., Jekel, M., Singer, G. , Lewandowski, J., Nehls, T., Barjenbruch, M. (2014): Urban water interfaces. Journal of Hydrology, 514: 226-232.

Brothers, S., Köhler, J., Attermeyer, K., Grossart, H.-P., Mehner, T., Meyer, N., Scharnweber, K., Hilt, S. (2014): A feedback loop links brownification and anoxia in a temperate, shallow lake. Limnology and Oceanography, 59(4): 1388-1398.

Bernhardt, J., Kirillin, G., Hupfer, M. (2014): Periodic convection within littoral lake sediments on the background of seiche-driven oxygen fluctuations. Limnology and Oceanography – Fluids and Environment, 4: 17-33.

Zak, D., Gelbrecht, J., Zerbe, S., Shatwell, T., Barth, M., Cabezas, A., Steffenhagen, P. (2014): How helophytes influence the phosphorus cycle in degraded inundated peat soils – implications for fen restoration. Ecological Engineering, 66: 82-90.

Rychla, A. ,Gonsiorczyk, T., Hupfer, M., Kasprzak, P. (2014): Impact of epilimnetic phosphorus supply and food web structure on phosphorus binding forms in settling material and sediments in a thermally stratified lake. Limnologica, 46: 116-123.

Photo: David Ausserhofer

Selected Projects

SalmoInvade (2014-2016): Causes and consequences of invasions of aquatic ecosystems by non-native salmonids (DFG, Biodiversa; Robert Arlinghaus).

The Protection of the Night/'Schutz der Nacht' (2014-2017): Effects of artificial lighting on biodiversity, definition of indicators and derivation of recommendations (BMUB/BfN; Franz Hölker).

MARS (2014-2018): Managing Aquatic ecosystems and water Resources under multiple Stress (EU FP7; Markus Venohr).

Selected Publications

Arlinghaus, R., Beardmore, B., Riepe, C., Meyerhoff, J., Pagel, T. (2014): Species-specific preferences of German recreational anglers for freshwater fishing experiences, with emphasis on the intrinsic utilities of fish stocking and wild fishes. Journal of Fish Biology, 85: 1843-1867.

Eschbach, E., Nolte, A.W., Kohlmann, K., Kersten, P., Kail, J., Arlinghaus, R. (2014): Population differentiation of zander *(Sander lucioperca)* across native and newly colonized ranges suggests increasing admixture in the course of an invasion. Evolutionary Applications, 7: 555-568.

Gessner, J., Zahn, S., Jaric, I., Wolter, C. (2014): Estimating the potential for habitat restoration and connectivity effects on European sturgeon *(Acipenser sturio* L. 1758) population rehabilitation in a lowland river – the Havel, Germany. Journal of Applied Ichthyology, 30: 1473-1482.

Kyba, C. C. M., Hänel, A., Hölker. F. (2014): Redefining efficiency for outdoor lighting. Energy and Environmental Science, 7: 1806-1809.

Radinger, J., Wolter, C. (2014): Patterns and predictors of fish dispersal in rivers. Fish and Fisheries, 15: 456-473.

Research Domain 3 – Human-Aquatic Ecosystem Interactions

Waters meet basic socio-economic needs such as drinking water supply, flood protection, irrigation, inland navigation, fisheries, and recreational use. Due to the multiple socio-economic uses provided, the accompanied anthropogenic alteration of waters is widely accepted as irreversible. However, human uses often affect ecosystem functions whose importance is insufficiently known or economically underestimated. Therefore, research domain 3 investigates the (socio)-economic consequences of different human uses. Natural and social sciences studies of the complex interactions between humans and their environment provide the scientific foundations for the sustainable management of rivers and lakes. In cultured landscapes, humans and waters form interconnected socio-ecological systems with humans as keystone species. Research domain 3 studies the various direct and indirect feedback mechanisms between humans and waters to derive management recommendations and to exploit their implementation as scientific experiments.

Our Research Topics

Potential impacts of angling and fish stocking on water systems and fish assemblages

Fish communities of large rivers

Improving the ecological status of waters and rehabilitation potential

Re-establishment of sturgeons in Germany

Impact of light pollution on aquatic communities

Impacts of multiple stressors

Photo: Andy Küchenmeister

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interconnected.

Research on Humans and Animals in Real Time

In 2014, scientists of the Princeton University (USA), the Humboldt-Universität zu Berlin and IGB started a new collaboration. The partnership between selected research teams from both universities and IGB was established with the objective to build a virtual centre for the real time analysis of human-animal systems.

Field studies elucidating the origins of animal and human behaviour in response to ecological and social conditions have to overcome high technical hurdles if the research is to approach the living reality. To meet these challenges the Princeton University, the Humboldt-Universität zu Berlin and IGB initiated an international collaboration in 2014. Using new real-time methods the participating scientists want to find out how animals, particularly fish, move in nature and how they react to human influences. The scientists will also investigate how human collaboration works in the search for fish. The results of the research should answer a range of ecological questions and foster ideas on the sustainable management of fish and other animal populations.

Experts from different scientific disciplines will collaborate with each other in the new science centre. Behaviourists, computer scientists, physicists, fishery experts, and theoretical ecologists will jointly develop synergies between the empirical and theoretical science of the real-time behaviour of free-roaming animals. IGB contributes with Professor Robert Arlinghaus and Professor Jens Krause and some of their team members to the centre. Arlinghaus serves as the speaker.

Renowned Guests and Active Exchange

The first meeting took place from December 5 to 8, 2014 at IGB, in the head quarter of the Leibniz Association, and at the Humboldt-Universität in Berlin in the Integrative Research Institute for the Transformation of Human-Environment Systems (IRI THESys). 40 professors, PhDs and postdocs from eight science teams made good use of the opportunity to exchange methodologies in obtaining and evaluating real-time position data of animals and humans. The participating scientists met again on March 20 and 21, 2015 at IGB. Among the guests were renowned professors Simon Levin and Daniel Rubenstein of Princeton University.

The planned life of the science centre extends from September 1, 2014 to August 31, 2015. In this period, the participating teams will work on a total of five projects. IGB will bring real-time position data to the project, which were gathered by IGB scientists using the 3-D telemetry facility at Lake 'Kleiner Döllnsee'. The scientists were able to sound dozens of different fish species simultaneously.

Prof. Dr. Robert Arlinghaus | arlinghaus@igb-berlin.de

Multidisciplinary Doctoral Programme 'Science for the Management of Rivers and their Tidal Systems' (SMART)

As an associated institute IGB is actively participating in the Erasmus Mundus programme SMART. The programme started in 2011 and, so far, more than 30 doctoral candidates from all corners of the world participated for their training in the management of rivers. The SMART programme joins topics in the fields of hydrology, geomorphology, biogeochemistry, ecology, and biology. Currently, eight doctoral candidates work at IGB on the influence of hydroelectric power plants on river ecosystems, on the dynamic of the carbon cycle in rivers, and on the influence of artificial light on aquatic food webs.

Programme partners are the University of Trento (Italy), the Queen Mary University of London (UK), and the Freie Universität Berlin. Every doctoral candidate is registered at one institution and visits one of the other partners and one associated institution to conduct joint research. The 2015 annual meeting, in which doctoral candidates and their thesis supervisors discuss current projects and organisational aspects, will take place in Berlin.

Dr. Ina Severin | severin@igb-berlin.de

European Sturgeon Research Network

Sturgeons are among the most threatened fish species worldwide. To ensure that one day these living fossils will return to our rivers in large numbers, scientists have joined forces in a Europe-wide network. Seven partner institutions collaborate on research related to the conservation and development of stable sturgeon stocks and therefore pool their resources. The network has been initiated by the World Sturgeon Conservation Society (WSCS) and IGB, a pioneer of the sturgeon reintroduction programme for almost 20 years.

Sturgeons migrate between worlds: They spawn in freshwater and spend the major part of their lives – which can last more than hundred years – in the sea. Spawning and nursing requirements bring them back to swiftly running rivers with gravel sediments. After reproduction, the adults return from the rivers to marine waters almost immediately. This migratory pattern repeats itself in cycles of 2–5 years. But the journey of the sturgeons has become increasingly challenging: The largest river fish of the northern latitudes is stopped by barrages and waterway constructions preventing the fish from reaching their spawning habitats. In addition, pollution adversely affects the development of their offspring in many rivers. This and unsustainable harvest practices lead toward the extinction of these giants on the European continent.

Transnational Collaboration to Prevent the Extinction of the Sturgeons

Rivers, coasts and sturgeons do not stop at national borders. The mobility of these animals makes a cross-border approach essential for effectively restoring the sturgeons. And this approach can only be successful if we closely coordinate our efforts, said Dr. Jörn Geßner, project coordinator at IGB. In order to better integrate and harmonise research and measures taken in different countries, scientists have established the European Sturgeon Research Network (ESRN). Their objective is to pave the way for further co-operations, to stimulate joint research, to better utilize existing knowledge, and to support regional networks.

As a start, a Memorandum of Understanding was signed by WSCS, IGB and the University of South Bohemia České Budějovice. Meanwhile, the Danube Delta National Institute in Tulcea (Romania), the BOKU Institute of Hydrobiology and Aquatic Ecosystem Management in Vienna (Austria), the universities in Belgrade (Serbia) and Padua (Italy) and the French National Research Institute of Science and Technology for Environment and Agriculture (Irstea) joined the network.

Dr. Jörn Geßner | sturgeon@igb-berlin.de

Professor Harald Rosenthal (World Sturgeon Conservation Society), Professor Klement Tockner (IGB) and Professor Otomar Linhart (University of South Bohemia in České Budějovice) signing the Memorandum of Understanding.

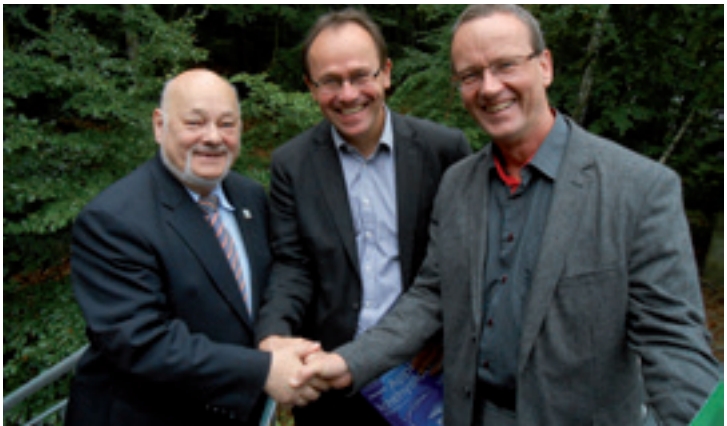


Photo: IGB/Angelina Tittmann

Fostering Cooperation

Scientists and conservationists met on October 24 and 25, 2014 at Lake Stechlin to discuss how to enhance collaboration in the future. Mark Gessner, Head of IGB's Experimental Limnology Department at Lake Stechlin, and Mario Schrumpf, Director of the Natural Park Stechlin-Ruppiner Land, signed a cooperation agreement on the sidelines of the 'Dialogue at Lake Stechlin'. Part of the agreement is the intention to provide support for ecological projects of the other party, jointly advice local authorities and agencies, and enhance the mutual exchange of information. Joint events such as the annual Nature Conservation Day organised by the Natural Park and the next 'Dialogue' have already been planned as collaborative projects.

Prof. Dr. Mark Gessner | gessner@igb-berlin.de

Concerted Engagements for Large Rivers

End of July 2014, after the Soccer World Championship, another big event took place in Brazil. We are talking about the 2nd Global Large Rivers Conference in Manaus under the auspices of the Universität für Bodenkultur Wien (Institute of Natural Resources and Life Sciences, Vienna). In Manaus, directly at the banks of the Rio Negro and just a stone's throw away from the fascinating River Amazon, scientists presented facts and data on the status, development, potential conflicts and renaturation of rivers in 400 presentations and posters. As part of this event the new UNESCO-IHP Initiative (International Hydrological Programme) – the Global Large Rivers Initiative – also took a few steps forward. The IGB participated in the inception of this new initiative. Water resources face increasing pressure due to pollution, climate change, and anthropogenic use. In response, the new initiative is meant to intensify and integrate research worldwide on the large rivers of our earth.

'Besatzfisch' Project on the Way

Fish stocking was the main topic of this year's symposium of the Fisheries Society of the British Isles (FSBI) at the University of Hull (UK). The Besatzfisch project co-organised the symposium. In addition, Robert Arlinghaus initiated a workshop at the National Socio-Environmental Synthesis Centre (SESYNC) in the United States of America. At the workshop, international scientists from various disciplines discussed the interactions between recreational anglers and their environment with reference to the importance of angler heterogeneity, management responses, and harvest regulations.

Chinese-German Workshop

Together with the Dalian University of Technology and the Taiyuan University of Technology IGB organised the Chinese-German workshop 'Ice-covered Aquatic Systems under Climate Change'. The workshop was funded by the Chinese-German Center for Research Promotion (CDZ) and took place from April 13 to 18, 2014 in Taiyuan, Shanxi, China. Participants from eleven universities and research institutions in China, Germany, Finland and the United States took part in the workshop. The workshop organiser IGB is now eligible to submit collaborative research proposals to the CDZ.

Dr. Georgiy Kirillin | kirillin@igb-berlin.de
Prof. Dr. Hans-Peter Grossart | hgrossart@igb-berlin.de

Shallow Lakes Conference 2014

At the 8th Shallow Lakes Conference from October 12 to 17, 2014 in Antalya (Turkey) six IGB scientists and two IGB doctoral candidates presented papers. The conference takes place every three years. In 2014, more than 300 participants discussed the topic 'Shallow Lakes in a fast Changing World'.
www.shallowlakes2014.org

Professor Wolfgang Cramer (IMBE, France), Emilie Egea and Laura Tydecks teamed up to organise the conference.

Biological Diversity Ensures Global Food Security

Food security faces significant challenges due to population growth, poverty and climate change. Supplying healthy food to all citizens is crucial for global development. To secure an adequate food supply the food production must increase and at the same time the equitable access to food must be improved substantially. On the 3rd Biodiversity Conference 'Biodiversity and Food Security – From Trade-offs to Synergies', which took place in October 2014 in Aix-en-Provence/France, scientists discussed the contribution of biological diversity to global food security.

"The diversity of genes, species and ecosystems is essential for agriculture, forestry and fishing", said IGB's director Professor Klement Tockner who helped to initiate the conference. "It is the key for a broad spectrum of crops and livestock. In addition, diversity provides the reservoir of genes for the breeding of agricultural variety – a natural insurance against crop reductions caused by plant diseases and weather extremes."

Intensive land use also endangers the biological diversity. Therefore, scientists advocate rethinking the ways ecosystems are managed in order to maintain their health and preserve sufficient biodiversity for future generations.

At the conference in Aix-en-Provence 110 researchers and stakeholders from different disciplines met to develop new solutions and strategies. On the 3rd international conference on biodiversity and in context with the United Nation's Millennium Development Goals, scientists discussed the interdependencies between biodiversity and food security under ecological, economic and societal challenges. "The conference has shown us the importance of interdisciplinary and participatory research. Also essential are the integration of practical knowledge as well as the acknowledgement of shareholder needs", said Professor Klement Tockner.

The conference was organised by the German Leibniz Association under the leadership of the Leibniz Network on Biodiversity in cooperation with the French Centre Nationale de la Recherche Scientifique (CNRS) and local partners.

Conference website:
http://biodiv2014.sciencesconf.org

Full moon over Lake Starnberg.

Interdisciplinary Conferences to Protect the Night

In the interdisciplinary research project "Loss of the Night" scientists investigate the reasons for the increasing illumination of the night, its ecological, cultural and socioeconomic effects, and the effects on human health.

In 2014, two conferences about light pollution were organised in cooperation with the research network 'Loss of the Night', the international congress ALAN, and the conference 'Schutz der Nacht' (Protection of the Night).

International Conference ALAN (Artificial Light at Night)

In October 2013, 'Loss of the Night' was the first congress of the ALAN series in Berlin. 120 participants from 21 nations attended. The second ALAN event took place in Leicester, UK, with a similar number of participants. The event was organised by the De Montfort University, in cooperation with the 'Loss of the Night Network' (EU-COST) and the 'International Dark Sky Association'. Scientists from different disciplines – biology, ecology, social sciences, medicine, lighting technology as well as planning and architecture – presented their research results. The presentations included, amongst others, remote sensing data on the increasing illumination of nightscapes, on aquatic microbial sediment communities producing oxygen under ALAN conditions, and on mice showing signs of depression due to ALAN.

Conference on 'Schutz der Nacht' (Protection of the Night)

This conference was held for the second time in Tutzing (Germany) from November 7 to 9, 2014. It was organised by Martin Held (Protestant Academy of Tutzing), Franz Hölker (IGB), and by Beate Jessel (President of the Federal Agency for Nature Conservation). Speakers from nature parks, science, industry, and public offices met to develop suitable lighting perspectives and concepts which are ecologically, socially, and economically sustainable. After enjoying impressive sounds of nightly animal voices, taped by the Animal Sound Archive of the 'Museum für Naturkunde', Berlin, all participants enjoyed the moon over Lake Starnberg.

Take part in our world-wide citizen science project that measures star visibility and light pollution.

PD Dr. Franz Hölker | hoelker@igb-berlin.de
Dr. Sibylle Schroer | schroer@igb-berlin.de

Genomics Symposium – Berlin Center for Genomics in Biodiversity Research

The Berlin Center for Genomics in Biodiversity Research held its annual 'Genomics Symposium' on September 23, 2014 at the Botanical Museum in Berlin-Dahlem. There were 70 participants (students, postdocs, technicians, and scientists) representing seven institutes in Berlin and Potsdam. Opened by Prof. Dr. Thomas Borsch, Director of BGBM, the Symposium consisted of thirteen oral presentations, breakout discussion groups, and a 'speed-meeting' round during which all participants could discuss their work one-on-one. The yearly event highlights new research and applications and stimulates exchange among scientists involved in genomics research. IGB is a founding member of the six-institute consortium.
www.begendiv.de
Dr. Michael T. Monaghan | monaghan@igb-berlin.de

ISAREN

Every two years, scientists from North America, Asia, and Europe meet at the 'International Symposium on Amphibian and Reptilian Endocrinology and Neurobiology', ISAREN in short. In 2014, the ISAREN took place in Okazaki (Japan). Professor Werner Kloas presented the keynote lecture. Numerous presentations and posters revolved around the endocrinology and neurobiology of amphibians and reptiles. Most delightful was also the exceptional hospitality of the local Japanese scientists. In the summer of 2016, IGB will organise the ISAREN in Berlin. We are looking forward to welcoming the participants.
Prof. Dr. Werner Kloas | werner.kloas@igb-berlin.de
Dr. Frauke Hoffmann | f.hoffmann@igb-berlin.de

Photo: by Till Credner

committed.

Doctoral Thesis in an Inter- and Transdisciplinary Project – Nothing to sneeze at!

Daniel Hühn belongs to a group of doctoral candidates with not quite so common ambitions. He works on his thesis in the Besatzfisch project (fish stocking project), in which researchers in the natural and social sciences jointly generate results. In addition, non-scientific practitioners are actively involved in the inter- and transdisciplinary sustainability research.

Daniel Hühn, you travelled more than 30,000 km back and forth in Germany to perform field experiments but mainly to offer workshops for anglers. What are the advantages of working so closely with stakeholders?

It's exciting and interesting to collaborate with practitioners in the studies; it beats just showing them the final results. Moreover, local insights can be very helpful for field experiments. Anglers from local clubs know exactly where to find the fish in their rivers and lakes. Lastly, clearly communicating my research is a good training experience.

Are there also disadvantages to involving practitioners closely in research?

The entire process requires a lot of time and effort. The work you contribute does not always directly relate to your thesis. For this reason, the financing allows for some extra time. Still, that does not change the fact that it takes some stamina.

Daniel Hühn, doctoral candidate at IGB (on the right) doing field work.

Do you also recognise the same opportunities and challenges with regard to work in an interdisciplinary team?

I just love it when my biological results flow into a socio-economic model and may lead to improved fisheries management. Something like this only happens when colleagues from different disciplines work together. This also means that everybody is dependent on everybody else. Every now and then, decisions made by an individual may have implications for the entire group.

What is your overall conclusion?

This type of project can enable doctoral candidates to work at the interface between academic science and real-world practice. Of course, you have to keep an open mind and think broadly beyond the thesis. At any rate, I had a lot of fun!

Daniel Hühn | huehn@igb-berlin.de

The interviewer was Eva-Maria Cyrus.

Doctoral Community Goes International

The welcome trend of the growing internationalisation of doctoral candidates at IGB continued in 2014. Half of the 24 doctoral candidates newly hired in 2014 are from abroad. A total of 40 % of the 73 doctoral candidates registered at IGB are from foreign countries.

This multicultural background not only strongly enriched each of the ten interactive courses of the IGB doctoral programme, it also enriched the various social activities organised by the doctoral representatives this year: the well attended and exciting doctoral retreat as well as various evening gatherings enabled the doctoral candidates to socialise, network and exchange experiences.

In 2014, ten doctoral candidates obtained their degrees. In the same period, ten bachelor and 17 master students as well as four diploma students successfully finished their theses. In the latter group, the proportion of international students was considerably smaller than for the doctoral candidates (less than 10 %).

Dr. Kirsten Pohlmann | kpohlmann@igb-berlin.de

Student and Youth Development Programmes on a New Course

Without doubt, it has become a tradition. Every spring, Professor Jens Krause embarks on a discovery tour with students from the German town of Aurich. They went to Trinidad where they joined forces to observe the social networks of fish and investigated how the fish react to changing environments. The project is part of the 'Auricher Wissenschaftstage' (Aurich Science Days). Since 2015, this project is under the patronage of the German Federal Minister of Science, Professor Johanna Wanka. In October 2014, the minister took advantage of an opportunity to exchange notes with Professor Krause and the students about the project and their experiences. **www.auricher-wissenschaftstage.de**

Prof. Dr. Jens Krause | j.krause@igb-berlin.de

Photos: Besatzfisch/IGB; IGB

International Summer School AQUALINK

An international summer school about 'Lake Restoration and Lake Management' was organised by the Leibniz Graduate School AQUALINK and by the Danish Centre for Lake Restoration. From August 2 to 9, 2014, 13 graduate students have been participating in the course at the field station of the University of Southern Denmark near Søgård. Scientists from various Danish institutes and IGB gave lectures, guided practice sessions and organised a one-day excursion. The lectures were given by Henning Jensen, Kasper Reitzel, Frede Andersen, und Mogens Flindt of the University of Southern Denmark, Michael Hupfer, Sabine Hilt, and Gunnar Nützmann of IGB as well as Martin Søndergaard und Torben Lauridsen of the Aarhus University and Jacob Kidmose of the University of Copenhagen.

www.igb-berlin.de/aqualink.html

Prof. Dr. Gunnar Nützmann | nuetzmann@igb-berlin.de
Dr. Michael Hupfer | hupfer@igb-berlin.de

Summer School on Interfaces

The dramatic alterations of energy and water fluxes and interlinked biogeochemical cycles at ecohydrological interfaces significantly impact on the ecosystem responses to environmental change. From June 30 to July 4, 2014, the EU FP7 INTERFACES ITN Summer School provided training in interdisciplinary research methods for its PhDs and external participants for better monitoring, modelling, understanding, and predicting the processes controlling the dynamics of ecohydrological interface fluxes.
The event offered fascinating lectures, practical presentations, discussions, and networking opportunities for the 40 participants. The stimulating spirit of this exciting meeting promoted further intensive scientific collaboration within and beyond the ITN.

Dr. Jörg Lewandowski | lewe@igb-berlin.de

Research Training Group on 'Urban Water Interfaces'

The DFG (German Research Association) establishes the Research Training Group 'Urban Water Interfaces' (UWI) to strengthen the training of junior scientists. The Research Training Group will be jointly organised by the Technische Universität (TU) Berlin and IGB. In UWI, scientists will investigate urban water cycles and specifically their natural and technical transition zones. The Research Training Group will start in July 2015 and is financed for an initial period of 4.5 years. The total financing amounts to approximately EUR 4.8 million.

Water quality and quantity in urban water systems of metropolitan areas face numerous threats. Climate and demographic changes exacerbate the occurrence of extreme events (such as water scarcity or floods) and of new, slowly degradable substances in the urban water cycle. To ensure that the urban water systems will be functioning under future conditions their management based on solid system understanding is essential. Scientists in the new Research Training Group will therefore focus their research on processes occurring in the transitional zones of urban water systems. They will investigate natural transition zones between surface water and ground water, technical transition zones between waste water, gas sphere, and the waste water canal as well as natural/technical transition zones at river, canal or lake banks where filtration processes take place.

The curriculum of the Research Training Group is meant to advance the research on complex processes in transitional zones and the interdisciplinary training of PhD students in the required disciplines in close collaborations with natural scientists and engineers. A total of 13 doctoral candidates will be financially supported. Five of them work at IGB and another eight at the Technische Universität Berlin. Professor Reinhard Hinkelmann (TU Berlin), Professor Kleinschmit (TU Berlin), Sabine Hilt, PhD (IGB), and Professor Mark Gessner (TU Berlin and IGB) are members of the speaker team.

Dr. Sabine Hilt | hilt@igb-berlin.de
Prof. Dr. Gunnar Nützmann | nuetzmann@igb-berlin.de

outstanding.

New Research Professorship for Georgiy Kirillin

In March 2014, Dr. Georgiy Kirillin was appointed Affiliated Research Professor at the University of Montana, USA. The Research Professorship was established for the more than 100-year old ecological research and education centre, the Flathead Lake Biological Station. The main research mission is to advance the fundamental understanding of the physical mechanisms governing the unique freshwater ecological system of Flathead Lake, one of the largest and clearest lakes in the USA.

Klement Tockner Advises NIES in Japan

The National Institute for Environmental Studies (NIES) in Japan appointed Professor Klement Tockner as a member of the NIES Scientific Advisory Board. In 1974, NIES was established as Japan's single interdisciplinary institute for environmental research. NIES advises, amongst others, the Japanese Government and international organisations such as the United Nations. Klement Tockner was appointed as a member of the advisory board as leading biodiversity expert. The board consists of members from all over the world.

Jens Krause is a New Member of the BBAW

Professor Jens Krause was appointed full member of the biological-medical science division of the BBAW (Berlin-Brandenburg Academy of Sciences). On June 28, 2014, Professor Christoph Markschies, Vice President of the BBAW, awarded the certificate in a festive event. With this appointment the BBAW honours Jens Krause for his pioneering research on social networks and collective decision making processes. According to the BBAW, the work triggered new developments in behavioural biology and contributed insights into collective intelligence of animals and humans.

Photos: private

Emily Bernhardt: Award Winner and Guest at IGB

Emily Bernhardt (Duke University, USA) has been in residence at IGB since July 2014, supported in part by an IGB sabbatical fellowship. This year the Humboldt Foundation honoured her with a 2015 Friedrich Wilhelm Bessel Research Award. The focus of her research is on the biogeochemistry of water catchment areas. She puts the emphasis mainly on land use and investigates how this use influences the structure, function, and chemistry of adjacent rivers and wetlands.

Emily Bernhardt, the Friedrich Wilhelm Bessel Research Award is given for exceptional research. What makes your research so exceptional?

The Humboldt Foundation makes awards to people, not projects – so this award is quite different from the grants that support my research programme. Instead, the Friedrich Wilhelm Bessel Award is intended to encourage international academics to build long-term relationships and collaborations with German scholars during a long-term stay in Germany. So, I guess, the award committee recognized that the research I have been doing on how land-use change alters the structure and function of freshwater ecosystems represented an important body of work and that the perspectives I have gained from this work would make me a useful contact and collaborator for my host institution.

What are your plans at IGB?

The primary goals of my sabbatical are to meet new and interesting colleagues and to finalise a large number of nearly finished projects and bring them to publication. I have also been working on a set of perspective papers with each of my hosts. Mark Gessner and I have been working with our colleague Emma Rosi-Marshall to write an opinion article about the role of contaminants in structuring ecosystems. Klement Tockner and I have been having wide ranging conversations about the role of freshwater scientists in ongoing policy, regulatory and planning debates over the management of water resources. I am also taking advantage of this year to learn a bit more about lakes through my interactions with Mark Gessner, Jens Nejstgaard, and Stella Berger. As most of my work to date has been in streams, wetlands and small watersheds, it has been a lot of fun to learn the ways in which lake ecosystem nutrient cycles differ from those in flowing waters and wetlands.

Do you like to work at our institute?

I appreciate that working at IGB actually allows me to meet a truly international group of researchers. If there are IGB folks who are interested in collaborating, I encourage them to get in touch with me as I am eager to find more ways to connect intellectually to the width and depth of research expertise at IGB.

Prof. Emily Bernhardt | ebernhar@duke.edu

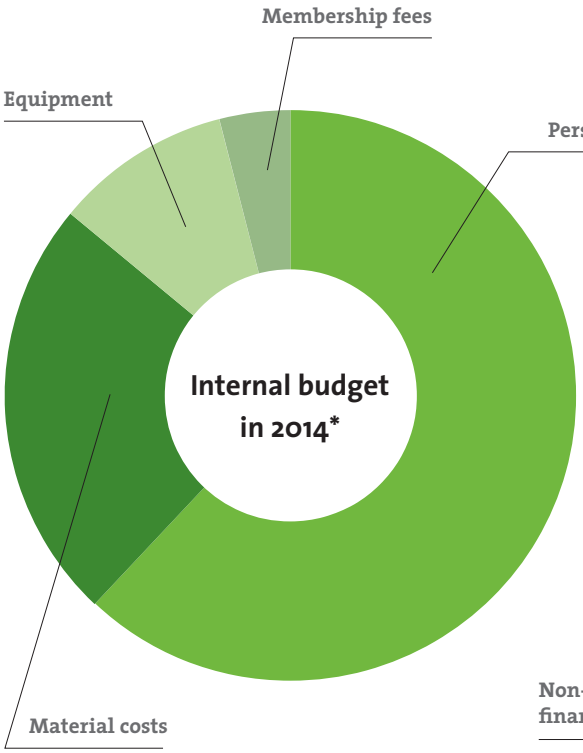
The interviewer was Eva-Maria Cyrus.

Emily Bernhardt completed her doctoral thesis at the Cornell University (USA) in 2001. In 2004, after working on research projects in Chile and Venezuela, biologist Emily Bernhardt decided to accept a position as associate professor for biogeochemistry at Duke University (USA).

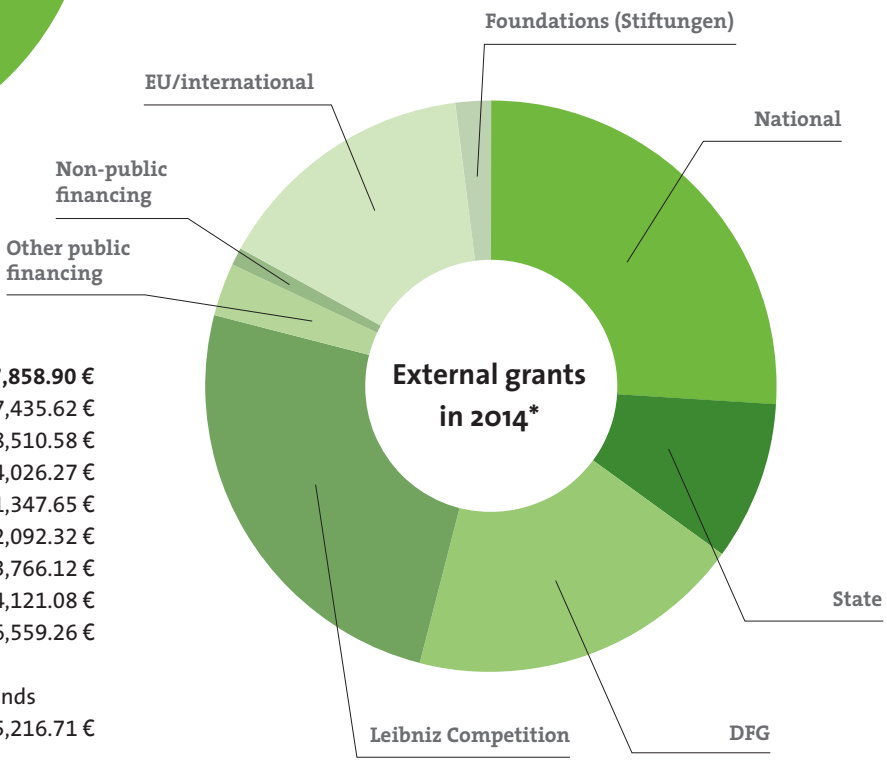
Annex

Finances

Status as of December 31, 2014



Total	**12,895,852.03 €**
Personnel	8,070,602.26 €
Material costs	3,238,570.61 €
Equipment	1,143,255.88 €
Membership fees	443,423.28 €



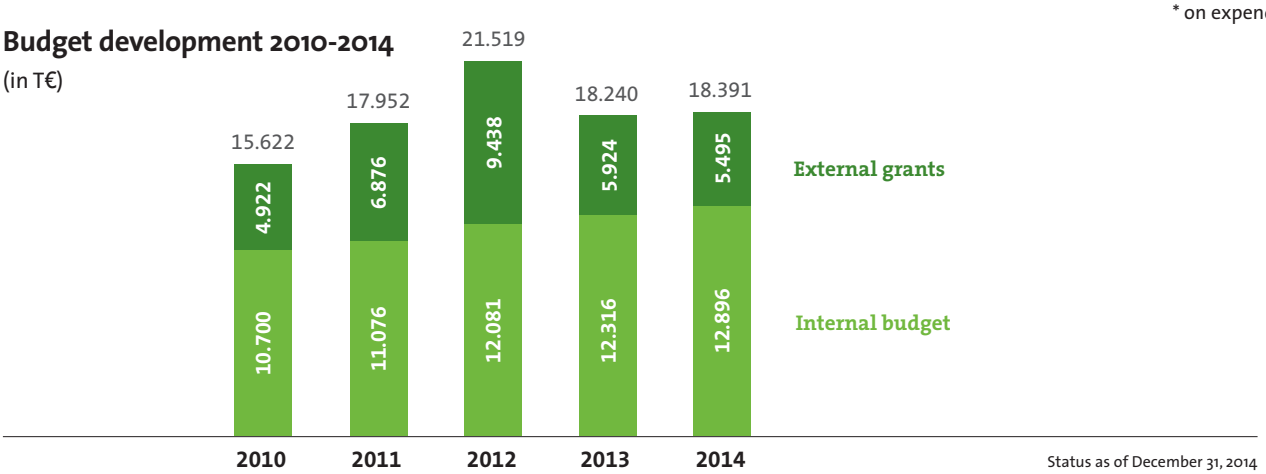
Total	**5,187,858.90 €**
National	1,377,435.62 €
State	448,510.58 €
DFG	954,026.27 €
Leibniz Competition	1,311,347.65 €
Other public financing	142,092.32 €
Non-public financing	33,766.12 €
EU/international	854,121.08 €
Foundations (Stiftungen)	66,559.26 €

External grants, including externally managed funds
5,495,216.71 €

* on expenditure basis

Budget development 2010-2014

(in T€)



Status as of December 31, 2014

Structure

Leibniz-Institute of Freshwater Ecology and Inland Fisheries

Forschungsverbund Berlin e.V.

Research Departments

Cross-cutting Research Domains

1 – Aquatic Biodiversity

Hans-Peter Grossart
NGL (3)

2 – Aquatic Boundaries and Linkages

Michael Hupfer
MD 301 (2)

3 – Human-Aquatic Ecosystem Interactions

Christian Wolter
MD 310 (1)

(1) MD 310: Müggelseedamm 310, Berlin (2) MD 301: Müggelseedamm 301, Berlin (3) NGL: Neuglobsow

Status as of March 31, 2015

IGB Scientific Advisory Board

We are extremely thankful to the members of the IGB Scientific Advisory Board, who have supported us with their advice and involvement.

Prof. Dr. Janet Hering
Head of the Scientific Advisory Board
Eawag, Switzerland

Prof. Dr. Gudrun Brockmann
Department of Animal Sciences, Humboldt-Universität zu Berlin, Germany

Prof. Dr. Wolfgang Cramer
Mediterranean Institute of marine and terrestrial Biodiversity and Ecology (IMBE), France

Prof. Dr. Peter Grathwohl
Hydrogeochemistry, Universität Tübingen, Germany

Prof. Dr. Joseph Holden
School of Geography, University of Leeds, UK

Prof. Dr. Patrick Hostert
Geography Department/Geomatics Lab, Humboldt-Universität zu Berlin, Germany

Prof. Dr. Otomar Linhart
Department of Fish Genetics and Breeding, Research Institute of Fish Culture and Hydrobiology Vodnany, Czech Republic

Prof. Dr. Margaret Palmer
National Socio-Environmental Synthesis Center (SESYNC), USA

Prof. Dr. Roland Psenner
Institute of Ecology, Universität Innsbruck, Austria

Prof. Dr. Rüdiger Schulz
Department of Biology, Endocrinology & Metabolism Section, Utrecht University, The Netherlands

Prof. Dr. Karen Wiltshire
Biol. Station Helgoland & Wadden Sea Station, Alfred-Wegener-Institute for Polar and Marine Research, Germany

IGB Employee Representatives

Worker's Council
Christof Engelhardt (Chair)
Marén Lentz (Vice-Chair)
Kerstin Schäricke
Georg Staaks
Thomas Hintze
Sascha Behrens
Viola Viehmann

Ombudsmen
Michael Hupfer
Franz Hölker (deputy)

Equal Opportunity Commissioners
Angela Krüger
Stefanie Burkert (deputy)

Doctoral Student Representatives
Fabian Schäfer
Pascal Bodmer
Jonas Keitel
Nina Ulrich

Status as of December 31, 2014

Employees

Employees 2014

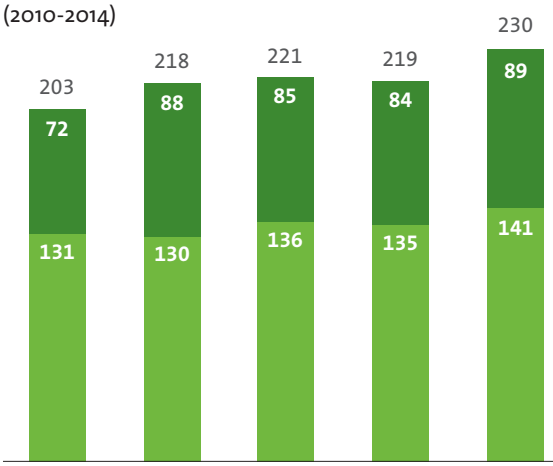
Total: 409

90 researchers
48 doctoral students
88 non-scientific staff
4 apprentices

6 fellows
50 assistants and temporary staff
123 others active at the institute (visiting scientists, foreign fellows, doctoral and other students, interns)

Employee development

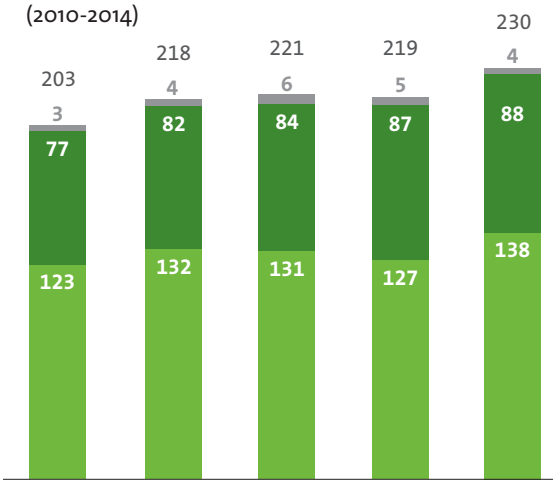
(2010-2014)

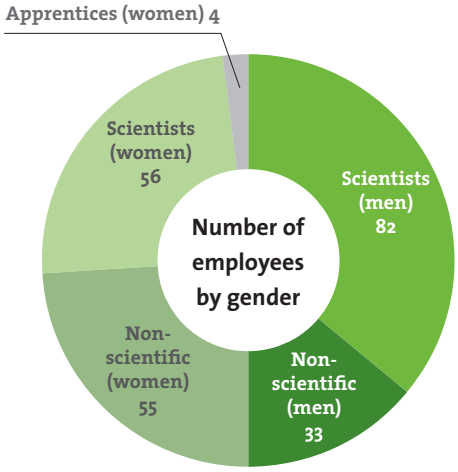


Status as of December 31, 2014

Assignment of employees

(2010-2014)

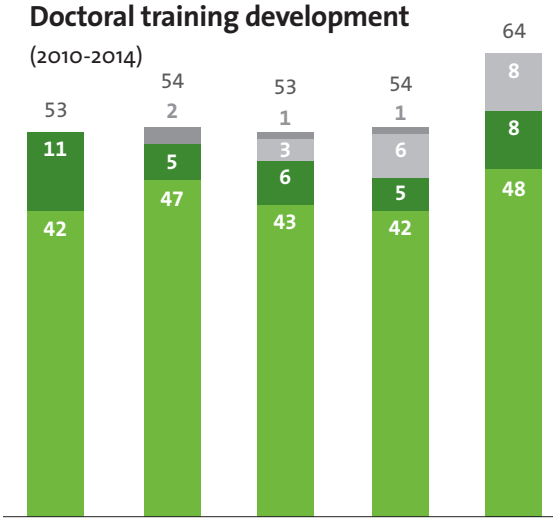


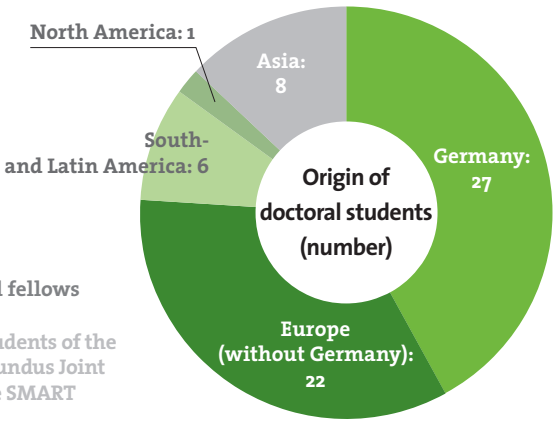


Status as of December 31, 2014

Doctoral training development

(2010-2014)



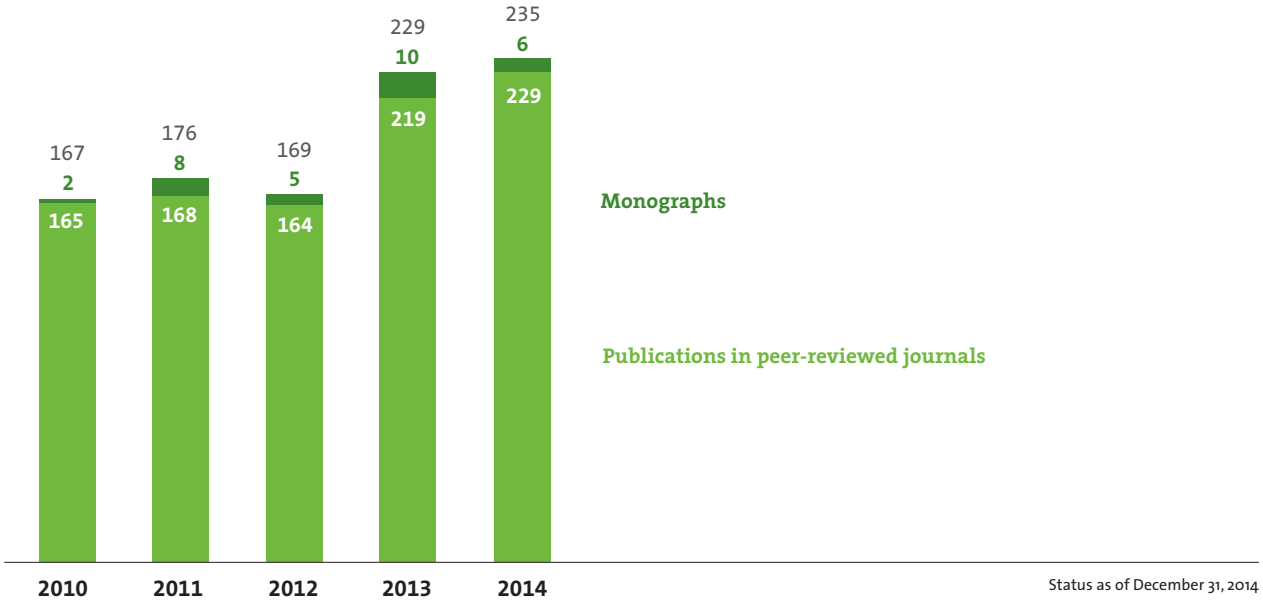


Status as of December 31, 2014

Activities

Publications development

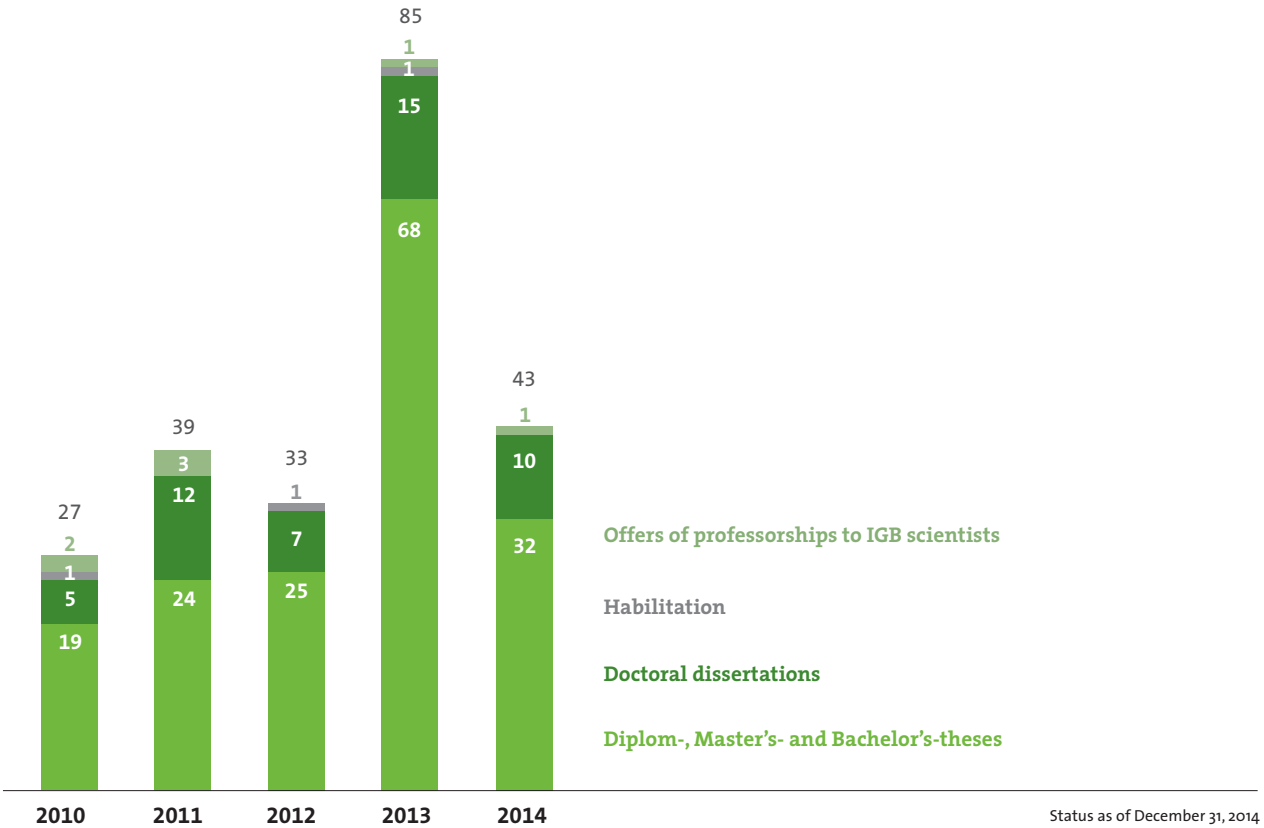
(2010-2014)



Status as of December 31, 2014

Professional development

(2010-2014)



Status as of December 31, 2014

Activities in Committees and Expert Associations 2014

Prof. Dr. Rita Adrian

Member of the Research Data Working Group (AK Research Data) of the Leibniz Association

Member of the Alliance Working Group 'Infrastructures in Terrestrial Research' (DFG)

Member of the DFG-Senate Commission on Water Research (KOWA)

Prof. Dr. Robert Arlinghaus

Member of the Working Group on 'Inland Fisheries & Aquaculture Research in Germany'

Dr. Jörn Geßner

Chair of the Project Group 'Baltic Marine Environment Protection Commission – Helsinki Commission (HELCOM)'

Board Member of the World Sturgeon Conservation Society (WSCS)

Board Member of the 'Gesellschaft zur Rettung des Störs e.V.' (Society to Save the Sturgeon)

Assessment Officer of the Sturgeon IUCN Species Survival Committee

Member of the 'ICES Working Group on the Science Requirements to Support Conservation, Restoration and Management of Diadromous Species (WGRECORDS)'

Prof. Dr. Mark Gessner

Expert Panel Member of the Katerva Prize

Member of the Alliance Working Group 'Infrastructures in Terrestrial Research' (DFG)

Member of the Scientific Advisory Board of the Mediterranean Institute of Marine and Terrestrial Biodiversity and Ecology (IMBE), France

Member of the International Committee of the Society of Freshwater Science (SFS), USA

Associated Member of the German Committee Sustainability Future Earth (DFG), Germany

Member of Faculty 1000 Prime, Ecology Section

Dr. Michael Hupfer

Member of the Advisory Board of the Master's Programme 'Boden, Gewässer, Altlasten' at Osnabrück University, Germany

Member of the Scientific Advisory Board of the 'Centre for Lake Restoration (CLEAR)' at the University of Southern Denmark, Denmark

Prof. Dr. Jonathan Jeschke

Member of the IUCN Commission on Ecosystem Management (CEM)

Member of the IUCN/SSC Invasive Species Specialist Group (ISSG)

Management Committee Member (Substitute) for Germany of the COST-Action 'European Information System for Alien Species'

Prof. Dr. Werner Kloas

Member of the OECD Expert Group 'Endocrine Disruptors Task Force for Amphibians (EDTA)'

Dr. Klaus Knopf

Treasurer and Board Member of the European Association of Fish Pathologists (EAFP)

Dr. Klaus Kohlmann

Vice-Chair of the Expert Committee on Aquatic Genetic Resources of the German Federal Agency for Agriculture and Food

Prof. Dr. Jens Krause

Member of the Berlin-Brandenburg Academy of Sciences and Humanities (BBAW), Germany

Member of the Advisory Board of the Bimini Biological Field Station Foundation, Bimini, Bahamas

Dr. Thomas Meinelt

Vice President of the 'Deutscher Angelfischerverband e.V.' (until October 22, 2014)

Member of the 'Aalkommission (Eel Commission) des Deutschen Fischereiverbandes e.V.'

Board Member of the Presidium of the 'Deutscher Fischereiverband e.V.'

Dr. Ute Mischke

Biological Expert of the Expert Committee GB10 'WFD – European Water Framework Directive' as part of the Surface Water and Soil Main Committee (DWA)

Head and German Delegate of the 'European intercalibration group for phytoplankton methods' of the Large Rivers Geographic Intercalibration Group (LR XGIG)

Prof. Dr. Gunnar Nützmann

Deputy Head of the Working Group 'Interplay between Ground and Surface Water' as part of the Expert Committee 'Hydrological Sciences' (DWA), Germany

Secretary of the International Commission on GroundWater (ICGW) of the International Association of Hydrological Sciences (IAHS)

Dr. Matthias Stöck

Member of the European Society on Evolutionary Biology (ESEB)

Member of the Societas Europea Herpetolocia (SEH)

Prof. Dr. Klement Tockner

Memberships in Scientific Advisory Boards

BfG – German Federal Institute for Hydrology, Bonn, Germany (Co-Speaker)

ICRA – Catalan Water Research Institute, Girona, Spain

WaterCluster Lunz, Austria

HCMR – Institute of Marine Biological Resources and Inland Waters, Athens, Greece

NIES – National Institute for Environmental Studies, Japan

FFPW/CENAKVA – Faculty of Fisheries and Protection of Waters, South Bohemian Research Center of Aquaculture and Biodiversity of Hydrocenoses, University of South Bohemia, Czech Republic

Other fields of functions

Co-Speaker of BeGenDiv – Berlin Center for Genomics in Biodiversity Research, Germany

Member of the Freshwater Biodiversity Group GEO BON

Member of the IHP Task Force der World´s Large Rivers Initiative (UNESCO)

Member of the scientific working group of the UNEP-project 'Water Quality Guidelines for Ecosystems'

Juror of the European Riverprize

Expert Panel Member of the Katerva Prize

Board Director of the Water Science Alliance, Germany

Vice Chair of the Board of Directors of the Forschungsverbund Berlin e.V. (since May 1.2015)

Elected Member of the Austrian Academy of Sciences

Jury Member of the ECI (Ecology Institute) and IRPE (International Recognition of Professional Excellence) Prizes (Otto Kinne Foundation, Ecology Institute)

DFG

Member of the Research Panel on Water Research (Professional Council 318)

Permanent Guest of the DFG-Senate Commission on Water Research (KOWA)

Member of the DFG-Senate Commission on Biodiversity Research

Dr. Christian Wolter

Chair of the 'Landesfischereibeirat Berlin', Germany

Member of the Scientific Advisory Board of the Institute of Inland Fisheries in Potsdam-Sacrow, Germany

Activities in Editorial and Advisory Boards of Journals 2014

Prof. Dr. Rita Adrian

Inland Waters

International Review of Hydrobiology

Prof. Dr. Robert Arlinghaus

North American Journal of Fisheries Management

Frontiers in Ecology and Evolution

Human Dimensions of Wildlife

Journal of Outdoor Recreation and Tourism

Dr. Jörn Geßner

Journal of Applied Ichthyology

Prof. Dr. Mark Gessner

Ecology Letters

Freshwater Biology

Aquatic Microbial Ecology

Prof. Dr. Hans-Peter Grossart

Frontiers in Microbiology

Fundamental and Applied Limnology

Aquatic Microbial Ecology

Dr. Sabine Hilt

Aquatic Botany

Dr. Michael Hupfer

Limnologica

Dr. Franz Hölker

Journal of Limnology

Prof. Dr. Jonathan Jeschke

Diversity and Distributions

Basic and Applied Ecology

Dataset Papers in Science

Immediate Science Ecology

NeoBiota

Soil Organisms

Dr. Peter Kasprzak

Limnologica

Prof. Dr. Werner Kloas

General and Comparative Endocrinology

Journal of Applied Ichthyology

Dr. Klaus Kohlmann

Environmental Biotechnology

Prof. Dr. Jens Krause

Fish and Fisheries

Behavioral Ecology

Dr. Thomas Mehner

Freshwater Biology

Aquatic Ecology

Limnologica

Dr. Thomas Meinelt

Science of the Total Environment

Dr. Michael T. Monaghan

Aquatic Ecology

Dr. Martin T. Pusch

River Systems

Dr. Matthias Stöck

PLOS ONE

Journal of Evolutionary Biology

Amphibia-Reptilia

Dr. Alexander Sukhodolov

Aquatic Sciences

Journal of Hydraulic Research

Prof. Dr. Klement Tockner

Ecosystems

Aquatic Sciences

River Systems

Dr. Christian Wolter

Journal of Applied Ichthyology

Dr. Dominik Zak

Wetlands

Lectures 2014

Scientist	Lecture	University
Prof. Dr. Robert Arlinghaus	Management of Fish Communities	Humboldt-Universität zu Berlin
Prof. Dr. Mark Gessner	Methoden der Landschaftsökologie – Gewässer	Technische Universität Berlin
Prof. Dr. Hans-Peter Grossart	Lectures in Applied Limnology	University of Potsdam
Prof. Dr. Hans-Peter Grossart	Aquatic Microbial Ecology; two-week summer course	Universität Osnabrück
Dr. Peter Kasprzak, Prof. Dr. Hans-Peter Grossart, Dr. Peter Casper	Limnology (Limnologisches Seen-praktikum); 2-wöchiger Sommerkurs	Dresden University of Technology
Prof. Dr. Hans-Peter Grossart	Aquatic Microbial Ecology; 2-wöchiger Sommerkurs	University of Potsdam
Prof. Dr. Hans-Peter Grossart, Dr. Jörg Lewandowski	Scientific Presentations Workshop	IGB Berlin
PD Dr. Sabine Hilt	Taxonomisch-ökologische Übungen	Humboldt-Universität zu Berlin
Dr. Michael Hupfer, PD Dr. Sabine Hilt, Prof. Dr. Gunnar Nützmann	Lake Restoration and Lake Management	Humboldt-Universität zu Berlin
PD Dr. Klaus Knopf	Metazoan Fish Parasites (Fish pathology II)	Humboldt-Universität zu Berlin
Dr. Klaus Kohlmann, Dr. Andreas Müller-Belecke	Genetics and Breeding of Fishes	Humboldt-Universität zu Berlin
Prof. Dr. Jens Krause	Fish Behaviour and Evolution	Humboldt-Universität zu Berlin
Prof. Dr. Jens Krause	Life of carnivores / advanced topics (5 lectures in the course of an visiting professorship)	University of Leeds, UK
PD Dr. Thomas Mehner, PD Dr. Martin T. Pusch	Theoretical Limnology	Humboldt-Universität zu Berlin
PD Dr. Thomas Mehner	Fish Ecology	Humboldt-Universität zu Berlin
PD Dr. Thomas Mehner	Scientific Writing	IGB Berlin
Dr. Thomas Meinelt	Environmental Stress in Fishes	Humboldt-Universität zu Berlin
Dr. Oliver Miler, Dr. Ingo Schnauder	Naturnaher Wasserbau	Beuth University of Applied Sciences in Berlin
Dr. Michael T. Monaghan	Biodiversity and Evolution (Bioinformatics)	Freie Universität Berlin
Dr. Michael T. Monaghan	Python from Scratch	Freie Universität Berlin
Dr. Michael T. Monaghan	Introduction to R + RStudio	IGB Berlin
Prof. Dr. Gunnar Nützmann, Dr. Michael Hupfer, Dr. Jörg Lewandowski, Dr. Christof Engelhardt	Ökohydrologie von Tieflandgewässern	Humboldt-Universität zu Berlin
Prof. Dr. Gunnar Nützmann	Physische Geographie von Mensch-Umwelt-Systemen	Humboldt-Universität zu Berlin
Dr. Kirsten Pohlmann	Time management, career planning and optimize your scientific advisers and network	IGB Berlin
Dr. Kirsten Pohlmann	Introduction to experimental design and basic statistics	IGB Berlin
Dr. Kirsten Pohlmann	Optimize your participation in scientific meetings and conferences	IGB Berlin

Scientist	Lecture	University
PD Dr. Martin T. Pusch	Grundlagen der Fließgewässerökologie	University of Potsdam
Dr. Gabriel Singer	Introduction to Statistics	UNESCO-IHE Institute for Water Education, Delft, The Netherlands
Dr. Gabriel Singer	Advanced statistics, selective multivariate methods in R	IGB Berlin
Dr. Gabriel Singer	Multivariate statistische Methoden in der Ökologie (VO)	Universität Wien, Austria
PD Dr. Matthias Stöck	Evolution by hybridization and polyploidy in animals	Humboldt-Universität zu Berlin
Prof. Dr. Klement Tockner, Dr. Michael T. Monaghan, PD Dr. Franz Hölker, Prof. Dr. Rita Adrian	Evolution und Biodiversität I (Zoologie)	Freie Universität Berlin
Dr. Markus Venohr	Seminar Geomathematik für Geowissenschaftler/innen Teil I: Statistisch-konzeptionelle Modellierung – Routing, Kaskadensysteme und Kalibrierung	Humboldt-Universität zu Berlin
Dr. Peter Casper, Dr. Thomas Gonsiorczyk	Limnologisches Geländepraktikum	TU Bergakademie Freiberg

Colloquia 2014

Date	Speaker	Title
09.01.2014	Dr. Deniz Özkundakci IGB	Aquatic Biogeochemical Modelling at Ecosystem Scales – Potentials and Pitfalls
23.01.2014	Prof. Dr. Tobias Krüger IRI THESys, Humboldt Universität zu Berlin, Germany	Data and model uncertainties in hydrology
30.01.2014	Prof. Dr. Felix Müller The University of Kiel, Germany	Resilience and adaptability as consequences of self-organization processes in ecosystems
06.02.2014	Dr. Michael Sander ETH Zurich, Switzerland	Redox Redux: New and ‚electrifying' insights into the redox properties and reactivities of organic and mineral phases
06.02.2014	Dr. Guy Woodward Imperial College London, UK	Resilience of freshwater food webs to perturbations
20.02.2014	José Ignacio Lucas Lledó Autonomous University of Barcelona, Spain / IGB	From structural variation in human genomes to population genomics of aquatic insects, or what we can do with a bunch of genome sequences
27.02.2014	Dr. Rüdiger Riesch The University of Sheffield, UK	Toxic waters, blue holes and beyond: The extreme adaptive potential of livebearing fishes (Poeciliidae)
03.03.2014	Dr. Dirk Schmeller Helmholtz Centre for Environmental Research (UFZ Leipzig), Germany	Micro-predators dictate infection dynamics of a globally emerged pathogen
06.03.2014	Prof. Dr. Ken Andersen Danish Technical University, Denmark	Towards ecosystem-based fisheries management using a size-based modelling approach
27.03.2014	Dr. Christian Jørgensen University of Bergen, Norway	Evolutionary models of fish behaviour
24.04.2014	Prof. Dr. Jeffrey Hutchings Life Sciences Centre, Dalhousie University Halifax, Canada	Perceptions of Fish Life History, Population Recovery, and Fisheries-Induced Evolution: Evaluation and Reconsideration

▸ Colloquia

Date	Speaker	Title
25.04.2014	Prof. Dr. Stan Gregory Oregon State University, USA	Patterns of Native and Non-native Fish Communities in the Willamette River: Implications for Future Climate and Land Use Change
07.05.2014	Dr. Dedmer B. van de Waal NIOO (Netherlands Institute of Ecology) Wageningen, The Netherlands	Out of balance – The impact of global change on the eco-physiology of toxic phytoplankton
12.06.2014	Prof. Dr. Stephen Maberly Centre for Ecology & Hydrology, Lancaster Environment Centre, UK	Inorganic carbon as an ecological factor in lakes
19.06.2014	Prof. Dr. Clifford Dahm The University of New Mexico, USA	California Water and the California Delta: A Scientist's Perspective From Inside the Heart of the Beast
19.06.2014	Prof. Dr. Beatrix Beisner University of Quebec at Montréal, Canada	Plankton Ecology in Spatially Variable Environments
26.06.2014	Dr. Stefan Krause School of Geography, Earth and Environmental Sciences, University of Birmingham, UK	Hot spots and hot moments of biogeochemical cycling in the hyporheic zone
26.06.2014	Dr. Maria Belyaeva IGB	Phylogeography of ubiquitous zooplankton species
03.07.2014	Prof. Dr. Jürgen Geist Technische Universität München, Germany	Importance of stream substrate conditions for biological communities and options for restoration
08.07.2014	Dr. William Darwall, Dr. Savrina Carrizo International Union for Conservation of Nature – IUCN Global Species Programme, UK	The Freshwater Biodiversity Crisis
10.07.2014	Prof. Dr. Shaul Sorek Ben-Gurion University of the Negev, Israel	Decision support system for sustainable integrated management of water resources: a conceptual model
17.07.2014	Dr. Thomas Cameron School of Biological Sciences, University of Essex, UK	Predation, harvesting, and environmental variation: life histories and population dynamics
11.09.2014	Prof. Dr. Rania Siam American University in Cairo, Egypt	Culture-dependent and culture-independent approach in understanding microbial communities in extreme environments
18.09.2014	Dr. Robert Ptacnik WasserCluster Lunz, Austria	Fresh and salty: Spatial pattern in plankton diversity along natural stress gradients
25.09.2014	Dr. José (Pepe) Barquín University of Cantabria, Spain	The use of fluvial synthetic networks for integrated catchment management
02.10.2014	Dr. Lothar Krienitz IGB	Tiny "green balls" – the survivalists in aquatic ecosystems
16.10.2014	Prof. Dr. Enrico Alleva Health Institute of Rome, Italy	The regulating role of Nerve Growth Factor in stress and coping of rodents and humans: hints for a physiological ecology of vertebrate sociality
23.10.2014	Univ.-Docent Dr. Katrin Teubner University of Vienna, Austria	Do we understand the utilization of small-scale and short-lived phosphate sources in aquatic environments?
30.10.2014	Dr. Kim Thompson University of Stirling, UK	The future of fish vaccines and immunotherapy in the control of diseases in aquaculture
05.11.2014	Dr. Russel Death College of Sciences, Massey University, New Zealand	Environmental crisis: science has failed send in the machines (a beginners guide to machine learning in river science)

Date	Speaker	Title
13.11.2014	Dr. Bärbel Tiemeyer Johann Heinrich von Thünen Institute, Federal Institute for Rural Areals, Forestry and Fisheries, Braunschweig, Germany	How hydrological dynamics influence GHG emissions and DOC concentrations in organic soils – examples from different scales
27.11.2014	Prof. Dr. Dirk Schulze-Makuch School of the Environment, Washington State University, USA	Drastic Environmental Changes and their Effects on the Habitability of a Terrestrial Planet
05.12.2014	Prof. Dr. Iain D. Couzin Princeton University, USA	Sensory networks and distributed cognition in schooling fish
11.12.2014	Prof. Dr. Nicola Fohrer The University of Kiel, Germany	Verbesserung von hydrologischer Modellierung durch ökohydrologische Methoden: Detektion und Implementierung von landwirtschaftlichen Dränagen

Doctoral Degrees 2014

Doctoral Candidates	Dept.	Subject	Date
Aldoushy Abdel Karim Ahmed Mahdy	2	Top-down and bottom-up effects in shallow lake food webs with special emphasis on periphyton	17.02.2014
Katrin Attermeyer	3	Effekte allochthonen organischen Kohlenstoffs auf den bakteriellen Metabolismus und die Gemeinschaftsstruktur, und Konsequenzen für den Kohlenstoffzyklus in kleinen Flachseen	21.02.2014
Mina Bizic-Ionescu	3	Polyphasic comparison of limnic and marine particle-associated bacteria	24.04.2014
Katrin Daedlow	4	Institutional change and persistance in German recreational-fisheries governance in response to external and internal challenge	28.04.2014
Franziska Leunert	3	Effects of UV light on aquatic organisms in humic rich limnic systems: phototoxicity of dissolved organic matter	25.06.2014
Fiona Johnston	4	Towards the sustainable management of recreational fisheries: accounting for the diversity in angler behaviour and fish life history	01.07.2014
Johannes Radinger	4	Modelling fish dispersal in catchments affected by multiple anthropogenic pressures	19.11.2014
Ann-Christin Honnen	2	Evolutionary implications of artificial night-time lighting for the mosquito Culex pipiens: insights from genetics, physiology, behaviour and population structure	12.12.2014
Amir Abbas Bazyar Lakeh	5	Effect of low frequency ultrasound and ultraviolet-C light for water disinfection in recirculating aquaculture systems	17.12.2014
Vanessa Burmester	4	Sensitivitätsunterschiede in limnischen Muscheln gegenüber cyanobakteriellen Toxinen	19.12.2014

Publications 2014

Journal contributions

Peer-reviewed publications with impact factor

Acuna, V.; Datry, T.; Marshall, J.; Barcelo, D.; Dahm, C. N.; Ginebreda, A.; McGregor, G.; Sabater, S.; Tockner, K.; Palmer, M. A. (2014): Why should we care about temporary waterways?. Science, 343(6175): 1080-1081.

Albayrak, I.; Nikora, V.; Miler, O.; O'Hare, M. T. (2014): Flow-plant interactions at leaf, stem and shoot scales – drag, turbulence, and biomechanics. Aquatic Sciences, 76(2): 269-294.

Alos, J.; Palmer, M.; Catalan, I. A.; Alonso-Fernández, A.; Basterretxea, G.; Jordi, A.; Buttay, L.; Morales-Nin, B.; Arlinghaus, R. (2014): Selective exploitation of spatially structured coastal fish populations by recreational anglers may lead to evolutionary downsizing of adults. Marine Ecology Progress Series, 503: 219-233.

Alos, J.; Palmer, M.; Linde-Medina, M.; Arlinghaus, R. (2014): Consistent size-independent harvest selection on fish body shape in two recreationally exploited marine species. Ecology and Evolution, 4(11): 2154-2164.

Arce, M. I.; Sanchez-Montoya, M. d. M.; Vidal-Abarca, M. R.; Suarez, M. L.; Gomez, R. (2014): Implications of flow intermittency on sediment nitrogen availability and processing rates in a Mediterranean headwater stream. Aquatic Sciences, 76(2): 173-186.

Arce, M. I.; Schiller, D. v.; Gomez, R. (2014): Variation in nitrate uptake and denitrification rates across a salinity gradient in Mediterranean semiarid streams. Aquatic Sciences, 76(2): 295-311.

Arlinghaus, R. (2014): Are current research evaluation metrics causing a tragedy of the scientific commons and the extinction of university-based fisheries programmes?. Fisheries, 39(5): 212-215.

Arlinghaus, R.; Beardmore, B.; Riepe, C.; Meyerhoff, J.; Pagel, T. (2014): Species-specific preferences of German recreational anglers for freshwater fishing experiences, with emphasis on the intrinsic utilities of fish stocking and wild fishes. Journal of Fish Biology, 85(6): 1843-1867.

Aslamov, I. A.; Kozlov, V. V.; Kirillin, G.; Mizandrontsev, I. B.; Kucher, K. M.; Makarov, M. M.; Gornov, A. Y.; Granin, N. G. (2014): Ice-water heat exchange during ice growth in Lake Baikal. Journal of Great Lakes Research, 40(3): 599-607.

Attard, K. M.; Glud, R. N.; McGinnis, D. F.; Rysgaard, S. (2014): Seasonal rates of benthic primary production in a Greenland fjord measured by aquatic eddy correlation. Limnology and Oceanography, 59(5): 1555-1569.

Attermeyer, K.; Hornick, T.; Kayler, Z. E.; Bahr, A.; Zwirnmann, E.; Grossart, H-P.; Premke, K. (2014): Enhanced bacterial decomposition with increasing addition of autochthonous to allochthonous carbon without any effect on bacterial community composition. Biogeosciences, 11(6): 1479-1489.

Berger, S. A.; Diehl, S.; Stibor, H.; Sebastian, P.; Scherz, A. (2014): Separating effects of climatic drivers and biotic feedbacks on seasonal plankton dynamics – no sign of trophic mismatch. Freshwater Biology, 59(10): 2204-2220.

Bickel, S. L.; Tang, K. W.; Grossart, H.-P. (2014): Structure and function of zooplankton-associated bacterial communities in a temperate estuary change more with time than with zooplankton species. Aquatic Microbial Ecology, 72(1): 1-15.

Bierbach, D.; Oster, S.; Jourdan, J.; Arias-Rodriguez, L.; Krause, J.; Wilson, A. D. M.; Plath, M. (2014): Social network analysis resolves temporal dynamics of male dominance relationships. Behavioral Ecology and Sociobiology, 68(6): 935-945.

Bizic-Ionescu, M.; Amann, R.; Grossart, H.-P. (2014): Massive regime shifts and high activity of heterotrophic bacteria in an ice-coverd lake. PLoS One, 9(11): e113611.

Blindow, I.; Hargeby, A.; Hilt, S. (2014): Facilitation of clear-water conditions in shallow lakes by macrophytes – differences between charophyte and angiosperm dominance. Hydrobiologia, 737(1): 99-110.

Boechat, I. G.; Krüger, A.; Chaves, R. C.; Graeber, D.; Gücker, B. (2014): Land-use impacts on fatty acid profiles of suspended particulate organic matter along a larger tropical river. Science of the Total Environment, 482-483: 62-70.

Bonet, B.; Corcoll, N.; Tlili, A.; Morin, S.; Guasch, H. (2014): Antioxidant enzyme activities in biofilms as biomarker of Zn pollution in a natural system – an active bio-monitoring study. Ecotoxicology and Environmental Safety, 103: 82-90.

Brothers, S. M.; Köhler, J.; Attermeyer, K.; Grossart, H.-P.; Mehner, T.; Meyer, N.; Scharnweber, K.; Hilt, S. (2014): A feedback loop links brownification and anoxia in a temperate, shallow lake. Limnology and Oceanography, 59(4): 1388-1398.

Bruder, A.; Schindler, M. H.; Moretti, M. S.; Gessner, M. O. (2014): Litter decomposition in a temperate and a tropical stream – the effects of species mixing, litter quality and shredders. Freshwater Biology, 59(3): 438-449.

Brüggemann, R.; Annoni, P. (2014): Average heights in partially ordered sets. Match – Communications in Mathematical and in Computer Chemistry, 71: 117-142.

Brüggemann, R.; Carlsen, L. (2014): Incomparable – what now?. Match – Communications in Mathematical and in Computer Chemistry, 71: 699-716.

Brüggemann, R.; Scherb, H.; Schramm, K.; Cok, I.; Voigt, K. (2014): CombiSimilarity, an innovative method to compare environmental and health data sets with different attribute sizes example – eighteen organochlorine pesticides in soil and human breast milk samples. Ecotoxicology and Environmental Safety, 105: 29-35.

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Butail, S.; Polverino, G.; Phamduy, P.; Del Sette, F.; Porfiri, M. (2014): Influence of robotic shoal size, configuration, and activity on zebrafish behavior in a free-swimming environment. Behavioural Brain Research, 275: 269-280.

Cabezas, A.; Pallasch, M.; Schönfelder, I.; Gelbrecht, J.; Zak, D. (2014): Carbon, nitrogen, and phosphorus accumulation in novel ecosystems – shallow lakes in degraded fen areas. Ecological Engineering, 66: 63-71.

Carlsen, L.; Brüggemann, R. (2014): Partial order methodology – a valuable tool in chemometrics. Journal of Chemometrics, 28(4): 226-234.

Carlsen, L.; Brüggemann, R. (2014): The "Failed state index" offers more than just a simple ranking. Social Indicators Research, 115(1): 525-530.

Ceola, S.; Bertuzzo, E.; Singer, G. A.; Battin, T. J.; Montanari, A.; Rinaldo, A. (2014): Hydrologic controls on basin-scale distribution of benthic invertebrates. Water Resources Research, 50(4): 2903-2920.

Cobo, C.; Makosch, K.; Jung, R.; Kohlmann, K.; Knopf, K. (2014): Enhanced Aeromonas salmonicida bacterin uptake and side effects caused by low frequency sonophoresis in rainbow trout (Oncorhynchus mykiss). Fish & Shellfish Immunology, 36(2): 444-452.

Conrad, R.; Claus, P.; Chidthaisong, A.; Lu, Y.; Fernandez Scavino, A.; Liu, Y.; Angel, R.; Galand, P. E.; Casper, P.; Guerin, F.; Enrich-Prast, A. (2014): Stable carbon isotope biogeochemistry of propionate and acetate in methanogenic soils and lake sediments. Organic Geochemistry, 73: 1-7.

Constantinescu, G.; Miyawaki, S.; Rhoads, B.; Sukhodolov, A. (2014): Numerical evaluation of the effects of planform geometry and inflow conditions on flow, turbulence structure, and bed shear velocity at a stream confluence with a concordant bed. Journal of Geophysical Research – Earth Surfaces, 119(10): 2079-2097.

Cooke, S. J.; Arlinghaus, R.; Bartley, D. M.; Beard, T. D.; Cowx, I. G.; Essington, T. E.; Jensen, O. P.; Lynch, A.; Taylor, W. W.; Watson, R. (2014): Where the waters meet – sharing ideas and experiences between inland and marine realms to promote sustainable fisheries management. Canadian Journal of Fisheries and Aquatic Sciences, 71(10): 1593-1601.

Czarnecka, M.; Pilotto, F.; Pusch, M. (2014): Is coarse woody debris in lakes a refuge or a trap for benthic invertebrates exposed to fish predation?. Freshwater Biology, 59(11): 2400-2412.

Dadheech, P. K.; Mahmoud, H.; Kotut, K.; Krienitz, L. (2014): Desertifilum fontinale sp. nov. (Oscillatoriales, Cyanobacteria) from a warm spring in East Africa, based on conventional and molecular studies. Fottea, 14(2): 129-140.

Dadheech, P. K.; Selmeczy, G. B.; Vasas, G.; Padisák, J.; Arp, W.; Tapolczai, K.; Casper, P.; Krienitz, L. (2014): Presence of potential toxin-producing cyanobacteria in an oligo-mesotrophic lake in Baltic Lake District, Germany – an ecological, genetic and toxicological survey. Toxins, 6(10): 2912-2931.

Danabalan, R.; Monaghan, M. T.; Ponsonby, D. J.; Linton, Y. (2014): Occurrence and host preferences of Anopheles maculipennis group mosquitoes in England and Wales. Medical and Veterinary Entomology, 28(2): 169-178.

Datry, T.; Larned, S. T.; Tockner, K. (2014): Intermittent rivers – a challenge for freshwater ecology. BioScience, 64(3): 229-235.

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Dijkstra, K. B.; Monaghan, M. T.; Pauls, S. U. (2014): Freshwater biodiversity and aquatic insect diversification. Annual Review of Entomology, 59(3): 979-991.

Domenici, P.; Wilson, A. D. M.; Kurvers, R. H. J. M.; Marras, S.; Herbert-Read, J. E.; Steffensen, J. F.; Krause, S.; Viblanc, P. E.; Couillaud, P.; Krause, J. (2014): How sailfish use their bills to capture schooling prey. Proceedings of the Royal Society of London – Ser. B, Biological Sciences, 281(1784): art.20140444.

Dufresnes, C.; Bertholet, Y.; Wassef, J.; Ghali, K.; Savary, R.; Pasteur, B.; Brelsford, A.; Rozenblut-Koscisty, B.; Ogielska, M.; Stöck, M.; Perrin, N. (2014): Sex-chromosome differentiation parallels postglacial range expansion in European tree frogs (Hyla arborea). Evolution, 68(12): 3445 - 3456.

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