



BioSC | Newsletter | 03/2018



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## 3<sup>rd</sup> International BioSC Symposium: Towards an Integrated Bioeconomy

The 3<sup>rd</sup> International BioSc Symposium with around 170 participants took place in Bonn on November 12<sup>th</sup> and 13<sup>th</sup>, 2018. National and international speakers from academia and industry presented current results and new developments for a sustainable bioeconomy. In addition to the lectures, 48 posters - three of them honored - provided connecting points for intensive scientific discussions.



Photos: Forschungszentrum Jülich

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In her welcoming speech, Undersecretary Andrea Noske from the German Federal Ministry for Education and Research emphasized the importance of internationally coordinated strategies for the implementation of a sustainable bioeconomy and reported on the current revision of the National Research Strategy for Germany. In the opening session, Michael Carus (nova-Institute, Hürth) gave a current overview of the worldwide production and market share of bio-based plastics and presented a case for the joint promotion of plastics produced from renewable carbon sources such as biomass, recycled material and CO<sub>2</sub>. Prof. Pierre Monsan (INSA Toulouse) introduced the "Toulouse White Biotechnology" Center, an association of public and private partners promoting research and technology transfer in the development of sustainable production processes based on renewable resources. The opening session was completed by Thomas D`Agnone (Creapaper GmbH), who reported on an innovative and successful business model, specifically to establish grass as raw material for the paper industry.

The program of the following day included three focal themes. In the session "Socioeconomic Perspectives within a Sustainable Bioeconomy", Dr. Neus Escobar (University of Bonn) showed examples of how the increased demand for bio-based raw materials is influencing land use and the emission of greenhouse gases and which policy measures could be suitable for ensuring the sustainability of the bioeconomy. Prof. Dr. Thomas Dietz (University of Münster) presented a study which compared 41 national bioeconomy strategies with regard to supporting and regulating control measures. Dr. Chad Baum (University of Bonn) presented a study using Group Concept Mapping as a method to identify obstacles and success factors for the acceptance and commercialization of a new technology - synthetic biology.

In the session "Innovations for Plant Production and Resource Management", Prof. Iain Donnison (Aberystwyth University, UK) discussed the suitability and choice of different grasses for industrial use and presented data on efforts to breed *Miscanthus*. Dr. Sylvia Schrey (Forschungszentrum Jülich) presented research results about a cultivation strategy for *Sida hermaphrodita* on marginal soils in which fermentation residues from biogas plants are used as fertilizer. The lecture of Prof. Dr. Shawn Mansfield (University of British Columbia, CA) dealt with plantation trees as raw material for cultivation in the

bioeconomy. He presented work about the cultivation of poplars with modified cell wall formation or modified lignin composition.



In the session "Green Value Chains - Processes and Products from Biomass", Dr. Stephan Noack (Forschungszentrum Jülich) presented a new hybrid process consisting of microbial transformations, enzymatic reactions and chemical synthesis steps that facilitate the production of a wide range of different chemical substances from lignocellulosic biomass. PD Dr. Ulf Prüße (Thünen Institute, Braunschweig) presented methods for the production of high-quality chemicals made of such diverse raw materials as wheat chaff, rapeseed meal or birch wood. Dr. Timo Johannes Koch (Savannah Ingredients GmbH / Pfeifer & Langen GmbH & Co. KG, Elsdorf) presented a method for the production of allulose, a naturally occurring sugar that is not metabolized and is suitable as calorie-free sugar substitute.

A total of 48 posters were presented and discussed in a poster session on the three thematic sessions. Three of them were honored for their scientific results, interdisciplinarity and quality of presentation. The winners of the poster awards are Gabriel Ponzoni Frey (Center for Development Research, University of Bonn) with the topic "Impacts of soy and infrastructure expansion in the Brazilian Amazon", André Krause (IBG-2 Plant Sciences, Forschungszentrum Jülich) with the topic "The effect of elevated CO<sub>2</sub> on photosynthetic performance of winter wheat" and Alina Hermann (Inorganic Chemistry, RWTH Aachen University) with the topic "A novel zinc bisguanidine complex for the polymerization of cyclic esters", which dealt with the production of biodegradable plastics made of renewable resources.

The symposium again demonstrated the need for comprehensive cooperation to establish a sustainable bioeconomy and provided a platform for interdisciplinary exchange. The 4<sup>th</sup> International BioSc Symposium will take place on November 18<sup>th</sup> & 19<sup>th</sup>, 2019 in Cologne.



## 5<sup>th</sup> BioSC Forum with Presentation of the Supervision Award 2018

On November 12<sup>th</sup>, the fifth internal retreat for BioSC members took place in the Gustav Stresemann Institute in Bonn. All ongoing projects from phase 2 of the NRW BioSC Strategy Project were presented. In addition, four core groups presented successful bioeconomy activities outside the NRW Strategy Project. Dr. Anita Loeschcke (HHU Düsseldorf) received the 2018 BioSC Supervision Award.



Photos: Forschungszentrum Jülich

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As first speaker, Dr. Holger Klose (Forschungszentrum Jülich) gave an overview of the current status of work in the AP<sup>3</sup> FocusLab, which establishes and economically validates an integrated biorefinery concept for sustainable implementation of biomass made from perennial plants using OrganoCat technology. Nina Ihling (RWTH Aachen University) then presented the current status of work in the Bio<sup>2</sup> FocusLab, which is developing a competitive biorefinery process for the production of next generation biosurfactants made from residual flows from food industry. This was followed by short lectures on projects recently started in the framework of the first SEED FUND 2.0 OPEN calls. Dr. Vera Göhre (HHU Düsseldorf) presented the iBioMass Project, which is investigating pest resistance of new biomass plants using corn mutants with altered lignocellulose composition by way of example. Dr. Ulrich Krauss (HHU Düsseldorf) presented the HySyn Project, which is investigating the representatives of a recently discovered class of alkane/alkene-synthesized photoenzymes by testing properties relevant to biotechnology. Kevin Herrmann (RWTH Aachen University) presented the QuantiP Project, in whose framework a sensitive methodology is being developed to quantify phosphate in storage molecules in algae, yeasts and plant material.

After the coffee break, Dr. Felix Jakob (RWTH Aachen University) and Dr. Michael Wustmans (University of Bonn) provided information on current work and results from the *greenRelease* FocusLab, which is developing a new platform technology. The aim is to reduce herbicide and fungicide usage by applying these substances to plants in the form of microgel particles and releasing them in a controlled manner over a longer period. Dr. Stephan Noack (Forschungszentrum Jülich) and Prof. Dr. Dörte Rother (RWTH Aachen University) gave an overview of the current status in the HyImPAct FocusLab. A hybrid process consisting of microbial transformations, enzymatic reactions and chemical synthesis steps is being developed that will allow the production of different chemical substances on the basis of lignocellulose-containing biomass. This was followed by short presentations on the two new projects in the framework of the first SEED FUND 2.0 LINK calls. Prof. Dr. Martina Pohl (Forschungszentrum Jülich) presented the XyloSenS Project. This project is linked to the HyImPAct and AP<sup>3</sup> FocusLabs in content and its objective is to

develop biosensors that allow the online detection of xylose as alternative carbon source in small cultivation systems. Prof. Dr. Sonja Herres-Pawlis (RWTH Aachen University) presented the R2HPBio Project, which is linked to the HylmPACT and *greenRelease* FocusLabs. Its aim is to produce biodegradable polymers from platform chemicals made of renewable resources.

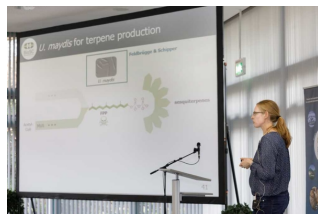
After a lunch break, Dr. Anita Loeschcke and Dr. Kerstin Schipper (HHU Düsseldorf) presented current developments in the *CombiCom* FocusLab; their goal is to use synthetic biology to allow sustainable production of new, valuable natural substances, evaluate their effectiveness, for example in crop protection, investigate the acceptance among the population and develop strategies for market introduction.



Following the presentation of all ongoing projects from phase 2 of the NRW Strategy Project BioSC, four BioSC core groups presented successful bioeconomy projects outside of the NRW Strategy Project. Dr. Alexandra Wormit (RWTH Aachen University) presented the BMBF project TaReCa, a follow-up to the *InducTomE* BioSC Project, which is evaluating the potential of residual biomass from paprika production as resource for high-quality bioactive natural substances. Dr. Sylvia Schleker (University of Bonn) presented the BMBF project NemaContAnt, a follow-up to the *NovoSurf* BioSC Project, which is evaluating the usage of tailor-made bio-based rhamnolipids to control plant parasitic nematodes. Prof. Dr. Henner Hollert (RWTH Aachen University) presented the research area green toxicology and explained the diverse connection possibilities to bioeconomy research, especially with regard to the environmental impact assessment for new bio-based products and processes. Prof. Dr. Ralf Pude (University of Bonn) presented the EFRE-FIS Project “Competence Center Bio-based Products”, the aim of which is to develop bio-based materials, such as building materials and packaging, in collaboration with companies located in North Rhine-Westphalia. The project is in part based on the results of the BioSC projects *SPREAD* and *MisQual*.

At the end of the forum, Dr. Anita Loeschcke from the Institute for Molecular Enzyme Technology of the HHU Düsseldorf was presented with the 2018 BioSC Supervision Award. With this prize, the BioSC honors young scientists for excellent achievements in the mentoring of doctoral students. It is endowed with 25,000 € and is awarded within the framework of the NRW Strategy Project BioSC. Dr. Loeschcke was nominated by three of her doctoral students and the nomination was supported by various letters of recommendation from former doctoral students. The jury voted for her due to the outstanding engagement and her commitment in the interdisciplinary education of her doctoral students.

This year's BioSC Forum was once again well attended by close to 130 participants. Engaged discussions in the plenary hall and in the breaks demonstrated continuous interest by the members in bioeconomy topics and development of the BioSC. The next BioSC Forum will take place in combination with the 4<sup>th</sup> International BioSC Symposium on 18<sup>th</sup> & 19<sup>th</sup> November, 2019 in Cologne.



## People at BioSC

### New Executive Board in office

In September and October, the core group leaders of the four BioSc locations elected new representatives to the Executive Board. These have now been confirmed by the heads of the four member institutions. Here are the new EB members:



Prof. Dr. Ralf Pude, University of Bonn



Prof. Dr. Jan Börner, University of Bonn



Prof. Dr. Markus Pauly, HHU Düsseldorf



Prof. Dr. Jörg Pietruszka, HHU Düsseldorf



Prof. Dr. Björn Usadel, RWTH Aachen University



Prof. Dr. Andreas Jupke, RWTH Aachen University



Prof. Dr. Ulrich Schurr, Forschungszentrum Jülich



Prof. Dr. Wolfgang Wiechert, Forschungszentrum Jülich

### New BioSC Core Group: Prof. Dr. Eike Lüdeling, University of Bonn

The BioSC welcomes a new core group: Prof Dr. Eike Lüdeling heads the Horticultural Sciences Department at the Rhenish Friedrich-Wilhelm University of Bonn. Among other horticultural topics, he studies climate risks in orcharding with his team and investigates the development of decision scientific analysis strategies for agricultural research. Another focus of the group is the scientific support for agricultural development processes.

With their research, the Bonn horticultural scientists are attempting to support horticultural operations in decision processes, particularly with regard to climate change adaption. In order to meet the complexity of the horticultural system and take account of the often incomplete level of knowledge, great importance is attached to the use of expert knowledge, flawless documentation of the state of knowledge and the

adequate consideration of uncertainties.

After his doctoral thesis at the University of Kassel (2007), which examined the sustainability of mountain oases in Oman, Eike Lüdeling spent two years at the University of California in Davis, where his work focused on dormancy processes in fruit trees and associated climate risks. From 2010 to 2018, he worked at the World Agroforestry Centre in Nairobi, Kenya, first as climate change expert and starting in 2013 as a decision analyst. Between 2014 and 2018 he carried out this responsibility based at the Center for Development Research (ZEF) in Bonn. In April 2018, Eike Lüdeling took over the Chair for Horticultural Sciences in Bonn.



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**New at the office: Dr. Stephani Baum**

Since August of this year, Dr. Stephani Baum has strengthened the team of the BioSc office. She studied biology at the RWTH Aachen University and discovered her passion for plant science during this time. In 2016, she completed her doctorate at the Institute for Plant Physiology in the working group of Prof. Dr. Uwe Conrath. The focus of her doctoral thesis was the investigation of molecular mechanisms of plant defense against *Arabidopsis thaliana*. Following a two-year post-doctoral period at the RWTH, Stephani Baum now adds to the BioSC office in the field scientific and administrative coordination.



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## 4<sup>th</sup> BioSC Spotlight: Smart management of plant performance - New strategies for crop protection

Plants are essential for a sustainable bioeconomy. They form the basis for the provision of the growing world population with food- and feedstuff, biomaterials and renewable energies. At the 4<sup>th</sup> BioSC Spotlight on October 29<sup>th</sup>, 2018, guests from academia and industry as well as BioSC members presented research activities the aim of which is to ensure yield and quality with simultaneous reduction of pesticide and fertilizer usage. The 47 participants used the event for a lively exchange.



Photos: Forschungszentrum Jülich

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The event was opened by Prof. Ulrich Schwaneberg (RWTH Aachen University), Deputy Spokesperson of the Bioeconomy Science Center. Prof. Karl-Heinz Kogel (University of Giessen) then presented research work involving the modification of the interaction between plant and pest using gene silencing in the plant and as a result inhibiting growth of the pest. In addition, he presented data on the increases resistance in barley to two common pests through the use of CRISPR/Cas9 technology.

Prof. Dr. Georg Groth (HHU Düsseldorf) reported on the [C4-PSH BioSc Project](#), in whose framework inhibitors for the key enzymes of the C4 photosynthesis were identified. These molecules represent possible lead substances for the development of herbicides acting selectively against C4 weeds. Prof. Dr. Stefan Schillberg (Fraunhofer IME, Aachen) then presented approaches for pest control by overexpression of antibodies and antimicrobial peptides in crop plants. In addition, he showed data on the increase of biomass yields of potatoes and tobacco through expression of bacterial genes and reported on a pilot project for indoor farming. To conclude the morning, Prof. Dr. Uwe Conrath (RWTH Aachen University) spoke about the defense priming, a systemic immune response of plants to infestation with pathogens that cause a more robust defense response in cases of repeated infestation. He also reported on the [PrimACs BioSC Project](#), in which new priming-triggering substances have been identified. Such substances could open up new possibilities in pest control.

After a lunch break, which was used for intensive exchange, Dr. Mauricio Hunsche (COMPO EXPERT GmbH) used synthetic fertilizers and natural biostimulators as an example to discuss the most important success

factors, challenges and obstacles for the development and market introduction of new products. Prof. Dr. Anant Patel (FH Bielefeld) presented the latest developments in the formulation of biological pesticides, in particular a system of beads which can be loaded with appropriate substances to attract the pests by releasing CO<sub>2</sub>. Dr. Felix Jakob (RWTH Aachen University) presented the work of the *greenRelease* BioSC FocusLab, in which a new platform technology was developed. The aim is to reduce the use of herbicides and fungicides by applying these substances in the form of microgel particles to plants and releasing them in a controlled manner over a longer period. Finally, Dr. Michael Wustmans (University of Bonn) presented a patent analysis on *greenRelease* by examining comparable, adjacent, complementary and alternative technologies.

The broad spectrum of the research approaches presented and the engaged discussions demonstrated the need for new strategies for sustainable crop protection and sustainable yield increases. The next BioSC Spotlight will address the topic “Moving the bioeconomy from mind to market” and will take place on February 4<sup>th</sup>, 2019 in Bonn.

## **Russian - German seminar “Bioeconomy and global challenges”**

**The National Research Center “Kurchatov Institute”, Moscow, and the IBG-2 Plant Sciences, Forschungszentrum Jülich, hosted an initial seminar featuring bilateral presentations and discussions of bioeconomy activities in Russia and Germany. The workshop was held September 20-22, 2018 in Moscow and St. Petersburg.**



The mutual seminar covering a wide range of topics was envisaged and subsequently implemented in order to further develop Russian-German cooperation on the bioeconomy. It was initiated by [KI Moscow](#) and IBG-2, who are partnered in the joint “Algnutrient-UrBioSol” project in the framework of the German-Russian International Bioeconomy program of the BMBF.

Over the course of the workshop, priority technologies, recent bioeconomy developments and innovative approaches in relevant fields were discussed with participants from the respective ministries as well as from research and industry; the seminar included a detailed situational overview as well as exemplary joint Russian-German projects in the field of bioeconomy.

The following focus points were addressed in six sessions: (1) Introduction and an overview of recent developments in the bioeconomy, (2) Resource bases for the bioeconomy, (3) Solutions for urban bioeconomic questions (ecology, energy etc.), (4) Biomass conversion modes and industrial biotechnology and (5) Social and economic aspects of bioeconomy.

The topics of the presentations included:

- Stable microalgal cultures in dynamic conditions –prerequisite for urban biotech applications (Bilateral project Algnutrient-UrBioSol)
- Development and implementation of an innovative aquatic-based bio-refinery for microalgae *Chlorella sorokiniana* and duckweed *Lemna minor* (Bilateral project ABiRe)
- Tailored enzyme cocktail for efficient cellulose biodegradation (Bilateral project EnzyBioDeg)
- *Scytalidium candidum* 3C is a promising toolbox for biomass degradation
- How the integration of biotechnology into a modern smart city can change the urban environment
- Bioeconomy regions as delivery mechanisms for national roadmaps

The need to develop and implement economically, environmentally and socially sustainable solutions to approach global societal challenges was clearly recognized in the sessions. Solutions depend heavily on the respective location and existing framework conditions, such as technologies, availability of bio-based resources and knowledge, regulations and policy support. The presented examples showed that technologies already exist or are being developed and can be tailored to the respective needs, based on the experience and expertise of the partners involved. Technical and scientific aspects of the presented projects were discussed, as well as differences in prerequisites in both countries, creating a diverse set of tasks and solutions, as well as options for cooperation. The developing relations in the bioeconomy field between Germany and Russia demonstrate that it is feasible to exploit synergies, for example in wastewater treatment, biological process improvement and automation, resource use and nutrient cycling, as shown by the current bilateral BMBF Bioeconomy International projects ABiRe, Algnutrient-UrBioSol and EnzyBioDeg. Crucial for further development is visibility and networking with various stakeholders.

Experiences from existing networks were shared, covering the local project as well as larger frameworks. The Bioeconomy Science Center was presented as an example of a research cluster for bioeconomy research and education in Germany in which scientific expertise, technologies and infrastructure are joined together for exploiting synergies and the development of sustainable bio-based solutions.

Attendees considered this seminar as a run-up to the German-Russian Science Year, supporting the start of new initiatives to overcome global challenges. The leading challenges to date are the translation of academic results into practice in industry and agriculture, and how to create the necessary awareness of bioeconomic challenges and implement solutions together with policy makers and stakeholders at all levels. As the participants have expressed their interest, the seminar will be continued with topic-specific follow-up events.

## **International BioSC Workshop “N/P/C storage pools in algae and cyanobacteria and nutrient uptake from waste streams”**

**Purification and recycling of agriculturally used water is an issue that is receiving more and more attention. Algae can accumulate large quantities of nitrate or phosphate, for example, and thus have the potential to clean agricultural effluents as well as to be used as nitrogen and phosphate fertilizers. A BioSC workshop on this topic with international participation took**

## place at Forschungszentrum Jülich on September 6 and 7, 2018.



The workshop was headed by Dr. Ladislav Nedbal (Forschungszentrum Jülich). Algae scientists from all over the world, including Australia, the US and numerous European countries participated.

The mini conference on the first day covered a broad range of topics and connected basic and applied research. Initially, the focus was on the mechanisms of nutrient uptake and release in algae. This was followed by the development of analysis methods such as Raman and NMR spectroscopy that allow, amongst other things, the analysis of nutrients in individual algal cells. Another complex of themes was the further development of different cultivation methods for algae -from bioreactors to “phytobags” to floating cultivation in open water basins. The final sessions dealt with the use of algae in wastewater treatment and plant fertilizers. Some impressive application examples were shown.

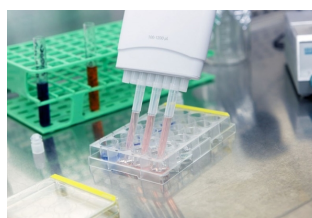
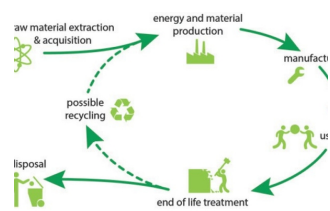
The poster exhibition provided additional topics for conversation during the breaks. PhD students, amongst others, presented posters on topics including algae as plant fertilizer, algae cultivation, biofuels and use of algae in public wastewater treatment. The first day of the meeting ended with an evening tour of the algae farm located at Forschungszentrum Jülich.

The second day aimed mainly at the development of communication strategies to make the topic more known to the scientific and general public. First, the session chairs from the first day summarized the most important contents. Patrik Jones (Imperial College, London) and Ladislav Nedbal led the plenum through voting on the structure of the subsequent sub-theme working groups. The topics “fundamental research”, “proof-of-concept in the lab” and “up-scale” were first discussed in three groups and then presented to the entire plenary. The two-day workshop ended with the objective to design together a special edition in the scientific journal “Algal issue - Biomass, Biofuels and Bioproducts”.

## Environmental Research for a Sustainable Bioeconomy

**For successful and sustainable development of the bioeconomy, it is necessary to assess the consequences of new technologies on the environment already during the development process. There is a long history of expertise in the field of ecotoxicology and bioanalytics in**

**teaching and in research at the Institute for Environmental Research at the RWTH Aachen University. Newer research focuses include green toxicology and life cycle assessment.**



The teaching and research area Ecosystem Analysis celebrated its 10<sup>th</sup> anniversary in 2017. It is one of the largest university institutes working in the field of ecotoxicology in Germany. Prof. Dr. Henner Hollert's department, also a core group at the BioSc, consists of 34 employees in three working groups and two teams and is funded by numerous third-party donors (e.g. DFG, EU, DBU, BMBF).

In ecotoxicology, research focuses on (1) the pro-and retrospective evaluation of the effects of anthropogenic pollutants from the use of a range of biotest and biomarker batteries, (2) the development, validation and optimization of effect-related test systems and (3) weight-of-evidence studies for hazard and risk assessment of environmental impacts. In particular, studies are carried out on effects on aquatic habitats due to the extensive use of the zebra danio fish (*Danio rerio*), considered a model organism for ecotoxicological studies of effects at the level of the molecule to the organism. This work has established the teaching and research area Ecosystem Analysis as a recognized player in the field of water analysis and evaluation. In cooperation with water engineers and hydrologists, the objective is to gain a comprehensive view of pollutants in aquatic habitats.

Research that stems from the Green Toxicology Concept forms a new focus. Green Toxicology refers to the use of predictive toxicology in the sustainable development and production of new, less harmful substances and chemicals. Green Toxicology is based on the principle of Green Chemistry and Green Engineering and the goal is to design future production processes and synthesis methods for chemicals that are safe in terms of the effects on the environment and human health (Crawford et al. 2017). The principles of Green Toxicology are an integral part of Green Chemistry and strengthen the role of health-related aspects for consumers and the environment. In addition, Green Toxicology is economical since the most environmentally-friendly products can be identified in the development of new processes.

Following the Green Toxicology Concept, toxicologically critical chemicals and materials can be sorted out already in the early stages of development through the use of suitable *in vitro* and *in silico* tools; this approach prevents both severe environmental impacts as well as expensive abandonment of development just before market launch. In addition, in complex production processes it is not immediately apparent which sub-processes include the greatest environmental impacts. Life cycle assessments can elucidate these critical points and thus highlight the greatest improvement potentials. In the Ecosystem Analysis area of teaching and research, this concept is applied, for example, in cooperation with various stakeholders in the TMFB Excellence Cluster (Bluhm et al. 2016) and the new FSC (Fuel Science Center) Cluster. Other applications include environmental impact assessment of rhamnolipids (in collaboration with the Core Group of Lars Blank; Johann et al. 2016), microplastics (Chen et al. 2017) and different bio-based molecules and nanoparticles.

Another research focus is Life Cycle Assessment (LCA). In life cycle assessments, the effects of products on

the environment are examined throughout a product's entire life cycle - from raw material extraction through production and use up to disposal. Different environmental impacts are considered (e.g. climate change, ecology, biodiversity). The Hollert Core Group is researching models for characterizing ecotoxicological effects in life cycle assessments. Previous models have not been able to sufficiently integrate effects such as hormonal effects or mutagenicity in a meaningful way, for example; nevertheless, these are established endpoints in ecotoxicology. The group benefits from their expertise in bioanalytical methods - knowledge that is lacking in the classical LCA field.

The RWTH Boost Fund TEPHA (Technical Product Harvesting - near-net-shape semi-finished products made from renewable raw materials) is one example of a project relating to LCA. Technical Product Harvesting is the use of suitable biomass for the production of technical products. In particular, the focus is organic raw materials that can be influenced in their natural growth and can, for example, be transferred to usable components of architecture or for engineering applications. This project is in part implemented in collaboration with the Chair for Botany and Molecular Genetics of the RWTH Aachen University (Core Group of Prof. Usadel and Dr. Wormit). The main objective of the environmental subproject is to account for overall environmental impacts of products generated by near-net-shape growth (Kämpfer et al. 2017).

Over the past few years, the work of the Ecosystem Analysis teaching and research area has increasingly turned to the role of environmental assessment to contribute to the success of a sustainable bioeconomy. The key question is how - in the sense of Green Toxicology or by means of environmental accounting, for example - environmental assessment can detect undesirable effects of bio-based processes, thus steering the development of technologies towards the greatest possible sustainability and making a decisive contribution to establishing the bioeconomy.



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## Bioeconomy Lecture at the RWTH Aachen University

**On October 16<sup>th</sup>, Prof. Ulrich Schwaneberg as responsible lecturer opened the lecture series “Bioeconomy - Routes to a Sustainable Economy”, which is taking place at the RWTH Aachen University during the 2018/19 winter semester. The lecture series is organized by the interdisciplinary RWTH teaching project LEONARDO and the Biotechnological Student Initiative e.V. Aachen in collaboration with the BioSC. Close to 200 students registered for the lecture at the beginning of the semester.**



“Interdisciplinary Teaching: Meeting Global Challenges” is the motto of the [LEONARDO](#) Project that was launched at the RWTH in autumn 2008 and which is located at the Institute for Political Science. Each semester, different teaching modules are initiated and organized, which are jointly offered by lecturers from various specialties and are aimed at students of all faculties. The topics include social challenges such as climate change, migration or urbanization.

The [Biotechnological Student Initiative \(bts\) e.V.](#) is a nationwide network that is active at 26 university locations and organizes excursions, company contact fairs, lectures and workshops and more, delivered by students for students. In cooperation with representatives of the LEONARDO Project and Prof. Ulrich Schwaneberg (Chair of Biotechnology of the RWTH and BioSC CoreGroup Leader), [bts Aachen](#) developed the concept for an interdisciplinary lecture series on the bioeconomy. Various BioSC CoreGroup Leader are contributing to the lecture, including the Chair for sustainability in Building Trade of the RWTH and the University of Applied Sciences in Aachen. One of the lectures is given by Prof. Dr. Thomas Müller-Kirschbaum, Henkel AG. Depending on performance, students can acquire different numbers of credit

points.

During the introductory lecture on October 16<sup>th</sup>, Prof. Schwaneberg discussed the social challenges of the 21<sup>st</sup> century and explained how the bioeconomy is defined and how it can contribute to the solution of global problems. After an overview of national and international bioeconomy strategies and research networks, he introduced the Bioeconomy Science Center and presented a few select BioSC projects. This was followed by a lively discussion with many questions. A total of more than 200 students registered for the lecture.

## 3<sup>rd</sup> NRW Doctoral Students Day in Düsseldorf

**The 3<sup>rd</sup> NRW-wide Doctoral Students Day, this time on the subject “Future Bioeconomy” with around 70 participants at the Lindner Congress Hotel Düsseldorf, was again a great success. The main focus was perception and representation of the bioeconomy in industry. Following keynote speeches in the morning, there was opportunity for direct and intensive exchange between representatives of bioeconomy-oriented companies and doctoral students within small groups in the afternoon.**



In the morning, invited speakers presented their definition of and perspectives on the bioeconomy in their own company. After a welcoming address by Minister Dr. Christiane Fricke, the first session was presented by Dr. Frank Roeber (Corteva Agrisciences/DowDuPont) and Dr. Grégoire Hummel (PhenoSpex) on the topic “Value added chains in agriculture (e.g. in breeding, cultivation and phenotyping)”. Different aspects such as breeding and provision of sufficient biomass, as well as monitoring and optimization of the cultivation of plants were addressed. In the second session with the subject “Molecules and active compounds: Biotechnological production and use”, Dr. Peter Welters (Phytowelt), Daniel Grünes (Aquila Biolabs) and David Schönauer (SeSaM Biotech) introduced their companies and covered topics ranging from the isolation of value-adding components from biomass to the optimal cultivation of single-celled organisms and production of tailor-made enzymes. The companies introduced ranged from start-ups to small- and medium-sized companies up to large group consortiums. The keynote speeches then served as the starting point for round table discussions in small groups in the afternoon. The speakers of the morning were complemented by discussion partners Prof. Dr. Ulrich Schurr (BioSC) and Dr. Günter Strittmatter (IBR consulting). In such company, doctoral students had the opportunity to briefly introduce themselves and their projects and then enter into an intensive round of questions with the respective speakers. Both speakers and students felt this part of the day was especially effective and inspiring, since very different contributions were offered in the direct discussion round and by the different perspectives from participants from various disciplines of the bioeconomy.



## Events and Calls

### *Events (selected)*

#### **5<sup>th</sup> BioSC Spotlight "Moving the BioEconomy from Mind to Market"**

**February 4, 2019, Bonn**

Veranstalter: Bioeconomy Science Center

[More Information](#)

#### **BIO-raffiniert X - Neue Wege in der Nutzung biogener Rohstoffe?**

**February 26-27, 2019, Oberhausen**

Host: Fraunhofer UMSICHT

[More Information](#)

#### **CrossBEE - Massive Open Online Course "Biobased products for a sustainable (bio)economy"**

**January 16 - March 6, 2019**

Host: BIG-C

[More Information](#)

#### **Global Food Summit 2019**

**March 20-21, 2019, Munich**

Host: Global Food Summit

[More Information](#)

#### **German Biotech Days**

**April 9-10, 2019, Würzburg**

Host: BIO Deutschland & Council of German BioRegions

[More Information](#)

#### **BioMAT 2019: European Symposium & Exhibition on Biomaterials and Related Areas**

**May 8-9, 2019, Weimar**

Host: Deutsche Gesellschaft für Materialkunde e.V. (DGM)

[More Information](#)

#### **SynBio World Cafe**

**May 13, 2019, Darmstadt**

Host: German Association for Synthetic Biology (GASB)

[More Information](#)

#### **8th International Bioeconomy Conference**

**May 13-14, 2019, Halle/Saale**

Host: ScienceCampus Halle

[More Information](#)

## **12th International Conference on Bio-based Materials**

**May 15-16, 2019, Cologne**

Host: nova-Institut GmbH

[More Information](#)

## **Plant Based Summit**

**May 22-24, 2019, Lyon**

Hosts: Association for Plant Based Chemistry (ACDV), IAR- The French Bioeconomy Cluster and others

[More Information](#)

### ***Calls (selected)***

#### **Bioeconomy in the North (BMBF)**

**Januar 17, 2019 (first phase)**

Das Ziel der im Jahr 2017 gegründeten Initiative Bioeconomy in the North (BiN) mit Partnern aus Finnland, Norwegen und Deutschland ist es, Forschung und Innovation zu fördern, die zu neuen Produkten und Dienstleistungen aus Non-Food-/Non-Feed-Biomasseressourcen Nordeuropas führt.

[More Information](#)

#### **ERA-NET ERA MIN 2 „Ressourceneffiziente Kreislaufwirtschaft - Optimierte Produkt- und Stoffkreisläufe“ (BMBF)**

**January 31, 2019 (first phase)**

Das ERA-NET ERA-MIN 2 ergänzt die nationalen Förderaktivitäten im Bereich der Rohstoffeffizienz und Kreislaufwirtschaft. ERA-MIN 2 ermöglicht dabei die Zusammenarbeit deutscher Unternehmen und Forschungseinrichtungen mit akademischen sowie industriellen Partnern der beteiligten Länder in Forschungs- und Entwicklungsprojekten, die durch die internationale Zusammenarbeit einen Mehrwert gegenüber nationalen Projekten aufweisen.

[More Information](#)

#### **UMSICHT Science Award**

**Deadline: March 31, 2019**

The UMSICHT Friends and Patrons Group honors people who support the dialog between science and society through their work.

[More Information](#)