Log*Dynamics* News February 2016

Prof. Dr. Jens Pöppelbuß Receives Berninghausen-Prize for „Excellent Contemporary Lecture Format“

The Beringhausen-Prize for excellent lecture was awarded on the 25th of November 2015 for the 23rd time at the University of Bremen. With this prize, lecturers are honored for their exceptional engagement and special creativity. The prize is named after its founder Friedo Berninghausen. The prize winners were honored in the categories of „Excellent designed research project“, „Excellent contemporary lecture format“ and „Student prize“.

Log*Dynamics* member Prof. Dr. Jens Pöppelbuß was honored with the prize of „Excellent contemporary lecture format“. His lecture format in the „Business Process Management“ course is especially designed with practical work packages, which are done independently in a work group. The tasks can be performed utilising modern tools, which are also applicable in the working field. Quick and precise feedbacks were highlighted for his excellent support for this activity. The course was named multiple times as the best course in the Curriculum.

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Prof. Dr. Rolf Drechsler Elected in the DFG Review Board

For the German Research Foundation (DFG), Prof. Rolf Drechsler has been elected in the review board of „Computer science“ for the subject „Computer architecture and embedded systems“. Prof. Dr. Drechsler, Log*Dynamics* member since September 2015, is a professor in the Faculty of Mathematics/Computer Science and leads the research group of Cyber-Physical Systems in the German Research Center for Artificial Intelligence (DFKI).

The elected 48 review boards will start officially in spring 2016 and this position lasts for four years. The review boards are the most important advisory boards to evaluate and monitor research funds of the DFG. Together with Prof. Dr. Rolf Drechsler, there are four additional professors of the University of Bremen have been elected in DFG review boards. Since a long time, voices from

Bremen Research Cluster for Dynamics in Logistics

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Bremen have great significance in the DFG, the Europe-wide biggest research funding organization, due to high engagement of professors from Bremen in the DFG executive committee.

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Photo: Kai Uwe Bohn

The Berlin-Brandenburg Academy of Sciences and Humanities Honors Log*Dynamics* Member Prof. Dr. Frank Kirchner as Outstanding Robotics Scientist

Prof. Dr. Frank Kirchner, professor of Robotics at the University of Bremen and director of the research area Robotics Innovation Center of the German Research Center for Artificial Intelligence (DFKI GmbH), was elected as a full member in the Berlin-Brandenburg Academy of Sciences and Humanities (BBAW). With his election in the BBAW Professor Kirchner was honored for his outstanding achievements in the field of robotics. At the same time, this award gives a highlight that robotics field as a key technology, which significantly pushes research and development in Germany, particularly in the field of Industry 4.0.

The ceremonial admission in the technical-scientific class of the academy took place in Potsdam on the 27th of November 2015. With currently 182 members, who are distinguished representatives in their research fields, the BBAW is an interdisciplinary and transnational research association with excellent reputation. 76 Nobel Prize winners shape the reputation of BBAW, including Theodor Mommsen, Albert Einstein and Max Planck.

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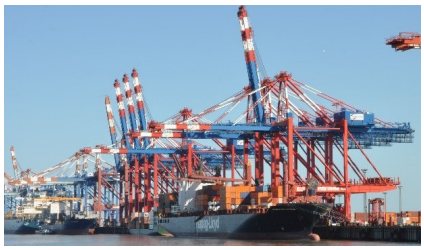
Photo: DFKI GmbH

Projects

Digitalization in the Seaport of the Future with Cloud as Basis for Industry 4.0 Standards



The state of Bremen counts as one of the highest performance harbor and logistic locations worldwide and offers as an internationally outstanding competence center in this field. One of the example is the new project „Process Innovation through Digital Services for the Seaport of the Future“ (ProDiS) with six partners from Bremen under the leadership of BIBA – Bremer Institut für Produktion und Logistik, University of Bremen.

The three and a half-year cooperation project deals with the optimization of processes in seaports. The project has a budget of 2.4 million Euro, supported partly by the Federal Ministry of Education and Research with around 1.9 million Euro, and is supervised by the Project Management Agency German Aerospace Center (DLR). In the consortium, the Institute of Shipping Economics and Logistics (ISL, Bremen) involves as a research partner of BIBA. Container-Service Friedrich Tiemann (Bremerhaven) as well as Kronschnabel

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und Franke Schwerlast Spedition (Bremerhaven) contribute as application partners to the project. The IT specialist for Cloud-solutions Axtrion (Bremen) and the Logistik Service Agentur (Bremerhaven) participate as service providers. Furthermore, the Maritime Cluster Northern Germany (MCN), VIA Bremen, the Bremische Hafenvertretung (BHV) and the Association of German Freight Villages (GVZ Bremen) are highly involved in the project.

The optimization along the value chain plays a decisive role in logistic process design when it comes to economic success. Processes get more and more complex and unmanageable, digitalization is required as well as a better integration of services and a more intensive use of new information and communication technologies. ProDiS research activities are intended to help and to increase the innovative strength of small and medium-sized companies.

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Photo: Sabine Nollmann

PräVISION – Methods Development for Preventative Increase of Work Safety on Forklift Trucks with the Implementation of an Assistance System through Fusion and Analysis of 2D and 3D Image Data

Every accident at work is a personal fate and an economic loss for the employer as well as the community. The operating range of motor-driven forklift trucks in in-house transport involves high potential dangers. Carelessness of the driver or persons nearby, poor visibility or its combination are often reasons for accidents at work, where employees may get harm. Modern sensors are able to capture 2D and 3D images of defined surroundings. The combination and consolidated analysis of both technologies enables an aggregation of their respective strengths. With 2D image, data contours and textures can be recognized, whereas 3D images provide information about spatial connections. Thus, the danger area can be automatically segmented with the help of 3D image data without great effort and afterwards it can be analyzed with robust and established methods of 2D image processing, for example.

In the scope of the research project PräVISION a combined analysis of 2D and 3D image data should be used for the development of an assistance system for forklift trucks, which is independent from any specific manufacturer. BIBA Institute carries out the project together with its project partners TU München Lehrstuhl FML, STILL, SICK as well as the Berufsgenossenschaft Handel und Logistik. The assistance system should be ready for an upgrade with any forklift truck from various manufacturers in order to be applicable for future tasks across all industries. In addition to that, conceptual perspectives and approaches are shown, which allow a scaling up of the assistance system to a safety system.

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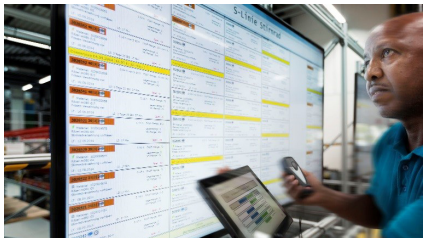
CyProS Project Conclusion: Cyber - Physical Systems for More Efficient Production Control



The project “Cyber-physical production systems – productivity and flexibility improvement through connection of intelligent systems in the factory“ is one of the first three research projects, which have been pushed forward by the Federal Government in the course of the Hightech Strategy as „Future Project Industry 4.0“. Cyber-physical systems (CPS) enable physical objects like machines, conveyor systems and products to capture, save and process data as well as the communication through digital networks. Embedded in existing IT systems, they are able to respond to situations. On the basis of their individual tasks they can make own decisions without external intervention and control processes. This allows flexible, adaptable and transparent production and logistic processes.

Cyber-physical production systems (CPPS) arise, due to the use of CPS. The aim of CyProS was to develop CPPS and to create the basis for their usage in the industry. Some of the tasks of BIBA within the joint project were involving the development of a cyber-physical logistic system as well as the adaption of autonomous control methods. A vivid example to use the new technology lucratively for production logistics is the „Milkrun 4.0“, a supply vehicle, which provides demand-based new supplies of materials in the factory of the future. Like the milkman, who only put a bottle of milk in front of the door, if an empty bottle was standing there, the „Milkrun 4.0“ delivers the needed material on optimized routes and ideal estimated times. The digitalization of the material flow and better connection of existing IT systems, compared to conventional systems, may reduce the effort up to 30 percent. The materials supply vehicle „Milkrun 4.0“, implemented in the CyProS project, shows the possibillity to design logistic processes more transparently and efficiently as Industry 4.0 basic technologies.

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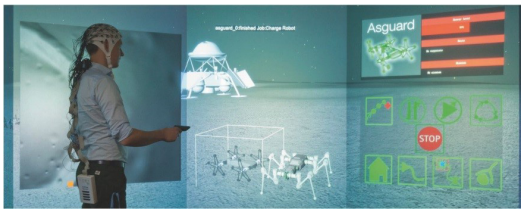
Photo: Wittenstein AG

DFKI Project Successfully Completed - Intelligent Robot Control through Adaptive Embedded Brain Reading



The Robotics Innovation Center of the German Research Center for Artificial Intelligence (DFKI) and the working group Robotics of the University of Bremen – both under the leadership of Prof. Dr. Frank Kirchner – have developed key technologies for the control of robots within the project IMMI (Intelligent Human-Machine-Interface). These key technologies allow real-time and adaptive Embedded Brain Reading in many application areas.

The space agency of the German Aerospace Center (DLR) supported the project over five years with around 3.7 million Euro. Neuroscientists, computer scientists, mathematicians, physicists and engineers worked together on an intelligent Human-Machine-Interface, which not only allows the intuitive and effective control of one or more robots, but also adjusts to changes of the user’s mental condition and alternating users on its own.

For the Embedded Brain Reading the operator wears an electrodes-equipped cap, which enables the system by means of electroencephalography (EEG), to measure the brain activity and to interpret specific changes of brain waves. These changes allow statements about the state of processing of presented information, about the operator's intentions or about the operator's cognitive utilization. In order to estimate the intended actions and the operator's task utilization precisely, researchers additionally count on electromyography (EMG) to measure muscular activity and on Eye-Tracking, which registers the viewing direction. Beside of applications in aerospace, the in IMMI developed technologies ought to be applied in medical rehabilitation as well.

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Photo: DFGKI GmbH

ZIM Funded-Project „NextGeneration Thermopack" Successfully Concluded

With total turnover of more than 12 billion Euro the frozen food market is an important market sector for logistics. In the scope of the project NextGeneration Thermopack, a new packing system for shipping of frozen food has been developed. Compared to conventional solutions, a much longer cooling period can be realized with the same amount of dry ice. This saves money and protects the environment. Designed as one-way solution, this new packing system uses only 100% - recyclable materials. The whole product development of the modular packing system has been supported by an environmental performance evaluation based on DIN EN ISO 14040 to reduce the use of climate-damaging styrofoam, for example. Using respective simulation and optimization models, a modular packing system has been developed, which is flexible to be adapted to different types of goods, temperature ranges and transport periods.

The development of the packing system has been made according to guidelines and requirements of the International Safe Transit Association (ISTA). Regarding the mechanical requirements, the development was orientated towards ISTA 3A (safety of goods towards mechanical damages) and ISTA 7E (proof of thermodynamic characteristics). During the product analysis, systematic identifications and evaluations of influential factors were realized using a static experiment design. Thus, product characteristics have been specifically adapted to the standardized testing and environmental conditions. As a result, use of materials as well as coolants can be reduced.

The prequalified packing system has been jointly developed by BIBA and the company K+S from Bremerhaven (Kühl- und Spezialtransporte GmbH) within a project period of 15 months. The packing system is exclusively distributed by K+S and project results were successfully presented to the public at the 32nd German Logistics Congress. The project was funded by the Central Innovation Program for SMEs (ZIM), which is a funding program of the Federal Ministry for Economic Affairs and Energy for small and medium-sized companies.

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Cooperation Agreement between IGS and Zhongyuan University of Technology

Promotion of cooperation in teaching, research and consultation to simplify international exchange of ideas and improvement of scientific achievements is one of the main aims of the new cooperation agreement between the International Graduate School for Dynamics in Logistics (IGS), University of Bremen and the Zhongyuan University of Technology (ZUT), China. Among other things, the cooperation includes exchange of students and researchers, joint research activities as well as joint organization of seminars and scientific meetings. Each university should send every year about the same number of participants to the respective partner university. The agreement has been initiated based on the intensive scientific exchange within the EU-funded Erasmus Mundus Program FUSION. Prof. Dr. Du Jianhui, vice president of ZUT, and Prof. Dr. Haasis, spokesman of IGS, signed the cooperation agreement on the 2nd of December 2015 in Bremen during the visit of a ZUT delegation in Europe.

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IGS Doctoral Candidates are „VIA BREMEN Logistics Ambassadors

Since end of 2015 the fourth round of „VIA BREMEN Logistics Ambassadors“, a programme initiated by the VIA BREMEN Foundation and the International Logistics department at Jacobs University, has started their activities. The new Logistics Ambassadors consist of not only participants from the Jacobs University but also the University of Bremen, which is represented for the first time. Three doctoral candidates of IGS, Kishwer Abdul Khaliq (Pakistan), Elaheh Nabati (Iran) and Molin Wang (China), will have a chance to learn for one year everything about the logistics sector in Bremen. As part of the programme‘s activities, they will be able take part in some company visits and study trips. For example, in December 2015 the participants visited the automobile and container terminal Bremerhaven, where they have gained insights into automobile logistics of BLG. The logistics ambassadors shall represent VIA BREMEN back in their home countries as well as communicate their enthusiasm for international logistics and particularly logistics business in Bremen there.

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IGS at the TU Dortmund

Logistics requires networks. This also applies already in education. The International Graduate School for Dynamics in Logistics (IGS) and the Graduate School of Logistics (GSofLog) of the TU Dortmund has started this networking on the level of doctoral candidates. In June 2015 this project started in Bremen with a scientific „SpeedDating“ programme. Within a few minutes the participants had to describe their research topic to the partner sitting in front of them and they had to identify interface point of research area and basis for research cooperation.

Topic of the second meeting in Dortmund in November 2015 was the analysis of research method. In small groups and in a plenary session, the scientists compared their used research methods, highlighted strengths and weaknesses and proposed recommendations. Through the network of GSofLog, industry-orientated doctoral candidates, and IGS, group of international doctoral candidates, an added value for publications and new approaches for logistics-related tasks is expected. The cooperation will continue further in 2016.

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Students of Nahda University visited BIBA

In November 2015 a group of Egyptian students from Nahda University visited the University of Bremen to gather information about study opportunities on-site. The TZI, which maintains contacts to Nahda University and supports its improvement concerning connections between industry/society and science, organized the program and took care of students during this time. Besides several institutes and working groups of the University of Bremen, the students also were introduced to BIBA and the LogDynamics Lab projects and activities during their visit to BIBA. Having insights to what German university may offer, reinforced the students‘ wish to take their master program in Bremen. The „Innovation Capability Center“ of TZI offers advice on management of universities, research centers and other scientific facilities to develop them into efficient and effective parts of the innovation cycle.

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5th International Conference on Dynamics in Logistics (LDIC 2016)

Date: 22nd – 25th of February, 2016
Venue: BIBA, Bremen

The 5th International Conference on Dynamics in Logistics (LDIC 2016) will be held from the 22nd to the 25th of February 2016 in Bremen. The conference, which was established by the Bremen Research Cluster for Dynamics in Logistics (Log*Dynamics*) in 2007, is dedicated to the identification, description and analysis of dynamic aspects in logistic processes and networks. The spectrum of topics reaches from modeling, planning and control of processes to supply chain management and maritime logistics to innovative technologies and robotic applications for cyber-physical production and logistic systems.

The LDIC 2016 will be held in Bremen in conjunction with the 7th IFAC MCPL 2016 – Conference on Management and Control of Production and Logistics. Here, topics reach from the information technology in control and management, modeling and control, concept, methods and algorithm of decision support systems, factory automation, robots and Human-Machine-Interface to engineering science.

The LDIC 2016 and MCPL 2016 provide a platform for scientific discussion on latest developments in the area of logistics and resulting applications in industrial practice. Furthermore, the conferences will be accompanied by several Satellite Events, for example the Internet of Things (IoT) Workshop and the Log*Dynamics* Summer School (LOGISS 2016).

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The Internet of Things (IoT) Workshop

Date: 24th of February, 2016
Venue: BIBA, Bremen

The IoT Workshop is one of the Satellite Events of the 5th International Conference on Dynamics in Logistics – LDIC 2016 and the jointly held 7th IFAC Conference on Management and Control of Production and Logistics – MCPL 2016.

Recent developments in the IoT sector are strongly connected to key subjects of the LDIC 2016. The term Internet of Things (IoT) describes the networking of everyday objects. While in the consumer sector many applications already exist, industrial application is still in its infancy. At the same time, IoT promises to deliver the technology for many applications of Industry 4.0 discussions. This IoT Workshop addresses industrial users, scientists, and doctoral candidates to discuss potentials of industrial IoT applications. Additionally, the aim is to discuss how latest technologies can be used for prototype solutions.

The purpose of the workshop is to gain knowledge of today's industrial IoT efforts and to discuss potentials and limitations of current IoT technology and infrastructure. To achieve this, one main cause of the workshop is a hands-on

prototyping session with the IoT team of the iotfablab and PTC ThingWorx, in which participants will create their very own IoT application either with a low-cost single board computer or even industrial PLCs. The second main cause of the workshop is the discussion about applications and business models for industrial IoT.

Participants of LDIC 2016 or MCPL 2016 can join the workshop without additional fees. Prospective participants can also obtain a one-day ticket for the workshop.

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Log*Dynamics* Summer School (LOGISS 2016)

Date: 29th of February – 4th of March, 2016
Venue: BIBA, Bremen

The complexity of logistic networks and systems is growing in today's globalized world. Individual customer requirements cause a significant increase in the number of product variants and services as well as shorter product life cycles. This implies new technical and economic challenges for logistic systems and processes. In order to meet these challenges, innovative control methods are required to flexibly adapt to continuously changing conditions. The ability to incorporate and utilize the dynamic aspect is essential for successful manufacturing and transport logistics. Moreover, it guarantees strategic advantages in terms of competitiveness on the world market, but also allows green and sustainable logistic solutions.

The goal of this course is to introduce students to methods and tools to develop distributed control algorithms and interfaces. To this end, students will learn how to use and combine logistic data (e.g. tour plans, bills of material, sensory data, demand forecasts, etc.). The idea is not only to provide students with the ability to use tools, which monitor and control flows (of material, energy, people, and information) in a variety of dynamic logistic environments (from global networks via urban areas to the production hall). Instead, the students will study information and algorithmic properties, which allow to increase efficiency, reduce emissions, or create robust processes on free scales. The course is designed for PhD students or advanced Master students in Logistics, Computer Science, Industrial Engineering, or related fields.

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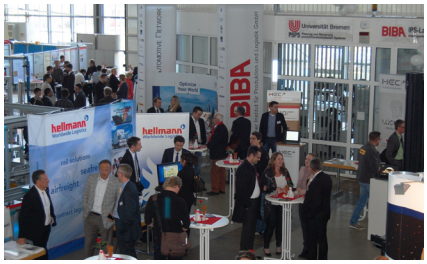
Day of Logistics: Digitalization in Logistics: Human – Technology – Organization



Date: 21st of April 2016
Venue: BIBA, Bremen

On the occasion of the Day of Logistics, the research cluster Log*Dynamics* organizes an event themed „Digitalization in Logistics: Human – Technology – Organization“ on 21st of April 2016. The event is co-organized by: Chamber of Commerce Bremen, VIA BREMEN and WFB - Bremen Economic Development Agency.

The event focuses on the cooperation between industry and science as well as the transfer of research results into practice. The aim of the event is to reveal numerous innovation potentials and developments in the field of digitalization of economy, especially in the logistics sector with exemplary applications and successful cooperations. A diverse program with short presentations, exhibitions and demonstrations of the latest research results will be offered during this event. For instance, technologies for the Factory of the Future, where products think on their own and humans work hand in hand with robots will be shown. An exhibition of renowned Bremen companies will give the opportunity to learn innovative technologies and their applications and to take part in expert discussions. This event will be concluded with a Get-Together.

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3rd International Conference on System-Integrated Intelligence (SysInt)

Date: 13th – 15th of June, 2016
Venue: Paderborn, Germany

The 3rd International Conference on System-Integrated Intelligence focuses on integration of new, intelligent functionalities into materials, components, systems and products to enable future technologies with enhanced capabilities.

The conference provides a forum for academia and industry, centered around 5 main topics:
1. Intelligent Systems: Enabling Technologies
2. The Future of Manufacturing: Cyber-Physical Production and Logistic Systems
3. Pervasive and Ubiquitous Computing
4. Structural Health Monitoring
5. Systems Engineering in Advanced Mechatronics

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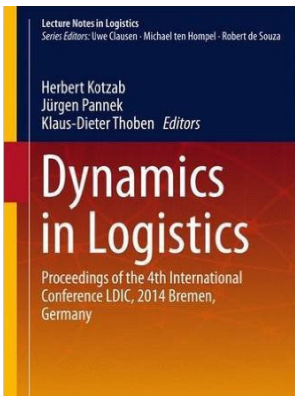
Publications

Dynamics in Logistics, Proceedings of the 4th LDIC 2014 Bremen



Proceedings of the 4th International Conference on Dynamics in Logistics (LDIC 2014) was published by Springer publishing company. The bi-annual conference focuses on the identification, analysis and description of dynamics in logistic processes and networks and it supports collaboration between theory and practice. The LDIC 2014 proved to be a forum for discussion about progress in the sector. It addressed scientists in logistics, operations research and computer science. Editors of the book are Prof. Herbert Kotzab, Prof. Jürgen Pannek and Prof. Klaus-Dieter Thoben.

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Available at: www.springer.com

International Graduate School for Dynamics in Logistics Publishes Research Report 2014/15

Logistics overcomes distances – and not only by routes of transportation. To guarantee smooth logistic flows in globally linked supply chains it is essential to perceive and consider diversity of cultures as well. Since 2005, the Graduate School for Dynamics in Logistics (IGS) has offered excellent scientists from all over the world the opportunity of an efficient and structured doctoral program in the LogDynamics research cluster. 56 young scientists from 23 countries have started their PhD in this program, 24 of them have already been awarded with a doctoral degree by the University of Bremen. The Research Report 2014/15 provides a kaleidoscope of research topics, results, training concepts and snapshots of the course of life in the IGS.

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