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Log*Dynamics* Newsletter August 2018

Projects

Next Generation Offshore Wind Energy Converters for Clean, Low Cost and Competitive Electricity

Offshore wind energy is a key technology for generating renewable energies. Due to its complex processes regarding installation, operation and service, and therefore relatively high costs, offshore wind energy converters still cannot compete with today's energy market prices. To create a competitive offshore WEC with a Levelised Cost of Electricity (LCoE) target of 35 Euro/MWh ReaLCoE takes a holistic approach and scrutinises costs in each link of the value chain.

As a key element of ReaLCoE, BIBA focuses on the digitisation of future offshore WECs and their adhered value chain. Besides the integration of sensors and the implementation of a condition-based monitoring system, the digital representation of the WECs through a digital twin ("product avatar") takes a major part in BIBAs contribution to ReaLCoE. Building on this, a concept for predictive maintenance will be developed and realized. Furthermore, BIBA will develop optimised logistic and installation concepts and will conduct various performance simulations for a further reduction of supply chain and installation costs. To validate the concept, a technology platform for a first prototype of a digitised 12+MW turbine as well as a pre-series array of 4-6 WEC will be installed, demonstrated and tested.

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Joint Project VIPE: Four-legged DFKI Walking Robot Supports Mars Exploration in the Robot Swarm

The development of a heterogeneous, autonomous robot swarm to explore the Valles Marineris on Mars is the focus of the research initiative VaMEx (Valles Marineris Explorer) of the DLR Space Administration. In the joint project VIPE, which has now been completed as a subproject of this initiative, the research area Robotics Innovation Center of the German Research Center for Artifical Intelligence (DFKI), under the direction of Prof. Dr. Dr. h.c. Frank Kirchner, has continued developing a swarming hominid robot platform that can climb over rocks and steep slopes. The up to seven kilometers deep rift valley of the

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Valles Marineris - the largest moat-breaking system in our solar system - is of great interest to science. Due to indications of water resources, previous volcanic activity and the shading of UV radiation, it fulfills the prerequisite for the existence of extra-terrestrial life.

Mountains, ravines and caves make the area extremely complex for exploration. However, a comprehensive exploration of the Valles Marineris has so far lacked a robot platform that can move even within the rugged rock formations and penetrate caves and crevices and navigate. This remaining gap in the swarm is closed by the four-legged hominid DFKI walking robot „Charlie“, which was further developed in VIPE. The cooperation partners of the Chair of Media Technology of the Technische Universität München and the NavVis GmbH developed innovative approaches of fully autonomous positioning and mapping, which enable Charlie to achieve a very low-drift position even under complex conditions. The researchers of the Robotics Innovation Center also developed a superior network intelligence, which decides which robot from the swarm is used depending on terrain and system capabilities.

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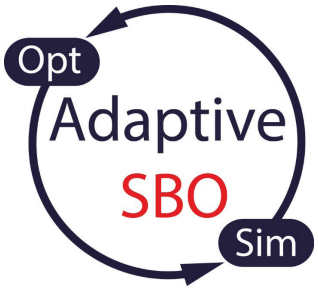
Details: https://robotik.dfki-bremen.de/en/research/projects/vipe.html
Image: DFKI GmbH, Thomas Frank

Begin of the 2nd Phase of the German-Brazilian Cooperation Project AdaptiveSBO



The project AdaptiveSBO is starting its second phase and will still be processed by a research group comprising scientists of the BIBA - Bremer Institut für Produktion and Logistik and the Federal University of Santa Catarina, Florianópolis, Brazil.

In the first project phase, a simulation-based optimisation method for controlling dynamic job shop production has been developed. The classical approach of simulation-based optimisation has been extended in such a way that the dynamics of job shop manufacturing are taken into account and the optimisation of planning decisions and control rules is always based on the current system state.

In the second project phase, a method for the integrated control of inventory, production and maintenance processes will be developed in order to map the current state of a production system in more detail. This means that maintenance orders can be scheduled for the machines in addition to the developed control method and the inventory stocks can be taken into account for planning and control. Both approaches will be combined to an integrated inventory, production and maintenance control method, which will then be evaluated in a real scenario using data from the industry partner Rudolph Usinados.

The project is funded within the BRAGECRIM program (Brazilian German Collaborative Research Initiative on Manufacturing Technology) by the German Research Foundation (DFG) in the period from April 2018 until March 2020.

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Predictive Intelligent Operation Management to Reduce the Risk of Icing of Wind Turbines

Wind turbines (WTG) and the rotor blades are exposed not only to special

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structural loads, but sometimes also to extreme environmental influences. Depending on the location of the plant there is a risk of ice formation, especially at lower temperatures and high humidity at the nasal edge of the rotor blades. Within the framework of the project PiB, a predictive intelligent operation to reduce the risk of icing of wind turbines and thus a new concept for an anti-icing system shall be researched by the University of Bremen and the consortium partners. The aim is not only to take into account the current investment situation as before, but to use a novel, comprehensive approach based on data mining and data analytics. In addition to the current SCADA data, this concept also includes historical and meteorological and life cycle data (previous operating / production, repair and status information). Moreover, the innovative system is not limited to a plant or a wind farm, but should in particular enable networking with other wind farms. The additionally available data and information should be used to develop a comprehensive picture of the individual risk of icing of each system under consideration.

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Personnel Changes

Log*Dynamics* Member Prof. Dr. Becker Appointed at the University of Applied Sciences Emden / Leer

Prof. Dr. Till Becker joined the University of Applied Sciences Emden/Leer on 1st of August 2018. He is Professor of Business Informatics at the Faculty of Business Studies at the campus in Emden. Previously, Prof. Dr. Becker was head of the cooperative research group „Production Systems and Logistic Systems“ at the Department of Production Engineering and at the Bremer Institut für Produktion und Logistik at the University of Bremen. In his new position he will work at the interface between the topics of digitalization, information flow, material flow, and business processes and will represent the area of Business Informatics in teaching. Prof. Dr. Becker is looking forward to continuing the interdisciplinary cooperation with the researchers in Log*Dynamics* in Bremen.

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Log*Dynamics* Member Prof. Dr. Buer Joins the German University of Technology in Oman (GUtech)

Prof. Dr. Buer joins the German University of Technology in Oman (GUtech). As of the upcoming winter semester he will contribute to develop an information technology-based logistics degree program as an associate professor. GUtech is developing into a technical university based on the German model and aims at becoming a leader in the Middle East. Following this goal, GUtech closely cooperates with RWTH Aachen University.

Prof. Dr. Buer earned his doctoral degree in information systems in 2011 at

the University of Hagen. Since 2013 he headed the research group on „Computational Logistics“ at the University of Bremen. In his research, he develops algorithms for the partial automation of decisions, in particular for inter-organizational planning, in (maritime) transportation as well as within container terminals.

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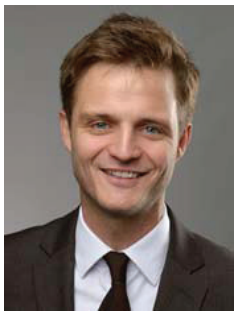
New Managing Director in the Log*Dynamics* Lab



Dr.-Ing. Matthias Burwinkel has taken over the position of managing director of Log*Dynamics* Lab from Dr.-Ing. Marco Lewandowski. After completing his studies in industrial engineering, Matthias Burwinkel researched and earned his doctorate in the field of automation of material and information flows in logistical processes. He also spent several years in the wind energy industry in a leading position. Since May 2018 he works for Log*Dynamics*. In addition to the well-established specialist topics of the lab, the focus is on the interplay between digital and physical logistical world, which should appeal to scientific and industrial partners, especially from the Northwest region.

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Details: www.logdynamics.de/lab.html?&L=1

Awards

Intelligent Technologies for Space Robotics - Project Entern Honored in 2018 for „Excellent Places in the Land of Ideas“

The project „Entern - autonomous robots for planetary exploration“ of the German Research Center for Artificial Intelligence (DFKI) and the University of Bremen was honored on 4th of June 2018 at the award ceremony in Berlin as one of the 100 innovative winners of the competition „Excellent Landmarks in the Land of Ideas“. In the space robotics project, the DFKI research area Robotics Innovation Center developed with the Robotics working group of the University of Bremen - both under the direction of Prof. Dr. Dr. h.c. Frank Kirchner - intelligent software solutions that enable robots to explore impassable terrain on foreign planets autonomously.

As potential locations for future base camps, extra-terrestrial caverns and craters are of great interest to space exploration. To scout them, robots are ideal. However, current systems do not yet have the necessary capabilities for exploring these impassable areas. In Entern, Bremen scientists developed innovative software tools that enable the semi-autonomous and fully autonomous operation of robots in hard-to-reach environments. This includes e.g. a space-suitable communication solution for the safe transfer of data between robot and ground station as well as an „in the loop“ simulation, in which the execution of the generated movement plan is simulated before it is actually executed by the system. The test platforms were the DFKI CREX and Asguard IV robots, which already proved their abilities when exploring lava caves on Tenerife. The project Entern was funded from October 2014 to December 2017 by the Federal Ministry for Economic Affairs and Energy (BMWi)

by the space management of the German Aerospace Center (DLR).

Contact: Prof. Dr. Dr. h.c. Frank Kirchner uk-hb@dfki.de
Details: https://robotik.dfki-bremen.de/en/research/projects/entern.html, https://land-der-ideen.de/en
Photo: DFKI GmbH

Internationalisation

Honorary Doctor for Professor Haasis

On the 26th of April 2018, Professor Haasis was awarded the title of „Honorary Doctor of Kyiv National Economic University after Vadym Hetman“ during a ceremony of the Academic Senate of the Kiev State University of Economics. In his subsequent keynote speech, Professor Haasis pointed out the importance of digitalization in production and logistics.

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Details: https://www-cps.hb.dfki.de/home
Photo: Universität Bremen

Professor Rolf Drechsler Appointed Adjunct Professor at the Indian Statistical Institute

Prof. Dr. Rolf Drechsler, Head of the Computer Architecture Group at the University of Bremen and Head of the Cyber-Physical Systems Research Unit at the German Research Center for Artificial Intelligence (DFKI), was appointed Adjunct Professor at the Indian Statistical Institute (ISI) in Kolkata on 7th of June 2018 in a festive ceremony. The ceremony took place in the context of the „Symposium on Algorithms, Architectures and Applications: Special Focus on Electronic Design Automation“, at which Professor Drechsler gave an invited lecture on the topic „Design and Verification of Cyber-Physical Systems - Challenges and Recent Developments“. The two-year visiting professorship comprises two stays per year at the Indian Statistical Institute (ISI). He will be part of the „Advanced Computing & Microelectronics“ group, which belongs to the „Computer and Communication Sciences Division“.

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Details: www.dfki.de/cps
Photo: Universität Bremen / DFKI GmbH

Events

World’s #1 Trade Fair for the Maritime Industry

Date: **4th - 7th of September 2018**
Venue: Hamburg

The SMM is the leading international trade fair for the maritime industry. From 4th -7th of September 2018, all

well-known representatives of the shipbuilding and shipbuilding-supply industry as well as experts from all over the world will meet in Hamburg to find out about innovations, forward-looking technologies and current trends in the field of digitalization. BIBA and ISL also present themselves with the Mittelstand 4.0-Kompetenzzentrum Bremen at the joint booth of the State of Bremen in **Hall B7, Booth No. 130**. The aim of the Bremen Competence Center is to promote small and medium-sized enterprises (SMEs) in their degree of digitalization as well as to increase the latter through individual support measures.

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Details: www.smm-hamburg.com

2nd MarSat Workshop: Maritime Industry Meets Space

Date: **6th of September 2018**
Venue: SMM Maritime Trade Fair, Room A 4.3, Hamburg

After the success of the 1st workshop, the MARSAT project partners cordially invite you to the 2nd MARSAT Workshop on Thursday, 6th of September 2018, 14.00 - 16.00 at the SMM Maritime Trade Fair in Hamburg, Germany. MARSAT, a network of four companies and a research institute, develops new innovative services to increase efficiency, safety and cost saving for the maritime industry based on satellite data services. These services include, amongst others, the optimization of ship routes, daily ice services or seabed and bathymetry mapping. Alongside shipping, the offshore industry and emergency and rescue services will also benefit from the new services. This workshop will provide again an excellent platform to discuss challenges and solutions for the maritime industry in the digital era with a strong focus on the contribution of modern satellite capabilities (Earth Observation), modeling services and data flows. The final results of MarSat, a 2.5 years research project, will also be showcased.

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Registration: MarsatWorkshop@eomap.de

Training Course on “Autonomous Control in Production and Logistics”

Date: **10th of September, 19th of November 2018**
Venue: Bremen

The BIBA factory of expertise on „Autonomous Control in Production and Logistics“ offers courses specifically for small and medium-sized companies to help them on their way toward the digital future. This training course applies to small and medium-sized enterprises in Germany and is held in German.

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Details: www.biba.uni-bremen.de/industrie/expertenfabrik/qualifizierung.html
Registration: www.mitunsdigital.de/veranstaltungen/selbststeuerung-in-der-produktion-und-logistik-4
Photo: clabeck.de

The Digital Presence: Cybercrime - Current Threats and Live Hacking

Date: **11th of September 2018**
Venue: Bremen

„The Digital Presence“ is a series of events offered in cooperation with the Mittelstand 4.0-Kompetenzzentrum Bremen, the bremen digitalmedia interest group and the Senator for Economics, Labour and Ports. As a result of digital change, companies are constantly facing new challenges that have to be overcome in a sustainable manner. With our series of events, we would like to invite small and medium-sized enterprises in particular to deal with various topics of digitization and to further educate themselves in dialogue with experts from the field. Each event is dedicated to a different digital theme. The participants have the rare opportunity to gain an insight into trend-setting projects of Bremen‘s institutes, companies and research institutions. It is particularly important to us that those interested discover the practical relevance of „abstract“ topics in a pleasant atmosphere and thus gain inspiration for their own digitization strategy. During the course of our event-series, innovative aspects of digitization are made perceptible and, at the same time, interesting contacts can be established and new impulses for one‘s own work can arise during the subsequent get-together. In the first event of our series we would like to talk to you about current and future cyber threats and how they can affect daily business processes.

In a live hacking session we demonstrate how easy it is for cybercriminals to break into other IT systems.

- See how hackers work and what exactly happens during a hacker attack using sample scenarios
- See how you can best protect yourself against cyber attacks
- Find out what role the human factor plays and why it is considered a weak point
- Learn why IT security doesn‘t always have to be expensive

Contact: Lisa Buschan lb@kompetenzzentrum-bremen.digital
Image: peshkov / fotolia.com

Innovation Workshop for SMEs - Leadership Agility... From the Concept of Trend to Effective Action

Date: **27th of September 2018**
Venue: Bremen

The increasing complexity and growing dynamics of digitalization require an increasing agility of the organizations and thus also of their managers. Traditional organisational and management tools are increasingly reaching their limits and companies are facing new challenges to their management systems. The workshop of the Mittelstand 4.0-Kompetenzzentrum Bremen, in which BIBA and ISL are involved, establishes the connection between agility and digitalization and shows how an agile management style on the way to digitalization leads to success. Learn how you can orientate yourself in the complex field of „Leadership Agility“. Get to know practical models and tools that can serve as suggestions for your own organizational development. Target group are managers and project managers of small and medium-sized companies, especially those who want to develop from conventional leadership to agile leadership in order to arm their organization for the digital world.

Registration Deadline: 20th of September 2018 lb@kompetenzzentrum-bre-

men.digital
Details: https://kompetenzzentrum-bremen.digital/events/innovationswerkstatt-fuer-kmu-leadership-agility-vom-trendbegriff-zum-wirksamen-tun
Photo: rawpixel / stock.adobe.com

35th German Supply Chain Congress: Digital Meets Real

Date: **17th - 19th of October 2018**
Venue: Berlin

The German Supply Chain Congress is one of Europe‘s most important event about logistics and supply chain management. Here, leading thinkers and logistics experts share knowledge and suggestions, as well as discuss recent and future issues. An important part from the start of congress is its ability to be a common ground for networking and future business opportunities.

The research cluster Log*Dynamics* is again taking part in the parallel exhibition. Following the 35th congress‘ motto „Digital Meets Real“, our presence is in the sign of digitalization. Our focus areas will be: digital communication, digital service, digital transport, digital product and digital transhipment. We would like to invite all congress participants to visit us at the Log*Dynamics* **Booth PV/23**.

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Details: https://www.bvl.de/dlk

ISL Maritime Conference 2018

Date: **23rd of October 2018**
Venue: Bremen

On 23rd of October the Institute of Shipping Economics and Logistics invites to the ISL Maritime Conference 2018 in Bremen and continues its traditional series of events. As in previous years, the participants can expect exciting lectures, discussions and forecasts on the current situation and perspectives of the global maritime industries. The speakers from business, science and politics will focus on digitalization and industry 4.0 in the maritime economy, its potential for maritime SMEs, as well as the development of shipping markets, ports and their hinterland.

Let yourself be inspired to take your first steps on the way to digitalization in the subject area „Digital Cargo Handling“ by lectures and discussions. We are pleased to welcome you to the ISL Maritime Conference 2018 at „Schuppen 2“ in the Überseestadt in Bremen together with this year‘s cooperation partner - the Mittelstand 4.0-Kompetenzzentrum Bremen.

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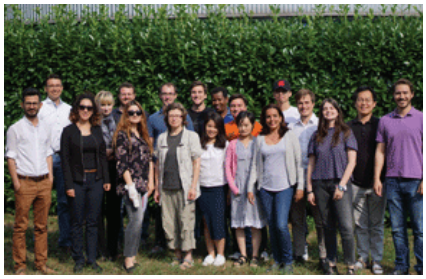
Details: www.isl.org/de/news/isl-maritime-conference-2018
Photo: ISL

Log*Dynamics* Summer School Internationally Attractive



The main theme of the third Log*Dynamics* Summer School (LOGISS), held at the University of Bremen from 16th to 20th of July 2018, was „Decision Support in Supply Chain Networks“.

The aim of the LOGISS series is to establish an international network of young scientists in the field of logistics, which promotes innovative ideas from different disciplines, as well as providing new opportunities and joint research. Target groups are master students and doctoral students with research subjects at the interface of logistics, computer science, business engineering or related fields.

The participants of the LOGISS 2018 were offered numerous lectures by well-known international scientists as well as lab sessions and field excursions. The following topics were discussed: Serious Games, Global Supply Chains, Mangerial Decision Making and Logistics Performance, Network Optimization and Sensitivity, and Network Decision Tasks. A total of 22 scientists from 14 countries attended the event

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4th International Conference on System-Integrated Intelligence (SysInt 2018)

The 4th International Conference on Systems-Integrated Intelligence took place in Hanover on 19th and 20th of June 2018 and was co-organized by Log*Dynamics*. The conference provided a forum for scientists and industry to share their innovations and practices. The focus was on integrating new, intelligent functionalities in materials, components, systems and products to provide future technologies with advanced capabilities. Around 80 participants took advantage of the opportunity to benefit from impulses on various topics around the future of machinery, products and production, provided in 28 sessions. Supplemented by the conference dinner, the event provided ample opportunity for discussion and networking.

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Details: www.sysint-conference.org
Photo: Leibniz-Universität-Hannover, IFW

Digitization Needs Pace! Business Leaders Discussed in the Practice Dialogue

On 8th of June another BIBA Practice Dialogue took place, this time with the

following question: „Are we making enough progress with digitization and new services and business models?“. In the series of events „Practice Dialogue“, the BIBA has been successfully bringing together executives from companies in various sectors for specific topics for several years. The topics are related to current research work by the BIBA. In facilitated moderated workshops with a small number of participants, an intensive, open exchange of experience is achieved and new ideas are generated together.

This time the partner and organizer of the practice dialogue was the company Saacke GmbH from Bremen. The company with production sites in Bremen, Croatia, China and Argentina as well as a worldwide service and sales network is one of the world market leaders for thermal processes and applications in the industrial and maritime sectors. The 15 participants first exchanged their assessments of the potential of digitization in relation to their respective services and internal and external processes. It was also discussed how well these potentials are already being developed. It was interesting that the potential for equipping the products with sensors, actuators and computing capacity is already considered to be well developed. When it comes to interfaces with suppliers and new business models, many participants still see unused opportunities. The anchoring of digitization among employees was discussed as a particular challenge in tapping the potential. Many companies are also faced with the question of how customers can be convinced to provide access to data. The participants agreed to continue the exchange in further workshops and to discuss actuall issues of the partners.

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Breakbulk Europe 2018 – a Great Success

Expectations were high. But in the end, they were even topped. The trade fair was hosted in Bremen for the first time and recorded about 500 exhibitors and more than 10,000 visitors. There were many opportunities to intensively connect with port experts from all around the world. „Bremen knows ports and Bremen knows trade fairs. With that combination no one can beat our service package.“, said Martin Günthner, Senator for Economy, Work and Ports after the three-day event. „I am pleased to prove again next year, that Bremen is an ideal location for this event.“

Breakbulk Europe is the leading trade fair for goods which cannot be shipped in containers. Before, the fair took place in Antwerp and was hosted in Bremen for the first time this year. Besides different ports and shipping lines, port-related industries showcased their services at the fair as well. Log*Dynamics* was involved as part of the Success Story at the joined exhibition stand of Bremen/ Bremerhaven: the best of Bremen‘s logistics research met the lively interest of the international industry.

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Details: www.breakbulk.com/events/breakbulk-europe-2018
Photo: bremenports GmbH & Co. KG