Log*Dynamics* Newsletter February 2021

25 years Log*Dynamic*s, 15 years IGS

2021 is a year of anniversaries: the University of Bremen celebrates its 50th anniversary. Fifty-five years ago, the Bremen ports introduced the first container. Log*Dynamics* has been successfully conducting logistics research in Bremen for 25 years. The interdisciplinary cooperation within the university and with external partners, such as the institutes BIBA, ISL and the Jacobs University Bremen, has become an integral part of the research and transfer landscape in the federal state of Bremen. The results of the research cluster are highly appreciated by business and science, both nationally and internationally. We want to emphasize the structured doctoral training through the International Graduate School for Dynamics in Logistics (IGS), with 50 graduates from 24 countries in the last 15 years.

We will celebrate the anniversary of Log*Dynamics* with several activities, including a lecture series on logistics topics from different disciplinary perspectives, webinars, virtual demonstrations in the Log*Dynamics* Lab, and intercultural encounters with the international doctoral candidates of the IGS, as well as with some alumni working worldwide. You can look forward to an exciting variety around the topic logistics!

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Projects ⏏

AI-based Assistance System for Concept Planning in Production and Logistics

TIntense global competition, shorter product life cycles, and an increasing number of variants require fl exible and adaptable, but also economical production and logistics systems. Due to this, companies announce tenders for the required logistics and production services. Logistics and production planners must react quickly to these tenders and develop a concept, including a cost estimate. The mentioned planning is currently done manually and requires a high level of expertise.

The time-intensive planning process shall be significantly shortened by an assistance system to become faster and more cost-efficient. In the BIBA - Bremer Institut für Produktion und Logistik GmbH project INSERT, a prototype of an artificial intelligence (AI)-based assistance system for concept develop-

ment for logistics and production planning is being developed. This assistance system supports the entire planning process and provides a platform for the development of logistics and production concepts.

The AI-based assistance system uses key data from the tender to design a rough concept. The AI is trained through historical planning concepts, expert knowledge, and operational data. Once the rough concept has been created, the planner has the opportunity to make adjustments. These adjustments are used to train the AI and to improve the performance of the AI in the future. Based on the adapted rough concept, a material fl ow simulation is automatically generated. The simulation compares the aim data of the tender with the performance of the logistics or production concept. On this basis, the assistance system generates suggestions to improve the concept. With this AI-based assistance system, both the planning and the simulation of production and logistics systems shall be simplified and considerably accelerated.

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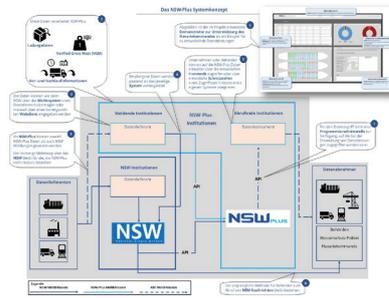Photo: hacohop/stock.adobe.com

NSW-Plus Connects Transport Players

The vision of NSW-Plus - in which ISL - Institute of Shipping Economics and Logistics is involved - is that all information relevant for a maritime transport, e.g. per voyage, port call or container, has to be provided only once - independent of member states, ports and other parties involved. For this purpose, the existing maritime National Single Window (NSW) for Germany will be enriched with safety-relevant and operational data on maritime

transports, which will be made available centrally to the maritime industry. This will enable transport operators to react more quickly in the short term and plan better in the long term.

With the implementation of the EU Reporting Formalities Directive 2010/65/EU, a central official reporting system for all German maritime traffic was set up in the form of the „National Single Window (NSW)". However, the information collected here is essentially administrative data; moreover, the exchange only takes place between companies subject to reporting requirements and authorities. However, all maritime transport stakeholders also require data for planning and operations. This data is exchanged using various additional channels, resulting in multiple reporting and different data formats. Through NSW-Plus, regulatory and transport-related data is transferred in just one reporting process - creating significant added value for all parties involved without much additional effort. In addition, data can be displayed or evaluated through special applications - via the Web or installed locally.

In the other pilot applications for verified container weight and for optimizing the coordination of container hinterland transports, all networked transport players were also able to exchange data with NSW-Plus, including direct integration of their existing information systems. This transport information was automatically available in the system in an up-to-date and standardized format, enabling short-term reactions to deviations from the transport plan and thus improving the planning of intermodal container transports.

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Further information on the project and short animation movies: www.nsw-plus.de
Photo: ISL

Optimized Resource Management in Steel Production

The steel industry is currently in a state of upheaval. Price pressure from the Far East meets a cost-intensive shift in production and logistics toward greater digitalization, energy efficiency, and climate protection. This is putting European steel producers under increasing pressure, making it more important than ever to exploit existing optimization potential.

The Combinatorial Optimization and Logistics research group at the Department of Mathematics/Informatics at the University of Bremen is making an important contribution to this at ArcelorMittal Bremen. A project on optimized resource management in the hot rolling mill has been successfully completed. The research group of Prof. Dr. Nicole Megow developed an efficient method for the allocation and scheduling of complex grinding processes for worn pairs of rolls. Interestingly, the problem combines classical combinatorial optimization problems, such as matching and scheduling problems, with the challenges of optimization under uncertainty. A short, rolling planning horizon and stochastic process durations require dynamic planning. Using methods from the field of mathematical optimization, the research group developed a solution procedure that effectively and efficiently controls grinding processes in practice.

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Photo: pixabay

Optimized Wind Turbines with Digital Twin

Bremen's ForWind-Center for Wind Energy Research (Bremen, Hannover, Oldenburg) coordination office has initiated a research project at the University of Bremen to preserve equipment, maintenance support, minimize expenses, and maximize wind yield. The aims of the project are the ecologically and economically optimum operation of the wind turbines

with the help of a digital twin. ForWind members, the Institute for Integrated Product Development (BIK), and the Institute for Electrical Drives, Power Electronics and Components (IALB) are working with eight partners to develop a research wind turbine within three years into a cyber-physical system. The title of the research project is Concept and design of a cyber-physical system for the holistic development of wind turbines (WindIO). Its total volume is 3.1 million euros, where 2.1 million euros are being funded by the German Federal Ministry for Economic Affairs and Energy as part of the 7th Energy Research Program of the Federal Government - Innovations for the Energy Transition. The project is supported by the project management company Jülich.

WindIO is intended to create a freely accessible, transparent data basis that is useful for the development and integration of new ideas and optimization approaches. This opens up completely new possibilities for comprehensive research activities with real field data, serving as a basis for technical as well as economic simulations for business model development. The WindIO system is to contribute to the significant improvement of the maintenance forecasts and the load-minimizing control of the wind turbines. It should be possible to guarantee optimum operation management by considering the individual boundary conditions. This contributes to a considerable reduction in the costs of energy generation and the best possible conservation of resources.

From Static to Dynamic - Synchronization of Logistics Processes Creates Added Value

Together with other partners, ISL - Institute of Shipping Economics and Logistics has spent the past three years researching how to control truck inflows and outflows at seaports more effectively in the future by means of an innovative process. In the SYNCHROLOG project, a technology-based service system for synchronizing handling and transport processes in intermodal logistics chains was developed and tested. The aim is to avoid congestion at terminal gates and chassis locations and to minimize negative environmental impacts caused by pollutant and noise emissions. In this way, costs can be reduced and the environment protected. The focal points of the project were: Specification and implementation of an IT demonstrator with different focal points, economic consideration and sustainability as well as the creation of an H0 demonstration model.

Using Bremerhaven as an example, the project partners built a system for pre-booking containers with a dynamic slot management system. The booking of a time slot for the delivery and/or collection of a container at the terminal is preceded by a simplified and effective pre-announcement. Unlike current static slot management systems, the transport status is continuously tracked via geo-coordinates and time stamps after the start of the journey and compared with the pre-calculated arrival time. If the booked slot can no longer be kept, the SYNCHROLOG system automatically books the next available slot, which can be kept according to advance calculation. Driver and dispatcher are informed e.g. via a smartphone app using text and voice or via an interface to the dispatching system. Slots that become free can be automatically transferred to other transports. Manual intervention in the process - a complete rescheduling by the dispatcher - is also possible if necessary. The knowledge gained in the project can also be used outside of ports for digital networking and synchronization of logistics chains - the added value can therefore be transferred to other areas.

Intelligent Use of Green Electricity in Industry: New Research Project at Jacobs University Bremen

The use of green electricity is a common practice for private households, but not for energy intensive industrial companies. How can they too succeed in consuming more electricity from renewable sources in the future? This is the subject of a project initiated by Hendro Wicaksono, Professor of Industrial Engineering at Jacobs University, together with SWT, the public utility company in Trier, and seven other scientific and economic partners. The three-year project is being funded by the German Federal Ministry of Economics and Energy with around 2 million euros. Around a quarter will go to Jacobs University.

A group of researchers from Jacobs University Bremen, the Karlsruhe Institute of Technology (KIT) and the Research Center for Information Technology (FZI) is

scientifically supporting the project. „It presents us with interdisciplinary research challenges in the fields of energy and data management, artificial intelligence and production optimization," explained Wicaksono, the scientific leader of the project.

The research project includes the integration and processing of data from heterogeneous sources, such as power plant, sensor, weather and production data. "Therefore, we are developing a concept of data management and data integration using semantic technologies and a service-oriented architecture," Wicaksono described the task. Semantic technologies serve as a key technology in the use of „big data". They help standardize different types of data, to combine and to merge them. The public utility company SWT operates more than 50 green power plants and is coordinating the project.

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Photo: Jacobs University

Research for Innovative and Seamless Goods Transport

ePIcenter will create an interoperable cloud-based ecosystem of user-friendly extensible Artificial Intelligence-based logistics software solutions and supporting methodologies that will enable all players in global trade and international authorities to co-operate with ports, logistics companies and shippers, and to react in an agile way to volatile political and market changes and to major climate shifts impacting traditional freight routes.

This will address the ever-increasing expectations of 21st century consumers for cheaper and more readily available goods and bring in Innovations in transport, such as hyperloops, autonomous/robotic systems (e.g. "T-pods") and new last-mile solutions as well as technological initiatives such as blockchain, increased digitalization, single windows, EGNOS positional precision and the Copernicus Earth Observation Programme. BIBA - Bremer Institut für Produktion und Logistik GmbH is one of the 36 partners in this project.

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"LAVIS" Feasibility Study Successfully Completed

Time and cost constraints are steadily increasing in hinterland port traffic. Planning the pick up of a container in the seaport is a particular challenge in import processes. A forecast of the „Estimated Time of Availability" should support transport companies in the future. ISL - Institute of Shipping Economics and Logistics, together with akquinet port consulting GmbH, has successfully evaluated the feasibility of a corresponding information service as part of the project "LAVIS - Intelligent Data Analysis for the Forecast of Cargo Availability in the Seaport" funded in the German mFund program.

An essential part of the project was the analysis of the application scenario. "It was important to us to understand the perspective of the transport company," explains ISL project manager Patrick Specht. "Over 90 percent of the companies surveyed in the project stated that transport customers are pushing for the containers to be picked up quickly in the seaport. This group confirmed that a forecast of cargo availability would be of great help."

From a technological point of view, the essential processes of a corresponding forecast application were integrated as part of an algorithm concept. The medium and long-term forecast of the expected time of unloading turned out to be a particular challenge. Since the planning of the terminal is only carried out immediately before the ship arrives, machine learning and simulation approaches were designed with which an indication can be provided at an early stage.

In addition, the project team discussed possible operator concepts for the forecast service with experts from the port industry. After a positive conclusion on the „Estimated Time of Availability" could be drawn in the feasibility study, a prototype implementation represents the next logical step. A service demonstrator, created in the project, with which the interaction of the Forecasting service can be illustrated in different scenarios can held wit search for suitable partners.

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Photo: ISL

Two More Years of Mittelstand 4.0 Kompetenzzentrum Bremen

The German Federal Ministry for Economic Affairs and Energy (BMWi) is funding the Mittelstand 4.0 Kompetenzzentrum Bremen for another two years as part of its „Mittelstand-Digital" initiative. After the expiration of the first funding phase from 2018 to 2020, the project coordinated by WFB Wirtschaftsförderung Bremen GmbH, in which BIBA - Bremer Institut für Produktion und Logistik GmbH and ISL - Institute of Shipping Economics and Logistics are involved as partners, has been extended until the end of 2022. Other project partners are OFFIS - Institute for Information Technology from Oldenburg and the Chair for SMEs, Buisness Start-ups and Entrepreneurship (LEMEX) at the University of Bremen.

The Mittelstand 4.0 Kompetenzzentrum Bremen is one of 26 competence centers nationwide and had set itself the goal over the past three years of promoting small and medium-sized enterprises in the northwestern metropolitan region in their state of digitalization and supporting them through individual measures. In doing so, the center in Bremen builds on a wide range of offers, in addition to events and trade fairs, above all on company visits and discussions, practical workshops and demonstrators. The balance sheet from 2018 to 2020 includes 325 company visits, 29 trade fair participations, 65 demonstration events, 80 innovation workshops, 85 training courses and online seminars, and 35 different projects with small and medium-sized enterprises.

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Photo: Tine Casper

ISL Active at Bremen digitalmedia

ASince January 01, 2021, ISL - Institute of Shipping Economics and Logistics is a member of bremen digitalmedia e.V., the association of media and information technology companies in the state of Bremen. Social and technical changes around the digital transformation affect all companies and also the entire value chain around the maritime industry. The current change is driven by the megat-

rend of digitalization, which, however, raises many questions: What does digital transformation mean? What does Industry 4.0 look like, what is changing? Where is it going? Where do we want to go? ISL will be working on answers to these and many other important questions surrounding digitalization together with the bremen digitalmedia e.V. network.

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Photo: pixabay

Maintenance of Wind Turbines - Soon Made Possible through Augmented Reality

In the research project „compARe", with participation of BIBA - Bremer Institut für Produktion und Logistik GmbH, an AR-based technical assistance system is developed that uses image processing methods to support service technicians in the maintenance of wind turbines. The project will focus on tasks that only allow defect detection by comparing the current status with a previously documented status or a target status. Thus, the system can help avoid damage to the WTG and increase maintenance measures' efficiency.
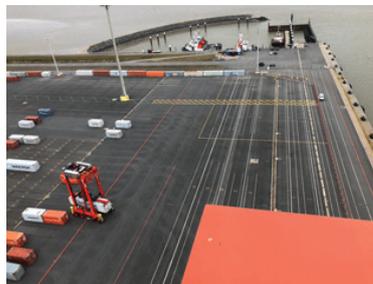

Employing AI-based image processing methods, such as Convolutional Neural Networks (CNN), defects in components can be detected, classified, and evaluated. Furthermore, the comparison of component states based on historical data is possible. Mobile assistance systems have proven to be very promising for the support of service technicians in wind energy. The use of these computing-intensive image processing methods on mobile devices is a challenge. However, it offers great potential in combination with mobile Augmented Reality (AR) technology. In this way, virtual information on the change of component conditions can be provided directly about the components concerned in the field of vision of the service technicians.

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Evaluation of the Automation of Straddle Carriers

German sea and inland ports are of structural importance for the export-oriented German industry. Since its development in the mid-twentieth century, container traffic underwent phases of both near unlimited growth and recession. Currently, terminal operators face a decline in container traffic growth, a constant increase in ship size, a market concentration through alliances, and the chances and challenges that arise in this environment through the digitalization of the value chain.

In this context, in order to evaluate both the technical feasibility and the profitability of an automation of straddle carriers in northern German mega container terminals, Eurogate and BIBA – Bremer Institut für Produktion und Logistik GmbH collaborated to initiate the now successfully completed research project STRADegy. The project was funded by the German Federal Ministry of Transport and Digital Infrastructure (German: Bundesministerium für Verkehr und digitale Infrastruktur, BMVI).

The project comprised essentially three phases. (1) A pilot installation was

erected at the container terminal in Wilhelmshaven (CTW), which enabled prototypical experiments under almost real life conditions. The pilot installation comprised four automated straddle carriers and additional quay cranes, truck access points and intermodal yard cranes to evaluate water and landside operations. (2) Based on the pilot installation, a simulation and emulation based approach was used to evaluate the automated systems' adequacy for the operational conditions of a mega container terminal. (3) In a third step, the profitability of the automation was assessed through a comprehensive cost simulation study.

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Photo: EUROGATE GmbH & Co. KGaA, KG

25 Years of Top International Research for Bremen at TZI

The Center for Computing Technologies (TZI) at the University of Bremen has been significantly contributing to the technological location Bremen since 1995. This year, the TZI is celebrating its 25th birthday. It is time to take a look into the past and the future of this strong research institute.

Each year, the TZI scientists work on an average of 120 research projects. This is often foundation research that builds the basis for technologies of the future – the researchers regularly project 10 or 20 years into the future. At the same time, a further core task is transferring application-related research findings into Bremen's economy quickly so that society can benefit. For example,the TZI is currently helping to establish a transfer center for artificial intelligence (AI) and working on the implementation of Bremen State's AI strategy. The TZI is also involved when it comes to the topic of open science, thus the free accessibility of research findings and the inclusion of diverse society groups into science.

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Weitere Informationen: www.uni-bremen.de/en/tzi,
www.uni-bremen.de/en/university/university-communication-and-marketing/25-jahre-internationale-spitzenforschung-fuer-bremen-am-tzi
Foto: Harald Rehling/Universität Bremen

Condition-Based Maintenance for Production Systems

Maintaining the proper functionality of manufacturing machines is a crucial factor in the automotive industry. Highly efficient maintenance systems are needed to stay competitive. In the course of the ongoing digitalization, new possibilities arise to further improve condition-based maintenance systems (CBM). Conventional condition monitoring systems demand a high level of domain expertise and manual tuning when implemented on individual machines.

The exhausting task of manually adapting condition-based maintenance systems for individual machines, which is typically done by multiple specialists from different areas, is set to be mostly automated. For this purpose, the project AutoCBM in which BIBA - Bremer Institut für Produktion und Logistik GmbH is involved, a machine learning based methodology will be developed to select suitable diagnostic and prognostic methods automatically.

A set of machine learning tools and conventional stochastic methods for time series analysis shall be combined to a learning algorithm in such a way, that the quality of the prognostics and its capability to detect anomalies in a manufacturing process can be improved over time. The core of the approach will be a meta-learning system for automatic selection and optimization of prognostic models via self-collected experience data. This way, the usual manual adaptation workload is set to be reduced.

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ISL Short Study on Hydrogen as a Basis for Future-Oriented Concepts

Logistics and the transport industry can derive considerable benefits from innovative concepts and climate-neutral processes based on hydrogen technologies. With its study funded by the Kieserling Foundation, ISL - Institute of Shipping Economics and Logistics lays the foundation for these concepts and procedures. In a first step, the energy requirements for fossil fuels of handling and logistics companies in the area of the Bremerhaven ports are determined by way of example. The application potential for C02-neutral hydrogen technologies will be determined on this basis. Both the direct application of hydrogen and the application of hydrogen products (power to liquid, power to gas) in exemplary subareas in maritime logistics will be considered. This potential for saving fossil fuels is another important step on the way to becoming a green port.

The aim is to identify potential for the application of hydrogen technologies in the port of Bremerhaven. All areas such as container terminals (e.g. van carriers), port railroad (e.g. shunting operations), port-side ship operations (e.g. tugs, workboats, ferries) as well as port access will be considered. Port operators, policy makers and other stakeholders in the port environment can base their further planning on hydrogen activities on the results of this analysis. The methodology of the study is also transferable to other ports. ISL also highlighted current technologies and prerequisites for the production, use and transport of hydrogen in a recently published thesis paper. The thesis paper can be downloaded free of charge: www.isl.org/index.php/en/position_paper_hydrogen

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Photo: pixabay

Quality Control in Industry 4.0

The i4Q project will provide a complete solution consisting of sustainable IoT-based Reliable Industrial Data Services (RIDS) able to manage the huge amount of industrial data coming from cost-effective, smart, and small size interconnected factory devices for supporting manufacturing online monitoring and control. The i4Q Framework will guarantee data reliability with functions grouped into five basic capabilities around the data cycle: sensing, communication, computing infrastructure, storage, and analysis and optimization; based on a microservice oriented architecture for the end users. With i4Q RIDS, factories will be able to handle large amounts of data, achieving adequate levels of data accuracy, precision and traceability, using it for analysis and prediction as well as to optimise the process quality and product quality in manufacturing, leading to an integrated approach to zerodefect manufacturing. i4Q Solutions will efficiently collect the raw industrial data using cost-effective instruments and state-of-

the-art communication protocols, guaranteeing data accuracy and precision, reliable traceability and time stamped data integrity through distributed ledger technology. The project i4Q will provide simulation and optimization tools for manufacturing line continuous process qualification, quality diagnosis, reconfiguration and certification for ensuring high manufacturing efficiency and optimal manufacturing quality. BIBA – Bremer Institut für Produktion und Logistik GmbH is one of the partners in this recently started project. It is funded by H2020.

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Individualized Series Production with 3D Printer Farms

The use of 3D printers has established itself as a recognized manufacturing process in recent years. In addition to rapid prototyping, the economical production of small series up to a quantity of 1 and the spatial decoupling of development and production/distribution are decisive advantages of this process. Creating printer farms, which require only a small amount of space and installation effort, decentralized production/distribution facilities can be created almost anywhere. To work optimally, it is necessary to develop quality control loops that are automated as far as possible and support the operators in recognizing and avoiding printing errors.

The research project, in which BIBA - Bremer Institut für Produktion und Logistik GmbH is involved, focuses on developing a novel software platform for operating 3D printer farms, with the innovations being determined mainly by additional in-situ and ex-situ sensor systems. For example, AI-based techniques will be used to capture product qualities and use this data to create self-learning quality control loops. This ensures that individual design elements are not consumed or damaged despite the adaptation of the standard models to the customers' individual foot scans.

A multi-layer platform is being developed that spans the entire process, starting with the design, printing, and final quality control. For the latter, 3D scans and optical cameras are used to generate measurement data through geometry testing and surface inspection, which is then incorporated into a „supervised learning" process. In this way, measurement data can be matched with CAD data underlying the models, with larger deviations indicating possible flaws. In addition to the difficulty of scanning transparent materials, the high degree of individuality of the models is a particular challenge, as this means that litt le generally valid training data can be generated.

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Awards ⏏

Start-up from BIBA Awarded with the Galileo Prize

Andreas Haselsteiner and Aljoscha Sander, who work at BIBA - Bremer Institut für Produktion und Logistik GmbH and the University of Bremen won the Galileo Prize Bremen for their startup idea "flucto". Their technology for tracking individual wind turbine components will address installation, maintenance and decommission of wind farms.

The company flucto aims at enhancing renewable energy generation with sensors, gadgets and software. Both founders worked on research projects dealing with the installation of offshore wind turbines, where they experienced the industry's challenges: big components that strongly move due to wind and wave and deciding when to install and when to wait for better weather. To tackle this challenge they developed an installation monitoring system that tracks wind turbine components in real time and provides this information to offshore personnel such that they can make smarter decisions. Instead of using only weather limits, installers can use the system to set movement limits for the components. The installation monitoring system will be launched in 2021.

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Award for BIBA at the WGAB Research Seminar

During this year's research seminar of the Scientific Society for Work and Business Organization (WGAB) on September 18 and 19, 2020 in Bremen, the BIBA contribution (Bremer Institut für Produktion und Logistik GmbH) „Concept and Evaluation Parameters for Gamification in Manual Assembly" was awarded as Best Staff Contribution. The authors are Dennis Keiser, Christoph Petzoldt, Thies Beinke and Michael Freitag. The content of the paper deals with the use of information-based assembly assistance systems to cope with the high product and process variance in industrial practice. A concept for the integration of gamification in manual assembly is presented, with a focus on the design of an evaluation study.

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Internationalization ⏏

Goal: Better Transport Chains in Cameroon

How can one change and improve the delivery chain of milk in such a way that only a little milk is lost due to cooling problems? This is only one of the numerous questions that the international research project NAVEL – Logistics Innovation Center Ngaoundéré is addressing. The international project, which is receiving funding of 300,000 euros from the German Federal Ministry of Education and Research (BMBF), has the aim of connecting many players in the logistics industry around the University of Ngaoundéré in inland Cameroon and making the implementation of innovation possible for them.

The example with the milk logistics has not been made up but is actually real. "On the one hand, this is a technical problem as the temperature of the milk should be efficiently observed throughout the entire change and be changed to suit the local conditions. On the other hand, it is a logistical and organizational task to bring together delivery chains that are currently rather relaxed and unofficial and to then operate them reliably," explains Anna Förster from the University of Bremen. The computer scientist and her colleague and project leader Hans-Dietrich Haasis from the Faculty of Business Studies & Economics represent the University of Bremen in the project. "When answering the questions and finding an acceptable solutions, considerable challenges – some of which concern the transport infrastructure, internet-based communication, and culture-based organization principles – must be considered,"

according to Haasis.

In NAVEL, scientists from the fields of logistics and business administration at the University of Ngaoundéré work together with business representatives and, above all, young entrepreneurs. In a logistics laboratory affiliated with the University of Ngaoundéré, the participants will come together to exchange ideas on technical and organizational innovations and develop concrete ideas.

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Photo: Prof. Dr. Dr. h.c. Hans-Dietrich Haasis / Universität Bremen

Introduction of "Sino-German Institute of Intelligent Technologies" - A Bridge for Sino-German Cooperation

The Sino-German Institute of Intelligent Technologies (Deutsch-Chinesisches Institut für Angewandte Forschung und Promotion - IFP) is an international platform for research on applied Industry 4.0 and Intelligent Logistics technologies and cultivation of technical talents with the unique feature of a Sino-German cooperation. IFP was set up by the Sino-German Park which is located in Qingdao, Shandong Province, China.

The successful German "Fraunhofer Gesellschaft" model - applied research work + talent cultivation - shall be well referred to by IFP in its functionalities: on one side IFP shall be well engaged in research, incubation, transformation and industrialization of the Industry 4.0 related intelligent technologies with the focus on Artificial Intelligence and Intelligent Logistics; while on the other side to cultivate top technological talents – through its research-project-based PhD programs (in cooperation with relevant German and local Chinese universities). In this way, the IFP can well make its contribution to the needs of local enterprises' technological upgrading and the economic transformation from the old growth drivers to the new ones in China.

The Sino-German Park, initiated in 2013, is the only Industrial Zone established in China per a written cooperation agreement between the Chinese government and the German Federal government. The IFP is jointly directed by Professor. Dr. Dianjun Fang who serves as the Chinese Director, and Professor Dr. Axel Kuhn who acts as the German Director. Prof. Dr. Fang is also the Chief Scientist and Chief representative in China of the Fraunhofer Institute for Material Flow and Logistics (IML) in Dortmund. Apart from the these two, there are also other acclaimed German experts as members of the IFPs Academic Committee. More than 30 professors from well-known German universities including RWTH Aachen, TUM, Dortmund University of Technology, University of Bremen, and Duisburg-Essen University contributed to the work of the IFP as guest researchers.

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Photo: IFP

Continuing International Exchange at the IGS

SSAPI is the acronym for a new Erasmus+ project of the International Graduate School for Dynamics in Logistics (IGS). It started on January 15, 2021 with a duration of three years and will be funded by EACEA in the field of „Capacity Building in the field of higher education". SSAPI stands for „Strategic Support for Accreditation of Programs and Internationalization at South Asian Higher Education Institutes" and describes a new approach of cooperation with Asian

partners from the former Erasmus Mundus projects of the IGS. Under the coordination of CUST (Capital University of Science & Technology), Islamabad, Pakistan, a total of nine universities from Bhutan, the Maldives, Pakistan, and Sri Lanka, with the help of experts from the Universidade de Evora, Portugal, and the University of Bremen, Germany, will adapt selected study programs to international standards in order to be more successful in accreditation, especially with regard to make the exchange of students with European universities easier. The analysis of currently existing structures and programs in the Asian universities will result in a draft of measures, which will be followed by an intensive phase of training and coaching, in which, in keeping with the style of the IGS, cultural differences will be taken into account in addition to content-related and administrative ones. Evaluation and accompanying quality assurance are regular parts of the project.

Log*Dynamics* can draw on many years of colaboration with Asian partners. In addition to intensifying the existing areas of cooperation, the research cluster hopes to contribute to the internationalization of the University of Bremen by facilitating the exchange of students after the successful completion of SSA-PI, so that Bremen students can literally demonstrate extensive international experience after graduation in the future.

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Details: www.ec.europa.eu/programmes/erasmus-plus/projects/eplus-project-details/#project/619438-EPP-1-2020-1-PK-EPPKA2-CBHE-JP
Photo: Dr.-Ing. Ingrid Rügge

Personnel Issues ⏏

Prof. Dr.-Ing. habil. Klaus-Dieter Thoben Appointed New Member of acatech

Prof. Dr.-Ing. habil. Klaus-Dieter Thoben, Head of the Department „Integrated Product Development" of the Faculty of Production Engineering at the University of Bremen and member of the Management Board of BIBA - Bremer Institut für Produktion und Logistik GmbH, was appointed as a new member at the General Assembly of the National Academy of Science and Engineering (acatech).

acatech is the national academy and voice of science and engineering funded by the German federal and state governments. Under the patronage of the German Federal President, acatech provides independent, fact-based and public-benefit-oriented advice to policymakers and society on issues relating to the future of technology science and technology policy. Members of acatech are admitted to the academy on the basis of their scientific achievements and reputation. They stem from the fields of engineering, natural sciences, medicine, humanities and social sciences. In the academy's projects, the scientific members work together with external experts from science and industry. The results of their work are presented to politics, business, science and the interested public in the form of publications and events.

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Details: www.en.acatech.de
Photo: BIBA

Prof. Dr. Aseem Kinra Inducted into the Steering and Scientific Committees of WCTRS

Prof. Dr. Aseem Kinra at the Professorship of Global Supply Chain Management has been inducted into the Steering and Scientific Committees of the World Conference on Transport Research Society WCTRS. WCTRS is one of the biggest societies within transportation research, with representatives in 67 countries around the World. The positions broaden the outreach of the University of Bremen as they provide a strong platform for researchers and educators from all over the world to exchange knowledge on important transport and logistics related matters from the German perspective. With the new role, the professorship intends to induce emerging opportunities within transportation research in the Bremen region, and in Germany. Prof. Kinra will also be co-chairing the SIG (Special Interest Group) B1– Logistics and Freight Transport Operations on Supply Chain Management in the future.

Contact: Prof. Dr. Aseem Kinra kinra@uni-bremen.de
Details: www.wctrs-society.com, www.uni-bremen.de/gscm
Photo: WCTRS and Elsevier Transportation Book Series

Events ⏶

Seminar Series „Production Data"

Dates: **February 25, March 11, March 25, 2021**
Venue: Online

The Mittelstand 4.0-Kompetenzzentrum Bremen in cooperation with BIBA - Bremer Institut für Produktion und Logistik GmbH is offering a three-part webinar series on the topic of production data acquisition. The webinars, with the participation of experts from Thyssen Krupp Systems Engineering, are aimed at small and medium-sized companies with their own production facilities that want to get started in digital data acquisition or review and expand their previous experience.

The first webinar on February 25 will show which data can be digitally captured, present concepts to increase production transparency and track production status in real time. The second webinar in this series on March 11 will use the example of a software product to show how data from different work processes can be brought together in one place and what evaluation options add value. The third webinar on March 25 will focus on data for quality assurance. In addition, further data analysis software for the production environment will be presented.

Contact: Henry Ekwaro-Osire eko@biba.uni-bremen.de
Details: www.kompetenzzentrum-bremen.digital/events/einstieg-in-die-produktionsdatenerfassung
(German)
Photo: ipopba/stock.adobe.com

Supply Chain Day

Date: **April 15, 2021**
Venue: Online

Logistics is more than just transport, storage and handling. At the Supply Chain Day, companies from industry, trade and logistics services provide the public with insights into

the variety of logistics tasks. Logistics institutes present their research projects, educational institutions present their offers. The Log*Dynamics* research cluster is also helping to shape the Supply Chain Day 2021 and, together with BIBA – Bremer Institut für Produktion und Logistik GmbH and the Mittelstand 4.0 Kompetenzzentrum Bremen, is hosting a virtual event under the motto „Future of Work in Logistics". Look forward to keynote speeches from business and science, an interactive panel discussion, and a virtual tour of the BIBA research hall and the Log*Dynamics* Lab.

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Details: www.tag-der-logistik.de/en

Human-Technology-Interaction in the Digitalized Work Environment - WGAB Visists BIBA

On September 18 and 19 BIBA hosted the research seminar of the Wissenschaftliche Gesellschaft für Arbeits- und Betriebsorganisation (WGAB) 2020. The focus was on the topic „Human-Technology Interaction in the Digitalized Work Environment". Despite corona-related travel restrictions, many WGAB members were able to attend the seminar. Although the scientific exchange took place with some distance, it was no less stimulating and intensive. The following topics were discussed: Digital planning of hybrid work systems, potentials of human-robot collaboration, digital twin for human-technology interaction and last but not least home office before, during and after the corona crisis.

During the seminar, three new members, including the host Prof. Michael Freitag, were accepted as members of the WGAB. Furthermore, Dr. Birgit von See was awarded the WGAB dissertation prize by the TU Hamburg-Harburg for her work „A Framework for Action for the Digital Transformation of Value Networks". Dennis Keiser from BIBA accepted a prize for „Concept and Evaluation Parameters for Gamification in Manual Assembly" as the best employee contribution. A guided tour in the BIBA research hall completed the program. The proceedings of the WGAB research seminar are published by Gito-Verlag: https://library.gito.de/node/415.

Contact: Prof. Dr.-Ing. Michael Freitag fre@biba.uni-bremen.de,
Dr.-Ing. Hendrik Stern ste@biba.uni-bremen.de
Photo: Miriam Gutjahr/BIBA

System-Integrated Intelligence: Virtual Exchange at SysInt 2020

The 5th International Conference on System-Integrated Intelligence (SysInt) took place from November 11 to 13, 2020. The conference, which was first held in 2012, moved online this year due to the COVID-19 pandemic. The forum for academia and industry focuses on the latest innovations and practices in the field of system-integrated intelligence and is a joint event hosted by the Universities of Bremen, Hanover and Paderborn, with Log*Dynamics* as one of the co-organizers and host of the conference 2020. The event centered around the integration of new, intelligent functionalities into materials, components, systems and products.
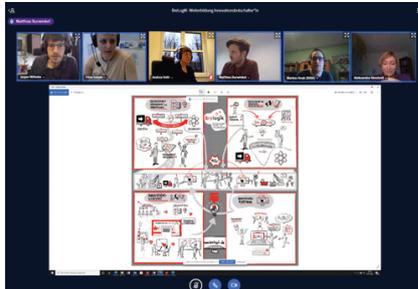
The program comprised 58 papers, three keynote speeches and three virtual guided tours. It spanned the spectrum of content and methodologies relating to current research in the area of system-integrated intelligence. Two contributions were awarded: The Best Paper Award went to Jhohan Chavez Vega,

Philipp Schorr, Tobias Kaufhold, Klaus Zimmermann, Lena Zentner, Valter Böhm for the Paper „Influence of Elastomeric Tensioned Members on the Characteristics of Compliant Tensegrity Structures in Soft Robotic Applications". The Commended Paper Award was awarded to the contribution „Data-driven Context Awareness of Smart Products in Discrete Smart Manufacturing Systems" by Jürgen Lenz, Valerio Pelosi, Marco Taisch, Eric MacDonald and Thorsten Wuest.

Contact: Aleksandra Himstedt him@biba.uni-bremen.de
Details: www.sysint-conference.org,
www.sciencedirect.com/journal/procedia-manufacturing/vol/52/suppl/C
Photo: Peera/stock.adobe.com

Virtual Regional Conference of the Mittelstand 4.0 Kompetenzzentrum Bremen

The regional conference of the Mittelstand 4.0-Kompetenzzentrum Bremen on November 25, 2020, which was co-organized by BIBA - Bremer Institut für Produktion und Logistik GmbH and ISL - Institute of Shipping Economics and Logistics (as partners of the center), focused on the topics of digitalization and sustainability. In a varied mix of keynote speeches, project presentations, demonstrations and discussion rounds, it was shown how digitalization can help medium-sized and small companies to deal with resources in a sustainable manner.

Dr. Saskia Dörr kicked off the event with a keynote interview on the topic of „Economic, Ecological, Social - This is how Corporate Responsibility Works in the Digital Age". She showed that entrepreneurs have a significant influence on the big picture through their corporate management and the design of their own business processes. Digitalization that takes sustainability into account is therefore an essential step toward modern, responsible entrepreneurship. How digitally supported workflows and business processes can simplify the sustainable use of resources became tangible through concrete projects that the Competence Center has carried out together with companies from the region. The virtual tour in the BIBA research hall in 3D space was one of the highlights of the conference.

Contact: Stefan Wiesner wie@biba.uni-bremen.de
Details and Recording: www.kompetenzzentrum-bremen.digital/rk2020 (German)
Photo: Leefje Roy

International Dialog on Subject-Oriented Business Process Management

S-BPM ONE 2020, the 12th International Conference on Subject-Oriented Business Process Management, originally planned to be held at BIBA - Bremer Institut für Produktion und Logistik GmbH in Bremen in July, has now taken place as an online conference on December 2-3, 2020. Its theme was „The Digital Workplace - Nucleus of Transformation" and a good part of the presentations addressed modeling, analysis and management of business processes in cyber-physical and Industry 4.0 processes. More information can be found at s-bpm-one.org. Herbert Kindermann's keynote address and the 15 accepted papers of the conference are documented in the conference proceedings, which are published in the Springer series Communications in Computer and Information Science (CCIS) as Volume 1278

(see www.springer.com/gp/book/9783030643508).

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Details: www.s-bpm-one.org
Photo: BIBA

Successful Start of the Qualification of Scientific Innovation Ambassadors

As part of the BreLogIK project (short for „Bremen Logistics Transfer and Innovation Culture", in which Log*Dynamics* is involved) 13 young scientists from various disciplines are being trained as scientific innovation ambassadors. From January 12 to 14, 2021, the first training event took place as a digital conference. 19 experts offered exciting insights into current developments in the logistics industry, politics and science in the state of Bremen.

The range of topics covered digitalization in the logistics sector, Bremen's strategy for port development, electromobility, and the possibilities of using hydrogen. The participants come from different scientific institutions in Bremen and all have a broad background. The qualification is designed to support the opportunity of direct networking among the participants in order to develop interdisciplinary project ideas and to carry them into Bremen's logistics industry. After the scheduled completion of this qualification in July 2021, the newly trained innovation ambassadors will support regional logistics SMEs in raising their innovation potential. The next workshop is scheduled for the end of March 2021.
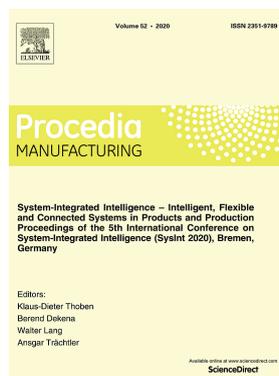
Contact: Eva Heumann Heumann@isl.org, Wiebke Duhme Duhme@isl.org
Details: www.brelogik.de/weiterbildung (German)
Foto: BreLogIK

Publications ⏏

System-Integrated Intelligence – Intelligent, Flexible and Connected Systems in Products and Production

Proceedings of the 5th International Conference on System-Integrated Intelligence (SysInt 2020), Bremen, Germany
Edited by Klaus-Dieter Thoben, Berend Denkena, Walter Lang, Ansgar Trächtler

This volume contains the collected research and development activities presented at the 5th International Conference on System-integrated Intelligence (SysInt). The SysInt conference series deals with the integration of new intelligent functionalities into materials, components, systems and products. The conference 2020 offered a virtual platform for science and industry and focuses six main topics: Intelligent Systems: Enabling Technologies and Artificial Intelligence; The Future of Manufacturing: Cyber-Physical Production and Logistic Systems; Pervasive and Ubiquitous Computing; Structural Health Monitoring; Systems Engineering; Soft Robotics and Human-Machine-Interaction.

Contact: Aleksandra Himstedt him@biba.uni-bremen.de
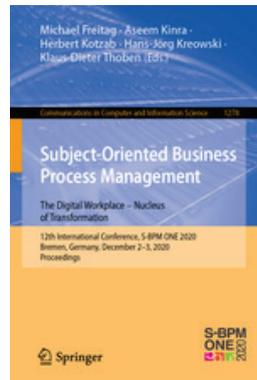Details: www.sciencedirect.com/journal/procedia-manufacturing/vol/52/suppl/C

Subject-Oriented Business Process Management. The Digital Workplace – Nucleus of Transformation

12th International Conference, S-BPM ONE 2020, Bremen, Germany, December 2-3, 2020, Proceedings
Editors: Freitag, M., Kinra, A., Kotzab, H., Kreowski, H.-J., Thoben, K.-D. (Eds.)

This book constitutes the refereed proceedings of the 12th International Conference on Subject-Oriented Business Process Management, S-BPM ONE 2020. The papers are thematically organized according to the following sections: Subject-oriented Business Processing – Syntax and Semantics; Cyber-Physical and Assistance Systems; Process Mining and the Internet of Actors and Behaviors; Industry 4.0; various views on business process management.

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New Strategic Global Supply Chain Network Design

Ph.D. student Juri Reich, together with Professors Aseem Kinra and Herbert Kotzab has published a new study "Strategic global supply chain network design – how decision analysis combining MILP and AHP on a Pareto front can improve decision-making" in the International Journal of Production Research. By employing an in-depth case-study in the med-tech industry, the study contributes with an innovative decision support framework from a practitioner's perspective and generates prescriptive, instrumental knowledge for better managerial decision-making for the global supply chain design problem. The article is open access and may be downloaded here:
www.tandfonline.com/doi/full/10.1080/00207543.2020.1847341

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Photo: Taylor & Francis Online

Virtual Tour through the BIBA Shop Floor and Log*Dynamics* Lab

Log*Dynamics* sees the transfer of scientific results to the economy and society as one of its essential tasks. In the course of digitalization, the Log*Dynamics* Lab now also has a virtual image and is available for a virtual visit with numerous demonstrators. Please feel free to enter and experience exciting insights into our research and transfer activities through the virtual tour: www.virtual-biba.de.

Contact: Aleksandra Himstedt him@biba.uni-bremen.de
Photo: Marcus Meyer/Matterport

Call for Papers: Symposium "Offshore Wind Turbines – Challenges and Potentials"

As offshore wind is gaining traction and turbine technology is maturing, increasing turbine sizes lead to challenges during installation and maintenance. Furthermore, with the emergence of floating wind farms, a novel class of engineering problems for offshore logistics arises. The installation of the offshore wind turbines (OWT) make up a large portion of the capital expenditures involved in the development of offshore wind farms, thus time-efficient installation methods are crucial for making cost-effective projects.

This highly promising topic will be addressed by the symposium „Installation of Offshore Wind Turbines - Challenges and Potentials", which will be held virtually as part of the Wind Energy Science Conference from May 25 to 28, 2021. BIBA - Bremer Institut für Produktion und Logistik GmbH will co-chair the symposium and focus on the integration of science and industry around the topic of installation of offshore wind farms. Contributions to the symposium are welcome and can be submitted via the conference website.

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Details: www.wesc2021.org/en/submissions-registration/call-for-abstracts
Photo: Trianel Windpark Borkum II GmbH

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