KSB-Stiftung – Förderungen 2018

Jannis Dickmann Fachbereich Physik	**Konferenz** SPIE Medical Imaging Houston, Texas, USA, 10.-15. Februar 2018
Michael Appold Fachbereich Chemie Ernst-Berl-Institut für Technische und Makromolekulare Chemie Dr.-Ing. Markus Gallei	**Konferenz** 225th ACS National Meeting @ Exposition New Orleans, Louisiana, USA, 18. bis 22. März 2018
Rosemarie Gauglitz Fachbereich Humanwissenschaften Institut für Psychologie – Arbeitsgruppe Organisations- und Wirtschaftspsychologie Professorin Dr. Nina Keith	**Konferenz** 33rd Annual Conference oft he Society for Industrial and Organizational Psychology Chicago, Illinois, USA, 19.-21. April 2018
Lucia Wright M.Sc. Fachbereich Architektur Fachgebiet Entwerfen und Stadtentwicklung | URBANgrad Professorin Dr.-Ing. Annette Rudolph-Cleff	**Konferenz** Young Water Leader Summit (YWLS) Singapur, 7.-12. Juni 2018
Sven Winkelhaus Fachbereich Rechts- und Wirtschaftswissenschaften Fachgebiet Produktions- und Supply Chain Management Dr. Eric Grosse	**Konferenz** Information Control Problems in Manufacturing (INCOM) 2018 Bergamo, Italien, 11.-13. Juni 2018
Dipl.-Phys. Tobias Bier Fachbereich Rechts- und Wirtschaftswissenschaften Multimodalität und Logistiktechnologien Junior-Professorin Dr. Anne Lange	**Konferenz** European Conference on Information Systems 2018 (ECIS 2018) Portsmouth, UK, 26.-28. Juni 2018
Tamara Winter Fachbereich Chemie Ernst-Berl-Institut für Technische und Makromolekulare Chemie Dr.-Ing. Markus Gallei	**Konferenz** 256th ACS National Meeting and Exposition Boston, Massachusetts, USA, 19.-23. August 2018
Makusee Masae Fachbereich Rechts- und Wirtschaftswissenschaften Fachgebiet Produktion und Supply Chain Management Professor Dr. Christoph Glock	**Konferenz** 20th International Symposium on Inventories Budapest, Ungarn, 20.-24. August 2018

Vereinigung von Freunden der Technischen Universität zu Darmstadt e.V. – Ernst-Ludwig-Hochschulgesellschaft

KSB-Stiftung – Abschlussbericht über die Verwendung der Fördermittel 2018

Nachwuchswissenschaftler

Jannis Dickmann
Fachbereich Physik

Konferenzreise

SPIE Medical Imaging
Houston, Texas, USA, 10.-15. Februar 2018

Abstract

A Count Rate-Dependent Method for Spectral Distortion Correction in Photon Counting CT
Computed tomography (CT) is a standard imaging technique used in clinics worldwide. In the context of cancer treatment, it allows for diagnosis as well as treatment planning. Novel photon counting detectors allow for the detection of more detailed contrasts such as the decomposition of the image into contributions from different materials. Rawdata-based material decomposition relies on a precise forwardmodel. This requires extensive system-specific measurements or calibration techniques. Existing calibrations either estimate a detected spectrum and are able to account for spectrally distorted assumptions or correct the predicted count rate using a correction function and can accommodate for count rate-dependent effects such as pulse pileup. We propose a calibration method that uses transmission measurements to optimize a correction function that, unlike existing methods, depends both on the photon energy and the count rate. It is thus able to correct for both kinds of distortions. In a simulated material decomposition into water and iodine, the error was reduced by 96 % compared to the best performing reference method if only pulse pileup was present and reduced by 23 % if additionally spectral distortions were taken into account. In phantom measurements using a Dectris Pilatus3 detector, the proposed method allowed to reduce the error by 27 % compared to the best performing reference method. Artifacts were below the noise level for the proposed method, while the reference methods either showed an offset in the water region or ring artifacts.

KSB-Stiftung – Abschlussbericht über die Verwendung der Fördermittel 2018

Nachwuchswissenschaftler

Michael Appold
Fachbereich Chemie
Ernst-Berl-Institut für Technische und Makromolekulare Chemie
Dr.-Ing. Markus Gallei

Konferenzreise

225th ACS National Meeting @ Exposition
New Orleans, Louisiana, USA, 18. bis 22. März 2018

Abstract
Structure Formation of Block Copolymer Based Photonic Materials and Functionalization Strategies
Self-assembly of block copolymers (BCPs) drives structure formation on the nanometer length scale in the bulk state or in selective solvents and it is a promising way for the preparation of tailor-made materials. Moreover, such BCPs can consist of stimuli responsive polymers that are addressable by external triggers like pH, light, redox reagents or electrical field yielding in novel smart materials. The presentation will focus on sequential and one- pot anionic polymerization of ultra-high molecular weight BCPs that combine elastomeric and hard materials. Furthermore, the structure formation in the bulk state and in selective solvents is shown. Some recent examples for the fabrication of photonic materials in the bulk state featuring excellent structural colors will be given. Additionally the functionalization of polystyrene-*block*-polyisoprene (PS-*b*-PI) with stimuli-responsive moieties via postmodification will be highlighted and discussed in more detail.[2] By taking advantage of the sidechains of PI the 1,2-moieties can be selectively hydrosilylated with chlorosilanes followed by anionic grafting-to of active polyvinylferrocene (PVFc) or poly-2-vinylpyridine (P2VP) chains yielding redox or pH responsive grafted BCPs.[3,4] As shown in Figure 1 this strategy reveals adjustable nanostructures, starting from the lamella morphology of PS-*b*-PI leading to PS spheres with different domain spacing in the case of P2VP or yielding PI lamellae incorporated with PVFc spheres. The combination of the herein presented preparation strategies will pave the way for photonic applications and optical sensing in the future.

Nachwuchswissenschaftlerin

Rosemarie Gauglitz

Fachbereich Humanwissenschaften

Institut für Psychologie – Arbeitsgruppe Organisations- und Wirtschaftspsychologie

Professor Dr. Nina Keith

Konferenzreise

33rd Annual Conference of the Society for Industrial and Organizational Psychology

Chicago, Illinois, USA, 19. bis 21. April 2018

Abstract

Positive Effects of Perceived Appreciation at Work

We propose positive effects of perceived appreciation on work outcomes. We base this prediction on social exchange theory and the norm of reciprocity. In a cross-sectional (N=183) and a longitudinal (N=117) study, appreciation positively predicted employee engagement and OCB. A moderating effect of reciprocity norms further supports our view of appreciation as a socioemotional resource at work.

Press Paragraph

Will an employee who feels appreciated do more than what is expected? The present research seeks to answer this question. We expected employees who feel appreciated at work to return this favorable treatment with behavior that benefits the organization and goes beyond mere job requirements. We explain this response with social exchange (i.e. a person receiving a favor feels obligated to return it in some way). Across two studies we showed that perceived appreciation positively affected work outcomes. Moreover, the effect of perceived appreciation on engagement at work was also stronger for employees who closely keep track of all the favors they receive to appropriately repay them. Our results imply that perceived appreciation acts as a socioemotional resource that is exchanged at work.

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Nachwuchswissenschaftlerin

Lucia Wright M.Sc.
Fachbereich Architektur
Fachgebiet Entwerfen und Stadtentwicklung | URBANgrad
Professor Dr.-Ing. Annette Rudolph-Cleff

Konferenzreise

Young Water Leader Summit (YWLS)
Singapur, 7. bis 12. Juni 2018

Abstract
The program included a networking event hosted by PUB (Public Utilities Board of Singapore) and IDA's (International Desalination Association) Young Leaders' Program, which provided the opportunity to get to know the other 70 fellow young water professionals coming from 35 different countries. Also, brilliant keynote speakers Prof. Kala Vairavamoorthy, executive director of IWA (International Water Association), and Ms. Sim Ann, senior minister of state in Singapore enabled a discussion with peers on global water needs and how to support the Agenda 2030 to achieve the Sustainable Development Goals. The sessions where interconnected with the **World Cities Summit** and the **Clean Enviro Summit**, where different debates revolved around sustainable urban solutions, resilient water futures, and approaches to water management and sanitation.
Thanks to PUB and the organizing committee of the Singapore International Water Week, I attended a site visit to the Tuas Desalination Plant. All in all, it was a great opportunity to network, establish new contacts, and touch base with former mentors and colleagues from NTU's Nanyang Environment & Water Research Institute, from the Water Quality Office of PUB, and peers from Fachbereich Bau- und Umwelt-ingenieurwissenschaften of TU Darmstadt. But most importantly, the synergy amongst the young water professionals at the YWLS with whom I engaged will be a long-lasting network.

Nachwuchswissenschaftler

Sven Winkelhaus
Fachbereich Rechts- und Wirtschaftswissenschaften
Produktions- und Supply Chain Management
Dr. Eric Grosse

Konferenzreise

Information Control Problems in Manufacturing (INCOM) 2018
Bergamo, Italien, 11. bis 13. Juni 2018

Abstract

The effects of human fatigue on learning in order picking: an explorative experimental investigation

Order picking is one of the most important processes in warehouse logistics as it impacts the efficiency of the whole supply chain. Despite many opportunities for automating order picking tasks, it is still performed manually in many companies. Although human factors are of prime importance for order picking performance, the interaction between human factors and the order picking system is still not fully understood. This paper presents the results of an experimental study that systematically investigated the influences of fatigue and learning on order picking performance. This study focuses on procedural and declarative learning and their impact on order picking performance as well as the effects of fatigue on learning. Preliminary findings of the experimental study show that a reversed u-shaped interrelation between physical fatigue and cognitive performance is likely, whereas mental fatigue appears to have a negative influence on learning effects.

![Grüner Balken]

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KSB-Stiftung – Abschlussbericht über die Verwendung der Fördermittel 2018

Nachwuchswissenschaftler

Dipl.-Phys. Tobias Bier
Fachbereich Rechts- und Wirtschaftswissenschaften
Multimodalität und Logistiktechnologien
Jun.-Prof. Dr. Anne Lange

Konferenzreise

European Conference on Information Systems 2018 (ECIS 2018)
Portsmouth, UK, 26. bis 28. Juni 2018

Abstract

A FORMATION MODEL FOR SUPPLY NETWORKS:
A FUNDAMENT FOR INVESTIGATIONS OF COMPLEX SUPPLY NETWORKS
Companies today are sourcing products from complex networks. Managing and overseeing these networks is challenging and requires methods including network theoretical considerations. Developing these methods demands an underlying model that describes the supply network structure and structural data, ideally representative samples. But large scale data of real supply network structures is rare what restricts research in this field. This paper presents a formation model that generates supply networks from a focal company's perspective. By conducting this formation process, exemplary networks are derived and compared to the structural patterns revealed by rare studies investigating real supply networks. The so generated networks close the gap of non-available empirical data of large scale supply networks. The formation bases upon a widely accepted concept of supplier selection. Necessary input parameters are a structured bill-of-materials. Further details, like the number of competitors, is modelled using a probability distribution. Hence this approach makes it possible for further research to investigate more advanced methods for supporting the management of supply processes. Additionally, using this framework for generating large-scale supply networks makes it possible to acquire a more detailed insight into supply network structure.

Nachwuchswissenschaftlerin

Tamara Winter

Fachbereich Chemie

Ernst-Berl-Institute for Technical and Macromolecular Chemistry

Dr.-Ing. Markus Gallei

Konferenzreise

256th ACS National Meeting and Exposition

Boston, Massachusetts, USA, 19. bis 23. August 2018

Abstract

Tailor-made Core-Shell Particles and the Melt-Shear Organization Technique for the Preparation of Redox-Responsive porous Nanostructures based on Ferrocene-containing Polymers

The field of artificial remotely-switchable colloidal crystals based on stimuli-responsive polymers attracted enormous attention in the past twenty years. Due to their excellent optical and sensory properties which can be easily stimulated by external triggers such nanomaterials provides manifold applications in the field of optical sensors, membrane technologies and catalysis. An efficient technique for the preparation of colloidal crystals is the so called melt-shear organization technique using almost monodisperse core-shell particles which can be synthesized by stepwise seeded emulsion polymerization. During melt-shearing which comprises an increase in temperature and moderate pressure the core particles self-assemble in a face centered cubic structure inside the viscous polymer shell material. Compared to other processes like the spin-coating method this technique has the advantage of producing flexible and large-scalable films without a dispersion medium.

The use of stimuli-responsive moieties as part of the core, the shell or the interlayer in between offers the possibilty to create remotely switchable opal films that can be triggered by e.g. temperature, light, electrochemical, light and redox. Moreover the obtained colloidal structure can be converted into an highly ordered porous inverse opal film by etching or dissolving the core particles. A shell material based on 2-methacryloyloxy-ethyl-ferrocencarboxylate (FcMA) enables the introduction of redox sensitive properties due to the remotely-switchable behavior of metallopolymers resulting in inverse colloidal crystals with either intriguing optical properties, mechanical robustness and electrochemical reversibility which offers the application to redox-responsive membranes and electrochemical absorbers.

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KSB-Stiftung – Abschlussbericht über die Verwendung der Fördermittel 2018

Nachwuchswissenschaftler

Makusee Masae
Fachbereich Rechts- und Wirtschaftswissenschaften
Produktion und Supply Chain Management
Professor Dr. Christoph Glock

Konferenzreise

20th International Symposium on Inventories
Budapest, Ungarn, 20. bis 24. August 2018

Abstract

Optimal Picker Routing in a Conventional Warehouse with Two Blocks and Arbitrary Start and End Points of a Tour

Order picking describes the process of retrieving items from storage locations in a warehouse to satisfy customer orders. Even though automating order picking is possible, it is done manually in most warehouses. In manual order picking, warehouse workers often spend a significant amount of their working time on travelling through the warehouse to retrieve requested items. To minimize the time required for retrieving all items contained in an order, researchers have developed various routing procedures that guide the order picker through the warehouse. The paper at hand contributes to this stream of research and proposes an optimal order picker routing policy for a conventional warehouse with two blocks and arbitrary start and end points of a tour. The procedure proposed in this paper extends an earlier work of Löffler et al. (2018) by applying the concepts of Ratliff and Rosenthal (1983) and Roodbergen and de Koster (2001a) that used graph theory and dynamic programming for finding an optimal picker route. The performance of the proposed algorithm is evaluated in an extensive numerical study. Furthermore, we compare the average travel time of the picker in a conventional warehouse with a single block to the case of a conventional warehouse with two blocks to assess the impact of the middle aisle in this context, also taking account of space requirements.