



News of the Cologne Institute for Information Systems (CIIS) 11|2023

Editorial



The recent developments around generative artificial intelligence (AI) have, in perhaps unprecedented clarity, highlighted how digital technologies challenge existing institutions, including legal, political, societal, financial, and educational institutions. Emerging technologies (i.e., technologies that are still becoming) promise innovation and economic growth but also present ethical challenges as well as societal and environmental risks. Universities need to rethink their evaluation practices in education to address the now widespread use of generative AI. Private businesses must reconsider their governance structures as they seek to meet data protection requirements and comply with intellectual property rights. National and supranational governments are challenged to create the legislative frameworks that provide legal certainty for developing business models based on emerging technologies (next to AI, other important examples include Internet of Things technologies, Cloud technology, and blockchain). In other words: technological development around emerging technologies cannot be left completely without oversight but needs to be regulated.

But regulating emerging technologies is a delicate act. On the one hand, regulation should help control a technol-

ogy—that is, keep the risks associated with that technology at bay. At the same time, it should ideally foster innovation. One key problem is that the actual prospects of the technology are unclear at the time of its regulation, a challenge known as the Collingridge Dilemma. Different strategies to regulate emerging technologies can range from technology-specific (e.g., regulating a specific class of machine learning algorithm) to technologically neutral (regulating technology in such way that does not discriminate against any specific implementation). The EU AI Act is an example of a regulatory effort that focuses on the risks associated with technology instead of specific implementations.

There is no “best” approach to regulating emerging technologies. What we regulate, how we regulate, and when we regulate are all subject to societal and political discourse at many different levels. The outcomes of this discourse will have profound societal impacts. The way we regulate emerging digital technologies will impact on our society’s openness, inclusiveness, sustainability, and competitiveness. Regulating digital technologies without compromising innovation is one of the key challenges of the digital age.

As information systems professionals—both in practice and academia—we are uniquely positioned to contribute to this discourse and help address this challenge. Regulating emerging technologies is a socio-technical problem that involves technology, people, processes, and social structures such as institutions. We must feel responsible, actively contribute to the discourse, help understand the technologies’ promises and perils, and negotiate what we want and what we do not want as a society. We, the CIIS, are looking forward to engaging in this conversation with our partners in society, industry, and academia.

Prof. Dr. Stefan Seidel

Member of the CIIS Directorate

Cologne Institute for Information Systems

The Cologne Institute for Information Systems (CIIS) – Kölner Institut für Wirtschaftsinformatik (KIWI) is part of the Faculty of Management, Economics and Social Sciences ("WISO") of the University of Cologne. The CIIS is formed by the research teams at the Information Systems (IS) Chairs for Information Management, Integrated Information Systems, Infor-

mation Systems for Sustainable Society, Systems Engineering, and Business Analytics. Its Founding and Managing Director is Prof. Dr. Detlef Schoder, its Deputy Director is Prof. Dr. Christoph Rosenkranz. The lecturers of the CIIS provide teaching services on an equal footing with research in the Bachelor's and Master's programmes operated jointly with the Faculty of Mathematics and Natural Sciences

as well as in postgraduate continuing education, including the University of Cologne Business School.

In our IS Master's programme we offer three main areas of study: (1) Business Analytics and Data Science, (2) Digital Innovation and Entrepreneurship, and (3) Digital Sustainable Society. CIIS recently heads the new Master Business Analytics and Econometrics.

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INFORMS Practical Impact Award

Professor Wolfgang Ketter has received the INFORMS ISS Practical Impact Award for 2022, honoring his commitment to the effective use and value of IS research and concepts that influence practice and policy. With this annual award, INFORMS ISS seeks to recognize scientists who "demonstrate a deep involvement with practice that results in more widespread use or appreciation of information system concepts and research".

Since 2017, Ketter is Chaired Professor of Information Systems for a Sustainable Society in the Faculty of Management, Economics, and Social Sciences. Until 2022, he was a Director of the Institute of Energy Economics. Since 2008, his trans-disciplinary research has focused on the use of digitalization and market incentives to create a faster and more stable energy transition. His primary approach has been to bring robust and complex scientific learning from the academic lab to the practical field of application.

CIIS Directorate Members



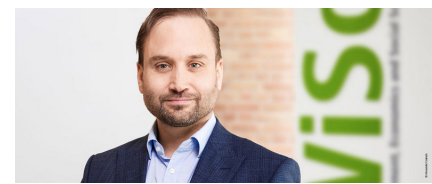
Information Systems and Information Management (Prof. Dr. Schoder)



Integrated Information Systems (Prof. Dr. Rosenkranz)



Information Systems for Sustainable Society (Prof. Dr. Ketter)



Information Systems and Systems Engineering (Prof. Dr. Seidel)



Business Analytics (Prof. Dr. Weinmann)



Information Systems and Information Management (Hon.-Prof. Dr. Gloor)

Featuring CIIS Teaching: Emerging Electronic Business Masters Course Showcases IoT Innovations

The Emerging Electronic Business Masters Course recently concluded with four teams unveiling their IoT projects. Leveraging Raspberry Pi's, Arduinos, various sensors, and actuators, students generated groundbreaking ideas. The projects ranged from Smart Doors which track various items using RFID technology to alert users if they forget something like their keys to tackling the problem of cats scratching furniture, using ultrasonic

waves as a deterrent as well as increasing sustainability by reducing water and electrical usage with IoT. These projects showcased the students' creativity and technical expertise in applying IoT solutions to real-world challenges.



New Professorship for Information Systems – CIIS welcomes Prof. Dr. Stefan Seidel



We are very happy to extend a warm welcome to Stefan Seidel whose expertise on the transformative powers of emerging technologies is truly exceptional. With a focus on exploring how artificial intelligence and Internet of Things (IoT) technologies drive organizational, societal, and environmental change and innovation, his impressive body of work has garnered recognition

in leading journals, including MIS Quarterly, Information Systems Research, Journal of Management Information Systems, Journal of the Association for Information Systems, Journal of Information Technology, European Journal of Information Systems, Communications of the ACM, IEEE Computer, California Management Review, and many others.

We are also delighted to share that our new colleague holds the esteemed position of Associate Editor for MIS Quarterly. This achievement exemplifies his dedication and expertise in the field of information systems. We look forward to collaborating, exchanging ideas, and achieving great things together. Please join us in extending a warm welcome to our new colleague!

Welcome Dr. Katharina Drechsler!



Katharina Drechsler is a new postdoctoral researcher at the Professorship for Information Systems (Prof. Dr. Stefan Seidel). Her research focuses on digital innovation and digital transformation and combines quantitative, qualitative, and design science research methods. She is particularly interested in the roles of employees and managers in driving digital innovation and transformation within organizations.

Most recently, Katharina worked at the University of Liechtenstein in Vaduz, Liechtenstein. She received her doctoral degree in Information Systems from the University of Bamberg. Her work has been published in leading journals, such as the Journal of Information Technology, Information and Management, and the Communications of the AIS.

Power TAC 2022 Tournament

Team VidyutVanika of the Indian Institute of Technology in Hyderabad are the winners of the tenth anniversary edition of the Power TAC tournament. The tournament is a competitive simulation of future retail electric power markets, in which retail „brokers“ buy and sell power in both wholesale and retail markets. The wholesale market is an abstraction of typical day-ahead markets in North America and Europe, and the retail market is a tariff market, in which customers are able to choose among tariff contract offerings from the competing brokers. Customers are models of household, business, electric vehicle and institutional users of electric power, as well as small-scale producers of power that own solar arrays or small wind turbines. Power TAC and the tournament were founded by Professor Wolfgang Ketter and Dr. John Collins in 2009 and feed interest and engagement in (applied) research to create sustainable energy grids and markets both during the energy transition and in a sustainable energy future. TUCTAC of the Technical University of Crete and Mertacor of the Aristotle University of Thessaloniki placed 2nd and 3rd. For more information, please see www.powertac.org.

FES2023 Workshop

A workshop on 'Electricity markets and energy crisis' was given by Saber Talari at the brand-new conference on energy domain named 'Future Energy Solutions – FES2023' on June 14th at University of Vaasa, Finland. The talk was about electricity market issues caused by energy crisis with focus on Germany. The causes, current short-term solutions that already

employed by German government and measures to avoid same issues in the future were discussed with audiences in an interactive workshop. FES is an annual IEEE-sponsored conference in energy domain and aims to bring together leading researchers, engineers, and industry experts from around the world to discuss and exchange ideas on future energy solutions.



New PhD: Welcome Simon Wolf!

We are delighted to introduce our newest PhD candidate, Simon Wolf, who joined the Chair of Prof. Schoder in January 2023. Simon brings a wealth of knowledge and expertise to our research team, with a strong background in Information Systems from the University of Cologne, holding both a Bachelor and Master degree.

Simon's research interests primarily lie in the exciting fields of Machine Learning and Data Science. He has already embarked on a captivating project within our institute, focusing on epileptic seizure detection. The ultimate goal of this project is to develop a system suitable for everyday use, capable of measuring the heartbeat of individuals affected and analyzing it for signs of an epileptic seizure.

With his academic prowess and dedication, we are confident that Simon's contributions to the field of machine learning and healthcare will be invaluable. We eagerly anticipate the insights and advancements he will bring to the CIIS.



Dr. Stefan Hirschmeier raises 520,000€ in third-party funding

Junior researcher Dr. Stefan Hirschmeier (CIIS, Department Information Systems and Information Management / Prof. Dr. Detlef Schoder) receives 520.000€ from the German Federal Ministry of Education and Research (BMBF) for his project proposal MLPolicy. The project aims to support companies in the creation of information security policies with the help of machine learning. With this project, Dr. Stefan Hirschmeier and his team are taking up the current developments around ChatGPT and Language Models.

In the age of digital transformation, organizations increasingly rely on robust information security policies to protect their sensitive data and information from cyber threats. However, creating such policies often requires a significant investment of time and expert knowledge. This is where the MLPolicy project comes in, using machine learning to simplify this process and make it more efficient. Dr. Stefan Hirschmeier and his team have the opportunity to set new standards in the field of information security and help companies meet the challenges of the digital age.

Update from BMBF Project "AFFIN"

The research project "AFFIN: Automated and Digital Forensics of Publicly Available Data in Finance" will be featured at the "Mittelstandskonferenz 2023" held by the German Federal Ministry of Education and Research (BMBF). The conference will take place from November 21st to 22nd in Berlin, Germany. AFFIN is a joint project between the Cologne Institute for Information Systems (CIIS), headed by Prof. Dr. Detlef Schoder, and Stockpulse, a German social media analytics company based

in Bonn and part of the German government's National Strategy for Artificial Intelligence (AI) and the High-Tech Strategy 2025.

Project-related research on how financial influencers drive user sentiment towards financial assets has recently been published at the European Conference on Information Systems (ECIS) 2023 in Norway (Haase, F., Rath, O., Kurka, M., & Schoder, D., 2023, Finfluencers: Opinion Makers or Opinion Followers?).



GEFÖRDERT VOM



Bundesministerium
für Bildung
und Forschung

CIIS at ECIS 2023

CIIS researchers attended this year's European Conference on Information Systems (ECIS), held in Kristiansand, Norway. ECIS draws world-leading academics and research-focused practitioners in the field of Information Systems. Six CIIS fellows were involved, contributing not only through presenting innovative research papers but also by the organization of conference tracks. These contributions highlight the quality

and breadth of our institute's ongoing research projects. Moreover, our researchers' participation in the ECIS doctoral consortium expanded their academic horizons while promoting valuable dialogue. We are elated to showcase the dynamic work of our institute, fostering a legacy of excellence, innovation, and collaboration at the cutting edge of Information Systems research.



New ISR Publication on Smart Sustainable Mobility!

Professor Wolfgang Ketter (Faculty of Management, Economics, and Social Sciences), Associate Professor Konstantina Valogianni (Instituto Empresa, Madrid) and recent University of Cologne graduate Dr. Karsten Schroer have proposed a research framework and call to action around smart sustainable mobility in the academic journal *Information Systems Research*, <https://doi.org/10.1287/isre.2022.1167>.

Transportation is a backbone of modern globalized societies, causing around a third of all EU/US emissions. That reality represents a major health hazard and economic cost. Innovations in vehicle tech, connectivity, hardware, and AI information systems offer significant potential for social and economic value. But the emergence of connected, autonomous, shared and electric (CASE) vehicle technology creates a 'digital layer' that must integrate with traditional physical mobility systems. Ketter et al. argue that the information systems field's uniquely multi-disciplinary, data-driven and socio-technical research lens puts it in a strong position to address many of the large-scale challenges encountered in the transition to sustainable mobility. They make the case for IS research to play a more active role in delivering a smart sustainable mobility ecosystem, and offer a framework to direct IS research efforts.

Publication on Community-based Grids in IEEE TSG

Our recent work on flexibility provision entitled 'Sequential Clearing of Network-

aware Local Energy and Flexibility Markets in Community-based Grids' has been published in *IEEE Transactions on Smart Grid*. The study proposes network-aware clearing algorithms for local energy markets (LEMs) and local flexibility markets (LFM) to be sequentially run and coordinate assets and flexible resources of energy communities (ECs) in distribution networks. In the proposed LEM clearing algorithm, EC managers run a two-stage stochastic programming while considering random events by scenario generation and network constraints using linearized DistFlow. As one of outcomes, maximum available up- and down-regulations provided by ECs are estimated in LEM and communicated to LFM. In the distributed LFM clearing algorithm, an iterative auction is designed using a dual-decomposition technique (Augmented Lagrangian) which is solved by consensus alternating direction method of multipliers. The LFM algorithm efficiently dispatches the flexibility provided by ECs in operating time while considering flexibility local marginal price as pricing method. Network constraints are included in the algorithm with an AC distribution optimal power flow for dynamic network topology in which branches and buses are decomposed to solve the problem in distributed fashion. The designed LFM algorithm can respond to exogenous and endogenous signals for flexibility requests. The simulation results in a test case display effectiveness of two proposed LEM and LFM algorithms for an efficient provision of flexibility.

Publication on Shared Autonomous Fleets in the Journal of Transportation Science

Our Ph.D. student Ramin Ahadi, Professor Wolfgang Ketter (Faculty of Management, Economics, and Social Sciences), Dr. John Collins (University of Minnesota), and Dr. Nicolò Daina (Columbia University) have proposed a learning-based cooperative dynamic charging management for shared autonomous fleets and published their study in the *Journal of Transportation Science*, *INFORMS*, <https://doi.org/10.1287/trsc.2022.1187>.

Shared Autonomous Electric Vehicles (SAEVs) enable mobility-on-demand fleets to optimize their services by improving safety, sustainability, and efficiency. In addition to technological improvements, fleet operators should employ advanced decision support systems to maximize the benefits of SAEVs. Ahadi et al. design a realistic comprehensive package of operations for SAEVs, but focus on smart charging, which poses significant challenges to fleet managers due to the technological challenges of electric vehicles (e.g., long charging time and infrastructure scarcity). Using state-of-the-art multi-agent reinforcement learning techniques, they propose a decentralized, cooperative model that optimally identifies vehicles in need of charging and assigns them to capacitated and heterogeneous charging stations.

DFG Research Unit “Marketing and IS in the Digital Age” at CIIS: Seven Years of Success

In October 2014, the German Research Foundation (DFG) approved the first „DFG Research Unit“ in the field of Business Administration (BWL) and Information Systems (IS). After a one-time extension, this multi-disciplinary research project is now concluded.

The DFG research group brings together leading scientists from the University of

Hamburg, the University of Münster, the University of Cologne (Prof. Schoder, CIIS, and Prof. Völckner) and Kühne Logistics University. CIIS contributed and investigated central questions of marketing in the age of digital and social media.

In the 7 years of its existence, the multidisciplinary group has been able to

publish over 49 publications in leading marketing and IS journals with the help of CIIS researchers.

<https://wim.uni-koeln.de/de/forschung/projekte/dfg-projekt-how-social-media-is-changing-marketing>

Graduations: Mario Müller and Michael Hüttermann

We congratulate Mario Müller and Michael Hüttermann (both supervised by Christoph Rosenkranz), who successfully defended their doctoral theses and thus finished their doctoral studies, graduating as “Dr. rer. pol.”!

Mario studied factors affecting the sustainability of open-source software projects. Specifically, he examined the influence of technical interdependencies in software ecosystems on developer participation. Using the JavaScript ecosystem and analyzing a complete dataset of GitHub data, Mario showed that projects attract more developers when depending on other projects, and their ability to retain developers increases with the number of shared developers with other technical interrelated projects.

Michael examined why and how large-scale organizations operationalize DevOps. Based on a multiple-case study of eight organizations, Michael finds that DevOps implementations are gradual transitions on a DevOps continuum, with two mechanisms, effectiveness adaptation and efficiency adaptation, leading to a new or the change of an existing implementation.

We wish both graduates best of luck for their future career and will stay in touch!

CIIS in Press: Ranked #1 for research excellence in German-speaking countries and Top3 in Europe

The current AIS 8 ranking of the Association of Information Systems puts the Cologne Institute for Information Systems (CIIS) in first place in the German-speaking world for academic research. In a European comparison, CIIS now shares third place with the University of Jyväskylä, Finland, and the University of St. Gallen, Switzerland, and is ranked 33rd worldwide as of January 2022, placing it in the top 100 worldwide.

The CIIS at the Faculty of Economics and Social Sciences at the University of Cologne brings together research groups led by Professors Gloor, Ketter, Rosenkranz, Schoder, Seidel and Weinmann. With challenging research topics such as artificial intelligence, digital transformation, digital innovation and sustainability, it has been one of the world’s leading research institutions for Information Systems since its foundation.

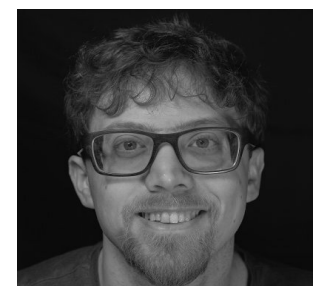
The Institute’s Master’s programme in ‘Information Systems’ offers an interdisciplinary approach with three focal points: Business Analytics and Data Science, Digital Innovation and Entrepreneurship and Digital Sustainable Society, which provides students with practical and theoretical tools to address current societal challenges in business, society and research. CIIS has recently expanded its offering with the brand-new Master’s programme ‘Business Analytics & Econometrics’. This programme offers a unique blend of traditional analytics (e.g. statistics, econometrics, optimization, simulation) and modern analytical approaches (e.g. machine learning and artificial intelligence) and applies these approaches to business, management and entrepreneurship.

More Information: <https://wiso.uni-koeln.de/de/services/rankings/ais-8>

Farewell to Phil Hennel

We say farewell to Dr. Phil Hennel, who leaves CIIS to take on the role of Researcher at University off Bremen. Phil has been with us as a Post-Doc on the DFG-funded research project “Digital Transformation of Healthcare Work”. At Bremen, he will be responsible for teaching digital business and management as well as conducting independent research on digital transformation, digital innovation, and digital management. We wish Phil all the best

for his new job, and we will continue to collaborate on research and teaching activities!



Graduation: Sven Stahlmann

Sven Stahlmann successfully defended his dissertation as a doctoral student at the CIIS (Chair Professor Schoder). The work titled „Mining Unique Customer Needs from Large Scale User Generated Content,” sheds light on the understanding of customer behavior. Stahlmann’s research was part of an interdisciplinary DFG research group (aka “DFG Forschergruppe” which is the first in Germany initiated by researchers

in the field of Business Administration and Information Systems) with the goal to develop and research IT-supported methods for the automated extraction of customer needs. His research got published at ECIS, HICSS, and DocEng. As we celebrate Stahlmann’s achievements, we extend our heartfelt congratulations to him. His perseverance, commitment, and contributions to his area of study

have set a high standard. We eagerly anticipate his future endeavors and the subsequent advancements he will bring to the field.

Program “Digital Design” at Zurich Group Germany

We successfully launched the “Digital Design” certificate program for Zurich Group Germany at the beginning of this year. In cooperation with the University of Cologne Business School, a tailor-made program was designed that addresses digital design in all facets and communicates it in a sustainable way. Prof. Dr. Andreas Vogelsang (Department of Computer Science), Prof. Christoph Rosenkranz (CIIS), and Dr. Phil Hennel (Univ. Bremen) are tackling this exciting topic over six seminar days and train up to 100 Zurich business analysts in a total of six runs. The focus is on digital product design, digital process design, business analysis, and agile software development. The team event “Agile Kitchen” on the last day of the seminar is particularly agile. Based on a customer vision, a self-developed dish is to be cooked and processes such as sprint planning, sprinting, and retrospective suddenly also play a role at the stove. Many thanks to Jens Becker as CIO of Zurich Group Germany for pushing and supporting this program!



Graduation: Jannik Rößler

We are happy to announce that on July 5th, 2023, Jannik Rößler successfully defended his dissertation, “Optimizing Uplift Modeling to Improve Treatment Assignment Problems”. Detlef Schoder, Peter Gloor (Massachusetts Institute of Technology), and Stefan Seidel served as examinees. Jannik’s research significantly extends the existing body of knowledge in uplift modeling, addressing both practical and conceptual challenges to enhance its application in treatment assignment problems. His research serves as an excellent resource

for anyone seeking to navigate the complexity of treatment assignment policies, offering robust methodologies and practical guidelines. We congratulate him on his graduation and wish him all the best for the future.



Graduation: Karsten Schroer

Dr. Karsten Schroer defended his PhD research on the topic of sustainable smart mobility. During his tenure with the Department of Information Systems for a Sustainable Society in the Faculty of Management, Economics, and Social Sciences, Dr. Schroer published four A+ articles, a rare accomplishment for a PhD student. Among other topics, his research focuses on the integrated use of mobility and pricing data in real time markets to manage allocation, and is particularly relevant in the emerging trend of shared mobility and electricity demand resource aggregation. He was supervised by Professor Wolfgang Ketter in Cologne and Professor Alok Gupta at the University of Minnesota Carlson School of Management. Dr. Schroer joined Amazon Web Services post-graduation.



This and previous newsletters can be found digitally at www.ciis.uni-koeln.de/newsletter/

There you can also register for our e-mail newsletter.

Did we spark your interest?

Please feel free to contact us if you have any questions.

We are at your service as contact persons - whether for questions on research, cooperations, or recruiting. You can reach us by e-mail:

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