

Upcoming Press-Relevant Seminars and Perspectives Workshops

This list provides the following information for press relevant Dagstuhl Seminars: names and affiliations of all members of the organizing team including the coordinators; arrival and departure dates; topics addressed; abstract.

17372 **Cybersafety in Modern Online Social Networks**

Sunday, September 10 to Wednesday, September 13, 2017 – <http://www.dagstuhl.de/17372>

Jeremy Blackburn (Telefónica Research – Barcelona, ES)

Emiliano De Cristofaro (University College London, GB)

Michael Sirivianos (Cyprus University of Technology – Lemesos, CY)

Thorsten Strufe (TU Dresden, DE)

The range of malicious activities perpetrated on online social networks is regrettably wide, ranging from malware and spam to controlling fake and compromised accounts, to artificially manipulating the reputation of accounts and pages, spreading false information and terrorist propaganda. Unfortunately, research in this field has looked at these problems in isolation, almost exclusively relying on algorithms aimed at detecting malicious accounts that act similarly. This ultimately yields a cat-and-mouse game, mostly played on economic grounds, whereby social network operators attempt to make it more and more costly for fraudsters to evade detection.

This prompts the need for a multi-faceted, multi-disciplinary, holistic approach to advancing the state of knowledge on cybersafety in online social networks, and the ways in which it can be researched and protected. This Dagstuhl Seminar will bring together researchers working on all aspects of cybersafety, including security, privacy, human factors, economics, sociology. It will benefit the system security research community due to the input from experts that can put into perspective the less technical aspects of cybersafety that are nonetheless invaluable in understanding and designing effective countermeasures to the problem. It will also benefit the experts, because considering security issues from the systems perspective will trigger ideas about studying important security problems from the human, sociological, and economic point of view.

Topics to be covered in this seminar include: Cyberbullying, Hate Speech, Propaganda, Radicalization, Cyber Fraud, Scams, Reputation Manipulation, and Fake Activities.

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17391 **Deep Learning for Computer Vision**

Sunday, September 24 to Friday, September 29, 2017 – <http://www.dagstuhl.de/17391>

Daniel Cremers (TU München, DE)

Laura Leal-Taixé (TU München, DE)

Ian Reid (University of Adelaide, AU)

René Vidal (Johns Hopkins University – Baltimore, US)

Over the last years, we have witnessed an impressive revival of neural networks and in particular deep convolutional networks. These have been demonstrated to outperform existing techniques on a variety of challenging problems in computer vision. The emphasis of this seminar is to bring together experts in the domain of deep learning for computer vision in order to evaluate progress, to discuss ongoing developments and aim to develop a systematic understanding of theoretical and experimental advances. The seminar will focus on a variety of aspects ranging from experimental performance of deep learning methods (what are they good for, what are they not good for, what network architectures exist) to theoretical understanding (why do they perform well, what performance guarantees do they offer, what theoretical analysis exists).

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17392 **Body-Centric Computing**

Sunday, September 24 to Friday, September 29, 2017 – <http://www.dagstuhl.de/17392>

Steve Benford (University of Nottingham, GB)

Kristina Höök (KTH Royal Institute of Technology – Stockholm, SE)

Florian Mueller (RMIT University – Melbourne, AU)

Dag Svanes (NTNU – Trondheim, NO)

Computer scientists are increasingly finding that “the body matters”. Prior approaches in the humanities, inspired by philosophies such as phenomenology, have led to perspectives that consider the role of the body in relation to technology. This has led to fundamental shifts in how we develop robotics, AI and interactive systems. However, what has received lesser attention is the role that technology can play in supporting an active human body. The rise of wearable technology has highlighted the need for deeper understandings of what we call “body-centric computing”. These technologies, including fitness trackers, mobile sports apps and exertion games, are intimately tied with an exerting body. As such they contrast to prior approaches in Human Computer Interaction (HCI), such as ergonomics, which aims to reduce the physical burden. Investigations into body-centric HCI poses unique challenges and opportunities, for example: How can computational system prevent injuries, yet celebrate the pain that comes with significant bodily investment? In understanding such body-centric computing we may further our knowledge on how human-computer interaction can support active, healthy living. To investigate this topic and establish a driving agenda for the years to come, this seminar brings together leading experts from industry and academia. This includes those who are central to the development of products and ideas relating to wearables, mobile computing, quantified self, data analysis, sports science, phenomenology as well as sports and exertion games. The goal is to address fundamental questions and issues related to a body-centric computing agenda and jump-start collaborations that will pioneer new approaches in this area.

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17401 **Quantum Cryptanalysis**

Sunday, October 01 to Friday, October 06, 2017 – <http://www.dagstuhl.de/17401>

Michele Mosca (University of Waterloo, CA)

Nicolas Sendrier (INRIA – Le Chesnay, FR)

Rainer Steinwandt (Florida Atlantic University – Boca Raton, US)

Krysta Svore (Microsoft Corporation – Redmond, US)

As demonstrated, e.g., by recent changes to NSA algorithms, quantum computing has already tangible effects on today’s use of cryptography. Yet we have only a very incomplete picture of the cryptanalytic potential of quantum computing, and identifying practical replacements for deployed encryption, key establishment, and signature solutions remains a struggle. The Dagstuhl Seminar “Quantum Cryptanalysis” targets the study of quantum attacks against currently deployed information processing systems and the design of cryptographic solutions that are suitable for standardization in the post-quantum setting.

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17441 **Big Stream Processing Systems**

Sunday, October 29 to Friday, November 03, 2017 – <http://www.dagstuhl.de/17441>

Irimi Fundulaki (FORTH – Heraklion, GR)

Tilmann Rabl (TU Berlin, DE)

Sherif Sakr (KSAU – Riyadh, SA)

Stream computing is a new paradigm necessitated by new data generating scenarios, such as the ubiquity of mobile devices, location services, and sensor pervasiveness. In general, stream processing systems support a large class of applications (e.g., financial markets, surveillance systems, manufacturing, smart cities and scalable monitoring infrastructure) in which data are generated from multiple sources and are pushed asynchronously to servers which are responsible for processing them. Recently, several systems (e.g., Apache Storm, Apache Heron, Apache Flink, Spark Streamin, Apache Apex) have been introduced to tackle the real-time processing of big streaming data. However, there are several challenges and open problems that need to be addressed in order improve the state-of-the-art in this domain and push big stream processing systems to make them widely used by large number of users and enterprises. Thus, this Dagstuhl Seminar will bring together researchers, developers and practitioners actively working in this domain to discuss very relevant open challenges in this domain with a main focus on two topics: benchmarking and high-level declarative programming abstracts of big streaming jobs.

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17452 **Algorithmic Cheminformatics**

Sunday, November 05 to Friday, November 10, 2017 – <http://www.dagstuhl.de/17452>

Jakob Lykke Andersen (Tokyo Institute of Technology, JP)
Christoph Flamm (Universität Wien, AT)
Daniel Merkle (University of Southern Denmark – Odense, DK)
Peter F. Stadler (Universität Leipzig, DE)

Cheminformatics is the application of algorithms, combinatorial approaches, and formal methods from Computer Science to problems in Chemistry. While Cheminformatics is formally a very old research field, building the theoretical foundations for Cheminformatics seen from the perspective of state-of-the-art theoretical Computer Science is not at all established research. This second edition of the Dagstuhl Seminar on “Algorithmic Cheminformatics” aims to bring together researchers working in Cheminformatics and fields in Computer Science related to it. This time, the seminar will specifically focus on the analysis of behaviour of chemical systems in terms of reaction networks. This includes both networks inferred from experimental data, as well as networks implicitly specified by for example formal grammars. We therefore also aim at integrating experts in concurrency theory, in particular using process calculi, Petri nets, and related formal approaches. State-of-the-art results in these fields are hardly used to infer qualitative or quantitative properties of chemical systems, which are highly concurrent systems by nature. Most current modeling approaches in chemistry are either very abstract and aimed at formal algebraic properties of reaction networks, or do precise modeling on the quantum mechanical level where computational costs prevent handling more than a few molecules. In this seminar we therefore seek to advance discrete modelling approaches for Systems Chemistry. Besides bringing together the experts in the respective fields from Computer Science, we will intentionally also invite wet-lab chemists in order to cross-fertilize the fields and generate mutually beneficial activities.

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17472 **Addressing the Computational Challenges of Personalized Medicine**

Sunday, November 19 to Wednesday, November 22, 2017 – <http://www.dagstuhl.de/17472>

Niko Beerenwinkel (ETH Zürich – Basel, CH)
Holger Fröhlich (UCB Biosciences GmbH – Monheim, DE)
Franziska Michor (Harvard Medical School – Boston, US)
Susan A. Murphy (University of Michigan – Ann Arbor, US)

Personalized medicine (PM) is understood as a non-traditional medical approach, in which patients are stratified based on their disease subtype, disease risk, disease prognosis or treatment response using specialized diagnostic tests. High promises for the whole health care sector are associated with PM, and correspondingly the topic has received a lot of attention during the last years. PM is tightly connected to and dependent on computational sciences (computer science, mathematical modeling, computational statistics, bioinformatics). Currently, shortcomings of computational methodology constitute an important bottleneck for PM, which hinders full realization. This Dagstuhl seminar aims to bring together an international and interdisciplinary group of experts in different computational science disciplines in order to discuss, how some of the major existing computational challenges could be better addressed in the future, namely: 1) how to enhance prediction performance of computational models for PM, 2) how to improve their interpretability, and 3) how to validate and implement them in practice. Bringing together expertise that is usually scattered across different disciplines, the seminar will have a strict focus on computational methodology, but few selected non-computational scientists provide connections to, and enhance impact on, the application field.

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17502 **Testing and Verification of Compilers**

Sunday, December 10 to Wednesday, December 13, 2017 – <http://www.dagstuhl.de/17502>

Junjie Chen (Peking University, CN)

Alastair F. Donaldson (Imperial College London, GB)

Andreas Zeller (Universität des Saarlandes, DE)

Hongyu Zhang (Microsoft Research – Beijing, CN)

This Dagstuhl Seminar brings together researchers and practitioners working on the testing and verification of compilers. Current research on compiler testing mainly focuses on three aspects: test programs, test oracles, and efficiency of compiler testing. Although the three aspects (especially the first two aspects) have been studied for many years, there is still ample room for further development. Furthermore, there are also some important but not extensively studied topics in practical compiler testing. Besides compiler testing, compiler verification is also an effective way to guarantee the quality of compilers. However, the two communities (compiler testing and compiler verification) tend to operate separately since the required techniques are rather different. Therefore, it is essential to explore a variety of synergies both within each community and between the two communities. This seminar will also discuss opportunities for generalising compiler testing/verification techniques to broader contexts (e.g., refactoring engines, static property checkers, and dynamic sanitisers).

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17511 **The Critical Internet Infrastructure Revisited**

Sunday, December 17 to Wednesday, December 20, 2017 – <http://www.dagstuhl.de/17511>

Georg Carle (TU München, DE)

Thomas C. Schmidt (HAW – Hamburg, DE)

Steve Uhlig (Queen Mary University of London, GB)

Matthias Wählisch (FU Berlin, DE)

Walter Willinger (Niksun – Princeton, US)

The main objective of this Dagstuhl Seminar is to discuss and analyze the Internet as a critical infrastructure. This includes the Internet core transport infrastructure and Internet services that (among other things) enable content delivery, but also new application scenarios such as the booming area of Internet of Things. This seminar will bring together people from the research and the operational communities. The participants will work on a better understanding of the Internet and the extensions of current research perspectives towards novel (maybe unusual) perspectives such as the question of the local and global ecosystems that shape (and are being shaped by) the Internet.

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18021 **Symmetric Cryptography**

Sunday, January 07 to Friday, January 12, 2018 – <http://www.dagstuhl.de/18021>

Joan Daemen (Radboud University Nijmegen, NL, and STMicroelectronics – Diegem, BE)
Tetsu Iwata (Nagoya University, JP)
Nils Gregor Leander (Ruhr-Universität Bochum, DE)
Kaisa Nyberg (Aalto University, FI)

Cryptography is the science of designing and analyzing techniques for secure communication. Modern cryptography can be divided into several areas of study, with symmetric cryptography being one of the most important. In the seminar, we plan to discuss in detail the design and analysis of symmetric cryptographic primitives while focusing on the three topics

- (i) cryptography for the IoT
- (ii) statistical attacks,
- (iii) symmetric cryptography and real-world needs.

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18061 **Evidence About Programmers for Programming Language Design**

Sunday, February 04 to Friday, February 09, 2018 – <http://www.dagstuhl.de/18061>

Stefan Hanenberg (Universität Duisburg-Essen, DE)
Brad A. Myers (Carnegie Mellon University – Pittsburgh, US)
Bonita Sharif (Youngstown State University, US)
Andreas Stefik (Univ. of Nevada – Las Vegas, US)

Since its inception, computer science has had many competing programming languages and technologies. The technical aspects of these language products are well known in the literature (e.g., type soundness, other mathematical properties of languages), but almost no systematic evidence has been gathered on the impact of their designs on human users. Further, recent work has shown that even minor differences in language design can have a significant impact on programmers in practice, both in education and in industry. This Dagstuhl Seminar has the following objectives:

1. to form a community of scholars around collecting evidence about programmers' performance for programming language design,
2. to create an organized set of priorities for new human studies in the area,
3. to define the evidence standard to be used in such studies, and
4. to discuss or create theories that can guide the community in understanding and framing the evidence gathered over time.

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18072 **Formal methods for the synthesis of biomolecular circuits**

Sunday, February 11 to Friday, February 16, 2018 – <http://www.dagstuhl.de/18072>

Yaakov Benenson (ETH Zürich – Basel, CH)
Neil Dalchau (Microsoft Research UK – Cambridge, GB)
Heinz Koeppl (TU Darmstadt, DE)
Oded Maler (VERIMAG – Grenoble, FR)

Synthetic biology aims for the rational bottom-up engineering of new biological functionalities. Recent years have witnessed an increase in the degree of "rationality" in the design of synthetic biomolecular circuits. With it, fewer design-build-test cycles were necessary to achieve a desired circuit performance. Most of these success stories reported the realization of logic circuits, typically operating via regulation of gene expression and/or direct manipulation of DNA sequences with recombinases, executing combinatorial and sometimes sequential logic. This was often achieved with the help of two ingredients, a library of previously well-characterized parts and some computational modeling. Hence, although circuits in synthetic biology are still by far less understood and characterized than electronic circuits, the opportunity for the formal synthesis of circuit designs with respect to a behavioral specification starts to emerge in synthetic biology.

This Dagstuhl Seminar will bring together experts in formal methods for the verification and synthesis of hardware and software with wet-lab and dry-lab synthetic biologists to (1) achieve a common understanding of the current state of design methodology in synthetic biology; (2) to identify the limitations of current approaches and (3) to investigate dedicated solutions to the synthesis problem in synthetic biology. Some of these methods will be based on leveraging experience and methods from electronic design automation (EDA) and from program synthesis and verification. In addition, ideas for entirely new methodologies specifically tailored for synthetic biology are likely to emerge. For example, features that are not apparent in electronic circuits such as heterogeneity and variability between the cells and between the circuits embedded in different cells, will be addressed.

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18081 [Designing and Implementing Algorithms for Mixed-Integer Nonlinear Optimization](#)

Sunday, February 18 to Friday, February 23, 2018 – <http://www.dagstuhl.de/18081>

Pierre Bonami (IBM Spain – Barcelona, ES)

Ambros M. Gleixner (Konrad-Zuse-Zentrum – Berlin, DE)

Jeff Linderoth (University of Wisconsin – Madison, US)

Ruth Misener (Imperial College London, GB)

Mathematical models for optimal decisions often require both nonlinear and discrete components. These mixed-integer nonlinear programs (MINLP) form an important class of optimization problems of pressing societal need. For example, MINLP is necessary for optimizing the energy use of large industrial plants, for integrating renewable sources into energy networks, for biological and biomedical design, and for countless other applications. The first MINLP algorithms and software were designed by application engineers. While these efforts initially proved very useful, scientists, engineers, and practitioners have realized that a transformational shift in technology will be required for MINLP to achieve its full potential. Realizing this opportunity, in the last decade, MINLP has transitioned to a forefront position in computer science, with researchers actively developing MINLP theory, algorithms, and implementations. Even with this concerted effort, algorithms and available software are often unable to solve practically-sized instances of these important models. Current obstacles include characterizing the computability boundary and effectively exploiting known optimization technologies for specialized classes of MINLP.

This Dagstuhl Seminar aims to address this mismatch between natural optimization models for important scientific problems and practical optimization solvers for their solution, facilitating an accelerated development of powerful new solver technology for mixed-integer nonlinear programs.

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18102 [Dynamic Traffic Models in Transportation Science](#)

Sunday, March 04 to Friday, March 09, 2018 – <http://www.dagstuhl.de/18102>

Roberto Cominetti (Universidad Adolfo Ibáñez – Santiago, CL)

Tobias Harks (Universität Augsburg, DE)

Carolina Osorio (MIT – Cambridge, US)

Britta Peis (RWTH Aachen, DE)

Traffic assignment models are crucial for traffic planners to be able to predict traffic distributions, especially, in light of possible changes of the infrastructure, e.g., road constructions, traffic light controls, etc. This Dagstuhl Seminar will address questions arising from the observation that there is a trend in the transportation community (science as well as industry) to base such predictions on complex computer-based simulations that are capable of resolving many elements of a real transportation system. On the other hand, the theory of dynamic traffic assignments in terms of equilibrium existence, computability and efficiency, has not matured to the point matching the model complexity inherent in simulations. The seminar aims at bringing together leading scientists in the areas traffic simulations, algorithmic game theory and dynamic traffic assignment.

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18171 **Normative Multi-Agent Systems**

Sunday, April 22 to Friday, April 27, 2018 – <http://www.dagstuhl.de/18171>

Mehdi Dastani (Utrecht University, NL)

Jürgen Dix (TU Clausthal, DE)

Harko Verhagen (Stockholm University, SE)

Serena Villata (Laboratoire I3S – Sophia Antipolis, FR)

The aim of this Dagstuhl Seminar is to bring together researchers from various scientific disciplines such as computer science, artificial intelligence, philosophy, law, cognitive science and social sciences to discuss the emerging topic concerning the *responsibility* of autonomous systems. Autonomous software systems and multi-agent systems in open environments require methodologies, models and tools to analyse and develop flexible control and coordination mechanism — without them, it is not possible to steer the behaviour and interaction of such systems and to ensure important overall properties. *Normative multi-agent systems* is an established area focussing on how norms can be used to control and coordinate autonomous systems and multi-agents systems without restricting the autonomy of the involved systems. Such control and coordination systems allow autonomous systems to violate norms, but respond to norm violations by means of various sanctioning mechanisms. Therefore it is crucial to determine which agents or agent groups are accountable for norm violations. This seminar focuses on how the responsibility of autonomous systems can be defined, modelled, analysed and computed.

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18181 **Towards Accountable Systems**

Sunday, April 29 to Friday, May 04, 2018 – <http://www.dagstuhl.de/18181>

David Eyers (University of Otago, NZ)

Christopher Millard (Queen Mary University of London, GB)

Margo Seltzer (Harvard University – Cambridge, US)

Jatinder Singh (University of Cambridge, GB)

Technology is putting our everyday lives under continuous scrutiny, such as through monitoring and surveillance by our phones or sensors in smart cities. At the same time, the actuation capabilities of the emerging Internet of Things add a new dimension, by allowing systems to directly affect the physical world. This, coupled with the integration of data analytics/machine learning techniques into system workflows is moving us into an increasingly automated world – driverless cars are just an early example.

It follows that the legal and policy concerns regarding technology are increasing in salience and prominence; there are real issues regarding privacy, transparency, agency and safety as they relate to the systems underpinning society, and the data that drives them.

Accountability, however, is hindered by the nature of the technology. Systems tend to be ‘black boxes’, that operate in a manner ‘invisible’ to those who are affected by them. Data can easily move across both administrative and geo-political boundaries, often without a trace. The structure and composition of the systems-of-systems involved can be dynamic and complex, and the internals of data analytics techniques are often opaque. This means that even where regulations are fit-for-purpose, ascertaining compliance is difficult, although accountability is still essential.

This seminar will bring together computer scientists, and lawyers from academia and industry. We will explore technical means for improving accountability, in light of legal/social requirements and conversely, interrogate and shape the legal, social and political frameworks regarding new and emerging technology. The goal of this seminar is to set new directions towards better aligning systems technologies; developing legal and regulatory requirements; and evolving user expectations.

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18202 **Inter-Vehicular Communication Towards Cooperative Driving**

Sunday, May 13 to Wednesday, May 16, 2018 – <http://www.dagstuhl.de/18202>

Onur Altintas (TOYOTA InfoTechnology Center USA – Mountain V, US)

Suman Banerjee (University of Wisconsin – Madison, US)

Falko Dressler (Universität Paderborn, DE)

Geert Heijenk (University of Twente, NL)

Katrin Sjöberg (Volvo Car Corporation – Göteborg, SE)

Looking back at the last decade, one can observe enormous progress in the domain of vehicular networking. In this growing community, many ongoing activities focus on the design of communication protocols to support safety applications, intelligent navigation, multi-player gaming and others. Very large projects have been initiated to validate the theoretic work in field tests and protocols are being standardized. With the increasing interest from industry, security and privacy have also become crucial aspects in the stage of protocol design in order to support a smooth and carefully planned roll-out. We are now entering an era that might change the game in road traffic management. This is supported by the U.S. federal government announcement in December 2016 that National Highway Traffic Safety Administration (NHTSA) plans to make V2V devices in new vehicles mandatory. The vehicular networking research also complements the ongoing activities towards automated driving. Very successful activities started with the Google car and lead to first projects on the road such as the Singapore driverless taxi service or the platooning experiments in Scandinavia and now Germany. The focus of this Dagstuhl Seminar will be networked control applications for the emerging “cooperative automated driving” domain. It is of utmost importance to bring together expertise from classical computer science (computer networking, simulation and modeling, operating system design), from electrical engineering (digital signal processing, communication networks), as well as from automated driving (mechanical engineering, image processing, control theory). The seminar aims to bring together experts from all these fields from both academia and industry.

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18242 **Secure Routing for the Internet and beyond**

Sunday, June 10 to Wednesday, June 13, 2018 – <http://www.dagstuhl.de/18242>

Phillipa Gill (University of Massachusetts – Amherst, US)

Amir Herzberg (Bar-Ilan University – Ramat Gan, IL)

Adrian Perrig (ETH Zürich, CH)

Matthias Wählisch (FU Berlin, DE)

The goals of this seminar are (i) to facilitate brainstorming and exchange of ideas among experts working in different areas and types of secure-networking, hopefully leading to improved understanding and progress in different aspect of secure routing, and (ii) to identify the most important research challenges and to devise a roadmap towards addressing this urgent issue. To this end, the

seminar aims at bringing together leading scientist in the area of secure routing, including scientists working on security of inter-AS routing, intra-AS routing, routing for future Internet designs, and on (secure) routing for highly-mobile scenarios including ad-hoc networks, sensor networks, robotic (swarm) networks, delay-tolerant networks and vehicular networks.

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18252 **Ubiquitous Gaze Sensing and Interaction**

Monday, June 18 to Thursday, June 21, 2018 – <http://www.dagstuhl.de/18252>

Lewis Chuang (MPI für biologische Kybernetik – Tübingen, DE)

Andrew Duchowski (Clemson University, US)

Pernilla Qvarfordt (FX Palo Alto Laboratory, US)

Daniel Weiskopf (Universität Stuttgart, DE)

The miniaturization of optical devices and advances in computer vision have led to an increasing integration of gaze sensing capabilities in computing systems, from desktop computing to virtual reality to wearables. Everyday scenarios include computer games that select the camera viewpoint given the user's gaze (e.g., Assassin's Creed 3) and robotic agents that infer user engagement from gaze behavior. Ubiquitous gaze sensing and interaction presents many computational challenges. This demands a framework that can accommodate compatible solutions from data acquisition to signal processing to pattern classification to visualization and analytics. By bringing together computer scientists and gaze researchers, the seminar will answer the following questions: (1) What can computing systems reliably sense from user gaze information? (2) What innovations in human-computing interaction can result from gaze information? From computer science, we invite experts from computer graphics, signal processing, visualization, human-computer interaction, data analytics, pattern analysis and classification. Also, we invite experts that employ gaze tracking across diverse disciplines: geo-information systems, medicine, aviation, psychology, neuroscience, etc. By involving experts in gaze interpretation, this seminar will provide a roadmap to develop solutions that will deliver meaningful inputs for computing systems as well as advance existing gaze research. The seminar will conduct workshops to identify high-impact scenarios and challenges. Subsequently, participants with complementary expertise will propose solutions that target identified challenges and write book sections for a handbook, which will help computer scientists appreciate the challenges of interpreting gaze information and inform gaze researchers on the modern techniques that underlie gaze acquisition and processing.

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