

# ICDCS 2018



**38<sup>TH</sup> IEEE INTERNATIONAL CONFERENCE**

**ON**

**DISTRIBUTED COMPUTING SYSTEMS**

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**July 2-5, 2018**

TU Wien, Campus Gußhaus  
Gußhausstraße 25-29  
1040 Vienna, Austria

Conference Handbook

# Floorplan Campus Gußhaus

## Location of Opening Session and Conference Tracks 1 - 3

For location of Tracks 4 - 5 see plan on pages 30-31.

### Campus Gußhaus - C Erdgeschoss Gußhausstraße 27-29, 1040 Wien

Hörsaal EI 7 - CD EG 13



CD EG

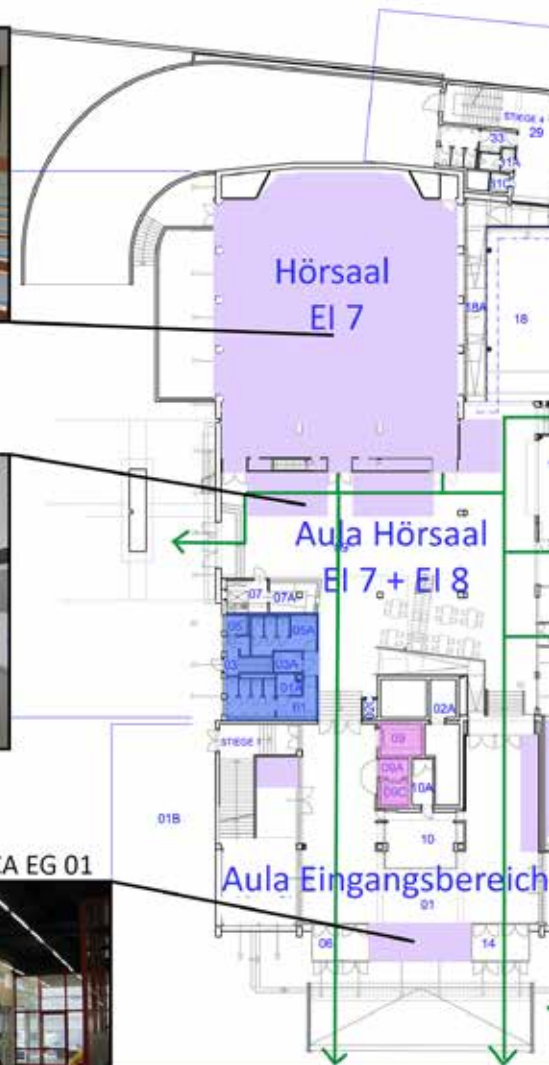
Aula vor EI 7 + EI 8 - CA EG 09



Aula Eingangsbereich - CA EG 01



Aula vor EI 9 + EI 10 - CA EG 1



Hörsaal EI 8 - CD EG 08



### Legende

- Veranstaltungsräume
- Hörsäle/Seminarräume
- Fluchtwege
- Aufzüge
- WC Anlagen



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# Message from the General Chair

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I would like to welcome you to ICDCS 2018, the 38th IEEE International Conference on Distributed Computing Systems, being held from July 2 to July 5, 2018, in Vienna, Austria. The conference is held at the Vienna University of Technology (TU Wien).

As a premier forum for the presentation of research results on a broader spectrum of distributed computing systems, the 2018 ICDCS conference continues the tradition with a similar organizational structure. I would like to express our heartfelt thanks to the Program Chair, Peter Pietzuch, and all of the track chairs. In addition, the ICDCS 2018 technical program also consists of industrial and experimentation sessions, applications and experiences sessions, short papers sessions, posters and demos sessions, and two co-located workshops.

Two particular highlights of ICDCS 2018 are:

- (1) the keynote by a distinguished speaker, Prof. Dr. Manfred Hauswirth from TU Berlin, and
- (2) the Blue Sky Ideas and Vision sessions featuring thought-provoking and forward looking blue sky ideas and visions on broader spectrums of future distributed computing systems.

In addition, the 2018 ICDCS main conference is enriched by two co-located workshops, as described in the workshop chairs' message. These workshops provide an opportunity for small groups of like-minded researchers to discuss areas of interest and new ideas.

ICDCS 2018 very much relied on the contributions of a great team of volunteers, including the program committee members from all tracks. I would like to thank all of them for their time, high quality service, and tireless efforts. I would like to express our special appreciation to the workshop chair (Qin Feng), panel chair (Erich Neuhold), publication chairs (Wang-Chien Lee and Fajar J. Ekaputra), publicity chair (Stefan Schulte), local arrangement chairs (Johann Stockinger, Christine Haas, and Sandra Pillis), and finance chair (Christian Huemer).

Finally, on behalf of the 2018 ICDCS organization and program committee, I would like to express our sincere gratitude to everyone who has contributed to the conference, especially the authors and the participants. I would also like to thank Xiaodong Zhang (ICDCS Steering Committee Chair) for his support and advice and for trusting us to organize the conference.

I wish you an enjoyable and productive conference and a pleasant stay in Vienna.

**A Min Tjoa**

TU Wien, Austria  
ICDCS 2018 General Chair

# Message from the Program Chair

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In my role as the Program Committee Chair for ICDCS 2018, I would like to welcome you to the conference. ICDCS continues to be a premier venue for the presentation and discussion of research results in the broad area of distributed computing. Distributed computing and its applications have had a major impact on society, which drives the demand for research work in this area. This puts distributed computing among the most exciting research areas in computer science. For ICDCS 2018, cloud computing, big data systems, security, middleware and IoT were among the most popular topics.

This year's ICDCS conference continues to build on the success of last year's conference, featuring a comprehensive set of technical research and special tracks. The technical program of ICDCS 2018 has eleven research tracks, three special tracks, one short papers track, and one posters & demonstrations track. The eleven research tracks received a total of 378 submissions, of which 78 were accepted for presentation at the conference. This translates to a healthy acceptance rate of 20.6%.

I am sure that you will agree with me that the quality of the accepted research papers at ICDCS 2018 is extremely high, which is also due to the robust review process. Submissions were reviewed within the research tracks, and the process was led by the Track Vice Chairs. Each paper received at least three reviews, and the reviews were discussed as part of an online discussion phase. The Vice Chairs then made recommendations on the set of papers to accept for each track. Some tracks solicited a larger number of reviews per paper and subjected papers to a shepherding process.

I would like to thank the Vice Chairs of the research tracks, who have done an outstanding job in ensuring the quality of the tracks: Marco Canini and Dejan Kostic (Cloud Computing & Data Centers), Hans-Arno Jacobsen (Distributed Big Data Systems & Analytics), Angela Demke Brown and Dushyanth Narayanan (Distributed Operating Systems & Middleware), Keren Censor-Hillel and Gregory Chockler (Distributed Algorithms & Theory), Pramod Bhatotia and Christof Fetzer (Distributed Fault Tolerance & Dependability), Erik Elmroth and Di Wang (Distributed Green Computing & Energy Management), Gian Pietro Picco (Internet of Things & Cyber-Physical Systems), Aruna Balasubramanian and Joerg Ott (Mobile & Wireless Network Computing), Abhishek Chandra and Mahadev Satyanarayanan (Edge Computing), Herbert Bos and Mathias Payer (Security, Privacy, and Trust), and Illias Leontiadis and Daniele Quercia (Social Networks & Crowdsourcing). I also want to thank the Vice Chairs of the special tracks: Roger Barga and Sangeetha Seshadri (Industry & Experimentation), Mudhakar Srivatsa and Evangelia Kalyvianaki (Applications & Experiences), and Calton Pu, Maarten van Steen and Masaru Kitsuregawa (Vision & Blue Sky Thinking). Last but not least, Lydia Y. Chen and Guillaume Pierre (Short Papers) and Nadeem Jamali and Vladimir Vlassov (Posters & Demonstrations) have done great work leading their tracks.

I would also like to express my sincere gratitude to all of the 648 Program Committee members who served across the tracks. Without their commitment, it would have been impossible to put together this high-quality program. Special thanks also go to A Min Tjoa (General Chair) and Christine Haas (Local Arrangements) for their help, Wang-Chien Lee and Fajar J. Ekaputra (Publication Chairs) for all their hard work putting the conference proceedings together, and Xiadong Zhang (ICDCS Steering Committee Chair) for his guidance. Finally, I would like to thank all of the authors of submitted and accepted papers – without your research work and contributions, ICDCS 2018 would not have been possible.

I hope that you will enjoy the ICDCS 2018 conference and its technical program.

**Peter Pietzuch**

Imperial College London, United Kingdom  
ICDCS 2018 Program Chair

# Message from the Workshop Chair

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Welcome to the ICDCS 2018 workshops! It is my great pleasure to present the workshop technical programs. This year, our two highly selective workshops are held in conjunction with the 2018 International Conference on Distributed Computing Systems (ICDCS) in Vienna, Austria, from July 2 to July 5, 2018.

The ICDCS 2018 workshops provide premier forums for international researchers, engineers, and computer system users to exchange and share the ideas and experiences on the topics related to distributed systems. Among many workshop proposals, we have selected the following two workshops:

1. Scalable Network Traffic Analytics (SNTA 2018)

2. The 3rd Workshop on QoE-based Analysis and Management of Data Communication Networks (Internet-QoE 2018)

In particular, the objective of the SNTA workshop is to bridge the network traffic processing in distributed systems and the latest advances in machine learning and data science technologies. Furthermore, the Internet-QoE workshop aims at scaling QoE out of the lab studies context and bringing it to the design, analysis and operation of real world networks and distributed systems.

Our workshops cannot become reality without tireless efforts from the organizers and reviewers of the individual workshop. Hereby I sincerely thank them for putting the high quality programs together. I am also full of gratitude to all the authors who submitted their papers to ICDCS 2018 workshops. In addition, I greatly appreciate the guidance and help from the ICDCS 2018 Steering Committee Chair Prof. Xiaodong Zhang, General Chair Prof. A Min Tjoa, Program Chair Peter Pietzuch, Publication Chair Prof. Wang-Chien Lee, Publication Co-Chair Fajar J. Ekaputra, and Financial Chair Christian Huemer.

**Feng Qin**

The Ohio State University  
ICDCS 2018 Workshop Chair

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## Been there, done that, bought the t-shirt: Trends in distributed systems architecture

### Abstract:

The history of distributed system architecture exhibits many extremes – from decentralization to centralization and back again. Each phase of evolution had improvements and replaced the previous generation of architectures in a wide range of applications. When the limitations of the new dominating paradigm were understood, the pendulum went back to the other side. This was the “normal evolution cycle” in computer science for quite some time. Recently, we are witnessing a gradual convergence towards “best of breed” hybrid approaches combining both sides. Also in almost all sectors, platforms are now dominating the landscape. Platforms promote separation of concern and enable virtualization, i.e., independence from technological advances in the virtualized system to protect investments and not having to dramatically change applications when novel approaches become available. For example, currently the network layer is being transformed into a virtualized resource facilitating a distributed programming platform through software defined networks (SDN), network function virtualization (NFV) and edge/fog computing. This is similar to the prior advances in virtualizing computing resources (CPU, memory, and disk space) through the cloud. Ultimately, the virtualization of the network may lead to a “unification” of the two traditionally separated paradigms of information processing and communication. In this keynote, I will review insights and lessons-learned from some of the major architectural developments of the last decades and which possible future architectures these evolutionary strands may lead to.

### Manfred Hauswirth



Manfred Hauswirth is the managing director (CEO) of the Fraunhofer Institute for Open Communication Systems (FOKUS) and a full professor for “Open Distributed Systems” at TU Berlin since 2014. He holds a PhD and an MSc in computer science from TU Vienna. He started his research career at EPFL, Switzerland and then became a professor at NUI Galway, Ireland, where he was Vice-Director of the Digital Enterprise Research Institute (DERI) for 8 years and a stream leader in INSIGHT, the Irish National Data Analytics Centre. His research is on distributed information systems, Internet of Things, stream data processing, and Linked Data. He has won several international awards for his work in these areas and is active in many scientific and political committees around digitization. He is a principal investigator in the Weizenbaum Institute, the German Internet Institute, in the Einstein Center Digital Future (ECDF), in the Berlin Big Data Center (BBDC) and the Helmholtz-Einstein International Berlin Research School in Data Science (HEIBRiDS). Manfred Hauswirth is an associate editor of the IEEE Transactions on Services Computing, a member of the IEEE Computer Society Conference Advisory Committee, a partner in the “Web Science Trust Network of Laboratories” (WSTNet), and the speaker of Fraunhofer’s “Berlin Center for Digital Transformation” as well as a member of numerous boards, committees and networks around digitization.



# Program Overview Workshops & Tutorials

**Monday, July 2, 2018**

**Workshops and Tutorials**

TIME	TRACK 1 EI 1	TRACK 2 EI 3A	TRACK 3 EI 4	TRACK 4 EI 8	TRACK 5 EI 9	TRACK 6 EI10
from 07:00	Registration					
08:00 - 09:30	Tutorial 1 Communication and Agreement in Byzantine Asynchronous Systems		Workshop 2 Internet-QoE	Tutorial 2 Building Efficient Cloud Middleware for HPC, Big Data, and Deep Learning Applications	Tutorial 3 Distributed Service Prototyping with Cloud Functions	Tutorial 4 High Performance Network Services: The Role of NFV and Kernel Bypass Networking
09:30 - 10:00	Coffee Break					
10:00 - 12:00	Tutorial 1 Communication and Agreement in Byzantine Asynchronous Systems		Workshop 2 Internet-QoE	Tutorial 2 Building Efficient Cloud Middleware for HPC, Big Data, and Deep Learning Applications	Tutorial 3 Distributed Service Prototyping with Cloud Functions	Tutorial 4 High Performance Network Services: The Role of NFV and Kernel Bypass Networking
12:00 - 13:30	Lunch					
13:30 - 15:30		Workshop 1 SNTA	Workshop 2 Internet-QoE		Tutorial 3 Distributed Service Prototyping with Cloud Functions	Tutorial 4 High Performance Network Services: The Role of NFV and Kernel Bypass Networking
15:30-16:00	Coffee Break					
16:00-17:30		Workshop 1 SNTA	Workshop 2 Internet-QoE		Tutorial 3 Distributed Service Prototyping with Cloud Functions	Tutorial 4 High Performance Network Services: The Role of NFV and Kernel Bypass Networking

# Program Overview Conference

## Tuesday, July 3, 2018

TIME	TRACK 1 EI 10	TRACK 2 EI 8	TRACK 3 EI 9	TRACK 4 EI 4	TRACK 5 EI 1
from 07:00	Registration				
08:30 - 09:30	Opening   Keynote Location: EI 7				
09:30 - 10:00	Coffee Break				
10:00 - 12:00	Session 1 A Research 1	Session 1 B Research 2	Session 1C Vision 1		
12:00 - 13:30	Lunch				
13:30 - 15:30	Session 2A Research 3	Session 2B Research 4	Session 2C Vision 2	Session 2D Applications 1	Session 2E Short Papers 1
15:30 - 16:00	Coffee Break				
16:00 - 17:20	Session 3A Research 5	Session 3B Research 6	Session 3C Vision 3	Session 3D Research 7	Session 3E Posters
17:20-19:00	Poster Display and Demos				
from 18:00	Welcome Reception Campus Gußhaus				

## Wednesday, July 4, 2018

TIME	TRACK 1 EI 10	TRACK 2 EI 8	TRACK 3 EI 9	TRACK 4 EI 4	TRACK 5 EI 1
from 09:00	Registration				
10:00 - 12:00	Session 4 A Research 8	Session 4 B Research 9	Session 4C Vision 4	Session 4 D Application 2	
12:00 - 13:30	Lunch				
13:30 - 15:30	Session 5A Research 10	Session 5B Research 11	Session 5C Vision 5	Session 5D Short Papers 2	Session 5E Industry 1
15:30 - 16:00	Coffee Break				
16:00 - 17:20	Session 6A Research 12	Session 6B Research 13	Session 6C Vision 6	Session 6D Research 14	
from 19:30	Conference Dinner City Hall Vienna				

## Thursday, July 5, 2018

TIME	TRACK 1 EI 10	TRACK 2 EI 8	TRACK 3 EI 9	TRACK 4 EI 4	TRACK 5 EI 1
10:00 - 12:00	Session 7 A Research 15	Session 7 B Research 16	Session 7C Research 17	Session 7 D Application 3	Session 7 E Industry 2
12:00 - 13:30	Lunch				

# Workshops

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## Scalable Network Traffic Analytics (SNTA)

Monday, July 2, 2018, 13:30 – 17:30

### Keynote

#### John Wu: Scientific Data Services Framework for Exascale Infrastructure

Dr. John Wu is a Senior Computer Scientist at Lawrence Berkeley National Laboratory. He works actively on a number of topics in data management, data analysis, and high-performance computing. His algorithmic research work includes statistical methods for feature extraction, indexing techniques for searching large datasets, and matrix based techniques for machine learning and scientific computing. He has authored and coauthored more than 100 technical publications, 11 of which have more than 100 citations each. He is the developer of a number of software packages, including, IDEALEM, SDS, FastBit and TRLan. Among them, the FastBit software for indexing large datasets has earned an R&D 100 Award, and is used by many organizations. For example, a German bioinformatics company uses FastBit to accelerate their molecular docking software by hundreds of times, and an US internet company uses it to sift through terabytes of advertisement related data daily. A FastBit paper is collected among the 40 major works funded by DOE Office of Science, as a part of its 40th Anniversary celebration.

## IEEE ICDCS 3rd Workshop on QoE-based Analysis and Management of Data Communication Networks (Internet-QoE 2018)

Monday, July 2, 2018, 08:30 – 17:45

### Keynotes

#### Theophilus Benson: A Data-driven Approach to Speeding Up the Internet

Theophilus Benson is an assistant professor in the Department of Computer Science at Brown University. His group works on designing frameworks and algorithms for solving practical networking problems with an emphasis on speeding up the internet, improving network reliability, and simplifying network management. He has won multiple awards including best paper awards, an applied network research prize, various Yahoo! and Facebook Faculty Awards, and an NSF Career award.

#### Stefan Schmid: Predictable Data Communications With (Self-)Adjusting Networks

Stefan Schmid is a Professor in Computer Science at the University of Vienna. He obtained his MSc and PhD from ETH Zurich, Switzerland, was a Postdoc at TU Munich and a Senior Research Scientist at T-Labs in Berlin, a visiting professor at CNRS-LAAS Toulouse and UCL Belgium, and an Associate Professor at Aalborg University. Stefan Schmid's research interests revolve around networked and distributed systems, with a focus on algorithms. Stefan Schmid serves as the Editor of the Distributed Computing Column of the Bulletin of the European Association of Theoretical Computer Science (EATCS), and as Associate Editor of IEEE Transactions on Network and Service Management (TNSM). He received the IEEE Communications Society ITC Early Career Award 2016.

#### Christian Timmerer: HTTP Adaptive Streaming – State of the Art and Challenges Ahead

Christian Timmerer is an Associate Professor with Alpen-Adria-Universität Klagenfurt, Klagenfurt, Austria. He is a co-founder of Bitmovin Inc., San Francisco, CA, USA, where he holds the position of Chief Innovation Officer, specifically Head of Research and Standardization. His research interests include immersive multimedia communications, streaming, adaptation, and Quality of Experience (QoE). He coauthored seven patents and more than 190 publications in workshops, conferences, journals, and book chapters. Dr. Timmerer was the General Chair of WIAMIS 2008, QoMEX 2013, ACM MMSys 2016, and ACM Packet Video 2018. He participated in several EC-funded projects, notably, DANAE, ENTHRONE, P2P-Next, ALICANTE, SocialSensor, ICoSOLE, and the COST Action IC1003 QUALINET. He also participated in ISO/MPEG work for several years, notably, in the areas of MPEG-21, MPEG-M, MPEG-V, and MPEG-DASH. Further information can be found at <http://blog.timmerer.com>.

# Tutorials

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## Communication and Agreement in Byzantine Asynchronous Systems

**Michel Raynal**

(IRISA, Université de Rennes, France, and Polytechnic University, Hong Kong)

Monday, July 2, 2018, 8:00 am – 12:00 pm

Communication and agreement abstractions are fundamental abstractions in any distributed system. (If the computing entities do not need to communicate or agree in one way or another, the system is not a distributed system!) This tutorial is devoted to the design of such abstractions built on top of asynchronous distributed systems prone to Byzantine process failures. Such failures are among the most severe failures a process can exhibit, namely a Byzantine process is a process that behaves arbitrarily. The tutorial is made up of three parts, each devoted to a given abstraction and algorithms that implement it. The first two are related to communication, while the last one is on distributed agreement.

## Building Efficient Cloud Middleware for HPC, Big Data, and Deep Learning Applications

**Dhabaleswar K. Panda (The Ohio State University)**

**Xiaoyi Lu (The Ohio State University)**

Monday, July 2, 2018, 8:00 am – 12:00 pm

To alleviate the cost burden, sharing cluster resources to end-users through virtualization is becoming necessary for modern cloud platforms. The recently introduced Single Root I/O Virtualization (SR-IOV) technique provides native I/O virtualization capabilities and is changing the landscape of I/O virtualization. In this tutorial, we first provide an overview of popular virtualization system software on cloud environments, such as hypervisors, containers, OpenStack, Slurm, etc., and high-performance communication mechanisms on clouds, such as InfiniBand, RDMA, SR-IOV, IVShmem, etc. We further discuss the opportunities and technical challenges of designing high-performance MPI runtime over cloud environments. We also discuss how to integrate these designs into popular cloud management systems like OpenStack and Slurm. Next, we will demonstrate how high-performance solutions can be designed to run Big Data and Deep Learning workloads (like Hadoop, Spark, TensorFlow) in cloud environments. Finally, we will provide demos of running these designs on the Chameleon Cloud Testbed.

## Distributed Service Prototyping with Cloud Functions

**Josef Spillner (Zurich University of Applied Sciences)**

Monday, July 2, 2018, 9:00 am – 5:30 pm

This hands-on tutorial lets participants build an application based on cloud functions by combining serverless computing and service prototyping approaches. All necessary background information including recent research results is conveyed during the tutorial which focuses on two parts, development and operation of functions.

## High Performance Network Services: The Role of NFV and Kernel Bypass Networking

**K. Ramakrishnan (University of California Riverside)**

**Timothy Wood (George Washington University)**

Monday, July 2, 2018, 9:00 am – 5:30 pm

This tutorial seeks to elucidate the challenges and opportunities in software-based networks by providing hands-on experience with key NFV technologies. It provides valuable hands-on experience to distributed systems researchers interested in learning about high performance network middleboxes, and requires no prior NFV knowledge or experience. The tutorial introduces attendees to an overview of NFV technology, motivation for NFV from the perspective of service providers, the DPDK I/O library, the mTCP user-space stack, and the OpenNetVM NF management platform. Attendees get hands-on experience running a mixture of high performance middleboxes and end-host applications on an integrated platform managed by OpenNetVM.

# Conference Program Details

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## Tuesday, July 3rd

8:40 - 9:30

### Keynote

***Been there, done that, bought the t-shirt: Trends in distributed systems architecture***

Manfred Hauswirth (Fraunhofer Institute for Open Communication Systems (FOKUS) and TU Berlin, Germany)

10:00 - 12:00

### Session 1A: Research 1 – Cloud Computing & Data Centers

Chair: Sara Bouchenak (INSA-Lyon, LIRIS, CNRS, France)

***DHL: Enabling Flexible Software Network Functions with FPGA Acceleration***

Xiaoyao Li, Xiuxiu Wang, Fangming Liu (all: Huazhong University of Science and Technology, China), Hong Xu (City University of Hong Kong)

***Scheduling Congestion-Free Updates of Multiple Flows with Chronicle in Timed SDNs***

Jiaqi Zhen, Bo Li, Chen Tian (all: Nanjing University, China), Klaus-Tycho Foerster, Stefan Schmid (both: Aalborg University, Denmark), Guihai Chen (Nanjing University, China), Jie Wu (Temple University, China)

***Fair Coflow Scheduling without Prior Knowledge***

Luping Wang, Wei Wang (both: The Hong Kong University of Science and Technology, Hong Kong)

***Support ECN in Multi-Queue Datacenter Networks via per-Port Marking with Selective Blindness***

Yawen Pan, Chen Tian, Jiaqi Zheng (all: Nanjing University, China), Gong Zhang, Hengky Susanto, Bo Bai (all: Huawei, Hong Kong), Guihai Chen (Nanjing University, China)

***Designing the Fast and Friendly TCP to Fit the Ultra-high Speed Data Center Network***

Tao Zhang, Jiawei Huang, Jianxin Wang (all: Central South University, China), Jianer Chen (Texas A&M University, United States), Yi Pan (Georgia State University, United States), Geyong Min (University of Exeter, UK)

***Fault Localization in Large-Scale Network Policy Deployment***

Praveen Tamma (The University of Edinburgh, UK), Chandra Nagarajan, Pavan Mamillapalli, Ramana Kompella (all: Cisco Systems, United States), Myungjin Lee (The University of Edinburgh, UK)

### Session 1B: Research 2 – Distributed Big Data Systems & Analytics

Chair: Nalini Venkatasubramanian (University of California, Irvine, United States)

***Ignem: Upward Migration of Cold Data in Big Data File Systems***

Simbarashe Dzinamarira (Rice University, United States), Florin Dinu (Ecole Polytechnique Fédérale de Lausanne, Switzerland), Eugene Ng (Rice University, United States)

***ADWISE: Adaptive Window-based Streaming Edge Partitioning for High-Speed Graph Processing***

Christian Mayer, Ruben Mayer, Muhammad Adnan Tariq, Heiko Geppert, Larissa Laich, Lukas Rieger, Kurt Rothermel (all: University of Stuttgart, Germany)

***Edge Caching for Enriched Notifications Delivery in Big Active Data***

Md Yusuf Sarwar Uddin, Nalini Venkatasubramanian (both: University of California, Irvine, United States)

***Stay Fresh: Speculative Synchronization for Fast Distributed Machine Learning***

Chengliang Zhang, Huangshi Tian, Wei Wang (all: The Hong Kong University of Science and Technology, Hong Kong), Feng Yan (University of Nevada, Reno, United States)

***D2Tree: A Distributed Double-Layer Namespace Tree Partition Scheme for Metadata Management in Large-Scale Storage Systems***

Xinjian Luo, Xiaofeng Gao (both: Shanghai Jiao Tong University, China), Zhaowei Tan (University of California, Los Angeles, United States), Jiayi Liu (Shanghai Jiao Tong University, China), Xiaochun Yang (Northeastern University, China), Guihai Chen (Shanghai Jiao Tong University, China)



## Session 1C: Vision 1

Chair: Misha Rabinovich (Case Western, United States)

### ***Will Distributed Computing Revolutionize Peace? The Emergence of Battlefield IoT***

Tarek Abdelzaher (University of Illinois at Urbana-Champaign, United States), Nora Ayanian (USC, United States), Tamer Basar (University of Illinois at Urbana-Champaign, United States), Suhas Diggavi (University of California, Los Angeles, United States), Jana Diesner (University of Illinois at Urbana-Champaign, United States), Deepak Ganesan (UMASS, United States), Ramesh Govindan (USC, United States), Susmit Jha (SRI, United States), Tancrede Lepoint (SRI, United States), Ben Marlin (UMASS, United States), Klara Nahrstedt, David Nicol (both: University of Illinois at Urbana-Champaign, United States), Raj Rajkumar (CMU, United States), Stephen Russell (ARL, United States), Sanjit Seshia (University of California, Berkeley, United States), Fei Sha (USC, United States), Prashant Shenoy (UMASS, United States), Mani Srivastava (University of California, Los Angeles, United States), Gaurav Saukhatme (USC, United States), Ananthram Swami (ARL, United States), Paulo Tabuada (University of California, Los Angeles, United States), Don Towsley (UMASS, United States), Nitin Vaidya, Venu Veeravalli (both: University of Illinois at Urbana-Champaign, United States)

### ***Rational Interoperability: A Pragmatic Path Toward a Data-Centric IoT***

Eve M. Schooler (Intel), Milan Milenkovic (IoTsense), Keith A. Ellis, Jessica McCarthy, Jeff Sedayao, Brian McCarson (all: Intel)

### ***Vegvisir: A Partition-Tolerant Blockchain for the Internet-of-Things***

Kolbeinn Karlsson, Weitao Jiang, Stephen Wicker, Edwin Ma, Robbert van Renesse, Hakim Weatherspoon (all: Cornell University, United States)

### ***OpenVDAP: An Open Vehicular Data Analytics Platform for CAVs***

Qingyang Zhang (Anhui University, China), Yifan Wang, Xingzhou Zhang (both: University of Chinese Academy of Sciences, China), Liangkai Liu, Xiaopei Wu, Weisong Shi (all: Wayne State University, United States), Hong Zhong (Anhui University, China)

### ***A Distributed Systems Perspective on Industrial IoT***

Konrad Iwanicki (University of Warsaw, Poland)

### ***Re-thinking: Design and Development of Mobility Aware Applications in Smart and Connected Communities***

Teruo Higashino, Hirozumi Yamaguchi, Akihito Hiromori, Akira Uchiyama (all: Osaka University, Japan), Takaaki Umedu (Shiga University, Japan)

**13:30 -15:30**

## Session 2A: Research 3 – Distributed Operating Systems & Middleware

Chair: Angela Demke Brown (University of Toronto, Canada)

### ***Multi-client Transactions in Distributed Publish/Subscribe Systems***

Martin Jergler, Kaiwen Zhang, Hans-Arno Jacobsen (all: Technical University of Munich, Germany)

### ***Optimal Service Function Tree Embedding for NFV Enabled Multicast***

Bangbang Ren, Deke Guo, Guoming Tang (all: National University of Defense Technology, China), Xu Lin (Xidian University, China), Yudong Qin (National University of Defense Technology, China)

### ***NetRS: Cutting Response Latency in Distributed Key-Value Stores with In-Network Replica Selection***

Yi Su, Dan Feng, Yu Hua, Zhan Shi, Tingwei Zhu (all: Huazhong University of Science and Technology, China)

### ***OpuS: Fair and Efficient Cache Sharing for In-Memory Data Analytics***

Yinghao Yu, Wang Wei, Jun Zhang, Qizhen Weng, Khaled Ben Letaief (all: The Hong Kong University of Science and Technology, Hong Kong)

### ***vNetTracer: Efficient and Programmable Packet Tracing in Virtualized Networks***

Kun Suo, Yong Zhao (both: University of Texas, Arlington, United States), Wei Chen (University of Colorado, Colorado Springs, United States), Jia Rao (University of Texas, Arlington, United States)

## Session 2B: Research 4 – Distributed Algorithms & Theory

Chair: Tigran Tonoyan (Reykjavik University, Island)

### ***„Semi-Asynchronous”: a new scheduler for robot based computing systems***

Serafino Cicerone, Gabriele Di Stefano (both: University of L'Aquila, Italy), Alfredo Navarra (Università degli Studi di Perugia, Italy)

### ***Shrewd Selection Speeds Surfing: Use Smart EXP3!***

Anuja Meetoo Appavoo, Seth Gilbert, Kian-Lee Tan (all: National University of Singapore, Singapore)

### ***A Scalable Linearizable Multi-Index Table***

Gali Sheffi (Yahoo research, Israel), Guy Golan-Gueta (VMWare research, Israel), Erez Petrank (Technion, Israel)

### ***Tight Bounds for Maximal Identifiability of Failure Nodes in Boolean Network Tomography***

Nicola Galesi, Fariba Ranjbar (all: Sapienza Università Roma, Italy)

**PEA: Parallel Evolutionary Algorithm by Separating Convergence and Diversity for Large-Scale Multi-Objective Optimization**

Huangke Chen, Xiaomin Zhu (both: National University of Defense University, China), Witold Pedrycz (University of Alberta, Canada), Shu Yin (ShanghaiTech University, China)

## Session 2C: Vision2

Chair: Maarten van Steen (University of Twente, Netherlands)

**Cognified Distributed Computing**

Ozalp Babaoglu (University of Bologna, Italy), Alina Sirbu (University of Pisa, Italy)

**Towards Intelligent Distributed Data Systems for Scalable Efficient and Accurate Analytics**

Peter Triantafillou (The University of Warwick, UK)

**Towards A Novel Architecture for Enabling Interoperability Amongst Multiple Blockchains**

Hai Jin, Jiang Xiao, Xiaohai Dai (all: Huazhong University of Science and Technology, China)

**Efficient Shared Memory Orchestration Towards Demand Driven Memory Slicing**

Qi Zhang (IBM Thomas J. Watson Research, United States), Ling Liu, Calton Pu, Wenqi Cao, Semih Sahin (all: Georgia Institute of Technology, United States)

**Massivizing Computer Systems: a Vision to Understand, Design, and Engineer Computer Ecosystems through and beyond Modern Distributed Systems**

Alexandru Iosup (Vrije Universiteit Amsterdam and TU Delft, Netherlands), Alexandru Uta (Vrije Universiteit Amsterdam, Netherlands), Laurens Versluis (Vrije Universiteit Amsterdam, Netherlands), Georgios Andreadis (Delft University of Technology, Netherlands), Erwin van Eyk, Tim Hegeman, Sacheendra Talluri (all: Delft University of Technology, Netherlands), Vincent van Beek (Solvinty, Netherlands), Lucian Toader (Vrije Universiteit Amsterdam, Netherlands)

**A Trusted Health Care Data Analytics Cloud Platform**

Arun Iyengar, Ashish Kundu, Upendra Sharma, Ping Zhang (all: IBM, United States)

## Session 2D: Applications 1

Chair: Nishanth Sastry (King's College London, United Kingdom)

**SSD-Insider: Internal Defense of Solid-State Drive against Ransomware with Perfect Data Recovery**

Sungha Baek (Inha University, South Korea), Youngdon Jung (DGIST, South Korea), Aziz Mohaisen (University of Central Florida, United States), Sungjin Lee (DGIST, South Korea), Daehun Nyang (Inha University, South Korea)

**Token Account Algorithms: The Best of the Proactive and Reactive Worlds**

Gábor Danner, Mark Jelasity (both: University of Szeged, Hungary)

**ACCIO: How to Make Location Privacy Experimentation Open and Easy**

Vincent Primault (University College London, UK), Mohamed Maouche (INSA-Lyon, LIRIS, CNRS, France), Antoine Boutet (INSA-Lyon, CITI, INRIA, France), Sonia Ben Mokhtar, Sara Bouchenak, Lionel Brunie (all: INSA-Lyon, LIRIS, CNRS, France)

**Improving Asynchronous Invocation Performance in Client-server Systems**

Shungeng Zhang (Louisiana State University, United States), Qingyang Wang (Louisiana State University - Baton Rouge, United States), Yasuhiko Kanemasa (Fujitsu Laboratories Ltd., Japan)

**Fast Lookup Is Not Enough: Towards Efficient and Scalable Flow Entry Updates for TCAM-based OpenFlow Switches**

Kun Qiu, Jing Yuan, Jin Zhao, Xin Wang (all: Fudan University, China), Stefano Secci (LIP6 UPMC, France), Xiaoming Fu (University of Goettingen, Germany)

## Session 2E: Short Papers 1

Chair: Anshul Ghandi (Stony Brook University, United States)

**EASY: Efficient segment assignment strategy for reducing tail latencies in Pinot**

Seyyed Ahmad Javadi, Harsh Gupta, Robin Manhas, Shweta Sahu, Anshul Gandhi (all: Stony Brook University, United States)

**Anti-Entropy Bandits for Geo-Replicated Consistency**

Benjamin Bengfort, Pete Keleher (both: University of Maryland, United States)

**On Device Grouping for Efficient Multicast Communications in Narrowband-IoT**

Galini Tsoukaneri, Mahesh Marina (both: The University of Edinburgh, UK)

**Replica-group leadership change as a performance enhancing mechanism in NoSQL data stores**

Antonis Papaioannou, Kostas Magoutis (both: ICS-FORTH and University of Ioannina, Greece)

***Towards Realistic Energy Profiling of Blockchains for securing Internet of Things***

Sriram Sankaran, Sonam Sanju, Krishnashree Achuthan (all: Amrita University, India)

***Concurrent Ranging with Ultra-Wideband Radios: From Experimental Evidence to a Practical Solution***

Bernhard Großwindhager, Carlo Alberto Boano, Michael Rath, Kay Römer (all: Graz University of Technology, Austria)

***DDP: Distributed Network Updates in SDN***

Geng Li (Yale University, United States), Yichen Qian (Tongji University, China), Chenxingyu Zhao (Peking University, China), Y. Richard Yang (Yale University, United States), Tong Yang (Peking University, China)

***Geolocation of Transmitters Using Minimally Accurate Receivers***

Brian Rapp, Barry Secrest (both: U.S. Army Research Laboratory, United States)

**16:00 - 17:20**

**Session 3A: Research 5 – Fault Tolerance & Dependability**

Chair: Valerio Schiavoni (University of Neuchatel, Switzerland)

***Renaissance: Self-Stabilizing Distributed SDN Control Plane***

Marco Canini (Université catholique de Louvain, Belgium), Iosif Salem (Chalmers University of Technology, Sweden), Liron Schiff (Tel Aviv University, Israel), Elad Michael Schiller (Chalmers University of Technology, Sweden), Stefan Schmid (University of Vienna, Austria)

***Cascade: Reliable Distributed Session Handoff for Continuous Interaction across Devices***

Yérom-David Bromberg, Adrien Luxey, François Taïani (all: Univ Rennes, Inria, CNRS, IRISA, France)

***EC-Store: Bridging the Gap Between Storage and Latency in Distributed Erasure Coded Systems***

Michael Abebe, Khuzaima Daudjee, Brad Glasbergen, Yuanfeng Tian (all: University of Waterloo, Canada)

***USTR: A High-performance Traffic Engineering Approach for the Failed Link***

Anmin Xu, Jun Bi, Baobao Zhang, Tianran Xu, Jianping Wu (all: Tsinghua University, China)

**Session 3B: Research 6: Green Computing & Energy Management**

Chair: Erik Elmroth (Umea University, Sweden)

***ElMem: Towards an Elastic Memcached System***

Ubaid Ullah Hafeez, Muhammad Wajahat, Anshul Gandhi (all: Stonybrook University, United States)

***Vulnerability of Interdependent Networks with Heterogeneous Cascade Models and Timescales***

Tianyi Pan, Alan Kuhnle, Xiang Li, My Thai (all: University of Florida, United States)

***Non-IT Energy Accounting in Virtualized Datacenter***

Weixiang Jiang (Huazhong University of Science and Technology, China), Shaolei Ren (University of California, Riverside, United States), Fangming Liu, Hai Jin (both: Huazhong University of Science and Technology, China)

***3DCS: A 3-D Dynamic Collaborative Scheduling Scheme for Wireless Rechargeable Sensor Networks with Heterogenous Chargers***

Chi Lin (School of Software, Dalian University of Technology, China), Chunyang Guo (DUT, China), Jing Deng (UNCG, United States), Guowei Wu (Dalian University of Technology, China)

**Session 3C: Research 7 – Internet-of-Things & Cyber-Physical Systems**

Chair: Wan Du (University of California, Merced, United States)

***Towards Personalized Learning in Mobile Sensing Systems***

Wenjun Jiang, Qi Li, Lu Su, Chenglin Miao (all: State University of New York, Buffalo, United States), Quanquan Gu (University of Virginia, United States), Wen Yao Xu (State University of New York, Buffalo, United States)

***ApDeepSense: Deep Learning Uncertainty Estimation Without the Pain for IoT Applications***

Shuochao Yao, Yiran Zhao, Huajie Shao, Chao Zhang (all: University of Illinois at Urbana-Champaign, United States), Aston Zhang (Amazon AI, United States), Dongxin Liu, Shengzhong Liu, Lu Su (all: State University of New York at Buffalo, United States), Tarek Abdelzaher (University of Illinois at Urbana-Champaign, United States)

***Conservative Channel Reuse in Real-Time Industrial Wireless Sensor-Actuator Networks***

Dolvara Gunatilaka, Chenyang Lu (both: Washington University in St. Louis, United States)

***DiGS: Distributed Graph Routing and Scheduling for Industrial Wireless Sensor-Actuator Networks***

Junyang Shi, Mo Sha (both: State University of New York at Binghamton, United States), Zhicheng Yang (University of California, Davis, United States)

## Session 3D: Vision 3

Chair: Alexandru Iosup (Vrije Universiteit Amsterdam and TU Delft, Netherlands)

### ***Crossover Service: Deep Convergence for Pattern, Ecosystem, Environment, Quality and Value***

Yin Jianwei, Zheng Bangpeng, Deng Shuiguang, Wen Yingying, Xi Meng, Luo Zhiling, Li Ying (all: Zhejiang University, China)

### ***Benchmarking Deep Learning Software Frameworks: Design Considerations, Metrics and Beyond***

Ling Liu, Yanzhao Wu, Wenqi Wei, Wenqi Cao, Semih Sahin (Georgia Institute of Technology, United States), Qi Zhang (IBM T. J. Watson, United States)

### ***Software-defined Software: A Perspective of Machine Learning-based Software Production***

Rubao Lee, Hao Wang, Xiaodong Zhang (all: The Ohio State University, United States)

### ***Towards Distributed Cyberinfrastructure for Smart Cities using Big Data and Deep Learning Technologies***

Shayan Shams, Sayan Goswami, Kisung Lee, Seungwon Yang, Seung-Jong Park (all: Louisiana State University, United States)

## Session 3E: Posters

Chair: Nadeem Jamali (University of Saskatchewan, Canada)

### ***GraphU: A Unified Vertex-Centric Parallel Graph Processing Platform***

Jing Su, Qun Chen, Zhuo Wangm, Murtadha Ahmed, Zhanhuai Li (all: School of Computer Science, Northwestern Polytechnical University, Xi'an, ShaanXi, China)

### ***FLight: A Fast and Lightweight Elephant-Flow Detection Mechanism***

Amer Alghadhbani, Basem Shihada (all: KAUST, Saudi Arabia)

### ***The CUBE – A REST and RESTful Based System for Data/Service Migration Through a Multi-Device User-Centric Environment***

Clay Palmeira, Nizar Messai, Yacine Sam, Thomas Devogele (all: Université François Rabelais Tours, France)

### ***Embedding Non-Compliant Nodes into the Information Flow Monitor by Dependency Modeling***

Stefan Gries, Marc Hesenius, Volker Gruhn (University of Duisburg-Essen, Germany)

### ***PPtaxi: A Non-stop Package Delivery Service via Crowdsourced Taxis***

Yueyue Chen, Deke Guo, Guoming Tang (all: National University of Defense Technology, China), Pin Lv (Guangxi University, China), Ming Xu (National University of Defense Technology, China)

### ***Cell Selection with Deep Reinforcement Learning in Sparse Mobile Crowdsensing***

Leye Wang (The Hong Kong University of Science and Technology, Hong Kong), Wenbin Liu (Jilin University, China), Daqing Zhang, Yasha Wang (both: Peking University, China), En Wang, Yongjian Yang (both: Jilin University, China)

### ***HDM-MC in-Action: A Framework for Big Data Analytics across Multiple Clusters***

Sherif Sakr (The University of New South Wales, Australia)

### ***Developing a Convenient and Fast to Deploy Simulation Environment for Cyber-Physical Systems***

Stefan Gries, Ole Meyer (University of Duisburg-Essen, Germany), Julius Ollesch (IBM Deutschland GmbH, Germany), Florian Wessling, Marc Hesenius, Volker Gruhn (University of Duisburg-Essen, Germany)

### ***A multi tenant computational platform for translational medicine***

Axel Oehmichen, Florian Guitton, Ibrahim Emam, Paul Agapow, Yike Guo (all: Imperial College London, UK)

### ***Low Latency Edge Rendering Scheme for Interactive 360 Degree Virtual Reality Gaming***

Marko Viitanen, Jarno Vanne, Timo D. Hämäläinen (all: Tampere University of Technology, Finland), Ari Kulmala (Nokia, Finland)

### ***MiniCloud: A Local Storage and Query Service for Heterogeneous IoT Devices***

Mehdi Karimibiuki, Andre Ivanov (both: The University of British Columbia, Canada)

### ***Maintaining Social Links through Direct Link Placement in Wireless Networks***

Li Qiu (The Pennsylvania State University, United States), Liang Ma (IBM, United States), Guohong Cao (The Pennsylvania State University, United States)

### ***Docker-sec: A Fully Automated Container Security Enhancement Mechanism***

Fotis Loukidis-Andreou, Ioannis Giannakopoulos, Katerina Doka, Nectarios Koziris (all: National Technical University of Athens, Greece)

### ***Chaff Allocation and Performance for Network Traffic Obfuscation***

Ertugrul Ciftcioglu, Rommie Hardy, Kevin Chan, Lisa Scott, Diego Oliveira, Gunjan Verma (all: US Army Research Laboratory, United States)

### ***Distributed Ledger Technology: Blockchain Compared to Directed Acyclic Graph***

Federico Matteo Bencic, Ivana Podnar Zarko (University of Zagreb, Croatia)

***Shared access to spreadsheet elements for end user programming***

Giancarlo Camera, Massimo Maresca, Pierpaolo Baglietto (CIPI- University of Genoa, Italy)

***MIN-Max-Min: A Heuristic Scheduling Algorithm for Jobs Across Geo-distributed Datacenters***

Li Yan (ict, China)

## Wednesday, July 4th

10:00 - 12:00

### Session 4A: Research 8: Edge Computing

Chairs:

Abhishek Chandra (University of Minnesota, United States),

Mahadev Satyanarayanan (Carnegie Mellon University, United States)

***It's Hard to Share: Joint Service Placement and Request Scheduling in Edge Clouds with Sharable and Non-sharable Resources***

Ting He (The Pennsylvania State University, United States), Hana Khamfroush (University of Kentucky, United States), Shiqiang Wang (IBM, United States), Tom La Porta (The Pennsylvania State University, United States), Sebastian Stein (University of Southampton, UK)

***WiBot! In-Vehicle Behaviour and Gesture Recognition Using Wireless Network Edge***

Muneeba Raja (Aalto University, Finland), Viviane Ghaderi (BMW Group, Germany), Stephan Sigg (Aalto University, Finland)

***An Optimal Auction Mechanism for Mobile Edge Caching***

Xuanyu Cao (Princeton University, United States), Junshan Zhang (Arizona State University, United States), H. Vincent Poor (Princeton University, United States)

***ATMoN: Adapting the "Temporality" in Large-Scale Dynamic Networks***

Demetris Trihinas (University of Cyprus, Cyprus), Luis F. Chiroque (IMDEA Networks, Spain), George Pallis (Dpt. of Computer Science, University of Cyprus, Cyprus), Antonio Fernandez Anta (IMDEA Networks, Spain), Marios Dikaiakos (University of Cyprus, Cyprus)

***ApproxIoT: Approximate Analytics for Edge Computing***

Zhenyu Wen (The University of Edinburgh, UK), Do Le Quoc (TU Dresden, Germany), Pramod Bhatotia (The University of Edinburgh, UK), Ruichuan Chen (NOKIA Bell Labs, Germany), Myungjin Lee (The University of Edinburgh, UK)

***Speeding up Multi-CDN Content Delivery via Traffic Demand Reshaping***

Huan Wang (University of Victoria, Canada), Guoming Tang (National University of Defense Technology, China), Kui Wu, Jiaming Fan (both: University of Victoria, Canada)

### Session 4B: Research 9: Security, Privacy & Trust

Chair: Elisa Bertino (Purdue University, United States)

***S3B: Software-defined Secure Server Bindings***

William Koch, Azer Bestavros (both: Boston University, United States)

***Time-Zone Geolocation of Crowds in the Dark Web***

Massimo La Morgia, Alessandro Mei, Simone Raponi, Julinda Stefa (all: Sapienza University of Rome, Italy)

***TACTIC: Tag-based Access ConTrol Framework for the Information-Centric Wireless Edge Networks***

Reza Tourani, Satyajayant Misra, Ray Stubbs (all: New Mexico State University, United States)

***CYCLOSA : Decentralizing Private Web Search Through SGX-Based Browser Extensions***

David Goltzsche (TU Braunschweig, Germany), Rafael Pires (University of Neuchatel, Switzerland), Sonia Ben Mokhtar (CNRS – Université de Lyon, France), Sara Bouchenak (INSA-Lyon, France), Antoine Boutet (INSA-Lyon, CITI, Inria, France), Pascal Felber (University of Neuchatel, Switzerland), Rüdiger Kapitza (TU Braunschweig, Germany), Marcelo Pasin, Valerio Schiavoni (both: University of Neuchatel, Switzerland)

***Hybrid Differentially-Private String Matching***

Fang-Yu Rao (Purdue University, United States), Gabriel Ghinita (University of Massachusetts, Boston, United States), Elisa Bertino (Purdue University, United States)

***DNProbe: Lightweight Fault Localization in the Error-Prone Environment***

Yu-Ming Ke, Hsu-Chun Hsiao (both: National Taiwan University, Taiwan), Tiffany Hyun-Jin Kim (HRL Laboratories, United States)



## Session 4C: Vision 4

Chair: Calton Pu (Georgia Institute of Technology; United States)

### ***Toward IoT-friendly Learning Models***

Ernesto Damiani, Gabriele Gianini (both: University of Milan, Italy), Michelangelo Ceci, Donato Malerba (both: Università degli Studi di Bari, Italy)

### ***Transform Blockchain into Distributed Parallel Computing Architecture for Precision Medicine***

Zonyin Shae, Jeffrey Tsai (both: Asia University, Taiwan)

### ***Computing In-Memory, Vision***

Dejan Milojicic, Kirk Bresnaker, Gary Campbell, Paolo Faraboschi, John Paul Strachan, Stan Williams (all: Hewlett Packard Enterprise, United States)

### ***On Managing the Social Components in a Smart City***

Schahram Dustdar, Ognjen Scekic (both: Vienna University of Technology, Austria)

### ***Toward an Intrusion-Tolerant Power Grid: Challenges and Opportunities***

Amy Babay (Johns Hopkins University, United States), John Schultz (Spread Concepts LLC, United States), Tom Tantillo, Yair Amir (both: Johns Hopkins University, United States)

### ***Private Memoirs of IoT Devices: Safeguarding User Privacy in the IoT Era***

Dong Chen, Phuthipong Bovornkeeratiroj, David Irwin, Prashant Shenoy (all: University of Massachusetts Amherst, United States)

## Session 4D: Applications 2

Chair: Arun Iyengar (IBM, United States)

### ***FlowTime: Dynamic Scheduling of Deadline-Aware Workflows and Ad-hoc Jobs***

Zhiming Hu, Baochun Li (both: University of Toronto, Canada), Chen Chen, Xiaodi Ke (both: Huawei Canada Research Center, Canada)

### ***To Sell or Not To Sell: Trading Your Reserved Instances in Amazon EC2 Marketplace***

Shengsong Yang, Li Pan (both: Shandong University, China), Qingyang Wang (Louisiana State University, United States), Shijun Liu (Shandong University, China)

### ***ROSE: Cluster Resource Scheduling via Speculative Over-subscription***

Xiaoyang Sun, Chunming Hu (both: Beihang University, China), Renyu Yang (University of Leeds, UK), Peter Garraghan (Lancaster University, UK), Tianyu Wo (Beihang University, China), Jie Xu (University of Leeds, UK), Jianyong Zhu (Beihang University, China), Chao Li (Alibaba Group, China)

### ***MPCSToken: Smart Contract Enabled Fault-Tolerant Incentivisation for Mobile P2P Crowd Service***

Fengrui Shi (Imperial College London, UK), Zhijin Qin (Lancaster University, UK), Di Wu (Hunan University, China), Julie McCann (Imperial College London, UK)

### ***A Decentralized Medium Access Protocol for Real-Time Wireless Ad Hoc Networks With Unreliable Transmissions***

Ping-Chun Hsieh, I-Hong Hou (both: Texas A&M University, United States)

**13:30 - 15:30**

## Session 5A: Research 10: Mobile & Wireless Network Computing

Chair: Adam Wolisz (TU Berlin, Germany)

### ***Symbol-level Cross-technology Communication via Payload Encoding***

Shuai Wang, Song Min Kim (both: George Mason University, United States), Tian He (University of Minnesota, United States)

### ***RF: Supervisory Control of User-Perceived Performance for Mobile Device Energy Savings***

Marco Brocanelli, Xiaorui Wang (both: The Ohio State University, United States)

### ***eBrowser: Making Human-Mobile Web Interactions Energy Efficient with Event Rate Learning***

Fei Xu, Shuai Yang (both: East China Normal University, China), Zhi Zhou (Sun Yat-sen University, China), Jia Rao (University of Texas at Arlington, United States)

### ***RF-MVO: Simultaneous 3D Object Localization and Camera Trajectory Recovery Using RFID Devices and a 2D Monocular Camera***

Zhongqin Wang, Min Xu (both: University of Technology, Sydney, Australia), Ning Ye, Ruchuan Wang (both: Nanjing University of Posts and Telecommunications, China)

### ***Multiple Object Activity Identification using RFIDs: A Multipath-Aware Deep Learning Solution***

Xiaoyi Fan (Simon Fraser University, Canada), Feng Wang (The University of Mississippi, United States), Wei Gong, Jiangchuan Liu (both: Simon Fraser University, Canada)

### ***Environment-adaptive Malicious Node Detection in MANETs with Ensemble Learning***

Boqi Gao, Takuya Maekawa, Daichi Amagata, Takahiro Hara (all: Osaka University, Japan)

## **Session 5B: Research 11: Social Networks & Crowdsourcing**

Chair: Vena Kalogeraki (Athens University of Economics and Business, Greece)

### ***Generating synthetic social graphs with Darwini***

Sergey Edunov, Dionysios Logothetis (both: Facebook, United States), Cheng Wang (University of Houston, United States), Avery Ching, Maja Kabiljo (both: Facebook, United States)

### ***SnapTask: Towards Efficient Visual Crowdsourcing for Indoor Mapping***

Marius Noreikis, Yu Xiao (both: Aalto University, Finland), Jiyao Hu (Duke University, United States), Yang Chen (Fudan University, China)

### ***Leveraging Crowdsensed Data Streams to Discover and Sell Knowledge: A Secure and Efficient Realization***

Chengjun Cai, Yifeng Zheng, Cong Wang (all: City University of Hong Kong, Hong Kong)

### ***DeepMatching: A Structural Seed Identification Framework for Social Network Alignment***

Chenxu Wang, Zhiyuan Zhao, Yang Wang, Dong Qin (all: Xi'an Jiaotong University, China), Xiapu Luo (The Hong Kong Polytechnic University, Hong Kong), Tao Qin (Xi'an Jiaotong University, China)

### ***Pay On-demand: Dynamic Incentive and Task Selection for Location-dependent Mobile Crowdsensing Systems***

Zhibo Wang, Jiahui Hu, Jing Zhao (Wuhan University, China), Dejun Yang (Colorado School of Mines, United States), Honglong Chen (China University of Petroleum, China), Qian Wang (Wuhan University, China)

## **Session 5C: Vision 5**

Chair: Ozalp Babaoglu (University of Bologna, Italy)

### ***Towards Dependable, Scalable, and Pervasive Distributed Ledgers with Blockchains***

Kaiwen Zhang (École de technologie supérieure de Montréal, Canada), Hans-Arno Jacobsen (University of Toronto, Canada)

### ***Rethinking Client-Driven Resource Management for Mobile Web: Measurement, Deployment, and Runtime***

Xuanzhe Liu, Yun Ma (both: Peking University, China), Felix Xiaozhu Lin (Purdue University, United States)

### ***A View from ORNL: Scientific Data Research Opportunities in the Big Data Age***

Scott Klasky, Matthew Wolf (both: Oak Ridge National Laboratory, United States), Mark Ainsworth (Brown University, United States), Chuck Atkins (Kitware Inc., United States), Jong Youl Choi (Oak Ridge National Laboratory, United States), Greg Eisenhauer (Georgia Institute of Technology, United States), Berk Geveci (Kitware inc., United States), William Godoy, Mark Kim, James Kress (all: Oak Ridge National Laboratory, United States), Tahsin Kurc (Stony Brook University, United States), Qing Liu (New Jersey Institute of Technology, United States), Jeremy Logan, Arthur B. Maccabe, Kshitij Mehta, George Ostrouchov (all: Oak Ridge National Laboratory, United States), Manish Parashar (Rutgers University, United States), Norbert Podhorszki, David Pugmire, Eric Suchyta, Lipeng Wan, Ruonan Wang (all: Oak Ridge National Laboratory, United States)

### ***How to prevent Skynet from forming (A Perspective from Policy-based Autonomic Device Management)***

Elisa Bertino (Purdue University, United States), Seraphin Calo, Dinesh Verma (both: IBM, United States), John Ingham (UK DSTL, UK), Gregory Cirincione (Army Research Labs, United States)

### ***Operating Systems for Internetware: Challenges and Future Directions***

Hong Mei, Yao Guo (both: Peking University, China)

### ***Deep Learning Towards Mobile Applications***

Ji Wang (National University of Defense Technology, China), Bokai Cao, Philip S. Yu, Lichao Sun (all: University of Illinois at Chicago, United States), Weidong Bao, Xiaomin Zhu (both: National University of Defense Technology, China)

## **Session 5D: Industry 1**

Chair: N.N.

### ***BeeFlow: a Workflow Management System for In situ Processing Across HPC and Cloud Systems***

Jieyang Chen (University of California, Riverside, United States), Qiang Guan (Kent State University, United States), Zhao Zhang (The University of Texas at Austin, United States), Xin Liang (University of California, Riverside, United States), Louis Vernon, Allen Mcpherson, Li-Ta Lo (all: Los Alamos National Laboratory, United States), Zizhong Chen (University of California, Riverside, United States), Patricia Grubel, James Ahrens (both: Los Alamos National Laboratory, United States)

### ***SQLoop: High Performance Iterative Processing in Data Management***

Sofoklis Floratos (The Ohio State University, United States), Yanfeng Zhang (The Ohio State University, United States, Northeastern University, China), Yuan Yuan (Google, United States), Rubao Lee, Xiaodong Zhang (both: The Ohio State University, United States)

### ***LogLens: A Real-time Log Analysis System***

Biplob Debnath (NEC Labs, United States), Mohiuddin Solaimani (The University of Texas at Dallas, United States), Muhammad Ali

Gulzar (University of California, Los Angeles, United States), Nipun Arora (Dropbox, United States), Cristian Lumezanu, Jianwu Xu, Bo Zong (all: NEC Labs, United States), Hui Zhang, Guofei Jiang (both: Ant Financial, United States), Latifur Khan (The University of Texas at Dallas, United States)

#### ***Design of Global Data Deduplication for A Scale-out Distributed Storage System***

Myoungwon Oh, Sejin Park, Jungyeon Yoon, Sangjae Kim, Kang Won Lee (all: SK Telecom, South Korea), Sage Weil (Red Hat, United States), Heonyoung Yeom (Seoul National University, South Korea), Myoungsoo Jung (Yonsei University, South Korea)

#### ***Stad: Stateful Diffusion for Linear Time Community Detection***

Amira Soliman, Sarunas Girdzijauskas (both: KTH Royal Institute of Technology, Sweden), Fatemeh Rahimian (KTH/SICS, Sweden)

## **Session 5E: Short Papers 2**

Chair: Y  rome-David Bromberg (Universit   de Rennes 1 - ESIR / IRISA, France)

#### ***KerA: Scalable Data Ingestion for Stream Processing***

Ovidiu-Cristian Marcu, Alexandru Costan, Gabriel Antoniu (all: INRIA, France), Maria Perez (Universidad Polit  cnica de Madrid, Spain), Bogdan Nicolae (ANL, United States), Radu Tudoran, Stefano Bortoli (both: HUAWEI, Germany)

#### ***A Flexible Network Approach to Privacy of Blockchain Transactions***

David M  dinger, Henning Kopp, Frank Kargl, Franz J. Hauck (all: Ulm University, Germany)

#### ***Computation Offloading for Machine Learning Web Apps in the Edge Server Environment***

Hyuk-Jin Jeong, Inchang Jeong, Hyeon-Jae Lee, Soo-Mook Moon (all: Seoul National University, South Korea)

#### ***CAL: A Smart Home Environment for Monitoring Cognitive Decline***

Erik M. Fredericks, Kate M. Bowers (both: Oakland University, United States), Katey A. Price (Albion University, United States), Reihaneh H. Hariri (Oakland University, United States)

#### ***SLoG: A Large-Scale Logging Middleware for HPC and Big Data Convergence***

Pierre Matri (Universidad Polit  cnica de Madrid, Spain), Philip Carns, Robert Ross (Argonne National Laboratory, United States), Alexandru Costan (INRIA, France), Mar  a S. P  rez (Universidad Polit  cnica de Madrid, Spain), Gabriel Antoniu (INRIA, France)

#### ***Identifying Privacy Risks in Distributed Data Services: A Model-Driven Approach***

Paul Grace, Daniel Burns, Geoff Neumann, Brian Pickering, Panos Melas, Mike Surridge (all: University of Southampton, UK)

#### ***AdaptiveConfig: Run-time Configuration of Cluster Schedulers for Cloud Short-running Jobs***

Rui Han (Institute of Computing Technology, Chinese Academy of Sciences, China),

Zan Zong (Tsinghua University, China), Lydia Y. Chen (IBM Research Zurich Lab, Switzerland), Siyi Wang, Jianfeng Zhan (both: Institute of Computing Technology, Chinese Academy of Sciences, China)

#### ***Q-placement: Reinforcement-Learning-Based Service Placement in Software-Defined Networks***

Ziyao Zhang (Imperial College London, UK), Liang Ma (IBM T. J. Watson Research Center, United States), Kin K. Leung (Imperial College London, UK), Leandros Tassiulas (Yale University, United States), Jeremy Tucker (Defence Science and Technology Laboratory, UK)

**16:00 - 17:20**

## **Session 6A: Research 12 – Cloud Computing & Data Centers**

Chair: Guillaume Pierre (University of Rennes, France)

#### ***DCMPTCP: Host-based Load Balancing for Datacenters***

Enhuan Dong (Tsinghua University, China), Xiaoming Fu (University of Goettingen, Germany), Mingwei Xu, Yuan Yang (Tsinghua University, China)

#### ***PageRankVM: A PageRank Based Algorithm with Anti-Collocation Constraints for Virtual Machine Placement in Cloud Datacenters***

Zhuozhao Li, Haiying Shen, Cole Miles (all: University of Virginia, United States)

#### ***Right-sizing Server Capacity Headroom for Global Online Services***

Chad Verbowski (The University of Edinburgh, UK), Paolo Costa (Microsoft, UK), Hugh Leather, Bjorne Franke (both: The University of Edinburgh, UK), Ed Thayer (Microsoft, United States)

#### ***Low-Level Augmented Bayesian Optimization for Finding the Best Cloud VM***

Chin-Jung Hsu, Vivek Nair, Vincent W. Freeh, Tim Menzies (North Carolina State University, United States)

## Session 6B: Research 13: Distributed Big Data Systems & Analytics

Chair: N.N.

### ***Continuous and Parallel LiDAR Point-cloud Clustering***

Hannaneh Najdataei, Yiannis Nikolakopoulos, Vincenzo Gulisano, Marina Papatriantaflou (all: Chalmers University of Technology, Sweden)

### ***On the fly load balancing to address hot topics in topic-based pub/sub systems***

Dimitris Dedousis, Nikos Zacheilas, Vana Kalogeraki (all: Athens University of Economics and Business, Greece)

### ***Parallelism-Aware Locally Repairable Code for Distributed Storage Systems***

Jun Li (Florida International University, United States), Baochun Li (University of Toronto, Canada)

### ***Approaches for Resilience Against Cascading Failures in Cloud Datacenters***

Haoyu Wang, Haiying Shen, Zhuozhao Li (all: University of Virginia, United States)

## Session 6C: Research 14: Distributed Operating Systems & Middleware

Chair: Angela Demke Brown (University of Toronto, Canada)

### ***Chronos: A Unifying Optimization Framework for Speculative Execution of Deadline-critical MapReduce Jobs***

Maotong Xu, Sultan Alamro, Tian Lan, Suresh Subramaniam (all: George Washington University, United States)

### ***SGX-Aware Container Orchestration for Heterogeneous Clusters***

Sébastien Vaucher, Rafael Pires, Pascal Felber, Marcelo Pasin, Valerio Schiavoni (all: University of Neuchatel, Switzerland), Christof Fetzer (TU Dresden, Germany)

### ***Efficient Sharing and Fine-Grained Scheduling of Virtualized GPU Resources***

Xiaohui Zhao, Jianguo Yao (both: Shanghai Jiao Tong University, China), Ping Gao (Intel, China), Haibing Guan (Shanghai Jiao Tong University, China)

## Session 6D: Vision 6

Chair: Dejan Milojevic (Hewlett Packard Enterprise, United States)

### ***Mobile-Friendly HTTP Middleware with Screen Scrolling***

Lei Zhang (Simon Fraser University, Canada), Feng Wang (The University of Mississippi, United States), Jiangchuan Liu (Simon Fraser University, Canada)

### ***An Architectural Perspective for Cloud Virtualization***

Yiming Zhang (NUDT, China)

### ***Complex Distributed Systems: The Need for Fresh Perspectives***

Gordon Blair (Lancaster University, UK)

### ***Improving Communication Through Overlay Detours: Pipe Dream or Actionable Insight?***

Stephen Brennan, Michael Rabinovich (both: Case Western Reserve University, United States)

## Thursday, July 5th

10:00 - 11:20

## Session 7A: Research 15 – Distributed Algorithms & Theory

Chair: Serafino Cicerone (University of L'Aquila, Italy)

### ***Wireless Aggregation at Nearly Constant Rate***

Magnus M. Halldorsson, Tigran Tonoyan (both: Reykjavik University, Iceland)

### ***Fast and Efficient Distributed Computation of Hamiltonian Cycles in Random Graphs***

Soumyottam Chatterjee, Reza Fathi, Gopal Pandurangan, Nguyen Dinh Pham (all: University of Houston, United States)

### ***Group exploration of dynamic tori***

Tsuyoshi Gotoh, Yuichi Sudo (both: Osaka University, Japan), Fukuhito Ooshita (NAIST, Japan), Hirotsugu Kakugawa, Toshimitsu Masuzawa (both: Osaka University, Japan)

### ***Slow links, fast links, and the cost of gossip***

Suman Sourav (National University of Singapore, Singapore), Peter Robinson (Royal Holloway, University of London, UK), Seth Gilbert (National University of Singapore, Singapore)

## Session 7B: Research 16 – Internet-of-Things & Cyber-Physical Systems

Chair: Chenyang Lu (Washington University in St. Louis, United States)

### ***CADET: Investigating a Collaborative and Distributed Entropy Transfer Protocol***

Kyle Wallace, Gang Zhou (both: The College of William and Mary, United States), Kun Sun (George Mason University, United States)

### ***I(TS,CS): Detecting Faulty Location Data in Mobile Crowdsensing***

Bowen Wang, Linghe Kong (both: Shanghai Jiao Tong University, China), Liang He (University of Colorado Denver, United States), Fan Wu, Jiadi Yu, Guihai Chen (all: Shanghai Jiao Tong University, China)

### ***UniLoc: A Unified Mobile Localization Framework Exploiting Scheme Diversity***

Wan Du (University of California, Merced, United States), Panrong Tong, Mo Li (both: Nanyang Technological University, Singapore)

## Session 7C: Research 17: Security, Privacy & Trust

Chair: Stefan Brunthaler (Paderborn University, Germany)

### ***FOCES: Detecting Forwarding Anomalies in Software Defined Networks***

Peng Zhang, Shimin, Zuoru Yang, Hao Li (all: Xi'an Jiaotong University, China), Qi Li (Tsinghua University, China), Huan Zhao Wang, Chengchen Hu (both: Xi'an Jiaotong University, China)

### ***AliDrone: Enabling Trustworthy Proof-of-Alibi for Commercial Drone Compliance***

Tianyuan Liu, Avesta Hojjati, Adam Bates, Klara Nahrstedt (University of Illinois at Urbana-Champaign, United States)

### ***ZebraLancer: Private and Anonymous Crowdsourcing System atop Open Blockchain***

Yuan Lu, Qiang Tang, Guiling Wang (all: New Jersey Institute of Technology, United States)

### ***Path MTU Discovery Considered Harmful***

Matthias Goehring, Haya Shulman, Michael Waidner (all: Fraunhofer, Germany)

## Session 7D: Applications 3

Chair: Mark Jelasity (University of Szeged, Hungary)

### ***TurboStream: Towards Low-Latency Data Stream Processing***

Song Wu, Mi Liu (both: Huazhong University of Science and Technology, China), Shadi Ibrahim (INRIA, France), Hai Jin, Lin Gu, Fei Chen, Zhiyi Liu (all: Huazhong University of Science and Technology, China)

### ***Consume Local: Towards Carbon Free Content Delivery***

Aravindh Raman, Dmytro Karamshuk, Nishanth Sastry (all: King's College London, UK), Andrew Secker, Jigna Chandaria (both: BBC Research & Development, UK)

### ***Scalable Transaction Processing Using Functors***

Hua Fan, Wojciech Golab (both: University of Waterloo, Canada)

### ***HaaS: Cloud-based Real-time Data Analytics with Heterogeneity-aware Scheduling***

Jiong He, Yao Chen, Tom Z.J. Fu (all: Advanced Digital Sciences Centre, Singapore), Xin Long (Alibaba Group, China), Marianne Winslett (University of Illinois at Urbana-Champaign, United States), Liang You (Alibaba Group, China), Zhenjie Zhang (Advanced Digital Sciences Centre, Singapore)

## Session 7E: Industry 2

Chair: N.N.

### ***Geodabs – Trajectory Indexing Meets Fingerprinting at Scale***

Bertil Chapuis, Benoît Garbinato (both: University of Lausanne, Switzerland)

### ***Toward Reliable and Rapid Elasticity for Streaming Dataflows on Clouds***

Yogesh Simmhan (Indian Institute of Science, India), Anshu Shukla (Ericsson Research-bangalore, India)

### ***Swarm Computing for Mobile Sensing***

Songchun Fan (Google, United States), Theodoros Salonidis (IBM, United States), Benjamin Lee (Duke University, United States)

### ***ShmCaffe: A Distributed Deep Learning Platform with Shared Memory Buffer for HPC Architecture***

Shinyoung Ahn (ETRI & KAIST, South Korea), Joongheon Kim (Chung-Ang University, South Korea), Eunji Lim, Wan Choi (both: ETRI, South Korea), Aziz Mohaisen (University of Central Florida, United States), Sungwon Kang (Korea Advanced Institute of Science and Technology, South Korea)



# Social Events

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## Welcome Reception

**Tuesday, July 3, 2018, 6 p.m.**

Location:

TU Wien, Campus Gußhaus  
Gußhausstraße 25-29  
1040 Vienna



TU Wien, Campus Gußhaus

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## Conference Dinner

**Wednesday, July 4, 2018, 7:30 p.m.**

Location:

Vienna City Hall  
Entrance at Lichtenfelsgasse 2  
1010 Vienna

### How to get there

Metro:

Line U2: Karlsplatz to Rathaus

Tram:

Line 2 from Kärntnerring/Oper to Rathaus  
(Stadiongasse)

Line 71 from Kärntnerring/Oper to Parlament



City Hall Vienna

## Location of Conference Tracks 4 - 5

Campus Gußhaus - C  
2. Obergeschoss  
Gußhausstraße 25-25a, 1040 Wien

Hörsaal EI 1 - CF 02 42



Hörsaal EI 4 - CF 02 45

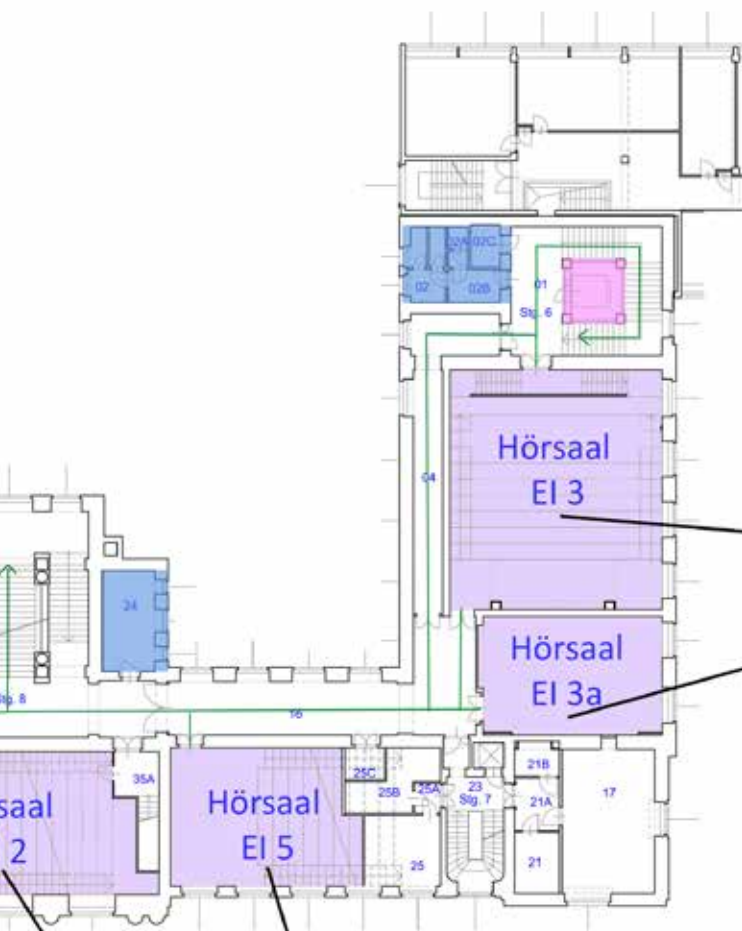


Hörsaal EI 2 - CF 02 3



## Legende

- Veranstaltungsräume
- Hörsäle/Seminarräume
- Fluchtwege
- Aufzüge
- WC Anlagen



Hörsaal EI 3 - CF 02 05



Hörsaal EI 3a - CF 02 13



Hörsaal EI 5 - CF 02 29





# Venue Map

## TU Wien Campus Gußhaus

Gußhausstraße 25-29  
1040 Vienna  
Austria

