IEEE CIT 2017
ICA3PP 2017
NSS 2017

AUGUST 21-23, 2017, HELSINKI FINLAND

With corrected schedule from Saturday August 19

Conference Program

11th International Conference on Network and System Security (NSS-2017)

17th International Conference on Algorithms and Architectures for Parallel Processing (ICA3PP-2017)

17th IEEE International Conference on Computer and Information Technology (IEEE CIT-2017)
Cognitive security operation to reduce attack surface and response time.

NetGuard ACTIVE Security is a fusion of security analytics, threat intelligence, and security orchestration, which consolidates data and extracts actionable insights from a variety of intelligence sources and existing security technologies. This enables security teams to streamline processes, accelerate decision-making and optimize costs while preventing, identifying and addressing security threats before they result in breaches.

Nokia Oyj | Korpokartt 3 | 02610 Espoo | Finland
networks.nokia.com/solutions/security

Organizers, Patrons and Partners, Publishers
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### Program at a Glance

#### Conferences

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<th>Conference</th>
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<tbody>
<tr>
<td>CIT</td>
<td>17th International IEEE Conference on Computer and Information Technology</td>
</tr>
<tr>
<td>ICA3PP</td>
<td>17th International Conference on Algorithms and Architectures for Parallel Processing</td>
</tr>
<tr>
<td>NSS</td>
<td>International Conference on Network and Systems Security</td>
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#### Workshops

<table>
<thead>
<tr>
<th>Workshop</th>
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<tbody>
<tr>
<td>DACSC</td>
<td>International Workshop on Distributed Autonomous Computing in Smart City</td>
</tr>
<tr>
<td>DTWSM</td>
<td>4th International Workshop on Data, Text, Web and Social Network Mining</td>
</tr>
<tr>
<td>IW5GS</td>
<td>3rd International Workshop on 5G Security and Machine Learning</td>
</tr>
<tr>
<td>Pbio</td>
<td>5th International Workshop on Parallelism in Bioinformatics</td>
</tr>
<tr>
<td>RACIT</td>
<td>International Symposium on Recent Advances of Computer and IT</td>
</tr>
<tr>
<td>SECIOE</td>
<td>2nd International Workshop on Security of Internet of Everything</td>
</tr>
<tr>
<td>SecureEdge</td>
<td>International Workshop on Secure and Resource-Efficient Edge Computing</td>
</tr>
<tr>
<td>SMCN</td>
<td>International Workshop on Security Measurement in Cyber Nets</td>
</tr>
<tr>
<td>UCER</td>
<td>2nd International Workshop on Ultrascale Computing for Early Researchers</td>
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#### Tutorials

<table>
<thead>
<tr>
<th>Tutorial</th>
<th>Details</th>
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<tbody>
<tr>
<td>CSec</td>
<td>Tutorial on Cooperative Security Using Commodity Linux Tools</td>
</tr>
<tr>
<td>HPmPP</td>
<td>Tutorial on High Performance Multithreaded Packet Processing</td>
</tr>
</tbody>
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Corrected schedule from Saturday August 19:

### Monday, August 21st

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>8:30-9:00</td>
<td>Opening of the Conference</td>
</tr>
<tr>
<td>9:00-9:45</td>
<td>Keynote 1: Elisa Bertino, Professor, IEEE Fellow, Purdue University, USA</td>
</tr>
<tr>
<td>9:45-10:15</td>
<td>Morning Coffee</td>
</tr>
<tr>
<td>10:15-11:00</td>
<td>Keynote 2: Francisco Herrera, Professor, University of Granada, Spain</td>
</tr>
<tr>
<td>11:00-12:00</td>
<td>Panel: Big Data and Analytics</td>
</tr>
<tr>
<td>12:00-13:20</td>
<td>Lunch</td>
</tr>
<tr>
<td>13:20-15:05</td>
<td>Room 1, 3, 4, 5, 10, 11, 12, CIT 1, NSS 1, ICA3PP 1, UCER 1, CSec p1, SMCN 1, CIT 2</td>
</tr>
<tr>
<td>15:05-15:35</td>
<td>Afternoon Coffee</td>
</tr>
<tr>
<td>15:35-17:20</td>
<td>Room 3, 4, 5, 10, 11, 12, CIT 3, NSS 2, ICA3PP 2, UCER 2, CSec p2, SMCN 2, CIT 4</td>
</tr>
<tr>
<td>18:30 -20:30</td>
<td>Welcome Reception City Hall</td>
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### Tuesday, August 22nd

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>8:15-9:00</td>
<td>Keynote 3: Lauri Oksanen, VP, Nokia Bellabs</td>
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<tr>
<td>9:00-9:45</td>
<td>Keynote 4: Tatu Ylönen, CEO of SSH Communications Security, Finland/USA</td>
</tr>
<tr>
<td>9:45-10:15</td>
<td>Morning Coffee</td>
</tr>
<tr>
<td>10:15-12:00</td>
<td>Room 1, 3, 4, 5, 10, 11, 12, CIT 5, NSS 3, ICA3PP 3, SECIOE 1, IW5GS 1, SMCN 3, Pbio 1</td>
</tr>
<tr>
<td>12:00-13:20</td>
<td>Lunch</td>
</tr>
<tr>
<td>13:20-15:10</td>
<td>Room 3, 4, 5, 10, 11, 12, CIT 6, NSS 4, ICA3PP 4-5, SECIOE 2, IW5GS 2, HPmPP1, Pbio 2</td>
</tr>
<tr>
<td>15:10-15:40</td>
<td>Afternoon Coffee</td>
</tr>
<tr>
<td>15:40-17:30</td>
<td>Room 5, 6, 3, 10, 11, 12, CIT 7, NSS 5, ICA3PP 6, SECIOE 3, IW5GS 3, DACSC 1, Pbio 3</td>
</tr>
<tr>
<td>19:00 -22:30</td>
<td>Gala Dinner (Kalastajatorppa)</td>
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### Wednesday, August 23rd

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>8:00-8:45</td>
<td>Keynote 5: Jinjun Chen, Professor, Swinburne University of Technology, Australia</td>
</tr>
<tr>
<td>8:45-9:30</td>
<td>Keynote 6: Anand Prasad, Dr., NEC Corporation</td>
</tr>
<tr>
<td>9:30-9:55</td>
<td>Morning Coffee</td>
</tr>
<tr>
<td>9:55-10:40</td>
<td>Keynote 7: Shiwen Mao, Professor, Auburn University, USA</td>
</tr>
<tr>
<td>10:45-12:30</td>
<td>Room 1, 3, 4, 5, 10, 11, 12, CIT 8, NSS 6, ICA3PP 7, SecureEdge 1, RACIT 1, DACSC 2, DTWSM 1</td>
</tr>
<tr>
<td>12:30-13:45</td>
<td>Lunch</td>
</tr>
<tr>
<td>13:45 - 15:25</td>
<td>Room 9, 4, 5, 10, 11, 12, CIT 9, HPmPP2, ICA3PP 8, SecureEdge 2, RACIT 2, DACSC 3, DTWSM 2</td>
</tr>
<tr>
<td>15:30-15:50</td>
<td>Closing of the Conference</td>
</tr>
<tr>
<td>15:50 - 16:20</td>
<td>Afternoon Coffee</td>
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Organizing Committees

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IEEE CIT 2017

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Moncef Gabbouj, Tampere University of Technology, Finland

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Kai Zeng, George Mason University, USA

Panel Chair
Yan Zhang, University of Oslo, Norway

Workshop Chairs
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Peng Zhang, Zalando, Finland

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Incheon Paik, University of Aizu, Japan
Qun Jin, Waseda University, Japan
Xingang Liu, University of Electronic Science and Technology of China, China
Geyong Min, University of Exeter, UK
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Bofeng Zhang, Shanghai University, China
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Zheng Yan, Xidian University, China

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Jing Chen, Wuhan University, China

Local and Finance Chair
Raimo Kantola, Aalto University, Finland

Web Chairs
Mingjun Wang, Xidian University, China
Mohsin Muhammad, Aalto University, Finland
Welcome Message from the NSS-ICA3PP-CIT2017 General Chairs

Welcome to the Joint Conference of
• 17th IEEE International Conference on Computer and Information Technology (CIT2017) sponsored by IEEE, IEEE Computer Society and IEEE Technical Committee on Scalable Computing (TCSC),
• 17th International Conference on Algorithms and Architectures for Parallel Processing (ICA3PP-2017)
• 11th International Conference on Network and System Security (NSS-2017)
held during August 21-23, 2017, in Helsinki, Finland. On behalf of the Organizing Committees of CIT, ICA3PP and NSS 2017 we would like to express our sincere and warm welcome to all participants!

The joint conferences are hosted by Aalto University and co-hosted by the following university, institutes and organizations. They are Xidian University, ISN - State Key Laboratory of Integrated Services Networks of Xidian University, Federation of Finnish Learned Societies, TEKES – the Finnish Funding Agency for Innovation, 111 - National 111 Project on Mobile Internet Security (Xidian University). We would like to express our sincere thanks to the above hosts and foundations for their great support. Special thanks go to Nokia for the Gold Patron support of the conference.

IEEE CIT 2017 conference is the 17th edition of the highly successful International Conference on Computer and Information Technology (CIT) previously held as CIT 2016, Fiji, CIT 2015, Liverpool, UK, Xi’an, China (2014), Sydney, Australia (2013), Chengdu, China (2012), Pafoes, Cyprus (2011), Bradford, UK (2010), Xiamen, China (2009), Sydney, Australia (2008), Fukushima, Japan (2007), Seoul, Korea (2006), Shanghai, China (2005), Wuhan, China (2004), Fukusima, Japan (2002), Shanghai, China (2001), and Fukusima, Japan (2000). It provides a forum for engineers and scientists in academia, industry, and government to address the resulting profound challenges and to present and discuss their new ideas, research results, applications and experiences on all aspects of computer and information technology.

Started in 1995, ICA3PP 2017 is the 17th in this series of conferences that are devoted to algorithms and architectures for parallel processing. ICA3PP is now recognized as the main regular event of the world that is covering the many dimensions of parallel algorithms and architectures, encompassing fundamental theoretical approaches, practical experimental projects, and commercial components and systems. As applications of computing systems have permeated in every aspect of daily life, the power of computing system has become increasingly critical. This conference provides a forum for academics and practitioners from countries around the world to exchange ideas for improving the efficiency, performance, reliability, security and interoperability of computing systems and applications. ICA3PP 2017 was the next event in a series of highly successful international conferences on algorithms and architectures for parallel processing, previously held in Granada, Spain (2016), Zhangjiajie, China (2015), Dalian, China (2014), Vietri sul Mare, Italy (2013), Fukuoka, Japan (2012), Melbourne, Australia (2011), Busan, Korea (2010), Taipei, Taiwan (2009), Cyprus (2008), Hangzhou, China (2007), Melbourne, Australia (2005), Beijing, China (2002), Hong Kong, China (2000), Melbourne, Australia (1997), Singapore (1996), and Brisbane, Australia (1995).

The NSS conference series is an established forum that brings together researchers and practitioners to provide a confluence of network and system security technologies, including all theoretical and practical aspects. In previous years, NSS took place in Taipei (2016), New York City, USA (2015), Xi’an, China (2014), Madrid, Spain (2013), Wu Yi Shan, China (2012), Milan, Italy (2011), Melbourne, Australia; (2010), Gold Coast, Australia (2009), Shanghai, China (2008), and Dalian, China (2007).
Besides the three main conferences the joint conference has a total of 9 Workshops, 8 keynote speeches by prominent scientists, two tutorials and a Panel discussion. Having reviewed the submitted papers on the basis of their significance, novelty, technical quality, presentation, and practical impact, the Program Committees accepted a total of 180 papers to the technical sessions and workshops for presentation. The acceptance rate to the main conferences was from 28% to 29%. The papers cover topics ranging from security, privacy, big data, mobile networks and communication, 5th Generation mobile systems, algorithms and architectures for parallel processing and other topics in computer and information technology. The Proceedings of IEEE CIT 2017 are published by the IEEE Computer Society Publishing Services (CPS). The Proceedings of ICA3PP and NSS are published in the Lecture Notes in Computer Science (LNCS) by Springer.

Two of the workshops, namely IEEE International Workshop on Secure and Resource-Efficient Edge Computing 2017 (SecureEdge 2017) and the IEEE International Symposium on Recent Advances of Computer and Information Technologies (RACIT 2017) are in conjunction with IEEE CIT 2017.

Four of the workshops are in conjunction with ICA3PP 2017: the 4th International Workshop on Data, Text, Web, and Social Network Mining (DTWSM 2017), the 5th International Workshop on Parallelism in Bioinformatics (PBio 2017), the First International Workshop on Distributed Autonomous Computing in Smart City (DACSC 2017), and the 2nd International Workshop on Ultrascale Computing for Early Researchers (UCER 2017).

Three of the workshops are in conjunctions with the NSS 2017: the 3rd International Workshop on 5G Security and Machine Learning (IW5GS-2017), the International Workshop on Security Measurements of Cyber Networks (SMCN-2017), and the 2nd International Workshop on Security of the Internet of Everything (SecIoE-2017).

First of all, we would like to sincerely thank Prof. Daming Wei (University of Aizu and Tohoku University, Japan) and Prof. Laurence T. Yang (St. Francis Xavier University, Canada), the Steering Committee Chairs of CIT, for giving us the opportunity to organize the conference and for their support and guidance. We thank the honorary chairs Mohammed Atiquzzaman, University of Oklahoma, USA and Qinghua Zheng, Xi’an Jiaotong University, China and Prof. Xinbo Gao, Xidian University, China for their kind support on the conference organization. We thank the Honorary Chair Prof. Hui Li, Xidian University, China for his kind support on the NSS 2017 conference organization. We would like express our appreciation to Prof. Elisa Bertino of Purdue University, USA, Prof. Francisco Herrera of University of Granada, Spain, Prof. Laurence T. Yang of St. Francis Xavier University, Canada, Prof. Jinjun Chen of Swinburne University of Technology, Australia, Lauri Oksanen, Vice President of Research and Technology of Nokia Bell Labs, Tatu Ylönen, CEO and Inventor of SSH of SSH Communications Security USA, Dr. Anand Prasad of NEC Corporation, Japan, Prof. Shiwen Mao of Auburn University, USA for accepting our invitation to be the keynote speakers.

We would like to give our warm thanks to the CIT Program Chairs Prof. Yulei Wu (University of Exeter, UK), Prof. Hao Wang (Norwegian University of Science and Technology, Norway), Prof. Kai Zeng (George Mason University, USA), Mika Ylianttila (University of Oulu, Finland) for their excellent work and great efforts in organizing an outstanding program committee, conducting a rigorous reviewing process and selecting high quality papers from a large number of submissions, and for preparing an excellent conference program. We give our warm thanks to ICA3PP Program Chairs, Dr. Shadi Ibrahim, Prof. Kim-Kwang Raymond Choo, and Prof. Florin Pop, for their generous support and leadership to ensure the success of the conference.

We would like to emphasize our gratitude to the NSS 2017 General Chairs, Prof. Raimo Kantola, Prof. Valtteri Niemi and Prof. Athanasios V. Vasilakos, for their generous support and leadership to ensure the success of the conference. We deeply appreciate Miss Wenxiu Ding’s assistance on NSS.
conference organization. Thanks also go to: Panel Chair, Yan Zhang; Publicity Chair, Dr Li Yang; Steering Committee, Prof. Elisa Bertino, Prof. Robert H. Deng, Prof. Dieter Gollmann, Prof. Xinyi Huang, Prof. Kui Ren, Prof. Ravi Sandhu, Prof. Yang Xiang, Prof. Wanlei Zhou; Web Chairs, Mr. Mingjun Wang and Mr. Mohsin Muhammad.

We would like to emphasize our gratitude to the General Chairs, Prof. Zheng Yan, Prof. Witold Pedrycz, and Prof. Geoffrey Fox; and the. We deeply appreciate Miss Wenxiu Ding’s assistance on conference organization. Thanks also go to: Panel Chair, Yan Zhang; Publicity Chair, Prof. Raimo Kantola; Steering Committee, Prof. Yang Xiang, Prof. Weijia Jia, Prof. Yi Pan, Prof. Laurence T. Yang, and Prof. Wanlei Zhou.

We are grateful to the Workshop/Symposium Chairs Prof. Jun Liu (Xi’an Jiaotong University, China), Dr. Peng Zhang (Zalando, Finland) and Panel chair Prof. Yan Zhang (University of Oslo, Norway) as well as other chairs, steering members, and PC members for their great supports. We would like to thank all reviewers for their hard work, for providing constructive feedback to authors and enabling an excellent selection of the papers.

Most importantly, our great appreciation to all authors, for submitting their high-quality papers to CIT 2017, to ICA3PP 2017, to NSS 2017 main conferences and their workshop/symposium. Last but not least, we would like to greatly thank the NSS-ICA3PP-CIT local organization team led by Prof. Raimo Kantola (Aalto University, Finland), the local and financial chair of CIT 2017, for the local arrangement of the conference, Mr. Mingjun Wang (Xidian University, China) and Mr. Mohsin Muhammad (Aalto University, Finland) for conference web management and Rikka Louhivuori of Confedent Oy for handling the registration and other organizational matters.

We thank all of you for participating in the joint conference. We sincerely hope NSS-ICA3PP-CIT 2017 can stimulate your innovation and future research and play as a platform for your professional activities.

Zheng Yan, Xidian University, China
Raimo Kantola, Aalto University, Finland
Moncef Gabbouj, Tampere University of Technology, Finland
Witold Pedrycz, Alberta University, Canada
Geoffrey Fox, Indiana University, USA
Valterti Niemi, University of Helsinki, Finland
Athanasios V. Vasilakos, Lulea University of Technology, Sweden

General Chairs NSS, ICA3PP, IEEE CIT 2017
Conference Hosts

Aalto University

When founded in 2010, Aalto University was given a national mission to strengthen the innovative capacity of Finland through first-class research, art and education. The international recognition of Aalto University has risen quickly due to our unique profile and novel approaches to tackle the challenges posed by a rapidly evolving knowledge economy. We have restructured our Bachelor’s curricula into a few broad programs, increased pedagogical education, and developed cross-disciplinary learning platforms, such as the Aalto Design Factory. Entrepreneurial education is now offered for all students. Our unique student- and alumnidriven entrepreneurial activities and a vibrant start-up ecosystem include the following internationally known brands: Aalto Entrepreneurship Society, Startup Sauna and SLUSH. We have increased the involvement of industry in our educational and research programs.

Key research areas

The cornerstones of Aalto University research are four fundamental competence areas:

1. ICT and digitalization
2. Materials and sustainable use of natural resources
3. Global business dynamics
4. Art and design knowledge building

In addition to these areas, Aalto University invests in three integrative multidisciplinary themes that focus on solving challenges that are important globally and for the Finnish economy.
5. Advanced energy solutions
6. Health and wellbeing
7. Human-centered living environments.
Xidian University

Xidian University has two campuses, occupying an area of 270 hectares, with the building area of over 1,300,000 square meters. Presently, the university has more than 31,000 students, of whom there are over 1700 doctoral candidates and 9000 master degree seeking students. It has set up 17 schools — School of Telecommunications Engineering, School of Electronic Engineering, School of Computer Science and Technology, School of Mechatronic Engineering, School of Cyber Engineering, School of Physics and Opto-electronic Engineering, School of Economics and Management, School of Humanities, School of Foreign Languages, School of Software Engineering, School of Microelectronics, School of Life Science and Technology, School of Aerospace Science and Technology, School of Advanced Materials and Nanotechnology, School of International Education, and School of Network and Continuing Education.

The State Key Laboratory of Integrated Services Network (ISN) is the high-level scientific research base in the field of communications in China and the high-level talents training base.

Xidian University is one of the institutions of higher learning in China, which earliest established the specialties of information theory, information system engineering, radar, microwave, antenna, electronic, mechanical engineering, and electronic countermeasure, being the forerunner of the IT discipline of China and forming distinct characteristics and advantages of electronic and information disciplines.

Xidian University has established the ideas of “people—oriented” and “teachers being the core competitive ability of a university”, and forged a well—structured contingent of teachers with an innovative spirit. The university constantly brings forth teaching ideas, deepens the reform in the teaching content, the curriculum system and the practice teaching, and vigorously promotes quality education, with remarkable results.
Keynote Speakers

Monday,
August, 21st

9:00 – 9:45
Security for the
Internet of Things
Session Chair:
Zheng Yan

Elisa Bertino
Professor, Purdue University, IEEE Fellow, USA

Abstract: The Internet of Things (IoT) paradigm refers to the network of physical objects or "things" embedded with electronics, software, sensors, and connectivity to enable objects to exchange data with servers, centralized systems, and/or other connected devices based on a variety of communication infrastructures. IoT makes it possible to sense and control objects creating opportunities for more direct integration between the physical world and computer-based systems. IoT will usher automation in a large number of application domains, ranging from manufacturing and energy management (e.g. SmartGrid), to healthcare management and urban life (e.g. SmartCity). However, because of its fine-grained, continuous and pervasive data acquisition and control capabilities, IoT raises concerns about the security and privacy of data. Deploying existing data security solutions to IoT is not straightforward because of device heterogeneity, highly dynamic and possibly unprotected environments, and large scale. In this talk, after outlining key challenges in data security and privacy, we present initial approaches for profiling IoT devices with the goal of protecting them from being exploited by botnets.

Bio: Elisa Bertino is professor of computer science at Purdue University, and serves as Director of the CyberSpace Security Lab (Cyber2SLab). She is also an adjunct professor of Computer Science & Info tech at RMIT in Melbourne. Prior to joining Purdue in 2004, she was a professor and department head at the Department of Computer Science and Communication of the University of Milan. She has been a visiting researcher at the IBM Research Laboratory (now Almaden) in San Jose, at the Microelectronics and Computer Technology Corporation, at Rutgers University, at Telcordia Technologies. Her recent research focuses on database security, digital identity management, policy systems, and security for web services. She is a Fellow of ACM, of IEEE, and AAAS. She received the IEEE Computer Society 2002 Technical Achievement Award, the IEEE Computer Society 2005 Kanai Award, and the ACM SIGSAC Outstanding Contributions Award. She is currently serving as EiC of IEEE Transactions on Dependable and Secure Computing.
Bio: Francisco Herrera received his M.Sc. in Mathematics in 1988 and Ph.D. in Mathematics in 1991, both from the University of Granada, Spain. He is currently a Professor in the Department of Computer Science and Artificial Intelligence at the University of Granada. He has been the supervisor of 36 Ph.D. students. He has published more than 290 papers in international journals. He is coauthor of the books “Genetic Fuzzy Systems: Evolutionary Tuning and Learning of Fuzzy Knowledge Bases” (World Scientific, 2001) and "Data Preprocessing in Data Mining" (Springer, 2015).


His current research interests include bibliometrics, soft computing, computing with words in decision making, information fusion, evolutionary algorithms, evolutionary fuzzy systems, biometrics, data preprocessing, imperfect data, imbalanced classification, data science, biometrics, cloud computing and big data.
Tuesday, August, 22nd
8:15 – 9:00
Security in 5G era
Session Chair:
Raimo Kantola

Lauri Oksanen
Vice President, Nokia Bellabs

Abstract: 5G will support a large range of new use cases. Many of those use cases are early in their evolution and their full impact regarding network security is today unclear. The network and the connections between people, devices and machines will be highly dynamic. Communication networks need to be able to react fast, flexibly, and reliably to new security situations, new attack vectors and upcoming technologies. Security needs to be automated to cope with the growth of data traffic and number of connections. Trust, a very human concept, needs to be digitalized to support the future use cases. Trust and security are not only a fundamental requirement from the user, but also a legal obligation to establish many of the new 5G use cases. The automation of security using machine learning to protect networks and the digitalization of trust in a virtual and highly dynamic network environment will be the focus of this presentation.

Bio: Lauri Oksanen is Vice President for Research and Technology in Nokia. He heads Technology, Architecture, Vision, and Standardization in Nokia Bell Labs. He started his industrial career 28 years ago in fiber optics in Nokia. Then Lauri moved to mobile networks where he has worked with all major wireless technologies from GSM to 5G. Lauri has worked in various advanced technology management positions covering fixed and wireless access, core, management and services, including also the HW and SW platforms and cloud and security technologies. Lauri has Master’s and Licentiate degrees in Telecommunications from Helsinki University of Technology (now Aalto), where he also worked as a researcher before joining Nokia.
Tuesday, August 22nd

9:00 – 9:45
Lessons on How Hackers Really Break into Systems
Session Chair: Raimo Kantola

Tatu Ylönen
CEO, SSH Communications Security, Finland/USA

Abstract: The talk explores lessons learned on how hackers really break into information systems, from broad Internet-based attacks to highly sophisticated attacks used by government-sponsored attackers. It looks at hardware, firmware, operating system, application, cryptographic, and operational vulnerabilities over the years, and how hackers circumvented designed-in security or exploited omissions. It looks at the history of SSH (Secure Shell) as a case study, and looks at how vulnerable some organizations today are because of operational issues around it. Finally, the talk seeks to provide concrete guidance for the R&D community on how to bring a lasting improvement in security.

Bio: Tatu Ylonen is a cybersecurity pioneer with over 20 years of experience from the field. He invented SSH (Secure Shell), which is the plumbing used to manage most networks, servers, and data centers and implement automation for cost-effective systems management and file transfers. He is has also written several IETF standards, was the principal author of NIST IR 7966, and holds over 30 US patents - including some on the most widely used technologies in reliable telecommunications networks. He takes a broad view on cybersecurity and its implications for business and society. At the same time, he still loves to code and can descend through all the layers from process to protocols, operating system internals, assembly, and hardware. He has also founded a NASDAQ OMX-listed security company (SSH Communications Security) and held various leadership roles in a public company (including CEO, CTO, and Chairman). Nowadays he focuses on advancing cybersecurity and permanently solving some of its biggest hurdles. Building better dams instead of just fixing new leaks.
Wednesday, August 23rd

8:00 – 8:45
Big Data - Big Application
Session Chair: Hui Li

Jinjun Chen
Professor, Swinburne University of Technology, Australia

Abstract: Right now, Big Data, Data Science or Data Analytics are being on wide interest in industry and academia. During this talk, we will discuss two questions based on my research industry engagement practice.

The first one is business gain from such buzz words. This is a practical question from business. Based on my research, big data can help business to identify big niche market opportunity which can grow up to become major markets. For example, by analyzing and generalizing potential weak connections between previously sparse data sources such as flight booking data and supermarket user data, we can better expand or enhance the market for personal recommendation on flight booking.

The second is about how researchers can make a full potential to business. A saying is "It's not who has the best algorithm that wins. It's who has the most data" by Andrew Ng (Coursera founder). Data is becoming a resource equally important to oil. While various public datasets are available to academics or researchers for research evaluation, those datasets may not be suitable or useful and timely for researchers. One way to make full potential of big data is to intensively work with industry because they have timely data. More or less, every industry is doing data analysis yet just for their specific purposes. We will brief our research and collaboration with specific industries.

Bio: Dr Jinjun Chen is a Professor at the Swinburne University of Technology, Australia. He is Deputy Director of Swinburne Data Science Research Institute, and Director of Data Science Platforms and Systems. He holds a PhD in Information Technology from Swinburne University of Technology, Australia. His research interests include scalability, big data, data science, software systems, cloud computing, data privacy and security, and related various research topics. His research results have been published in more than 140 papers in international journals and conferences, including various IEEE/ACM Transactions.

He received UTS Vice-Chancellor’s Awards for Research Excellence Highly Commended (2014), UTS Vice-Chancellor’s Awards for Research Excellence Finalist (2013), Swinburne Vice-Chancellor’s Research Award (ECR) (2008), IEEE Computer Society Outstanding Leadership Award (2008-2009) and (2010-2011), IEEE Computer Society Service Award (2007), Swinburne Faculty of ICT Research Thesis Excellence Award (2007). He is an Associate Editor for ACM Computing Surveys, IEEE Transactions on Big Data, IEEE Transactions on Knowledge and Data Engineering, IEEE Transactions on Cloud Computing, as well as other journals such as Journal of Computer and System Sciences, JNCA. He is the Chair of IEEE Computer Society’s Technical Committee on Scalable Computing (TCSC).
8:45 – 9:30
5G IoT Security:
Future Revealed
Session Chair:
Valtteri Niemi

Anand Prasad
Dr. NEC Corporation, Japan

Abstract: Internet of Things (IoT) will be integral part of 5G unlike other generations of mobile communications systems. In this talk we will discuss how 5G is expected to be and security associated to 5G as well as IoT. The talk will cover all aspects from radio to core and services to users. Focus of the talk will be on 3GPP based 5G security solution.

Bio: Anand R. Prasad, Dr. & ir. (MScEngg) from Delft University of Technology, The Netherlands, is Chief Advanced Technologist, Executive Specialist, at NEC Corporation, Japan, where he leads the mobile communications security activity. Anand is the chairman of 3GPP SA3, founder chairman of the GISFI Security & Privacy group and member of the governing body / council member of GISFI and TSDSI. He has 20+ years of experience in networking, wireless and mobile communications product design, development and business development in companies around the globe.


He is recipient of the 2014 ITU-AJ “Encouragement Award: ICT Accomplishment Field” and the 2012 (ISC)² “Asia Pacific Information Security Leadership Achievements (ISLA) Award as a Senior Information Security Professional”. Anand is a certified information systems security professional (CISSP).
RF Sensing for Vital Sign Measurement in healthcare Internet of Things

Session Chair:
Laurence T. Yang

Shiwen Mao
Professor, Auburn University, USA

Abstract: Vital signs, such as breathing and heartbeat, are useful to health monitoring since such signals provide important clues of medical conditions. Effective solutions are needed to provide contact-free, easy deployment, low-cost, and long-term vital sign monitoring. Exploiting wireless signals for contact-free vital sign monitoring will be an important part of the future healthcare Internet of Things (IoT). In this talk, we present our recent work on contact-free vital sign monitoring. The first part is to exploit channel state information (CSI) phase difference data to monitor breathing and heartbeat with commodity WiFi devices. We will present PhaseBeat, a design, based on a discrete wavelet transform, and TensorBeat, a tensor decomposition based design, as well as our experimental study to validate their performance. The second part of this talk is to exploit the CSI tensor and tensor decomposition to distinguish the respiration rates of multiple persons. In the last part of the talk, we will present our smartphone App based solution that uses a 20KHz ultrasound signal for breathing rate detection. Our experimental study shows that the proposed systems can achieve high accuracy under different environments for vital sign monitoring.

Technical Symposia

Monday, August 21st

13:20 – 15:05

**R1.1 – CIT 1: Machine Learning, Data Mining and Big Data Analytics**

Chair: Rafael Valero Fernandez, Keele University, UK

- Learning from Big Data: A Survey and Evaluation of Approximation Technologies for Large-scale Reinforcement Learning  
  *Cheng Wu and Yiming Wang*

- Predicting the Popularity of Online News Based on Multivariate Analysis  
  *Caiyun Liu, Wenjie Wang, Yuqing Zhang, Ying Dong, Fannv He and Chensi Wu*

- Efficient Strip-Mode Microwave Correlated Imaging Method with Data Fusion  
  *Yuanyue Guo and Jie Deng*

- Sentiment classification: Feature selection based approaches versus deep learning  
  *Alper Kursat Uysal and Yi Lu Murphey*

13:20 – 15:05

**R3.1 – NSS 1: Platform and Hardware Security**

Chair: Roberto Saia, Ph.D, University of Cagliari, Italy

- A Practical Method to Confine Sensitive API Invocations on Commodity Hardware  
  *Donghai Tian, Dingjun Qi, Li Zhan, Yuhang Yin, Changzhen Hu and Jingfeng Xue*

- Hardware and Software Support for Transposition of Bit Matrices in High-Speed Encryption  
  *Patrick Eitschberger, Jörg Keller and Simon Holmbacka*

- An Android Vulnerability Detection System  
  *Jiayuan Zhang and Yao Yao*

- Exploring Energy Consumption of Juice Filming Charging Attack on Smartphones: A Pilot Study  
  *Lijun Jiang, Weizhi Meng, Yu Wang and Chunhua Su*

13:20 – 15:05

**R4.1 – ICA3PP 1: Parallel and Distributed Architectures**

Chair: Prof Valtteri Niemi, University of Helsinki, Finland

- Workload Type-Aware Scheduling on big.LITTLE Platforms  
  *Simon Holmbacka and Jörg Keller*

- Pipelining Computation and Data Reuse Strategies for Scaling GROMACS on the Sunway Many-core Processor  
  *Yu Yang, Hong An, Junshi Chen, Weihao Liang, Qingqing Xu and Yong Chen*

- Exploring FPGA-GPU Heterogeneous Architecture for ADAS: Towards Performance and Energy  
  *Xiebing Wang, Linlin Liu, Kai Huang and Alois Knoll*
**R12.1 – CIT 2: Social Networks and Optimization**

Chair: Hao Wang, Norwegian University of Science & Technology, Norway

A Core Theory based Algorithm for Influence Maximization in Social Networks  
*Kan Zhang, Zichao Zhang and Yanlei Wu*

A design towards personally identifiable information control and awareness in OpenID Connect identity providers  
*Rafael Weingärtner and Carla Merkle Westphall*

ROBOMO: Effects of a Motivational Intervention to Address the Barriers During Science Learning  
*Khaoula Youssef, Walid Boukadida and Michio Okada*

A multi-objective metaheuristic approach to search-based stress testing  
*Francisco Nauber Gois, Pedro Porfírio Muniz Farias and André Coelho*

**R1.2 – CIT 3: Wireless Networks and Communications I**

Chair: Madhusanka Liyanage, University of Oulu, Finland

Robust Optimal Spectrum Patrolling for Passive Monitoring in Cognitive Radio Networks  
*Jiachen Li, Jing Xu, Wei Liu, Shimin Gong and Kai Zeng*

Cooperative Multi-Relay Assisted Multicast Beamforming in Wirelessly Power Communications  
*Jiachen Li, Yue Mi, Shimin Gong, Jing Xu, Xiaoxia Huang and Yanyan Shen*

Improved Presence detection for Occupancy Control in Multisensory Environments  
*Charikleia Papatsimpa and Jean Paul Linnartz*

Subspace Decomposition Channel Estimation for Multiple Virtual MIMO SC-FDMA Systems  
*Ashraf Tahat, Claude D’Amours and Benoit Champagne*

Dynamic MAC protocol for Tactical Data Links  
*Zhe Guo and Zheng Yan*

**R3.2 – NSS 2: Network Security I**

Chair: Dr. Weizhi Meng, Technical University of Denmark, Denmark

Mixed Wavelet-based Neural Network Model for Cyber Security Situation Prediction using MODWT and Hurst Exponent Analysis  
*Fannv He, Yuqing Zhang, Donghang Liu, Ying Dong, Caiyun Liu and Chensi Wu*

Detecting DNS Tunneling Using Ensemble Learning  
*Saeed Shafieian, Daniel Smith and Mohammad Zulkernine*

CookiesWall: Preventing Session Hijacking Attacks Using Client Side Proxy  
*Somanath Tripathy and Praveen Kumar*
15:35 – 17:20  
**R4.2 – ICA3PP 2: Software Systems and Programming Models**

Chair: Stephan Sigg, Aalto University, Finland

Hzmem: New Huge Page Allocator with Main Memory Compression  
*Guoxi Li, Wenzhi Chen, Kui Su, Zonghui Wang and Zhongyong Lu*

An FPGA-Based Real-Time Moving Object Tracking Approach  
*Wenjie Chen, Yangyang Ma, Zhilei Chai, Mingsong Chen and Daojing He*

Automatic Acceleration of Stencil Codes in Android  
*Sergio Afonso, Alejandro Acosta and Francisco Almeida*

15:35 – 17:20  
**R12.2 – CIT 4: Video and Audio Transmission**

Chair: Kimmo Järvinen, University of Helsinki

Fast Coding-Unit Mode Decision for HEVC Transrating  
*Shih-Hsuan Yang and Chong-Cheng Zhong*

Multidimensional QoE Assessment of a Simultaneous Transmission Method in Multi-View Video and Audio Transmission with MPEG-DASH  
*Yuki Maehara and Toshiro Nunome*

Energy Efficient Event Driven Video Streaming Surveillance Using sleepyCAM  
*Tenager Mekonnen, Erkki Harjula, Arto Heikkinen, Timo Koskela and Mika Ylianttila*

Fuzzy Analogy based Effort Estimation: An Empirical Comparative Study  
*Ali Idri and Ibtissam Abnane*

Notes
Tuesday, August 22\textsuperscript{nd}

10:15 – 12:00  \textbf{R1.3 – CIT 5: Wireless Networks and Communications II}

Chair: Ashraf A. Tahat, Princess Sumaya University for Technology, Jordan

A Simplified Massive MIMO Approach using Precoding
\textit{Mário Marques Da Silva and Rui Dinis}

Indoor localization using ambient FM radio fingerprinting: A 9-month study
\textit{Andrei Popleteev}

Assessment of TCP parameters for mobile devices concerning performance and energy consumption
\textit{Jonas Pontes, Demetrio Borges, Eric Borba and Eduardo Tavares}

Antenna Array Based Localization Scheme for Vehicular Networks
\textit{Marco Antonio Marques Marinho, Alexey Vinel, Felix Antreich, Joao Paulo Carvalho Lustosa Da Costa and Edison Pignaton de Freitas}

A New Method of Error Reduction for Affine Projection Algorithm
\textit{Shin'Ichi Koike}

10:15 – 12:00  \textbf{R3.3 – NSS 3: Cloud and IoT Security}

Chair: Catalin Leordeanu, Lecturer, University Politehnica of Bucharest, Romania

A Generic Construction of Secure-Channel Free Searchable Encryption with Multiple Keywords
\textit{Keita Emura}

Experiences in Trusted Cloud Computing
\textit{Silke Holtmanns, Ian Oliver, Yoan Miche, Aapo Kalliola, Shankar Lal, Leo Hippeläinen and Sowmya Ravidas}

Private Membership Test Protocol with Low Communication Complexity
\textit{Sara Ramezanian, Tommi Meskanen, Masoud Naderpour and Valtteri Niemi}

Risk Modelling of Blockchain Ecosystem
\textit{Igor Kabashkin}

Adaptively Secure Hierarchical Identity-based Encryption over Lattice
\textit{Leyou Zhang and Qing Wu}

10:15 – 12:00  \textbf{R4.3 – ICA3PP 3: Distributed and Network Based Computing}

Chair: Llorente Santos Jesus, Aalto University

Optimizing Concurrent Evacuation Transfers for Geo-Distributed Datacenters in SDN
\textit{Xiaole Li, Hua Wang, Shanwen Yi, Xibo Yao, Fangjin Zhu and Linbo Zhai}

Energy-Balanced and Depth-Controlled Routing Protocol for Underwater Wireless Sensor Networks
\textit{Hao Qin, Zhiyong Zhang, Rui Wang, Xiaojun Cai and Zhiping Jia}
On the Energy Efficiency of Sleeping and Rate Adaptation for Network Devices
Timothée Haudebourg and Anne-Cécile Orgerie

13:20 – 15:10

R1.4 – CIT 6: Machine Learning, Data Mining and Big Data Analytics II

Chair: Kazuhiko Takahashi, Doshisha University, Japan

Remarks on Adaptive-type Hypercomplex-valued Neural Network-based Feedforward Feedback Controller
Kazuhiko Takahashi

Towards Accurate Predictions of Customer Purchasing Patterns
K-P Lam, Rafael Valero-Fernandez, David Collins, Collin Rigby and James Bailey

Improving Performance for Geo-Distributed Data Process in Wide –Area
Ge Zhang, Zhongzhi Luon and Weiguo Wu

Predicting Student Performance in an ITS using Task-driven Features
Ritu Chaturvedi and Christie Ezeife

An adaptive visualization tool for high order discontinuous galerkin method with quadratic elements
Liyang Xu, Xiaoguang Ren, Xinhai Xu, Hao Li, Yuhua Tang and Yongquan Feng

13:20 – 15:10

R3.4 – NSS 4: Crypto and other topics

Chair: Leyou Zhang, Prof., Xidian University, China

A Generic yet Efficient Method for Secure Inner Product
Lihua Wang, Takuya Hayashi, Yoshinori Aono and Le Trieu Phong

Randomization can’t stop BPF JIT spray
Elena Reshetova, Filippo Bonazzi and N. Asokan

EEG-based Random Number Generators
Dang Nguyen, Dat Tran, Wanli Ma and Dharmendra Sharma

Safety of ABAC_\alpha is Decidable
Tahmina Ahmed and Ravi Sandhu

Implementation of Bitsliced AES Encryption on CUDA-Enabled GPU
Naoki Nishikawa, Hideharu Amano and Keisuke Iwai

13:20 – 14:20

R4.4 – ICA3PP 4: Big Data and its Applications

Chair: Dr. Yu Xiao, Aalto University, Finland

Private and Efficient Set Intersection Protocol for Big Data Analytics
Zakaria Gheid and Yacine Challal

A Topology-aware Framework for Graph Traversals
Jia Meng, Liang Cao and Huashan Yu

Adaptive Traffic Signal Control with Network-wide Coordination
Yong Chen, Juncheng Yao, Chunjiang He, Hanhua Chen and Hai Jin
ICA3PP 5: Parallel and Distributed Algorithms
Chair: Shadi Ibrahim, Inria, France
A Novel Parallel Dual-Character String Matching Algorithm on Graphical Processing Units
Chung-Yu Liao and Cheng-Hung Lin
Distributed Nonnegative Matrix Factorization with HALS Algorithm on MapReduce
Rafał Zdunek and Krzysztof Fonal

R1.5 – CIT 7: Network Security and Privacy
Chair: Raimo Kantola, Aalto University, Finland
A Software-Hardware Co-Designed Methodology for Efficient Thread Level Speculation
Qiong Wang, Jialong Wang, Li Shen and Zhiying Wang
Fast Transmission Mechanism for Secure VPLS Architectures
Madhusanka Liyanage, Andrei Gurtov and Mika Ylianttila
"You have a potential hacker's infection": A study on technical support scams
Sampsu Rauti and Ville Leppänen
A New Approach to Utility-based Privacy Preserving in Data Publishing
Yilmaz Vural and Murat Aydos
Best random codes construction for syndrome coding scheme
Ke Zhang, Martin Tomlinson and Mohammed Zaki Ahmed

R3.5 – NSS 5: Authentication and Key Management
Chair: Prof. Jayaprakash Kar, The LNM Institute of Information Technology, India
Cryptanalysis and Improvement of an Identity-based Proxy Multi-signature scheme
Jayaprakash Kar
The Time Will Tell on You: Exploring Information Leaks in SSH Public Key Authentication
Joona Kannisto and Jarmo Harju
Lightweight Deterministic Non Interactive (ni) Hierarchical Key Agreement Scheme (KAS)
Pinaki Sarkar

R4.5 – ICA3PP 6: Applications of Parallel and Distributed Computing
Anne-Cécile Orgerie, CNRS, France
GPU-Accelerated Block-Max Query Processing
Haibing Huang, Mingming Ren, Yue Zhao, Rebecca J. Stones, Rui Zhang, Gang Wang and Xiaoguang Liu
KD-tree and HEALPix-Based Distributed Cone Search Indexing System for Multi-Band Astronomical Catalogs  
Chen Li, Ce Yu, Jian Xiao, Xiaoteng Hu, Hao Fu, Kun Li and Yanyan Huang

An Out-of-Core Branch and Bound Method for Solving the 0-1 Knapsack Problem on a GPU  
Jingcheng Shen, Kentaro Shigeoka, Fumihiko Ino and Kenichi Hagihara

The Curve Boundary Design and Performance Analysis for DGM Based on OpenFOAM  
Yongquan Feng, Xinhai Xu, Yuhua Tang, Liyang Xu and Yongjun Zhang

Notes
Wednesday, Aug 23rd

10:45 – 12:30

R1.6 – CIT 8: Cloud Computing and Data Centre Networks

Chair: KP Lam, Keele University, UK

A Sensitivity Approach to Energy-Efficient Mapping of Dependable Virtual Networks
Victor Lira, Eduardo Tavares, Meuse Oliveira Jr and Dennys Azevedo

CDController: A Cloud Data Access Control System based on Reputation
Huaqing Lin, Zheng Yan and Raimo Kantola

Cloud IEC 61850: DDS Performance in Virtualized Environment with OpenDDS
Roger D. F. Ferreira and Rômulo S. Oliveira

Using Game Theory To Solve the Fault Diagnosis Problem Under Symmetric Comparison Rules
Mourad Elhadef

10:45 – 12:30

R3.6 – NSS 6: Network Security II

Chair: Llorente Santos Jesus, Aalto University

Exploiting AUTOSAR Safety Mechanisms to Launch Security Attacks
Ahmad Nasser, Di Ma and Sam Lauzon

Survey on Big Data Analysis Algorithms for Network Security Measurement
Hanlu Chen, Yulong Fu and Zheng Yan

A State Recovery Attack on ACORN-v1 and ACORN-v2
Deepak Kumar Dalai and Dibyendu Roy

DNA-Droid: A Real-time Android Ransomware Detection Framework
Amirhossein Gharib and Ali Ghorbani

10:45 – 12:30

R4.6 – ICA3PP 7: Service Dependability and Security in Distributed and Parallel Systems

Chair: Zheng Yan, Xidian University, China/Aalto University, Finland

Leakage-Resilient Password-Based Authenticated Key Exchange
Ou Ruan, Mingwu Zhang and Jing Chen

Secure Encrypted Data Deduplication with Ownership Proof and User Revocation
Wenxiu Ding, Zheng Yan and Robert H. Deng

Optimally Selecting the Timing of Zero-Day Attack via Spatial Evolutionary Game
Yanwei Sun, Lihua Yin, Yunchuan Guo, Fenghua Li and Binxing Fang
R1.7 – CIT 9: Machine Learning, Data Mining and Big Data Analytics III

Chair: Ali Idri, Mohamed V University, Morocco

A data mining-based approach for cardiovascular dysautonomias diagnosis and treatment
Ali Idri and Ilham Kadi

Investigating the Agility Bias in DNS Graph Mining
Jukka Ruohonen and Ville Leppänen

The Enumeration of Flippable Edges in Maximal Planar Graphs
Dongyang Zhao, Yangyang Zhou and Jin Xu

Accurate Localization using LTE Signaling Data
Lei Ni, Yanming Shen, Yuxin Wang, Haoyang Tang and Zhao Yin

A Novel Model for Cybersecurity Economics and Analysis
Paresh Rathod, Timo Hämäläinen

R4.7 – ICA3PP 8: Performance Modeling and Evaluation

Chair: KP Lam, Keele University, UK

Performance Analysis of a Ternary Optical Computer Based on M/M/1 Queueing System
Xianchao Wang, Sulan Zhang, Mian Zhang, Jia Zhao and Xiangyang Niu

Efficient Computation Offloading for Various Tasks of Multiple Users in Mobile Edge Clouds
Weiyu Liu, Xiangming Wen, Zhaoming Lu, Luning Liu and Xin Chen

A CNN-Based Supermarket Auto-Counting System
Zhonghong Ou, Changwei Lin, Meina Song and Haihong E

Research and Implementation of Question Classification Model in Q & A System
Haihong E, Yingxi Hu, Meina Song, Zhonghong Ou and Xinrui Wang

Notes
## Workshops

**Monday, August 21st**

13:20 – 15:05 **R5.1 – UCER 1:**

Chair: Dr. Jiri Dokulil, University of Vienna, Austria

Probabilistic-based selection of alternate implementations for heterogeneous platforms

*Javier Fernández, Jesús Sánchez Cuadrado, David del Río Astorga, Manuel F. Dolz, and J. Daniel García*

Accelerating processing of scale-free graphs on massively-parallel architectures

*Mikhail Chernoskutov*

A Hybrid Parallel Search Algorithm for Solving Combinatorial Optimization Problems on Multicore Clusters

*Victoria Sanz, Armando De Giusti, and Marcelo Naiouf*

13:20 – 15:05 **R11.1 – SMCN 1:**

Chair: Wenxiu Ding, Xidian University

A Quantitative method for evaluating Network Security based on Attack Graph

*Lv Kun, Zheng Yukun and Hu Changzhen*

SulleyEX: A Fuzzer for Stateful Network Protocol

*Rui Ma, Tianbao Zhu, Changzhen Hu, Chun Shan and Xiaolin Zhao*

A detecting method of array bounds defects based on symbolic execution

*Chun Shan, Shiyou Sun, Jingfeng Xue, Changzhen Hu and Hongjin Zhu*

Machine learning for Analyzing Malware

*Dong Yajie, Liu Zhenyan, Yan Yida, Wang Yong, Xue Jingfeng and Zhong Ji*

Optimal Attack Path Generation Based on Supervised Kohonen Neural Network

*Yun Chen, Kun Lv and Changzhen Hu*

15:35 – 17:20 **R5.2 – UCER 2**

Chair: Dr. Javier Fernández Muñoz, University Carlos III of Madrid, Spain

Concurrent Treaps

*Praveen Alapati, Swamy Saranam, Madhu Mutyam*

Survey on Energy-saving Technologies for Disk-based Storage Systems

*Ce Yu, Jianmei Wang, Chao Sun, Xiaoxiao Lu, Jian Xiao and Jizhou Sun*

The Open Community Runtime on the Intel Knights Landing Architecture

*Jiri Dokulil, Siegfried Benkner and Jakub Yaghob*

High-Performance Graphics in Racket with DirectX

*Antoine Bossard*
15:35 – 17:20

**R11.2 – SMCN 2**

Chair: Foukia Noria, HES, Switzerland

Defenses against Wormhole Attacks in Wireless Sensor Networks
*Rui Ma, Siyu Chen, Ke Ma, Changzhen Hu and Xiajing Wang*

A systematic analysis of random forest based social media spam classification
*Mohammed Al-Janabi and Peter Andras*

Application Research on Network Attack and Defense with Zachman Framework
*Chensi Wu, Yuqing Zhang and Ying Dong*

A Novel Approach to Network Security Situation Assessment Based on Attack Confidence
*Donghang Liu, Lihua Dong, Shaoqing Lv, Ying Dong, Fannv He, Chensi Wu and Yuqing Zhang*

A Discrete Wavelet Transform Approach to Fraud Detection
*Roberto Saia*

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**Tuesday, August 22nd**

10:15 – 12:00

**R5.3 – SECIOE 1**

Chair: Dr. Somanath Tripathy, Associate Professor, IIT Patna, India

Improving Alert Accuracy for Smart Vehicles
*Chia-Mei Chen, Gu-Hsin Lai and Tan-Ho Chang*

Hardware Secured, Password-based Authentication for Smart Sensors for the Industrial Internet of Things
*Thomas Wolfgang Pieber, Thomas Ulz, Christian Steger and Rainer Matischek*

Towards Dependably Detecting Geolocation of Cloud Servers
*Leo Hippeläinen, Ian Oliver and Shankar Lal*

Tor de-anonymisation techniques
*Juha Nurmi and Mikko Niemelä*

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10:15 – 12:00

**R10.3 – IWSGS 1: Interconnection Security**

Chair: Yoan Miche, Nokia Bellabs, Finland

10:15 -10:45
Jaakko Wallenius (CSO Elisa)

10:45 – 11:10
Stealthy SS7 Attacks
*Sergey Puzankov (Positive Technologies)*

11:10 – 11:35
Diameter Security: An Auditor’s Viewpoint
*Sergey Mashukov (Positive Technologies)
11:35 – 12:00  Subscriber Profile Extraction and Modification via Diameter Interconnection
Silke Holtmanns, Ian Oliver, Yoan Miche (Nokia Bell Labs)

10:15 – 12:00  **R11.3 – SM CN 3**

Chair Tu Peng, Beijing Institute of Technology

An Automatic Vulnerabilities Classification Method based on their Relevance
Hao Zhang, Kun Lv and Changzhen Hu

A Novel Threat-Driven Data Collection Method for Resource-Constrained Networks
Jing Li, Lihua Yin, Yunchuan Guo, Chao Li, Fenghua Li, Lihua Chen

OE-CP-ABE: Over-Encryption based CP-ABE Scheme for Efficient Policy Updating
Jialu Hao, Jian Liu, Hong Rong, Huimei Wang and Ming Xian

Privacy-Preserving Stochastic Gradient Descent with Multiple Distributed Trainers
Le Trieu Phong

10:15 – 12:00  **R12.3 – PBio 1: Multicore and cluster computing in Bioinformatics**

Session Chair: José M. Granado-Criado

A Resource Manager for Maximizing the Performance of Bioinformatics Workflows in Shared Clusters.
Ferran Badosa, Cesar Acevedo, Antonio Espinosa, Gonzalo Vera and Ana Ripoll.

Massively Parallel Sequence Alignment with BLAST through Work Distribution Implemented using PCJ Library.
Marek Nowicki, Davit Bzhalava and Piotr Bala

On the Use of Binary Trees for DNA Hydroxymethylation Analysis.
César González, Mariano Pérez, Juan M. Orduña, Javier Chaves and Ana-Bárbara García.

Parallel Multi-Objective Optimization for High-Order Epistasis Detection.
Daniel Gallego-Sánchez, José M. Granado-Criado, Sergio Santander-Jiménez, Álvaro Rubio-Largo and Miguel A. Vega-Rodríguez.

13:20 – 15:10  **R5.4 – SECO E 2**

Chair: Todor Ginchev, Aalto University

Coincer: Decentralised Trustless Platform for Exchanging Decentralised Cryptocurrencies
Michal Zima

Enhancing Resilience of KPS Using Bidirectional Hash Chains and Application on Sensornet
Deepak Kumar Dalai and Pinaki Sarkar

μShield: Configurable Code-Reuse Attacks Mitigation For Embedded Systems
Ali Abbasi, Jos Wetzels, Wouter Bokslag, Emmanuele Zambon and Sandro Etalle

A Role-based Access Control System for Intelligent Buildings
Nian Xue, Xin Huang and Liu Dawei

Chair: Ian Oliver, Nokia Bellabs, Finland

13:20 – 13:50  Bengt Sahlin (Ericsson)
Invited talk: IOT and 5G; Security Considerations.

13:50 – 14:10  5G Slicing as a Tool to test User Equipment against Advanced Persistent Threats
*Lauri Isotalo (Elisa)*

14:10 -14:30  IPsec and IKE as Functions in SDN Controlled Network
*Markku Vajaranta, Joona Kannisto and Jarmo Harju*

14:30 – 14:50  Area-dividing Route Mutation in Moving Target Defense Based on SDN
*Huiting Tan, Chaoping Tang, Chen Zhang and Shaolei Wang*

14:50 -15:10  Probabilistic Transition-based Approach for Detecting Application-Layer DDoS attacks in Encrypted Software-Defined Networks
*Elena Ivannikova, Mikhail Zolotukhin and Timo Hamalainen*


Session Chair: José M. Granado-Criado

Configuring Concurrent Computation of Phylogenetic Partial Likelihoods:
Accelerating Analyses using the BEAGLE Library.
*Daniel L. Ayres and Michael P. Cummings.*

Accelerating FaST-LMM for Epistasis Tests.
*Héctor Martínez, Sergio Barrachina, Maribel Castillo, Enrique S. Quintana-Ortí, Jordi Rambla De Argila, Xavier Farré and Arcadi Navarro.*

Pipelined Multi-FPGA Genomic Data Clustering.
*Rick Wertenbroek, Enrico Petraglio and Yann Thoma.*

First Experiences Accelerating Smith-Waterman on Intel’s Knights Landing Processor.

15:40 – 17:30  **RS5.5 – SECIOE 3**

Chair: Michal Zima, Masaryk University, Brno, Czech Republic

Access Control Model for AWS Internet of Things
*Smriti Bhatt, Farhan Patwa and Ravi Sandhu*

Privacy Verification Chains for IoT
*Noria Foukia, David Billard and Eduardo Salana*

Platform for detection of voids in the Bogotá D. C. road network and exposure of its information in a web environment
*Angel Rendon, Octavio Salcedo and Lewys Correa*
A Denial of Service Attack Method for IoT System in Photovoltaic Energy System
Lulu Liang, Kai Zheng, Qiankun Sheng, Wei Wang, Xin Huang

15:40 – 17:30

R10.5 – IW5GS 3: New approaches for 5G Security

Chair: Silke Holtmanns, Nokia Bellabs, Finland

15:40 – 16:05
Concealing IMSI in 5G Network Using Identity Based Encryption
Md Mohsin Ali Khan and Valtteri Niemi

16:05 – 16:30
Mind Your Right to Know: On De-anonymization Auditability in V2X Communications
Tommi Meskanen, Masoud Naderpour, Valtteri Niemi

16:30 – 16:55
A formal approach for network security policy relevancy checking
Fakher Ben Ftima, Kamel Karoui and Henda Ben Ghezala

16:55 -
Covert Channels Implementation and Detection in Virtual Environments
Irina Mihai, Catalin Leordeanu and Alecsandru Patrascu

R11.5 – DACSC 1: Internet of Vehicles

Chair: Wendong Wang, BUPT, China

15:40 – 17:30

En-Eye: A Cooperative Video Fusion Framework for Traffic Safety in Intelligent Transportation Systems
Tianhao Wu and Lin Zhang

Security/Reliability-Aware Relay Selection with Connection Duration Constraints for Vehicular Networks
Zhenyu Liu and Lin Zhang

Research on Properties of Nodes Distribution on Internet of Vehicle
Jiujun Cheng, Zheng Shang, Hao Mi, Cheng Cheng and Zhenhua Huang

Application of Batch and Stream Collaborative Computing in Urban Traffic Data Processing
Tao Zhang and Shuai Zhao

R12.5 – PBio 3: Heterogeneous and distributed computing in Bioinformatics

Session Chair: José M. Granado-Criado

Juan José Escobar, Julio Ortega, Antonio Francisco Díaz, Jesús González and Miguel Damas.

Using Spark and GraphX to Parallelize Large-Scale Simulations of Bacterial Populations over Host Contact Networks.
Andrea Sofia Teixeira, Pedro T. Monteiro, João A. Carriço, Francisco C. Santos and Alexandre P. Francisco.
PPCAS: Implementation of a Probabilistic Pairwise Model for Consistency-based Multiple Alignment in Apache Spark. 
Jordi Lladós, Fernando Guirado and Fernando Cores.

Accelerating Exhaustive Pairwise Metagenomic Comparisons. 
Esteban Pérez-Wohlfeil, Oscar Torreno and Oswaldo Trelles.

**Wednesday, August 23rd**

**10:45 – 12:30**

**RS.6 – SecureEdge 1: Secure and Resource-Efficient Edge Computing I**

Chair: Mika Ylianttila, Professor, Oulu University, Finland

Some Cryptography Models Designed by Double Odd-edge Labelling of Trees 
Hongyu Wang, Jin Xu and Bing Yao

Enhancing Security, Scalability and Flexibility of Virtual Private LAN Services 
Madhusanka Liyanage, Mika Ylianttila and Andrei Gurtov

Horizontal Requirement Engineering in Integration of Multiple IoT Use Cases of City Platform as a Service 
Toshihiko Yamakami

**10:45 – 12:30**

**R10.6 – RACIT 1: Advances of Computer and Information Technologies I**

Chair: Yongquan Feng, National University of Defense Technology, China

Investigation and Performance Evaluation of Scalable High Efficiency Video Coding 
Wei-Lune Tang and Shih-Hsuan Yang

An Efficient Dynamic Ridesharing Algorithm 
Jianren Gao, Yuxin Wang, Yanming Shen, Haoyang Tang and Zhao Yin

A Best Practice Based E-government Portals’ Maturity Model – A Case Study 
Ali Idri, Abdoullah Fath Allah, Laila Cheikhi and Rafa Al Qutaich

Security Assessment of a Distributed, Modbus-based Building Automation System 
Tuomas Tenkanen and Timo Hamalainen

Practical Performance Models for High-order CFD Simulation 
Hao Li, Xiaoguang Ren, Yufei Lin, Yuhua Tang, Shuai Ye and Chen Cui

**10:45 – 12:30**

**R11.6 – DACSC 2: Big Data**

Chair: Yu Xiao, Aalto University, Finland

Fine-grained Infer $\text{PM}_{2.5}\$ Using Images from Crowdsourcing 
Shuai Li, Teng Xi and Xirong Que, Wendong Wang

An Advanced Random Forest Algorithm Targeting the Big Data with Redundant Features 
Ying Zhang, Bin Song, Yue Zhang and Sijia Chen
The Impact of International Inter-City Investment on Enterprises Performance: Pluralistic Interpretation of Geographical Death
Yanghao Zhan, Yan Chen and Ruirui Zhai

Comparing Electricity Consumer Categories based on Load Pattern Clustering with Their Natural Types
Zigui Jiang, Rongheng Lin, Fangchun Yang and Zhihan Liu

10:45 – 12:30

R12.6 – DTWSM 1

Chair: Zheng Yan, Professor, Xidian University, China/Aalto University, Finland
Cloud Multimedia Files Assured Deletion Based on Bit Stream Transformation with Chaos
Wenbin Yao, Yijie Chen and Dongbin Wang

Interval Merging Binary Tree
István Finta, Lóránt Farkas, Sándor Szénási and Szabolcs Sergyán

Mining Suspicious Tax Evasion Groups in a Corporate Governance Network
Wenda Wei, Zheng Yan, Jianfei Ruan, Qinghua Zheng and Bo Dong

PerRec: A Permission Configuration Recommender System for Mobile Apps
Yanxiao Cheng and Zheng Yan

13:45 – 15:25

R5.7 – SecureEdge 2: Secure and Resource-Efficient Edge Computing II

Chair: Mika Ylianttila, Professor, Oulu University, Finland
Dynamic Malware Detection using API Similarity
Ehab Alkhateeb

Where Resources meet at the Edge
Klervie Toczé and Simin Nadjm-Tehrani

Software-Defined Edge Defense Against IoT-Based DDoS
Mert Özçelik, Niaz Chalabianloo and Gürkan Gür

13:45 – 15:25

R10.7 – RACIT 2: Advances of Computer and Information Technologies II

Chair: Leo Hippeläinen, Nokia Bell Labs, Finland
Dynamic Reconfiguration of Architecture in the Communication Network of Air Traffic Management System
Igor Kabashkin

Changing for Win-Win
Guangyu Xiong, Timo R. Nyberg and Gang Xiong

3D matrix-based visualization system of association rules
Biying Wang, Tingting Zhang, Zheng Chang, Tapani Ristaniemi and Guohua Liu
On the performance of web services and Google cloud messaging
Waqar Hassan, Guido Albertengo, Fikru Getachew Debele and Dario Stramandino

13:45 – 15:25

**R11.7 – DACSC 3: Smart City**

Chair: Ye Tian, BUPT, China

Smart City Environmental perception from ambient cellular signals
*Isha Singh and Stephan Sigg*

When Clutter Reduction Meets Machine Learning for People Counting Using IR-UWB Radar
*XiuZhu Yang and Lin Zhang*

ESD-WSN: An Efficient SDN-based Wireless Sensor Network Architecture for IoT Applications
*Zhiwei Zhang, Zhiyong Zhang, Rui Wang, Zhiping Jia, Haijun Lei, and Xiaojun Cai*

Energy Efficient Manycast Routing, Modulation Level and Spectrum Assignment in Elastic Optical Networks for Smart City Applications
*Xiao Luo, Xue Chen and Lei Wang*

A Multitask-Oriented Selection Strategy for Efficient Cooperation of Collocated Mobile Devices
*Hui Gao, Jun Feng, Ruidong Wang and Wendong Wang*

13:45 – 15:25

**R12.7 – DTWSM 2**

Chair: Hui Li, Professor, Xidian University

An Android Malware Detection System Based on Behavior Comparison Analysis
*Jing Tao, Qiqi Zhao, Pengfei Cao, Zheng Wang and Yan Zhang*

Stream-based Live Probabilistic Topic Computing and Matching
*Kun Ma, Ziqiang Yu, Ke Ji and Bo Yang*

Experiment for analysing the impact of financial events on Twitter
*Ana Fernández Vilas, Lewis Evans, Majdi Owda, Rebeca P. Díaz Redondo and Keeley Crocket*

APK-DFS: An Automatic interaction system based on Depth-First-Search for APK
*Jing Tao, Qiqi Zhao, Pengfei Cao, Zheng Wang and Yan Zhang*

Optimized Data Layout for Spatio-temporal Data in Time Domain Astronomy
*Jie Yan, Ce Yu, Chao Sun, Zhaohui Shang, Yi Hu and Jinghua Feng*
Tutorials

Monday, August 21st

13:20 – 15:05  
**R10.1 – Cooperative Security with Commodity Linux Tools (CSec)**  
*Part 1: Introduction and motivation*

Introduction to Cooperative Security  
*Raimo Kantola, Aalto University, Finland*

Motivation for cooperation based on game theory  
*Hammad Kabir, Aalto University, Finland*

15:35 – 17:20  
**R10.2 – CSec Tutorial Part 2: Firewalling and trust processing**

Realm Gateway and Firewalling using Linux Kernel  
*Jesus Llorente, Aalto University, Finland*

Homomorphic encryption in digital trust processing  
*Lifang Zhang, Aalto University, Finland*

Tuesday, August 22nd

13:20 – 15:10  
**R11.4 – HPmPP1: Tutorial on High Performance Multithreaded Packet Processing**  
*Juha-Matti Tilli, Nokia Bellabs, Finland*  
Part 1

Wednesday, August 23rd

13:45 – 15:25  
**R3.7 – HPmPP2: Tutorial on High Performance Multithreaded Packet Processing**  
*Juha-Matti Tilli, Nokia Bellabs, Finland*  
Part 2

Panel

Monday, August 21st

11:00 – 12:00  
**Big Data and Analytics**

*Elisa Bertino, Professor, Purdue University, USA*  
*Shadi Ibrahim, Inria, France*  
*Francisco Herrera, Professor, University of Granada, Spain*  
*NN*  
*Hao Wang, Dr., Norwegian University of Science and Technology, Norway*
NSS-ICA3PP-CIT 2017 General Information

Conference Venue
Hotel Crowne Plaza, Address: Mannerheimintie 50, 00260 Helsinki

Registration and Information Desk
The Registration and Information Desk at hotel Crowne Plaza is open as follows:

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Time</th>
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<tr>
<td>Sunday</td>
<td>20 August</td>
<td>18:00 - 20:00</td>
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<tr>
<td>Monday</td>
<td>21 August</td>
<td>07:00 - 18:00</td>
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<tr>
<td>Tuesday</td>
<td>22 August</td>
<td>07:30 - 18:00</td>
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<tr>
<td>Wednesday</td>
<td>23 August</td>
<td>08:00 - 16:00</td>
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Registration fees include:
- Admission to the three conferences
- Helsinki City Reception
- Conference Dinner (not included in Student non-author fees)
- Name badge
- Conference bag and material

Social Program

Helsinki City Reception
Venue: Helsinki City Hall
Address: Pohjois Esplanadi 11-13
Time: Monday, August 21st at 18:30 – 20:30

The City of Helsinki has the pleasure to invite all delegates to a cocktail reception taking place at the City Hall. A light buffet and drinks will be served. Kindly remember to bring your invitation card with you.

Gala Dinner
Venue: Hilton Helsinki Kalastajatorppa
Address: Kalastajatorpantie 1
Time: Tuesday, August 22nd at 19:00 – 22:30

The Gala Dinner will take place at the beautiful Hilton Helsinki Kalastajatorppa, only a 15-minute drive from the city center and overlooking the Gulf of Finland. Bus transportation from hotel Crowne Plaza to the Gala Dinner is provided at 18:30 and back to the hotel starting at 22:00.

Accompanying persons’ meeting point
Room 13 will have coffee and refreshments available for accompanying persons in the morning 8:00 – 10:00.

Other Information

Badges
Wearing your personal name badge is compulsory in order to attend the sessions and other activities of the conference, including lunches and coffee breaks.
Certificates
A Certificate of Attendance will be provided to participants upon request at the Registration desk during the Conference.

Climate
The average day-time temperature in Finland in June-July is around 17-25°C (63-77°F). Evenings may be cooler. Fairly warm weather with occasional rain showers is likely. So, you might benefit from packing both lighter and warmer clothes and an umbrella!

Coffee Breaks and Lunch
Coffee, tea and snacks will be served in the Winter Garden area (see floor plan) during the coffee breaks indicated in the program. Lunch will be served in the Royal Hall.

Currency
The official currency in Finland is the euro (€). Most major credit cards are accepted in hotels and shops. VISA, MasterCard and Eurocard are accepted at the registration desk. Personal or company cheques will not be accepted at the registration desk or shops. Traveller’s cheques can be cashed at banks and exchange bureaus.

Electricity
230 V (formerly 220 V), 50 Hz

Insurance
The Organizing Committee will take no liability for personal injuries sustained by, or for loss or damage to property belonging to conference participants, either during or as a result of the conference. All participants are recommended to have travel insurance to cover non-attendance due to illness or other unforeseen circumstances.

Internet access
Hotel Crowne Plaza has free Wireless Internet Access in the lobby area. SSID and password are on a paper slip in your badge.

Language
The official language of the conference is English.

Mobile phones
As a courtesy towards other delegates, please ensure that your mobile telephone is turned off during all sessions.

Parking
Limited parking space is available at hotel Crowne Plaza. No parking space can be reserved in advance.

Smoking
Smoking inside is prohibited at all the venues

Time
Time zone in Finland: GMT + 3 hrs (during daylight saving/in August)

Tipping
All restaurant prices and taxi fares include service, but good service in the restaurant can be rewarded with a tip. Tipping is at the guest’s discretion in hotels.