MobiSec 2021 Program Outline

Jeju Oriental Hotel, Jeju Island, South Korea

Time	October 7 (Thursday), 2021	
	*Offline Session	**Online Session
9:00 ~ 10:30	Session1A: IoT and Cyber Security 1	Session1B: Blockchain Security
10:30 ~ 11:00	Break	
11:00 ~ 12:30	Session2A: 5G Core Network Security 1	Session2B: IoT and Cyber Security 2
12:30 ~ 13:30	Lunch	
13:30 ~ 14:00	Opening Ceremony	
14:00 ~ 15:00	Invited Talk 1 Introduction to Network Equipment Security Assurance Scheme (NESAS) by CSO Joonho Lee (Huawei Korea, South Korea)	
15:00 ~ 15:30	Break	
15:30 ~ 17:00	Session3A: Cryptography and Network Security 1	Session3B: Online Poster Session (15 poster presentations)
17:00 ~ 18:00	Offline Poster Session (15 poster offline exhibitions)	
	October 8 (Friday), 2021	
Time	Offline Session	Online Session
9:00 ~ 10:30	Session4A: Digital Forensic	Session4B: 5G Virtual Infra. & Services Security 2
10:30 ~ 11:00	Break	
11:00 ~ 12:30	Session5A: Malware Analysis	Session5B: Cryptography and Network Security 2
12:30 ~ 13:30	Lunch	
13:30 ~ 15:00	Session6: AI & Cloud Security	
15:00 ~ 15:30	Break	
15:30 ~ 16:30	Invited Talk 2 Cybersecurity for 5G-Powered Vehicles by CSO Jaeson Yoo (Autocrypt Co. Ltd., South Korea)	
16:30 ~ 17:00	Break	
17:00 ~ 18:00	Invited Talk 3 AI technologies and advanced security for connected devices in next generation networks by Prof. Antonio Skarmeta (University of Murcia, Spain)	
	October 9 (Saturday), 2021	
Time	Offline Session	
9:00 ~ 10:10	Session7: Best Paper Session	
10:10 ~ 10:30	Break	
10:30 ~ 11:30	Invited Talk 4 Networking Cognitive Security Dr. Gianni D'Angelo (University of Salerno, Italy)	
11:30 ~ 12:00	Closing Ceremony	

*Authors deliver the presentations at the venue. Some presentation may still be conducted virtually.

**Recorded presentations are broadcasted to audiences. The presenters will be online for Q&A.

Invited Talks

CSO Joonho Lee

Huawei Korea, South Korea

Invited Talk1
Introduction to Network Equipment Security Assurance Scheme (NESAS)

NESAS, jointly defined by 3GPP and GSMA, provides an overall security assurance framework for improving security levels in the mobile industry. This scheme not only suggests security requirements and an assessment framework for secure product development and lifecycle processes, but also supports the security evaluation of network equipment through 3GPP defined security test cases. It is expected that NESAS will play the important role of a security baseline proving that network equipment satisfy a list of security requirements and achieve security assurance.

This talk will introduce the overall NESAS process and evaluation framework whose details are as follows:
(1) Philosophy on how NESAS handle equipment designed to support functions that are defined by 3GPP and deployed by mobile network operators on their networks.
(2) Security assessments of vendor development and product lifecycle processes
(3) Security evaluations of network products.
(4) Differences from the existing equipment certification method.

Biography

Senior Managing Director Joonho Lee is currently working as a Chief Security Officer (CSO) of Huawei Korea. Prior to join to Huawei Korea, he worked as a CIO (Chief Information Officer) at Daum Communications, as a CISO (Chief Information Security Officer) at Naver, and as a co-CEO at a security startup SsenStone Inc. In addition, Mr. Lee served as a non-executive director of KISA (Korea Internet & Security Agency) and was a member of the Government 3.0 Committee. While having contributed as one of key leaders in the Korean security industry, Mr. Lee was selected as CIO of the Year at the Korea CIO Forum in 2006 and 2016, and received the CISO of the Year Award at the 13th Information Security Awards and Asia-Pacific Information Security Leadership Achievements by (ISC)²in 2014. After moving to an equipment manufacturer with a lot of work experience in Internet companies, Mr. Lee focuses on mobile communication security while striving to develop the security industry ecosystem. Moreover, as a person in charge of security and personal information protection of Huawei Korea, he is making best to build trust in the company.

Keynote Speaker

CSO Jaeson Yoo

Autocrypt Co. Ltd., South Korea

Invited Talk2

Cybersecurity for 5G-Powered Vehicles

5G technology is expected to push mobile communications beyond the domain of just mobile devices, expanding to endpoints that can directly impact day-to-day safety, which includes the vehicles of tomorrow. Autocrypt CSO Jaeson Yoo will illustrates what 5G means for vehicles and the future of transportation, utilizing what user case scenarios can be expected. Jaeson will also discuss 5G's implications for connected and autonomous driving, innovations in Local Dynamic Map (LDM) technology, data governance issues, and the cybersecurity requirements that must be addressed to ensure safety for tomorrow's roads.

Biography

CSO Jaeson Yoo is the Chief Strategy Officer for Autocrypt Co. Ltd. In Seoul, Korea. With over ten years of IT Security consulting and public speaking experience for automotive security, fleet management services, IoT, PKI, web security and data encryption, Jaeson brings Autocrypt's proprietary and market-proven cybersecurity technologies closer to partners and customers all over the globe. Jaeson is a magna cum laude graduate of Occidental College, and is a member of Phi Beta Kappa.

Prof. Antonio Skarmeta

Dept. Information and Communications Engineering
Faculty of Informatics
University of Murcia
Murcia, Spain

Invited Talk3

AI technologies and advanced security for connected devices in next generation networks

IoT devices and the emergence of 5G in our daily lives are bringing new data-driven and increasingly autonomous scenarios. There is new possibilities of highly distributed processing capacities from IoT-Edge-Cloud in a continuum. New services require efficient and effective management of computing and network resources what means to deal with huge amounts of data and at different levels of the future NG infrastructure. In this context there is a need for configuration, architecture and coordination of processing nodes at different levels what has an impact over security of the 5G infrastructure but also for the new data processing. In this talk several areas of intelligent management and AI and security procedures will be presented to support heterogeneous processing infrastructures in 5G and beyond 5G networks based on the results of some EU project.

Biography

Dr. Antonio Skarmeta received an M.S. degree in Computer Science from the University of Granada and B.S. (Hons.) and a Ph.D. degrees in Computer Science from the University of Murcia, Spain. Since 2009, he is Full Professor at the same department and University. Antonio F. Skarmeta has worked on different research projects in the national and international area in the networking, security and IoT area. He now coordinates the H2020 project IoTCrawler focusing on IoT advanced discovery on IPv6 networks and OLYMPUS on privacy preserving IdM. His main interested is in the integration of IPv6, security services, identity, IoT and Smart Cities. He has been head of the research group ANTS since its creation in 1995. Currently, he is also Advisor to the Vice-Rector of Research of the University of Murcia for International projects and Head of the International Research Project Office. Since 2014, he is the Spanish National Representative for the MSCA within H2020. He has published over 200 international papers and is a member of several program committees. He has also participated in several standardization fora like IETF, ISO and ETSI and being nominated as IPv6 Forum Fellow. He is also CTO of the spinoff company Odin Solution S.L. (OdinS) in the area of IoT and Smart Infrastructure.

Dr. Gianni D'Angelo

University of Salerno, Italy

Invited Talk4

Networking Cognitive Security

The talk addresses the changing world of security systems, and the possible approaches to their improvement through the usage of Artificial Intelligence and Machine Learning-based techniques. Although many security aspects are addressed, the talk will be focused on addressing networking security issues. The concept of "Networking Cognitive Security" is mainly explored from three different perspectives and implementation levels, namely:

a) Network-level, by considering only data flowing in a network in order to perform Traffic Classification and Anomaly Detection;

b) Application-level, by modeling the behavior of apps in order to detect suspect behaviors.

c) Social-level, by modeling the behavior of entities involved in social communities in order to detect unfair uses of social networks.

For each of these levels, theoretical aspects and implementation details will be shown. In particular, solutions based on Deep Neural Network architectures and ad-hoc intelligent algorithms will be shown.

Particular attention is given to the inner behavior of Deep Neural Networks. In this regard, a formal mathematical exploration of inner processes behind neural network architectures are shown in order to provide a useful understanding of how each neural component affects network performance. This allows improving the skill of a neural network designer to provide improvements in reliability and performance of security systems. These aspects are presented with reference to many security systems developed in our research group making use of Convolutional Neural Networks, Recurrent Neural Networks, Autoencoders, and their combinations as well as specific algorithms also based on evolutionary approaches to solve constrained optimization problems, and more.

Comments and future challenges will conclude the talk.

Biography

Dr. Gianni D'Angelo received the M.S. degree (cum laude) in Computer Engineering, and the Ph.D. degree in Computer Science from the University of Sannio and Salerno, Italy, in 1998 and 2003, respectively. From April, 14 2021 he qualified as Second Level University Professor for the Sector 01/B1 - Computer Science, and from April 29, 2021 as Second Level University Professor for the Sector 09/H1 - Systems of Information Processing. Actually, he is tenured adjunct professor at the Department of Computer Science of the University of Salerno, Italy

where he lectures "Computer Networks" and "Fundamentals of Computer Science and Programming". Since 2012, he is Contract Professor of "Elements of Computer Science" at the Department of Law, Economics, Management and Quantitative Methods of the University of Sannio, Benevento, Italy. His research interests concern with the development and implementation of algorithms based on Artificial Intelligence, Deep Learning, and Machine Learning for Knowledge Discovery in BIG DATA context and implemented for High-Performance machines - HPC, and Parallel Computing. He gained experience in the world of the pattern recognition, neural networks, fuzzy logic, ANFIS systems, genetic and evolutionary algorithms, and parallel programming applied in various scientific and industrial fields. He authored many articles published in international journals, books and conferences, and currently serves as a reviewer, editorial board and guest editor for several international journals.

MobiSec 2021 Program

October 7th Thursday, 2021

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09:00 ~ 10:30   - Session1A: IoT and Cyber Security 1 (Offline Session)
Session Chair: Prof. Ilsun You (Soonchunhyang University, South Korea)

- Comparative Analysis of Bluetooth LE and EDHOC for Potential Security Protocol in Artificial Pancreas System
  Daniel Gerbi Duguma, Philip Virgil Astillo, Yonas Engida Gebremariam, Bonam Kim, and Ilsun You
- MemTwin Consecutive Memory-Recording enhanced with FPGA for IoT Memory Inspection
  Hye Lim Jung, Gi-Choel Choi, and Ki-Woong Park
- Automotive Intrusion Detection Using Degree of Change in CAN Data Frame
  Wansoo Kim, Jung Ho Lee, Yeon Jin Kim, Jin Gyun Chung, and Samuel Woo
- Semantic Embedding-based Entity Alignment for Cybersecurity Knowledge Graphs
  Minhwan Kim, Hanmin Kim,Gyudong Park and Mye Sohn

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09:00 ~ 10:30   - Session1B: Blockchain Security (Online Session)
Session Chair: Prof. Bonam Kim (Soonchunhyang University, South Korea)

- A Resource-Blockchain Framework for Safeguarding IoT
  Monika Bharti, Rajesh Kumar, Sharad Saxena and Vishal Sharma
- The Design and Implementation of Blockchain-assisted User Public-private Key Generation Method
  Tianhong Zhang, Jianfeng Guan and Zejun Lan
- A blockchain - based authentication scheme for 5G applications
  Lanfang Ren, Xiaoting Huang, Huachun Zhou, Bo Yang, and Li Su
- Smart Contract Based Personal Data Protection Framework: in cross-app advertising
  Yuyuan Shi and Jianfeng Guan

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10:30 ~ 11:00   Break

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11:00 ~ 12:30   - Session2A: 5G Core Network Security 1 (Offline Session)
Session Chair: Prof. Hwankuk Kim (Sangmyung University, South Korea)

- Development Protection Profile for 5G Mobile Core Network Equipment
  Hyungjin Cho, Sungmoon Kwon, Daeun Kim, Dowon Kim, and Ieckchae Euom
- 5G StandAlone Network Attack Scenarios using GTP Protocol
  Sungmoon Kwon, Daeun Kim, Seongmin Park, and Dowon Kim
- A Study on Analysis of Machine Learning-based IoT Botnet Traffic in 5G Core Networks
  Ye-Eun Kim, Min-Gyu Kim, and Hwankuk Kim
- *Security and Trust in the Integration of Network Functions within the 5G Architecture:
  The 5GASP Project
  Jorge Gallego-Madrid, Ramon Sanchez-Iborra and Antonio Skarmeta

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* indicates that the paper will be presented via the recorded video file even though it belongs to the offline session.

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11:00 ~ 12:30   - Session2B: Blockchain Security (Online Session)
Session Chair: Prof. Jianfeng Guan (Beijing University of Posts and Telecommunications, China)

−   Secure LoRaWAN Root Key Update Scheme for IoT Environment
    Kun-Lin Tsai, Li-Woei Chen, Fang-Yie Leu, Hsiung-Chieh Hsu, and Tz-Yuan Huang
−   Distributed trust and reputation services in pervasive Internet-of-Things deployments
    Borja Bordel Sánchez and Ramón Alcarria
−   A Secure Dispersed Computing Scheme for Internet of Mobile Things
    Yan Zhao, Jincai Zou, Yuqiang Zhang, and Ning Hu
−   A Credible Information Fusion Method Based on Cascaded Topology Interactive Traceability
    Yueqing Gao, Yuting Shen, Huachun Zhou, Benhui Shi, Lulu Chen, and Chu Du

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12:30 ~ 13:30   Lunch

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13:30 ~ 14:00   Opening Ceremony
Chair: Prof. Ki-Woong Park (Sejong University, South Korea)

−   Opening Remark and Welcome Message
    Prof. Okyeon Yi (Kookmin University, South Korea)
−   Program Report
    Prof. Hwankuk Kim (Sangmyung University, South Korea)
−   MobiSec 2021 Awards

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14:00 ~ 15:00   Invited Talk 1
Session Chair: Prof. Huisu Jang (Soongsil University, South Korea)
−   Introduction to Network Equipment Security Assurance Scheme (NESAS)
    CSO Joonho Lee (Huawei Korea, Korea)

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15:00 ~ 15:30   Break

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15:30 ~ 17:00   - Session3A: Cryptography and Network Security 1 (Online Session)
Session Chair: Prof. Taek-Young Youn (Dankook University, South Korea)

−   Secure Data Encryption Technique for Cloud-based Collaboration supporting Dynamic Data Update
    Taek-Young Youn and Nam-Su Jho
−   ASD: OpenWrt-based ARP Spoofing Detector
    Yeon Seon Jeong, Hyung Hoon Kim, Hyojin Jo and Dong Hoon Lee
−   *Theoretical Analysis of Biases in Chacha 128-bits
    Karthika Sk and Kunwar Singh
−   *Research On Health Security Association Model Based On Mobile Communication Location
    Tao Haoran, Ding Ning, Huang Tianhui, Liu Jingyuan, Luo Rui, Qian Dongsheng and Ma Yuyin

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15:30 ~ 17:00   - Session3B: Posters Session (Online Session)
Session Chair: Prof. Haehyun Cho (Soongsil University, South Korea)
NOTE: In this session, all the posters will be broadcast via their pre-recorded video file.

−   POSTER: Feature Reduction in Machine Learning for Application-based Examples
    Long Nguyen-Vu and Souhwan Jung
−   POSTER: A Study on Voice-based Authentication via Speaker-Recognition and the Risk of Speech Synthesis

Hyeon Park and Taeguen Kim
- POSTER: A Benchmark for Image Encryption Scheme with Statistical Effective Range
  Sung-Won Kang and Kyung-Hyune Rhee
- POSTER: Performance comparison of GNSS navigation message authentication protocols
  Turabek Gaybullaev, Da-Yeon Jeon and Mun-Kyu Lee
- POSTER: Decentralized Fair Data Trading Model
  Kang Woo Cho, Mi Hyeon Jeon and Sang Uk Shin
- POSTER: Development of Total Security Platform To Protect Autonomous Car and Intelligent Traffic System Under 5G Environment
  Keon Yun, Wonhaeng Lee, Myungwoo Chung, Jinhyeok Oh, Hyunjun Shin and Kwonkoo Kwak
- POSTER: A study on user recognition based on dilated convolution usingbiosignals for wearable device application
  Min-Gu Kim and Sung Bum Pan
- POSTER: A study on face recognition based on deep learning using HOG features
  Cheol-Ho Song, Min-Gu Kim and Sung-Bum Pan
- POSTER: Toward Hourglass-Concepted Memory Data Leakage protection with Capacitor-Based Timer
  Sung-Kyu Ahn and Ki-Woong Park
- POSTER: Evaluating the robustness of blockchain network topology against blockchain network attacks
  Huisu Jang, Kang-Ju Lee and Woong Kook
- POSTER: Deobfuscating Obfuscated Code for Detecting Sensitive Data Flows in Mobile Malware
  Dongho Lee, Haehyun Cho and Jeong Hyun Yi
- POSTER: A Study on Deep Learning-based Approaches for Code Similarity Detection
  Younghoon Ban, Haehyun Cho and Jeong Hyun Yi
- POSTER: Specification-based misbehavior detection and Deep learning (DL)-based anomaly detection system to enhance Insulin Pump security
  Philip Virgil Astillo, Yonas Engida Gebremariam, Daniel Gerbi Duguma, Bonam Kim and Ilsun You
- POSTER: Secure and Efficient JWT Token Authentication for Light OAuth 2.0 Implementation
  Sung-Hyun Kim, Su-Yoon Jang and Taek-Young Youn
- POSTER: Instruction-level Disassembler Based on Power Consumption Leakage of IoT devices
  Daehyeon Bae, Jaewook Lee and Jaecheol Ha

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17:00 ~ 18:00   -   Offline Poster Session (Offline Session)
Session Chair: Prof. Haehyun Cho (Soongsil University, South Korea)

NOTE: In this session, all the posters will be exhibited at the venue.

October 8th Friday, 2021

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09:00 ~ 10:30   - Session4A: Digital Forensic (Offline Session)
Session Chair: Prof. Bonam Kim (Soonchunhyang University, South Korea)

- Forensic Analysis of Apple Carplay: A case study
  Junsu Lee, Juwon Kim, Hojun Seong, Keonyong Lee, Seongje Cho, Younjae Park, and Minkyu Park
- Fingerprint Defender: Defense against browser based user tracking
  Deepali Moad, Vikas Sihag, Gaurav Choudhary, Daniel Gerbi Duguma, and Ilsun You
- *Detection of Business Email Compromise Attacks with Writing Style Analysis
  Alisa Vorobeva, Guldar Khisaeva, Danil Zakoldaev, and Igor Kotenko
- *Forensic analysis of Fitness Applications on Android
  Rahul Sinha, Vikas Sihag, Gaurav Choudhary, Manu Vardhan, and Pradeep Singh

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09:00 ~ 10:30   - Session4B: 5G Virtual Infra. & Services Security 2 (Online Session)
Session Chair: Dr. Philip Virgil Astillo (University of San Carlos, Philippines)

- GreenSlice: An Energy-Efficient Secure Network Slicing Framework
  Ozan Akin, Umut Can Gülmez, Ozan Sazak, Osman Ufuk Yagmur, and Pelin Angin
- A Blockchain-based User Identity Authentication Method for 5G
  Zhe Tu, Huachun Zhou, Kun Li, Haoxiang Song, and Weilin Wang
- Cyber-Attack Behavior Knowledge Graph Based on CAPEC and CWE towards 6G
  Weilin Wang, Huachun Zhou, Kun Li, Zhe Tu, and Feiyang Liu
- The Security Mechanisms between two UPFs Belonging to two 5G Core Networks
  Fang-Yie Leu, Yu-Syuan Lu, and Heru Susanto

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10:30 ~ 11:00   Break

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11:00 ~ 12:30   - Session5A: Malware Analysis (Offline Session)
Session Chair: Prof. Taek-Young Youn (Dankook University, South Korea)

- Measuring Anti-analysis Techniques in Malware
  Minho Kim, Haehyun Cho, and Jeong Hyun Yi
- Android Adware Detection using Soot and CFG
  Jungsoo Park, Hyunseok Shim, Long Nguyen Vu, and Souhwan Jung
- A Systematic Literature Review on the Mobile Malware Detection Methods
  Kim Yu-Kyung, Jemin Lee, Myong-Hyun Go, Hae Young Kang, and Kyungho Lee
- *Effectiveness of Video-Classification in Android malware detection through API-Streams and CNN-LSTM Autoencoders
  Gianni D'Angelo, Francesco Palmieri, and Antonio Robustelli

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11:00 ~ 12:30   - Session5B: Cryptography and Network Security 2 (Online Session)
Session Chair: Dr. Gaurav Choudhary (Denmark Technological University, Denmark)

- Which One is More Robust to Low-rate DDoS Attacks? The Multipath TCP or The SCTP
  Lejun Ji, Gang Lei, Ruiwen Ji, Yuanlong Cao, Xun Shao, and Xin Huang
- A DDoS Detection Method with Feature Set Dimension Reduction
  Man Li, Yajuan Qin and Huachun Zhou
- Malicious Behavior Feature Graph for Knowledge Reasoning of DDoS Attacks in 6G
  Kun Li, Huachun Zhou, Zhe Tu, Feiyang Liu, and Lijuan Li
- An Anonymous Communication System Based on Software Defined Architecture
  Xinda Cheng, Yixing Chen, Jincai Zou, Yuqiang Zhang, and Ning Hu

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12:30 ~ 13:30   Lunch

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13:30 ~ 15:00 - Session6:   AI & Cloud Security (Offline Session)
Session Chair: Dr. Sandi Rahmadika (Wonkwang University, South Korea)

- Temporal Patterns Discovery of Evolving Graphs for Graph Neural Network (GNN)-based Anomaly Detection in Heterogenous Networks
  Jongmo Kim, Kunyoung Kim, Gi-yoon Jeon, and Mye Sohn
- Anomaly Detection Methods Using Power Plant Packet Data with Machine Learning in IoT Environment

Junwon Kim, Hyunpyo Choi, Jiho Shin, and Jung Taek Seo
- DAVS: Dockerfile Analysis for Vulnerable Scanning
  Thien-Phuc Doan and Souhwan Jung
- *A Novel Rescaled and Reformulated Convolution Network for Semantic Segmentation
  Sai Prabanjan Kumar Kalvapalli, C. Mala, and V. Punitha

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15:00 ~ 15:30 **Break**

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15:30 ~ 16:30 - Invited Talk 2
Session Chair: Prof. Hwankuk Kim (Sangmyung University, South Korea)

- Cybersecurity for 5G-Powered Vehicles
  CSO Jaeson Yoo (Autocrypt Co. Ltd., South Korea)

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16:30 ~ 17:00 **Break**

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17:00 ~ 18:00 - Invited Talk 3
Session Chair: Prof. Mun-Kyu Lee (Inha University, South Korea)

- Introduction AI technologies and advanced security for connected devices in next generation networks
  Prof. Antonio Skarmeta (University of Murcia, Spain)

October 9th Saturday, 2021

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9:00 ~ 10:10 - Session7: Best Papers (Offline Session)
Session Chair: Prof. Ilsun You (Soonchunhyang University, South Korea)

- *Trojan Attacks and Defense for Speech Recognition
  Wei Zong, Yang-Wai Chow, Willy Susilo, and Jongkil Kim
- *Research and Implementation of Speed and Distance Measurement Technology in Train Safety Control System
  Yutong Liu, Fei Song, Xiuling Wang, and Letian Li

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10:10 ~ 10:30 **Break**
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10:30 ~ 11:30 - Invited Talk 4
Session Chair: Prof. Haehyun Cho (Soongsil University, South Korea)

- Networking Cognitive Security
  Dr. Gianni D'Angelo (University of Salerno, Italy)
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11:30 ~ 12:00 **Closing Ceremony**

Chair: Prof. Taek-Young Youn (Dankook University, South Korea)