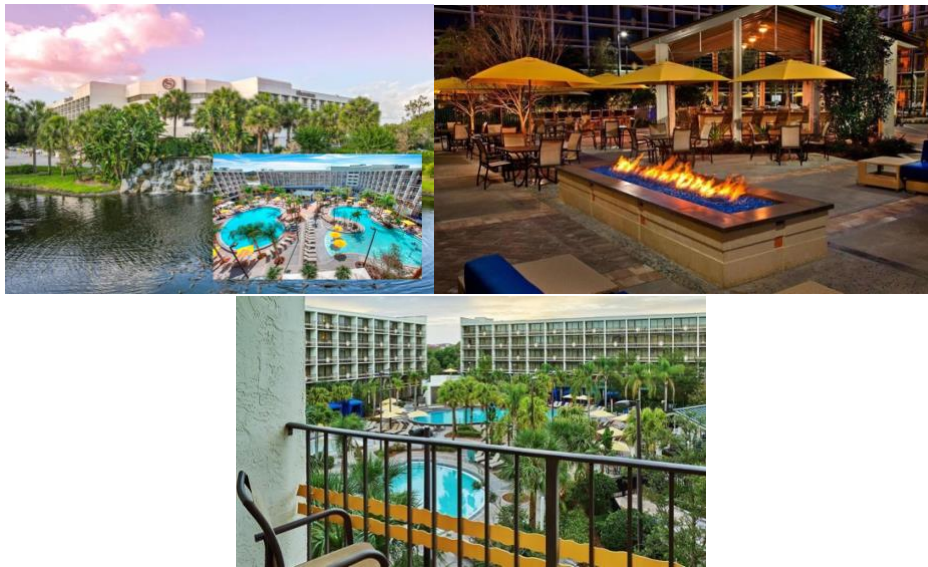


## Final Program



# The 21st IEEE/ACIS International Conference on Software Engineering Research, Management and Applications (SERA 2023)



**May 23-25, 2023, Orlando, Florida, U.S.A.**  
**Sheraton Orlando Lake Buena Vista Resort**  
<https://acisinternational.org/conferences/sera-2023/>

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## Program at a Glance

**Venue: Sheraton Orlando Lake Buena Vista Resort**

**Day 1 - Tuesday, May 23, 2023**

Time (EST)	Activity	Concurrent Sessions	
		Room 1	Room 2
8:00 – 10:30 AM	Registration		
8:20 - 8:40 AM	Opening Ceremony	Plenary Session (Auditorium)	
8:40 – 9:40 AM	Keynote – Dr. Wuwei Shen		
9:40 – 10:00 AM	Coffee Break		
10:00AM – 12:00 PM	Sessions	A1: Special Session: Metaverse and Digital Twins	B1: Artificial Intelligence I
12:00 – 1:40 PM	Luncheon (on your own)		
1:40 – 3:40 PM	Sessions	A2: Software	B2: Network and System
3:40 - 4:00 PM	Coffee Break		
4:00 – 6:00 PM	Sessions	A3: Modeling and Analysis	B3: IoT, Automotive, Cyber Physical Systems
6:20 - 8:00 PM	Dinner Banquet (provided by conference)		

**Day 2 - Wednesday, May 24, 2023**

<b>Time (EST)</b>	<b>Activity</b>	<b>Concurrent Sessions</b>	
		<b>Room 1</b>	<b>Room 2</b>
8:00 – 10:00 AM	Sessions	A4: Code Analysis	B4: Artificial Intelligence II
10:00 – 10:20 AM	Coffee Break		
10:20 AM – 12:00 PM	Sessions	A5: Performance	B5: Artificial Intelligence III
12:00 – 1:00 PM	Luncheon (provided by conference)		
1:20 – 3:00 PM	Sessions	A6: Bugs and Testing	B6: Special Session: Software Engineering for AI and Blockchain
3:00 - 3:20 PM	Coffee Break		
3:20 – 5:40 PM	Sessions	A7: Potpourri	B7: Special Session: Software Engineering for AI and Blockchain

**Day 3 - Thursday, May 25, 2023**

<b>Time (EST)</b>	<b>Activity</b>	<b>Concurrent Sessions</b>	
		<b>Room 1</b>	<b>Room 2</b>
8:00 – 10:00 AM	Sessions	A8: Security	B8: Special Session: Theory and Application for Advanced Software System
10:00 – 10:20 AM	Coffee Break		
10:20 AM – 12:40 PM	Sessions	A9: Special Session: Cybersecurity	B9-1: Special Session: Theory and Application for Advanced Software System B9-2: Special Session: Information Technology for Social and Business Fields
12:40 – 12:45 PM	Closing Remark		
1:00 - 5:00 PM	Conference Organization Committee Meeting (This event is only for conference organizers)		

## Keynote

### Support of Assurance-based Software Development for Cyber-Physical Systems

Dr. Wuwei Shen

Email: [wuwei.shen@wmich.edu](mailto:wuwei.shen@wmich.edu)

Professor, Western Michigan University, USA

#### Abstract

Cyber-Physical systems (CPSs) become more important in our daily life. Failure of CPSs can have some serious consequences such as loss of human life. To ensure the trustworthiness of a CPS, an assurance case has been proposed as a communication means between different stakeholders such as developers and certifiers. In this talk, we will introduce a novel framework that supports the integration of an assurance case into software development lifecycle by means of the Model-Driven Architecture. The framework not only provides an automatic mechanism to generate an assurance case in the Goal Structural Notation (GSN) but also supports the evaluation mechanism using the Dempster-Shafer (D-S) theory. The framework dramatically reduces the burden of the developers and certifiers when developing a CPS.

#### Biography

Wuwei Shen received his PhD from the Univ. of Michigan in computer science. He has been working on various techniques such as the Model-Driven Engineering (MDE) to increase automation in software development, implementation, and validation in various application domains. Dr Shen received the Senior Research Award from the National Research Council (NRC) Associateship Programs, the National Academies of Sciences, Engineering, and Medicine in 2017. He also received several fellowships from the Visiting Faculty Research Program (VFRP), the Air Force Research Laboratory's Information Directorate (AFRL/RI) from 2015 to 2018.

# Program in Detail

Day 1 - Tuesday, May 23, 2023

<b>8:00 – 10:30 AM – Registration</b>	<b>Foyer</b>
<b>8:20 – 8:40 AM – Opening Ceremony</b>	<b>Auditorium</b>
<b>8:40 – 9:40 AM – Keynote – Dr. Wuwei Shen</b>	<b>Auditorium</b>
<b>9:40 – 10:00 AM – Coffee Break</b>	<b>Foyer</b>
<b>10:00 AM – 12:00 PM -- Special Session A1: Metaverse and Digital Twins</b> <b>Chair: Dr. Yongik Yoon (Sookmyung Women’s University)</b>	<b>Room 1</b>
The Strategy of Digital Twin Convergence Service based on Metaverse <i>JiEun Kang, Subi Kim and Yongik Yoon</i>	
SDCG: Silhouette-based Deep Clustering with GNN for Improved Graph Node Clustering <i>Hyesoo Shin, Eunjo Jang, SoJung Kim and Ki Yong Lee</i>	
TI-former: A Time-Interval Prediction Transformer for Timestamped Sequences <i>Hyewon Ryu, Sara Yu and Kiyong Lee</i>	
Anomalous Node Detection in a Graph Considering Text Features <i>Yeonju Song and Kiyong Lee</i>	
Cloud-based Digital Twins Storage in Emergency Healthcare <i>Erdan Wang, Pouria Tayebi and Yeong-Tae Song</i>	
<b>10:00 AM – 12:00 PM -- Session B1: Artificial Intelligence I</b> <b>Chair: Stavros Kalafatis (Texas A&amp;M) – Remote hosting</b>	<b>Room 2</b>
A Data Mining Approach to Construct Classification Model for Predicting Tourism Graduates Employability <i>Anna Sheila Crisostomo, Riah Encarnacion and Shakir Al Balushi</i> (Virtual presentation)	
Towards Imbalanced Large Scale Multi-label Classification with Partially Annotated Labels <i>Xin Zhang, Yuqi Song, Fei Zuo, Zheqing Zhou and Xiaofeng Wang</i>	
Robust Federated Learning: A Heterogeneity Index Based Clustering Approach <i>Papa Pene, Pu Tian, Weixian Liao, Qianlong Wang and Wei Yu</i>	
Digital Twins of Smart Campus: Performance Evaluation Using Machine Learning Analysis <i>Adamu Hussaini, Cheng Qian, Yifan Guo, Chao Lu and Wei Yu</i>	
A Bottom-Up Generic Probabilistic Building and Enriching approach for knowledge graph using the LDA-based clustering method <i>Amani Mechergui, Sami Zghal and Wahiba Ben Abdessalem Karaa</i>	

**12:00 – 1:40 PM – Luncheon (on your own)**

**1:40 – 3:40 PM -- Session A2: Software**  
**Chair: Xiaopeng Li (Microsoft)**

**Room 1**

Analysis of Software Engineering Practices in General Software and Machine Learning Startups  
*Bishal Lakha, Kalyan Bhetwal and Nasir Eisty*  
(Virtual presentation)

Analyzing the Effects of CI/CD on Open Source Repositories in GitHub and GitLab  
*Jeffrey Fairbanks, Akshharaa Tharigonda and Nasir Eisty*  
(Virtual presentation)

Domain-specific Modeling Environment Construction Tool based on View Patterns: RapidDSM  
*Masumi Kawakami and Fuyuki Ishikawa*

Evaluating Code Metrics in GitHub Repositories Related to Fake News and Misinformation  
*Jason Duran, Mostofa Najmus Sakib, Nasir Eisty and Francesca Spezzano*

Documentation Practices in Agile Software Development: A Systematic Literature Review  
*Md Athikul Islam, Rizbanul Hasan and Nasir Eisty*  
(Virtual presentation)

**1:40 – 3:40 PM -- Session B2: Network and System**  
**Chair: Chao Lu (Towson University)**

**Room 2**

Balance-aware Cost-efficient Routing in the Payment Channel Network  
*Suhan Jiang, Jie Wu, Fei Zuo, and Alessandro Mei*

A Dynamic Wireless Sensor Network Deployment Algorithm for Emergency Communications  
*Kubra Gundogan, Nuri Alperen Kose, Khushi Gupta, Damilola Oladimeji and Fan Liang*

Obsolescence in Operating Systems and Microprocessors  
*Dheeraj Narahariseti, Ramesh Karne, Joel Weymouth and Alexander Wijesinha*

A Blockchain-Based Verification Process for Smart Cities  
*Raad Haddad, Dhiah El Diehn I. Abou-Tair and Ala Khalifeh*

Reinforcement of collaborative work in the metaverse through playful activities  
*Nicia Guillén Yparrea and Felipe Hernández-Rodríguez*

**3:40 – 4:00 PM – Coffee Break**

**Foyer**



**4:00 – 6:00 PM -- Session A3: Modeling and Analysis**  
**Chair: Junghwan Rhee (University of Central Oklahoma)**

**Room 1**

Generating Timed Scenarios from Behaviours  
*David Katz and Neda Saeedloei*

Using Effective Dummy Locations and Routes to Conceal User Locations  
*Sanjaikanth E Vadakkethil Somanathan Pillai and Wen-Chen Hu*

Data-Driven Smart Manufacturing Technologies for Prop Shop Systems  
*Zhicheng Xu, Weinan Gao, Zhicun Chen, Rami Haddad, Scot Hudson, Ezebuugo Nwaonumah, Frank Zahiri and Jeremy Johnson*

Multi-objective particle swarm optimization approach for population classification in emergency management  
*Bethsy Guerrero Granados, María Valle Rada, Mauricio Restrepo, Christian G. Quintero M., César Viloría Núñez, Miguel Jimeno and Jairo Alberto Cardona*

Misinformation Detection Using an Ensemble Method with Emphasis on Sentiment and Emotional Analyses  
*Sanjaikanth E Vadakkethil Somanathan Pillai and Wen-Chen Hu*

**4:00 – 6:00 PM -- Session B3: IoT, Automotive, Cyber Physical Systems**  
**Chair: Lin Deng (Towson University)**

**Room 2**

Nighttime Vehicle Classification based on Thermal Images  
*Xianshan Qu, Nathan Huynh, Robert Mullen and John Rose*

Programming Model for Information Sharing among IoT Devices: Software Engineering Perspective  
*Samuel Cho and Myoungkyu Song*  
(Video presentation)

Named Data Networking (NDN) for Data Collection of Digital Twins-based IoT Systems  
*Hengshuo Liang, Cheng Qian, Chao Lu, Lauren Burgess, John Mulo and Wei Yu*

An Assurance Case Driven Development Paradigm for Autonomous Vehicles: An F1Tenth Racing Car Case Study  
*Ioannis Nearchou, Lance Rafalko, Ryan Phillips, Matthew Anderson, Wuwei Shen and Steven Drager*

Towards an Adversarial Machine Learning Framework in Cyber-Physical Systems  
*John Mulo, Pu Tian, Adamu Hussaini, Hengshuo Liang and Wei Yu*

**6:20 – 8:00 PM – Dinner Banquet (provided by conference)**

**TBD**

**Day 2 - Wednesday, May 24, 2023**

**8:00 – 10:00 AM -- Session A4: Code Analysis**

**Room 1**

**Chair: Masato Oguchi (Ochanomizu University, Japan)**

Applications of Causality and Causal Inference in Software Engineering

*Patrick Chadbourne and Nasir Eisty*

Automating code assessment based on PowerShell for programming courses

*Fei Zuo, Junghwan Rhee, Myung-Ah Park, and Gang Qian*

TIPICAL - Type Inference for Python In Critical Accuracy Level

*Jonathan Elkobi, Bernd Gruner and Clemens-Alexander Brust*

Consideration of Semantics between Q&A Statements to Obtain Factor Score

*Yuya Yokoyama*

**8:00 – 10:00 AM -- Session B4: Artificial Intelligence II**

**Room 2**

**Chair: Xianshan Qu (Microsoft)**

LSTM-AE for Anomaly Detection on Multivariate Telemetry Data

*Anes Abdennebi, Alp Tunçay, Cemal Yilmaz, Anil Koyuncu and Oktay Gungor*  
(Virtual presentation)

Fake News Detection Using Machine Learning Techniques

*Achhiya Sultana, Mahmudul Islam, Mahady Hasan and Farruk Ahmed*  
(Virtual presentation)

Deep Learning Model to Improve the Stability of damage Identification via Output-only Signal

*Jongyeop Kim, Jinki Kim, Matthew Sand and Seongsoo Kim*

Anomaly Detection in Intrusion Detection System using Amazon SageMaker

*Ian Trawinski, Hayden Wimmer and Jongyeop Kim*

A Comparative Study of Deep Learning Models for Hyper Parameter Classification on the UNSW-NB15

*Seongsoo Kim, Lei Chen, Jongyeop Kim, Yiming Ji and Rami Haddad*

**10:00 – 10:20 AM – Coffee Break**

**Foyer**

**10:20 AM – 12:00 PM -- Session A5: Performance**  
**Chair: Yuseok Jeon (UNIST)**

**Room 1**

Evaluation of Improvement Plans to Increase the Efficiency of Performance Data Collection/Transfer for Server Systems

*Chika Iiyama, Akira Hirai, Mari Yamaoka, Naoto Fukumoto and Masato Oguchi*

Evaluating the Performance of Containerized Webservers against web servers on Virtual Machines using Bombardment and Siege

*Daniel Ukene, Hayden Wimmer and Jongyeop Kim*

Time-Series Trend-Based Multi-Level Adaptive Execution Tracing for Performance Analysis

*Mohammed Adib Khan and Naser Ezzati-Jivan*

Analysis of Programming Performance Based on 2-grams of Keystrokes and Mouse Operations

*Kazuki Matsumoto, Kinari Nishiura, Mariko Sasakura and Akito Monden*

**10:20 AM – 12:00 PM -- Session B5: Artificial Intelligence III**

**Room 2**

**Chair: Xiaopeng Li (Microsoft)**

Texture and Orientation-based Feature Extraction for Robust Facial Expression Recognition

*Sajid Ali Khan, Mohammed Bin Abdulrahman Alawairdhi and Mousa Al-Akhras*

*(Virtual presentation)*

Split and Federated Learning with Mobility in Vehicular Edge Computing

*Sungwon Moon and Yujin Lim*

Classification of Multilingual Medical Documents using Deep Learning

*Ben Abdessalem Wahiba Wahiba and Dridi Kawther*

Phishy? Detecting Phishing Emails Using ML and NLP

*Md Fazle Rabbi, Arifa Champa and Minhaz Zibran*

**12:00 – 1:00 PM – Luncheon (provided by conference)**

**TBD**

**1:20 PM – 3:00 PM -- Session A6: Bugs and Testing**  
**Chair: Jim Alves-Foss (University of Idaho)**

**Room 1**

Determining the Most Significant Metadata Features to Indicate Defective Software Commits  
*Rupam Kumar Dey, Anahita Khojandi and Kalyan Perumalla*

A Library-Based Approach for Writing Design Assertions  
*Yoonsik Cheon, Ricardo Lozano and Rajasoundarya Senthil Prabhu*

A Test Suite Minimization Technique for Testing Numerical Programs  
*Prashanta Saha, Clemente Izurieta and Upulee Kanewala*

A Systematic Literature Review on Test Case Prioritization and Regression Test Selection  
*Zhengxinchao Xiao and Lei Xiao*

**1:20 PM – 3:00 PM – Special Session B6:**  
**Special Session B6: Software Engineering for AI and Blockchain**  
**Chair: Simon Xu (Algonia University)**

**Room 2**

Research on the Ranking of Social Q&A Community Answer Quality Based on Entropy Weight Method and AHP Weight  
*Chenqing Tsai, Chenyu Zhou, Kai Song*

DeepFake Detection Using Graph Representation with Multi-dimensional Feature  
*Jia Chen, Weiguo Lin, Junfeng Xu*

Design and Implementation of Scientific Research Achievement Transformation System  
*Jinbao Song, Jiahui Cai, Ran Li, Yanan Li*

Research and Application of Content-based Image Hash Retrieval Algorithm  
*Xinquan Luo, Xingyu Tan*

**3:00 – 3:20 PM – Coffee Break**

**Foyer**

**3:20 PM – 5:40 PM -- Session A7: Potpourri**  
**Chair: Yuseok Jeon (UNIST)**

**Room 1**

Increase Patients' Survivability During Emergency Care using Blockchain-based Digital Twin Technology

*Shirin Hasavari, Yeong-Tae Song and Benjamin Lawner*

Integrated Framework for Efficient Educational Software Development

*Bassey Isong, Alain Mbiada and Francis Lugayizi*

A Learning Enhancement System for Learner's Community

*Yuta Ishii, Ayako Sugiyama, Kosuke Fukushima, Ryotaro Okada and Takafumi Nakanishi*

Enhancing Students' Job Seeking Process Through A Digital Badging System

*Hamdan Alabsi, Majed Almotairi, Yahya Alqahtani and Mohammed Alyami*

Another Software for Designing Electric Transformers

*Jangwu Jo, Junhyun Park, Ayoung Jang, Youngsu Chon and Byeongdo Kang*  
(Virtual presentation)

Agile User-Centered Design Framework to Support the Development of E-Health for Patient Education

*Ira Puspitasari*

(Virtual presentation)

**3:20 PM – 5:40 PM –**

**Special Session B7: Software Engineering for AI and Blockchain**

**Room 2**

**Chair: Simon Xu (Algoma University)**

Cona: A Novel Context-aware Knowledge Graph Completion Method

*Zechen Jia, Jiangtao Ma*

Construction of Systematic Financial Risk Index System and Policy Suggestions in China

*Yongguang Fu, Yuping Li*

Construction and Application of Knowledge Graph for Food Therapy

*Qianzhong Chen, Xianghao Meng*

Rule-Based Representation Learning for Traditional Chinese Medicine Knowledge Graph

*Dongsheng Shi, Feng Lin*

Experimental Evaluation of Adversarial Attacks Against Natural Language Machine Learning Models

*Jonathan Li, Steven Pugh, Honghe Zhou, Lin Deng, Josh Dehlinger and Suranjan Chakraborty,*  
(Special Session: Security Paper)

**Day 3 - Thursday, May 25, 2023**

**8:00 AM – 10:00 AM -- Session A8: Security**

**Room 1**

**Chair: Fei Zuo (University of Central Oklahoma)**

Detection of Anomalies in the HDFS Dataset

*Marwa Chnib and Wafa Gabsi*

Calibrating Cybersecurity Experiments: Evaluating Coverage Analysis for Fuzzing Benchmarks

*Jim Alves-Foss, Aditi Pokharel, Shigdel Ronisha and Jia Song*

Identifying Code Tampering Using A Bytecode Comparison Analysis Tool

*Young Lee, Arlen McDonald and Jeong Yang*

*(Virtual presentation)*

Are We Aware? An Empirical Study on the Privacy and Security Awareness of Smartphone Sensors

*Arifa Islam Champa, Md Fazle Rabbi, Farjana Eishita and Minhaz Zibran*

3 B (Block Byte Bit) Cipher Algorithm for Secure Socket Layer

*Yong Pil Geum*

**8:00 AM – 10:00 AM –**

**Special Session B8: Theory and Application for Advanced Software System**

**Room 2**

**Chair: Junghwan Rhee (University of Central Oklahoma)**

Detection of a Novel Object-Detection-Based Cheat Tool for First-Person Shooter Games Using Machine Learning

*Zhang Xiao, Takaaki Goto, Partha Ghosh, Tadaaki Kirishima, Kensei Tsuchida*

*(Virtual presentation)*

Novel Music Genre Classification System using Transfer Learning on a Small Dataset

*Yi Wang, Takaaki Goto, Tadaaki Kirishima, Kensei Tsuchida*

*(Virtual presentation)*

Improve Accuracy of PC Skill Assessment using PC Operation Log Data

*Haotian Yan, Tadaaki Kirishima, Takaaki Goto, and Kensei Tsuchida*

*(Virtual presentation)*

Customer Segmentation using Credit Card Data Analysis

*Saikat Raj, Surajit Jana, Soumyadip Roy, Santanu Roy, Takaaki Goto and Soumya Sen*

*(Virtual presentation)*

Scientific Organization of Blood Donation Camp Through Lexicographic Optimization and Taxicab Path Computation

*Partha Ghosh, Takaaki Goto, Leena Jana Ghosh and Soumya Sen*

*(Virtual presentation)*

**10:20 AM – 12:40 PM – Special Session A9: Cybersecurity**  
**Chair: Dr. Fei Zuo (University of Central Oklahoma)**

**Room 1**

A Statistical Method for API Usage Learning and API Misuse Violation Finding  
*Deepak Panda, Piyush Basia, Kushal Nalavolu, Xin Zhong, Harvey Siy and Myoungkyu Song*  
(Virtual presentation)

Commit Message Can Help: Security Patch Detection in Open Source Software via Transformer  
*Fei Zuo, Xin Zhang, Yuqi Song, Junghwan Rhee and Jicheng Fu*

On Effectiveness of GAN-Based Denoising Techniques for Adversarial Face Images  
*Turhan Kimbrough, Pu Tian, Weixian Liao and Wei Yu*

ProvSec: Provenance Tracking Cybersecurity Benchmark Dataset  
*Madhukar Shrestha, Yonghyun Kim, Jeehyun Oh, Junghwan Rhee, Yung Ryn Choe, Fei Zuo, Myung-Ah Park and Gang Qian*

RUST Unsafe Region Targets Directed Greybox Fuzzing (Poster)  
*Donhyeon Yu and Yuseok Jeon*

Membership Inference Attack with a Distance-based Contrastive Approach (Poster)  
*Nozima Murodova and Hyungjoon Koo*

**10:20 AM – 12:40 PM – Special Session B9-1:  
Theory and Application for Advanced Software System  
Chair: Dr. Yeong-Tae Song (Towson University)**

**Room 2**

Orchestrating Apache NiFi/MiNiFi within a Spatial Data Pipeline

*Chase Carthen, Araam Zaremehrdi, Vinh Le, Alireza Tavakkol, Frederick C. Harris Jr., Sergiu Dascalu, Carlos Cardillo, Scotty Strachan*  
(Virtual presentation)

Measuring the Effects of Signal-To-Noise in EEG Emotion Recognition

*Zachary Estreito, Vinh Le, Frederick C. Harris Jr., Sergiu Dascalu*  
(Virtual presentation)

Mobile Augmented Reality System for Emergency Response

*Sharad Sharma*

Realistic Predictors for Regression and Semantic Segmentation

*Krishna Chaitanya Gadepally, Sambandh Bhusan Dhal, Stavros Kalafatis and Kevin Nowka*  
(Session A4: Code Analysis), (Virtual presentation)

**10:20 AM – 12:40 PM –**

**Special Session B9-2: Information Technology for Social and Business Fields**

**Room 2**

**Chair: Dr. Motoi Iwashita (Chiba Institute of Technology, Japan) – Remote hosting**

Mobile User Analysis Considering Collaboration with Financial Services

*Ken Nishimatsu, Akiya Inoue*  
(Virtual presentation)

Study on Emissions of Environmental Impact in Chemical Industry

*Yohei Hara, Hiroyuki Ono*  
(Virtual presentation)

Operation Management Method of Software Defined Perimeter for Promoting Zero-Trust Model

*Shigeaki Tanimoto, Sogen Hori, Hiroyuki Sato and Atsushi Kanai*  
(Virtual presentation)

Develop a System to Analyze Logs of a Given System Using Machine Learning

*Md. Tarek Hasan and Mahady Hasan*  
(Session A7: Potpourri)

**12:40 – 12:45 PM – Closing Remark**