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/
Conference Organizing Committee Members

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Central Michigan University, U.S.A.

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Towson University

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University of Central Oklahoma
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Masato Oguchi 
Ochanomizu University
Amel Fraisse 
University of Lille, France
Myungkyu Song 
University of Nebraska Omaha
## Program at a Glance

### Venue: Sheraton Orlando Lake Buena Vista Resort

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

<table>
<thead>
<tr>
<th>Time (EST)</th>
<th>Activity</th>
<th>Concurrent Sessions</th>
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</thead>
<tbody>
<tr>
<td>8:30 – 8:50 AM</td>
<td>Registration</td>
<td>Room 1</td>
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<td>Room 2</td>
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<td>Room 3</td>
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<tr>
<td>8:50 - 9:10 AM</td>
<td>Opening remark by conference chair and program co-chairs</td>
<td>Plenary Session (Auditorium)</td>
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<tr>
<td>9:10 – 9:40 AM</td>
<td>Keynote – Dr. Wuwei Shun</td>
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<tr>
<td>9:40 - 10:00 AM</td>
<td>Coffee break</td>
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<tr>
<td>10 AM - 12 PM</td>
<td>Session 1</td>
<td>Special Session 1</td>
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<td></td>
<td></td>
<td>Artificial Intelligence 1</td>
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<td>Security</td>
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<tr>
<td>12:00 – 1:00 PM</td>
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<td>Lunch (Provided by Conference)</td>
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<tr>
<td>1:00 – 3:00 PM</td>
<td>Session 2</td>
<td>Special Session 5 and 3-1</td>
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<td>Artificial Intelligence 2</td>
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<td>Software</td>
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<td>3:00 – 3:20 PM</td>
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<td>Coffee break</td>
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<tr>
<td>3:20 - 5:20 PM</td>
<td>Session 3</td>
<td>Special Session 3-2</td>
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<td>Artificial Intelligence 3</td>
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<td>IoT</td>
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Day 2 - Wednesday, May 24, 2023

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<th>Time (EST)</th>
<th>Activity</th>
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<td>9:00 – 10:00 AM</td>
<td>Registration</td>
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<tr>
<td>9:20 - 9:40 AM</td>
<td>Coffee break</td>
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<tr>
<td>9:40 - 11:40 AM</td>
<td>Session 4</td>
<td>Special Session 2-1</td>
</tr>
<tr>
<td>11:40AM - 1:00 PM</td>
<td>Lunch on your own (Not provided by conference)</td>
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<tr>
<td>1:00 – 3:00 PM</td>
<td>Session 5</td>
<td>Special Session 2-2 and 4-1</td>
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<td>3:00 – 3:20 PM</td>
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<td>Coffee break</td>
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<tr>
<td>3:20–5:40 PM</td>
<td>Session 6</td>
<td>Special Session 4-2</td>
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<tr>
<td>6:00 PM -</td>
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<td>Banquet, awards, closing remark</td>
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Day 3 - Thursday, May 25, 2023

<table>
<thead>
<tr>
<th>Time (EST)</th>
<th>Activity</th>
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<tbody>
<tr>
<td>9:00 AM - 12 PM</td>
<td>Conference organization committee meeting</td>
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</table>

* This event is only for conference organizers.
Keynote
Support of Assurance-based Software Development for Cyber-Physical Systems

Dr. Wuwei Shun
Email: 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

Note:
- Regular paper authors will have 20 minutes presentation and 5 minutes Q&A.
- Poster authors will have 10 minutes presentation and 5 minutes Q&A.

Day 1 - Tuesday, May 23, 2023

Special Session 1
Chair: Dr. Yongik Yoon
Room 1

The Strategy of Digital Twin Convergence Service based on Metavers
JiEun Kang, Subi Kim and Yongik Yoon

SDCG: Silhouette-based Deep Clustering with GNN for Improved Graph Node Clustering
Hyesoo Shin, Eunjo Jang, SoJung Kim and Ki Yong Lee

TI-former: A Time-Interval Prediction Transformer for Timestamped Sequences
Hyewon Ryu, Sara Yu and Kiyong Lee

Anomalous Node Detection in a Graph Considering Text Features
Yeonju Song and Kiyong Lee

Cloud-based Digital Twins Storage in Emergency Healthcare
Erdan Wang, Pouria Tayebi and Yeong-Tae Song

Special Session 5
Chair: Dr. Motoi Iwashita
Room 1

Mobile user analysis considering collaboration with financial services
Ken Nishimatsu, Akiya Inoue

Study on Emissions of Environmental Impact in Chemical Industry
Yohei Hara, Hiroyuki Ono

Operation Management Method of Software Defined Perimeter for Promoting Zero-Trust Model
Shigeaki Tanimoto, Sogen Hori, Hiroyuki Sato and Atsushi Kanai
Special Session 3-1
Chair: Dr. Takaaki Goto
Room 1

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

Novel music genre classification system using transfer learning on a small dataset
Yi Wang, Takaaki Goto, Tadaaki Kirishima, Kensei Tsuchida

Special Session 3-2
Chair: Dr. Takaaki Goto
Room 1

Improve accuracy of PC skill assessment using PC operation log data
Haotian Yan, Tadaaki Kirishima, Takaaki Goto, and Kensei Tsuchida

Customer Segmentation using Credit Card Data Analysis
Saikat Raj, Surajit Jana, Soumyadip Roy, Santanu Roy, Takaaki Goto and Soumya Sen

Scientific Organization of Blood Donation Camp Through Lexicographic Optimization and Taxicab Path Computation
Partha Ghosh, Takaaki Goto, Leena Jana Ghosh and Soumya Sen

Orchestrating Apache NiFi/MiNiFi within a Spatial Data Pipeline
Chase Carthen, Araam Zaremehrjardi, Vinh Le, Alireza Tavakkol, Frederick C. Harris Jr., Sergiu Dascalu, Carlos Cardillo, Scotty Strachan

Measuring the Effects of Signal-To-Noise in EEG Emotion Recognition
Zachary Estreito, Vinh Le, Frederick C. Harris Jr., Sergiu Dascalu

Mobile Augmented Reality System for Emergency Response
Sharad Sharma
Session: AI and Machine Learning I
Chair: Room 2

A Data Mining Approach to Construct Classification Model for Predicting Tourism Graduates Employability
Anna Sheila Crisostomo, Riah Encarnacion and Shakir Al Balushi

Towards Imbalanced Large Scale Multi-label Classification with Partially Annotated Labels
Xin Zhang, Yuqi Song, Fei Zuo, Zheqing Zhou and Xiaofeng Wang

Robust Federated Learning: A Heterogeneity Index Based Clustering Approach
Papa Pene, Pu Tian, Weixian Liao, Qianlong Wang and Wei Yu

Digital Twins of Smart Campus: Performance Evaluation Using Machine Learning Analysis
Adamu Hussaini, Cheng Qian, Yifan Guo, Chao Lu and Wei Yu

A Bottom-Up Generic Probabilistic Building and Enriching approach for knowledge graph using the LDA-based clustering method
Amani Mechergui, Sami Zghal and Wahiba Ben Abdessalem Karaa

Session: AI and Machine Learning II
Chair: Room 2

LSTM-AE for Anomaly Detection on Multivariate Telemetry Data
Anes Abdennebi, Alp Tunçay, Cemal Yılmaz, Anıl Koyuncu and Oktay Gungor

Fake News Detection Using Machine Learning Techniques
Achhiya Sultana, Mahmudul Islam, Mahady Hasan and Farruk Ahmed

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
Session: AI and Machine Learning III
Chair: Room 2

Texture and Orientation-based Feature Extraction for Robust Facial Expression Recognition
Sajid Ali Khan, Mohammed Bin Abdulrahman Alawaidhi and Mousa Al-Akhras

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
Session: Security
Chair: Room 3

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

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

Session: Software
Chair: Room 3

Analysis of Software Engineering Practices in General Software and Machine Learning Startups
Bishal Lakha, Kalyan Bhetwal and Nasir Eisty

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

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
Session: IoT, Automotive, Cyber Physical Systems
Chair: Room 3

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

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
Day 2 - Wednesday, May 24, 2023

Special Session 2-1
Chair: Dr. Fei Zuo
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

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

Experimental Evaluation of Adversarial Attacks Against Natural Language Machine Learning Models
Jonathan Li, Steven Pugh, Honghe Zhou, Lin Deng, Josh Dehlinger and Suranjan Chakraborty,

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

Special Session 2-2
Chair: Dr. Fei Zuo
Room 1

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

Special Session 4-1
Chair: Simon Xu
Room 1

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

**Special Session 4-2**  
**Chair:** Simon Xu  
**Room 1**

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

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

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*

**Session: Bugs and Testing**  
**Chair:**  
**Room 2**

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*
Session : Modeling and Analysis
Chair: Room 3

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 Viloria Niñez 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*

Session : Code analysis
Chair: Room 2

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*

Realistic Predictors for Regression and Semantic Segmentation
*Krishna Chaithanya Gadeally, Sambandh Bhusan Dhal, Stavros Kalafatis and Kevin Nowka*

Consideration of Semantics between Q&A Statements to Obtain Factor Score
*Yuya Yokoyama*
Session: Network and System
Chair:
Room 3

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 Naraharisetti, 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

Session: Performance
Chair:
Room 2

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
Session : Potpourri
Chair: Room 3

Increase patients’ survivability During Emergency Care using blockchain-based Digital Twin Technology
Shirin Hasavari, Yeong-Tae Song and Benjamin Lawner

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

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