ISSRE2024

The 35th IEEE International Symposium on
Software **R**eliability **E**ngineering

Oct. 28-31, Tsukuba, Japan

IEEE COMPUTER SOCIETY

IEEE

IEEE Reliability Society

Contents

MESSAGE FROM THE GENERAL CHAIRS

On behalf of the Organizing Committee, we warmly welcome you to the 35th International Symposium on Software Reliability Engineering (ISSRE 2024). ISSRE has been the premier venue for exchanging ideas on software reliability engineering between leading experts from academia and industry. As the leading conference of software reliability engineering, ISSRE has become more international, diverse, and inclusive. It is our great honor to host the 35th edition of ISSRE at Tsukuba in Japan.

Tsukuba is the largest science city in Japan, located in southern Ibaraki Prefecture, involving 29 national, semi-national, and other research and educational institutions such as the University of Tsukuba. The conference will take place at the Tsukuba International Congress Center, which is situated at the center of Tsukuba City. Tsukuba is conveniently located approximately 50 kilometers from central Tokyo and is accessible by a rapid train about 45 minutes from Tokyo's Akihabara Station.

Creating ISSRE2024 would not have been possible without the contributions of well over 200 members of our technical community, including members of the steering committee, the organizing committee, the program committee of several tracks, and the organizers of co-located workshops. We are indebted to their efforts, expertise, and the unprecedented level of dedication that has become expected in our research community.

ISSRE2024 is supported by many technical, institutional, and corporate sponsors. IEEE Computer Society and Reliability Society are the conjoint technical sponsors. We would like to express gratitude to our corporate sponsors, Huawei, Money Forward, Nissho Electron, and GAIO TECHNOLOGY. We also would like to thank the financial support from the Association of Software Test Engineering (ASTER), Kayamori Foundation of Informational Science Advancement, Kajima Foundation, The Telecommunication Advancement Foundation, Tsukuba Tourism and Convention Association, and MICE Promotion Council of Ibaraki.

Finally, we would like to thank all the authors, presenters, and attendees for shaping the conference with valuable presentations and discussions. We do hope ISSRE2024 is a fruitful, enjoyable, and memorable event.

Fumio Machida
University of Tsukuba
General Chair

Kazuhiko Kato
University of Tsukuba
Honorary General Co-chair

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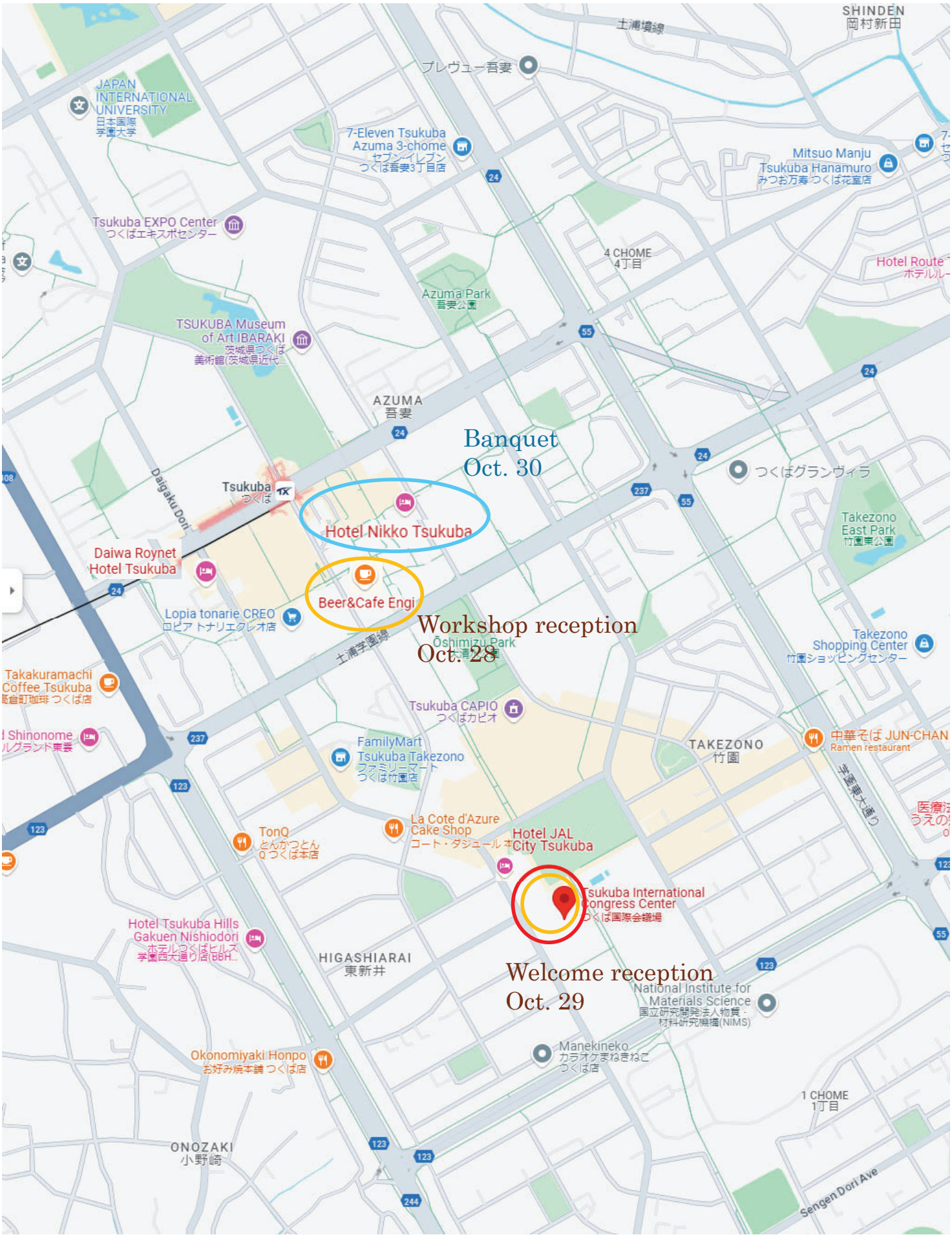
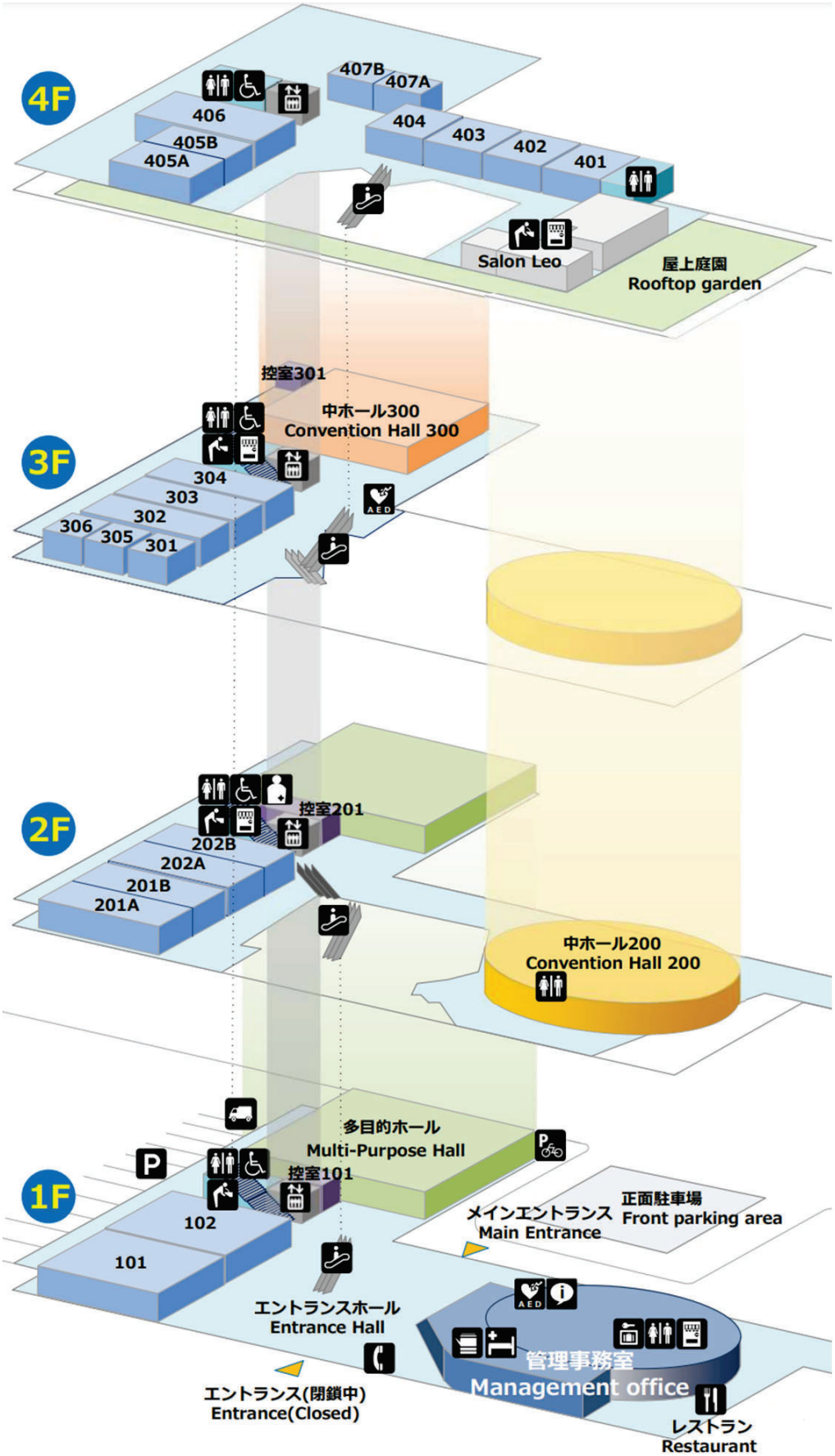
CITY MAP


Banquet
Oct. 30
Workshop reception
Oct. 28
Welcome reception
Oct. 29
Hotel Nikko Tsukuba
Beer&Cafe Engi
Hotel JAL City Tsukuba
Tsukuba International Congress Center
JAPAN INTERNATIONAL UNIVERSITY
Tsukuba EXPO Center
Azuma Park
TSUKUBA Museum of Art IBARAKI
AZUMA
Tsukuba
Daiwa Roynet Hotel Tsukuba
Lopia tonarie CREO
Takakuramachi Coffee Tsukuba
Tsukuba CAPIO
FamilyMart Tsukuba Takezono
TAKEZONO
La Cote d'Azure Cake Shop
TonQ
Hotel Tsukuba Hills Gakuen Nishiodori
HIGASHIARAI
Okonomiyaki Honpo
ONOZAKI
Manekineko
National Institute for Materials Science
Takezono East Park
Takezono Shopping Center
つくばグランヴィラ
Hotel Route
Mitsuo Manju Tsukuba Hanamuro
7-Eleven Tsukuba Azuma 3-chome
プレヴュー吾妻
SHINDEN
4 CHOME
1 CHOME
Daigaku Dori
Sengen Dori Ave

VENUE MAP



インフォメーション
Information

トイレ
Toilet

多目的トイレ
Multi-Purpose toilet

オストメイト対応トイレ
Ostomate toilet

救護室
First-aid room

エレベーター
Elevator

エスカレーター
Escalator

レストラン
Restaurant

喫煙所
Smoking area

給水所
Water service

駐車場
Parking area

駐輪場
Bicycle parking area

搬入口
Delivery entrance

コインロッカー
Coin locker

公衆電話
Telephone

FAX・コピー・プリンター(有料)
Facsimile & Copy & Printer(pay)

飲料自動販売機
Automatic vending machine(soft drinks)

AED(自動体外式除細動器)
Automated External Defibrillator

FULL PROGRAM

Day 1: Monday, October 28, 2024 (CO-LOCATED WORKSHOPS)							
Start	**End**	**Rm 201A**	**Rm 201B**	**Rm 202A**	**Rm 202B**	**Rm 303**	**Rm 304**
09:00	10:30	ReSAISE 2024	AISTA 2024	AI Pattern 2024	IWSF & SHIFT 2024	ASSURE 2024	WDMD 2024
10:30	11:00	**MORNING COFFEE BREAK**					
11:00	12:30	ReSAISE 2024		AI Pattern 2024	IWSF & SHIFT 2024	ASSURE 2024	WDMD 2024
12:30	14:00	**LUNCH**					
14:00	15:30	ReSAISE 2024	AISQ 2024	HFSD 2024	WoSAR 2024	ASSURE 2024	WDMD 2024
15:30	16:00	**AFTERNOON COFFEE BREAK**					
16:00	17:30	ReSAISE 2024	AISQ 2024	HFSD 2024	WoSAR 2024	ASSURE 2024	WDMD 2024
18:00		**RECEPTION**					

Day 2: Tuesday, October 29, 2024 (MAIN CONFERENCE)				
Start	**End**	**Convention Hall 200**	**Rm 201**	**Rm 202**
09:00	09:30	CONFERENCE WELCOME Opening Remarks and Keynote Speaker Introduction		
09:30	10:30	KEYNOTE TALK 1 **Quality Assurance of AI-based Systems** Hiroshi Maruyama		
10:30	11:00	**MORNING COFFEE BREAK**		
11:00	12:15	RESEARCH TRACK 1 **Best Research Paper Candidates**		
12:15	13:45	**LUNCH**		
13:45	15:25	SPECIAL SESSION 1 **Association of Software Test Engineering (ASTER)**	RESEARCH TRACK 2 **Anomaly Detection I**	RESEARCH TRACK 3 **Vulnerability Analysis and Detection**
15:30	16:00	**AFTERNOON COFFEE BREAK**		
16:00	17:40	FAST ABSTRACTS	RESEARCH TRACK 4 **Anomaly Detection II**	RESEARCH TRACK 5 **Security and Performance**
18:00		**RECEPTION** Poster presentations		

Day 3: Wednesday, October 30, 2024 (MAIN CONFERENCE)				
Start	**End**	**Convention Hall 200**	**Rm 201**	**Rm 202**
09:00	09:05	Keynote Speaker Introduction		
09:05	10:05	KEYNOTE TALK 2 **Quantum Circuit Compilation and Compression** Kae Nemoto		
10:05	10:35	**MORNING COFFEE BREAK**		
10:35	11:50	INDUSTRY TRACK 1 **Best Industry Paper Candidates**		
11:50	12:15	Test of Time Awardee Talk		
12:15	13:45	**LUNCH**		
13:45	14:30	KEYNOTE TALK 3 **Generative AI Applications and Trustworthiness** Yennun Huang		
14:30	14:40	**RECESS**		
14:40	15:30	RESEARCH TRACK 6 **Tools and Artifacts**	JOURNAL FIRST, CONFERENCE SECOND	SPECIAL SESSION 2 **Huawei**
15:30	16:00	**AFTERNOON COFFEE BREAK**		
16:00	17:40	RESEARCH TRACK 7 **Safety**	RESEARCH TRACK 8 **Fuzzing**	DOCTORAL SYMPOSIUM AND PANEL
18:30		**BANQUET**		

Day 4: Thursday, October 31, 2024 (MAIN CONFERENCE)				
Start	**End**	**Convention Hall 200**	**Rm 201**	**Rm 202**
09:00	09:05	Keynote Speaker Introduction		
09:05	10:05	KEYNOTE TALK 4 **Software Reliability in the Era of Large Language Models: A Dual Perspective** David Lo		
10:05	10:35	**MORNING COFFEE BREAK**		
10:35	12:15	RESEARCH TRACK 9 **Testing I**	RESEARCH TRACK 10 **Root Cause Analysis & Program Repair**	INDUSTRY TRACK 2 **Language Models**
12:15	13:45	**LUNCH**		
13:45	15:25	RESEARCH TRACK 11 **Testing II**	RESEARCH TRACK 12 **Fault Monitoring, Prediction & Diagnosis**	INDUSTRY TRACK 3 **Design and Development Process**
15:30	16:00	**AFTERNOON COFFEE BREAK**		
16:00	17:40	RESEARCH TRACK 13 **Security and Privacy**	RESEARCH TRACK 14 **Performance and Reliability Analysis & Prediction**	INDUSTRY TRACK 4 **Debugging, Verification, and Analysis**
17:40	18:00	CONFERENCE CLOSING		

KEYNOTES

Keynote talk 1 (October 29th):

Title: Quality Assurance of AI-Based Systems

Hiroshi Maruyama (Executive Fellow at Kao Corporation)

Abstract: *Recent rapid advancements in AI technologies pose significant challenges for quality assurance (QA) of systems employing these technologies due to the opaque nature of their internal workings. This talk will discuss various challenges to QA for AI-based systems and how they are being addressed. We will argue that these challenges have some parallels in other disciplines such as engineering and social sciences, and that radically multi-disciplinary discussions are needed.*

Biography: Hiroshi Maruyama has spent 26 years in IBM Research, Tokyo Research Laboratory, working on various computer science areas such as artificial intelligence, natural language processing, machine translation, hand-writing recognition, multimedia, XML, Web Services, and security. He was the director of IBM Tokyo Research Laboratory from 2006 to 2009. From 2011 to 2016, he was a professor at the Institute of Statistical Mathematics where he worked on projects related to big data, statistics, and their impacts on society. He joined Preferred Networks, Inc. in April 2016 as the chief strategy officer. His current research interests include practical applications of machine learning, social implications of information technology and machine learning, and computer science and statistics in general. Currently he is an Executive Fellow at Kao Corporation, a senior researcher at Research into Artifacts, Center for Engineering, University of Tokyo, and a senior advisor at Preferred Networks, Inc.

Keynote talk 2 (October 30th):

Title: Quantum circuit compilation and compression

Kae Nemoto (Professor at Okinawa Institute of Science and Technology)

Abstract: *In the last few years, we have seen the rapid development of the technology needed for the realization of quantum computers. The number of qubits (quantum bits) has now exceeded 1,000 and we are about to leave the regime of physical qubits by constructing logical qubits. Logical qubits can be implemented in a fault-tolerant manner and thought that we can keep the noise on logical qubits under control to the end of our algorithms. In this talk, I will review the difference between logical qubits and physical qubits, before introducing the fault-tolerant quantum computer (FTQC) technology stack. In the FTQC technology stack, the quantum computer architecture is in the middle to connect the technologies layers below (hardware) to the above (middleware/software). In fault-tolerant quantum computation, compression of gate circuits is important to make fault-tolerant quantum computer faster in those above layers and the physical requirements in the bottom layers (hardware) lower. Hence compilation and representation (language) of gate circuits are necessary for us to safely reduce the depth of gate circuits. In this talk I will go through how these three elements work together in fault-tolerant quantum computers.*

Biography: Kae Nemoto is a professor at Okinawa Institute of Science and Technology and the Center Director for OIST Center for Quantum Technologies. She is also a professor at the National Institute of Informatics (NII) in Tokyo, where she serves as the director of the Global Research Center for Quantum Information Science and the co-director of the Japanese-French Laboratory for Informatics (JFLI). Her research is focused on applications for quantum computers, quantum machine learning, quantum computer architectures, quantum middleware, quantum networks, quantum internet and complex systems. She also leads an academic education consortium "Quantum Academy for Science and Technology" to provide high quality lectures and education materials for undergraduate and graduate levels in this field. She is a Fellow of both the IoP (UK) and the APS (US).

Keynote talk 3 (October 30th Remote):

Title: Generative AI Applications and Trustworthiness

Yennun Huang (Minister of Digital Affairs of Executive Yuan in Taiwan)

Abstract: *In this talk, I will give some examples of how Generative AI applications are being applied in Taiwan. However the applications with GAI technologies may raise some trustworthiness issues. I will describe these issues and technologies we are developing to help the trustworthiness of GAI applications.*

Biography: Yennun Huang is the Minister of Digital Affairs of Executive Yuan in Taiwan. He received his PhD in Computer Science from University of Maryland. He Joined AT&T Bell Labs in 1989. His work on Software Implemented Fault Tolerance (SwiFT) tools was applied to tens of telecommunication systems in AT&T and was named one of the ten major technology breakthroughs in Bell Laboratories in 1992. He became a Distinguished Member of Technical Staff of Bell Labs in 1996. He started the Dependable Computing Research Department in AT&T in 1999 and was the department head to ensure the high dependability of all AT&T services. In 2004, Dr. Huang became the Executive Director of Dependable Distributed Computing and Communication Research Department to lead AT&T dependability research programs. In 2007, Dr. Huang became the Executive Vice President of Institute for Information Industry of Taiwan. Dr. Huang was also the Deputy Executive Secretary of Science and Technology Advisory Group of Executive Yuan, helping Taiwan Government on the Information and Communication Technology development policy and funding allocation between 2010 and 2015. He was the Director for Research Center for Information Technology Innovation (CITI), Academia Sinica, Taiwan between 2015 and 2024. Dr. Huang has more than 20 US patents and more than 150 papers published in well-known journals and conferences. His Software rejuvenation paper was awarded Jean-Claude Laprie Award in 2019. Dr. Huang is an IEEE Fellow.

Keynote talk 4 (October 31st):

Title: Software Reliability in the Era of Large Language Models: A Dual Perspective

David Lo (Professor at Singapore Management University)

Abstract: *Much software engineering research has been dedicated to building reliable software systems. The last two decades have witnessed the growth of software engineering data availability that spurred many AI-driven automated solutions. The last few years saw rapid growth in the construction of specialized solutions based on Large Language Models (LLM) to aid software engineers in many tasks, including improving software reliability. However, LLM has unique challenges, presenting new reliability concerns that must be managed. This underscores two compelling and complementary research trajectories: Large Language Models for Software Reliability (LLM4SR) and Software Reliability for Large Language Models (SR4LLM). This talk will showcase promising LLM4SR solutions, focusing on vulnerability repair and runtime error recovery. It will then discuss some reliability issues that affect LLM and preliminary solutions to manage them, highlighting much research needed in SR4LLM. The talk will conclude with a discussion on future directions, showing how SR and LLM can change software engineering in the years ahead.*

Biography: David Lo is the OUB Chair Professor of Computer Science and Director of the Center for Research in Intelligent Software Engineering (RISE) at Singapore Management University. Championing the area of AI for Software Engineering (AI4SE) since the mid-2000s, he has demonstrated how AI - encompassing data mining, machine learning, information retrieval, natural language processing, and search-based algorithms - can transform software engineering data into automation and insights. His contributions have led to over 20 awards - including two Test-of-Time awards, one for his ISSRE 2012 work, and ten ACM SIGSOFT / IEEE TCSE Distinguished Paper awards - and gathered more than 30k citations. An ACM Fellow, IEEE Fellow, ASE Fellow, and National Research Foundation Investigator (Senior Fellow), Lo has also served as a PC Co-Chair for ASE'20, FSE'24, and ICSE'25. For more information, please visit: http://www.mysmu.edu/faculty/davidlo/.

RESEARCH TRACK

Research Session 1: Best Papers Session

Session Chair: Roberto Pietrantuono (University of Naples Federico II) and Lei Ma (The University of Tokyo / University of Alberta)

API2Beh: Learning Behavior Inclination of APIs for Malware Classification
Lei Cui, Yiran Zhu, Junnan Yin, Zhiyu Hao, Wei Wang, Peng Liu, Ziqi Yang and Xiaochun Yun

LiScopeLens: An Open-Source License Incompatibility Analysis Tool Based on Scope Representation of License Terms
Ziang Liu, Xin Liu, Yingli Zhang, Zihao Zhang, Song Li, Weina Niu, Qingguo Zhou, Rui Zhou and Xiaokang Zhou

Exploring Hierarchical Patterns for Alert Aggregation in Supercomputers
Yuan Yuan, Tongqing Zhou, Xiuhong Tan, Yongqian Sun, Yuqi Li, Zhixing Li, Zhiping Cai and Tiejun Li

Research Session 2: Anomaly Detection I

Session Chair: Domenico Cotroneo (University of Naples Federico II)

Detection Latencies of Anomaly Detectors: An Overlooked Perspective?
Tommaso Puccetti and Andrea Ceccarelli

Self-Evolutionary Group-wise Log Parsing Based on Large Language Model
Changhua Pei, Zihan Liu, Jianhui Li, Erhan Zhang, Le Zhang, Haiming Zhang, Wei Chen, Dan Pei and Gaogang Xie

TimeSeriesBench: An Industrial-Grade Benchmark for Time Series Anomaly Detection Models
Haotian Si, Jianhui Li, Changhua Pei, Hang Cui, Jingwen Yang, Yongqian Sun, Shenglin Zhang, Jingjing Li, Haiming Zhang, Jing Han, Dan Pei and Gaogang Xie

Detecting Numerical Deviations in Deep Learning Models Introduced by the TVM Compiler
Xia Zichao, Chen Yuting, Nie Pengbo and Wang Zihan

Research Session 3: Vulnerability Analysis and Detection

Session Chair: Xiaofei Xie (Singapore Management University)

U2Vul: Vulnerability Analysis Based on Unsupervised Information Integration

Shaojie Yang, Haoran Xu, Fangliang Xu and Yongjun Wang

A Comprehensive Study on the Impact of Vulnerable Dependencies on Open-Source Software

Shree Hari Bittugondanahalli Indra Kumar, Lília Rodrigues Sampaio, André Martin, Andrey Brito and Christof Fetzer

Fine-Tuning Pre-trained Model with Optimizable Prompt Learning for Code Vulnerability Detection

Wei Chang, Chunyang Ye and Hui Zhou

Learning Graph-based Patch Representations for Identifying and Assessing Silent Vulnerability Fixes

Mei Han, Lulu Wang, Jianming Chang, Bixin Li and Chunguang Zhang

Research Session 4: Anomaly Detection II

Session Chair: Shenglin Zhang (Nankai University)

LLMeLog: An Approach for Anomaly Detection based on LLM-enriched Log Events

Minghua He, Tong Jia, Chiming Duan, Huaqian Cai, Ying Li and Gang Huang

LogCAE: An Approach for Log-based Anomaly Detection with Active Learning and Contrastive Learning

Pei Xiao, Tong Jia, Chiming Duan, Huaqian Cai, Ying Li and Gang Huang

VCRLog: Variable Contents Relationship Perception for Log-based Anomaly Detection

Jinyuan Wang, Tong Li, Runzi Zhang, Zifang Tang, Di Wu and Zhen Yang

Leveraging RAG-Enhanced Large Language Model for Semi-Supervised Log Anomaly Detection

Wanhao Zhang, Qianli Zhang, Enyu Yu, Yuxiang Ren, Yeqing Meng, Mingxi Qiu and Jilong Wang

Research Session 5: Security and Performance

Session Chair: Hiroyuki Okamura (Hiroshima University)

Enhancing AI-based Generation of Software Exploits with Contextual Information

Pietro Liguori, Cristina Improta, Roberto Natella, Bojan Cukic and Domenico Cotroneo

Android's Cat-and-Mouse Game: Understanding Evasion Techniques against Dyanmic Analysis

Shuang Li, Rui Li, Shishuai Yang and Wenrui Diao

RE-DLC: Learning-driven Reverse Engineering for Deep Learning Compilers

Minghui Li, Yang Li, Hao Han, Xiaopeng Ke, Tongyu Wang, Fengyuan Xu and Liming Fang

Assessing the Performance of AI-Generated Code: A Case Study on GitHub Copilot

Shuang Li, Yuntao Cheng, Jinfu Chen, Jifeng Xuan, Sen He and Weiyi Shang

Research Session 6: Tools and Artefacts

Session Chair: Enrico Vicario (University of Florence)

CovSBOM: Enhancing Software Bill of Materials with Integrated Code Coverage Analysis

Yunze Zhao, Yuchen Zhang, Dan Chacko and Justin Cappos

LabelEase: A Semi-Automatic Tool for Efficient and Accurate Trace Labeling in Microservices

Shenglin Zhang, Zeyu Che, Zhongjie Pan, Xiaohui Nie, Yongqian Sun, Lemeng Pan and Dan Pei

Research Session 7: Safety
Session Chair: Tadashi Dohi (Hiroshima University)

Aspis: Lightweight Neural Network Protection Against Soft Errors
Anna Schmedding, Lishan Yang, Adwait Jog and Evgenia Smirni

GAS: Generating Fast & Accurate Surrogate Models for Simulations of Autonomous Vehicle Systems
Keyur Joshi, Chiao Hsieh, Sayan Mitra and Sasa Misailovic

Applying Concept-Based Models for Enhanced Safety Argumentation
João Paulo Costa de Araujo, Balahari Vignesh Balu, Eik Reichmann, Jessica Kelly, Stefan Kugele, Núria Mata and Lars Grunske

AI-Supported Eliminative Argumentation: Practical Experience Generating Defeaters to Increase Confidence in Assurance Cases
Torin Viger, Logan Murphy, Simon Diemert, Claudio Menghi, Jeffrey Joyce, Alessio Di Sandro and Marsha Chechik

Research Session 8: Fuzzing
Session Chair: Naoyasu Ubayashi (Kyushu University)

Multi-level Fuzzing for Document File Formats with Intermediate Representations
Yifan Wang and Jun Xu

An Empirical Study on the Distance Metric in Guiding Directed Grey-box Fuzzing
Tingke Wen, Yuwei Li, Huimin Ma, Zhang Lu and Zulie Pan

Enhancing Black-box Compiler Option Fuzzing with LLM through Command Feedback
Taiyan Wang, Ruipeng Wang, Yu Chen, Lu Yu, Zulie Pan, Min Zhang, Huimin Ma and Jinghua Zheng

History-driven Compiler Fuzzing via Assembling and Scheduling Bug-triggering Code Segments
Zhenye Fan, Guixin Ye, Tianmin Hu and Zhanyong Tang

Research Session 9: Testing I

Session Chair: Xiao-Yi Zhang (University of Science and Technology Beijing)

Hierarchy-Aware Regression Test Prioritization
Hao Wang, Pu Yi, Jeremias Parladorio, Wing Lam, Darko Marinov and Tao Xie

An Empirical Investigation on Android App Testing Practices
Tarek Mahmud, Meiru Che, Anne Ngu and Guowei Yang

Fix the tests: Augmenting LLMs to Repair Test Cases with Static Collector and Neural Reranker
Jun Liu, Jiwei Yan, Yuanyuan Xie, Jun Yan and Jian Zhang

Code Ownership: The Principles, Differences, and Their Associations with Software Quality
Patanamon Thongtanunam and Chakkrit Tantithamthavorn

Research Session 10: Root Cause Analysis and Program Repair

Session Chair: Enrico Vicario (University of Florence)

SparseRCA: Efficient Root Cause Analysis in Sparse Microservice Testing Trace
Zhenhe Yao, Haowei Ye, Changhua Pei, Guang Cheng, Guangpei Wang, Zhiwei Liu, Hongwei Chen, Hang Cui, Zeyan Li, Jianhui Li, Gaogang Xie and Dan Pei

KPIRoot: Efficient Monitoring Metric-based Root Cause Localization in Large-scale Cloud Systems
Wenwei Gu, Xinying Sun, Jinyang Liu, Yintong Huo, Zhuangbin Chen, Jianping Zhang, Jiazhen Gu, Yongqiang Yang and Michael Lyu

FaaSRCA: Full Lifecycle Root Cause Analysis for Serverless Applications
Jin Huang, Pengfei Chen, Guangba Yu, Yilun Wang, Haiyu Huang and Zilong He

RATCHET: Retrieval Augmented Transformer for Program Repair
Jian Wang, Shangqing Liu, Xiaofei Xie, Siow Jing Kai, Kui Liu and Yi Li

Research Session 11: Testing II

Session Chair: Xiao-Yi Zhang (University of Science and Technology Beijing)

Testing Diverse Geographical Features of Autonomous Driving Systems
Seongdeok Seo, Judy Lee and Mijung Kim

Themis: Automatic and Efficient Deep Learning System Testing with Strong Fault Detection Capability
Dong Huang, Tsz On Li, Xiaofei Xie and Heming Cui

A Combinatorial Interaction Testing Method for Multi-Label Image Classifier
Peng Wang, Shengyou Hu, Huayao Wu, Xintao Niu, Changhai Nie and Lin Chen

Mutation-Based Integration Testing of Knowledge Graph Applications
Tobias John, Einar Broch Johnsen and Eduard Kamburjan

Research Session 12: Failure Monitoring, Prediction and Diagnosis

Session Chair: Pietro Liguori (University of Naples Federico II)

DRLFailureMonitor: A Dynamic Failure Monitoring Approach for Deep Reinforcement Learning Systems
Cai Yi, Zheng Zheng, Wan Xiaohui and Liu Zhihao

Can We Trust Auto-Mitigation? Improving Cloud Failure Prediction with Uncertain Positive Learning
Haozhe Li, Minghua Ma, Yudong Liu, Pu Zhao, Shuo Li, Lingling Zheng, Ze Li, Murali Chintalapati, Yingnong Dang, Chetan Bansal, Saravan Rajmohan, Qingwei Lin and Dongmei Zhang

Demystifying and Extracting Fault-indicating Information from Logs for Failure Diagnosis
Junjie Huang, Zhihan Jiang, Jinyang Liu, Yintong Huo, Jiazhen Gu, Zhuangbin Chen, Cong Feng, Hui Dong, Zengyin Yang and Michael Lyu

Large Language Models Can Provide Accurate and Interpretable Incident Triage
Zexin Wang, Jianhui Li, Minghua Ma, Ze Li, Yu Kang, Chaoyun Zhang, Chetan Bansal, Murali Chintalapati, Saravan Rajmohan, Qingwei Lin, Dongmei Zhang, Changhua Pei and Gaogang Xie

Research Session 13: Security and Privacy

Session Chair: Justin Cappos (New York University)

A Security Verification Framework for the LoRaWAN Protocol with Application in the Manufacturing Industry
Wenting Dong, Huibiao Zhu, Sini Chen and Ning Ge

MDIplier: Protocol Format Recovery via Hierarchical Inference
Kai Liang, Zhengxiong Luo, Yanyang Zhao, Wenlong Zhang, Ronghua Shi, Yu Jiang, Heyuan Shi and Chao Hu

Beyond the Horizon: Exploring Cross-Market Security Discrepancies in Parallel Android Apps
Shishuai Yang, Guangdong Bai, Ruoyan Lin, Jialong Guo and Wenrui Diao

Understanding and Detecting Privacy Leakage Vulnerabilities in Hyperledger Fabric Chaincodes
Ziming Chen, Yue Li, Jianbo Gao, Jiashuo Zhang, Ke Wang, Jianbin Hu, Zhi Guan and Zhong Chen

Research Session 14: Performance and Reliability Analysis and Prediction
Session Chair: Ganesh Pai (KBR / NASA Ames Research Center)

Understanding Atomics and Memory Ordering Issues in Real-World Rust Software
Cheng Wang, Tengfei Tu, Sujuan Qin, Guangjun Wu, Fei Gao and Mingchao Wan

A Compositional Approach to Coordinated Software Rejuvenation of Component-Based Systems
Tommaso Botarelli, Laura Carnevali, Leonardo Paroli and Enrico Vicario

Feedback-Directed Cross-Layer Optimization of Cloud-Based Functional Actor Applications
Andrea Cappelletti and Mark Grechanik

Exact Computation of Network Reliability with Sentential Decision Diagram
Delong Li, Jiayu Zeng, Liangda Fang, Chaonan Wang, Lin Cui and Quanlong Guan

INDUSTRY TRACK

Industry Session 1: Best Industry Paper Candidates

Session Chair: Susumu Tokumoto (Fujitsu Limited)

Early Bird: Ensuring Reliability of Cloud Systems Through Early Failure Prediction
Yudong Liu, Minghua Ma, Pu Zhao, Tianci Li, Bo Qiao, Shuo Li, Ze Li, Murali Chintalapati, Yingnong Dang, Chetan Bansal, Saravan Rajmohan, Qingwei Lin, Dongmei Zhang

An Exploration of Fuzzing for Discovering Use-After-Free Vulnerabilities
Zeyu Chen, Jidong Xiao, Angelos Stavrou, Haining Wang.

Auto-PIP: Real-time Identification of Critical Performance Inflection Points in Software Stress Testing
Shenglin Zhang, Xiao Xiong, Mengyao Li, Yongqian Sun, Yongxin Zhao, Xia Chen, Bowen Deng, Dan Pei

Industry Session 2: Language Models

Session Chair: Hiroshi Kuwajima (DENSO)

Multivariate Time Series Anomaly Detection Based on Pre-trained Models with Dual-Attention Mechanism
Yongqian Sun, Yang Guo, Shenglin Zhang, Minghan Liang, Junhua Kuang, Hongbo Li, Kaixu Xia, Xidao Wen, Dan Pei

A Language-guided Acceleration Method for Smoke Testing of Game Quests
Jie Hu, Mingyue Zhang, Bo Liu, Yuechen Wu, Yingfeng Chen

Enhanced Fine-Tuning of Lightweight Domain-Specific Q&A Model Based on Large Language Models
Shenglin Zhang, Pengtian Zhu, Minghua Ma, Jiagang Wang, Yongqian Sun, Dongwen Li, Jingyu Wang, Qianying Guo, Xiaolei Hua, Lin Zhu, Dan Pei

On Enhancing Root Cause Analysis with SQL Summaries for Failures in Database Workload Replays at SAP HANA
Neetha Jambigi, Joshua Hammesfahr, Moritz Mueller, Thomas Bach, Michael Felderer

Industry Session 3: Design and Development Process
Session Chair: TBD

A Systematic Methodology for Specifying the Operational Design Domain of Automated Vehicles
Frank Eichenseer, Shinjini Sarkar, Ali Shakeri

Dependability Modeling in an Industrial Environment
Alberto Avritzer, James Cusick, Andrea Janes, Matteo Camilli, Barbara Russo, Catia Trubiani, Andre van Hoorn

A Global Operational Readiness Review Process: Improving Cloud Availability
James Cusick, Lija Basil

Engineer Insights: The Challenges of Implementing Agile at Scale in Software Development
Yichi Zhang, Yang Feng, Jianxun Ju

Industry Session 4: Debugging, Verification and Analysis
Session Chair: TBD

CrashChecker: A Fusion Method for Clustering Duplicate Crash Failures in SAP HANA Delivery
Yang Xu, Yong Li, Qiaoluan Xie, Chao Liu, Xiaoxiao Zhang, Thomas Bach, Sunghun Kim, Sanghun Kang

CCBPS: A Hardware-based Data Loss Prevention Approach
Panshi Jin, Lei Xing, Yufei Yang, Zhaojun Hao

NICSDG: A Non-Intrusive Approach to Constructing Concise Service Dependency Graphs for Microservice Systems
Weijie Hong, Yong Yang, Junqi Wu, Dongdong Shangguan, Yuanhao Lai, Qiang Bai, Ying Li

Fast and Precise Interval Analysis on Industry Code
Bharti Chimdyalwar

FAST ABSTRACTS

Session Chair: Hui Xu (Fudan University)

How Maintainable is Proficient Code? A Case Study of Three PyPI Libraries
Indira Febriyanti, Youmei Fan, Kazumasa Shimari, Kenichi Matsumoto, and Raula Gaikovina Kula

Coding Pitfalls: Demystifying the Potential API Compatibility Risk of Variadic Parameters in Python
Shuai Zhang, Gangqiang He, and Guanping Xiao

Linking Code and Documentation Churn: Preliminary Analysis
Ani Hovhannisyan, Youmei Fan, Raula Gaikovina Kula, and Gema Rodriguez-Perez

Initial Investigation of Behavioral Changes of Obfuscated Programs Caused by Code Optimization
Tetsuya Kitaoka, Yuichiro Kanzaki, Takashi Ishio, Kazumasa Shimari, and Kenichi Matsumoto

On Applying Bandit Algorithm to Fault Localization Techniques
Masato Nakao, Kensei Hamamoto, Masateru Tsunoda, Amjed Tahir, Koji Toda, Akito Monden, Keitaro Nakasai, and Kenichi Matsumoto

Dynamic Testing for Mobile Privacy Compliance
Jingyi Lei, Yi Wu, Nan Hu, Junjie Tao, Yin Wang, Ming Fan, and Haijun Wang

Assuring Data Integrity on Commercial Gamification Software Considering Productivity: an Industrial Case Study
Masateru Tsunoda, Shohei Sinto, Takeshi Yamada, and Hidetsugu Suto

n-Pipeline Log Anomaly Detection Drift Mitigation
Scott Lupton, Hironori Washizaki, Naoyasu Ubayashi, and Nobukazu Yoshioka

Towards N-version Quantum Software Systems for Reliable Classical-Quantum Computing
Shinobu Saito, Suguru Endo, and Yasunari Suzuki

DOCTORAL SYMPOSIUM

Doctoral Symposium Session 1:
Session Chair: Naghmeh Ivaki (University of Coimbra)

Automated Interpretation of Fleetpool Incidents to Enable System Level Runtime Assurance

Tihomir Rohlinger

Search-Based White-Box Fuzzing of Web Frontend Applications

Iva Kertusha

Reliable Online Log Parsing Using Large Language Models with Retrieval-Augmented Generation

Hansae Ju

Panel: Generative AI and a New Academic Reality: Challenges and Opportunities for PhD Students

Summary: This discussion will explore the advantages and disadvantages that tools like ChatGPT and Copilot bring to students, particularly PhD students and researchers. We aim to provide a comprehensive overview of how these technologies impact academic work, research productivity, and the overall learning experience.

Panelist:
Hironori Washizaki, Waseda University, Japan

Marco Vieira, University of North Carolina at Charlotte, USA

Lishan Yang, George Mason University, USA

Helen Paik, UNSW, Australia

SPECIAL SESSIONS

Special Session 1: Test of Time Award

Session Chair: Domenico Cotroneo (University of Naples Federico II)

Predicting Vulnerable Components: Software Metrics vs Text Mining

James Walden, Jeff Stuckman, and Riccardo Scandariato

ISSRE 2014, pp. 23-33

Special Session 2: Journal First and Conference Second (J1C2)

Session Chair: Yulei Sui (University of New South Wales, Sydney)

Highly Available Blockchain Nodes With N-Version Design

Javier Ron, Cesar Soto-Valero, Long Zhang, Benoit Baudry and Martin Monperrus

IEEE Transactions on Dependable and Secure Computing, vol. 21, no. 04, pp. 4084-4097, 2024.

Systematic Evaluation of Deep Learning Models for Log-based Failure Prediction

Fatemeh Hadadi, Joshua Heneage Dawes, Donghwan Shin, Domenico Bianculli, and Lionel C. Briand.

Empirical Software Engineering, vol. 29, 2024.

Special Session 4: ASTER

Session Chair: Satomi Yoshizawa (NEC Corporation / NPO ASTER)

How should software tests be designed in practice? - Introducing case studies from the Test Design Competition by ASTER

Time table:

- Introduction to ASTER: Kenji Onishi
- Introduction to the Test Design Competition: Akiharu Sato
- Introduction to the SUT (System Under Test) for the case study: Akiharu Sato
- Case Study Presentation 1 by Previous Winners: Noriyuki Mizuno
- Case Study Presentation 2 by Previous Winners: Tomohiro Odan
- Experiences of the Latest Winners (including AI utilization): Takafumi Yanagawa
- Q&A Session

Special Session 4: Huawei

Session Chair: Masateru Tsunoda (Kindai University)

Reliability Challenges and Progress for Huawei Cloud in AI era

Zhenli Sheng

Abstract: Huawei Cloud is one of the leading global providers in cloud computing, offering around 200 services and operating nearly one million servers. Throughout our journey, we've faced various reliability challenges related to both hardware and software, some of which have become particularly critical in the AI era. In this talk, we will explore the key reliability issues in AI clusters and share how we address these risks through hardware fault prediction, silent data corruption detection, and resilient recovery during large language model (LLM) training. Finally, we will highlight some of the remaining challenges that continue to demand attention.

WORKSHOPS

AI-Pattern Workshop Sessions

AI-Pattern Session 1:

Opening

Invited talk: A Pattern-Oriented Approach for Engineering Safe and Responsible AI Systems

Qinghua Lu

AI-Pattern Session 2:

Toward Pattern-Oriented Machine Learning Reliability Argumentation
Takumi Ayukawa, Jati H. Husen, Nobukazu Yoshioka, Hironori Washizaki, Naoyasu Ubayashi

A Process Pattern for Cybersecurity Assessment Automation: Experience and Futures
James Cusick

Toward Extracting Learning Pattern: A Comparative Study of GPT-4o-mini and BERT Models in Predicting CVSS Base Vectors
Sho Isogai, Shinpei Ogata, Yutaro Kashiwa, Satoshi Yazawa, Kozo Okano, Takao Okubo, Hironori Washizaki

AI-Pattern Session 3:

Discussion

Closing Remarks

AISQ Workshop Sessions

AISQ Session 1: Testing and Debugging

Session Chair: Zhenya Zhang and Xiao-Yi Zhang

Keynote I: VsusFL: Variable-suspiciousness-based Fault Localization for novice programs

Yong Liu

TLFL: Token-Level Fault Localization for Novice Programs via Graph Representation Learning

Yong Liu, Ruishi Huang Liu, Jizhe Yang Liu, Binbin Yang, Shumei Wu

Towards Mutation Testing of Embedded Software: A Framework and Case Study

Wei Jiang, Sijin Dong, Jiaming Zhang, Jin Tang, Zichao Zhang, Chang-Ai Sun, Xiao-Yi Zhang

Impact of V2V Communication on Robustness of Autonomous Driving Systems (Short paper)

Lejin Li, Xiao-Yi Zhang, Shuncheng Tang, Zhenya Zhang, Jianjun Zhao

AISQ Session 2: Reliability and Dependability

Session Chair: *Junjun Zheng* and *Xiao-Yi Zhang*

Keynote II: Flexible Formal Modelling with Stepwise Refinement

Kobayashi Tsutomu

A Web-based Tool for Predicting Software Development Effort

Xiao Xiao, Tomoya Tanahashi, Tadashi Dohi

Data Augmentation for Vulnerability Detection Based on Code Refactoring and Mixup

Ying Xing, Jiaqi Huang, Guilong Wang, Yehao You, Bin Yang, Xiaofeng Li, Yixing Luo

DynTrackr: A Robust Two-Stage Framework with Attribute Enhancement for KPI Anomaly Detection

Meixian Zhang, Xue Shi, Jiaxin Huang, Lide Su, Yanan Zhang

AISTA Workshop Session

AISTA Session 1:

Business Compliance Detection of Smart Contracts in Electricity and Carbon Trading Scenarios
Yin Wu, Haijun Wang, Yuanhui Zhang, Xitao Li, Hao Wu, Ming Fan, Ting Liu

HyWE: A Hybrid Word Embedding Method for Smart Contract Vulnerability Detection
Jinfu Chen, Zhehao Li, Dongjie Wang, Saihua Cai, Haotong Ding

EMI Testing of Large Language Model (LLM) Compilers
Xiangzhong Yu, Wai Kin Wong, Shuai Wang

ASSURE Workshop Sessions

ASSURE Session 1: Assurance and Dependability Standards

Session Chair: Ewen Denney (KBR / NASA ARC)

The SOTIF Meta-Algorithm: Quantitative Analyses of the Safety of Autonomous Behaviors

Carmen Carlan, Noah Carlson, Chris Dwyer, Manoja Hirannaiah, Michael Wagner

ASSURE Session 2: Assurance of Artificial Intelligence (AI) and Machine Learning (ML) – 1

Session Chair: Ganesh Pai (KBR / NASA ARC)

Models are Central to AI Assurance

John Rushby, Robin Bloomfield

Supporting Change Impact Assessment with LLMs

Torin Viger, Logan Murphy, Simon Diemert, Claudio Menghi, Marsha Chechik

Removing the Big Red Button: Uncrewed Ground Vehicles in Complex Military Environments

Alec Banks, Prathyush Menon, Steve Austen

Developing Assurance Cases for Adversarial Robustness and Regulatory Compliance in LLMs

Tomas Bueno Momcilovic, Dian Balta, Beat Buesser, Giulio Zizzo, Mark Purcell

ASSURE Session 3: Assurance Cases and Processes

Session Chair: Yutaka Matsuno (Nihon University)

SynBioTrace: Integrating Safety and Security Artifacts to Build Assurance Cases for Synthetic Biology Applications

Justin Firestone, Myra B. Cohen, Robyn R. Lutz

Using Boundary Objects for Continuous Compliance in Automotive Development

Anthony Shenouda, Tiziano Santilli, Faezeh Siavashi, Thomas Chiang, Nicholas Annable, Horacio Hoyos Rodriguez, Richard Paige, Patrizio Pelliccione, Mark Lawford, Alan Wassyng, Vera Pantelic

A Digital Assurance Framework

Mauricio Castillo-Effen, Carter Veldhuizen, Charles Lutz

Generating Understandable and Reusable Safety Assurance Cases Using Workflow+

Nicholas Annable, Mark Lawford, Richard Paige, Alan Wassyng

ASSURE Session 4: Assurance of Artificial Intelligence (AI) and Machine Learning (ML) – 2

Session Chair: Yoshiki Kinoshita (Kanagawa University)

Towards the Certification of an Evacuation Assistance System Utilizing AI-based Approaches

Georg Hägele, Abdelbaki Bouguerra, Arezoo Sarkheyli-Hägele

Quantifying Lower Reliability Bounds of Deep Neural Networks

Max Scheerer, Marius Take, Jonas Klamroth

Defect-based Testing for Safety-critical ML Components

Amit Sahu, Carmen Carlan

HFSD Workshop Sessions

HFSD Session 1: Keynote Speech

Session Chair: Fuqun Huang (Western Washington University)

Human Reliability for Software Dependability

Carol Smidts

HFSD Session 2: Human Factors for Security

Session Chair: Fuqun Huang (Western Washington University)

A Survey on Physical Event Verification in User-centric Smart Home Systems

Bing Huang, Kwok-Yan Lam

HFSD Session 3: Human Errors in Software Dependability

Session Chair: Philippe Palanque (University Toulouse 3)

Taking into Account Human Error when Assessing the Impact of Dependability on Usability

Camille Fayollas, Célia Martinie, Philippe Palanque

Human Error Scenario Analysis of Software Defects

Vivian White, Alyssa White, Jason White, Fuqun Huang

HFSD Session 4: Human Factors for Software Reliability and Safety

Session Chair: Philippe Palanque (University Toulouse 3)

State Diagram Extension and Test Case Generation Based on Large Language Models for Improving Test Engineers' Efficiency in Safety Testing

Qingran Su, Xingze Li, Yuming Ren, Xulang Ouyang, Chunming Hu, Yongfeng Yin

Failing and Learning: A Study of What is Learned about Reliability from Software Incidents

Jonathan Sillito, Matt Pope

IWSF & SHIFT Workshop Sessions

IWSF & SHIFT Session 1:

Welcome from the Chairs

Sigrid Eldh and Paolo Arcaini

Keynote: Detecting, Analyzing, and Addressing "Faults" in Automated Driving Systems

Fuyuki Ishikawa

Toward System Security Monitoring: Employing Multi-Agent Systems and Digital Twin

Zoé Lagache, Annabelle Mercier, Oum-El-Kheir Aktouf, Arthur Baudet

An Empirical Study on Predicting Software Development Bugs Using Dynamic Bayesian Networks

Kiyoshi Honda, Hironori Washizaki, Yoshiaki Fukazawa, Masahiro Taga, Akira Matsuzaki, Kazuyuki Nakagawa, Yusuke Sakai

A Novel Fuzzing Mutation Scheduling Method Based on Evolutionary Strategy

Leyang Xu, Jinfu Chen, Xinghao Yang

IWSF & SHIFT Session 2:

Energy Bugs in Object Detection Software on Battery-Powered Devices

Ippo Hiroi, Fumio Machida, Ermeson Andrade

C Source Code Generation from IR Towards Making Bug Samples to Fluctuate for Machine Learning

Yuto Sugawa, Chisato Murakami, Mamoru Ohara

Keynote: Debugging Quantum Programs: Challenges and Solutions

Jianjun Zhao

Final Remarks: Workshop Chairs

ReSAISE Workshop Sessions

ReSAISE Session 1:
Session chair: Pietro Liguori (University of Naples Federico II)

Opening

Keynote: Value-Flow-Based Code Embedding for Software Vulnerability Detection
Yulei Sui

ReSAISE Session 2: Safety and Reliability of Autonomous Systems
Session chair: Domenico Cotroneo (University of Naples Federico II)

Better and Safer Autonomous Driving with Predicted Object Relevance
Andrea Ceccarelli, Leonardo Montecchi

Safety-Aware Weighted Voting for N-version Traffic Sign Recognition System
Linyun Gao, Qiang Wen, Fumio Machida

Towards Improved Perception System's Generalization Through Generative Artificial Intelligence
Jiawei Wang, João R. Campos, Henrique Madeira

ReSAISE Session 3: Testing and Security of AI and Robotic Systems
Session chair: Cristina Improta (University of Naples Federico II)

Enhancing Neuron Coverage of DNN Models for Adversarial Testing
Zimu Tang, Jun Ai, Jie Wang

A Study on Prompt Injection Attack Against LLM-Integrated Mobile Robotic Systems
Wenxiao Zhang, Xiangrui Kong, Conan Dewitt, Thomas Bräunl, Jin Hong

Closing Remarks

WoSAR Workshop Sessions

WoSAR Session 1:

Opening

Keynote 1: Multi-granularity Software Rejuvenation for Dependability Control of Service Chain
Xiaolin Chang

A CTMDP Modeling for Multi-Stage Software Aging and Rejuvenation
Nianqiu Wang, Fumio Machida

Quantitative Evaluation of Software Rejuvenation of a Pool of Service Replicas
Leonardo Scommegna, Marco Becattini, Giovanni Fontani, Leonardo Paroli, Enrico Vicario

WoSAR Session 2:

Keynote 2: Beyond Reboot-based Recovery: Making System Software Resilient with Software-surgery
Hiroshi Yamada

Measurements and Models for Resiliency Assessment of VM Clusters under Aging and Rejuvenation
Alberto Avritzer, Andrea Janes, Andrea Marin, Daniel Sadoc Menasché, Catia Trubiani, Andre Bondi, James Cusick

Splitting Application Input into Batches as a Countermeasure Against Software Aging
Carlos Eduardo de Schuller Banjar, Daniel Sadoc Menasché, Alberto Avritzer

Evaluation of Software Aging in Hyperledger Fabric
Kojiro Soeda, Xiao Xiao

Closing Remarks

WDMD Workshop Sessions

WDMD Session 1: Reliability and Functional Safety for Autonomous Driving Systems

Session chair: Yang Zheng (Huawei Technologies Co., Ltd)

Opening: Risk Assessment and Regulation of AI Systems,
Joseph Sifakis

Keynote: Autonomous Driving in the Urban City Environment
Yanlei Gu

Panel 1：Reliability and Functional Safety for Autonomous Driving Systems

WDMD Session 2: Reliability and Modelling Technologies for AI Systems

Session chair: Zheng Zheng (Beihang University)

Keynote: AI-powered software reliability engineering and it's application
Jun Ai

Keynote: Parallelism in LLMs: Beyond Data, Tensor, and Pipeline Parallelism
Mohamed Wahib

Keynote: Reliability Analysis and Evaluation of Computing Network
Xing Pan

Panel 2：Reliability Technologies for AI training/inference Systems

WDMD Session 3: Papers

Session chair: Jiazhen Gu (Huawei Technologies Co., Ltd)

World Models: The Safety Perspective

Feng Liu, Zifan Zeng, Chongzhe Zhang, Joseph Sifakis, Qunli Zhang, Shiming Liu and Peng Wang

Developing a Dependable Multi-Agent Rover Swarm Using cFS

Irfan Sljivo, Pavlo Vlastos, Corey Carter and Aaron Woodard

Reliability Analysis of Man-Machine Systems Considering Imperfect Error Coverage Model

Chuqi Guo, Yu Lin, Ling Dong, Zhijie Feng, Luyao Ye, Wenhua Hu, Siwei Zhou and Jianwen Xiang

Toward Deterministic Wireless Communication: Latency Prediction Using Network Measurement Data

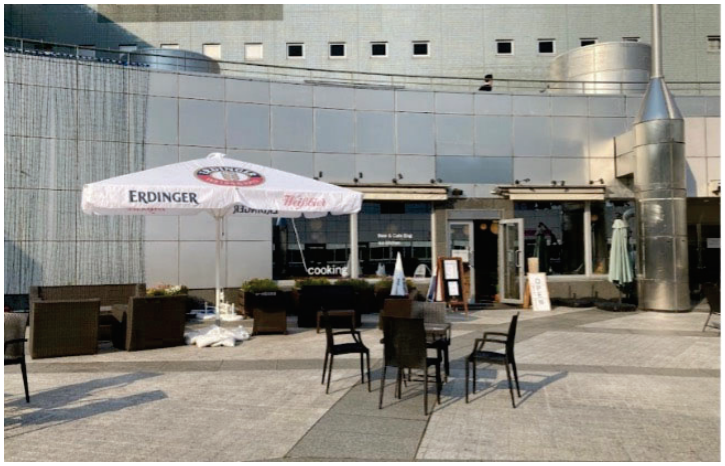
Lizhi Zhang, Jingwei Fu, Yan He and Xiaobin Jiang

A Practical Reliability Metric for Large Language Model Training Systems

Ning, Lu, Qian Xie, Hao Zhang, Wenyi Fang, Yang Zheng, Zheng Hu and Jiantao Ma

SOCIAL EVENTS

Workshop reception (October 28th)
Bar Engi (https://beercafe-engi.studio.site/)
Tsukuba Center Building 1F, 1-10-1 Azuma, Tsukuba, Ibaraki 3050031 Japan



Welcome reception (October 29th)
Epochal Tsukuba (conference venue https://www.epochal.or.jp/)
2-20-3 Takezono, Tsukuba, Ibaraki 3050032 Japan

Banquet (October 30th)
Banquet at Hotel Nikko Tsukuba (https://www.nikko-tsukuba.com/)
with a Japanese traditional cultural exhibition
1-1364-1 Azuma, Tsukuba, Ibaraki 3050031 Japan

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IPSJ Information Processing Society of Japan SIG Software Engineering (SIGSE)

YK

SIG - KBSE (Knowledge-based Software Engineering)

WHASE 武汉计算机软件工程学会

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