

ICFEM 2024

CONFERENCE PROGRAM

**THE 25th INTERNATIONAL CONFERENCE
ON FORMAL ENGINEERING METHODS**

WITH THE WORKSHOP OF

SFPVV 2024

**THE 1st INTERNATIONAL SYMPOSIUM ON SOFTWARE FAULT PREVENTION,
VERIFICATION, AND VALIDATION**

December 2-6, 2024

VENUE

**International Conference Center Hiroshima
1-5, Nakajima-cho, Naka-ku, Hiroshima
(in the Peace Memorial Park)**

730-0811

Japan



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Conference Venue



International Conference Center Hiroshima

<https://www.pcf.city.hiroshima.jp/icch/location.html>





Conference Schedule

SFPVV 2024 Symposium

December 2, 2024 (Monday, UTC+9)

09:15 ~ 09:25	Opening
09:25 ~ 10:25	Keynote Session 1
10:25 ~ 10:40	Coffee Break
10:40 ~ 12:20	Session 1: Formal Methods
12:30 ~ 14:00	Lunch
14:00 ~ 15:15	Session 2: Testing and Analysis
15:15 ~ 15:30	Coffee Break
15:30 ~ 16:20	Session 3: Formal Semantics
16:20 ~ 17:35	Session 4: Defect Detection
18:30 ~ 20:30	SFPVV 2024 Banquet

December 3, 2024 (Tuesday, UTC+9)

09:15 ~ 10:15	Keynote Session 2
10:15 ~ 10:45	Coffee Break
10:45 ~ 12:00	Session 5: Specification and Implementation
12:30 ~ 14:00	Lunch
14:00 ~ 15:15	Session 6: Language and Blockchain
15:15 ~ 15:20	Closing

ICFEM 2024 Main Conference

December 4, 2024 (Wednesday, UTC+9)

09:15 ~ 09:30	Opening
09:30 ~ 10:30	Keynote Session 1
10:30 ~ 11:00	Coffee Break
11:00 ~ 12:30	Session 1: Modeling and Specification



12:30 ~ 14:00	Lunch
14:00 ~ 15:30	Session 2: Timed Automata
15:30 ~ 16:00	Coffee Break
16:00 ~ 17:30	Session 3: Improving Neural Networks
18:30 ~ 20:30	Conference Reception

December 5, 2024 (Thursday, UTC+9)

09:15 ~ 10:15	Keynote Session 2
10:15 ~ 10:45	Coffee Break
10:45 ~ 12:15	Session 4: Formal Analysis
12:30 ~ 14:00	Lunch
14:00 ~ 15:30	Session 5: Defect Detection
15:30 ~ 16:00	Coffee Break
16:00 ~ 17:20	Panel Discussion
19:00 ~ 21:00	Conference Banquet

December 6, 2024 (Friday, UTC+9)

09:15 ~ 10:15	Keynote Session 3
10:15 ~ 10:45	Coffee Break
10:45 ~ 12:15	Session 6: Formal Verification
12:30 ~ 14:00	Lunch
14:00 ~ 16:00	Session 7: Model Checking
16:00 ~ 16:10	Closing


Onsite Sessions

SFPVV 2024 Symposium

December 2, 2024 (Monday, UTC+9)


Keynote Session 1 09:25 ~ 10:25 Chair: Shaoying Liu	
09:25 ~ 10:25	Some Achievements of the International Joint Research Project "Formal Analysis and Verification of Post-quantum Cryptographic Protocols" Prof. Kazuhiro Ogata

Session 1: Formal Methods 10:40 ~ 12:20 Chair: Fumiko Nagoya	
10:40 ~ 11:05	Generating Simulink Models from Hybridised Event-B Models Neeraj Singh, Guillaume Dupont, Yamine Ait Ameer and Marc Pantel
11:05 ~ 11:30	Towards a Novel Approach to Railway Safety using STPA and Promise Theory Felix Schaber, Atif Mashkooor and Michael Leuschel
11:30 ~ 11:55	Formal Specification and Model Checking of a Synchronous Leader Election Protocol in Maude Tomoyoshi Ogura, Kazuhiro Ogata and Canh Do
11:55 ~ 12:20	Functional Modelling of the Matroid and Application to the Knapsack Problem Zikang Wan, Zhen You, Chen Zhang, Zhengkang Zuo, Changjing Wang and Qimin Hu



Session 2: Testing and Analysis 14:00 ~ 15:15 Chair: Jiandong Li	
14:00 ~ 14:25	Automated Software Test Input Generation with Diffusion Models Yujin Zhu, Xiuqing Guo, Hiroyuki Okamura and Tadashi Dohi
14:25 ~ 14:50	A Framework for Standardized Partitioning Analysis in Integrated Modular Avionics Systems Jilu Zhang, Yong Cai and Weikai Miao
14:50 ~ 15:15	Improving and Evaluating Sparse Decision-Based Black-Box Attacks and Defenses Jonas Brager Jacobsen, Jingyue Li and Mathias Lundteigen Mohus

Session 3: Formal Semantics 15:30 ~ 16:20 Chair: Shaoying Liu	
15:30 ~ 15:55	An Executable Operational Semantics of Quantum Programs and Its Application Canh Minh Do and Kazuhiro Ogata
15:55 ~ 16:20	Relational Denotational and Algebraic Semantics Based on UTP Zhiru Hou and Huibiao Zhu



Session 4: Defect Detection 16:20 ~ 17:35 Chair: Weikai Miao	
16:20 ~ 16:45	S3DA: A 3D point cloud based PCB solder defect detection algorithm Yilongfei Xu, Zhewei Wang, Jinhao Liang, Yueling Zhang, Jincao Feng, Weikai Miao, Jiangtao Wang and Geguang Pu
16:45 ~ 17:10	ASTD Patterns for Integrated Continuous Anomaly Detection In Data Logs Chaymae el Jabri, Marc Frappier and Pierre-Martin Tardif
17:10 ~ 17:35	The Three-point Optimization Algorithm: A novel Physics-based metaheuristic approach Xiong Deng, Shaoying Liu and Yanli Liu

December 3, 2024 (Tuesday, UTC+9)

Keynote Session 2 09:15 ~ 10:15 Chair: Shaoying Liu	
09:15 ~ 10:15	Developing the industrial-strength tools for modeling, testing and verification: A formal-methods perspective Prof. Geguang Pu

Session 5: Specification and Implementation 10:45 ~ 12:00 Chair: Yamine Ait Ameur	
10:45 ~ 11:10	Consistency Naming between Requirements Analysis and Specifications Fumiko Nagoya
11:10 ~ 11:35	Recovery of Trace Links Between a SOFL Formal Specification and its Corresponding Incomplete Java Code Jiandong Li, Shaoying Liu and Zhi Jin



11:35 ~ 12:00	A Methodology for Rating Maintainability Metrics of SOFL Formal Specifications Yu Du and Shaoying Liu
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Session 6: Language and Blockchain 14:00 ~ 15:15 Chair: Fumiko Nagoya	
14:00 ~ 14:25	A Common Declarative Language for UML State Machine Representation, Model Transformation, and Interoperability of Visualization Tools Ali Jannatpour and Constantinos Constantinides
14:25 ~ 14:50	Blockchain Solutions for Cash-on-Delivery: Utilizing Encrypted NFTs, Smart Contracts, and IPFS Technology Bang Le, Trung Phan and Son Ha Xuan
14:50 ~ 15:15	Revolutionizing Animal Health Privacy: Blockchain and Encrypted NFTs Bang Le, Trung Phan and Son Ha Xuan




ICFEM 2024 Main Conference

December 4, 2024 (Wednesday, UTC+9)

Keynote Session 1 09:30 ~ 10:30 Chair: Kazuhiro Ogata	
09:30 ~ 10:30	Formal Specification of Autonomy Features with ARE and KnowLang Prof. Mike Hinchey

Session 1: Modeling and Specification 11:00 ~ 12:30 Chair: Yamine Ait Ameur	
11:00 ~ 11:30	NL2CTL: Automatic Generation of Formal Requirements Specifications via Large Language Models Mengyan Zhao, Ran Tao, Yanhong Huang, Jianqi Shi, Shengchao Qin, Yang Yang
11:30 ~ 12:00	Repairing Event-B Models through Quantifier Elimination Tsutomu Kobayashi, Fuyuki Ishikawa
12:00 ~ 12:30	Tuning Trains Speed in Railway Scheduling Étienne André

Session 2: Timed Automata 14:00 ~ 15:30 Chair: Zhe Hou	
14:00 ~ 14:30	The Bright Side of Timed Opacity Étienne André, Sarah Dépernet, Engel Lefauchaux
14:30 ~ 15:00	Clock-Dependent Probabilistic Timed Automata with One Clock and No Memory Jeremy Sproston




15:00 ~ 15:30	Efficient State Estimation of Discrete-Timed Automata Julian Klein, Paul Kogel, Sabine Glesner
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Session 3: Improving Neural Networks 16:00 ~ 17:30 Chair: Jinsong Dong	
16:00 ~ 16:30	LRNN: A Formal Logic Rules-Based Neural Network for Software Defect Prediction Yuxiang Shang, Shaoying Liu
16:30 ~ 17:00	Quantitative Symbolic Robustness Verification for Quantized Neural Networks Mara Downing, William Eiers, Erin DeLong, Anushka Lodha, Brian Ozawa Burns, Ismet Burak Kadron, Tefvik Bultan
17:00 ~ 17:30	Graph Convolutional Network Robustness Verification Algorithm Based on Dual Approximation Dongdong An, Jianqi Shi, Jing Liu

December 5, 2024 (Thursday, UTC+9)

Keynote Session 2 09:15 ~ 10:15 Chair: Meng Sun	
09:15 ~ 10:15	Synthesizing (Differential) Invariants by Reduction Non-Convex Programming to SDP Prof. Naijun Zhan

Session 4: Formal Analysis 10:45 ~ 12:15 Chair: Fumiko Nagoya	
10:45 ~ 11:15	Formal Kinematic Analysis of Epicyclic Bevel Gear Trains Kubra Aksoy, Adnan Rashid, Sofiene Tahar



11:15 ~ 11:45	Deciding the synthesis problem for hybrid games through bisimulation Catalin Dima, Mariem Hammami, Youssouf Oualhadj, Régine Laleau
11:45 ~ 12:15	Formal Analysis of FreeRTOS Scheduler on ARM Cortex-M4 Cores Chen-Kai Lin, Bow-Yaw Wang

Session 5: Defect Detection 14:00 ~ 15:30 Chair: Weikai Miao	
14:00 ~ 14:30	Differential Property Monitoring for Backdoor Detection Otto Brechelmacher, Dejan Nikovic, Tobias Nießen, Sarah Sallinger, Georg Weissenbacher
14:30 ~ 15:00	MemSpate: Memory Usage Protocol Guided Fuzzing Zhiyuan Fu, Jiacheng Jiang, Cheng Wen, Zhiwu Xu, Shengchao Qin
15:00 ~ 15:30	Formalizing Potential Flows using the HOL Light Theorem Prover Elif Deniz, Sofiene Tahar


Panel Discussion 16:00 ~ 17:20 Chair: Shaoying Liu	
16:00 ~ 17:20	What Roles Can Formal Methods Play in the AI Era?

December 6, 2024 (Friday, UTC+9)

Keynote Session 3 09:15 ~ 10:15 Chair: Dominique Méry	
09:15 ~ 10:15	Challenges and Opportunities in Assurance of Software Defined Vehicle Prof. Mark Lawford

Session 6: Formal Verification 10:45 ~ 12:15 Chair: Shengchao Qin	
10:45 ~ 11:15	The Continuum Hypothesis Implies the Existence of Non-Principal Arithmetical Ultrafilters -- A Coq Formal Verification Guowei Dou, Si Chen, Wensheng Yu, Ru Zhang
11:15 ~ 11:45	Observability of Boolean Control Networks: New Definition and Verification Algorithm Guisen Wu, Zhiming Liu, Jun Pang
11:45 ~ 12:15	On-the-Fly Proof-Based Verification of Reachability in Autonomous Vehicle Controllers Relying on Goal-Aware RSS Peter Riviere, Tsutomu Kobayashi, Neeraj Singh, Fuyuki Ishikawa, Yamine Ait Ameer, Guillaume Dupont

Session 7: Model Checking 14:00 ~ 16:00 Chair: Étienne André	
14:00 ~ 14:30	Efficient SMT-Based Model Checking for HyperTWTL Ernest Bonnah, Luan Nguyen, Khaza Anuarul Hoque



14:30 ~ 15:00	A Tableau-based Approach to Model Checking Linear Temporal Properties Canh Minh Do, Tsubasa Takagi, Kazuhiro Ogata
15:00 ~ 15:30	Simple LTL Model Checking on Finite and Infinite Traces over Concrete Domains David Doose, Julien Brunel
15:30 ~ 16:00	Model Checking Concurrency in Smart Contracts with a Case Study of Safe Remote Purchase Yisong Yu, Naipeng Dong, Zhe Hou, Jin Song Dong



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