# **2024 39th IEEE/ACM International Conference on Automated Software Engineering (ASE 2024)**

## Sacramento, California, USA 27 October - 1 November 2024

**Pages 1-630** 



IEEE Catalog Number: CFP24075-POD **ISBN:** 

979-8-3315-0824-1

**Copyright © 2024, Association for Computing Machinery (ACM) All Rights Reserved** 

### \*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number: ISBN (Print-On-Demand): ISBN (Online): ISSN: CFP24075-POD 979-8-3315-0824-1 979-8-4007-1248-7 1938-4300

#### Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633 E-mail: curran@proceedings.com Web: www.proceedings.com



## 2024 39th IEEE/ACM International Conference on Automated Software Engineering (ASE) **ASE 2024**

## **Table of Contents**

Message from the Chairs	xxxix
ASE 2024 Organizing Committee	xlii
ASE 2024 Program Committees	xliv
ASE 2024 Sponsors	lv

## **Research Papers**

PatUntrack: Automated Generating Patch Examples for Issue Reports without Tracked Insecure Code
Can Cooperative Multi-Agent Reinforcement Learning Boost Automatic Web Testing? An
Exploratory Study
Yujia Fan (Southern University of Science and Technology, China),
Sinan Wang (Southern University of Science and Technology, China),
Zebang Fei (Southern University of Science and Technology, China), Yao
Qin (Southern University of Science and Technology, China), Huaxuan Li
(Southern University of Science and Technology, China), and Yepang Liu
(Southern University of Science and Technology, China)
SLIM: A Scalable and Interpretable Light-weight Fault Localization Algorithm for
Imbalanced Data in Microservice
Rui Ren (DAMO Academy, Alibaba Group Hangzhou, China), Jingbang Yang
(DAMO Academy, Alibaba Group Hangzhou, China), Linxiao Yang (DAMO
Academy, Alibaba Group Hangzhou, China), Xinyue Gu (DAMO Academy,
Alibaba Group Hangzhou, China), and Liang Sun (DAMO Academy, Alibaba
Group Hangzhou, China)
To Tag, or Not to Tag: Translating C's Unions to Rust's Tagged Unions

<ul> <li>General and Practical Property-based Testing for Android Apps</li></ul>	3
<ul> <li>Preference-Guided Refactored Tuning for Retrieval Augmented Code Generation</li></ul>	5
Language-Agnostic Static Analysis of Probabilistic Programs	3
Beyond Manual Modeling: Automating GUI Model Generation Using Design Documents91 Shaoheng Cao (Nanjing University, China), Renyi Chen (Samsung Electronics (China) R&D Centre, China), Minxue Pan (Nanjing University, China), Wenhua Yang (Nanjing University of Aeronautics and Astronautics, China), and Xuandong Li (Nanjing University, China)	1
GPP: A Graph-Powered Prioritizer for Code Review Requests	1
<ul> <li>Test Case Generation for Simulink Models using Model Fuzzing and State Solving</li></ul>	7
A Position-Aware Approach to Decomposing God Classes	•

Revisiting the Conflict-Resolving Problem from a Semantic Perspective
Demonstration-Free: Towards More Practical Log Parsing with Large Language Models 153 Yi Xiao (Chongqing University), Van-Hoang Le (The University of Newcastle), and Hongyu Zhang (Chongqing University)
Efficient Detection of Test Interference in C Projects
<ul> <li>Detect Hidden Dependency to Untangle Commits</li></ul>
Instructive Code Retriever: Learn from Large Language Model's Feedback for Code Intelligence Tasks
DynaMO: Protecting Mobile DL Models through Coupling Obfuscated DL Operators
Understanding Code Changes Practically with Small-Scale Language Models
<ul> <li>Sifting through the Chaff: On Utilizing Execution Feedback for Ranking the Generated Code</li> <li>Candidates</li></ul>
Imperceptible Content Poisoning in LLM-Powered Applications242Quan Zhang (Tsinghua University, China), Chijin Zhou (Tsinghua242University, China), Gwihwan Go (Tsinghua University, China), Binqi2eng (Central South University, China), Heyuan Shi (Central SouthUniversity), Zichen Xu (The Nanchang University, China), and Yu Jiang(Tsinghua University, China)

<ul> <li>UFront: Toward A Unified MLIR Frontend for Deep Learning</li></ul>
SoVAR: Building Generalizable Scenarios from Accident Reports for Autonomous Driving Testing
A Systematic Evaluation of Large Code Models in API Suggestion: When, Which, and How 281 Chaozheng Wang (The Chinese University of Hong Kong), Shuzheng Gao (The Chinese University of Hong Kong), Cuiyun Gao (Harbin Institute of Technology, Shenzhen), Wenxuan Wang (The Chinese University of Hong Kong), Chun Yong Chong (Huawei), Shan Gao (Huawei), and Michael R. Lyu (The Chinese University of Hong Kong)
Repairing Regex-Dependent String Functions
<ul> <li>What Is Wrong with My Model? Identifying Systematic Problems with Semantic Data Slicing 306 Chenyang Yang (Carnegie Mellon University), Yining Hong (Carnegie Mellon University), Grace Lewis (Carnegie Mellon Software Engineering Institute), Tongshuang Wu (Carnegie Mellon University), and Christian Kästner (Carnegie Mellon University)</li> </ul>
Interrogation Testing of Program Analyzers for Soundness and Precision Issues
<ul> <li>MaskDroid: Robust Android Malware Detection with Masked Graph Representations</li></ul>
Constraint-Based Test Oracles for Program Analyzers
Leveraging Large Language Model to Assist Detecting Rust Code Comment Inconsistency
Verifying the Option Type with Rely-Guarantee Reasoning

REACT: IR-Level Patch Presence Test for Binary Qi Zhan (Zhejiang University, China), Xing Hu (Zhejiang University, China), Xin Xia (Huawei, China), and Shanping Li (Zhejiang University, China)	381
Effective Vulnerable Function Identification based on CVE Description Empowered by Large Language Models Yulun Wu (Huazhong University of Science and Technology), Ming Wen (Huazhong University of Science and Technology, China ), Zeliang Yu (Huazhong University of Science and Technology, China ), Xiaochen Guo (Huazhong University of Science and Technology, China ), and Hai Jin (Huazhong University of Science and Technology, China )	393
LLM Meets Bounded Model Checking: Neuro-symbolic Loop Invariant Inference Guangyuan Wu (State Key Laboratory for Novel Software Technology, Nanjing University), Weining Cao (State Key Laboratory for Novel Software Technology, Nanjing University), Yuan Yao (State Key Laboratory for Novel Software Technology, Nanjing University), Hengfeng Wei (State Key Laboratory for Novel Software Technology, Nanjing University), Taolue Chen (School of Computing and Mathematical Sciences, Birkbeck, University of London), and Xiaoxing Ma (State Key Laboratory for Novel Software Technology, Nanjing University)	406
Program Synthesis Meets Visual What-Comes-Next Puzzles Sumit Lahiri (Indian Institute of Technology Kanpur), Pankaj Kumar Kalita (Indian Institute of Technology Kanpur), Akshay Kumar Chittora (Indian Institute of Technology Kanpur), Varun Vankudre (Indian Institute of Technology Kanpur), and Subhajit Roy (Indian Institute of Technology Kanpur)	418
<ul> <li>Semantic-Enhanced Indirect Call Analysis with Large Language Models</li> <li>Baijun Cheng (Peking University, China), Cen Zhang (Nanyang Technological University, Singapore), Kailong Wang (Huazhong University of Science and Technology, China), Ling Shi (Nanyang Technological University, Singapore), Yang Liu (Nanyang Technological University, Singapore), Haoyu Wang (Huazhong University of Science and Technology, China), Yao Guo (Peking University, China), Ding Li (Peking University, China), and Xiangqun Chen (Peking University, China)</li> </ul>	430
AI-driven Java Performance Testing: Balancing Result Quality with Testing Time Luca Traini (University of L'Aquila, Italy), Federico Di Menna (University of L'Aquila, Italy), and Vittorio Cortellessa (University of L'Aquila, Italy)	443
Efficient Detection of Toxic Prompts in Large Language Models Yi Liu (Nanyang Technological University, Singapore), Junzhe Yu (ShanghaiTech University, China), Huijia Sun (ShanghaiTech University, China), Ling Shi (Nanyang Technological University, Singapore), Gelei Deng (Nanyang Technological University, Singapore), Yuqi Chen (ShanghaiTech University, China), and Yang Liu (Nanyang Technological University, Singapore)	455

DRMiner: Extracting Latent Design Rationale from Jira Issue Logs Jiuang Zhao (Beihang University, China), Zitian Yang (Beihang University, China), Li Zhang (Beihang University, China), Xiaoli Lian (Beihang University, China), Donghao Yang (Beihang University, China), and Xin Tan (Beihang University, China)	468
WaDec: Decompiling WebAssembly Using Large Language Model Xinyu She (Huazhong University of Science and Technology), Yanjie Zhao (Huazhong University of Science and Technology), and Haoyu Wang (Huazhong University of Science and Technology)	481
Promise and Peril of Collaborative Code Generation Models: Balancing Effectiveness and Memorization <i>Zhi Chen (Singapore Management University) and Lingxiao Jiang</i> <i>(Singapore Management University)</i>	493
FAIL: Analyzing Software Failures from the News Using LLMs Dharun Anandayuvaraj (Purdue University, USA), Matthew Campbell (Purdue University, USA), Arav Tewari (Purdue University, USA), and James C. Davis (Purdue University, USA)	506
<ul> <li>AVIATE: Exploiting Translation Variants of Artifacts to Improve IR-based Traceability</li> <li>Recovery in Bilingual Software Projects</li></ul>	519
<ul> <li>Detecting and Explaining Anomalies Caused by Web Tamper Attacks via Building</li> <li>Consistency-based Normality</li></ul>	531

An Empirical Study on Learning-based Techniques for Explicit and Implicit Commit Messages Generation
Zhiquan Huang (Sun Yat-sen University, China), Yuan Huang (Sun Yat-sen University, China), Xiangping Chen (Sun Yat-sen University, China), Xiaocong Zhou (Sun Yat-sen University, China), Changlin Yang (Sun Yat-sen University, China), and Zibin Zheng (Sun Yat-sen University, China)
MR-Adopt: Automatic Deduction of Input Transformation Function for Metamorphic Testing 557 Congying Xu (The Hong Kong University of Science and Technology, China; Guangzhou HKUST Fok Ying Tung Research Institute, China), Songqiang Chen (The Hong Kong University of Science and Technology, China; Guangzhou HKUST Fok Ying Tung Research Institute, China), Jiarong Wu (The Hong Kong University of Science and Technology, China; Guangzhou HKUST Fok Ying Tung Research Institute, China), Shing-Chi Cheung (The Hong Kong University of Science and Technology, China; Guangzhou HKUST Fok Ying Tung Research Institute, China), Shing-Chi Cheung (The Hong Kong University of Science and Technology, China; Guangzhou HKUST Fok Ying Tung Research Institute, China), Valerio Terragni (The University of Auckland, New Zealand), Hengcheng Zhu (The Hong Kong University of Science and Technology, China; Guangzhou HKUST Fok Ying Tung Research Institute, China), and Jialun Cao (The Hong Kong University of Science and Technology, China; Guangzhou HKUST Fok Ying Tung Research Institute, China), and Jialun Cao (The Hong Kong University of Science and Technology, China; Guangzhou HKUST Fok Ying Tung Research Institute, China)
<ul> <li>GraphCoder: Enhancing Repository-Level Code Completion via Coarse-to-fine Retrieval Based</li> <li>on Code Context Graph</li></ul>
Semantic Sleuth: Identifying Ponzi Contracts via Large Language Models
NeuroJIT: Improving Just-In-Time Defect Prediction Using Neurophysiological and Empirical Perceptions of Modern Developers

Snopy: Bridging Sample Denoising with Causal Graph Learning for Effective Vulnerability Detection
Sicong Cao (Yangzhou University), Xiaobing Sun (Yangzhou University), Xiaoxue Wu (Yangzhou University), David Lo (Singapore Management University), Lili Bo (Yangzhou University), Bin Li (Yangzhou University), Xiaolei Liu (China Academy of Engineering Physics),
Xingwei Lin (Zhejiang University), and Wei Liu (Yangzhou University)
Towards Synthetic Trace Generation of Modeling Operations using In-Context Learning Approach
Vittoriano Muttillo (University of Teramo), Claudio Di Sipio (University of L'Aquila), Riccardo Rubei (University of L'Aquila), Luca Berardinelli (Johannes Kepler University), and MohammadHadi Dehghani (Johannes Kepler University)
Rust-twins: Automatic Rust Compiler Testing through Program Mutation and Dual Macros Generation
Wenzhang Yang (University of Science and Technology of China, China), Cuifeng Gao (University of Science and Technology of China, China), Xiaoyuan Liu (University of Science and Technology of China, China), Yuekang Li (University of New South Wales), and Yinxing Xue (University of Science and Technology of China, China)
<ul> <li>GlitchProber: Advancing Effective Detection and Mitigation of Glitch Tokens in Large</li> <li>Language Models</li></ul>
What Makes a High-Quality Training Dataset for Large Language Models: A Practitioners' Perspective
Xiao Yu (Huawei), Zexian Zhang (School of Computer Science and Artificial Intelligence, Wuhan University of Technology, Wuhan University of Technology Chongqing Research Institute), Feifei Niu (School of Electrical Engineering and Computer Science, University of Ottawa), Xing Hu (The State Key Laboratory of Blockchain and Data Security, Zhejiang University), Xin Xia (Huawei), and John Grundy (Faculty of Information Technology, Monash University)
<ul> <li>FastFixer: An Efficient and Effective Approach for Repairing Programming Assignments</li></ul>
DroidCoder: Enhanced Android Code Completion with Context-Enriched Retrieval-Augmented Generation

<ul> <li>How to Pet a Two-Headed Snake? Solving Cross-Repository Compatibility Issues with Hera 694 Yifan Xie (National University of Defense Technology, China), Zhouyang Jia (National University of Defense Technology, China), Shanshan Li (National University of Defense Technology, China), Ying Wang (Northeastern University, China), Jun Ma (National University of Defense Technology, China), Xiaoling Li (National University of Defense Technology, China), Haoran Liu (National University of Defense Technology, China), Ying Fu (National University of Defense Technology, China), and Xiangke Liao (National University of Defense Technology, China)</li> </ul>
Root Cause Analysis for Microservices based on Causal Inference: How Far Are We?
<ul> <li>Exploring Parameter-Efficient Fine-Tuning of Large Language Model on Automated Program</li> <li>Repair</li></ul>
Bridging the Gap between Real-world and Synthetic Images for Testing Autonomous Driving Systems
Three Heads Are Better Than One: Suggesting Move Method Refactoring Opportunities with Inter-class Code Entity Dependency Enhanced Hybrid Hypergraph Neural Network
<ul> <li>Evaluating Terminology Translation in Machine Translation Systems via Metamorphic Testing 758 Yihui Xu (School of Computer Science and Technology, Soochow</li> <li>University, China), Yanhui Li (State Key Laboratory for Novel Software</li> <li>Technology, Nanjing University, China), Jun Wang (State Key Laboratory</li> <li>for Novel Software Technology, Nanjing University, China), and</li> <li>Xiaofang Zhang (School of Computer Science and Technology, Soochow</li> <li>University, China)</li> </ul>
RCFG2Vec: Considering Long-Distance Dependency for Binary Code Similarity Detection

An Explainable Automated Model for Measuring Software Engineer Contribution
How Effectively Do Code Language Models Understand Poor-Readability Code?
Differential Fuzzing for Data Distribution Service Programs with Dynamic Configuration
Compiler Bug Isolation via Enhanced Test Program Mutation
<ul> <li>Evaluation of Version Control Merge Tools</li></ul>
An Empirical Study to Evaluate AIGC Detectors on Code Content
Getting Inspiration for Feature Elicitation: App Store- vs. LLM-based Approach
JavaBench: A Benchmark of Object-Oriented Code Generation for Evaluating Large Language Models

<ul> <li>Detecting Element Accessing Bugs in C++ Sequence Containers</li></ul>	13
<ul> <li>FAST: Boosting Uncertainty-based Test Prioritization Methods for Neural Networks via</li> <li>Feature Selection</li></ul>	95
<ul> <li>Scaler: Efficient and Effective Cross Flow Analysis</li></ul>	17
<ul> <li>Unlocking the Power of Numbers: Log Compression via Numeric Token Parsing</li></ul>	.9
<ul> <li>The Potential of One-Shot Failure Root Cause Analysis: Collaboration of the Large Language</li> <li>Model and Small Classifier</li></ul>	31
<ul> <li>Navigating Mobile Testing Evaluation: A Comprehensive Statistical Analysis of Android GUI</li> <li>Testing Metrics</li></ul>	14
<ul> <li>FaaSConf: QoS-aware Hybrid Resources Configuration for Serverless Workflows</li></ul>	57

Mutation-Based Deep Learning Framework Testing Method in JavaScript Environment
Do not neglect what's on your hands: localizing software faults with exception trigger
<ul> <li>stream</li></ul>
RMCBench: Benchmarking Large Language Models' Resistance to Malicious Code
Approximation-guided Fairness Testing through Discriminatory Space Analysis
<ul> <li>AdvSCanner: Generating Adversarial Smart Contracts to Exploit Reentrancy Vulnerabilities</li> <li>Using LLM and Static Analysis</li></ul>
Semistructured Merge with Language-Specific Syntactic Separators
Effective Unit Test Generation for Java Null Pointer Exceptions

<ul> <li>MRCA: Metric-level Root Cause Analysis for Microservices via Multi-Modal Data</li></ul>
<ul> <li>FIPSER: Improving Fairness Testing of DNN by Seed Prioritization</li></ul>
<ul> <li>Parf: Adaptive Parameter Refining for Abstract Interpretation</li></ul>
Unveiling the Characteristics and Impact of Security Patch Evolution
<ul> <li>Giving Every Modality a Voice in Microservice Failure Diagnosis via Multimodal Adaptive</li> <li>Optimization</li></ul>
Blackbox Observability of Features and Feature Interactions
Spotting Code Mutation for Predictive Mutation Testing

SpiderScan: Practical Detection of Malicious NPM Packages Based on Graph-Based BehaviorModeling and Matching1146Yiheng Huang (Fudan University), Ruisi Wang (Fudan University), Wen1146Zheng (Fudan University), Zhuotong Zhou (Fudan University), Susheng Wu(Fudan University), Shulin Ke (Fudan University), Bihuan Chen (FudanUniversity), Shan Gao (Huawei Technologies Co., Ltd), and Xin Peng(Fudan University)
<ul> <li>1+1&gt;2: Integrating Deep Code Behaviors with Metadata Features for Malicious PyPI Package</li> <li>Detection</li></ul>
University) Incremental Context-free Grammar Inference in Black Box Settings
<ul> <li>ART: A Unified Unsupervised Framework for Incident Management in Microservice Systems 1183 Yongqian Sun (Nankai University &amp; TKL-SEHCI, China), Binpeng Shi (Nankai University, China), Mingyu Mao (Nankai University, China), Minghua Ma (Microsoft, USA), Sibo Xia (Nankai University, China), Shenglin Zhang (Nankai University &amp; HL-IT, China), and Dan Pei (Tsinghua University &amp; BNRist, China)</li> </ul>
AXA: Cross-Language Analysis through Integration of Single-Language Analyses
<ul> <li>DataRecipe — How to Cook the Data for CodeLLM?</li></ul>

Prioritizing Test Inputs for DNNs Using Training Dynamics
Compositional Security Analysis of Dynamic Component-based Systems
AACEGEN: Attention Guided Adversarial Code Example Generation for Deep Code Models 1245 Zhong Li (Nanjing University, China), Chong Zhang (Nanjing University, China), Minxue Pan (Nanjing University, China), Tian Zhang (Nanjing University, China), and Xuandong Li (Nanjing University, China)
HITS: High-coverage LLM-based Unit Test Generation via Method Slicing
TypeFSL: Type Prediction from Binaries via Inter-procedural Data-flow Analysis and         Few-shot Learning       1269         Zirui Song (The Chinese University of Hong Kong), YuTong Zhou (The         Chinese University of Hong Kong), Shuaike Dong (Ant Group), Ke Zhang         (The Chinese University of Hong Kong), and Kehuan Zhang (The Chinese         University of Hong Kong)
Contextualized Data-Wrangling Code Generation in Computational Notebooks
Microservice Decomposition Techniques: An Independent Tool Comparison
Dynamic Scoring Code Token Tree: A Novel Decoding Strategy for Generating High-Performance Code
A Pair Programming Framework for Code Generation via Multi-Plan Exploration and Feedback-Driven Refinement

Efficient Slicing of Feature Models via Projected d-DNNF Compilation
iSMELL: Assembling LLMs with Expert Toolsets for Code Smell Detection and Refactoring 1345 Di Wu (BeiHang University, China), Fangwen Mu (Institute of Software , Chinese Academy of Sciences Beijing, China), Lin Shi (Beihang University, China), Zhaoqiang Guo (Software Engineering Application Technology Lab, Huawei, China), Kui Liu (Software Engineering Application Technology Lab, Huawei, China), Weiguang Zhuang (Beihang University, China), Yuqi Zhong (Beihang University, China), and Li Zhang (Beihang University, China)
COBRA: Interaction-Aware Bytecode-Level Vulnerability Detector for Smart Contracts
<ul> <li>Exploring ChatGPT App Ecosystem: Distribution, Deployment and Security</li></ul>
DeepREST: Automated Test Case Generation for REST APIs Exploiting Deep Reinforcement Learning
LLM-Generated Invariants for Bounded Model Checking Without Loop Unrolling
Towards Understanding the Effectiveness of Large Language Models on Directed Test Input Generation
Understanding the Implications of Changes to Build Systems
LeanBin: Harnessing Lifting and Recompilation to Debloat Binaries

<ul> <li>Vision: Identifying Affected Library Versions for Open Source Software Vulnerabilities</li></ul>
Attribution-guided Adversarial Code Prompt Generation for Code Completion Models
ChatBR: Automated assessment and improvement of bug report quality using ChatGPT 1472 Lili Bo (Yangzhou University), Wangjie Ji (Yangzhou University), Xiaobing Sun (Yangzhou University), Ting Zhang (Singapore Management University), Xiaoxue Wu (Yangzhou University), and Ying Wei (Yangzhou University)
Mutual Learning-Based Framework for Enhancing Robustness of Code Models via Adversarial Training
LeGEND: A Top-Down Approach to Scenario Generation of Autonomous Driving Systems Assisted by Large Language Models
Proof Automation with Large Language Models
Diagnosis via Proofs of Unsatisfiability for First-Order Logic with Relational Objects

DevMuT: Testing Deep Learning Framework via Developer Expertise-Based Mutation
<ul> <li>Semi-Supervised Code Translation Overcoming the Scarcity of Parallel Code Data</li></ul>
<ul> <li>Hybrid Regression Test Selection by Integrating File and Method Dependences</li></ul>
<ul> <li>Skyeye: Detecting Imminent Attacks via Analyzing Adversarial Smart Contracts</li></ul>
Test-Driven Development and LLM-based Code Generation
<ul> <li>Giving without Notifying: Assessing Compliance of Data Transmission in Android Apps</li></ul>

On the Evaluation of Large Language Models in Unit Test Generation
ROCAS: Root Cause Analysis of Autonomous Driving Accidents via Cyber-Physical Co-mutation 1620
Shiwei Feng (Purdue University, USA), Yapeng Ye (Purdue University, USA), Qingkai Shi (Nanjing University, China), Zhiyuan Cheng (Purdue University, USA), Xiangzhe Xu (Purdue University, USA), Siyuan Cheng (Purdue University, USA), Hongjun Choi (DGIST, Korea), and Xiangyu Zhang (Purdue University)
Magneto: A Step-Wise Approach to Exploit Vulnerabilities in Dependent Libraries via         LLM-Empowered Directed Fuzzing         Zhuotong Zhou (Fudan University), Yongzhuo Yang (Fudan University),         Susheng Wu (Fudan University), Yiheng Huang (Fudan University), Bihuan         Chen (Fudan University), and Xin Peng (Fudan University)
Constructing Surrogate Models in Machine Learning Using Combinatorial Testing and Active Learning
Developer-Applied Accelerations in Continuous Integration: A Detection Approach and Catalog of Patterns
<ul> <li>MiniChecker: Detecting Data Privacy Risk of Abusive Permission Request Behavior in</li> <li>Mini-Programs</li></ul>

<ul> <li>End-to-End AutoML for Unsupervised Log Anomaly Detection</li></ul>
<ul> <li>B4: Towards Optimal Assessment of Plausible Code Solutions with Plausible Tests</li></ul>
<ul> <li>Enhancing Automated Program Repair with Solution Design</li></ul>
Enhancing the Efficiency of Automated Program Repair via Greybox Analysis
Coding-PTMs: How to Find Optimal Code Pre-trained Models for Code Embedding in Vulnerability Detection?
Context-Aware Automated Sprint Plan Generation for Agile Software Development
Reducing Test Runtime by Transforming Test Fixtures
Combining Coverage and Expert Features with Semantic Representation for CoincidentalCorrectness Detection <i>Huan Xie (Chongqing University, China), Yan Lei (Chongqing University, China), Maojin Li (Chongqing University, China), Meng Yan (Chongqing University), and Sheng Zhang (Chongqing University)</i>
STASE: Static Analysis Guided Symbolic Execution for UEFI Vulnerability Signature Generation

Discovering Likely Program Invariants for Persistent Memory Zunchen Huang (University of Southern California), Srivatsan Ravi (University of Southern California), and Chao Wang (University of Southern California)	1795
Towards Effective Static Type-Error Detection for Python Wonseok Oh (Korea University, Republic of Korea) and Hakjoo Oh (Korea University, Republic of Korea)	1808
A Longitudinal Analysis Of Replicas in the Wild Wild Android Syeda Mashal Abbas Zaidi (University of Waterloo, Canada), Shahpar Khan (University of Waterloo, Canada), Parjanya Vyas (University of Waterloo, Canada), and Yousra Aafer (University of Waterloo, Canada)	1821
Balancing the Quality and Cost of Updating Dependencies Damien Jaime (Sorbonne Université, CNRS, LIP6, SAP), Pascal Poizat (Sorbonne Université, CNRS, LIP6, Université Paris Nanterre), Joyce El Haddad (Université Paris Dauphine-PSL, CNRS, LAMSADE), and Thomas Degueule (Univ. Bordeaux, CNRS, Bordeaux INP, LaBRI, UMR 5800)	1834
Shoot Yourself in the Foot Efficient Code Causes Inefficiency in Compiler Optimizations Fengjuan Gao (Nanjing University of Science and Technology; Nanjing University), Hongyu Chen (Nanjing University), Yuewei Zhou (Rice University), and Ke Wang (Visa Research)	1846
Typed and Confused: Studying the Unexpected Dangers of Gradual Typing Dominic Troppmann (CISPA Helmholtz Center for Information Security, Germany), Aurore Fass (CISPA Helmholtz Center for Information Security, Germany), and Cristian-Alexandru Staicu (CISPA Helmholtz Center for Information Security, Germany)	1858
Refinement Types for Visualization Jingtao Xia (University of California, Santa Barbara), Junrui Liu (University of California, Santa Barbara), Nicholas Brown (University of California, Santa Barbara), Yanju Chen (University of California, Santa Barbara), and Yu Feng (University of California, Santa Barbara)	1871
Efficient Incremental Code Coverage Analysis for Regression Test Suites Jiale Amber Wang (University of Waterloo, Canada), Kaiyuan Wang (Google, USA), and Pengyu Nie (University of Waterloo, Canada)	1882
ComplexCodeEval: A Benchmark for Evaluating Large Code Models on More Complex Code Jia Feng (University of Electronic Science and Technology of China, China), Jiachen Liu (Harbin Institute of Technology, China), Cuiyun Gao (Harbin Institute of Technology, China), Chun Yong Chong (Huawei, China), Chaozheng Wang (The Chinese University of Hong Kong, China), Shan Gao (Huawei, China), and Xin Xia (Huawei, China)	1895
A Joint Learning Model with Variational Interaction for Multilingual Program Translation Yali Du (National Key Laboratory for Novel Software Technology, Nanjing University, China School of Artificial Intelligence, Nanjing University, China ), Hui Sun (National Key Laboratory for Novel Software Technology, Nanjing University, China School of Artificial Intelligence, Nanjing University, China ), and Ming Li (National Key Laboratory for Novel Software Technology, Nanjing University, China School of Artificial Intelligence, Nanjing University, China )	1907

How Does Code Optimization Impact Third-party Library Detection for Android Applications? .. 1919
Zifan Xie (Huazhong University of Science and Technology, China ),
Ming Wen (Huazhong University of Science and Technology, China ),
Tinghan Li (Huazhong University of Science and Technology, China ),
Yiding Zhu (Huazhong University of Science and Technology, China ),
Qingshneg Hou (Shandong University; QI-ANXIN Technology Research
Institute Qingdao, China ), and Hai Jin (Huazhong University of
Science and Technology, China )

### **Industry Showcase**

<ul> <li>Understanding Developer-Analyzer Interactions in Code Reviews</li></ul>
MLOLET - Machine Learning Optimized Load and Endurance Testing
<ul> <li>Vehicle Domain-Specific Language: Unifying Modeling and Code Generation for Low-Code</li> <li>Automotive Development</li></ul>
<ul> <li>Enabling Cost-Effective UI Automation Testing with Retrieval-Based LLMs: A Case Study in</li> <li>WeChat</li></ul>
The Importance of Accounting for Execution Failures when Predicting Test Flakiness

Towards Robust Detection of Open Source Software Supply Chain Poisoning Attacks inIndustry Environments1990Xinyi Zheng (Huazhong University of Science and Technology), Chen Wei (MYbank, Ant Group), Shenao Wang (Huazhong University of Science and Technology), Yanjie Zhao (Huazhong University of Science and Technology), Peiming Gao (MYbank, Ant Group), Yuanchao Zhang (MYbank, Ant Group), Kailong Wang (Huazhong University of Science and Technology), and Haoyu Wang (Huazhong University of Science and Technology)
<ul> <li>How many pomodoros do professional engineers need to complete a microtask of programming?</li> <li>2002</li> <li>Shinobu Saito (NTT, Japan), Yukako Iimura (NTT, Japan), Emad Aghayi</li> <li>(George Mason University, USA), and Thomas LaToza (George Mason University, USA)</li> </ul>
Challenges & Opportunities in Automating DBMS: A Qualitative Study
Seeding and Mocking in White-Box Fuzzing Enterprise RPC APIs: An Industrial Case Study2024 Man Zhang (Beihang University), Andrea Arcuri (Kristiania University College and Oslo Metropolitan University), Piyun Teng (Meituan), Kaiming Xue (Meituan), and Wenhao Wang (Meituan)
Applying Fuzz Driver Generation to Native C/C++ Libraries of OEM Android Framework: Obstacles and Solutions
AutoDW: Automatic Data Wrangling Leveraging Large Language Models
DeployFix: Dynamic Repair of Software Deployment Failures via Constraint Solving

Towards a Robust Waiting Strategy for Web GUI Testing for an Industrial Software System 2065 Haonan Zhang (University of Waterloo), Lizhi Liao (Memorial University of Newfoundland), Zishuo Ding (The Hong Kong University of Science and Technology (Guangzhou)), Weiyi Shang (University of Waterloo), Nidhi Narula (ERA Environmental), Catalin Sporea (ERA Environmental), Andrei Toma (ERA Environmental), and Sarah Sajedi (ERA Environmental)
Experience Report on Applying Program Analysis Techniques for Mainframe Application Understanding
Models Are Codes: Towards Measuring Malicious Code Poisoning Attacks on Pre-trained Model         Hubs       2087         Jian Zhao (Huazhong University of Science and Technology), Shenao Wang       2087         (Huazhong University of Science and Technology), Yanjie Zhao (Huazhong       2087         University of Science and Technology), Yanjie Zhao (Huazhong       2087         Science and Technology), Xinyi Hou (Huazhong University       2087         of Science and Technology), Xinyi Hou (Huazhong University of       2087         Science and Technology), Kailong Wang (Huazhong University of       2087         Science and Technology), Kailong Wang (Huazhong University of       2087         Science and Technology), Chen Wei (MYbank, Ant Group), Yuanchao       2087         Zhang (MYbank, Ant Group), Chen Wei (MYbank, Ant Group), and Haoyu       2087         Wang (Huazhong University of Science and Technology)       2087
<ul> <li>Same App, Different Behaviors: Uncovering Device-specific Behaviors in Android Apps</li></ul>
Integrating Mutation Testing Into Developer Workflow: An Industrial Case Study
Enhancing Compositional Static Analysis with Dynamic Analysis
Quantum Program Testing Through Commuting Pauli Strings on IBM's Quantum Computers 2130 Asmar Muqeet (Simula Research Laboratory and University of Oslo, Norway), Shaukat Ali (Simula Research Laboratory and Oslo Metropolitan University, Norway), and Paolo Arcaini (National Institute of Informatics, Japan)

Towards Long-Term Scientific Model Sustainment at Sandia National Laboratories
Ansible Lightspeed: A Code Generation Service for IT Automation
Industry Practice of Directed Kernel Fuzzing for Open-source Linux Distribution
Cloud Resource Protection via Automated Security Property Reasoning
<ul> <li>Android Malware Family Labeling: Perspectives from the Industry</li></ul>
In-Simulation Testing of Deep Learning Vision Models in Autonomous Robotic Manipulators 2187 Dmytro Humeniuk (Polytechnique Montreal, Canada), Houssem Ben Braiek (Sycodal, Canada), Thomas Reid (Sycodal, Canada), and Foutse Khomh

#### (Polytechnique Montreal, Canada)

## New Ideas and Emerging Results (NIER)

A vision on a methodology for the application of an Intrusion Detection System for satellites
Towards Leveraging LLMs for Reducing Open Source Onboarding Information Overload
Automated Repair of Multi-fault Programs: Obstacles, Approaches, and Prospects
A Formal Treatment of Performance Bugs
<ul> <li>Trident: Detecting SQL Injection Attacks via Abstract Syntax Tree-based Neural Network</li></ul>
Copilot-in-the-Loop: Fixing Code Smells in Copilot-Generated Python Code using Copilot 2230 Beiqi Zhang (Wuhan University), Peng Liang (Wuhan University), Qiong Feng (Nanjing University of Science and Technology), Yujia Fu (Wuhan University), and Zengyang Li (Central China Normal University)
<ul> <li>Unity Is Strength: Collaborative LLM-Based Agents for Code Reviewer Recommendation</li></ul>
Oracle-Guided Vulnerability Diversity and Exploit Synthesis of Smart Contracts Using LLMs 2240 Mojtaba Eshghie (KTH Royal Institute of Technology) and Cyrille Artho (KTH Royal Institute of Technology)
Emergence of a Novel Domain Expert: A Generative AI-based Framework for Software Function Point Analysis
Towards Extracting Ethical Concerns-related Software Requirements from App Reviews
Towards Automated Configuration Documentation
CoDefeater: Using LLMs To Find Defeaters in Assurance Cases

<ul> <li>Attacks and Defenses for Large Language Models on Coding Tasks</li></ul>	268
Prioritizing Tests for Improved Runtime	273
RepoSim: Evaluating Prompt Strategies for Code Completion via User Behavior Simulation22 Chao Peng (ByteDance), Qinyun Wu (ByteDance), Jiangchao Liu (ByteDance), Jierui Liu (ByteDance), Bo Jiang (ByteDance), Mengqian Xu (East China Normal University), Yinghao Wang (ByteDance), Xia Liu (ByteDance), and Ping Yang (ByteDance)	279
Toward Individual Fairness Testing with Data Validity	284
Towards Robust ML-enabled Software Systems: Detecting Out-of-Distribution data using Gini       22         Coefficients       22         Hala Abdelkader (Deakin University, Australia), Jean-Guy Schneider       22         (Monash University), Mohamed Abdelrazek (Deakin University, Australia), Priya Rani (RMIT University), and Rajesh Vasa (Deakin University, Australia)         University, Australia)	289
<ul> <li>Translation Titans, Reasoning Challenges: Satisfiability-Aided Language Models for</li> <li>Detecting Conflicting Requirements</li></ul>	294
Learning DNN Abstractions using Gradient Descent	299
Build Issue Resolution from the Perspective of Non-Contributors	304
Assessing the Feasibility of Micro Frontend Architecture in Native Mobile App Development 23 Quentin Capdepon (Université de Montpellier, France / Berger-Levrault, France), Nicolas Hlad (Berger-Levrault, France), Benoit Verhaeghe (Berger-Levrault, France), and Abdelhak-Djamel Seriai (Université de Montpellier, France)	309

A Conceptual Framework for Quality Assurance of LLM-based Socio-critical Systems
The Software Genome Project: Unraveling Software Through Genetic Principles
Mining for Mutation Operators for Reduction of Information Flow Control Violations
GPTZoo: A Large-scale Dataset of GPTs for the Research Community

## **Tool Demonstrations**

VulZoo: A Comprehensive Vulnerability Intelligence Dataset
PACGBI: A Pipeline for Automated Code Generation from Backlog Items
<ul> <li>FixKit: A Program Repair Collection for Python</li></ul>
MADE-WIC: Multiple Annotated Datasets for Exploring Weaknesses In Code
ContractTinker: LLM-Empowered Vulnerability Repair for Real-World Smart Contracts

Self-Elicitation of Requirements with Automated GUI Prototyping Kristian Kolthoff (Institute for Enterprise Systems, University of Mannheim), Christian Bartelt (Institute for Enterprise Systems, University of Mannheim), Simone Paolo Ponzetto (Data and Web Science Group, University of Mannheim), and Kurt Schneider (Leibniz Universität Hannover)	2354
DroneWiS: Automated Simulation Testing of small Unmanned Aerial Systems in Realistic Windy Conditions Bohan Zhang (Saint Louis University ) and Ankit Agrawal (Saint Louis University )	2358
Olympia: Fuzzer Benchmarking for Solidity Jana Chadt (TU Wien, Austria), Christoph Hochrainer (TU Wien, Austria), Valentin Wüstholz (ConsenSys, Austria), and Maria Christakis (TU Wien, Austria)	2362
CompAi: A Tool for GDPR Completeness Checking of Privacy Policies using Artificial Intelligence Orlando Amaral Cejas (SnT, University of Luxembourg), Sallam Abualhaija (SnT, University of Luxembourg), and Lionel Briand (Lero SFI center for Software Research and University of Limerick)	2366
Depends-Kotlin: A Cross-Language Kotlin Dependency Extractor Qiong Feng (Nanjing University of Science and Technology), Xiaotian Ma (Nanjing University of Science and Technology), Huan Ji (Nanjing University of Science and Technology), Wei Song (Nanjing University of Science and Technology), and Peng Liang (Wuhan University)	2370
ARUS: A Tool for Automatically Removing Unnecessary Stubbings from Test Suites Mengzhen Li (University of Minnesota) and Mattia Fazzini (University of Minnesota)	2374
HighGuard: Cross-Chain Business Logic Monitoring of Smart Contracts Mojtaba Eshghie (KTH Royal Institute of Technology), Cyrille Artho (KTH Royal Institute of Technology), Hans Stammler (KTH Royal Institute of Technology), Wolfgang Ahrendt (Chalmers University of Technology), Thomas Hildebrandt (University of Copenhagen), and Gerardo Schneider (University of Gothenburg)	2378
CoqPilot, a plugin for LLM-based generation of proofs Andrei Kozyrev (JetBrains Research, Constructor University Bremen), Gleb Solovev (JetBrains Research, Constructor University Bremen), Nikita Khramov (JetBrains Research, Constructor University Bremen), and Anton Podkopaev (JetBrains Research, Constructor University Bremen)	2382
BenchCloud: A Platform for Scalable Performance Benchmarking Dirk Beyer (LMU Munich, Germany), Po-Chun Chien (LMU Munich, Germany), and Marek Jankola (LMU Munich, Germany)	2386
flowR: A Static Program Slicer for R Florian Sihler (Ulm University) and Matthias Tichy (Ulm University)	2390
LLM4Workflow: An LLM-based Automated Workflow Model Generation Tool Jia Xu (Anhui University, China), Weilin Du (Anhui University, China), Xiao Liu (Deakin University, Australia), and Xuejun Li (Anhui University, China)	2394

OpenTracer: A Dynamic Transaction Trace Analyzer for Smart Contract Invariant Generation and Beyond	2399
LLM-Based Java Concurrent Program to ArkTS Converter	2403
Slicer4D: A Slicing-based Debugger for Java	2407
Model-Based GUI Testing for HarmonyOS Apps	2411
<ul> <li>Automated Validation of COBOL to Java Transformation</li></ul>	2415
CoVeriTeam GUI: A No-Code Approach to Cooperative Software Verification	2419

## **Student Research Competition**

Finding Performance Issues in Rust Projects	2423
Efficient Code Causes Inefficiency in Compiler Optimizations	2426
Can Large Language Models Comprehend Code Stylometry?	<u>2429</u>
Mining and Recommending Mobile App Features using Data-driven Analytics	2432
Semi-Automated Verification of Interior Unsafe Code Encapsulation in Real-World Rust Systems	2435

## Posters

SemantiLog: Log-based Anomaly Detection with Semantic Similarity
AgoneTest: Automated creation and assessment of Unit tests leveraging Large Language         Models       2440         Andrea Lops (Polytechnic University of Bari), Fedelucio Narducci       2440         (Polytechnic University of Bari), Azzurra Ragone (University of Bari), and Michelantonio Trizio (Wideverse)       240
Match Word with Deed: Maintaining Consistency for IoT Systems with Behavior Models
A Pixel-Level Explainable Approach of Convolutional Neural Networks and Its Application2444 Haitao Zhang (Lanzhou University, China), Jing Wang (Lanzhou University, China), Ziyue Wang (Lanzhou University, China), Ziyi Zhao (Lanzhou University, China), and Zhuo Cheng (Jiangxi Normal University, China)
<ul> <li>Feature Model Slicing for Real-time Selection of Mission-critical Edge Application</li></ul>
Bridging Gaps in LLM Code Translation: Reducing Errors with Call Graphs and Bridged Debuggers
Yang Luo (Microsoft Research, China), Richard Yu (Microsoft, China), Fajun Zhang (Microsoft, China), Ling Liang (Microsoft, China), and Yongqiang Xiong (Microsoft Research, China)
GUI Test Repair Based on Test-Extension
Quantitative Symbolic Non-Equivalence Analysis
Detecting Atomicity Violations for Interrupt-driven Programs via Systematic Scheduling and Prefix-directed Feedback

Studying Versioning in Stack Overflow
GrayDuck: The Sword of Damocles for Duck Typing in Dynamic Language Deserialization 2458 Xiaofan Liu (Hubei Key Laboratory of Distributed System Security, School of Cyber Science and Engineering, Huazhong University of Science and Technology), Xunjin Zheng (Ant Group), Cai Fu (Hubei Key Laboratory of Distributed System Security, School of Cyber Science andEngineering, Huazhong University of Science and Technology), Xiaoheng Xie (Ant Group), and Peng Di (Ant Group)
A Generalized Approach for Solving Web Form Constraints
Automatically Deriving Developers' Technical Expertise from the GitHub Social Network
LLMs and Prompting for Unit Test Generation: A Large-Scale Evaluation
RepoGenix: Dual Context-Aided Repository-Level Code Completion with Language Models 2466 Ming Liang (Ant Group), Xiaoheng Xie (Ant Group), Gehao Zhang (Ant Group), Xunjin Zheng (Ant Group), Peng Di (Ant Group), Wei Jiang (Ant Group), Hongwei Chen (Ant Group), Chengpeng Wang (The Hong Kong University of Science and Technology, Hong Kong, China), and Gang Fan (Ant Group)
A High-level Architecture of an Automated Context-aware Ethics-based Negotiation Approach 2468 Mashal Afzal Memon (University of L'Aquila, Italy), Marco Autili (University of L'Aquila, Italy), Gianluca Filippone (Gran Sasso Science Institute, Italy), Gian Luca Scoccia (Gran Sasso Science Institute, Italy), and Paola Inverardi (Gran Sasso Science Institute, Italy)
Assessing Open Source Software Survivability using Kaplan-Meier Survival Function and Polynomial Regression

Can Code Metrics Enhance Documentation Generation for Computational Notebooks?
Cross-lingual Code Clone Detection: When LLMs Fail Short Against Embedding-based Classifier
Towards LLM-augmented multiagent systems for agile software engineering
IdeoRate: Towards a Semi-automated Assessment Methodology for OSS Ideologies
PatchTrack: Analyzing ChatGPT's Impact on Software Patch Decision-Making in Pull Requests 2480 Daniel Ogenrwot (University of Nevada, Las Vegas) and John Businge (University of Nevada, Las Vegas)
Detecting Malicious Accounts in Web3 through Transaction Graph
From Logging to Leakage: A Study of Privacy Leakage in Android App Logs
Using LLM for Mining and Testing Constraints in API Testing
A Data-driven Approach for Mining Software Features based on Similar App Descriptions and User Reviews Analysis

## **Doctoral Symposium**

Improving the Comprehension of R Programs by Hybrid Dataflow Analysis	.490
Semantic-aware Source Code Modeling	.494
Enhancing Software Design and Developer Experience via LLMs	.498
Syntactic Resilience in Greybox Fuzzing: Automated Error Recovery	502
Software Supply Chain Risk: Characterization, Measurement & Attenuation	506
A Comprehensive Study of Privacy Leakage Vulnerability in Android App Logs 2. Zhiyuan Chen (Rochester Institute of Technology)	510
Using AI to Automate the Modernization of Legacy Software Applications	514

#### Author Index