# 2021 IEEE/ACM 43rd International Conference on Software Engineering (ICSE) ICSE 2021

#### **Table of Contents**

Message from the Program Chairs of ICSE 2021 xxxii  Message from the Journal-First Chairs of ICSE 2021 xxxiii  Organizing Committee of ICSE 2021 xxxiii  Organizing Committee of ICSE 2021 xxiii  Technical Program Committee of ICSE 2021 xxxiii  Journal First Program Committee of ICSE 2021 xxiii  External Reviewers of ICSE 2021 xxiii  Sponsors and Supporters of ICSE 2021 xxliii  Agile Methods  Playing Planning Poker in Crowds: Human Computation of Software Effort Estimates flow and Itim Storer (University of Glasgow, United Kingdom) and Tim Storer (University of Glasgow, United Kingdom)  Analyzing System Properties: Correctness, Determinism, Realizability  JEST: N+1-Version Differential Testing of Both JavaScript Engines and Specification flowed by Park (KAIST, South Korea), Seungmin An (KAIST, South Korea), Donsgiun Youn (KAIST, South Korea), Seungmin An (KAIST, South Korea), and Sukyoung Ryu (KAIST, South Korea)  Unrealizable Cores for Reactive Systems Specifications flowed by Shahar Maoz (Tel Aviv University, Israel) and Rafi Shalom (Tel Aviv University, Israel)  Verifying Determinism in Sequential Programs flowed flowed flowed the Shahar Mudduluru (University of Washington), Jason Waataja (University of Washington), Suzanne Millstein (University of Washington), and Michael Ernst (University of Washington)	Message from the ICSE 2021 General Chair	
Message from the Journal-First Chairs of ICSE 2021	Message from the Program Chairs of ICSE 2021	xxxi
Technical Program Committee of ICSE 2021	Message from the Journal-First Chairs of ICSE 2021	xxxiii
Technical Program Committee of ICSE 2021	Organizing Committee of ICSE 2021	xxxiv
External Reviewers of ICSE 2021 xli Sponsors and Supporters of ICSE 2021 xliii  Agile Methods  Playing Planning Poker in Crowds: Human Computation of Software Effort Estimates Mohammed Alhamed (University of Glasgow, United Kingdom) and Tim Storer (University of Glasgow, United Kingdom)  Analyzing System Properties: Correctness, Determinism, Realizability  JEST: N+1-Version Differential Testing of Both JavaScript Engines and Specification 13 Jihyeok Park (KAIST, South Korea), Seungmin An (KAIST, South Korea), Dongjun Youn (KAIST, South Korea), Gyeongwon Kim (KAIST, South Korea), and Sukyoung Ryu (KAIST, South Korea)  Unrealizable Cores for Reactive Systems Specifications 25 Shahar Maoz (Tel Aviv University, Israel) and Rafi Shalom (Tel Aviv University, Israel)  Verifying Determinism in Sequential Programs 37 Rashmi Mudduluru (University of Washington), Jason Waataja (University of Washington), Suzanne Millstein (University of Washington), and	Technical Program Committee of ICSE 2021	xxxvi
Agile Methods  Playing Planning Poker in Crowds: Human Computation of Software Effort Estimates		
Agile Methods  Playing Planning Poker in Crowds: Human Computation of Software Effort Estimates	External Reviewers of ICSE 2021	xli
Playing Planning Poker in Crowds: Human Computation of Software Effort Estimates  Mohammed Alhamed (University of Glasgow, United Kingdom) and Tim  Storer (University of Glasgow, United Kingdom)  Analyzing System Properties: Correctness, Determinism, Realizability  JEST: N+1-Version Differential Testing of Both JavaScript Engines and Specification  Jihyeok Park (KAIST, South Korea), Seungmin An (KAIST, South Korea),  Dongjun Youn (KAIST, South Korea), Gyeongwon Kim (KAIST, South Korea),  and Sukyoung Ryu (KAIST, South Korea)  Unrealizable Cores for Reactive Systems Specifications  Shahar Maoz (Tel Aviv University, Israel) and Rafi Shalom (Tel Aviv  University, Israel)  Verifying Determinism in Sequential Programs  Rashmi Mudduluru (University of Washington), Jason Waataja (University  of Washington), Suzanne Millstein (University of Washington), and	Sponsors and Supporters of ICSE 2021	xliii
Mohammed Alhamed (University of Glasgow, United Kingdom) and Tim Storer (University of Glasgow, United Kingdom)  Analyzing System Properties: Correctness, Determinism, Realizability  JEST: N+1-Version Differential Testing of Both JavaScript Engines and Specification 13  Jihyeok Park (KAIST, South Korea), Seungmin An (KAIST, South Korea),  Dongjun Youn (KAIST, South Korea), Gyeongwon Kim (KAIST, South Korea),  and Sukyoung Ryu (KAIST, South Korea)  Unrealizable Cores for Reactive Systems Specifications 25  Shahar Maoz (Tel Aviv University, Israel) and Rafi Shalom (Tel Aviv  University, Israel)  Verifying Determinism in Sequential Programs 37  Rashmi Mudduluru (University of Washington), Jason Waataja (University  of Washington), Suzanne Millstein (University of Washington), and	Agile Methods	
JEST: N+1-Version Differential Testing of Both JavaScript Engines and Specification 13  Jihyeok Park (KAIST, South Korea), Seungmin An (KAIST, South Korea),  Dongjun Youn (KAIST, South Korea), Gyeongwon Kim (KAIST, South Korea),  and Sukyoung Ryu (KAIST, South Korea)  Unrealizable Cores for Reactive Systems Specifications 25  Shahar Maoz (Tel Aviv University, Israel) and Rafi Shalom (Tel Aviv  University, Israel)  Verifying Determinism in Sequential Programs 37  Rashmi Mudduluru (University of Washington), Jason Waataja (University  of Washington), Suzanne Millstein (University of Washington), and	Mohammed Alhamed (University of Glasgow, United Kingdom) and Tim	1
Jihyeok Park (KAIST, South Korea), Seungmin An (KAIST, South Korea), Dongjun Youn (KAIST, South Korea), Gyeongwon Kim (KAIST, South Korea), and Sukyoung Ryu (KAIST, South Korea)  Unrealizable Cores for Reactive Systems Specifications	Analyzing System Properties: Correctness, Determinism, Real	izability
Shahar Maoz (Tel Aviv University, Israel) and Rafi Shalom (Tel Aviv University, Israel)  Verifying Determinism in Sequential Programs	Jihyeok Park (KAIST, South Korea), Seungmin An (KAIST, South Korea), Dongjun Youn (KAIST, South Korea), Gyeongwon Kim (KAIST, South Korea),	13
Rashmi Mudduluru (University of Washington), Jason Waataja (University of Washington), Suzanne Millstein (University of Washington), and	Shahar Maoz (Tel Aviv University, Israel) and Rafi Shalom (Tel Aviv	25
	Rashmi Mudduluru (University of Washington), Jason Waataja (University	37

# **API:** Development

Oomain-Specific Fixes for Flaky Tests with Wrong Assumptions on Underdetermined pecifications50
Peilun Zhang (University of Illinois at Urbana-Champaign, USA), Yanjie Jiang (Beijing Institute of Technology, China), Anjiang Wei (Peking University, China), Victoria Stodden (University of Illinois at Urbana-Champaign, USA), Darko Marinov (University of Illinois at Urbana-Champaign, USA), and August Shi (The University of Texas at Austin, USA)
Studying Test Annotation Maintenance in the Wild
API: Evolution and Maintenance #1
emantic Patches for Adaptation of JavaScript Programs to Evolving Libraries
API: Evolution and Maintenance #2
DepOwl: Detecting Dependency Bugs to Prevent Compatibility Failures
Hero: On the Chaos When PATH Meets Modules
Ying Wang (Northeastern University, China), Liang Qiao (Northeastern University, China), Chang Xu (Nanjing University, China), Yepang Liu (Southern University of Science and Technology, China), Shing-Chi Cheung (The Hong Kong University of Science and Technology, China), Na Meng (Virginia Tech, USA), Hai Yu (Northeastern University, China), and Zhiliang Zhu (Northeastern University, China)
API: Usage and Refactoring
OAR: A Synthesis Approach for Data Science API Refactoring

AutoCCAG: An Automated Approach to Constrained Covering Array Generation
Continuous Integration
What Helped, and what did not? An Evaluation of the Strategies to Improve Continuous Integration
Deep Neural Networks: Data Selection
Distribution-Aware Testing of Neural Networks Using Generative Models
An Empirical Study of Refactorings and Technical Debt in Machine Learning Systems
DeepLocalize: Fault Localization for Deep Neural Networks
Deep Neural Networks: Hacking
DeepPayload: Black-box Backdoor Attack on Deep Learning Models through Neural Payload Injection
Yuanchun Li (Microsoft Research, China), Jiayi Hua (Beijing University of Posts and Telecommunications, China), Haoyu Wang (Beijing University of Posts and Telecommunications, China), Chunyang Chen (Monash University, Australia), and Yunxin Liu (Microsoft Research, China)
Reducing DNN Properties to Enable Falsification with Adversarial Attacks

Deep Neural Networks: Quality Assurance
Graph-Based Fuzz Testing for Deep Learning Inference Engines
RobOT: Robustness-Oriented Testing for Deep Learning Systems
Scalable Quantitative Verification for Deep Neural Networks
Deep Neural Networks: Supporting SE Tasks #1
Traceability Transformed: Generating More Accurate Links with Pre-Trained BERT Models 324  Jinfeng Lin (University Of Notre Dame, USA), Yalin Liu (University Of  Notre Dame, USA), Qingkai Zeng (University Of Notre Dame, USA), Meng  Jiang (University Of Notre Dame, USA), and Jane Cleland-Huang  (University Of Notre Dame, USA)
Deep Neural Networks: Supporting SE Tasks #2
Studying the Usage of Text-To-Text Transfer Transformer to Support Code-Related Tasks
Deep Neural Networks: Validation #1
Operation is the Hardest Teacher: Estimating DNN Accuracy Looking for Mispredictions
AUTOTRAINER: An Automatic DNN Training Problem Detection and Repair System

elf-Checking Deep Neural Networks in Deployment 372  Yan Xiao (National University of Singapore, Singapore), Ivan Beschastnikh (University of British Columbia, Canada), David S. Rosenblum (George Mason University, USA), Changsheng Sun (National University of Singapore, Singapore), Sebastian Elbaum (University of Virginia, USA), Yun Lin (National University of Singapore, Singapore), and Jin Song Dong (National University of Singapore, Singapore)
Deep Neural Networks: Validation #2
leasuring Discrimination to Boost Comparative Testing for Multiple Deep Learning Models 385 Linghan Meng (Nanjing University, China), Yanhui Li (Nanjing University, China), Lin Chen (Nanjing University, China), Zhi Wang (Nanjing University, China), Di Wu (Momenta, China), Yuming Zhou (Nanjing University, China), and Baowen Xu (Nanjing University, China)
rioritizing Test Inputs for Deep Neural Networks via Mutation Analysis
esting Machine Translation via Referential Transparency
Defect Prediction: Automation #1
utomatic Web Testing Using Curiosity-Driven Reinforcement Learning
Defect Prediction: Automation #2
valuating SZZ Implementations Through a Developer-Informed Oracle

Defect Prediction: Data Issues and Bug Classification
Early Life Cycle Software Defect Prediction. Why? How?
IoT Bugs and Development Challenges
Defect Prediction: Modeling and Performance
How Developers Optimize Virtual Reality Applications: A Study of Optimization Commits in Open Source Unity Projects
Developers: Behavior
"Do this! Do that!, and Nothing will Happen" Do Specifications Lead to Securely Stored Passwords?
Why Don't Developers Detect Improper Input Validation? '; DROP TABLE Papers;
Developers: Experiments
The Mind Is a Powerful Place: How Showing Code Comprehensibility Metrics Influences Code Understanding
Program Comprehension and Code Complexity Metrics: An fMRI Study

# **Developers: General Issues**

Do you Really Code? Designing and Evaluating Screening Questions for Online Surveys with
Programmers
Germany), and Matthew Smith (University of Bonn, Fraunhofer FKIE, Germany)
How Gamification Affects Software Developers: Cautionary Evidence from a Natural
Experiment on GitHub
(RWTH Aachen University & GESIS - Leibniz Institute for the Social Sciences, Germany), and Johannes Wachs (Vienna University of Economics
and Business & Complexity Science Hub Vienna, Austria)
Developers: Naming Methods and Variables
IdBench: Evaluating Semantic Representations of Identifier Names in Source Code
A Context-Based Automated Approach for Method Name Consistency Checking and Suggestion . 574
Yi Li (New Jersey Institute of Technology, USA), Shaohua Wang (New Jersey Institute of Technology, USA), and Tien Nguyen (The University
of Texas at Dallas, USA)
On the Naming of Methods: A Survey of Professional Developers
University, Saudi Arabia), Christian Newman (Rochester Institute of Technology, USA), Michael Decker (Bowling Green State University,
USA), Michael Collard (The University of Akron, USA), and Jonathan Maletic (Kent State University, USA)
Developers: Observational Studies
Relating Reading, Visualization, and Coding for New Programmers: A Neuroimaging Study 600 Madeline Endres (University of Michigan), Zachary Karas (University of Michigan), Xiaosu Hu (University of Michigan), Ioulia Kovelman (University of Michigan), and Westley Weimer (University of Michigan)
Developers: Onboarding
A Case Study of Onboarding in Software Teams: Tasks and Strategies

#### **Developers: Well-Being and Productivity**

"How Was Your Weekend?" Software Development Teams Working From Home During COVID-19 ... Courtney Miller (New College of Florida, USA), Paige Rodeghero (Clemson University, USA), Margaret-Anne Storey (University of Victoria, Canada), Denae Ford (Microsoft Research, USA), and Thomas Zimmermann (Microsoft Research, USA) Fault Localization #1 Guolong Zheng (University of Nebraska-Lincoln), ThanhVu Nguyen (University of Nebraska, Lincoln), Simón Gutiérrez Brida (University of Rio Cuarto and CONICET), Germán Regis (University of Rio Cuarto and CONICET), Marcelo F. Frias (Software Engineering Instituto Tecnológico de Buenos Aires), Nazareno Aguirre (University of Rio Cuarto and CONICET), and Hamid Bagheri (University of Nebraska-Lincoln) Improving Fault Localization by Integrating Value and Predicate Based Causal Inference Yigit Kucuk (Case Western Reserve University, USA), Tim A. D. Henderson (Google Inc., USA), and Andy Podgurski (Case Western Reserve *University*, *USA*) Fault Localization #2 Fault Localization with Code Coverage Representation Learning 661

Yi Li (New Jersey Institute of Technology, USA), Shaohua Wang (New Jersey Institute of Technology, USA), and Tien Nguyen (The University of Texas at Dallas, USA) Fault Localization #3 Zhenpeng Chen (Peking University, China), Huihan Yao (Peking University, China), Yiling Lou (Peking University, China), Yanbin Cao (Peking University, China), Yanbin Cao (Peking University, China), Peking University Information Technology Institute, China), Yuanqiang Liu (Peking University Information Technology Institute, China), Haoyu Wang (Beijing University of Posts and Telecommunications, China), and Xuanzhe Liu (Peking University, China) Extracting Concise Bug-Fixing Patches from Human-Written Patches in Version Control Systems 686 Yanjie Jiang (Beijing Institute of Technology, China), Hui Liu (Beijing Institute of Technology, China), Nan Niu (University of Cincinnati, USA), Lu Zhang (Peking University, China), and Yamin Hu (Beijing Institute of Technology, China)

# **Fuzzing**

Input Algebras	9
Fuzzing Symbolic Expressions	1
Growing a Test Corpus with Bonsai Fuzzing	3
Games	
We'll Fix It in Post: What Do Bug Fixes in Video Game Update Notes Tell Us?	6
GUI Design	
GUIGAN: Learning to Generate GUI Designs Using Generative Adversarial Networks74  Tianming Zhao (Jilin University, China), Chunyang Chen (Monash University, Australia), Yuanning Liu (Jilin University, China), and Xiaodong Zhu (Jilin University, China)	8
Don't Do That! Hunting Down Visual Design Smells in Complex UIs Against Design Guidelines 76 Bo Yang (Zhejiang University, China), Zhenchang Xing (Australian National University, Australia), Xin Xia (Monash University, Australia), Chunyang Chen (Monash University, Australia), Deheng Ye (Tencent AI Lab, China), and Shanping Li (Zhejiang University, China)	1
Handling Ecosystems of Forked Projects	
Same File, Different Changes: The Potential of Meta-Maintenance on GitHub	3
Can Program Synthesis be Used to Learn Merge Conflict Resolutions? An Empirical Analysis 78 Rangeet Pan (Iowa State University, USA), Vu Le (Microsoft Corporation, USA), Nachiappan Nagappan (Microsoft Corporation, USA), Sumit Gulwani (Microsoft Corporation, USA), Shuvendu Lahiri (Microsoft Corporation, USA), and Mike Kaufman (Microsoft Corporation, USA)	5

#### University), James R. Larus (EPFL), and Dinghao Wu (The Pennsylvania State University) Jingbo Wang (University of Southern California), Chungha Sung (University of Southern California), Mukund Raghothaman (University of Southern California), and Chao Wang (University of Southern California) **Image Processing** Wei Song (Nanjing University of Science and Technology, China), Mengqi Han (Nanjing University of Science and Technology, China), and Jeff Huang (Texas A&M University, USA) **Model Checking** Xinwei Fang (University of York, UK), Radu Calinescu (University of York, UK), Simos Gerasimou (University of York, UK), and Faisal Alhwikem (University of York, UK) Claudio Menghi (University of Luxembourg, Luxembourg), Enrico Viganò (University of Luxembourg, Luxembourg), Domenico Bianculli (University of Luxembourg, Luxembourg), and Lionel C. Briand (University of Luxembourg, Luxembourg; University of Ottawa, Canada) Modularization and Reusability CENTRIS: A Precise and Scalable Approach for Identifying Modified Open-Source Software Seulbae Kim (Georgia Institute of Technology), Heejo Lee (Korea University), and Hakjoo Oh (Korea University)

**Identifying Information Leaks** 

Interpretation-Enabled Software Reuse Detection Based on a Multi-level Birthmark Model
Monitoring Cloud-Based Services
Fast Outage Analysis of Large-Scale Production Clouds with Service Correlation Mining
Mutation Testing: General Issues
MuDelta: Delta-Oriented Mutation Testing at Commit Time
Does Mutation Testing Improve Testing Practices?
Obtaining Information from App User Reviews #1
Identifying Key Features from App User Reviews

CHAMP: Characterizing Undesired App Behaviors from User Comments Based on Market Policie 933	es
Yangyu Hu (Chongqing University of Posts and Telecommunications, China), Haoyu Wang (Beijing University of Posts and	
Telecommunications, China), Tiantong Ji (Case Western Reserve	
University, USA), Xusheng Xiao (Case Western Reserve University, USA),	
Xiapu Luo (The Hong Kong Polytechnic University, China), Peng Gao	
(University of California, USA), and Yao Guo (Peking University,	
China)	
Prioritize Crowdsourced Test Reports via Deep Screenshot Understanding	. 946
Shengcheng Yu (Nanjing University, China), Chunrong Fang (Nanjing	
University, China), Zhenfei Cao (Nanjing University, China), Xu Wang (Nanjing University, China), Tongyu Li (Nanjing University, China),	
and Zhenyu Chen (Nanjing University, China)	
It Takes Two to Tango: Combining Visual and Textual Information for Detecting Duplicate Video-Based Bug Reports	. 957
Nathan Cooper (College of William and Mary, USA), Carlos	. 757
Bernal-Cárdenas (College of William and Mary, USA), Oscar Chaparro	
(College of William and Mary, USA), Kevin Moran (George Mason	
University, USA), and Denys Poshyvanyk (College of William and Mary,	
USA)	
Obtaining Information from App User Reviews #2	
Automatically Matching Bug Reports With Related App Reviews	. 970
Marlo Haering (University of Hamburg, Germany), Christoph Stanik	
(University of Hamburg, Ğermany), and Walid Maalej (University of Hamburg, Germany)	
Open Source: Developers' Skills	
•	
What Makes a Great Maintainer of Open Source Projects?	982
Castor (UFPE, Brazil), Igor Steinmacher (UTFPR, Brazil; NAU, USA),	
Igor Wiese (UTFPR, Brazil), and Gustavo Pinto (UFPA, Brazil)	
Representation of Developer Expertise in Open Source Software	. 995
Tapajit Dey (The University of Tennessee, USA), Andrey Karnauch (The	
University of Tennessee, USA), and Audris Mockus (The University of	
Tennessee, USA)	
Oman Causaa Canaval Iaasaa	
Open Source: General Issues	
Extracting Rationale for Open Source Software Development Decisions — A Study of Python	
Email Archives Pankajeshwara Nand Sharma (University of Otago, New Zealand), Bastin	1008
Tankajesnwara Nana Sharma (University of Otago, New Zealand), Bastin Tony Roy Savarimuthu (University of Otago, New Zealand), and Nigel	
Stanger (University of Otago, New Zealand)	

# Open Source: Participants' Motivations

Leaving My Fingerprints: Motivations and Challenges of Contributing to OSS for Social Good 1020 Yu Huang (University of Michigan, MI), Denae Ford (Microsoft Research, USA), and Thomas Zimmermann (Microsoft Research, USA)
Onboarding vs. Diversity, Productivity and Quality — Empirical Study of the OpenStack  Ecosystem
The Shifting Sands of Motivation: Revisiting What Drives Contributors in Open Source
Performance Modeling of Highly Configurable Software Systems
White-Box Performance-Influence Models: A Profiling and Learning Approach 1059  Max Weber (Leipzig University, Germany), Sven Apel (Saarland University, Saarland Informatics Campus, Germany), and Norbert Siegmund (Leipzig University, Germany)
White-Box Analysis over Machine Learning: Modeling Performance of Configurable Systems 1072 Miguel Velez (Carnegie Mellon University), Pooyan Jamshidi (University of South Carolina), Norbert Siegmund (Leipzig University), Sven Apel (Saarland University), and Christian Kästner (Carnegie Mellon University)
Privacy in Apps: Cases from COVID-19
An Empirical Assessment of Global COVID-19 Contact Tracing Applications
Sustainable Solving: Reducing the Memory Footprint of IFDS-Based Data Flow Analyses Using Intelligent Garbage Collection

#### **Program Repair: Automatic Patching** Zelin Zhao (Nanjing University, China), Yanyan Jiang (Nanjing University, China), Chang Xu (Nanjing University, China), Tianxiao Gu (Alibaba Group, USA), and Xiaoxing Ma (Nanjing University, China) Lingchao Chen (The University of Texas at Dallas), Yicheng Ouyang (The University of Texas at Dallas), and Lingming Zhang (University of *Illinois at Urbana-Champaign)* **Program Repair: General Issues** of Rio Cuarto and CONICET, Argentina), Germán Regis (University of Rio Cuarto, Argentina), Guolong Zheng (University of Nebraska-Lincoln, USA), Hamid Bagheri (University of Nebraska-Lincoln, USA), ThanhVu Nguyen (University of Nebraska-Lincoln, USA), Nazareno Aguirre (University of Rio Cuarto, Argentina; University of Rio Cuarto and CONICET, Argentina), and Marcelo Frias (Buenos Aires Institute of Technology and CONICET, Argentina; Buenos Aires Institute of Technology, Argentina) Jordan Henkel (University of Wisconsin-Madison, USA), Denini Silva (Federal University of Pernambuco, Brazil), Leopoldo Teixeira (Federal University of Pernambuco, Brazil), Marcelo d'Amorim (Federal University of Pernambuco, Brazil), and Thomas Reps (University of Wisconsin-Madison, USA) Nan Jiang (Purdue University, USA), Thibaud Lutellier (University of Waterloo, Canada), and Lin Tan (Purdue University, USA) **Programming: Code Analysis Algorithms** A Differential Testing Approach for Evaluating Abstract Syntax Tree Mapping Algorithms ....... 1174 Yuanrui Fan (Zhejiang University, China; PengCheng Laboratory, China), Xin Xia (Monash University, Australia), David Lo (Singapore Management University, Singapore), Ahmed E. Hassan (Queen's University, Canada), Yuan Wang (Huawei Sweden Research Center), and Shanping Li (Zhejiang

Nghi D. Q. Bui (Singapore Management University), Yijun Yu (The Open University, UK), and Lingxiao Jiang (Singapore Management University)

University, China)

# **Programming: General Issues**

Efficient Compiler Autotuning via Bayesian Optimization
TransRegex: Multi-modal Regular Expression Synthesis by Generate-and-Repair
EvoSpex: An Evolutionary Algorithm for Learning Postconditions
Programming: Low Level
Interface Compliance of Inline Assembly: Automatically Check, Patch and Refine
Enabling Software Resilience in GPGPU Applications via Partial Thread Protection

Q&A in Unline Platforms: Stack Overflow #1
Automatic Extraction of Opinion-Based Q&A from Online Developer Chats
Q&A in Online Platforms: Stack Overflow #2
Automated Query Reformulation for Efficient Search Based on Query Logs From Stack Overflow 1273 Kaibo Cao (Nanjing University, China), Chunyang Chen (Monash University, Australia), Sebastian Baltes (University of Adelaide, Australia), Christoph Treude (University of Adelaide, Australia), and Xiang Chen (Nantong University, China)
Automatic Solution Summarization for Crash Bugs
Supporting Quality Assurance with Automated Process-Centric Quality Constraints Checking 1298 Christoph Mayr-Dorn (Johannes Kepler University, Austria), Michael Vierhauser (Johannes Kepler University, Austria), Stefan Bichler (Johannes Kepler University, Austria), Felix Keplinger (Johannes Kepler University, Austria), Jane Cleland-Huang (University of Notre Dame, USA), Alexander Egyed (Johannes Kepler University, Austria), and Thomas Mehofer (Frequentis AG, Austria)
Quality Assurance
Understanding Bounding Functions in Safety-Critical UAV Software
Search-Based SE & Genetic Operations
Enhancing Genetic Improvement of Software with Regression Test Selection
Security Vulnerabilities: Different Domains
Containing Malicious Package Updates in npm with a Lightweight Permission System

Too Quiet in the Library: An Empirical Study of Security Updates in Android Apps' Native Code
If It's Not Secure, It Should Not Compile: Preventing DOM-Based XSS in Large-Scale Web  Development with API Hardening
Security Vulnerabilities: From 3rd Parties' Code
Why Security Defects Go Unnoticed During Code Reviews? A Case-Control Study of the Chromium OS Project
Security Vulnerabilities: General Issues #1
Technical Leverage in a Software Ecosystem: Development Opportunities and Security Risks 1386 Fabio Massacci (University of Trento (IT), Vrije Universiteit Amsterdam (NL)) and Ivan Pashchenko (University of Trento (IT))
Security Vulnerabilities: General Issues #2
RAICC: Revealing Atypical Inter-Component Communication in Android Apps
Smart Contracts
Smart Contract Security: A Practitioners' Perspective
Social Equality and Fairness #1
AID: An Automated Detector for Gender-Inclusivity Bugs in OSS Project Pages

Social Equality and Fairness #2
"Lgnorance and Prejudice" in Software Fairness
Software Log Analysis
Semi-Supervised Log-Based Anomaly Detection via Probabilistic Label Estimation
DeepLV: Suggesting Log Levels Using Ordinal Based Neural Networks
Software Requirements
How to Identify Boundary Conditions with Contrasty Metric?
Using Domain-Specific Corpora for Improved Handling of Ambiguity in Requirements
Source Code Histories and Documentation
On Indirectly Dependent Documentation in the Context of Code Evolution: A Study
CodeShovel: Constructing Method-Level Source Code Histories

Testing: 3rd Party Software
Evaluating Unit Testing Practices in R Packages
Data-Oriented Differential Testing of Object-Relational Mapping Systems
Testing: Automatic Test Generation
Automatic Unit Test Generation for Machine Learning Libraries: How Far Are We?
Testing: Automation
Layout and Image Recognition Driving Cross-Platform Automated Mobile Testing
Testing: Flaky Tests
FlakeFlagger: Predicting Flakiness Without Rerunning Tests
An Empirical Analysis of UI-Based Flaky Tests
Testing: General Issues
GenTree: Using Decision Trees to Learn Interactions for Configurable Software

Semantic Web Accessibility Testing via Hierarchical Visual Analysis
Tools for the Python Language
Restoring Execution Environments of Jupyter Notebooks
PyART: Python API Recommendation in Real-Time
PyCG: Practical Call Graph Generation in Python
Variability and Product Lines
Seamless Variability Management with the Virtual Platform
Vulnerabilities in Android #1
Fine with "1234"? An Analysis of SMS One-Time Password Randomness in Android Apps 1671 Siqi Ma (The University of Queensland), Juanru Li (Shanghai Jiao Tong University), Hyoungshick Kim (Sungkyunwan University), Elisa Bertino (Purdue University), Surya Nepal (Data61 CSIRO), Diethelm Ostry (Data61 CSIRO), and Cong Sun (Xidian University)
App's Auto-Login Function Security Testing via Android OS-Level Virtualization

ATVHunter: Reliable Version Detection of Third-Party Libraries for Vulnerability
Identification in Android Applications1695
Xian Zhan (The Hong Kong Polytechnic University, China), Lingling Fan
(Nankai Univerisity, China), Sen Chen (Tianjin University, China),
Feng We (Nanyang Technological University, Singapore), Tianming Liu
(Monash University, Australia), Xiapu Luo (The Hong Kong Polytechnic
University, China), and Yang Liu (Nanyang Technological University,
Singapore)
Vulnerabilities in Android #2
JUSTGen: Effective Test Generation for Unspecified JNI Behaviors on JVMs
Author Index