

**2019 IEEE/ACM 41st International
Conference on Software
Engineering: Companion
Proceedings
(ICSE-Companion 2019)**

**Montreal, Quebec, Canada
25 – 31 May 2019**



**IEEE Catalog Number: CFP1949C-POD
ISBN: 978-1-7281-1765-2**

**Copyright © 2019 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. 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:	CFP1949C-POD
ISBN (Print-On-Demand):	978-1-7281-1765-2
ISBN (Online):	978-1-7281-1764-5
ISSN:	2574-1926

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

CURRAN ASSOCIATES INC.
proceedings
.com

2019 IEEE/ACM 41st International Conference on Software Engineering: Companion Proceedings (ICSE-Companion) **ICSE-Companion 2019**

Table of Contents

Message from the ICSE 2019 General Chair	.xviii
Message from the Demonstrations Track Chairs of ICSE 2019	.xx
Demonstrations Program Committee of ICSE 2019	.xxi
Message from the Posters Chairs of ICSE 2019	.xxii
Posters Program Committee of ICSE 2019	.xxiii
Message from the Doctoral Symposium Chairs of ICSE 2019	.xxiv
Doctoral Symposium Program Committee of ICSE 2019	.xxv
Message from the Student Research Competition Chairs of ICSE 2019	.xxvi
Student Research Competition Committee of ICSE 2019	.xxvii
Message from the Technical Briefings Chairs of ICSE 2019	.xxviii
Message from the Workshop Chairs of ICSE 2019	.xxix
Workshops Program Committee of ICSE 2019	.xxx
Message from the Software Engineering Student Mentoring Workshop Chairs of ICSE 2019	.xxxi
Organizing Committee of ICSE 2019	.xxxii
Sponsors and Supporters of ICSE 2019	.xxxviii

Keynotes

Managing Variation: An Industrial Perspective on Product Line Engineering	.1
<i>Paul Clements (BigLever Software, Inc.)</i>	
Publish or Perish: Questioning the Impact of Our Research on the Software Developer	.2
<i>Margaret Anne Storey (University of Victoria, Canada)</i>	

Technical Briefings

Analyzing Software Delivery with the Flow Framework	.3
<i>Mik Kersten (Tasktop)</i>	
AIOps: Real-World Challenges and Research Innovations	.4
<i>Yingnong Dang (Microsoft Azure), Qingwei Lin (Microsoft Research), and Peng Huang (Johns Hopkins University)</i>	

Software Engineering for Automated Vehicles: Addressing the Needs of Cars That Run on Software and Data .6.....
Krzysztof Czarnecki (University of Waterloo, Canada)

Developing Games That Capture and Engage Users .9.....
Magy Seif El-Nasr (Northeastern University)

Demonstrations

Static Analysis

SMT-Based Refutation of Spurious Bug Reports in the Clang Static Analyzer .11.....
Mikhail R. Gadelha (SIDIA Instituto de Ciencia e Tecnologia), Enrico Steffnlongo (University of Southampton), Lucas C. Cordeiro (University of Manchester), Bernd Fischer (University of Stellenbosch), and Denis Nicole (University of Southampton)

Debugging and Fault Localization

VeDebug: Regression Debugging Tool for Java .15.....
Ben Buhse (The University of Texas at Austin), Thomas Wei (The University of Texas at Austin), Zhiqiang Zang (The University of Texas at Austin), Aleksandar Milicevic (Microsoft), and Milos Gligoric (The University of Texas at Austin)

IoT and Cooperative Systems

IoT Composer: Composition and Deployment of IoT Applications .19.....
Ajay Krishna (Univ. Grenoble Alpes, Inria, CNRS, Grenoble INP, LIG, France), Michel Le Pallec (Nokia Bell Labs, France), Radu Mateescu (Univ. Grenoble Alpes, Inria, CNRS, Grenoble INP, LIG, France), Ludovic Noirie (Nokia Bell Labs, France), and Gwen Salaün (Univ. Grenoble Alpes, CNRS, Grenoble INP, Inria, LIG, France)

Security 2

EASYFLOW: Keep Ethereum Away from Overflow .23.....
Jianbo Gao (Peking University, China), Han Liu (Tsinghua University, China), Chao Liu (Peking University, China), Qingshan Li (Peking University, China), Zhi Guan (Peking University), and Zhong Chen (Peking University)

Test Generation

AsFault: Testing Self-Driving Car Software Using Search-Based Procedural Content Generation .27.....
Alessio Gambi (University of Passau, Germany), Marc Mueller (BeamNG GmbH, Germany), and Gordon Fraser (University of Passau, Germany)

AC3R: Automatically Reconstructing Car Crashes from Police Reports .31.....
Tri Huynh (Saarland University/CISPA, Germany), Alessio Gambi (University of Passau, Germany), and Gordon Fraser (University of Passau, Germany)

Analysis and Verification

ALPACA: A Large Portfolio-Based Alternating Conditional Analysis .35.....
Mitchell J Gerrard (University of Virginia) and Matthew B Dwyer (University of Virginia)

Mockingbird: A Framework for Enabling Targeted Dynamic Analysis of Java Programs .39.....
Derrick Lockwood (Iowa State University, United States), Benjamin Holland (Iowa State University, United States), and Suresh Kothari (Iowa State University, United States)

Model-Based Software Engineering

VIATRA Solver: A Framework for the Automated Generation of Consistent Domain-Specific Models .43.....
Oszkár Semeráth (Budapest University of Technology and Economics, Hungary; MTA-BME Lendület Cyber-Physical Systems Research Group, Hungary), Aren A. Babikian (McGill University, Canada), Sebastian Pilarski (McGill University, Canada), and Dániel Varró (Budapest University of Technology and Economics, Hungary; MTA-BME Lendület Cyber-Physical Systems Research Group, Hungary; McGill University, Canada)

SE Datasets, Research Infrastructure, and Methodology

Defexts: A Curated Dataset of Reproducible Real-World Bugs for Modern JVM Languages .47.....
Samuel Benton (University of Texas at Dallas, USA), Ali Ghanbari (University of Texas at Dallas, USA), and Lingming Zhang (University of Texas at Dallas, USA)

Process and Project Management

SortingHat: Wizardry on Software Project Members .51.....
David Moreno (Bitergia), Santiago Dueñas (Bitergia), Valerio Cosentino (Bitergia), Miguel Angel Fernandez (Bitergia), Ahmed Zerouali (Bitergia), Gregorio Robles (Universidad Rey Juan Carlos), and Jesus M. Gonzalez-Barahona (Universidad Rey Juan Carlos)

Requirements

MCP: A Security Testing Tool Driven by Requirements .55.....
Phu X. Mai (University of Luxembourg), Fabrizio Pastore (University of Luxembourg), Arda Goknil (University of Luxembourg), and Lionel C. Briand (University of Luxembourg)

RM2PT: A Tool for Automated Prototype Generation from Requirements Model .59.....
Yilong Yang (University of Macau, Macau), Xiaoshan Li (University of Macau, Macau), Zhiming Liu (Southwest University, China), and Wei Ke (Macau Polytechnic Institute, Macau)

Tool Taxonomy and Adoption

Witt: Querying Technology Terms Based on Automated Classification .63.....
Mathieu Nassif (McGill University), Christoph Treude (University of Adelaide), and Martin P. Robillard (McGill University)

Dependencies

ENRE: A Tool Framework for Extensible eNtity Relation Extraction .67.....
Wuxia Jin (Xi an jiaotong university), Yuanfang Cai (Drexel University), Rick Kazman (University of Hawaii), Qinghua Zheng (Xi an jiaotong university), Di Cui (Xi an jiaotong university), and Ting Liu (Xi an jiaotong university)

Requirements Engineering for Mass-Market Software

Guigle: A GUI Search Engine for Android Apps .71.....
Carlos Bernal-Cárdenas (College of William & Mary, USA), Kevin Moran (College of William & Mary, USA), Michele Tufano (College of William & Mary, USA), Zichang Liu (College of William & Mary, USA), Linyong Nan (College of William & Mary, USA), Zhehan Shi (College of William & Mary, USA), and Denys Poshyvanyk (College of William & Mary, USA)

Concurrency

SWORD: A Scalable Whole Program Race Detector for Java .75.....
Yanze Li (Texas A&M University), Bozhen Liu (Texas A&M University), and Jeff Huang (Texas A&M University)

Mining Software Changes and Patterns

Coming: A Tool for Mining Change Pattern Instances from Git Commits .79.....
Matias Martinez (Université Polytechnique Hauts-de-France) and Martin Monperrus (KTH Royal Institute of Technology)

PatchNet: A Tool for Deep Patch Classification .83.....
Thong Hoang (Singapore Management University), Julia Lawall (Sorbonne University/Inria/LIP6), Richard J. Oentaryo (McLaren Applied Technologies/Singapore), Yuan Tian (Queen's University/Canada), and David Lo (Singapore Management University)

Software Product Lines

- xLineMapper: A Product Line Feature-Architecture-Implementation Mapping Toolset .87.....
Cuong Cu (CyberSource Corporation, USA), Xin Ye (California State University San Marcos, USA), and Yongjie Zheng (California State University San Marcos, USA)

API Analysis

- Vetting API Usages in C Programs with IMChecker .91.....
Zuxing Gu (Tsinghua University, China), Jiecheng Wu (Tsinghua University, China), Chi Li (Tsinghua University, China), Min Zhou (Tsinghua University, China), Yu Jiang (Tsinghua University, China), Ming Gu (Tsinghua University, China), and Jianguang Sun (Tsinghua University, China)

IDEs

- Git-Based Integrated Uncertainty Manager .95.....
Naoyasu Ubayashi (Kyushu University), Takuya Watanabe (Edirium K.K., Japan), Yasutaka Kamei (Kyushu University), and Ryosuke Sato (Kyushu University)

Specifications and Models

- PsALM: Specification of Dependable Robotic Missions .99.....
Claudio Menghi (University of Luxembourg), Christos Tsigkanos (TU Wien), Thorsten Berger (Chalmers & University of Gothenburg), and Patrizio Pelliccione (Chalmers & University of Gothenburg, University of L'Aquila)
- ARepair: A Repair Framework for Alloy .103.....
Kaiyuan Wang (Google Inc), Allison Sullivan (North Carolina A&T State University), and Sarfraz Khurshid (University of Texas at Austin)
- Visual Debugging of Behavioural Models .107.....
Gianluca Barbon (University of Grenoble Alpes), Vincent Leroy (University of Grenoble Alpes), Gwen Salaün (University of Grenoble Alpes), and Emmanuel Yah (University of Grenoble Alpes)

Testing of AI Systems

- DeepConcolic: Testing and Debugging Deep Neural Networks .111.....
Youcheng Sun (University of Oxford), Xiaowei Huang (University of Liverpool), Daniel Kroening (University of Oxford), James Sharp (Defence Science and Technology Laboratory (Dstl)), Matthew Hill (Defence Science and Technology Laboratory (Dstl)), and Rob Ashmore (Defence Science and Technology Laboratory (Dstl))

APIs

- DRONE: A Tool to Detect and Repair Directive Defects in Java APIs Documentation .115.....
Yu Zhou (Nanjing University of Aeronautics and Astronautics), Xin Yan (Nanjing University of Aeronautics and Astronautics), Taolue Chen (Birkbeck, University of London), Sebastiano Panichella (Zurich University of Applied Science), and Harald Gall (University of Zurich)
- MULAPI: A Tool for API Method and Usage Location Recommendation .119.....
Congying Xu (Yangzhou University, China), Bosen Min (Yangzhou University, China), Xiaobing Sun (Yangzhou University, China), Jiajun Hu (The Hong Kong University of Science and Technology, China), Bin Li (Yangzhou University, China), and Yucong Duan (Hainan University, China)

Student Research Competition

- Towards Zero Knowledge Learning for Cross Language API Mappings .123.....
Nghi Bui (Singapore Management University, Singapore)
- An Empirical Study on Leveraging Logs for Debugging Production Failures .126.....
An Ran Chen (Concordia University, Canada)
- MARVEL: A Generic, Scalable and Effective Vulnerability Detection Platform .129.....
Xiaoning Du (Nanyang Technological University, Singapore)
- Visually Identifying Potential Sensitive Information Leaks in Access-Controlled Data Services .132.....
Kalvin Eng (University of Alberta)
- Release Synchronization in Software Ecosystems .135.....
Armstrong Foundjem (École Polytechnique de Montréal)
- Guided, Automated Testing of Blockchain-Based Decentralized Applications .138.....
Jianbo Gao (Peking University, China)
- Android GUI Search Using Hand-Drawn Sketches .141.....
Xiaofei Ge (Nanjing University, China)
- Finding Concurrency Exploits on Smart Contracts .144.....
Yue Li (Peking University)
- Characterizing and Detecting Duplicate Logging Code Smells .147.....
Zhenhao Li (Concordia University, Canada)
- Agile Process Improvement in Retrospectives .150.....
Christoph Matthies (Hasso Plattner Institute, University of Potsdam, Germany)
- Toward Detection and Characterization of Variability Bugs in Configurable C Software: An Empirical Study .153.....
Austin Mordahl (University of Texas at Dallas)
- Configuration-Dependent Fault Localization .156.....
Son Nguyen (The University of Texas at Dallas, USA)
- Improving Automated Program Repair with Retrospective Fault Localization .159.....
Tongtong Xu (Nanjing University, China)

Property Oriented Verification Via Iterative Abstract Interpretation .162.....	<i>Banghu Yin (National University of Defense Technology, China)</i>
A Systematic Evaluation of Problematic Tests Generated by EvoSuite .165.....	<i>Zhiyu Fan (Southern University of Science and Technology, China)</i>
JSOptimizer: An Extensible Framework for JavaScript Program Optimization .168.....	<i>Yi Liu (Southern University of Science and Technology, China)</i>
Identifying Developers by Their Application Usage .171.....	<i>Ihar Shulhan (Innopolis University)</i>
TOAD: A Tool for Recommending Auto-Refactoring Alternatives .174.....	<i>Alejandra Siles Antezana (Universidad Católica Boliviana San Pablo)</i>
Impact of Lifestyle and Working Process Organization on the Job Satisfaction Level of Software Engineers .177.....	<i>Aleksandr Tarasov (Innopolis University)</i>

Doctoral Symposium

Towards Just-In-Time Rational Refactoring .180.....	<i>Jevgenija Pantiuchina (Università della Svizzera italiana)</i>
Finding and Using Design Information in Discussions .182.....	<i>Giovanni Viviani (University of British Columbia, Canada)</i>
Effects of Automated Static Analysis Tools: A Multidimensional View on Quality Evolution .184.....	<i>Alexander Trautsch (University of Göttingen)</i>
SReYantra: Automated Software Requirement Inter-Dependencies Elicitation, Analysis and Learning .186.....	<i>Gouri Deshpande (University of Calgary)</i>
Supporting the Acquisition of Programming Skills with Program Construction Patterns .188.....	<i>Max Kesselbacher (University of Klagenfurt, Austria)</i>
INDIRECT: Intent-Driven Requirements-to-Code Traceability .190.....	<i>Tobias Hey (Karlsruhe Institute of Technology)</i>
Detecting, Understanding and Resolving Build and Test Conflicts .192.....	<i>Léuson Silva (Federal University of Pernambuco)</i>
Improving the Software Logging Practices in DevOps .194.....	<i>Boyuan Chen (York University, Canada)</i>
Feedback in Scrum: Data-Informed Retrospectives .198.....	<i>Christoph Matthies (Hasso Plattner Institute, University of Potsdam, Germany)</i>
Digital Nudges for Encouraging Developer Actions .202.....	<i>Chris Brown (North Carolina State University, USA)</i>
Stuck in The Middle: Removing Obstacles to New Program Features through Batch Refactoring .206.....	<i>Eduardo Fernandes (Pontifical Catholic University of Rio de Janeiro, Brazil)</i>
Towards a More Reliable Interpretation of Defect Models .210.....	<i>Jirayus Jiarpakdee (Monash University)</i>

- An Artificial Intelligence-Based Model-Driven Approach for Exposing Off-Nominal Behaviors .214.....
Kaushik Madala (University of North Texas)
- Mobile-App Analysis and Instrumentation Techniques Reimagined with DECREE .218.....
Yixue Zhao (University of Southern California, USA)
- Automated Fine-Grained Requirements-to-Code Traceability Link Recovery .222.....
Juan Manuel Florez (The University of Texas at Dallas)
- Supporting Code Search with Context-Aware, Analytics-Driven, Effective Query Reformulation.226...
Mohammad Masudur Rahman (University of Saskatchewan)

Poster Papers

- Divide and Conquer: Recovering Contextual Information of Behaviors in Android Apps Around Limited-Quantity Audit Logs .230.....
Zhaoyi Meng (University of Science and Technology of China, China), Yan Xiong (University of Science and Technology of China, China), Wenchao Huang (University of Science and Technology of China, China), Fuyou Miao (University of Science and Technology of China, China), Taeho Jung (University of Notre Dame, United States), and Jianmeng Huang (University of Science and Technology of China, China)
- How Are Design Patterns Concerned by Developers? .232.....
He Jiang (Dalian University of Technology, China; Beijing Institute of Technology, China), Dong Liu (Dalian University of Technology, China), Xin Chen (Hangzhou Dianzi University, China), Hui Liu (Beijing Institute of Technology, China), and Hong Mei (Beijing Institute of Technology, China)
- Confidence in Programming Skills: Gender Insights From StackOverflow Developers Survey .234.....
Karina Kohl Silveira (Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS) University, Brazil), Soraia Musse (Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS) University, Porto Alegre, Brazil), Isabel H. Manssour (Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS) University, Porto Alegre, Brazil), Renata Vieira (Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS), Brazil), and Rafael Prikladnicki (Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS), Brazil)
- FastDroid: Efficient Taint Analysis for Android Applications .236.....
Jie Zhang (Xidian University, China), Cong Tian (Xidian University, China), and Zhenhua Duan (Xidian University, China)
- Dynamic Unit Test Extraction Via Time Travel Debugging for Test Cost Reduction .238.....
Thomas Bach (Heidelberg University), Ralf Pannemans (SAP), Johannes Haeussler (SAP), and Artur Andrzejak (Heidelberg University)
- An Empirical Study on Female Participation in Software Project Courses .240.....
Anh Nguyen-Duc (University of Southeastern Norway), Letizia Jaccheri (Norwegian University of Science and Technology), and Pekka Abrahamsson (University of Jyväskylä)
- Supervised Tie Breaking in Test Case Prioritization .242.....
Sepehr Eghbali (University of Waterloo), Vinit Kudva (University of Waterloo), Gregg Rothermel (North Carolina State University), and Ladan Tahvildari (University of Waterloo)

Optimizing Seed Inputs in Fuzzing with Machine Learning .244.....	
	<i>Liang Cheng (Institute of Software, Chinese Academy of Sciences, China), Yang Zhang (Institute of Software, Chinese Academy of Sciences, China), Yi Zhang (N/A, United States of America), Chen Wu (Alibaba Group, China), Zhangtan Li (Institute of Software, Chinese Academy of Sciences, China), Yu Fu (Institute of Software, Chinese Academy of Sciences, China), and Haisheng Li (Beijing Technology and Business University, China)</i>
When Software Development Meets the Shopfloor: The Case of Industrial Fablabs .246.....	
	<i>Tudor B. Ionescu (Vienna Technical University)</i>
Carving Parameterized Unit Tests .248.....	
	<i>Alexander Kampmann (CISPA Helmholtz Center for Information Security) and Andreas Zeller (CISPA Helmholtz Center for Information Security)</i>
Incorporating Real Projects Into a Software Engineering Undergraduate Curriculum .250.....	
	<i>Rafael Chanin (PUCRS), Jorge Melegati (Free University of Bozen-Bolzano), Afonso Sales (PUCRS), Mariana Detoni (PUCRS), Xiaofeng Wang (Free University of Bozen-Bolzano), and Rafael Prikladnicki (PUCRS)</i>
A Winning Team - What Personality Has To Do With Software Engineering .252.....	
	<i>Erica Weilemann (University of Applied Sciences Neu-Ulm)</i>
Quantifying Patterns and Programming Strategies in Block-Based Programming Environments .254.	
	<i>Max Kesselbacher (University of Klagenfurt, Austria) and Andreas Bollin (University of Klagenfurt, Austria)</i>
A Data-Driven Security Game to Facilitate Information Security Education .256.....	
	<i>Dag Erik Homdrom Løvgren (Acando AS, Norway), Jingyue Li (Norwegian University of Science and Technology, Norway), and Tosin Daniel Oyetoyan (Western Norway University of Applied Sciences, Norway)</i>
Comparing the Popularity of Testing Careers Among Canadian, Chinese, and Indian Students .258..	
	<i>Luiz Fernando Capretz (Western University), Pradeep Waychal (Western Michigan University), and Jingdong Jia (Beihang University)</i>
Evaluation of Feature Selection for Anomaly Detection in Automotive E/E Architectures .260.....	
	<i>Christoph Segler (BMW Group Research, New Technologies, Innovations, Germany), Stefan Kugele (Technical University of Munich, Germany), Philipp Obergfell (BMW Group Research, New Technologies, Innovations, Germany), Mohd Hafeez Osman (Technical University of Munich, Germany), Sina Shafaei (Technical University of Munich, Germany), Eric Sax (Karlsruhe Institute of Technology, Germany), and Alois Knoll (Technical University of Munich, Germany)</i>
Studies on the Software Testing Profession .262.....	
	<i>Luiz Fernando Capretz (Western University), Pradeep Waychal (Western Michigan University), Jingdong Jia (Beihang University), Daniel Varona (Western University), and Yadira Lizama (Western University)</i>
Demand-Driven Refinement of Points-to Analysis .264.....	
	<i>Chenguang Sun (Purdue University) and Samuel Midkiff (Purdue University)</i>

Validity Fuzzing and Parametric Generators for Effective Random Testing .266.....	
	<i>Rohan Padhye (University of California, Berkeley), Caroline Lemieux (University of California, Berkeley), Koushik Sen (University of California, Berkeley), Mike Papadakis (University of Luxembourg), and Yves Le Traon (University of Luxembourg)</i>
Good-Bye Localhost: A Cloud-Based Web IDE for Teaching Java EE Web Development to Non-Computer Science Majors .268.....	
	<i>Michael Leisner (Department of Information Management, University of Applied Sciences Neu-Ulm) and Philipp Brune (Department of Information Management, University of Applied Sciences Neu-Ulm)</i>
Energy Distribution Matters in Greybox Fuzzing .270.....	
	<i>Lingyun Situ (State Key Laboratory for Novel Software Technology, Nanjing University, Nanjing, China), Linzhang Wang (State Key Laboratory for Novel Software Technology, Nanjing University, Nanjing, China), Xuandong Li (State Key Laboratory for Novel Software Technology, Nanjing University, Nanjing, China), Le Guan (University of Georgia, Athens, GA, USA), Wenhui Zhang (Pennsylvania State University, State College, PA, USA), and Peng Liu (Pennsylvania State University, State College, PA, USA)</i>
On the Deterioration of Learning-Based Malware Detectors for Android .272.....	
	<i>Xiaoqin Fu (Washington State University, Pullman) and Haipeng Cai (Washington State University, Pullman)</i>
Recommending Unnecessary Source Code Based on Static Analysis .274.....	
	<i>Roman Haas (CQSE GmbH, Germany), Rainer Niedermayr (University of Stuttgart), Tobias Röhm (CQSE GmbH), and Sven Apel (Universität Passau)</i>
A Grading Schema for Reinforcing Teamwork Quality in a Capstone Course .276.....	
	<i>María Cecilia Bastarrica (Department of Computer Science, University of Chile, Chile), Daniel Perovich (Department of Computer Science, University of Chile, Chile), Francisco J. Gutierrez (Department of Computer Science, University of Chile, Chile), and Maira Marques (Department of Computer Science, University of Chile, Chile)</i>
fAST: Flattening Abstract Syntax Trees for Efficiency .278.....	
	<i>Yijun Yu (The Open University)</i>
Immutable Log Storage as a Service .280.....	
	<i>William Pourmajidi (Department of Computer Science, Ryerson University, Toronto, Canada), Lei Zhang (Department of Computer Science, Ryerson University, Toronto, Canada), John Steinbacher (IBM Canada Lab, Toronto, Canada), Tony Erwin (IBM Watson and Cloud Platform, Austin, USA), and Andriy Miranskyy (Department of Computer Science, Ryerson University, Toronto, Canada)</i>
Symbolic Execution for Attribution and Attack Synthesis in Neural Networks .282.....	
	<i>Divya Gopinath (Carnegie Mellon University Silicon Valley), Corina S. Pasareanu (Carnegie Mellon University Silicon Valley), Kaiyuan Wang (University of Texas at Austin), Mengshi Zhang (University of Texas at Austin), and Sarfraz Khurshid (University of Texas at Austin)</i>

A Decentralized Application for Fostering Biodiversity: Opportunities and Challenges .284.....	
	<i>Jagadeesh Chandra Bose R.P. (Accenture Labs, India), Vikrant Kaulgud (Accenture Labs, India), Mauro Rebelo (Federal University of Rio de Janeiro, Brazil), and Sanjay Podder (Accenture Labs, India)</i>
Enhancing Precision of Structured Merge by Proper Tree Matching .286.....	
	<i>Fengmin Zhu (Tsinghua University), Fei He (Tsinghua University), and Qianshan Yu (Tsinghua University)</i>
Optimal MC/DC Test Case Generation .288.....	
	<i>Joxan Jaffar (National University of Singapore, Singapore), Sangharatna Godbole (National University of Singapore, Singapore), and Rasool Maghareh (National University of Singapore, Singapore)</i>
Automatically Reconstructing Car Crashes from Police Reports for Testing Self-Driving Cars.290.....	
	<i>Alessio Gambi (University of Passau, Germany), Tri Huynh (Saarland University/CISPA, Germany), and Gordon Fraser (University of Passau, Germany)</i>
Industry Trends in Software Engineering Education: A Systematic Mapping Study .292.....	
	<i>Orges Cico (Norwegian University of Science and Technology) and Letizia Jaccheri (NTNU)</i>
Analyzing and Repairing Compilation Errors .294.....	
	<i>Ali Mesbah (University of British Columbia, Canada and Google LLC, USA), Andrew Rice (University of Cambridge, England and Google LLC, USA), Edward Aftandilian (Google LLC, USA), Emily Johnston (Google LLC, USA), and Nick Glorioso (Google LLC, USA)</i>
Leveraging Contextual Information from Function Call Chains to Improve Fault Localization .296.....	
	<i>Árpád Beszédes (Software Engineering Department, University of Szeged, Szeged, Hungary), Ferenc Horváth (Software Engineering Department, University of Szeged, Szeged, Hungary), Massimiliano Di Penta (Department of Engineering, University of Sannio, Benevento, Italy), and Tibor Gyimóthy (Software Engineering Department, University of Szeged, Szeged, Hungary)</i>
Beware of Disengaged User Acceptance in Testing Software-as-a-Service .298.....	
	<i>Sebastian Loss (IT University of Copenhagen, Denmark), Raffaele Fabio Ciriello (IT University of Copenhagen, Denmark), and Jürgen Cito (Massachusetts Institute of Technology, USA)</i>
Exploring Customer Influence on the Agile Transformation of Service Providers .300.....	
	<i>Jeppe Aagaard Glud (IT University of Copenhagen, Denmark), Kevin Helge Hansen-Schwartz (IT University of Copenhagen, Denmark), and Raffaele Fabio Ciriello (IT University of Copenhagen, Denmark)</i>
Towards Visualizing Large Scale Evolving Clones .302.....	
	<i>Debajyoti Mondal (Department of Computer Science, University of Saskatchewan), Manishankar Mondal (Department of Computer Science, University of Saskatchewan), Chanchal K. Roy (Department of Computer Science, University of Saskatchewan), Kevin A. Schneider (Department of Computer Science, University of Saskatchewan), Shisong Wang (Department of Computer Science, University of Saskatchewan), and Yukun Li (Department of Computer Science, University of Saskatchewan)</i>

Software Engineering Studies Attractiveness for the Highly Educated Women Planning to Change Career in Finland .304.....	
	<i>Sonja Hyrynsalmi (University of Turku) and Sami Hyrynsalmi (Tampere University)</i>
Directives of Communicability: Teaching Students How to Improve Communication Through Software Modeling .306.....	
	<i>Adriana Lopes (Federal University of Amazonas, Brazil), Edson Oliveira (SEFAZ, Brazil), Tayana Conte (Federal University of Amazonas, Brazil), and Clarisse de Souza (PUC-Rio, Brazil)</i>
Constructural Software Documentation .308.....	
	<i>Mathieu Nassif (McGill University) and Martin P. Robillard (McGill University)</i>
Towards Crowd-Sourced API Documentation .310.....	
	<i>Gias Uddin (SWAT Lab, Polytechnique Montreal, QC, Canada), Foutse Khomh (SWAT Lab, Polytechnique Montreal, QC, Canada), and Chanchal K Roy (Department of Computer Science, University of Saskatchewan, SK, Canada)</i>
Guiding Testing Effort Using Mutant Utility .312.....	
	<i>Justin Alvin (University of Massachusetts, USA), Bob Kurtz (George Mason University, USA), Paul Ammann (George Mason University, USA), Huzefa Rangwala (George Mason University, USA), and René Just (University of Washington, USA)</i>
Testing Untestable Neural Machine Translation: An Industrial Case .314.....	
	<i>Wujie Zheng (Tencent Inc., China), Wenyu Wang (University of Illinois at Urbana-Champaign, USA), Dian Liu (Tencent Inc., China), Changrong Zhang (Tencent Inc., China), Qinsong Zeng (Tencent Inc., China), Yuetang Deng (Tencent Inc., China), Wei Yang (University of Texas at Dallas, USA), Pinjia He (ETH Zurich, Switzerland), and Tao Xie (University of Illinois at Urbana-Champaign, USA)</i>
Localized or Architectural: An Empirical Study of Performance Issues Dichotomy .316.....	
	<i>Yutong Zhao (Stevens Institute of Technology), Lu Xiao (Stevens Institute of Technology), Wang Xiao (Stevens Institute of Technology), Bihuan Chen (Fudan University), and Yang Liu (Nanyang Technological University)</i>
Mimicking User Behavior to Improve In-House Test Suites .318.....	
	<i>Qianqian Wang (Georgia Institute of Technology, USA) and Alessandro Orso (Georgia Institute of Technology, USA)</i>
Structural Test Coverage Criteria for Deep Neural Networks .320.....	
	<i>Youcheng Sun (University of Oxford), Xiaowei Huang (University of Liverpool), Daniel Kroening (University of Oxford), James Sharp (Defence Science and Technology Laboratory (Dstl)), Matthew Hill (Defence Science and Technology Laboratory (Dstl)), and Rob Ashmore (Defence Science and Technology Laboratory (Dstl))</i>
Deobfuscating Android Native Binary Code .322.....	
	<i>Zeliang Kan (Beijing University of Posts and Telecommunications), Haoyu Wang (Beijing University of Posts and Telecommunications), Lei Wu (PeckShield, Inc.), Yao Guo (Peking University), and Guoai Xu (Beijing University of Posts and Telecommunications)</i>

Wok: Statistical Program Slicing in Production .324.....
*Bogdan-Alexandru Stoica (Swiss Federal Institute of Technology in
Lausanne (EPFL)), Swarup K. Sahoo (Deepfence Inc.), James R. Larus
(Swiss Federal Institute of Technology in Lausanne (EPFL)), and Vikram
S. Adve (University of Illinois at Urbana-Champaign)*

GUI-Guided Repair of Mobile Test Scripts .326.....
*Minxue Pan (Nanjing University, China), Tongtong Xu (Nanjing
University, China), Yu Pei (The Hong Kong Polytechnic University,
China), Zhong Li (Nanjing University, China), Tian Zhang (Nanjing
University, China), and Xuandong Li (Nanjing University, China)*

Author Index 329