Keynotes

Progress toward an Engineering Discipline of Software
Mary Shaw
— Carnegie Mellon University, USA

Investing in the Impending Digital Quake 80% Jobs/Companies/Research Disrupted?
Stephen Ibaraki
— Founding Chair IFIP Global Industry Council / SIDO Capital, Canada

Programming Dangerously! Can Formal Methods and Empirical Software Engineering
Come to the Rescue?
Wolfram Schulte
Microsoft Research, USA

Is Continuous Adoption in Software Engineering Achievable and Desirable?
Gail C. Murphy
— University of British Columbia and Tasktop Technologies Incorporated, Canada

Software Engineering in Practice (SEIP)

Infrastructure Support

CloudBuild: Microsoft's Distributed and Caching Build Service
Hamed Esfahani, Jonas Fietz, Qi Ke, Alexei Kolomiets, Erica Lan, Erik Mavrinac,
Wolfram Schulte, and Newton Sanches, Srikanth Kandula
— Microsoft, USA; Microsoft, Switzerland
Continuous Deployment at Facebook and OANDA

Tony Savor, Mitchell Douglas, Michael Gentili, Laurie Williams, Kent Beck, and Michael Stumm
— Facebook, USA; Stanford University, USA; OANDA Corporation, USA; North Carolina State University, USA; University of Toronto, Canada

An Empirically Developed Method to Aid Decisions on Architectural Technical Debt Refactoring: AnaConDebt

Antonio Martini and Jan Bosch
— Chalmers University of Technology, Sweden

Trustworthiness in Enterprise Crowdsourcing: A Taxonomy & Evidence from Data

Anurag Dwarakanath, Shrikanth N.C., Kumar Abhinav, and Alex Kass
— Accenture Technology Labs, India; IIIT-Delhi, India; Accenture Technology Labs, USA

Static Analysis

Practical Programming, Validation and Verification with Finite-State Machines: A Library and Its Industrial Application

Paulo Salem
— Salem Sistemas, Brazil

Battles with False Positives in Static Analysis of JavaScript Web Applications in the Wild

Joonyoung Park, Inho Lim, and Sukyoung Ryu
— KAIST, The Republic of Korea; Samsung Electronics, The Republic of Korea

Detecting Problems in the Database Access Code of Large Scale Systems - An Industrial Experience Report

Tse-Hsun Chen, Weiyi Shang, Ahmed E. Hassan, Mohamed Nasser, and Parminder Flora
— Queen’s University, Canada; Concordia University, Canada; BlackBerry, Canada

Engineering the Servo Web Browser Engine Using Rust

Brian Anderson, Lars Bergstrom, Manish Goregaokar, Josh Matthews, Keegan McAllister, Jack Moffitt, and Simon Sapin
— Mozilla Research, USA; Indian Institute of Technology Bombay, India; Mozilla, Canada

Panel Discussion

Chaos Engineering Panel

Lorin Hochstein and Casey Rosenthal
— Netflix, USA

Monitoring

The Bones of the System: A Case Study of Logging and Telemetry at Microsoft

Titus Barik, Robert DeLine, Steven Drucker, and Danyel Fisher
— North Carolina State University, USA; Microsoft Research, USA
Log Clustering Based Problem Identification for Online Service Systems ............................................... 102
Qingwei Lin, Hongyu Zhang, Jian-Guang Lou, Yu Zhang, and Xuewei Chen
— Microsoft Research, China; Microsoft Corporation, USA

Use Runtime Verification to Improve the Quality of Medical Care Practice..................................................... 112
Yu Jiang, Han Liu, Hui Kong, Rui Wang, Mohammad Hosseini, Jiaguang Sun, and Lui Sha
— Capital Normal University, China; University of Illinois at Urbana-Champaign, USA; Tsinghua University, China; Institute of Science and Technology, Austria

Assessing the Usefulness of a Requirements Monitoring Tool: A Study Involving Industrial Software Engineers ................................................................................................................... 122
Rick Rabiser, Michael Vierhauser, and Paul Grünbacher
— Johannes Kepler University Linz, Austria

Evolution

Lessons Learned in Aligning Data and Model Evolution in Collaborative Information Systems .......... 132
Thomas Reschenhofer, Manoj Bhat, Adrian Hernandez-Mendez, and Florian Matthes
— Technical University of Munich, Germany

Mentoring Trajectories in an Evolving Agile Workplace.................................................................................. 142
Shreya Kumar, Charles Wallace, and Michael Young
— Michigan Technological University, USA; ThermoAnalytics Inc., USA

Visualizing the Effects of Requirements Evolution .......................................................................................... 152
Shinobu Saito, Yukako Iimura, Hirokazu Tashiro, Aaron K. Massey, and Annie I. Antón
— NTT CORPORATION, Japan; NTT DATA CORPORATION, Japan; University of Maryland, USA; Georgia Institute of Technology, USA

VEnron: A Versioned Spreadsheet Corpus and Related Evolution Analysis ........................................... 162
Wensheng Dou, Liang Xu, Shing-Chi Cheung, Chushu Gao, Jun Wei, and Tao Huang
— Chinese Academy of Sciences, China; Hong Kong University of Science and Technology, China

Dynamic Analysis

System Testing of Repository-Style Software: An Experience Report.......................................................... 172
Paolo Salvaneschi
— University of Bergamo, Italy

Enhancing Test Case Prioritization in an Industrial Setting with Resource Awareness and Multi-objective Search .................................................................................................................. 182
Shuai Wang, Shaukat Ali, Tao Yue, Øyvind Bakkeli, and Marius Liaaen
— Simula Research Laboratory, Norway; University of Oslo, Norway; Cisco Systems, Norway

Integrating Automatic Backward Error Recovery in Asynchronous Rich Clients...................................... 192
Manuel Quintela-Pumares, Bruno Cabral, Daniel Fernandez-Lanvin, and Alberto-Manuel Fernandez-Alvarez
— University of Oviedo, Spain; University of Coimbra, Portugal
Opaque Service Virtualisation: A Practical Tool for Emulating Endpoint Systems................................... 202
  Steve Versteeg, Miao Du, Jean-Guy Schneider, John Grundy, Jun Han, and Menka Goyal
  — CA Technologies, Australia; Swinburne University of Technology, Australia;
  Deakin University, Australia

Development Support

A Study of the Quality-Impacting Practices of Modern Code Review at Sony Mobile......................... 212
  Junji Shimagaki, Yasutaka Kamei, Shane McIntosh, Ahmed E. Hassan,
  and Naoyasu Ubayashi
  — Sony Mobile, Japan; Kyushu University, Japan; McGill University, Canada;
  Queen’s University, Canada

CORRECT: Code Reviewer Recommendation in GitHub Based on Cross-Project
and Technology Experience...................................................................................................................... 222
  Mohammad Masudur Rahman, Chanchal K. Roy, and Jason A. Collins
  — University of Saskatchewan, Canada; Google Inc., USA

  Martin F. Krafft, Klaas-Jan Stol, and Brian Fitzgerald
  — Debian Developer, Germany; Lero - The Irish Software Research Centre, Ireland

Observations on Knowledge Transfer of Professional Software Developers
during Pair Programming .......................................................................................................................... 242
  Franz Zieris and Lutz Prechelt
  — Freie Universität Berlin, Germany

Process

Assessing the Process of an Eastern European Software SME Using Systemic
Analysis, GQM, and Reliability Growth Models - A Case Study ............................................................... 251
  Vladimir Ivanov, Manuel Mazzara, Witold Pedrycz, Alberto Sillitii, and Giancarlo Succi
  — Innopolis University, Russian Federation; University of Alberta, Canada;
  Center for Applied Software Engineering, Italy

Model Driven Development of Business Applications - A Practitioner’s Perspective ...................... 260
  Vinay Kulkarni
  — Tata Consultancy Services Research, India

Industry Application of Continuous Integration Modeling: A Multiple-Case Study ......................... 270
  Daniel Ståhl and Jan Bosch
  — Ericsson AB, Sweden; Chalmers University of Technology, Sweden

"What Went Right and What Went Wrong": An Analysis of 155 Postmortems
from Game Development......................................................................................................................... 280
  Michael Washburn Jr., Pavithra Sathiyanarayanan, Meiyappan Nagappan,
  Thomas Zimmermann, and Christian Bird
  — Rochester Institute of Technology, USA; Microsoft Research, USA
Software Engineering Education and Training (SEET)

Agile

Learning Agile Software Development in High School: An Investigation ................................................................. 293
  Marcello Missiroli, Daniel Russo, and Paolo Ciancarini
  — University of Modena and Reggio Emilia, Italy; University of Bologna, Italy

Teaching Agile - Addressing the Conflict between Project Delivery and Application of Agile Methods ................................................................. 303
  Jan-Philipp Steghöfer, Eric Knauss, Emil Alégroth, Imed Hammouda, Håkan Burden, and Morgan Ericsson
  — University of Gothenburg, Sweden; Chalmers University, Sweden; Viktoria Swedish ICT, Sweden; Linneus University, Sweden

How Surveys, Tutors and Software Help to Assess Scrum Adoption in a Classroom Software Engineering Project ................................................................. 313
  Christoph Matthies, Thomas Kowark, Keven Richly, Matthias Uflacker, and Hasso Plattner
  — Hasso Plattner Institute, University of Potsdam, Germany

 Metrics in Agile Project Courses ................................................................................................................................ 323
  Lukas Alperowitz, Dora Dzvonyar, and Bernd Bruegge
  — Technical University of Munich, Germany

Architecture and Collaboration

Smart Decisions: An Architectural Design Game ................................................................................................... 327
  Humberto Cervantes, Serge Haziyev, Olha Hrytsay, and Rick Kazman
  — Universidad Autonoma Metropolitana - Iztapalapa Mexico; Softserve, Inc., USA; Software Engineering Institute, Carnegie-Mellon University and University of Hawaii, USA

Reflections on Applying Constructive Alignment with Formative Feedback for Teaching Introductory Programming and Software Architecture ................................................................. 336
  Andrew Cain and Muhammad Ali Babar
  — Swinburne University of Technology, Australia; The University of Adelaide, Australia

Software Security Education at Scale ................................................................................................................... 346
  Christopher Theisen, Laurie Williams, Kevin Oliver, and Emerson Murphy-Hill
  — North Carolina State University, USA

What Makes Teaching Software Architecture Difficult? ............................................................................................. 356
  Matthias Galster and Samuil Angelov
  — University of Canterbury, New Zealand; Fontys University of Applied Sciences, The Netherlands

Collaborative Software Engineering Education between College Seniors and Blind High School Students ............................................................................... 360
  Collin McMillan and Amanda Rodda-Tyler
  — University of Notre Dame, USA; Illinois School for the Visually Impaired, USA
Verification and Test

Can Software Engineering Students Program Defect-Free? An Educational Approach ......................... 364
Guoping Rong, He Zhang, Qi Shan, and Dong Shao
— Nanjing University, China

Impact of CS Programs on the Quality of Test Cases Generation: An Empirical Study ......................... 374
Omar S. Gómez, Sira Vegas, and Natalia Juristo
— Escuela Superior Politécnica de Chimborazo, Ecuador; Universidad Politécnica de Madrid, Spain; University of Oulu, Finland

Teaching Code Review Management Using Branch Based Workflows .............................................. 384
Stephan Krusche, Mjellma Berisha, and Bernd Bruegge
— Technische Universität München, Germany

Let’s Verify Linux: Accelerated Learning of Analytical Reasoning through Automation and Collaboration ...................................................................................................................................... 394
Suraj Kothari, Ahmed Tamrawi, Jeremias Sauceda, and Jon Mathews
— Iowa State University, USA; EnSoft Corporation, USA

Team Projects

Enriching Traditional Software Engineering Curricula with Software Project Management Knowledge ................................................................. 404
Ana M. Moreno, María-Isabel Sánchez-Segura, Fuenanta Medina-Dominguez, Lawrence Peters, and Jonathan Araujo
— Technical University of Madrid, Spain; Carlos III University Madrid, Spain; Software Consultants International, USA; Tomtom, The Netherlands

When Teams Go Crazy: An Environment to Experience Group Dynamics in Software Project Management Courses...................................................................................... 412
Marco Kuhrmann and Jürgen Münch
— University of Southern Denmark, Denmark; University of Helsinki and Reutlingen University, Finland

Student Experiences Using GitHub in Software Engineering Courses: A Case Study ............................ 422
Joseph Feliciano, Margaret-Anne Storey, and Alexey Zagalsky
— University of Victoria, Canada

What Communication Tools Do Students Use in Software Projects and How Do Different Tools Suit Different Parts of Project Work? ........................................................................................................ 432
Otto Seppälä, Tapio Auvinen, Ville Karavirta, Arto Vihavainen, and Petri Ihantola
— Aalto University, Finland; Mobile IceCube, Finland; University of Helsinki, Finland; Tampere University of Technology, Finland

HoliCoW: Automatically Breaking Team-Based Software Projects to Motivate Student Testing ............ 436
Peng Zhang, Jules White, and Douglas C. Schmidt
— Vanderbilt University, USA
Software Development

Teaching a Global Software Development Course: Student Experiences Using Onsite Exercise Simulation................................................................................................................................... 440
  Jouni Lappalainen, Nimaya Tripathi, and Jouni Similä
  — University of Oulu, Finland

VisAr3D: An Innovative 3D Visualization of UML Models................................................................................................................................. 451
  Claudia Susie C. Rodrigues, Cláudia M. L. Werner, and Luiz Landau
  — COPPE/UFRJ, Brazil

Facing the Challenges of Teaching Requirements Engineering......................................................................................................................... 461
  Roxana Lisette Quintanilla Portugal, Priscila Engiel, Joanna Pivatelli,
  and Julio Cesar Sampaio do Prado Leite
  — PUC-Rio, Brasil

Teaching University Students Kanban with a Collaborative Board Game........................................................................................................... 471
  Ville T. Heikkilä, Maria Paasivaara, and Casper Lassenius
  — Aalto University, Finland

Tools and Toys

SolMiner: Mining Distinct Solutions in Programs ................................................................................................................................. 481
  Lannan Luo and Qiang Zeng
  — The Pennsylvania State University, USA; Temple University, USA

STAGE - Software Tool for Automatic Grading of Testing Exercises - Case Study Paper ................. 491
  Sebastian Pape, Julian Flake, Andreas Beckmann, and Jan Jürjens
  — Goethe University Frankfurt, Germany; TU Dortmund, Germany

Measuring Code Behavioral Similarity for Programming and Software Engineering Education .......... 501
  Sihan Li, Xusheng Xiao, Blake Bassett, Tao Xie, and Nikolai Tillmann
  — University of Illinois at Urbana-Champaign, USA; NEC Laboratories America, USA;
  Microsoft Research, USA

Engaging Software Estimation Education Using LEGOs: A Case Study ................................................. 511
  Linda M. Laird and Ye Yang
  — Stevens Institute of Technology, USA

Software Engineering In Society (SEIS)

Keynotes

Software Engineering and Policy ................................................................................................................................... 521
  Anthony Finkelstein
  — The Alan Turing Institute, United Kingdom
Sustainable Software Design

Software Energy Profiling: Comparing Releases of a Software Product ............................................................... 523
  Erik A. Jagroep, Jan Martijn van der Werf, Sjaak Brinkkemper, Giuseppe Procaccianti,
  Patricia Lago, Leen Blom, and Rob van Vliet
  — Utrecht University, The Netherlands; Vrije Universiteit Amsterdam, The Netherlands;
  Centric, The Netherlands

Sustainability Design in Requirements Engineering: State of Practice ................................................................. 533
  Ruzanna Chitchyan, Christoph Becker, Stefanie Betz, Leticia Duboc,
  Birgit Penzenstadler, Norbert Seyff, and Colin C. Venters
  — University of Leicester, United Kingdom; University of Toronto, Canada;
  Karlsruhe Institute of Technology, Germany; State University of Rio de Janeiro, Brazil;
  California State University Long Beach, USA; FHNW and University of Zurich, Switzerland

Sustainability Debt: A Portfolio-Based Approach for Evaluating Sustainability Requirements in Architectures ................................................................. 543
  Bendra Ojameruaye, Rami Bahsoon, and Leticia Duboc
  — University of Birmingham, United Kingdom; State University of Rio de Janeiro, Brazil

Values in Software Engineering

Values-First SE: Research Principles in Practice .......................................................................................................... 553
  Maria Angela Ferrario, Will Simm, Stephen Forshaw, Adrian Gradinar,
  Marcia Tavares Smith, and Ian Smith
  — Lancaster University, United Kingdom

A Guided Tour of the Legal Implications of Software Cloning .................................................................................. 563
  Paolo Ciancarini, Daniel Russo, Alberto Sillitti, and Giancarlo Succi
  — University of Bologna & CINI, Italy; Center for Applied Software Engineering & CINI, Italy;
  Innopolis University, Russian Federation

Engineering Software Assemblies for Participatory Democracy: The Participatory Budgeting Use Case ................................................................. 573
  James Holston, Valérie Issarny, and Cristhian Parra
  — University of California, Berkeley, USA; Inria, France

Demonstrations

Verification and Validation (1)

SimCoTest: A Test Suite Generation Tool for Simulink/Stateflow Controllers .......................................................... 585
  Reza Matinnejad, Shiva Nejati, Lionel C. Briand, and Thomas Bruckmann
  — University of Luxembourg, Luxembourg; Delphi Automotive Systems, Luxembourg

SMACK Software Verification Toolchain ......................................................................................................................... 589
  Montgomery Carter, Shaobo He, Jonathan Whitaker, Zvonimir Rakamaric, and Michael Emmi
  — University of Utah, USA; IMDEA Software Institute, Spain
FOREPOST: A Tool for Detecting Performance Problems with Feedback-Driven Learning Software Testing....................................................................................................................................................... 593
Qi Luo, Denys Poshyvanyk, Aswathy Nair, and Mark Grechanik
— The College of William and Mary, USA; University of Illinois at Chicago, USA

Verification and Validation (2)
SourcererCC and SourcererCC-I: Tools to Detect Clones in Batch Mode and during Software Development............................................................................................................................................. 597
Vaibhav Saini, Hitesh Sajnani, Jaewoo Kim, and Cristina Lopes
— University of California, Irvine, USA

Visually Reasoning about System and Resource Behavior........................................................................ 601
Tony Ohmann, Ryan Stanley, Ivan Beschastnikh, and Yuriy Brun
— University of Massachusetts, USA; University of British Columbia, Canada

Toward Arbitrary Mapping for Debugging Visualizations........................................................................ 605
Yung-Pin Cheng, Chiu-Yu Ku, Wei-Chen Pan, Chuan Yang, and Ting-Shu Lin
— National Central University, Taiwan; Synopsys, Inc., Taiwan

FUSION: A Tool for Facilitating and Augmenting Android Bug Reporting.............................................. 609
Kevin Moran, Mario Linares-Vásquez, Carlos Bernal-Cárdenas, and Denys Poshyvanyk
— College of William & Mary, USA

Analysis and Refactoring
JDeodorant: Clone Refactoring................................................................................................................. 613
Davood Mazinanian, Nikolaos Tsantalis, Raphael Stein, and Zackary Valenta
— Concordia University, Canada

AD-ROOM: A Tool for Automatic Detection of Refactorings in Object-Oriented Models ....................... 617
Djamel Eddine Khelladi, Reda Bendraou, and Marie-Pierre Gervais
— Sorbonne Universités, France; Université Paris Ouest Nanterre La Defense, France

srcSlice: A Tool for Efficient Static Forward Slicing............................................................................... 621
Christian D. Newman, Tessandra Sage, Michael L. Collard, Hakam W. Alomari,
and Jonathan I. Maletic
— Kent State University, USA; The University of Akron, USA; Miami University, USA

Trending Technologies
SPYSE - A Semantic Search Engine for Python Packages and Modules................................................ 625
Shiva Krishna Imminni, Mir Anamul Hasan, Michael Duckett, Puneet Sachdeva,
Sudipta Karmakar, Piyush Kumar, and Sonia Haiduc
— Florida State University, USA

FeatureIDE: Taming the Preprocessor Wilderness.................................................................................. 629
Jens Meinicke, Thomas Thüm, Reimar Schröter, Sebastian Krieter,
Fabian Benduhn, Gunter Saake, and Thomas Leich
— METOP GmbH, Germany; University of Magdeburg, Germany; TU Braunschweig, Germany
JooMDD: A Model-Driven Development Environment for Web Content Management
System Extensions ....................................................................................................................... 633
  Dennis Priefer, Peter Kneisel, and Gabriele Taentzer
  — KITE, Germany; Philipps-Universität Marburg, Germany

Microsoft Touch Develop and the BBC micro:bit ........................................................................ 637
  Thomas Ball, Jonathan Protzenko, Judith Bishop, Michal Moskal, Jonathan de Halleux,
  Michael Braun, Steve Hodges, and Clare Riley
  — Microsoft Research, USA; Microsoft Research, United Kingdom; Microsoft, United Kingdom

Program Understanding

DECA: Development Emails Content Analyzer ............................................................................ 641
  Andrea Di Sorbo, Sebastiano Panichella, Corrado A. Visaggio, Massimiliano Di Penta,
  Gerardo Canfora, and Harald Gall
  — University of Sannio, Italy; University of Zurich, Switzerland

CodeTube: Extracting Relevant Fragments from Software Development Video Tutorials.................. 645
  Luca Ponzanelli, Gabriele Bavota, Andrea Mocci, Massimiliano Di Penta, Rocco Oliveto,
  Barbara Russo, Sonia Haiduc, and Michele Lanza
  — Università della Svizzera Italiana, Switzerland; Free University of Bozen-Bolzano, Italy;
  University of Sannio, Italy; University of Molise, Italy; Florida State University, USA

TASSAL: Autofolding for Source Code Summarization .................................................................. 649
  Jaroslav Fowkes, Pankajan Chanthirasegaran, Razvan Ranca, Miltiadis Allamanis,
  Mirella Lapata, and Charles Sutton
  — University of Edinburgh, United Kingdom; Tractable, United Kingdom

LibRadar: Fast and Accurate Detection of Third-Party Libraries in Android Apps ....................... 653
  Ziang Ma, Haoyu Wang, Yao Guo, and Xiangqun Chen
  — Peking University, China

ACM Student Research Competition

Causal Impact for App Store Analysis ............................................................................................. 659
  William Martin
  — University College London, United Kingdom

Identifying Successful Strategies for Resolving Static Analysis Notifications ............................... 662
  Justin Smith
  — North Carolina State University, USA

Do Biases Related to Geographical Location Influence Work-Related Decisions in GitHub? ............ 665
  Ayushi Rastogi
  — IIIT-Delhi, India

Safely Evolving Preprocessor-Based Configurable Systems .............................................................. 668
  Flávio Medeiros
  — Federal University of Campina Grande

Discovering Important Source Code Terms .................................................................................. 671
  Paige Rodeghero
  — University of Notre Dame, USA
Scaling Testing of Refactoring Engines ................................................................. 674
Melina Mongiovi
— Federal University of Campina Grande, Brazil

RDIT - Race Detection from Incomplete Traces ....................................................... 677
Arun Krishnakumar Rajagopalan
— Texas A&M University, USA

Towards Better Program Obfuscation: Optimization via Language Models .......... 680
Han Liu
— Tsinghua University, China

An Empirical Study of Blindness and Program Comprehension............................. 683
Ameer Armaly
— University of Notre Dame, USA

Maximally Stateless Model Checking for Concurrent Bugs under Relaxed Memory Models .......... 686
Alan Huang
— Texas A&M University, USA

FSMdroid: Guided GUI Testing of Android Apps ..................................................... 689
Ting Su
— East China Normal University, China

Instantaneous Performance Bug Detection in IDE ................................................. 692
Shanshan Li
— Texas A&M University, USA

Code Parallelization through Sequential Code Search .......................................... 695
Bowen Cai
— Texas A&M University, USA

Posters

Posters I

Extracting Conceptual Interoperability Constraints from API Documentation Using Machine Learning ................................................................. 701
Hadil Abukwaik, Mohammed Abujayyab, Shah Rukh Humayoun, and Dieter Rombach
— University of Kaiserslautern, Germany

Technical Debt Prioritization Using Predictive Analytics ....................................... 704
Zadia Codabux and Byron J. Williams
— Mississippi State University, USA

Recommending Developers with Supplementary Information for Issue Request Resolution ........ 707
Hui Yang, Xiaobing Sun, Bin Li, and Jiajun Hu
— Yangzhou University, China; Nanjing University, China

A New Homogeneous Pure Birth Process Based Software Reliability Model ........ 710
Nestor Ruben Barraza
— Universidad Nacional de Tres de Febrero, Argentina
On the Effectiveness of Labeled Latent Dirichlet Allocation in Automatic Bug-Report Categorization .......................................................... 713
Minhaz F. Zibran
— University of New Orleans, USA

On the Reduction of Verbose Queries in Text Retrieval Based Software Maintenance .................. 716
Oscar Chaparro and Andrian Marcus
— The University of Texas at Dallas, USA

Security Expert Recommender in Software Engineering ............................................................... 719
Shahab Bayati
— University of Auckland, New Zealand

Abdullah Aldaaej and Omar Badreddin
— State University of New York at Albany, USA; Northern Arizona University, USA

Applying Scrum to the Army - A Case Study ............................................................................. 725
Luigi Benedicenti, Franco Cotugno, Paolo Cianfrini, Angelo Messina, Witold Pedrycz, Alberto Silitti, and Giancarlo Succi
— University of Regina, Canada; Italian Army General Staff and DSSEA, Italy;
Università di Bologna, Italy; University of Alberta, Canada;
Center for Applied Software Engineering, Italy; Innopolis University, Russian Federation

Debugging Reactive Programming with Reactive Inspector ....................................................... 728
Guido Salvaneschi and Mira Mezini
— Technical University of Darmstadt, Germany

Making a Difference: An Overview of Humanitarian Free Open Source Systems ....................... 731
Esteban Parra, Sonia Haiduc, and Rebecca James
— Florida State University, USA

Posters II

A New Thread-Aware Birthmark for Plagiarism Detection of Multithreaded Programs ................. 734
Zhenzhou Tian, Ting Liu, Qinghua Zheng, Feifei Tong, Ming Fan, and Zijiang Yang
— Xi’an Jiaotong University, China; Western Michigan University, USA

When to Release in Open Source Project? .................................................................................. 737
Zeheng Li and LiGuo Huang
— Southern Methodist University, USA

Topsy-Turvy: A Smarter and Faster Parallelization of Mutation Analysis ..................................... 740
Rahul Gopinath, Carlos Jensen, and Alex Groce
— Oregon State University, USA

Mobile Malware Detection in the Real World ............................................................................. 744
Francesco Mercaldo, Corrado Aaron Visaggio, Gerardo Canfora, and Aniello Cimitile
— University of Sannio, Italy

Continuous Assessment of Software Traceability ....................................................................... 747
Patrick Rempel and Patrick Mäder
— Technische Universität Ilmenau, Germany
Characterizing API Elements in Software Documentation with Vector Representation
Thanh Van Nguyen, Anh Tuan Nguyen, and Tien N. Nguyen
— Iowa State University, USA

Guiding the Crowds for Android Testing
Xin Zhang, Zhenyu Chen, Chunrong Fang, and Zicong Liu
— Nanjing University, China

Assessing Iterative Practical Software Engineering Courses with Play Money
Kai Mindermann, Jan-Peter Ostberg, and Stefan Wagner
— University of Stuttgart, Germany

Mapping API Elements for Code Migration with Vector Representations
Trong Duc Nguyen, Anh Tuan Nguyen, and Tien N. Nguyen
— Iowa State University, USA

Candoia: A Platform and Ecosystem for Mining Software Repositories Tools
Nitin M Tiwari, Ganesha Upadhyaya, and Hridesh Rajan
— Iowa State University, USA

Visions of 2025 and Beyond (V2025)

Analysing the Program Analyser
Cristian Cadar and Alastair F. Donaldson
— Imperial College London, United Kingdom

Continuous Validation for Data Analytics Systems
Mark Staples, Liming Zhu, and John Grundy
— Data61, CSIRO and NICTA, Australia; Deakin University, Australia

COPE: Vision for a Change-Oriented Programming Environment
Danny Dig, Ralph Johnson, Darko Marinov, Brian Bailey, and Don Batory
— Oregon State University, USA; University of Illinois, USA; University of Texas, USA

Exploring Process Improvement Decisions to Support a Rapidly Evolving Developer Base
Erika S. Mesh, David M. Tolar, and J. Scott Hawker
— Rochester Institute of Technology, USA

Prodirect Manipulation: Bidirectional Programming for the Masses
Ravi Chugh
— University of Chicago, USA

Code Drones
Mithun P. Acharya, Chris Parmin, Nicholas A. Kraft, Aldo Dagnino, and Xiao Qu
— ABB Corporate Research, USA; North Carolina State University, USA

Testing the Untestable - Model Testing of Complex Software-Intensive Systems
Lionel Briand, Shiva Nejati, Mehrdad Sabetzadeh, and Domenico Bianculli
— University of Luxembourg, Luxembourg

Theories of Everything
Pamela Zave
— AT&T Labs - Research, USA
Wide-Field Ethnography: Studying Software Engineering in 2025 and Beyond .............................................. 797
David Socha, Robin Adams, Kelly Franznick, Wolff-Michael Roth, Kevin Sullivan, Josh Tenenberg, and Skip Walter
— University of Washington Bothell, USA; Purdue University, USA; Blink UX, USA; University of Victoria, Canada; University of Virginia, USA; University of Washington Tacoma, USA; Factor, Inc., USA

Doctoral Symposium

A Variability Aware Configuration Management and Revision Control Platform ............................................. 803
Lukas Linsbauer
— Johannes Kepler University, Austria

Architectural-Based Speculative Analysis to Predict Bugs in a Software System ............................................. 807
Duc Le
— University of Southern California, USA

Assisting Developers with License Compliance .................................................................................................. 811
Christopher Vendome
— The College of William and Mary, USA

Automatized Derivation of Comprehensive Specifications for Black-Box Services ........................................... 815
Simon Schwichtenberg
— Paderborn University, Germany

Boosting Static Analysis of Android Apps through Code Instrumentation ......................................................... 819
Li Li
— University of Luxembourg, Luxembourg

Cognitive Biases in Software Quality and Testing ............................................................................................. 823
Iflaah Salman
— University of Oulu, Finland

Context-Sensitive Identification of Refactoring Opportunities ............................................................................. 827
Diego Cedrim
— Pontifical Catholic University of Rio de Janeiro, Brazil

Fixing Bug Reporting for Mobile and GUI-Based Applications ............................................................................ 831
Kevin Moran
— The College of William & Mary, USA

Implications of Requirements Engineering on Software Design: A Cognitive Insight ....................................... 835
Rahul Mohanani
— University of Oulu, Finland

Mining Software Process Lines ........................................................................................................................... 839
Fabian Rojas Blum
— Universidad de Chile, Chile

Ontology Learning and Its Application in Software-Intensive Projects ............................................................... 843
Jin Guo
— DePaul University, USA
Realistic Bug Triaging ............................................................................................................................... 847
   Ali Sajedi Badashian
   — University of Alberta, Canada

Recognizing Relevant Code Elements during Change Task Navigation .................................................. 851
   Katja Kevic
   — University of Zurich, Switzerland

Reducing the Test Effort of Variability-Rich Systems by Using Feature Interaction Knowledge and Variability-Aware Source Code Analysis ........................................................................... 855
   Stefan Fischer
   — Kepler University Linz, Austria

Reusing Stack Traces: Automated Attack Surface Approximation ........................................................... 859
   Christopher Theisen
   — North Carolina State University, USA

Spotting Design Problems with Smell Agglomerations ............................................................................. 863
   Leonardo da Silva Sousa
   — Pontifical Catholic University of Rio de Janeiro, Brazil

Towards a Better Understanding of the Impact of Experimental Components on Defect Prediction Modelling .............................................................................................................................................. 867
   Chakkrit Tantithamthavorn
   — Nara Institute of Science and Technology, Japan; Queen’s University, Canada

Trace Link Evolution across Multiple Software Versions in Safety-Critical Systems ................................ 871
   Mona Rahimi
   — DePaul University, USA

Using Data Provenance to Improve Software Process Enactment, Monitoring, and Analysis ............... 875
   Gabriella Castro Barbosa Costa
   — Federal University of Rio de Janeiro, Brazil; Centro Federal de Educação Tecnológica de Minas Gerais, Brazil

When More Heads Are Better than One? Understanding and Improving Collaborative Identification of Code Smells .............................................................................................................................................. 879
   Roberto Oliveira
   — Pontifical Catholic University of Rio de Janeiro, Brazil

Technical Briefings

Rethinking Verification: Accuracy, Efficiency, and Scalability through Human-Machine Collaboration ................................................................................................................................. 885
   Suraj Kothari, Ahmed Tamrawi, and Jon Mathews
   — Iowa State University, USA; EnSoft Corporation, USA

"How Not to Do It": Anti-patterns for Data Science in Software Engineering ........................................... 887
   Tim Menzies
   — North Carolina State University, USA
Software Engineering for Molecular Programming ................................................................. 888
  Robyn R. Lutz and Jack H. Lutz
  — Iowa State University, USA

Improving and Balancing Software Qualities .............................................................................. 890
  Barry Boehm
  — University of Southern California, USA

Logic-Based Learning in Software Engineering ......................................................................... 892
  Dalal Alrajeh, Alessandra Russo, Sebastian Uchitel, and Jeff Kramer
  — Imperial College London, United Kingdom

Software Release Planning .............................................................................................................. 894
  Xavier Franch and Guenther Ruhe
  — Universitat Politècnica de Catalunya, Spain; University of Calgary, Canada

Risk Assessment in Open Source Systems ..................................................................................... 896
  Xavier Franch and Angelo Susi
  — Universitat Politècnica de Catalunya, Spain; Fondazione Bruno Kessler, Italy

The Use of Text Retrieval and Natural Language Processing in Software Engineering ................ 898
  Sonia Haiduc, Venera Arnaoudova, Andrian Marcus, and Giuliano Antoniol
  — Florida State University, USA; Washington State University, USA; University of Texas at Dallas, USA; Polytechnique Montréal, Canada

Analyzing Software Engineering Experiments: Everything You Always Wanted to Know but Were Afraid to Ask .............................................. 900
  Natalia Juristo and Sira Vegas
  — Universidad Politécnica de Madrid, Spain; University of Oulu, Finland

Software Analytics: Challenges and Opportunities ...................................................................... 902
  Latifa Guerrouj, Olga Baysal, David Lo, and Foutse Khomh
  — École de Technologie Supérieure, Canada; Carleton University, Canada; Singapore Management University, Singapore; École Polytechnique de Montréal, Canada

Advances in Unit Testing: Theory and Practice ........................................................................... 904
  Tao Xie, Nikolai Tillmann, and Pratap Lakshman
  — University of Illinois at Urbana-Champaign, USA; Microsoft, USA

Using Docker Containers to Improve Reproducibility in Software Engineering Research ............ 906
  Jürgen Cito and Harald C. Gall
  — University of Zurich, Switzerland

Technical Briefing: Control Theory for Software Engineering ................................................ 908
  Antonio Filieri and Martina Maggio
  — Imperial College London, United Kingdom; Lund University, Sweden

Author Index