Internet Access

Please use the following information to connect to the conference Wi-Fi. Remember that Internet bandwidth is a shared and limited resource. Please respect the other attendees and don’t use it for high bandwidth activities (e.g. streaming media or downloading large files)

SSID: FSE 2016  Password: EmeraldCity
Hashtag: #FSEConf

FSE 2016 Proceedings

Proceedings can be downloaded via the following URLs.

Conference and workshops (A-TEST, CHESE, RELENG, SSE, SWAN, WAMA), includes all-in-one PDFs (298M):
Conference only, no all-in-one PDF (97M)
Conference only as all-in-one PDF (104M)
Workshops only, no all-in-one PDF (53M)

Expeditions

What is more exciting and enlightening than a regular conference lunch or dinner? It is, of course, an “expedition”. An expedition is an activity that takes place close to the conference venue where researchers of similar interest (either social or research wise) network with each other. This year, for the first time, FSE will be hosting SE expeditions where attendees with similar interests meet, explore the beautiful Seattle, enjoy an activity, and of course network!

To see the list of available expeditions and sign up, please visit http://bit.ly/fse16-exp

Community Meetings

For meetings labeled with “*”, pick up your lunch at the buffet on the 4th floor and bring to the room.

Tue, Nov 15, 12:30 - 14:00
SIGSOFT EC Meeting (invitation only). Room: Capitol Hill*

Tue, Nov 15, 18:30 - 23:00
ICSE Steering Committee Meeting (invitation only), Room: Belltown

Wed, Nov 16, 12:30 - 14:00
Gay and Lesbian Software Engineers @ FSE Lunch, Room: Blue Mouse*

ESEC SC Meeting (invitation only), Room: Capitol Hill*

Program

Legend: 🏅: Paper with Artifact, 🏆: Distinguished Paper

— Sunday, November 13 —
Breaks 10:30-11:00 and 15:30-16:00 (4th floor). Lunch 12:30-14:00 (Seattle 1)

Workshop on the Naturalness of Software (NL+SE)
Sun, Nov 13, 09:00 - 17:30, Seattle 2

Workshop on Software Analytics (SWAN)
Sun, Nov 13, 09:00 - 17:20, Seattle 3
Organizers: Olga Baysal, Jacek Czerwonka, Latifa Guerrouj, David Lo, Brendan Murphy

— Monday, November 14 —
Breaks 10:30-11:00 and 15:30-16:00 (3rd floor). Lunch 12:30-14:00 (Seattle 1)

Workshop on App Market Analytics (WAMA)
Mon, Nov 14, 09:00 - 17:30, Emerald 1
Organizers: Meiyappan Nagappan, Federica Sarro, and Emad Shihab

Code Hunt Workshop on Educational Software Engineering (CHESE)
Mon, Nov 14, 09:00 - 17:30, Emerald 2
Organizers: Chang Liu, Rishabh Singh

Workshop on Social Software Engineering (SSE)
Mon, Nov 14, 09:00 - 17:15, Emerald 3
Organizers: Andrew Begel, Fabio Calefato, Christoph Treude

Doctoral Symposium
Mon, Nov 14, 09:00 - 18:00, Seattle 3
Organizers: Felienne Hermans, Emerson Murphy-Hill

Refactoring and Migration of Cascading Style Sheets: Towards Optimization and Improved Maintainability
Davood Mazinanian (Concordia University, Canada)

Developing a Reusable Control-Based Approach to Build Self-Adaptive Software Systems with Formal Guarantees
Stepan Shvetsov (Linnaeus University, Sweden)

Automating Repetitive Code Changes using Examples
Reudismam Rolim (Federal University of Campina Grande, Brazil)

Understanding and Improving Continuous Integration
Michael Hilton (Oregon State University, USA)
Guided Code Synthesis using Deep Neural Networks
Carol V. Alexandru (University of Zurich, Switzerland)

Generating Interactive Web Pages from Storyboards
Pavel Panchekha (University of Washington, USA)

Data Structure Synthesis
Calvin Loncaric (University of Washington, USA)

Understanding Behavioural Patterns in JavaScript
Saba Alimadadi (University of British Columbia, Canada)

Regression Testing of Web Applications using Record/Replay Tools
Mouna Hammoudi (University of Nebraska-Lincoln, USA)

Supporting Change in Product Lines within the Context of Use Case-Driven Development and Testing
Ines Hajri (University of Luxembourg, Luxembourg)

Input-Sensitive Performance Testing
Qi Luo (College of William and Mary, USA)

On the Utility of Dominator Mutants for Mutation Testing
Bob Kurtz (George Mason University, USA)

— Tuesday, November 15 —

Welcome
Tue, Nov 15, 08:30 - 09:00, Emerald Ballroom
Thomas Zimmermann, Jane Cleland-Huang, Zhendong Su

Keynote
Tue, Nov 15, 09:00 - 10:00, Emerald Ballroom
"Womenomics" and Gender-Inclusive Software: What Software Engineers Need to Know
Margaret Burnett (Oregon State University, USA)

Margaret Burnett is an OSU Distinguished Professor at Oregon State University. She began her career in industry, where she was the first woman software developer ever hired at Procter & Gamble Ivorydale. A few degrees and start-ups later, she joined academia, with a research focus on people who are engaged in some form of software development. She was the principal architect of the Forms/3 and FAR visual programming languages, and co-founded the area of end-user software engineering, which aims to improve software for computer users that are not trained in programming. She pioneered the use of information foraging theory in the domain of software debugging, and leads the team that created GenderMag, a software inspection process that uncovers gender inclusiveness issues in software from spreadsheets to programming environments.

Burnett is an ACM Distinguished Scientist and a member of the ACM CHI Academy. She currently serves on three editorial boards including that of IEEE's Transactions on Software Engineering, and has served in over 50 conference organization and program committee roles. She is also on the Academic Alliance Advisory Board of the National Center for Women in IT (NCWIT).

Visions 1
Tue, Nov 15, 10:00 - 10:30, Emerald Ballroom
Session Chair: Darko Marinov

Sustainable Software Design (Visions and Reflections)
Martin P. Robillard (McGill University, Canada)

Designing for Dystopia: Software Engineering Research for the Post-apocalypse (Visions and Reflections)
Titus Barik, Rahul Pandita, Justin Middleton, and Emerson Murphy-Hill (North Carolina State University, USA)

Disrupting Developer Productivity One Bot at a Time (Visions and Reflections)
Margaret-Anne Storey and Alexey Zagalsky (University of Victoria, Canada)

Break
Tue, Nov 15, 10:30 - 11:00, Foyer 3rd/4th Floor

Session 1: Specification
Tue, Nov 15, 11:00 - 12:30, Emerald 1
Session Chair: Mike Whalen

Titanium: Efficient Analysis of Evolving Alloy Specifications
Hamid Bagheri and Sam Malek (University of Nebraska-Lincoln, USA; University of California at Irvine, USA)

Mining Performance Specifications
Marc Brünink and David S. Rosenblum (National University of Singapore, Singapore)

Designing Minimal Effective Normative Systems with the Help of Lightweight Formal Methods
Jianye Hao, Eunsuk Kang, Jun Sun, and Daniel Jackson (Tianjin University, China; University of California at Berkeley, USA; Singapore University of Technology and Design, Singapore; Massachusetts Institute of Technology, USA)

Proteus: Computing Disjunctive Loop Summary via Path Dependency Analysis
Xiaofei Xie, Bihuan Chen, Yang Liu, Wei Le, and Xiaohong Li (Tianjin University, China; Nanyang Technological University, Singapore; Iowa State University, USA)

NonDex: A Tool for Detecting and Debugging Wrong Assumptions on Java API Specifications (Demo)
Alex Gyori, Ben Lambeth, August Shi, Owolabi Legunsen, and Darko Marinov (University of Illinois at Urbana-Champaign, USA)

Session 2: HCI and Process
Tue, Nov 15, 11:00 - 12:30, Emerald 2
Session Chair: Peri Tarr

A Cross-Tool Communication Study on Program Analysis Tool Notifications
Brittany Johnson, Rahul Pandita, Justin Smith, Denae Ford, Sarah Elder, Emerson Murphy-Hill, Sarah Heckman, and Caitlin Sadowski (North Carolina State University, USA; Google, USA)
Factors Influencing Code Review Processes in Industry
Tobias Baum, Olga Liskin, Kai Niklas, and Kurt Schneider (Leibniz Universität Hannover, Germany)

Foraging and Navigations, Fundamentally: Developers' Predictions of Value and Cost
David Piorkowski, Austin Z. Henley, Tahmid Nabi, Scott D. Fleming, Christopher Scaffidi, and Margaret Burnett (Oregon State University, USA; University of Memphis, USA)

How to Break an API: Cost Negotiation and Community Values in Three Software Ecosystems
Christopher Bogart, Christian Kästner, James Herbsleb, and Ferdian Thung (Carnegie Mellon University, USA; Singapore Management University, Singapore)

TIPMerge: Recommending Developers for Merging Branches (Demo)
Catarina Costa, Jair Figueiredo, Anita Sarma, and Leonardo Murta (Federal University of Acre, Brazil; Oregon State University, USA; Federal Fluminense University, Brazil)

Session 3: Bug Detection and Debugging
Tue, Nov 15, 11:00 - 12:30, Emerald 3
Session Chair: Tingting Yu

Python Predictive Analysis for Bug Detection
Zhaogui Xu, Peng Liu, Xiangyu Zhang, and Baowen Xu (Nanjing University, China; Purdue University, USA)

Crash Consistency Validation Made Easy
Yanyan Jiang, Haicheng Chen, Feng Qin, Chang Xu, Xiaoxing Ma, and Jian Lu (Nanjing University, China; Ohio State University, USA)

Discovering Bug Patterns in JavaScript
Quinn Hanam, Fernando S. de M. Brito, and Ali Mesbah (University of British Columbia, Canada; Federal University of Paraíba, Brazil)

Effort-Aware Just-in-Time Defect Prediction: Simple Unsupervised Models Could Be Better Than Supervised Models
Yibiao Yang, Yuming Zhou, Jinpeng Liu, Yangyang Zhao, Hongmin Lu, Lei Xu, Baowen Xu, and Hareton Leung (Nanjing University, China; Hong Kong Polytechnic University, China)

Time-Travel Debugging for JavaScript/Node.js (Demo)
Earl T. Barr, Mark Marron, Ed Maurer, Dan Moseley, and Gaurav Seth (University College London, UK; Microsoft Research, USA; Microsoft, USA)

Lunch
Tue, Nov 15, 12:30 - 14:00, Seattle Ballrooms, 4th Floor
Lunch sponsored by Microsoft Corporation.

Session 4: Security and Privacy
Tue, Nov 15, 14:00 - 15:30, Emerald 1
Session Chair: Diomidis Spinellis

Detecting Sensitive Data Disclosure via Bidirectional Text Correlation Analysis
Jianjun Huang, Xiangyu Zhang, and Lin Tan (Purdue University, USA; University of Waterloo, Canada)

Multi-representational Security Analysis
Eunsuk Kang, Aleksandar Milicevic, and Daniel Jackson (University of California at Berkeley, USA; Microsoft, USA; Massachusetts Institute of Technology, USA)

String Analysis for Side Channels with Segmented Oracles
Lucas Bang, Abdulbaki Aydin, Quoc Sang Phan, Corina S. Păsăreanu, and Tevfik Bultan (University of California at Santa Barbara, USA; Carnegie Mellon Silicon Valley, USA)

WebRanz: Web Page Randomization for Better Advertisement Delivery and Web-Bot Prevention
Weihang Wang, Yunhui Zheng, Xinyu Xing, Yonghwi Kwon, Xiangyu Zhang, and Patrick Eugster (Purdue University, USA; IBM Research, USA; Pennsylvania State University, USA; Purdue University, Germany)

Session 5: Adaptation and Change
Tue, Nov 15, 14:00 - 15:30, Emerald 2
Session Chair: Harald Gall

A Discrete-Time Feedback Controller for Containerized Cloud Applications
Luciano Baresi, Sam Guinea, Alberto Leva, and Giovanni Quattrocchi (Politecnico di Milano, Italy)

Keep It SIMPLEX: Satisfying Multiple Goals with Guarantees in Control-Based Self-Adaptive Systems
Stepan Shevtsov and Danny Weys (Linnaeus University, Sweden; KU Leuven, Belgium)

Automated Change Impact Analysis between SysML Models of Requirements and Design
Shiva Nejati, Mehrdad Sabetzadeh, Chetan Arora, Lionel C. Briand, and Felix Mandoux (University of Luxembourg, Luxembourg; Delphi Automotive Systems, Luxembourg)

Inner Source in Platform-Based Product Engineering (J1-TSE)
Dirk Riehle, Maximilian Capraro, Detlef Kips, and Lars Horn (University of Erlangen-Nuremberg, Germany)

PUMConf: A Tool to Configure Product Specific Use Case and Domain Models in a Product Line (Demo)
Ines Hajri, Arda Goknil, Lionel C. Briand, and Thierry Stephany (University of Luxembourg, Luxembourg; IEE, Luxembourg)

Session 6: API Mining and Usage
Tue, Nov 15, 14:00 - 15:30, Emerald 3
Session Chair: Tao Xie

Parameter-Free Probabilistic API Mining across GitHub
Jaroslav Fowkes and Charles Sutton (University of Edinburgh, UK)
API Deprecation: A Retrospective Analysis and Detection Method for Code Examples on the Web
Jing Zhou and Robert J. Walker (University of Calgary, Canada)

When Should Internal Interfaces Be Promoted to Public?
André Hora, Marco Tulio Valente, Romain Robbes, and Nicolas Anquetil (Federal University of Minas Gerais, Brazil; University of Chile, Chile; University of Lille, France)

POLLUX: Safely Upgrading Dependent Application Libraries
Sukrit Kalra, Ayush Goel, Dhriti Khanna, Mohan Dhawan, Subodh Sharma, and Rahul Purandare (IIIT Delhi, India; IBM Research, India; IIIT Delhi, India)

T2API: Synthesizing API Code Usage Templates from English Texts with Statistical Translation (Demo)
Thanh Nguyen, Peter C. Rigby, Anh Tuan Nguyen, Mark Karanfil, and Tien N. Nguyen (Iowa State University, USA; Concordia University, Canada; University of Texas at Dallas, USA)

Student Research Competition & Break
Tue, Nov 15, 15:30 - 16:30, Foyer 3rd/4th Floor
Please visit the poster presentations of the ACM Student Research Competition during the coffee break.

Graduate Submissions
Effective Assignment and Assistance to Software Developers and Reviewers
Motahareh Bahrami Zanjani (Wichita State University, USA)

RABIEF: Range Analysis Based Integer Error Fixing
Xi Cheng (Tsinghua University, China)

Fine-Grained Binary Code Authorship Identification
Xiaozhu Meng (University of Wisconsin-Madison, USA)

Identifying Participants for Collaborative Merge
Catarina Costa (Federal Fluminense University, Brazil)

Cozy: Synthesizing Collection Data Structures
Calvin Loncaric (University of Washington, USA)

Constraint-Based Event Trace Reduction
Jie Wang (University of Chinese Academy of Sciences, China)

Automatic Trigger Generation for End User Written Rules for Home Automation
Chandrakana Nandi (University of Washington, USA)

Hotspot Symbolic Execution of Floating-Point Programs
Minghui Quan (National University of Defense Technology, China)

Evaluation of Fault Localization Techniques
Spencer Pearson (University of Washington, USA)

How Should Static Analysis Tools Explain Anomalies to Developers?
Titus Barik (North Carolina State University, USA)

Repairing Test Dependence
Wing Lam (University of Illinois at Urbana-Champaign, USA)

Combining Bug Detection and Test Case Generation
Martin Kellogg (University of Washington, USA)

SmartDebug: An Interactive Debug Assistant for Java
Xinrui Guo (Tsinghua University, China)

Static Loop Analysis and Its Applications
Xie Xiaofei (Tianjin University, China)

Social Health Cues Developers Use when Choosing Open Source Packages
Andrew Head (University of California at Berkeley, USA)

Finding and Breaking Test Dependencies to Speed Up Test Execution
Sebastian Kappler (Saarland University, Germany)

Automatic Performance Testing using Input-Sensitive Profiling
Qi Luo (College of William and Mary, USA)

Undergraduate Submissions
Enforcing Correct Array Indexes with a Type System
Joseph Santino (University of Washington, USA)

Discovering Additional Violations of Java API Invariants
Waylon Huang (University of Washington, USA)

Preventing Signedness Errors in Numerical Computations in Java
Christopher A. Mackie (University of Washington, USA)

Felipe R. Monteiro (Federal University of Amazonas, Brazil)

Atlas: An Intelligent, Performant Framework for Web-Based Grid Computing
Sachith Gullapalli (Yale University, USA)

Session 7: Verification
Tue, Nov 15, 16:30 - 18:00, Emerald 1
Session Chair: Abhik Roychoudhury

Extracting Instruction Semantics via Symbolic Execution of Code Generators
Niranjan Hasabnis and R. Sekar (Intel, USA; Stony Brook University, USA)

Efficient Generation of Inductive Validity Cores for Safety Properties
Elahesh Ghassabani, Andrew Gacek, and Michael W. Whalen (University of Minnesota, USA; Rockwell Collins, USA)

Correctness Witnesses: Exchanging Verification Results between Verifiers
Dirk Beyer, Matthias Dangl, Daniel Dietsch, and Matthias Heizmann (LMU Munich, Germany; University of Passau, Germany; University of Freiburg, Germany)

SMT-Based Verification of Parameterized Systems
Conference Banquet  
**Tue, Nov 15, 19:00 - 23:00**

Please see the page in the yearbook for details.

### Session 8: Requirements and Models
**Tue, Nov 15, 16:30 - 18:00, Emerald 2**

Session Chair: Jo Atlee

- **On-the-Fly Decomposition of Specifications in Software Model Checking**
  Sven Apel, Dirk Beyer, Vitaly Mordan, Vadim Mutilin, and Andreas Stahlbauer (University of Passau, Germany; LMU Munich, Germany; Russian Academy of Sciences, Russia)

- **On Well-Separation of GR(1) Specifications**
  Shahar Maoz and Jan Oliver Ringert (Tel Aviv University, Israel)

- **Lightweight Specification and Analysis of Dynamic Systems with Rich Configurations**
  Nuno Macedo, Julien Brunel, David Chemouil, Alcino Cunha, and Denis Kuperberg (INESC TEC, Portugal; University of Toulouse, France; TU Munich, Germany)

- **Gray Links in the Use of Requirements Traceability**
  Nan Niu, Wentao Wang, and Arushi Gupta (University of Cincinnati, USA)

### Session 9: Android
**Tue, Nov 15, 16:30 - 18:00, Emerald 3**

Session Chair: Lingxiao Jiang

- **Understanding and Detecting Wake Lock Misuses for Android Applications**
  Yepang Liu, Chang Xu, Shing-Chi Cheung, and Valerio Terragni (Hong Kong University of Science and Technology, China; Nanjing University, China)

- **DiagDroid: Android Performance Diagnosis via Anatomizing Asynchronous Executions**
  Yu Kang, Yangfan Zhou, Hui Xu, and Michael R. Lyu (Chinese University of Hong Kong, China; Fudan University, China)

- **Minimizing GUI Event Traces**
  Lazaro Clapp, Osbert Bastani, Saswat Anand, and Alex Aiken (Stanford University, USA)

- **Causal Impact Analysis for App Releases in Google Play**
  William Martin, Federica Sarro, and Mark Harman (University College London, UK)

- **ARdoc: App Reviews Development Oriented Classifier (Demo)**
  Sebastiano Panichella, Andrea Di Sorbo, Emitza Guzman, Corrado A. Visaggio, Gerardo Canfora, and Harald C. Gall (University of Zurich, Switzerland; University of Sannio, Italy)

### Conference Banquet
**Tue, Nov 15, 19:00 - 23:00**

Please see the page in the yearbook for details.
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<td><strong>Panel:</strong> PerfGuard: Binary-Centric Application Performance Monitoring in Production Environments</td>
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<td>Iftekhar Ahmed, Rahul Gopinath, Caius Brindescu, Alex Groce, and Carlos Jensen (Oregon State University, USA)</td>
<td>Chung Hwan Kim, Junghwan Rhee, Kyu Hyung Lee, Xiangyu Zhang, and Dongyan Xu (Purdue University, USA; NEC Labs, USA; University of Georgia, USA)</td>
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<tr>
<td><strong>A Large-Scale Empirical Comparison of Static and Dynamic Test Case Prioritization Techniques</strong></td>
<td><strong>Python Probabilistic Type Inference with Natural Language Support</strong></td>
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<td>Qi Luo, Kevin Moran, and Denys Poshyvanyk (College of William and Mary, USA)</td>
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<td><strong>Analyzing the Validity of Selective Mutation with Dominator Mutants</strong></td>
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<td>Bob Kurtz, Paul Ammann, Jeff Offutt, Márcio E. Delamaro, Mariet Kurtz, and Nida Gökçe (George Mason University, USA; University of São Paulo, Brazil; MITRE, USA; Muğla University, Turkey)</td>
<td>Ran Wang, Daming Zou, Xinrui He, Yingfei Xiong, Lu Zhang, and Gang Huang (Peking University, China)</td>
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<td><strong>An Extensive Study of Static Regression Test Selection in Modern Software Evolution</strong></td>
<td><strong>Deep API Learning</strong></td>
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<td>Owofolabi Legunsen, Farah Hariri, August Shi, Yafeng Lu, Lingming Zhang, and Darko Marinov (University of Illinois at Urbana-Champaign, USA; University of Texas at Dallas, USA)</td>
<td>Xiaodong Gu, Hongyu Zhang, Dongmei Zhang, and Sunghun Kim (Hong Kong University of Science and Technology, China; Microsoft Research, China)</td>
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<td><strong>Cluster-Based Test Suite Functional Analysis (Industry)</strong></td>
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<td>Marcel Zalmanovici, Orna Raz, and Rachel Tzoref-Brill (IBM Research, Israel)</td>
<td>Connor Imes, Lars Bergstrom, and Henry Hoffmann (University of Chicago, USA; Mozilla Research, USA)</td>
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**Lunch**

**Wed, Nov 16, 12:30 - 14:00, Seattle Ballrooms**

Lunch sponsored by Intel Corporation.
Session 15: Code Search and Similarity  
**Wed, Nov 16, 14:00 - 15:30, Emerald 3**  
Session Chair: Mehdi Mirakhorli

**BinGo: Cross-Architecture Cross-OS Binary Search**  
Mahinthan Chandramohan, Yinxing Xue, Zhengzi Xu, Yang Liu, Chia Yuan Cho, and Hee Beng Kuan Tan (Nanyang Technological University, Singapore; DSO National Laboratories, Singapore)

**Relationship-Aware Code Search for JavaScript Frameworks**  
Xuan Li, Zerui Wang, Qianxiang Wang, Shoumeng Yan, Tao Xie, and Hong Mei (Peking University, China; Intel Research, China; University of Illinois at Urbana-Champaign, USA)

**Code Relatives: Detecting Similarly Behaving Software**  
Fang-Hsiang Su, Jonathan Bell, Kenneth Harvey, Simha Sethumadhavan, Gail Kaiser, and Tony Jebra (Columbia University, USA)

**Estimating Semantic Relatedness in Source Code**  
Anas Mahmoud and Gary Bradshaw (Louisiana State University, USA; Mississippi State University, USA)

**Hunter: Next-Generation Code Reuse for Java (Demo)**  
Yuepeng Wang, Yu Feng, Ruben Martins, Arati Kaushik, Isil Dillig, and Steven P. Reiss (University of Texas at Austin, USA; Brown University, USA)

**Tool Demonstrations, Foyer 3rd/4th Floor & Break**  
**Wed, Nov 16, 15:30 - 16:30**  
Please visit the tool demos during the coffee break.

Panel: The State of Software Engineering Research  
**Wed, Nov 16, 16:30 - 18:00, Emerald Ballroom**  
Moderator: Margaret-Anne Storey

Panelists: Lionel Briand, University of Luxembourg  
Prem Devanbu, University of California at Davis  
Peri Tar, IBM Research  
Laurie Williams, North Carolina State University  
Tao Xie, University of Illinois at Urbana-Champaign

As software becomes more ubiquitous and pervasive in today’s interconnected and instrumented world, software engineering—as a practice and as a research topic—is having a hard time keeping up. In this panel, we invite FSE 2016’s participants to engage with five prominent software engineering researchers as they reflect on the state of current software engineering research and share how they each believe our work impacts (or should impact) science, society and industry. Our panelists will discuss whether our community as a whole is achieving the right balance of science, engineering and design in its combined research efforts. This lively and interactive panel discussion will also highlight new areas of research that our community should pay more attention to, as well as suggest new ways of conducting research that could improve the impact of software engineering research in the near and distant future.

SIGSOFT Town Hall  
**Wed, Nov 16, 18:00 - 19:00, Emerald Ballroom**  
Free snacks and drinks!

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**Keynote**  
**Thu, Nov 17, 08:30 - 09:30, Emerald Ballroom**  
Building a Socio-Technical Theory of Coordination: Why and How (Outstanding Research Award)  
James Herbsleb (Carnegie Mellon University, USA)

James Herbsleb is a Professor in the Institute for Software Research in the School of Computer Science at Carnegie Mellon University, where he serves as Director of the PhD program in Societal Computing. His research interests lie primarily in the intersection of software engineering, computer-supported cooperative work, and socio-technical systems, focusing on such areas as geographically distributed development teams and large-scale open source development. He holds a PhD in psychology, and an MS in computer science. His research has won several awards at ICSE, including the Most Influential Paper award in 2010, Honorable Mention for Most Influential Paper award in 2011, and ACM Distinguished Paper Award in 2011. Other awards include an ACM Distinguished Paper award for ESEM 2008 and a Best Paper Award for CSCW 2006. He was recently awarded the SIGSOFT Outstanding Research Award in 2016, and previously the Alan Newell Award for Research Excellence in 2014. For no apparent reason, he also holds a Juris Doctor degree and is a member of the Michigan Bar Association. For about two decades, he has worked with assorted colleagues and minions to try to understand the complex and dynamic relationship between human collaboration and the software that humans design and use. On his optimistic days, he feels he has made a bit of progress.

**Visions 2**  
**Thu, Nov 17, 09:30 - 10:30, Emerald Ballroom**  
Session Chair: Miryung Kim

Training the Future Workforce through Task Curation in an OSS Ecosystem (Visions and Reflections)  
Anita Sarma, Marco Aurélio Gerosa, Igor Steinmacher, and Rafael Leano (Oregon State University, USA; University of São Paulo, Brazil; Federal University of Technology Paraná, Brazil)

Reaching the Masses: A New Subdiscipline of App Programmer Education (Visions and Reflections)  
Charles Weir, Avais Rashid, and James Noble (Security Lancaster, UK; Victoria University of Wellington, New Zealand)

Studying Developer Gaze to Empower Software Engineering Research and Practice (Visions and Reflections)  
Bonita Sharif, Benjamin Clark, and Jonathan I. Maletic (Youngstown State University, USA; Kent State University, USA)

DeepSoft: A Vision for a Deep Model of Software (Visions and Reflections)  
Hoang Khahn Dam, Truyen Tran, John Grundy, and Aditya Ghose (University of Wollongong, Australia; Deakin University, Australia)

Budgeted Testing through an Algorithmic Lens (Visions and Reflections)  
Myra B. Cohen, A. Pavan, and N. V. Vinodchandran (University of Nebraska-Lincoln, USA; Iowa State University, USA)

Reasoning with Imprecise Privacy Preferences (Visions and Reflections)  
Inah Omoronyia (University of Glasgow, UK)
Session 16: Program Repair
Thu, Nov 17, 11:00 - 12:30, Emerald 1
Session Chair: Tien Nguyen
Understanding and Generating High Quality Patches for Concurrency Bugs
Haopeng Liu, Yuxi Chen, and Shan Lu (University of Chicago, USA)
Anti-patterns in Search-Based Program Repair
Shin Hwei Tan, Hiroaki Yoshida, Mukul R. Prasad, and Abhik Roychoudhury (National University of Singapore, Singapore; Fujitsu Labs, USA)
Semi-supervised Verified Feedback Generation
Shalini Kaleeswaran, Anirudh Santhiar, Aditya Kanade, and Sumit Gulwani (Indian Institute of Science, India; Microsoft Research, USA)
WATERFALL: An Incremental Approach for Repairing Record-Replay Tests of Web Applications
Mouna Hammoudi, Gregg Rothermel, and Andrea Stocco (University of Nebraska-Lincoln, USA; University of Genoa, Italy)
BigDebug: Interactive Debugger for Big Data Analytics in Apache Spark (Demo)
Muhammad Ali Gulzar, Matteo Interlandi, Tyson Condie, and Miryung Kim (University of California at Los Angeles, USA)

Session 17: Development Environments
Thu, Nov 17, 11:00 - 12:30, Emerald 2
Session Chair: Dongmei Zhang
Efficiency of Projectional Editing: A Controlled Experiment
Thorsten Berger, Markus Vollter, Hans Peter Jensen, Taweesap Dongprasert, and Janet Siegmund (Chalmers University of Technology, Sweden; itemis, Germany; IT University of Copenhagen, Denmark; University of Passau, Germany)
ECHO: Instantaneous In Situ Race Detection in the IDE
Sheng Zhan and Jeff Huang (Texas A&M University, USA)
Detecting Table Clones and Smells in Spreadsheets
Wensheng Dou, Shing-Chi Cheung, Chushu Gao, Chang Xu, Liang Xu, and Jun Wei (Institute of Software at Chinese Academy of Sciences, China; Hong Kong University of Science and Technology, China; Nanjing University, China)
Exploring Mobile End User Development: Existing Use and Design Factors (J1-TSE)
Abdallah Namoun, Athanasia Daskalopoulou, Nikolay Mehandiiev, and Zhang Xun (Islamic University of Madinah, Saudi Arabia; University of Manchester, UK)
Visualizing Code and Coverage Changes for Code Review (Demo)
Sebastiaan Oosterwaal, Arie van Deursen, Roberta Coelho, Anand Ashok Sawant, and Alberto Bacchelli (Delft University of Technology, Netherlands; Federal University of Rio Grande do Norte, Brazil)

Session 18: Concurrency
Thu, Nov 17, 14:30 - 16:00, Emerald 1
Session Chair: Jeff Huang
Flow-Sensitive Composition of Thread-Modular Abstract Interpretation
Markus Kusano and Chao Wang (Virginia Tech, USA; University of Southern California, USA)
A Deployable Sampling Strategy for Data Race Detection
Yan Cai, Jian Zhang, Lingwei Cao, and Jian Liu (Institute of Software at Chinese Academy of Sciences, China; Institute of Information Engineering at Chinese Academy of Sciences, China)
Online Shared Memory Dependence Reduction via Bisectional Coordination
Yanyan Jiang, Chang Xu, Du Li, Xiaoxing Ma, and Jian Lu (Nanjing University, China; Carnegie Mellon University, USA)
Parallel Data Race Detection for Task Parallel Programs with Locks
Adarsh Yoga, Santosh Nagarakatte, and Aarti Gupta (Rutgers University, USA; Princeton University, USA)
End-to-End Memory Behavior Profiling with DINAMITE (Demo)
Svetozar Miucin, Conor Brady, and Alexandra Fedorova (University of British Columbia, Canada; Simon Fraser University, Canada)

Session 19: Open Source
Thu, Nov 17, 14:30 - 16:00, Emerald 2
Session Chair: Mei Naggapan
Paradise Unplugged: Identifying Barriers for Female Participation on Stack Overflow
Denae Ford, Justin Smith, Philip J. Guo, and Chris Parnin (North Carolina State University, USA; University of California at San Diego, USA)
Why We Refactor? Confessions of GitHub Contributors
Danilo Silva, Nikolaos Tsantalis, and Marco Tulio Valente (Federal University of Minas Gerais, Brazil; Concordia University, Canada)
Effectiveness of Code Contribution: From Patch-Based to Pull-Request-Based Tools
Jiaxin Zhu, Minghui Zhou, and Audris Mockus (Peking University, China; University of Tennessee, USA)
Since our work on verification sixteen years ago, our views of the role of verification, and the centrality of correctness, have evolved. In our presentation, we’ll talk about some of our concerns about the limitations of this kind of technology, including: usability as a key factor; the unknowable properties of the environment; and the inadequacy of specifications as a means of capturing users’ desires. We’ll describe two approaches we’re currently working on to mitigate these concerns — (1) moving to higher level abstractions with correctness by construction and (2) focusing on the conceptual structure of applications — and will argue that, combined with traditional verification tools, these offer the possibility of applications that are both usable and correct.

Daniel Jackson is Professor of Computer Science at MIT, a MacVicar teaching fellow, and an Associate Director of the Computer Science and Artificial Intelligence Laboratory, where he leads the Software Design Group. He is the lead designer of the Alloy modelling language, and author of “Software Abstractions: Logic, Language, and Analysis” (MIT Press; second ed. 2012). He was chair of the National Academies’ study “Software for Dependable Systems: Sufficient Evidence?” (2007). His research currently focuses on a new approach to software design, on new programming paradigms, and on cybersecurity.

Mandana Vaziri is a Research Staff Member at IBM’s T.J. Watson Research Center. She has worked on different projects in the area of Programming Languages and Software Engineering, most notably data-centric synchronization (Atomic Sets), the IDE for IBM’s X10 language (X10DT), and a spreadsheet interface for IBM’s Stream Processing Language (ActiveSheets). She holds a PhD from MIT working with Daniel Jackson on analyzing imperative code with a SAT solver.
**Message from the Chairs**

On behalf of the entire conference committee, it is our great pleasure to welcome you to Seattle for the *24th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE 2016)*. ACM SIGSOFT FSE is one of the premier forums that bring together researchers, practitioners, and educators to present and discuss the most recent innovations, trends, visions, experiences, and challenges in software engineering.

FSE 2016 has a rich and diverse program on the latest innovations and visions in software engineering. The Research track received 273 submissions, of which six were desk-rejected and one was withdrawn by the authors. The remaining 266 papers were each reviewed by three program committee members using criteria of novelty, strength of evidence, and clarity. Reviews, including the scores, were sent to all authors, and author responses were elicited. Each paper was then assigned a **guardian** from the Program Committee with the responsibility for leading online discussions and ensuring that the authors’ response was read and addressed. Following an extensive online discussion, 96 papers were selected for discussion at the Program Committee meeting held on May 21-22, 2016 in Austin, Texas. Of these, 36 were marked as “pre-accept” and 60 were marked for more extensive discussion. A total of 74 papers were ultimately accepted to FSE. Of these, 10 were initially accepted conditionally, and authors were given the opportunity to address specific problems. The use of conditional acceptances made it possible for high-quality papers, which may otherwise have been rejected, to appear in a timely manner at FSE. This helped achieve our goal of accepting as many high-quality papers as possible to facilitate timely dissemination of research ideas. The following papers received ACM SIGSOFT Distinguished Paper Awards:

- **Detecting Sensitive Data Disclosure via Bi-directional Text Correlation Analysis**, by Jianjun Huang, Xiangyu Zhang and Lin Tan
- **Factors Influencing Code Review Processes in Industry**, by Tobias Baum, Olga Liskin, Kai Niklas and Kurt Schneider
- **Foraging and Navigations, Fundamentally: Developers’ Predictions of Value and Cost**, by David Piorkowski, Austin Henley, Tahmid Nabi, Scott Fleming, Christopher Scaffidi and Margaret Burnett
- **Multi-Representational Security Analysis**, by Eunsuk Kang, Aleksandar Milicevic and Daniel Jackson
- **Proteus: Computing Disjunctive Loop Summary via Path Dependency Analysis**, by Xiaofei Xie, Bihuan Chen, Yang Liu, Wei Le and Xiaohong Li
- **Why We Refactor? Confessions of GitHub Contributors**, by Danilo Silva, Nikolaos Tsantalis and Marco Tulio Valente

The research program also includes five Journal-First presentations of papers that have been published in the ACM Transactions on Software Engineering Methodology (TOSEM), IEEE Transactions on Software Engineering (TSE), and Springer’s Journal on Empirical Software Engineering (EMSE). Journal-first is an initiative to provide opportunities for novel research results that have been published in premiere journals to be presented to the community in the technical research track of an ACM- or IEEE-sponsored conference. The Visions and Reflections track highlights radical new directions that represent disruptive innovations in the making. Out of the 34 submissions (28 visions and 6 reflections), 9 vision
papers were selected for presentation at the conference. The Demonstration track features the most recent research tools, data, and artifacts. Out of the 32 submissions, 13 demos were accepted for inclusion and presentation in the conference program.

The conference program features three keynotes: Margaret Burnett on “Womenomics” and Gender-Inclusive Software: What Software Engineers Need to Know; ACM SIGSOFT Outstanding Research Award Winner James Herbsleb on Building a Theory of Coordination: Why and How; and ACM SIGSOFT Impact Paper Award Winners Daniel Jackson and Mandana Vaziri on Correct or usable? The Limits of Traditional Verification.

The conference has a strong focus on practice and highlights best practices in software engineering. The Showcase track features invited presentations by innovative software engineering practitioners:

- Tony Savor from Facebook on Towards Continuous Mobile Deployment;
- Shan Shan Huang from LogicBlox on Model, Execute, and Deploy: Answering the Hard Questions in End-User Programming;
- Gazi Muhmaud from Sonatype on Making Invisible Things Visible: Tracking Down Known Vulnerabilities at 3000 Companies; and
- Caitlin Sadowski from Google on Developer Workflow at Google

The Industry track showcases exemplary applied research in software engineering. Out of the 31 submissions, 6 papers were accepted for the conference program.

Motivated by frequent discussions on the relevance of software engineering research, FSE 2016 will feature a plenary panel on the State of Software Engineering Research and how our community can ensure long-term impact on science and society. The panel will be moderated by Margaret-Anne Storey. The panelists are Lionel Briand, Prem Devanbu, Peri Tarr, Laurie Williams, and Tao Xie.

The goal of the Artifacts track was to promote, share, and celebrate excellent research artifacts in software engineering. All accepted research papers were eligible to submit artifacts for evaluation. Out of the 74 research papers, 17 submitted artifacts to an open artifact evaluation process handled through GitHub (https://github.com/researchart/fse16/issues). The process encouraged communication between the reviewers and the authors. Any issues or problems with artifacts could be resolved during the review process, and all artifacts were evaluated positively as Gold, Platinum, and Diamond. Two papers received the highest rating (Diamond) for their artifacts: Python Probabilistic Type Inference with Natural Language Support by Zhaogui Xu, Xiangyu Zhang, Lin Chen, Kexin Pei and Baowen Xu, and Why We Refactor? Confessions of GitHub Contributors by Danilo Silva, Nikolaos Tsantalis and Marco Tulio Valente.

Workshops provide opportunities for exchanging views, advancing ideas, and discussing preliminary results in various areas of software engineering. We are proud to host the following eight workshops at FSE 2016: Workshop on Naturalness of Software (NL+SE); The 2nd International Workshop on Software Analytics (SWAN); The 8th International Workshop on Social Software Engineering (SSE); Workshop on App Market Analytics (WAMA); The 2nd International Code Hunt Workshop on Educational Software Engineering (CHESE); The 4th International Workshop on Release Engineering (RELENG); The Java Pathfinder Workshop (JPF); The 7th Workshop on Automating Test Case Design, Selection, and Evaluation (A-TEST). For more information on those workshops, please read the Summary of Co-located Workshops by Yuriy Brun and Mehdi Mirakhorli, the FSE 2016 Workshops Co-Chairs. We thank the organizers of all workshops for their vision and help in making FSE 2016 successful.
FSE 2016 offers several student programs. The Doctoral Symposium gives 12 students the opportunity to discuss their doctoral research with senior researchers in the software engineering community. The ACM Student Research Competition, sponsored by Microsoft Research, is a unique forum for students to experience the research world, present their research, and compete for prizes. 22 students were accepted for the competition at FSE 2016. As part of the Student Volunteer Program, 15 student volunteers were selected. Through generous support from ACM SIGSOFT, Microsoft Research, and the National Science Foundation (NSF), many students received travel support and/or complimentary registrations to the conference.

FSE 2016 includes several innovations related to conference experience. First, the program is organized into blended sessions to improve the cohesiveness of sessions by combining research, journal-first, industry, and demo presentations. Second, the mentorship program facilitates one-on-one meetings between junior and senior researchers, each lasting 20 minutes during lunch or breakfast. The goal for these meetings is to enable fruitful collaborations or mentoring relationships, and to build a stronger community. Third, the conference yearbook is a printed souvenir book that includes attendee profiles and interests, and allows attendees to share status changes. Finally, the banquet will be at the famous EMP Museum in the Sky Church. The EMP Museum is a short ride from the conference venue with the Seattle Monorail. Attendees will explore the exhibition Star Trek: Exploring New Worlds.

Many people contributed to making FSE 2016 possible. We apologize in advance if we do not mention everyone by name. A special thanks to all the members of the organizing committee for their fantastic work in putting together the conference. Another special thanks to the program committees for the FSE 2016 tracks and workshops. They worked hard on reviewing many great contributions and selecting the best for presentation during the FSE week. We are extremely grateful to the following people: Will Tracz for his excellent advice and help with the logistics of the PC Meeting in Austin, Texas; Jin Guo and Chengnian Sun for their help with running the PC meeting; Fran Spinola, Farrah Khan, and the entire ACM team for their help and support in organizing FSE 2016; and Dirk and Simone Beyer for the fantastic work with the FSE proceedings.

Finally, we would like to acknowledge ACM for the sponsorship of FSE 2016 through its Special Interest Group on Software Engineering (SIGSOFT). We deeply thank our supporters for their generous support: National Science Foundation (NSF), Microsoft, Intel, Cisco, Tata Consultancy Services, Accenture, Facebook, Google, Huawei Technologies, Infosys, and IBM Research.

The success of a conference heavily depends on its attendees. As of the first week of October, FSE has a record number of registrations with 386 attendees during the FSE week; 40% of attendees are students and 17% from industry. For 52% of the attendees, it is the first FSE conference that they are attending. Thank you! We hope that you will enjoy the program, and have plenty of opportunities for networking, and thought-provoking and inspiring discussions.

Have a great time in Seattle!

Thomas Zimmermann
FSE 2016 General Chair

Jane Cleland-Huang and Zhendong Su
FSE 2016 Program Co-Chairs
A huge thanks to our fantastic FSE 2016 volunteers!

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IBM Research
FSE Banquet at the EMP Museum

EMP – designed by a classical music fan for rock ‘n roll, and now celebrating Star Trek!

**SPECIAL EXHIBITION**

**Star Trek: Exploring New Worlds**

OPENS MAY 21, 2016

As part of the franchise’s 50th anniversary celebrations, explore the phenomenon and its enduring impact on our culture with more than 100 series and film artifacts plus state-of-the-art interactives.

**NORTH GALLERIES**

**World of WearableArt™**

Explore a showcase of 32 award-winning garments emerging from the breathtaking international design competition where art and fashion intersect.

**Wild Blue Angel: Hendrix Abroad, 1966–1970**

Travel alongside Jimi Hendrix at the height of his fame with intimate handwritten notes, original photographs, and personal artifacts.

**Indie Game Revolution sponsored by Nintendo**

Discover the most exciting and creative work contemporary video game culture has to offer through multimedia installations and 20 playable games.

**Nirvana: Taking Punk to the Masses**

The world’s most extensive exhibition of memorabilia celebrating the music and history of Seattle grunge luminaries, Nirvana.

**On Stage**

On Stage invites participants to step into the spotlight to perform one of five songs before a virtual audience.

**Sound Lab**

Multimedia installations invite hands-on interaction so that visitors can explore the tools of rock ‘n roll through electric guitars, drums, samplers, mixing consoles, and more.

**Guitar Gallery: The Quest for Volume**

Trace the evolution of the guitar through 55 vintage, world-changing guitars from the 1770s to the present from musicians Eddie Van Halen, Kurt Cobain, and more.
Banquet Program Tuesday November 15

6:00 pm  FSE sessions end

Make your way to EMP Museum at 325 5th Avenue N at Seattle Center

Option 1: by Seattle Monorail starting at Westlake Center. Your badge is your ticket.
Extras pay $2.25 one way. Train departs every 10 minutes

Option 2: Walk along Seattle 5th Avenue (25 mins)

See the Space Needle! Take a selfie!

7:00 pm  Buffet dinner at the EMP Museum with Exhibitions in the North Galleries and Special Star Trek Exhibition. Remember your drinks tickets!

10:45 pm  EMP Museum closes. Monorail closes at 11:00. There are plenty of Ubers in Seattle.

Games for Prizes

1. Find the hidden Tribbles in the Star Trek exhibition and jot down locations. First five people to turn in a correct entry at the table will win an Exploding Kitten Game¹ or a 404 not Found Coloring Book.

2. Answer five questions on Seattle music. First ten to turn in correct answers win an Exploding Kitten Game or a 404 not Found Coloring Book.

3. Post a video or photo of yourself in the Star Trek exhibition and share on #StarTrekFSE. Best five social media content chosen by judges will be shown at FSE on Wednesday and win special PRIZES.

¹ This is the card game that made Kickstarter history. Created by Elan Lee (Xbox, ARGs), Matthew Inman (The Oatmeal), and Shane Small (Xbox, Marvel), Exploding Kittens made history when it became the most-backed game in Kickstarter history and the campaign with the most number of backers, ever.
FSE 2016 Artifacts Track

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- Tim Menzies, North Carolina State University, USA

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- Sonia Haiduc, Florida State University
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- Barbara Russo, Free University of Bolzano/Bozen
- Christoph Treude, University of Adelaide
- Mark Van Den Brand, Eindhoven University of Technology
- Hongyu Zhang, Microsoft Research

List of Accepted Artifacts Papers:
- Danilo Silva, Nikolaos Tsantalis, and Marco Tulio Valente. “Why-We-Refactor Dataset” [Diamond]
- Zhaogui Xu, Xiangyu Zhang, Lin Chen, Kexin Pei, and Baowen Xu. “Python Probabilistic Type Inference with Natural Language Support” [Diamond]
- Adarsh Yoga, Santosh Nagarakatte, and Aarti Gupta. “Parallel Data Race Detection for Task Parallel Programs with Locks”
- Yepang Liu, Chang Xu, Shing-Chi Cheung, and Valerio Terragni. “Understanding and Detecting Wake Lock Misuses for Android Applications”
- Ran Wang, Daming Zou, Xinrui He, Yingfei Xiong, Lu Zhang, and Gang Huang. “Detecting and Fixing Precision-Specific Operations for Measuring Floating-Point Errors”
- Dirk Beyer, Matthias Dangl, Daniel Dietsch, and Matthias Heizmann. “Correctness Witnesses: Exchanging Verification Results Between Verifiers”
- Monika Dhok and Murali Krishna Ramanathan. “Artifact: Directed Test Generation to Detect Loop Inefficiencies”
- Michael Reif, Michael Eichberg, Ben Hermann, Johannes Lerch, and Mira Mezini. “Call Graph Construction for Java Libraries using OPAL”
- Quinn Hanam, Fernando Brito, and Ali Mesbah. “A Dataset of Bug Patterns in JavaScript”
- Yulei Sui and Jingling Xue. “On-Demand Strong Update Analysis via Value-Flow Refinement”
- Chunga Sung, Markus Kusano, Nishant Sinha, and Chao Wang. “Static DOM Event Dependency Analysis for Testing Web Applications”
- Sven Apel, Dirk Beyer, Vitaly Mordan, Vadim Mutilin, and Andreas Stahlbauer. “Replication Package for On-The-Fly Decomposition of Specifications in Software Model Checking”
- Zhaogui Xu, Peng Liu, Xiangyu Zhang, and Baowen Xu. “Python Predictive Analysis for Bug Detection”

For more information, please visit: https://github.com/researchart/fse16.
Workshop on the Naturalness of Software
Sunday, November 13

Natural Language Processing (NLP) techniques and tools have become very powerful and are applicable in many domains. In the context of Software Engineering (SE), there are many promising opportunities for the application of NLP to be used to improve SE theory and practice. Recently, investigations have begun to unravel the extent to which large code corpora that can be retrieved from GitHub, StackOverflow, etc., are amenable to analysis using statistical NLP models and algorithms, so that the revolutionary advances in speech recognitions, translation, comprehension, etc. can be applied in SE.

Program
9:00 am – 9:15 am       Welcome
9:15 am – 10:30 am      Keynote: Chris Quirk, Microsoft Research
10:30 am – 11 am        Coffee Break
11 am – 12:30 pm       Paper Presentations

Session 1: Coding Style
Learning to Name Code Identifiers by Miltiadis Allamanis and Charles Sutton
On the Use of Statistical Machine Translation for Code Beautification and Refactoring by Bogdan Vasilescu

Session 2: Tracing & Translating
Augmenting Natural Language Analysis with Trace Links to Mine Domain Facts from Software Requirements by Jin Guo and Jane Cleland-Huang
Learning to Translate Docstrings to Function Representations in Standard Library Documentation by Kyle Richardson
Using Natural Language Processing to Translate Software Project Queries into Structured Form by Jane Cleland-Huang, Jin Guo, Natavut Monakul, Singandha Lohar, William Goss and Alexander Rasin

12:30 pm – 2:00 pm      Lunch
2:00 pm – 3:30 pm       Technical Briefing: Statistical NLP for Software Miltiadis Allamanis, Edinburgh University
3:30 pm – 4:00 pm        Coffee break
4:00 pm – 5:30 pm       Paper Presentations

Session 3: Language Models and Code Cloning
Entropy Guided Spectrum Based Testing by Matthew Irvine and Baishakhi Ray
A deep language model for software code by Hoa Khanh Dam, Truyen Tran and Trang Pham
Can I Copy this Code? Extracting Norms from Software Licenses using Frame Semantics by Sayomha Mandal, Robin Gandhu and Harvey Sty

Session 4: Search & Retrieval
Towards Improving Q&A Forum Search and Mining: Automatic Identification of Developer Goal and Symptom by Zachary R. Senzer, Lori Pollock and K. Vijey-Shanker
Finding Similar Projects in GitHub using Word2Vec and WMD by Md Masudur Rahman

Program Committee
Chairs
Prem Devanbu, University of California, Davis
Baishakhi Ray, University of Virginia

Members
Abram Hindle, University of Alberta
Charles Sutton, University of Edinburgh
Christian Bird, Microsoft Research
Dana Movshovitz-Attias, Google Research
Denys Poshyvanyk, College of William & Mary
Earl Barr, University of London
Tien N. Nguyen, Iowa State University
Vladimir Filkov, University of California, Davis
Zhendong Su, University of California, Davis

Organizers
Prem Devanbu, University of California, Davis
Tien N. Nguyen, Iowa State University
Baishakhi Ray, University of Virginia
Earl Barr, University of London
Christian Bird, University College, London

NL+SE 2016
The second International Workshop on Software Analytics (SWAN 2016) will provide an informal interactive forum for researchers and participants to exchange ideas and experiences, streamline research on software analytics, identify some common ground of their work, share lessons and challenges, thereby articulating a vision for the future of software analytics.

SWAN 2016 will be co-located with the 24th ACM SIGSOFT International Symposium on the Foundations of Software Engineering and held on November 13, 2016 in Seattle, WA, USA.

Program

Program (November 13, 2016)
09:00 – 09:15 – Welcome from the organizers
09:15 – 10:30 – Keynote by Tim Menzies, North Carolina State University, USA
10:30 – 11:00 – Break
11:00 – 12:30 – Paper Presentations

Session 1: API Analytics & Security
- Ervina Cergani, Sebastian Proksch, Sarah Nadi and Mira Mezini. Addressing Scalability in API Method Call Analytics
- Nuthan Munaiyah and Andrew Meneely. “Vulnerability Severity Scoring and Bounties: Why the Disconnect?”

Session 2: Defects & Effort Estimation
- Tamer Abdou, Atakan Erdem, Ayse Bener and Adam Neal. “A Replication Study: Mining A Proprietary Temporal Defect Dataset”
- Ali Dehghan, Kelly Blincoe and Daniela Damian. “A Hybrid Model for Task Completion Effort Estimation”
12:30 – 14:00 – Lunch
14:00 – 15:30 – Keynote by Wolfram Schulte, (former) Microsoft Research, Redmond, USA
15:30 – 16:00 – Break
16:00 – 17:15 – Paper Presentations

Session 3: Crowdsourcing

Session 4: Design & Clones
- Abbas Shakiba, Robert Green and Robert Dyer. FourD: "Do Developers Discuss Design? Revisited"
- Tim Henderson and Andy Podgurski. “Sampling Code Clones from Program Dependence Graphs with GRAPLE”
17:15 – 17:20 – Wrap-up and closing

SWAN 2016 on Web and Social Media
- SWAN 2016 Web site: http://www.softwareanalytics.ca/
- SWAN 2016 Twitter: @SWANworkshop
- SWAN 2016 Team: SWAN2016@gmail.com
The Workshop on Social Software Engineering (SSE) focuses on the interplay between social computing and software engineering. On one hand, social factors in software engineering activities, processes and tools are essential for improving the quality of development processes and the software produced by them. Examples include the role of situational awareness and multi-cultural factors in collaborative software development. On the other hand, social software mediates people-to-people communication, supporting human choices, actions and interactions with each other. Social software needs to accommodate a wide range of social concepts, such as trust, governance, reputation, and privacy. Being social, the software would also need to be receptive to users’ choices and give them a voice in the design, operation and evolution decisions. The SSE workshop brings together academic and industrial perspectives to provide models, methods, tools and approaches to address these issues.

Program

09:00-10:30 Keynote

*Should We Take a Human-Centric View of Software Engineering by Adopting a Socio-Technical Perspective?*

Jim Herbsleb, Carnegie Mellon University, USA

11:00-12:30 Session II: Paper presentations

*Understanding Git History: A Multi-sense View*

Kevin J. North, Anita Sarma and Myra B. Cohen
University of Nebraska-Lincoln, USA; Oregon State University, USA; University of Nebraska-Lincoln, USA

*VDML4RS: a tool for reputation systems modeling and design*

Lorenzo Bettini, Sara Capecchi
University of Firenze, Italy; University of Torino, Italy

*On the Impact of Social Network Information Diversity of End-User Programming Productivity: A Foraging-Theoretic Study*

Xiaoyu Jin, Nan Niu, Michael Wagner
University of Cincinnati, USA; University of Cincinnati, USA; Cincinnati Children’s Hospital Medical Center, USA

14:00-15:30 Session III: Invited talks

*The Rise and Fall of Developer Online Communities*

Chris Parlin, NC State University, USA

*Lessons in Social Coding: Software Analytics in the Age of GitHub*

Bogdan Vasilescu, Carnegie Mellon University, USA

16:00-17:00 Session IV: Brainstorming

*How should we study social-enhanced developer experiences?*

*What kinds of new social-enhanced developer experiences should we design?*

Organizers

Andrew Begel, andrew.begel@microsoft.com
Microsoft Research, USA

Fabio Calefato, fabio.calefato@uniba.it
University of Bari, Italy

Christoph Treude, christoph.treude@adelaide.edu.au
University of Adelaide, Australia

http://socialse.org

@sse_ws
1st International Workshop on App Market Analytics

We would like to welcome you to the 1st International Workshop on App Market Analytics (WAMA), where we seek to bring together researchers and practitioners to discuss research challenges, ideas, initiatives and results that leverages app market data to answer pertinent software engineering questions.

Software applications (or apps) are distributed very differently these days than how they were once distributed-through centralized market places (which has changed the way developers interact with users, the way software is released, and consumed). These app markets, which are now standard for mobile apps, are getting popular now for desktop apps, games, and even open source apps. Such markets make it easier for app developers to release their new apps and update their existing apps. It also makes it easier for users to search, compare and download new apps and keep their existing apps up to date. Additionally, the app markets provide useful guidance to developers so that end users have the best quality apps. Finally, the market is public facing and has unique data like user comments, release notes, app popularity, besides just the app itself. Hence, app markets can be mined and the resulting data analyzed by researchers and analytics companies. Therefore our goal was to seek original articles on studies that are related to app markets, with the end goal of making concrete recommendations to the app developers, app market developers, or other developers who provide libraries and frameworks for building apps, and end users. The program for the first edition of WAMA is as follows:

**Keynote**
Ankit Jain, VP Special Projects, SimilarWeb. Analytics in Context

**Data, Metrics and Tools**
1. Konstantin Kuznetsov, Vitalii Avdienko, Alessandra Gorla and Andreas Zeller. Checking App User Interfaces Against App Descriptions
2. Daniel Krutz, Nuthan Munaiah, Andrew Meneely and Samuel Malachowsky. Examining the Relationship between Security Metrics and User Ratings of Mobile Apps: A Case Study
4. Vitalii Avdienko, Konstantin Kuznetsov, Paolo Calciati, Juan Carlos Caiza Roman, Alessandra Gorla and Andreas Zeller. CALAPPA: a Toolchain for Mining Android Applications
5. Nuthan Munaiah, Casey Klimkowsky, Shannon Trudeau, Adam Blaine, Samuel Malachowsky, Cesar Perez and Daniel Krutz. Darwin: A Static Analysis Dataset of Malicious and Benign Android Apps

**Platforms and Releases**
7. Stefano Comino, Fabio M. Manenti and Franco Mariuzzo. Managing app versions - To Upgrade or Not to Upgrade? The Release of New Versions to Survive in the Hypercompetitive App Market
8. Ivan Tactuk Mercado, Nuthan Munaiah and Andrew Meneely. The Impact of Cross-platform Development Approaches for Mobile Applications from the User’s Perspective
9. Mohamed Ali and Ali Mesbah. Mining and Characterizing Hybrid Apps

We thank the PC members for their efforts in reviewing the papers and the authors for their quality contributions. We also would like to thank the FSE 2016 organizers and especially the workshop organizing committee.

Meiyappan Nagappan, Federica Sarro, and Emad Shihab
WAMA 2016 Organizers
Seattle, Washington, USA
Monday November 14, 2016

CHESE 2016 is about coding, testing, and education, using game-based learning

Join the Workshop
Read the Papers
Play the Game
Check the Project
Get the Data
Sign up for the Community

Find it all on http://bit.ly/CHESE

Advances in software engineering have improved the state-of-the-art in educational software engineering. CHESE 2016 focuses on building up the research community of educational software engineering, around the educational coding game, Code Hunt along with various other platforms, systems, and tools. Join us!

CHESE 2016 Program Chairs
Chang Liu, Ohio University, USA
Rishabh Singh, Microsoft Research, USA

CHESE 2016 Steering Committee
Judith Bishop, USA
Alex Orso, Georgia Institute of Technology, USA
Nikolai Tillmann, FaceBook, US
Tao Xie, University of Illinois at Urbana-Champaign, USA
4th International Workshop on Release Engineering
Seattle, WA, USA—November 18th, 2016

Release engineering deals with all activities in between regular development and actual usage of a software product by the end user, i.e., integration, build, test execution, packaging and delivery of software. Although research on this topic goes back for decades, the increasing heterogeneity and variability of software products along with the recent trend to reduce the release cycle to days or even hours starts to question some of the common beliefs and practices of the field.

RELENG 2016 is a full-day workshop that aims to provide a highly interactive forum for researchers and practitioners to interact and address the challenges of, find solutions for, and share experiences with release engineering, and to build connections between communities. The workshop consists of a keynote, practitioner talks, paper presentations, working groups, and semi-structured group discussions. The keynote, presented by a prominent industrial release engineer, will set the stage for the rest of the workshop, introducing the release engineering challenges that modern companies face.

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Jonathan Bell George Mason U.
Jan Bosch Chalmers U. of Tech.
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Foutse Khomh Poly. Montreal
Kim Moir Mozilla
John O’Duinn US Digital Service

Workshop Program

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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>9:00am</td>
<td>Introductions &amp; Ice Breaking Activity</td>
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<tr>
<td></td>
<td>Keynote by Greg Grossmeier, Wikimedia</td>
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<tr>
<td>10:30am</td>
<td>Break</td>
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<tr>
<td>11:00am</td>
<td>Session 2: Integration &amp; Release Processes</td>
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<td>Research &amp; Industry Talks</td>
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<tr>
<td>12:30pm</td>
<td>Lunch</td>
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<tr>
<td>2:00pm</td>
<td>Session 3: Build &amp; Release Tooling</td>
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<td></td>
<td>Research &amp; Industry Talks</td>
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<tr>
<td>3:30pm</td>
<td>Break</td>
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<tr>
<td>4:00pm</td>
<td>Session 4: Lightning Talks &amp; Poster Session</td>
</tr>
<tr>
<td>4:45pm</td>
<td>Session 5: Break-out discussion groups</td>
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<tr>
<td>5:30pm</td>
<td>Closing session</td>
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http://releng.polymtl.ca/ @relengcon
Java PathFinder (JPF) Workshop 2016
November 18, 2016, Seattle, WA, USA

The goal of the workshop is to highlight research and tools for Java/Android program verification and analysis. Although there is a particular emphasis on JPF, and on projects that use JPF to support basic research, tool development, or verification case studies, the workshop also welcomes contributions related to general program analysis of Java/Android programs. The hope is to use the workshop to grow the community of researchers investigating Java, Android, and JPF in an effort to foster collaboration and define future needs for Java program analysis.

Program:

09:00-09:15 Opening
09:15-10:30 Keynote, “From Dynamic Software Model Checking to Better Beer” by Patrice Godefroid
10:30-11:00 Break
11:00-12:30 Session I

- *Java Pathfinder on Android Devices* by Alexander Kohan, Mitsuharu Yamamoto, Cyrille Artho, Yoriyuki Yamagata, Lei Ma, Masami Hagiya and Yoshinori Tanabe
- *Towards Exhaustive Testing of Websites using JPF* by Sarvesh Nagarajan, Nastaran Shafiei and Sarfraz Khurshid
- *Resource Contracts for Java* by Rody Kersten, Martin Schaeff and Temesgen Kahsai
- *Exploring Underdetermined Specifications using Java Pathfinder* by Alex Gyori, Ben Lambeth, Sarfraz Khurshid and Darko Marinov

12:30-14:00 Lunch

14:00-15:30 Session II

- *Symbolic Arrays in Symbolic Pathfinder* by Aymeric Fromherz, Kasper S. Luckow and Corina S. Pasareanu
- *Staged Symbolic Execution for Parallel Property Checking* by Junye Wen and Guowei Yang
- *Releasing the PSYCO: Using symbolic search in interface generation for Java* by Malte Mues, Falk Howar, Temesghen Kahsai, Kasper Luckow and Zvonimir Rakamaric
- *StateComparator: Detecting unbounded variables using JPF* by Heila Botha, Oksana Tkachuk, Brink Van Der Merwe and Willem Visser

15:30-16:00 Break

16:00-16:30 Session III (short papers)

- *Visualization Support for JDArt* by Chaofeng Zhou, Falk Howar, Kasper Luckow and Zvonimir Rakamaric
- *Monitoring Distributed Applications with Java Pathfinder* by Lei Ma, Cyrille Artho, Masami Hagiya, Yoshinori Tanabe, Yoriyuki Yamagata, Alexander Kohan and Mitsuharu Yamamoto

16:30-17:50 JPF Open Discussion

17:50-18:00 Closing

Program committee:

- Milos Gligoric (Co-Chair)
- Marcelo d’Amorim,
- Corina Pasareanu,
- Elena Sherman
- Guowei Yang (Co-Chair)
- Antonio Filieri
- Suzette Person
- Oksana Tkachuk
- Cyrille Artho
- Eric Mercer
- Neha Rungta
- Arnaud Venet
7th Workshop on Automated Software Testing (A-TEST), 18th Nov. 2016

The A-TEST workshop provides a venue for researchers and industry to exchange and discuss trending views, ideas, state of the art work in progress, and scientific results on automated test case design, production, and evaluation. It invites researchers as well as practitioners to submit contribution in the forms of research papers, work-in-progress papers, tool presentation papers, or case study papers in areas such as:

- techniques and tools for automating the design, production, or selection of test cases, e.g. model-based, combinatorial-based, search based, symbolic-based, or property-based approaches.
- test suite optimization.
- test cases evaluation and metrics.
- test cases design, selection, production, and evaluation in emerging test domains, e.g. Graphical User Interfaces, virtual worlds, social network, cloud, games, security, or Cyber Physical Systems.
- case studies that have been evaluated on real systems, not only toy problems.
- experiences during test technology transfer from universities to the industry.

WORKSHOP PROGRAMME

☐ Session 1 (9:00 - 10:30)
  1. Opening

Break (10:30 - 11:00)

☐ Session 2 (11:00 - 12:30)

Lunch (12:30 - 14:00)

☐ Session 3 (14:00 - 15:30)

Break (15:30 - 16:00)

☐ Session 4 (16:00 - 17:00)
  11. Mitigating (and Exploiting) Test Reduction Slippage, Josie Holmes, Mohammad Amin Alipour and Alex Groce.
Thanks to our sponsors and supporters!