38th International Conference on Software Engineering Program

14-22 May 2016
Austin, Texas, USA

Published by the IEEE Computer Society
10862 Los Vaqueros Circle
Los Alamitos, CA 90720
<table>
<thead>
<tr>
<th>Time</th>
<th>Wed 05/18</th>
<th>Thu 05/19</th>
<th>Fri 05/20</th>
</tr>
</thead>
</table>
| 8:30 - 10:30 AM | **Plenary Session:**  
– Opening  
– Awards I  
– Mary Shaw Keynote  | **Plenary Session:**  
– Awards II  
– Stephen Ibaraki Keynote  | **Plenary Session:**  
– Wolfram Schulte Keynote  
– Gail Murphy Keynote  |
| 10:30 - 11:00 AM | **BREAK - Atrium**  | **BREAK - Atrium**  | **BREAK - Atrium**  |
| 11:00 - 12:30 PM | Finkelstein and Herbsled Keynotes  
**Empirical**  
**Android**  
**Infrastructure Support**  
**Agile**  
**Performance**  
**Thesis in Three**  | **Code Smells**  
**Architecture**  
**Testing I**  
**Monitoring**  
**Sustainable Software Design**  
**SRC Finalist Presentations**  
**Team Projects**  | **Dynamic Analysis**  
**Collaborative**  
**Security**  
**Development Support**  
**Tools and Toys**  
**Values in Software Engineering**  |
| 12:30 - 2:00 PM | **LUNCH BREAK - Rio Exhibit Hall A**  | **LUNCH BREAK - Rio Exhibit Hall A**  | **LUNCH BREAK - Rio Exhibit Hall A**  |
| 2:00 - 3:30 PM | **Open Source**  
**Architecture and Collaboration**  
**Symbolic Execution**  
**Energy and Videos**  
**Static Analysis**  
**Compilers and Emerging Trends**  
**Verification and Validation I**  | **Software Development**  
**Product Lines**  
**Testing II**  
**Evolution**  
**Repair and Model Synthesis**  
**Analysis and Refactoring**  
**Effort Estimation and Search**  | **Software Quality**  
**Program Lines**  
**Maintenance**  
**Process**  
**Concurrency**  
**Verification and Test**  
**Program Understanding**  |
| 3:30 - 4:00 PM | **VISIONS OF 2025 AND BEYOND I**  
**API**  
**Defect Prediction**  
**Chaos Engineering Panel**  
**Verification and Validation II**  | **VISIONS OF 2025 AND BEYOND II**  
**Requirements**  
**Debugging**  
**Dynamic Analysis**  
**Trending Technologies**  
**Languages**  | **Plenary Session (GB):**  
– Awards III  
– Closing  |
| 4:00 - 5:30 PM | **Town Hall Meeting (GO)**  | **Town Hall Meeting (GO)**  | **Town Hall Meeting (GO)**  |
| 5:45 - 7:00 PM | **Poster Reception**  
(AR, GB)  
Ends at 9:00 PM  | **Banquet**  | **Community Meetings**  
See Page 40  |
| 7:00 - 10:00 PM | **Exhibits (GB Foyer)**  
Wed 5/18 9:00 AM - 9:00 PM  
Thurs 5/19 9:00 AM - 4:00 PM  
Fri 5/20 9:00 AM - 4:00 PM  | **Technical Research**  
**SEIP**  
**SEET**  | **Posters**  
**ACM SRC**  
**V2025**  |

**GB** = Grand Ballroom  
**GO** = Glass Oaks  
**SA** = San Antonio  
**BA** = Ballroom A  
**WW** = Wedgwood  
**SB** = Sabine  
**BB** = Ballroom B  
**TR** = Trinity  
**AR** = Arbor  

**ACM SRC** = ACM Student Research Competition  
**SEIP** = Software Engineering in Practice  
**SEET** = Software Engineering Education and Training  
**SEIS** = Software Engineering in Society  

**V2025** = Visions of 2025 and Beyond
Welcome to ICSE in the Great State of Texas!

It gives us great pleasure to welcome you to the 38th International Conference in Software Engineering in the lovely Austin Arboretum area — known as “new Austin” — at the start of the Texas hill country. This setting provides an ideal backdrop for the world’s leading software engineering researchers and practitioners to share cutting-edge results and visionary ideas, attend inspirational talks, and engage in lively conversation. A quarter-century after the Texas state capitol first hosted ICSE, Austin has become a hub for technology, entrepreneurship, music, outdoor recreation and nightlife. In addition to a great technical program, the ICSE week provides opportunities for you to check out what Austin has to offer and to experience Texas hospitality first hand.

The ICSE 2016 week starts Saturday, May 14 with 4 days of ICSE workshops and symposia, including a day of technical briefings on May 17. The week culminates in the 3-day main conference program May 18-20. The prestigious research track is the heart of the main conference program. However, complementing this track, half-a-dozen smaller tracks offer stimulating sessions for a variety of audiences.

Each day of the main conference features a keynote talk and the last day features two award talks. Fifteen years since Mary Shaw delivered a keynote on the coming-of-age of software architecture research, she will look back at the evolution of software engineering as a discipline in the ICSE opening keynote. She will take this opportunity to assess the maturity of the field and forecast the challenges ahead. Mary is the Alan J. Perlis University Professor of Computer Science in the Institute for Software Research at Carnegie Mellon University and winner of the 2014 National Medal of Technology and Innovation Award.

In the Thursday morning keynote, Stephen Ibaraki will delve into the exponential investor mindset. He will discuss the questions and answers required by investors in the impending digital quake, which will disrupt 80% of jobs, companies, and research; and he will explain why researchers and educators should care. Stephen is the Founding Chair of IFIP Global Industry Council / SIDO Capital.

Friday will open with two talks: Delivering the 2016 Harlan D. Mills Award talk, Wolfram Schulte will reflect on challenges encountered in his roles at Microsoft, which have led him to conclude that a combination of both formal methods and empirical software engineering is the most promising approach to impact existing practice. Delivering the Software Engineering in Practice keynote, Gail C. Murphy will explore questions
around continuous adoption in software engineering practice, drawing from experiences she has gained in helping to take a research idea to market and from insights learned from interviewing industry leaders. Wolfram is director of engineering in Microsoft's Developer Division, Redmond, USA, and Gail is a Professor of Computer Science at the University of British Columbia and co-founder and Chief Scientist at Tasktop Technologies Inc.

The second award talk will take place in the Friday afternoon plenary. It will be delivered by the recipients of the Most Influential Paper of ICSE 2006: “Who Should Fix This Bug?,” by John Anvik, Lyndon Hiew and Gail C. Murphy.

The Research Paper track got a record 530 submissions this year from 1500 authors and 46 countries. A Program Board model was used, as in 2014, whereby a Program Committee (PC) of 88 members reviewed the submissions in a first round, after which a month long discussion period ensued, overseen by the 28 Program Board (PB) members (shown below). The online discussions were very extensive with more than 6500 discussion entries and a total word count of approximately 4 copies of The Hobbit (386,000 words). The next phase of reviewing involved the PB reviewing all the papers that made it past the online discussion phase (193 papers). Lastly, the PB met in a 2-day face-to-face meeting (9-10 December in Raleigh, North Carolina, USA) where the final decisions were made on 100 papers (an additional 36 papers were accepted without discussion). In the end, 101 papers were accepted for an acceptance rate of 19%. The PB member overseeing the discussions also wrote a summary of the decisions (including points raised in discussion), which the authors received as feedback. The reviewing committees and the Program Chairs later selected 9 of the 101 accepted papers worthy of receiving ACM Distinguished Paper awards (marked in the conference program with a trophy symbol).

To increase author feedback and participation in the reviewing process, each paper received 3 reviews from the PC, following which the authors could write a response back to the reviewers. Authors were also asked to rate the reviews they received. The results were: Very Useful 31%, Useful 44%, Neutral 13%, Not Very Useful 9% and Not Useful At All 3%. You can find a final report with more detailed feedback on the process consisting of input from the chairs, the authors and the two reviewing committees at http://2016.icse-conferences.org/static/downloads/2016ReviewProcess.pdf.
The ICSE 2016 Research Paper Track will also feature 7 Journal First Papers. This relatively new initiative allows authors of papers first published in a journal to reach a broader audience, while enriching the conference program with presentations of papers that may not fit the standard conference format. The journal first papers were jointly selected among recent journal papers by the Program Chairs and the Editors in Chief of 3 top journals in the field: ACM TOSEM, IEEE TSE, and Empirical Software Engineering.

Although the whole ICSE program targets academia and industry, software engineering practitioners have long considered the Software Engineering in Practice (SEIP) Track the preferred channel for exchanging concrete results and useful innovations. As usual, the competition was high: out of 108 submissions, the SEIP committee selected 28 papers and one panel. Additionally, an outstanding and well-known researcher, Gail C. Murphy of the University of British Columbia, is giving the SEIP keynote in which she explores various questions on software engineering in practice (see above).

A goal of the Software Engineering Education and Training Track (SEET) at ICSE 2016 is to explore ways of exploiting and integrating the Internet in the education and training of software engineers. From 64 paper submissions, the SEET committee selected 6 full papers and 4 short papers, including a SEET Best Long Paper and SEET Best Short Paper (marked in the conference program with a star symbol).

2016 is the second year for the Software Engineering in Society Track (SEIS) at ICSE. This track explicitly recognizes the role and impact of software engineering in a sustainable society. SEIS received 22 submissions of which 6 full papers were selected for presentation. In addition, two outstanding researchers in the field will be providing keynotes: Anthony Finkelstein from the Alan Turing Institute and University College London, currently serving as Chief Scientific Adviser to the UK Government, will be discussing how software engineering intersects with policy. James Herbsleb, from Carnegie Mellon University, will be talking about the scientific discipline of societal computing and how it is shaping the digital landscape.

The ICSE 2016 program features a new track entitled Visions of 2025 and Beyond (V2025). This track encourages us all to think beyond our usual scope of results to what hard problems software engineering researchers will be tackling ten years from now—what will be the state-of-the-practice and the state-of-the-art for software engineering in 2025? The track received 19 submissions of which 9 were selected for presentation. V2025 is sponsored by the Computing Community Consortium, which will provide prizes (awarded as travel grants) for up to 3 papers in this special track: first prize $1000, second prize $750 and third prize $500. The winning papers are marked in the conference program with a ribbon symbol.

The Poster Track allows researchers and practitioners to present and discuss their most recent advances, ideas, experiences, and challenges in the field of software engineering. The Poster track received 38 submissions and accepted 22 of them, including one Best Poster and four Distinguished Posters (marked in the conference program by a star symbol). A Poster Session on Wednesday evening will provide an informal setting for attendees to discuss posters with authors. Authors of posters will also give short presentations in 2 smaller poster sessions during the main conference. Finally, the Poster Gallery permits online viewing of posters at http://2016.icse-conferences.org/postersGallery.

The Demonstrations Track allows for hands-on experience with tools and data sets. This track received 58 submissions and accepted 18. Researchers and practitioners will present live demos in the 5 Demo track sessions during the main conference, with time for discussion and for trying out tools built into the end of each session. The Demonstrations Video Show includes videos of the tools in action at http://2016.icse-conferences.org/videoShow.

The ICSE 2016 week includes a day of Technical Briefings (TBs) Tuesday before the main conference program. A TB consists of a 90-minute introduction to the state-of-the-art in an emerging topic. Of the 31 proposals received, 13 TBs were selected. Technical briefings offer an alternative model to tutorials: attendees can freely choose to attend up to four full technical briefings or move from one to another throughout the day.

Also on Tuesday, the New Faculty Symposium (NFS) offers a venue to those who have recently started their research careers or expect to hold a position soon. Attendees will receive advice and guidance from leading software engineering faculty and researchers. The program includes talks on key concerns such as research funding, publishing, advising and managing students, with many opportunities for informal and small group interactions.
The ICSE 2016 week includes 4 programs for students. First, through the **Doctoral Symposium (DS)**, PhD students in Software Engineering will have the opportunity to present their work to a committee of senior researchers and receive feedback. This year, 36 students submitted a research proposal to the DS. Of these, 20 were selected to attend the symposium: 8 of them will give a 30-minute talk and 12 will have lunch with the senior researchers. This year, we have also introduced a **Thesis in 3 Session** at the main Conference on Wednesday morning: 14 students will present their research in 3 minutes using 3 slides.

Second, ICSE is proud to host an **ACM Student Research Competition (SRC)**, sponsored by Microsoft. The competition received 37 submissions, of which 14 were invited to compete at ICSE. The ACM SRC program committee will select a set of finalists based on feedback from attendees and on the committee members’ own assessments of the abstracts, posters, and discussions with students during the Wednesday evening Poster Session. Finalists will present their research in a morning session on Thursday. Winners will be announced at the Friday afternoon plenary session and go on to compete in the 2016 SRC Grand Finals.

A third student program, the **Student Contest on Software Engineering (SCORE)** is back at ICSE! Student teams from all over the world have been developing software projects sponsored by SCORE's program committee members. The finals will take place in parallel to the main ICSE conference, when the 3 top teams selected by the committee will present their work and compete for the overall winner award.

Finally, ICSE boasts a very robust **Student Volunteer Program**. Student volunteers play a crucial role in ensuring the success of ICSE. They help with everything from registration to local support. The 47 student volunteers at ICSE this year span the academic ranks (undergraduate through PhD). They claim 22 different nationalities and are pursuing degrees at 38 different institutions. You will see them in their ICSE 2016 t-shirts and cowboy hats while on duty. Other times, you will see them presenting their work in sessions and networking with their peers and leaders in their fields of study.

While not strictly student programs, the **NSF ICSE 2016 Travel Award Program (NSF TAP)** and the **ACM SIGSOFT Conference Attendance Program for Students (CAPS)** made it possible for many students to attend ICSE who could not have otherwise. These programs also support travel for early-career faculty and for those in need of childcare during ICSE. The NSF TAP extended travel support to 12 early career faculty and 21 students (3 undergraduate and 18 PhD students). The SIGSOFT CAPS expects to provide travel support to another 34 individuals.

The ICSE student programs—Doctoral Symposium, ACM SRC, SCORE and Student Volunteers—and the travel programs—NSF TAP and SIGSOFT CAPS—are contributing toward development of the next generation of experts in software engineering research and practice. Moreover, they aim to ensure that **this next generation is more diverse than the current generation**—inclusive of nationalities, ethnicities, and genders in closer proportions to their representation in society.

**ICSE Workshops** are lively interactive meetings in which participants discuss current topics in software engineering research and practice, and exchange and discuss innovative scientific and engineering ideas. ICSE Workshops often serve as incubators for emerging research areas and new scientific communities that form and share a future research agenda. This year, 23 workshops (selected from among 31 workshop proposals) will take place in the days before the main conference. Many are successful continuing workshops, while others are brand new this year.

Finally, 5 **co-located events** are being held in the days prior to the main conference:

ICSE 2016 has benefitted from an army of dedicated and creative people, without whom we could not have put together this extraordinarily rich program: The authors; the chairs of the tracks; the members of the many committees; the student volunteers; and the meticulous and tireless work of those assisting with creation and administration of proceedings, web, social media, publicity, budget, registrations, and countless other activities required to orchestrate such a big event. It has been an honor and a privilege to work with this extraordinary team, and we would like to express our gratitude to each and every one of them.

Following precedent set by ICSE 2015, the ICSE 2016 winning promotional video was unveiled at the ICSE 2015 closing. This fun video has livened the ICSE 2016 homepage ever since. Our rendition of “Mamas Don’t Let Your Babies Grow Up to Write Software” (with apologies to Willie Nelson)—fraught as it was with technical difficulties and execution problems—is testament to the good will and ‘never say die’ attitude of our extraordinary organizing committee members. No awards for this group on the musical front. But you can certainly find award-winning country music in Austin this week!

We would also like to express gratitude to the ICSE co-sponsors, ACM and IEEE, and to our Benefactors and Supporters—in particular, our Gold (U.S. National Science Foundation) and Silver (ARISE - Center for Advanced Research in Software Engineering at The University of Texas at Austin, Google, Michigan State University, Microsoft, and Siemens) Benefactors. Contributions from our Benefactors and Supporters allowed us to make ICSE more affordable to all attendees without needing to sacrifice the great programs and high quality social events you have come to expect at ICSE.
Finally, we would like to thank all ICSE speakers and attendees. Enjoy your time at ICSE: renew old acquaintances and make new ones, be inspired by and provide inspiration to colleagues, take away visionary ideas and add your own into the mix.

Paraphrasing from our song at the ICSE 2015 closing: 'Austin is weird and we sure hope to keep it that way, at least that’s the plan. So saddle up your pony and we’ll see ya’ll in Texas at ICSE in Austin this year.’ Yippie ki-yay!

Laura Dillon  
Michigan State University  
United States  
*ICSE 2016 General Chair*

Willem Visser  
Stellenbosch University  
South Africa  
*ICSE 2016 Program Co-Chairs*

Laurie Williams  
North Carolina State University  
United States

Notable Paper Legend

👩 = ACM SIGSOFT Distinguished Paper Award  
🌟 = Visions of 2025 and Beyond Paper Award  
★★ = Best Poster, Best SEIP Paper, Best SEET Full Paper  
★ = Distinguished Poster, Best SEET Short Paper
## Week Overview

<table>
<thead>
<tr>
<th>Sat 14</th>
<th>Sun 15</th>
<th>Mon 16</th>
<th>Tue 17</th>
<th>Wed 18</th>
<th>Thu 19</th>
<th>Fri 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSR (Ballroom B/Wedgwood)</td>
<td>ICPC (Trinity/Pecos)</td>
<td>ICSSP (Sabine)</td>
<td>SEAMS (Glass Oaks)</td>
<td>AST (Brazos)</td>
<td>MOBILESoft (Ballroom B/Wedgwood)</td>
<td>SEHS (Pecos)</td>
</tr>
<tr>
<td>CSED (Trinity)</td>
<td>MISE (San Marcos)</td>
<td>FormaliSE (San Marcos)</td>
<td>SE4Science (Guadalupe)</td>
<td>Teshenic Briefings (Rio Hall B)</td>
<td>TOSE (San Saba)</td>
<td>MET (Nueces)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CSI-SE (San Antonio)</td>
<td>VACE (Concho)</td>
<td>New Faculty Symposium (San Antonio)</td>
<td>CHASE (Pecos)</td>
<td>CESI (San Saba)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WETSoM (San Antonio)</td>
<td></td>
<td>SEmotion (Concho)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ICSE Main Program

- FormaliSE (San Marcos)
- SE4Science (Guadalupe)
- Teshenic Briefings (Rio Hall B)
- TOSE (San Saba)
- SEAMS (Glass Oaks)
- AST (Brazos)
- MOBILESoft (Ballroom B/Wedgwood)
- SEHS (Pecos)
- SBST (Sabine)
- CSED (Trinity)
- MISE (San Marcos)
- VACE (Concho)
- CHASE (Pecos)
- CESI (San Saba)
- WETSoM (San Antonio)
- BIGDSE (Brazos)
- SEmotion (Concho)
- GREENS (San Saba)
- SEsCPS (Frio)
- SER&IP (Nueces)
- GAS (Concho)
- Bridge (Guadalupe)
- SESoS (Bosque)
- RAISE (Bosque)

### Community Meetings

See Page 40

Website: [http://2016.icse-conferences.org](http://2016.icse-conferences.org)

Mobile App: Please see proceedings for app download information


Internet: SSID: ICSE

login: icse16

password: conf16

www.facebook.com/icseconf

@icseconf

www.instagram.com

Use #icse16

Use #icse16
### Saturday, May 14th

#### Co-located Events

<table>
<thead>
<tr>
<th>Event Name</th>
<th>Details</th>
</tr>
</thead>
</table>

#### Workshops

<table>
<thead>
<tr>
<th>Workshop Name</th>
<th>Details</th>
</tr>
</thead>
</table>

#### Breaks

<table>
<thead>
<tr>
<th>Break Type</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Break</td>
<td>10:30 – 11:00 AM</td>
<td>Atrium</td>
</tr>
<tr>
<td>PM Break</td>
<td>3:30 – 4:00 PM</td>
<td>Atrium</td>
</tr>
<tr>
<td>Lunch</td>
<td>12:30 – 2:00 PM</td>
<td>Rio Exhibit Hall A</td>
</tr>
</tbody>
</table>
## Sunday, May 15th

### Co-located Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Location</th>
<th>URL</th>
</tr>
</thead>
</table>

### Workshops

<table>
<thead>
<tr>
<th>Workshop</th>
<th>Date</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSED 2016: International Workshop on Continuous Software Evolution and Delivery</td>
<td>May 14-15</td>
<td>Trinity</td>
</tr>
<tr>
<td>TOSE 2016: 5th International Workshop on Theory-Oriented Software Engineering</td>
<td>May 15</td>
<td>San Saba</td>
</tr>
<tr>
<td>VACE 2016: 1st International Workshop on Variability and Complexity in Software Design</td>
<td>May 15</td>
<td>Concho</td>
</tr>
<tr>
<td>WETSoM 2016: 7th International Workshop on Emerging Trends in Software Metrics</td>
<td>May 15</td>
<td>San Antonio</td>
</tr>
</tbody>
</table>

### Breaks

- **AM Break:** 10:30 – 11:00 AM
  - Location: Atrium

- **PM Break:** 3:30 – 4:00 PM
  - Location: Atrium

- **Lunch:** 12:30 – 2:00 PM
  - Location: Rio Exhibit Hall A
# Monday, May 16th

## Co-located Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>URL</th>
<th>Location</th>
</tr>
</thead>
</table>

## Workshops

<table>
<thead>
<tr>
<th>Workshop</th>
<th>Date</th>
<th>URL</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBST 2016: 9th International Workshop on Search-Based Software Testing</td>
<td>May 16-17</td>
<td><a href="https://cse.sc.edu/~ggay/sbst2016">https://cse.sc.edu/~ggay/sbst2016</a></td>
<td>Sabine</td>
</tr>
<tr>
<td>BIGDSE 2016: 2nd International Workshop on BIG Data Software Engineering</td>
<td>May 16</td>
<td><a href="https://sse.uni-due.de/bigdse16">https://sse.uni-due.de/bigdse16</a></td>
<td>Brazos</td>
</tr>
</tbody>
</table>

## Breaks

- **AM Break**: 10:30 – 11:00 AM  
  Location: Atrium
- **PM Break**: 3:30 – 4:00 PM  
  Location: Atrium
- **Lunch**: 12:30 – 2:00 PM  
  Location: Rio Exhibit Hall A
<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Website</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREENS 2016: 5th International Workshop on Green and Sustainable Software</td>
<td>May 16</td>
<td><a href="http://greens.cs.vu.nl/">http://greens.cs.vu.nl/</a></td>
<td>San Saba</td>
</tr>
</tbody>
</table>
## Tuesday, May 17th

### Co-located Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICPC 2016: International Conference on Program Comprehension</td>
<td>May 16-17</td>
<td>Trinity and Pecos</td>
</tr>
<tr>
<td>SEAMS 2016: 11th International Symposium on Software Engineering</td>
<td>May 16-17</td>
<td>Glass Oaks</td>
</tr>
</tbody>
</table>

### Workshops

<table>
<thead>
<tr>
<th>Workshop</th>
<th>Date</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBST 2016: 9th International Workshop on Search-Based Software Testing</td>
<td>May 16-17</td>
<td>Sabine</td>
</tr>
<tr>
<td>MiSE 2016: 8th International Workshop on Modeling in Software Engineering</td>
<td>May 16-17</td>
<td>San Marcos</td>
</tr>
<tr>
<td>CESI 2016: 4th International Workshop on Conducting Empirical Studies in</td>
<td>May 17</td>
<td>San Saba</td>
</tr>
<tr>
<td>SEmotion 2016: 1st International Workshop on Emotional Awareness in</td>
<td>May 17</td>
<td>Concho</td>
</tr>
<tr>
<td>SER&amp;IP 2016: 3rd International Workshop on Software Engineering Research</td>
<td>May 17</td>
<td>Nueces</td>
</tr>
<tr>
<td>Bridge 2016: 1st International Workshop on Bringing Architectural</td>
<td>May 17</td>
<td>Guadalupe</td>
</tr>
<tr>
<td>RAISE 2016: 5th International Workshop on Realizing Artificial</td>
<td>May 17</td>
<td>Bosque</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Breaks

- **AM Break:** 10:30 – 11:00 AM  
  Location: Atrium
- **PM Break:** 3:30 – 4:00 PM  
  Location: Atrium
- **Lunch:** 12:30 – 2:00 PM  
  Location: Rio Exhibit Hall A
<table>
<thead>
<tr>
<th>Time</th>
<th>Track 1</th>
<th>Track 2</th>
<th>Track 3</th>
<th>Track 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 - 10:30 AM</td>
<td>&quot;How Not to Do It&quot;: Anti-patterns for Data Science in Software Engineering &lt;br&gt; Tim Menzies &lt;br&gt; — North Carolina State University, USA</td>
<td>Improving and Balancing Software Qualities &lt;br&gt; Barry Boehm &lt;br&gt; — University of Southern California, USA</td>
<td>Control Theory for Software Engineering &lt;br&gt; Antonio Filieri and Martina Maggio &lt;br&gt; — Imperial College London, United Kingdom; Lund University, Sweden</td>
<td>Software Engineering for Molecular Programming &lt;br&gt; Robyn R. Lutz and Jack H. Lutz &lt;br&gt; — Iowa State University, USA</td>
</tr>
<tr>
<td>10:30 - 11:00 AM</td>
<td>BREAK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00 - 12:30 PM</td>
<td>Analyzing Software Engineering Experiments: Everything You Always Wanted to Know but Were Afraid to Ask &lt;br&gt; Natalia Juristo and Sira Vegas &lt;br&gt; — Universidad Politécnica de Madrid, Spain; University of Oulu, Finland</td>
<td>Software Release Planning &lt;br&gt; Xavier Franch and Guenther Ruhe &lt;br&gt; — Universitat Politècnica de Catalunya, Spain; University of Calgary, Canada</td>
<td>Logic-Based Learning in Software Engineering &lt;br&gt; Dalal Alrajeh, Alessandra Russo, Sebastian Uchtel, and Jeff Kramer &lt;br&gt; — Imperial College London, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>12:30 - 2:00 PM</td>
<td>LUNCH BREAK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00 - 3:30 PM</td>
<td>Using Docker Containers to Improve Reproducibility in Software Engineering Research &lt;br&gt; Jürgen Cito and Harald C. Gall &lt;br&gt; — University of Zurich, Switzerland</td>
<td>Risk Assessment in Open Source Systems &lt;br&gt; Xavier Franch and Angelo Susi &lt;br&gt; — Universitat Politècnica de Catalunya, Spain; Fondazione Bruno Kessler, Italy</td>
<td>Rethinking Verification: Accuracy, Efficiency, and Scalability through Human-Machine Collaboration &lt;br&gt; Suraj Kothari, Ahmed Tamravi, and Jon Mathews &lt;br&gt; — Iowa State University, USA; EnSoft Corporation, USA</td>
<td></td>
</tr>
<tr>
<td>3:30 - 4:00 PM</td>
<td>BREAK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:00 - 5:30 PM</td>
<td>Software Analytics: Challenges and Opportunities &lt;br&gt; Latifa Guerrero, Olga Baysal, David Lo, and Foutse Khomh &lt;br&gt; — École de Technologie Supérieure, Canada; Carleton University, Canada; Singapore Management University, Singapore; École Polytechnique de Montréal, Canada</td>
<td>The Use of Text Retrieval and Natural Language Processing in Software Engineering &lt;br&gt; Sonia Haiduc, Venera Arnaoudova, Andrian Marcus, and Giuliano Antioniol &lt;br&gt; — Florida State University, USA; Washington State University, USA; University of Texas at Dallas, USA; Polytechnique Montréal, Canada</td>
<td>Advances in Unit Testing: Theory and Practice &lt;br&gt; Tao Xie, Nikolai Tillmann, and Pratap Lakshman &lt;br&gt; — University of Illinois at Urbana-Champaign, USA; Microsoft, USA</td>
<td></td>
</tr>
</tbody>
</table>
# Doctoral Symposium

May 17, Tuesday (by invitation only)

**Location:** Brazos

**Symposium Chairs**

James Jones, University of California, Irvine, USA

Ita Richardson, Lero - University of Limerick, Ireland

## Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:45 - 9:00 AM</td>
<td>Introduction: James Jones</td>
</tr>
<tr>
<td>9:00 - 9:30 AM</td>
<td>Keynote: Jim Clause</td>
</tr>
<tr>
<td>9:30 - 10:30 AM</td>
<td>Student Presentations</td>
</tr>
<tr>
<td>10:30 - 11:00 AM</td>
<td>BREAK</td>
</tr>
<tr>
<td>11:00 - 12:30 PM</td>
<td>Student Presentations</td>
</tr>
<tr>
<td>12:00 - 2:00 PM</td>
<td>LUNCH</td>
</tr>
<tr>
<td>2:00 - 3:30 PM</td>
<td>Student Presentations</td>
</tr>
<tr>
<td>3:30 - 4:00 PM</td>
<td>BREAK</td>
</tr>
<tr>
<td>4:00 - 5:00 PM</td>
<td>Panel, Analysis, and Wrap Up</td>
</tr>
</tbody>
</table>

## Thesis in Three Presentations

May 18th, Wednesday, 11:00 - 12:30 PM

**Location:** Sabine

*Listed in order by presentation.*

- **Reducing the Test Effort of Variability-Rich Systems by Using Feature Interaction Knowledge and Variability-Aware Source Code Analysis** by Stefan Fischer, Kepler University Linz, Austria
- **Towards a Better Understanding of the Impact of Experimental Components on Defect Prediction Modelling** by Chakkrit Tantithamthavorn, Nara Institute of Science and Technology, Japan; Queen’s University, Canada
- **Implications of Requirements Engineering on Software Design: A Cognitive Insight** by Rahul Mohanani, University of Oulu, Finland
- **Assisting Developers with License Compliance** by Christopher Vendome, The College of William and Mary, USA
- **Recognizing Relevant Code Elements during Change Task Navigation** by Katja Kevic, University of Zurich, Switzerland
- **Realistic Bug Triaging** by Ali Sajedi Badashian, University of Alberta, Canada
- **Spotting Design Problems with Smell Agglomerations** by Leonardo da Silva Sousa, Pontifical Catholic University of Rio de Janeiro, Brazil
- **Trace Link Evolution across Multiple Software Versions in Safety-Critical Systems** by Mona Rahimi, DePaul University, USA
- **Fixing Bug Reporting for Mobile and GUI-Based Applications** by Kevin Moran, The College of William and Mary, USA
- **Automatized Derivation of Comprehensive Specifications for Black-Box Services** by Simon Schwichtenberg, Paderborn University, Germany
- **Mining Software Process Lines** by Fabian Rojas Blum, Universidad de Chile, Chile
- **Ontology Learning and Its Application in Software-Intensive Projects** by Jin Guo, DePaul University, USA
- **Boosting Static Analysis of Android Apps through Code Instrumentation** by Li Li, University of Luxembourg, Luxembourg
- **Architectural-Based Speculative Analysis to Predict Bugs in a Software System** by Duc Le, University of Southern California, USA
A Variability Aware Configuration Management and Revision Control Platform  
Lukas Linsbauer  
— Johannes Kepler University, Austria

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

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

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

Using Data Provenance to Improve Software Process Enactment, Monitoring, and Analysis  
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  
Roberto Oliveira  
— Pontifical Catholic University of Rio de Janeiro, Brazil
New Faculty Symposium  
Tuesday, May 17, 8:00 - 6:00 PM  
Location: San Antonio

Symposium Chairs  
Margaret Burnett, Oregon State University, USA  
Moonzoo Kim, KAIST, Republic of Korea

Welcome, Overview, and Introductions  
Moonzoo Kim, KAIST, Republic of Korea

Obtaining Research Funding  
Panelists:  
Sol Greenspan, National Science Foundation, United States  
Others TBA

Advising & Supervising Students  
Margaret Burnett, Oregon State University, United States  
Others TBA

How to Have a Life & a Career -- and Why  
Carlos Jensen, Oregon State University, United States  
Others TBA

Publication Strategies & How to Get a Paper Accepted  
Panelists:  
Betty HC Cheng, Michigan State University, United States  
Jin Song Dong, National University of Singapore, China  
Others TBA

Active Learning Mix; Interactive Session  
Moderator:  
Margaret Burnett  
Contributors:  
Everyone in the room

Advice from Junior Faculty/Researchers  
Panelists:  
Scott Fleming, University of Memphis, United States  
Thomas Fritz, University of Zurich, Switzerland  
Kathryn Stolee, North Carolina State University, United States

More Q&A & Final Advice; Interactive Q&A; Discussion  
Moderator:  
Moonzoo Kim, KAIST, Republic of Korea
Wednesday, May 18th

ICSE Opening
May 18th, Wednesday, 8:30 – 9:00 AM
Chair: Laura Dillon
Location: Grand Ballroom

Welcome Message
Sol Greenspan

Conference Introduction
Laura Dillon

Technical Program and Awards Session I
Presenters Willem Visser & Laurie Williams
See page 36 for awards presented in Awards Session I.

ICSE Keynote
May 18th, Wednesday, 9:00 – 10:30 AM
Location: Grand Ballroom

Progress Toward an Engineering Discipline of Software
Mary Shaw (Carnegie Mellon University)

Is "software engineering" really engineering? The term was coined in 1968 to call attention to problems with software production. Both theory and practice for software have evolved since then, but do we yet have a true engineering discipline? Classical engineering disciplines have emerged from craft practice and commercialization through the infusion of codified knowledge and science. Using this emergence pattern as a point of reference, I will sketch the evolution of software engineering, drawing on civil engineering and software architecture for examples that show the progressive codification of informal knowledge toward rigorous models and tools. This will provide the basis for assessing the maturity of the field and identifying our next challenges.

BREAK 10:30 – 11:00 AM (ATRIUM)

Technical Research
Android
May 18th, Wednesday, 11:00 - 12:30 PM
Session Chair: Mei Nagappan
Location: Glass Oaks

PRADA: Prioritizing Android Devices for Apps by Mining Large-Scale Usage Data
Xuan Lu, Xuanzhe Liu, Huorui Li, Tao Xie, Qiaozhu Mei, Dan Hao, Gang Huang, and Feng Feng
— Peking University, China; University of Illinois at Urbana-Champaign, USA; University of Michigan, USA; Wandoujia Lab, China

Release Planning of Mobile Apps Based on User Reviews
Lorenzo Villarroel, Gabriele Bavota, Barbara Russo, Rocco Oliveto, and Massimiliano Di Penta
— Free University of Bozen-Bolzano, Italy; University of Molise, Italy; University of Sannio, Italy

Toward a Framework for Detecting Privacy Policy Violations in Android Application Code
Rocky Slavin, Xiaoyin Wang, Mitra Bokaei Hosseini, James Hester, Ram Krishnan, Jaspreet Bhatia, Travis D. Breaux, and Jianwei Niu
— University of Texas at San Antonio, USA; University of Texas at Dallas, USA; Carnegie Mellon University, USA

Mining Sandboxes
Konrad Jamrozik, Philipp von Styp-Rekowsky, and Andreas Zeller
— Center for IT-Security, Privacy and Accountability (CISPA), Germany

Technical Research
Performance
May 18th, Wednesday, 11:00 - 12:30 PM
Session Chair: Antonio Filieri
Location: San Antonio

Generating Performance Distributions via Probabilistic Symbolic Execution
Bihuan Chen, Yang Liu, and Wei Le
— Nanyang Technological University, Singapore; Iowa State University, USA
Performance Issues and Optimizations in JavaScript: An Empirical Study
Marija Selakovic and Michael Pradel
— TU Darmstadt, Germany

Reliability of Run-Time Quality-of-Service Evaluation Using Parametric Model Checking
Guoxin Su, David S. Rosenblum, and Giordano Tamburrelli
— National University of Singapore, Singapore; BESTSELLER E-commerce, The Netherlands

Optimizing Selection of Competing Services with Probabilistic Hierarchical Refinement
Tian Huat Tan, Mannman Chen, Jun Sun, Yang Liu, Étienne André, Yinxing Xue, and Jin Song Dong
— Singapore University of Technology and Design, Singapore; National University of Singapore, Singapore; Université Paris 13, France; Nanyang Technological University, Singapore

Technical Research

Empirical
May 18th, Wednesday, 11:00 - 12:30 PM
Session Chair: Ayse Bener
Location: Ballroom B

The Emerging Role of Data Scientists on Software Development Teams
Miryung Kim, Thomas Zimmermann, Robert DeLine, and Andrew Begel
— UCLA, USA; Microsoft Research, USA

Belief & Evidence in Empirical Software Engineering
Premkumar Devanbu, Thomas Zimmermann, and Christian Bird
— University of California, Davis, USA; Microsoft Research, USA

Klaas-Jan Stol, Paul Ralph, and Brian Fitzgerald
— Lero — The Irish Software Research Centre, Ireland; University of Auckland, New Zealand

Open Innovation in Software Engineering: A Systematic Mapping Study
Hussan Munir, Krzysztof Wrul, and Per Runeson
— Lund University, Sweden

Software Engineering In Practice

Infrastructure Support
May 18th, Wednesday, 11:00 - 12:30 PM
Session Chair: Diomidis Spinellis
Location: Wedgwood

CloudBuild: Microsoft's Distributed and Caching Build Service
Hamed Esfahani, Jonas Fietz, Qi Ke, Alexei Kolomiets, Erica Lan, Erik Mavrinac, Wolfram Schulte, Newton Sanches, and 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 Dwarkanath, Shrikanth N.C., Kumar Abhinav, and Alex Kass
— Accenture Technology Labs, India; IIT-Delhi, India; Accenture Technology Labs, USA

Software Engineering Education and Training

Agile
May 18th, Wednesday, 11:00 - 12:30 PM
Session Chair: Janet Burge
Location: Trinity

Learning Agile Software Development in High School: An Investigation
Marcello Missirolli, 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
Jan-Philipp Sieghöfer, 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
Christoph Matthis, Thomas Kowark, Keven Richly, Matthias Uflacker, and Hasso Plattner
— Hasso Plattner Institute, University of Potsdam, Germany

Doctoral Symposium

Thesis in Three
May 18th, Wednesday, 11:00 - 12:30 PM
Session Chair: Ita Richardson
Location: Sabine

Technical Research
Symbolic Execution
May 18th, Wednesday, 2:00 - 3:30 PM
Session Chair: Cristian Cadar
Location: Glass Oaks

*On the Techniques We Create, the Tools We Build, and Their Misalignments: A Study of KLEE*
Eric F. Rizzi, Sebastian Elbaum, and Matthew B. Dwyer
— Grammatech Inc., USA; University of Nebraska - Lincoln, USA

*Guiding Dynamic Symbolic Execution toward Unverified Program Executions*
Maria Christakis, Peter Müller, and Valentin Wütholz
— ETH Zurich, Switzerland

Synthesizing Framework Models for Symbolic Execution
Jinseong Jeon, Xiaokang Qiu, Jonathan Fetter-Degges, Jeffrey S. Foster, and Armando Solar-Lezama
— University of Maryland, USA; Massachusetts Institute of Technology, USA

Type-Aware Concolic Testing of JavaScript Programs
Monika Dhok, Murali Krishna Ramanathan, and Nishant Sinha
— Indian Institute of Science, India; IBM Research, India

Technical Research
Compilers and Emerging Trends
May 18th, Wednesday, 2:00 - 3:30 PM
Session Chair: Bernd Fischer
Location: San Antonio

An Empirical Comparison of Compiler Testing Techniques
Junjie Chen, Wenzhang Hu, Dan Hao, Yingfei Xiong, Hongyu Zhang, Lu Zhang, and Bing Xie
— Peking University, China; Microsoft Research, China

Termination-Checking for LLVM Peephole Optimizations
David Menendez and Santosh Nagarakatte
— Rutgers University, USA

Technical Research
Energy and Videos
May 18th, Wednesday, 2:00 - 3:30 PM
Session Chair: Denys Poshyvanyk
Location: Wedgwood

*Energy Profiles of Java Collections Classes*
Samir Hasan, Zachary King, Munawar Hafiz, Mohammed Sayagh, Bram Adams, and Abram Hindle
— Auburn University, USA; Polytechnique Montreal, Canada; University of Alberta, Canada

An Empirical Study of Practitioners' Perspectives on Green Software Engineering
Irene Manotas, Christian Bird, Rui Zhang, David Shepherd, Ciera Jaspal, Caitlin Sadowski, Lori Pollock, and James Clause
— University of Delaware, USA; Microsoft Research, USA; IBM Research - Almaden, USA; ABB Corporate Research, USA; Google, Inc., USA

Automated Energy Optimization of HTTP Requests for Mobile Applications
Ding Li, Yingjun Lu, Jiaping Gui, and William G. J. Halfond
— University of Southern California, USA

Too Long; Didn't Watch! Extracting Relevant Fragments from Software Development Video Tutorials
Luca Ponzanelli, Gabriele Bavota, Andrea Mocci, Massimiliano Di Penta, Rocco Oliveto, Mir Hasan, 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
Technical Research

Open Source
May 18th, Wednesday, 2:00 - 3:30 PM
Session Chair: Anita Sarma
Location: Ballroom A

Overcoming Open Source Project Entry Barriers with a Portal for Newcomers
Igor Steinmacher, Tayana Uchoa Conte, Christoph Treude, and Marco Aurélio Gerosa
— Federal University of Technology – Paraná, Brazil; Federal University of Amazonas, Brazil; Institute of Mathematics and Statistics University of São Paulo, Brazil

Work Practices and Challenges in Pull-Based Development: The Contributor’s Perspective
Georgios Gousios, Margaret-Anne Storey, and Alberto Bacchelli
— Radboud University Nijmegen, The Netherlands; University of Victoria, Canada; Delft University of Technology, The Netherlands

From Aristotle to Ringelmann: A Large-Scale Analysis of Team Productivity and Coordination in Open Source Software Projects
Ingo Scholtes, Pavlin Mavrodiev, and Frank Schweitzer
— ETH Zürich, Switzerland

Inflow and Retention in OSS Communities with Commercial Involvement: A Case Study of Three Hybrids
Minghui Zhou, Audris Mockus, Xiujuan Ma, Zhang, Lu, and Hong Mei
— Peking University, China; University of Tennessee, USA; National Institute of Network and Information Security Beijing, China

Software Engineering In Practice

Static Analysis
May 18th, Wednesday, 2:00 - 3:30 PM
Session Chair: Yves Le Traon
Location: Trinity

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 Nassar, 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

Software Engineering Education and Training

Architecture and Collaboration
May 18th, Wednesday, 2:00 - 3:30 PM
Session Chair: Mehdi Mirakhorli
Location: Ballroom B

Smart Decisions: An Architectural Design Game
Humberto Cervantes, Serge Haziyev, Olha Hrytsay, and Rick Kazman
— Universidad Autónoma 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
Andrew Cain and Muhammad Ali Babar
— Swinburne University of Technology, Australia; The University of Adelaide, Australia

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

What Makes Teaching Software Architecture Difficult?
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
Collin McMillan and Amanda Rodda-Tyler
— University of Notre Dame, USA; Illinois School for the Visually Impaired, USA

Demonstrations

Verification and Validation I
May 18th, Wednesday, 2:00 - 3:30 PM
Session Chair: Aditya Nori
Location: Sabine

SimCoTest: A Test Suite Generation Tool for Simulink/Stateflow Controllers
Reza Matinnejad, Shiva Nejati, Lionel C. Briand, and Thomas Bruckmann
— University of Luxembourg, Luxembourg; Delphi Automotive Systems, Luxembourg
SMACK Software Verification Toolchain  
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  
Qi Luo, Denys Poshvyvanyk, Aswathy Nair, and Mark Grechanik  
— The College of William and Mary, USA; University of Illinois at Chicago, USA  

<table>
<thead>
<tr>
<th>Technical Research</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Defect Prediction</strong></td>
<td></td>
</tr>
<tr>
<td>May 18th, Wednesday, 4:00 - 5:30 PM</td>
<td></td>
</tr>
<tr>
<td>Session Chair: Pete Rotella</td>
<td></td>
</tr>
<tr>
<td><strong>Location:</strong> Glass Oaks</td>
<td></td>
</tr>
</tbody>
</table>

- Automatically Learning Semantic Features for Defect Prediction  
  Song Wang, Taiyue Liu, and Lin Tan  
  — University of Waterloo, Canada  

- Cross-Project Defect Prediction Using a Connectivity-Based Unsupervised Classifier  
  Feng Zhang, Quan Zheng, Ying Zou, and Ahmed E. Hassan  
  — Queen’s University, Canada  

- Automated Parameter Optimization of Classification Techniques for Defect Prediction Models  
  Chakkrit Tantithamthavorn, Shane McIntosh, Ahmed E. Hassan, and Kenichi Matsumoto  
  — Nara Institute of Science and Technology, Japan; McGill University, Canada; Queen’s University, Canada  

- AntMiner: Mining More Bugs by Reducing Noise Interference  
  Bin Liang, Pan Bian, Yan Zhang, Wenchang Shi, Wei You, and Yan Cai  
  — Renmin University, China; Chinese Academy of Sciences, China  

<table>
<thead>
<tr>
<th>Technical Research</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Synthesis</strong></td>
<td></td>
</tr>
<tr>
<td>May 18th, Wednesday, 4:00 - 5:30 PM</td>
<td></td>
</tr>
<tr>
<td>Session Chair: Victor Braberman</td>
<td></td>
</tr>
<tr>
<td><strong>Location:</strong> San Antonio</td>
<td></td>
</tr>
</tbody>
</table>

- Program Synthesis Using Natural Language  
  Aditya Desai, Sumit Gulwani, Vineet Hingorani, Nidhi Jain, Amey Karkare, Mark Marron, Sailesh R, and Subhajit Roy  
  — IIT Kanpur, India; MSR Redmond, USA  

- SWIM: Synthesizing What I Mean - Code Search and Idiomatic Snippet Synthesis  
  Mukund Raghothaman, Yi Wei, and Youssef Hamadi  
  — University of Pennsylvania, USA; Microsoft Research, United Kingdom; École Polytechnique, Palaiseau, France  

- Cross-Supervised Synthesis of Web-Crawlers  
  Adi Omari, Sharon Shoham, and Eran Yahav  
  — Technion - Israel Institute of Technology, Israel; Academic College of Tel Aviv Yaffo, Israel  

21
Visions of 2025 and Beyond I
May 18th, Wednesday, 4:00 - 5:30 PM
Session Chairs: Gail Murphy
and David Rosenblum
Location: Ballroom A

% Wide-Field Ethnography: Studying Software Engineering in 2025 and Beyond
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

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

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

Software Engineering In Practice
Panel Discussion
May 18th, Wednesday, 4:00 - 5:30 PM
Session Chairs: Lorin Hochstein
and Aaron Blohowiak
Location: Trinity

Chaos Engineering Panel
Heather Nakama, Microsoft, USA
Kyle Parrish, Fidelity Investments, USA
Ian Van Hoven, Yahoo, USA
Chris Adams, Uber, USA

Demonstrations
Verification and Validation II
May 18th, Wednesday, 4:00 - 5:30 PM
Session Chair: Aditya Nori
Location: Sabine

SourceerCC and SourceerCC-I: Tools to Detect Clones in Batch Mode and during Software Development
Vaibhav Saini, Hitesh Sajnani, Jaewoo Kim, and Cristina Lopes
— University of California, Irvine, USA

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

Toward Arbitrary Mapping for Debugging Visualizations
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
Kevin Moran, Mario Linares-Vásquez, Carlos Bernal-Cárdenas,
and Denys Poshyvanyk
— College of William & Mary, USA

BREAK 5:30-6:00 PM

ACM SIGSOFT / IEEE CS TCSE Town Hall Meeting
May 18th, Wednesday, 5:45 - 7:00 PM
Location: Glass Oaks
ICSE 2016 Poster Reception
May 18th, Wednesday, 7:00 - 9:00 PM
Location: Atrium

ACM Student Research Competition

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

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

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

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

Discovering Important Source Code Terms
Paige Rodeghero
— University of Notre Dame, USA

Scaling Testing of Refactoring Engines
Melina Mongiovi
— Federal University of Campina Grande, Brazil

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

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

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

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

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

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

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

Student Contest on Software Engineering Finalist Projects

MeetMe, A Meeting Planner
Manuel Gollmann, Danny Friedrich, Natascha Kania, Ronald Robertson, and Malte Kloß
— University of Applied Sciences Neu-Ulm, Germany

CoCo: A Code Coach
Sophia Stahl, Jan Pawellek, Dominik Sterk, and Julia Kreutzer
— Heidelberg University, Germany

Agile TweetViz
Kedar Pitke, Aditya Bivalkar, Tanmay Patil, Meenal Kulkarni, and Snehal Shendware
— Arizona State University, USA
Extracting Conceptual Interoperability Constraints from API Documentation Using Machine Learning
Hadil Abukwaik, Mohammed AbuJayyah, Shah Rukh Humayoun, and Dieter Rombach
— University of Kaiserslautern, Germany

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

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

A New Homogeneous Pure Birth Process Based Software Reliability Model
Nestor Ruben Barraza
— Universidad Nacional de Tres de Febrero, Argentina

On the Effectiveness of Labeled Latent Dirichlet Allocation in Automatic Bug-Report Categorization
Minhaz F. Zibran
— University of New Orleans, USA

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

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

Towards Promoting Design and UML Modeling Practices in the Open Source Community
Abdullah Aladdej and Omar Baidreddin
— State University of New York at Albany, USA; Northern Arizona University, USA

Applying Scrum to the Army - A Case Study
Luigi Benedicenti, Franco Cotugno, Paolo Cianfrini, Angelo Messina, Witold Pedrycz, Alberto Sillitti, 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

Making a Difference: An Overview of Humanitarian Free Open Source Systems
Esteban Parra, Sonia Haiduc, and Rebecca James
— Florida State University, USA
Thursday, May 19th

Awards Session II
May 19th, Thursday, 8:30 – 9:00 AM
Session chair: Laurie Williams
Location: Grand Ballroom
See page 37 for awards presented in Award Session II.

Keynote
May 19th, Thursday, 9:00 – 10:30 AM
Location: Grand Ballroom

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

The innovation and start-up investment community want to fund SMART research and education leading to sustainable global impact however the impending digital quake triggered by discoveries in multiple domains will disrupt 80% of the world as we know it. Moreover, all domains (science, education, research, entrepreneurship/startups, funding/investments, government, industry, business, media, civil society (non-profits), ...) are connected through their underlying dependence upon computing catalyzed by software engineering. Thus in the exponential investor mindset, what are these global trends/disruptions and daily discoveries that will change all of our lives in every way possible? What are the implications in your work? How is the industry and start-up landscape radically changing and why should you care in your research or education focus? What are the triggers to get investment? Why does having an eclectic understanding of innovation in multiple-domains matter?

BREAK 10:30 – 11:00 AM (ATRIUM)

Technical Research
Code Smells
May 19th, Thursday, 11:00 - 12:30 PM
Session Chair: Lutz Prechelt
Location: Ballroom A

On the "Naturalness" of Buggy Code
Baishakhi Ray, Vincent Hellendoorn, Saheel Godhane, Zhaopeng Tu, Alberto Bacchelli, and Premkumar Devanbu
— University of Virginia, USA; University of California, Davis, USA; Huawei Technologies Co. Ltd., China; Delft University of Technology, The Netherlands

Code Anomalies Flock Together: Exploring Code Anomaly Agglomerations for Locating Design Problems
William Oizumi, Alessandro Garcia, Leonardo da Silva Sousa, Bruno Cafeto, and Yixue Zhao
— Pontifical Catholic University of Rio de Janeiro, Brazil; University of Southern California, USA

Using (Bio)Metrics to Predict Code Quality Online
Sebastian C. Müller and Thomas Fritz
— University of Zurich, Switzerland

CUSTODES: Automatic Spreadsheet Cell Clustering and Smell Detection Using Strong and Weak Features
Shing-Chi Cheung, Wanjun Chen, Yepang Liu, and Chang Xu
— The Hong Kong University of Science and Technology, China; Nanjing University, China

Technical Research
Architecture
May 19th, Thursday, 11:00 - 12:30 PM
Session Chair: Henry Muccini
Location: Ballroom B

Disseminating Architectural Knowledge on Open-Source Projects: A Case Study of the Book "Architecture of Open-Source Applications"
Martin P. Robillard and Nenad Medvidovic
— McGill University, Canada; University of Southern California, USA

Identifying and Quantifying Architectural Debt
Lu Xiao, Yuanfang Cai, Rick Kazman, Ran Mo, and Qiong Feng
— Drexel University, USA; University of Hawaii & SEI/CMU, USA

Decoupling Level: A New Metric for Architectural Maintenance Complexity
Ran Mo, Yuanfang Cai, Rick Kazman, Lu Xiao, and Qiong Feng
— Drexel University, USA; University of Hawaii & SEI/CMU, USA

Evaluating the Effects of Architectural Documentation: A Case Study of a Large Scale Open Source Project
Rick Kazman, Dennis Goldenson, Ira Monarch, William Nichols, and Giuseppe Valetto
— Carnegie Mellon University, USA; University of Hawaii, USA; Fondazione Bruno Kessler, Italy
Technical Research
Testing 1
May 19th, Thursday, 11:00 - 12:30 PM
Session Chair: Moonzoo Kim
Location: Glass Oaks

On The Limits of Mutation Reduction Strategies
Rahul Gopinath, Mohammad Amin Alipour, Iftekhar Ahmed,
Carlos Jensen, and Alex Groce
— Oregon State University, USA

Comparing White-Box and Black-Box Test Prioritization
Christopher Henard, Mike Papadakis, Mark Harman, Yue Jia,
and Yves Le Traon
— University of Luxembourg, Luxembourg; University College London,
United Kingdom

How Does Regression Test Prioritization Perform in Real-World Software Evolution?
Yafeng Lu, Yiling Lou, Shiyang Cheng, Lingming Zhang,
Dan Hao, Yangfan Zhou, and Lu Zhang
— University of Texas at Dallas, USA; Peking University, China

The Impact of Test Case Summaries on Bug Fixing Performance: An Empirical Investigation
Sebastiano Panichella, Annibale Panichella, Moritz Beller,
Andy Zaidman, and Harald C. Gall
— University of Zurich, Switzerland; Delft University of Technology,
The Netherlands

ACM Student Research Competition
Finalist Presentations: ACM Student Research Competition
May 19th, Thursday, 11:00 - 12:30 PM
Location: San Antonio

See page 23 for the ACM SRC Finalist presentations.

Software Engineering In Practice
Monitoring
May 19th, Thursday, 11:00 - 12:30 PM
Session Chair: Hao Zhong
Location: Wedgwood

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
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
Yu Jiang, Han Liu, Hui Kong, Rui Wang, Mohammad Hosseini,
Jiaguan 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
Rick Rubiser, Michael Vierhauser, and Paul Grünbacher
— Johannes Kepler University Linz, Austria

Software Engineering Education and Training
Team Projects
May 19th, Thursday, 11:00 - 12:30 PM
Session Chair: Charles Wallace
Location: Sabine

Enriching Traditional Software Engineering Curricula with Software Project Management Knowledge
Ana M. Moreno, Maria-Isabel Sánchez-Segura,
Fuensanta Medina-Dominguez, Lawrence Peters,
and Jonathan Araújo
— 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
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
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?
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
Peng Zhang, Jules White, and Douglas C. Schmidt
— Vanderbilt University, USA
Software Engineering In Society
Sustainable Software Design
May 19th, Thursday, 11:00 - 12:30 PM
Session Chair: Maria Angela Ferrario
Location: Trinity

Software Energy Profiling: Comparing Releases of a Software Product
Erik A. Jagroep, Jan Martijn van der Werf, Sjaak Brinkkemper, Giuseppe Proaccianni, 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
Ruzanna Chitchyan, Christoph Becker, Stefanie Betz, Leticia Duboc, Birgit Penzenstadler, Norbert Seiff, 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
Bendra Ojameruaye, Rami Bahsoon, and Leticia Duboc
— University of Birmingham, United Kingdom; State University of Rio de Janeiro, Brazil

Technical Research
Testing 2
May 19th, Thursday, 2:00 - 3:30 PM
Session Chair: Wei Li
Location: Glass Oaks

Reducing Combinatorics in GUI Testing of Android Applications
Nariman Mirzaei, Joshua Garcia, Hamid Bagheri, Alireza Sadeghi, and Sam Malek
— George Mason University, USA; University of California, Irvine, USA

MobiPlay: A Remote Execution Based Record-and-Replay Tool for Mobile Applications
Zhengrui Qin, Yutao Tang, Ed Novak, and Qun Li
— The College of William and Mary, USA

VDTest: An Automated Framework to Support Testing for Virtual Devices
Tingting Yu, Xiao Qu, and Myra B. Cohen
— University of Kentucky, USA; ABB Corporate Research, USA; University of Nebraska - Lincoln, USA

Automated Test Suite Generation for Time-Continuous Simulink Models
Reza Matinnejad, Shiva Nejati, Lionel Briand, and Thomas Bruckmann
— University of Luxembourg, Luxembourg; Delphi Automotive Systems, Luxembourg

Technical Research
Effort Estimation and Search
May 19th, Thursday, 2:00 - 3:30 PM
Session Chair: Tim Menzies
Location: Sabine

Missing Data Imputation Based on Low-Rank Recovery and Semi-Supervised Regression for Software Effort Estimation
Xiao-Yuan Jing, Fumin Qi, Fei Wu, and Baowen Xu
— Wuhan University, China; Nanjing University of Posts and Telecommunications, China; Nanjing University, China

Multi-objective Software Effort Estimation
Federica Sarro, Alessio Petrozziello, and Mark Harman
— University College London, United Kingdom; University of Portsmouth, United Kingdom

A Practical Guide to Select Quality Indicators for Assessing Pareto-Based Search Algorithms in Search-Based Software Engineering
Shuai Wang, Shaukat Ali, Tao Yue, Yan Li, and Marius Liuaen
— Simula Research Laboratory, Norway; University of Oslo, Norway; Beihang University, China; Cisco Systems, Norway

Metamorphic Testing for Software Quality Assessment: A Study of Search Engines
Zhi Quan Zhou, Shaowen Xiang, and Tsong Yueh Chen
— University of Wollongong, Australia; Swinburne University of Technology, Australia

Technical Research
Product Lines
May 19th, Thursday, 2:00 - 3:30 PM
Session Chair: Yves Le Traon
Location: Ballroom B

A Comparison of 10 Sampling Algorithms for Configurable Systems
Flávio Medeiros, Christian Kästner, Márcio Ribeiro, Rohit Gheyi, and Sven Apel
— Federal University of Campina Grande, Brazil; Carnegie Mellon University, USA; Federal University of Alagoas, Brazil; Universität Passau, Germany

Featured Model-Based Mutation Analysis
Xavier Devroey, Gilles Perrouin, Mike Papadakis, Axel Legay, Pierre-Yves Schobbens, and Patrick Heymans
— University of Namur, Belgium; University of Luxembourg, Luxembourg; INRIA Rennes, France

Feature-Model Interfaces: The Highway to Compositional Analyses of Highly-Configurable Systems
Reimar Schröter, Sebastian Krieter, Thomas Thüm, Fabian Benduhn, and Gunter Saake
— University of Magdeburg, Germany; TU Braunschweig, Germany
How Does the Degree of Variability Affect Bug Finding?  
Jean Melo, Claus Brabrand, and Andrzej Wasowski  
— IT University of Copenhagen, Denmark

Technical Research  
Repair and Model Synthesis  
May 19th, Thursday, 2:00 - 3:30 PM  
Session Chair: Alex Orso  
Location: Trinity

Angelix: Scalable Multiline Program Patch Synthesis via Symbolic Analysis  
Sergey Mechtaev, Jooyong Yi, and Abhik Roychoudhury  
— National University of Singapore, Singapore

An Analysis of the Search Spaces for Generate and Validate Patch Generation Systems  
Fan Long, and Martin Rinard  
— MIT EECS & CSAIL, USA

PAC Learning-Based Verification and Model Synthesis  
Yu-Fang Chen, Chiao Hsieh, Ondrej Lengál, Tsung-Ju Lii, Ming-Hsien Tsai, Bow-Yaw Wang, and Farn Wang  
— Academia Sinica, Taiwan; National Taiwan University, Taiwan; Brno University of Technology, Czech Republic

StubDroid: Automatic Inference of Precise Data-Flow Summaries for the Android Framework  
Steven Arzt, and Eric Bodden  
— Technische Universität Darmstadt, Germany; Paderborn University & Fraunhofer IEM, Germany

Software Engineering Education and Training  
Software Development  
May 19th, Thursday, 2:00 - 3:30 PM  
Session Chair: Collin McMillan  
Location: Ballroom A

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

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

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

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

Demonstrations  
Analysis and Refactoring  
May 19th, Thursday, 2:00 - 3:30 PM  
Session Chair: Aditya Nori  
Location: San Antonio

JDeodorant: Clone Refactoring  
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  
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  
— Kent State University, USA; The University of Akron, USA; Miami University, USA
Technical Research

Languages
May 19th, Thursday, 4:00 - 5:30 PM
Session Chair: Michael Ernst
Location: Sabine

Exploring Language Support for Immutability
Michael Coblenz, Joshua Sunshine, Jonathan Aldrich, Brad Myers, Sam Weber, and Forrest Shull
— Carnegie Mellon University, USA; Software Engineering Institute, USA

Diomidis Spinellis, Panos Louridas, and Maria Kechagia
— Athens University of Economics and Business, Greece

An Empirical Study on the Impact of C++ Lambdas and Programmer Experience
Phillip Merlin Uesbeck, Andreas Stefik, Stefan Hanenberg, Jan Pedersen, and Patrick Daleiden
— University of Nevada, Las Vegas, USA; University of Duisburg-Essen, Germany

Understanding and Fixing Multiple Language Interoperability Issues: The C/Fortran Case
Navrin Sultana, Justin Middleton, Jeffrey Overbey, and Munawar Hafiz
— Auburn University, USA

Technical Research

Requirements
May 19th, Thursday, 4:00 - 5:30 PM
Session Chair: Natalia Juristo
Location: Ballroom B

Are "Non-functional" Requirements really Non-functional? An Investigation of Non-functional Requirements in Practice
Jonas Eckhardt, Andreas Vogelsang, and Daniel Medéz Fernández
— Technische Universität München, Germany

Probing for Requirements Knowledge to Stimulate Architectural Thinking
Preetha Rose Anish, Balaji Balasubramaniam, Abhishek Sainani, Jane Cleland-Huang, Maya Daneva, Roel J. Wieringa, and Smita Ghaissas
— TATA Consultancy Services Ltd., India; DePaul University, USA; University of Twente, The Netherlands

Risk-Driven Revision of Requirements Models
Dalal Alrajeh, Axel van Lamsweerde, Jeff Kramer, Alessandra Russo, and Sebastian Uchitel
— Imperial College London, United Kingdom; Université catholique de Louvain, Belgium; Universidad de Buenos Aires and CONICET, Argentina

Discovering "Unknown Known" Security Requirements
Awais Rashid, Syed Asad Ali Naqvi, Rajiv Ramdhany, Matthew Edwards, Ruzanna Chitchyan, and M. Ali Babar
— Lancaster University, United Kingdom; University of Adelaide, Australia

Technical Research

Debugging
May 19th, Thursday, 4:00 - 5:30 PM
Session Chair: Jun Sun
Location: Glass Oaks

BigDebug: Debugging Primitives for Interactive Big Data Processing in Spark
Muhammad Ali Gulzar, Matteo Interlandi, Seunghyun Yoo, Sai Deep Tetali, Tyson Condie, Todd Millstein, and Miryung Kim
— UCLA, USA

Debugging for Reactive Programming
Guido Salvaneschi, and Mira Mezini
— Technical University of Darmstadt, Germany

Revisit of Automatic Debugging via Human Focus-Tracking Analysis
Xiaoyuan Xie, Zicong Liu, Shuo Song, Zhenyu Chen, Jifeng Xuan, and Baowen Xu
— Wuhan University, China; Nanjing University, China

RETracer: Triaging Crashes by Reverse Execution from Partial Memory Dumps
Weidong Cui, Marcus Peinado, Sang Kil Cha, Yanick Fratantonio, and Vasilisios P. Kemerlis
— Microsoft Research, USA; KAIST, South Korea; University of California, Santa Barbara, USA; Brown University, USA

V2025

Visions of 2025 and Beyond II
May 19th, Thursday, 4:00 - 5:30 PM
Session Chairs: Gail Murphy and David Rosenblum
Location: Ballroom A

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

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

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

8 Theories of Everything
Pamela Zave
— AT&T Labs - Research, USA
System Testing of Repository-Style Software: An Experience Report
Paolo Salvaneschi
— University of Bergamo, Italy

Enhancing Test Case Prioritization in an Industrial Setting with Resource Awareness and Multi-objective Search
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
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
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

SPYSE - A Semantic Search Engine for Python Packages and Modules
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
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
Dennis Priefer, Peter Kneisel, and Gabriele Taentzer
— KITE, Germany; Philipps-Universität Marburg, Germany

Microsoft Touch Develop and the BBC micro:bit
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

Banquet
May 19th, Thursday, 6:30 - 10:00 PM
Location: Bullock Texas State History Museum
See page 44 for information about the Banquet
This award prompts me to reflect on how my team at Microsoft Research was able to bring research in formal methods and empirical software engineering into practice. How did I select the topics for my teams and my research? How did we conduct the research and which methods did we choose? How did we show progress, and equally important when did we decide to stop? I will also discuss the importance of knowing your customers, i.e., who, how and why a customer will use your research contributions. Of equal importance is to understand the constraints of a product group that productizes your research, and how your role changes when a product team adopts your ideas.

Three years ago, I changed roles and founded a product group, called Tools for Software Engineers, which builds developer tools and service at scale. I will explain what new research challenges I encountered in building software services. I will argue that a combination of both formal methods and empirical software engineering is the most promising approach to impact existing practice.

Continuity in software development is all about shortening cycle times. For example, continuous integration shortens the time to integrating changes from multiple developers and continuous delivery shortens the time to get those integrated changes into the hands of users. Although it is now possible to get multiple new versions of complex software systems released per day, it still often takes years, if ever, to get software engineering research results into use by software development teams. What would software engineering research and software engineering development look like if we could shorten the cycle time from taking a research result into practice? What can we learn from how continuity in development is performed to make it possible to achieve continuous adoption of research results? Do we even want to achieve continuous adoption? In this talk, I will explore these questions, drawing from experiences I have gained in helping to take a research idea to market and from insights learned from interviewing industry leaders.
Automated Partitioning of Android Applications for Trusted Execution Environments
Konstantin Rubinov, Lucia Rosculete, Tulika Mitra, and Abhik Roychoudhury
— Politecnico di Milano, Italy; Application Threat Intelligence - Ixia, Romania; National University of Singapore, Singapore

"Jumping Through Hoops": Why do Java Developers Struggle with Cryptography APIs?
Sarah Nadi, Stefan Krüger, Mira Mezini, and Eric Bodden
— Technische Universität Darmstadt, Germany; Universität Paderborn & Fraunhofer IEM, Germany; Lancaster University, United Kingdom

Finding Security Bugs in Web Applications Using a Catalog of Access Control Patterns
Joseph P. Near and Daniel Jackson
— University of California, Berkeley, USA; Massachusetts Institute of Technology, USA

Reference Hijacking: Patching, Protecting and Analyzing on Unmodified and Non-rooted Android Devices
Wei You, Bin Liang, Wenchang Shi, Shiyang Zhu, Peng Wang, Sikefu Xie, and Xiangyu Zhang
— Renmin University of China, China

Building a Theory of Job Rotation in Software Engineering from an Instrumental Case Study
Ronnie E. S. Santos, Fabio Q. B. da Silva, Cleyton V. C. de Magalhães, and Cleiton V. F. Monteiro
— Universidade Federal de Pernambuco, Brazil; Universidade Federal Rural de Pernambuco, Brazil

The Challenges of Staying Together While Moving Fast: An Exploratory Study
Julia Rubin and Martin Rinard
— Massachusetts Institute of Technology, USA

The Sky Is Not the Limit: Multitasking Across GitHub Projects
Bogdan Vasilescu, Kelly Blincoe, Qi Xuan, Casey Casalnuovo, Daniela Damian, Premkumar Devanbu, and Vladimir Filkov
— University of California, Davis, USA; University of Auckland, New Zealand; Zhejiang University of Technology, China; University of Victoria, Canada

Quantifying and Mitigating Turnover-Induced Knowledge Loss: Case Studies of Chrome and a Project at Avaya
Peter C. Rigby, Yue Cai Zhu, Samuel M. Donadelli, and Audris Mockus
— Concordia University, Canada; University of Tennessee, USA
Measuring Code Behavioral Similarity for Programming and Software Engineering Education
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
Linda M. Laird and Ye Yang
— Stevens Institute of Technology, USA

Software Engineering In Society
Values in Software Engineering
May 20th, Friday, 11:00 - 12:30 PM
Session Chair: Birgit Penzenstadler
Location: Sabine

Values-First SE: Research Principles in Practice
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
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
James Holston, Valérie Issarny, and Cristhian Parra
— University of California, Berkeley, USA; Inria, France

LUNCH 12:30 – 2:00 PM (RIO EXHIBIT HALL A)

Technical Research
Software Quality
May 20th, Friday, 2:00 - 3:30 PM
Session Chair: James Clause
Location: Ballroom A

Automatically Recommending Peer Reviewers in Modern Code Review
Motahareh Bahrami Zanjani, Huzefa Kagdi, and Christian Bird
— Wichita State University, USA; Microsoft Research, USA

Quality Experience: A Grounded Theory of Successful Agile Projects without Dedicated Testers
Lutz Prechelt, Holger Schmeisky, and Franz Zieris
— Freie Universität Berlin, Germany

Code Review Quality: How Developers See It
Oleksii Kononenko, Olga Baysal, and Michael W. Godfrey
— University of Waterloo, Canada; Carleton University, Canada

Revisiting Code Ownership and Its Relationship with Software Quality in the Scope of Modern Code Review
Patanamon Thongtanunam, Shane McIntosh, Ahmed E. Hassan, and Hajimu Iida
— Nara Institute of Science and Technology, Japan; McGill University, Canada; Queen’s University, Canada

Technical Research
Program Analysis
May 20th, Friday, 2:00 - 3:30 PM
Session Chair: Eric Bodden
Location: Ballroom B

IntEQ: Recognizing Benign Integer Overflows via Equivalence Checking across Multiple Precisions
Hao Sun, Xiangyu Zhang, Yunhui Zheng, and Qingkai Zeng
— Nanjing University, China; University, Purdue University, USA; IBM T.J. Watson Research Center, USA

Nomen est Omen: Exploring and Exploiting Similarities between Argument and Parameter Names
Hui Liu, Qurong Liu, Cristian-Alexandru Staicu, Michael Pradel, and Yue Luo
— Beijing Institute of Technology, China; TU Darmstadt, Germany

Floating-Point Precision Tuning Using Blame Analysis
Cindy Rubio-González, Cuong Nguyen, Benjamin Mehne, Koushik Sen, James Demmel, William Kahan, Costin Iancu, Wim Lavrijsen, David H. Bailey, and David Hough
— University of California, Davis, USA; University of California, Berkeley, USA; Lawrence Berkeley National Laboratory, USA; Oracle Corporation, USA

Crowdsourcing Program Preconditions via a Classification Game
Daniel Fava, Dan Shapiro, Joseph Osborn, Martin Schäef, and E. James Whitehead Jr.
— University of California, Santa Cruz, USA; SRI International, USA
Technical Research
Concurrency
May 20th, Friday, 2:00 - 3:30 PM
Session Chair: Arie van Deursen
Location: Trinity

Scalable Thread Sharing Analysis
Jeff Huang
— Texas A&M University, USA

Fixing Deadlocks via Lock Pre-Acquisitions
Yan Cai and Lingwei Cao
— Chinese Academy of Sciences, China

Coverage-Driven Test Code Generation for Concurrent Classes
Valerio Terragni and Shing-Chi Cheung
— The Hong Kong University of Science and Technology, China

Locking Discipline Inference and Checking
Michael D. Ernst, Alberto Lovato, Damiano Macedonio, Fausto Spoto, and Javier Thaine
— University of Washington, USA; Università di Verona, Italy; Julia Srl, Italy

Technical Research
Maintenance
May 20th, Friday, 2:00 - 3:30 PM
Session Chair: Neha Rungta
Location: Glass Oaks

Improving Refactoring Speed by 10X
Jongwook Kim, Don Batory, Danny Dig, and Maider Azanza
— University of Texas at Austin, USA; Oregon State University, USA; University of the Basque Country (UPV/EHU), Spain

SourcererCC: Scaling Code Clone Detection to Big-Code
Hitesh Sajnani, Vaibhav Saini, Jeffrey Svajlenko, Chanchal K. Roy, and Cristina V. Lopes
— University of California, Irvine, USA; University of Saskatchewan, Canada

Understanding Asynchronous Interactions in Full-Stack JavaScript
Saba Alimadadi, Ali Mesbah, and Karthik Pattabiraman
— University of British Columbia, Canada

Shadow of a Doubt: Testing for Divergences between Software Versions
Hristina Palkareva, Tomasz Kuchta, and Cristian Cadar
— Imperial College London, United Kingdom

Software Engineering In Practice
Process
May 20th, Friday, 2:00 - 3:30 PM
Session Chair: Pete Rotella
Location: Wedgwood

Assessing the Process of an Eastern European Software SME Using Systemic Analysis, GQM, and Reliability Growth Models - A Case Study
Vladimir Ivanov, Manuel Mazzara, Witold Pedrycz, Alberto Sillitti, 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
Vinay Kulkarni
— Tata Consultancy Services Research, India

Industry Application of Continuous Integration Modeling: A Multiple-Case Study
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
Michael Washburn Jr., Pavithra Sathiyarayanan, Meiyappan Nagappan, Thomas Zimmermann, and Christian Bird
— Rochester Institute of Technology, USA; Microsoft Research, USA

Software Engineering Education and Training
Verification and Test
May 20th, Friday, 2:00 - 3:30 PM
Session Chair: Muhammad Ali Babar
Location: San Antonio

Can Software Engineering Students Program Defect-Free? An Educational Approach
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
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
Stephan Krusche, Mjellma Berisha, and Bernd Bruegge
— Technische Universität München, Germany

Let's Verify Linux: Accelerated Learning of Analytical Reasoning through Automation and Collaboration
Suraj Kothari, Ahmed Tamraoui, Jeremias Sauceda, and Jon Mathews
— Iowa State University, USA; EnSoft Corporation, USA
Demonstrations
Program Understanding
May 20th, Friday, 2:00 - 3:30 PM
Session Chair: Yuanfang Cai
Location: Sabine

DECA: Development Emails Content Analyzer
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
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
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
Ziang Ma, Haoyu Wang, Yao Guo, and Xiangqun Chen
— Peking University, China

BREAK 3:30-4:00 PM (ATRIUM)

Awards Session III
May 20th, Friday, 4:00 – 5:00 PM
Session Chairs: Nenad Medvidovic and Harald Gall
Location: Grand Ballroom
See page 38 for awards presented in Awards Session III.

ICSE 2016 Closing
May 20th, Friday, 5:00 – 5:30 PM
Session Chair: Nenad Medvidovic

Thanks to organizers and attendees
Coming ICSE announcements
ICSE 2017 - Buenos Aires, Argentina - Sebastian Uchitel
ICSE 2018 - Gothenburg, Sweden - Ivica Crnkovic
ICSE 2016 Awards

Awards I
May 18th, Wednesday, 8:30 – 9:00 AM
Location: Grand Ballroom

ACM SIGSOFT Distinguished Paper Awards

Efficient Large-Scale Trace Checking Using MapReduce
Marcello M. Bersani, Domenico Bianculli, Carlo Ghezzi, Srdan Krstic, and Pierluigi San Pietro

Energy Profiles of Java Collections Classes
Samir Hasan, Zachary King, Munawar Hafiz, Mohammed Sayagh, Bram Adams, and Abram Hindle

Feedback-Directed Instrumentation for Deployed JavaScript Applications
Magnus Madsen, Frank Tip, Esben Andreasen, Koushik Sen, and Anders Møller

From Word Embeddings to Document Similarities for Improved Information Retrieval in Software Engineering
Xin Ye, Hui Shen, Xiao Ma, Razvan Bunescu, and Chang Liu

Guiding Dynamic Symbolic Execution toward Unverified Program Executions
Maria Christakis, Peter Müller, and Valentin Wüstholz

On the Techniques We Create, the Tools We Build, and Their Misalignments: A Study of KLEE
Eric F. Rizzi, Sebastian Elbaum, and Matthew B. Dwyer

Termination-Checking for LLVM Peephole Optimizations
David Menendez and Santosh Nagarakatte

VDTest: An Automated Framework to Support Testing for Virtual Devices
Tingting Yu, Xiao Qu, and Myra B. Cohen

Work Practices and Challenges in Pull-Based Development: The Contributor's Perspective
Georgios Gousios, Margaret-Anne Storey, and Alberto Bacchelli

Distinguished Reviewers

Shing-chi Cheung, The Hong Kong University of Science and Technology, Hong Kong
Eric Bodden, Fraunhofer SIT & Technische Universität Darmstadt, Germany
Lutz Prechelt, Freie Universitaet Berlin, Germany
Chris Bird, Microsoft Research, USA
Awards II
May 19th, Thursday, 8:30 – 9:00 AM
Location: Grand Ballroom

IEEE CS TCSE Awards

**IEEE CS TCSE Distinguished Service Award**
Dr. Hausi Müller, University of Victoria, Canada

**IEEE CS TCSE Distinguished Education Award**
Dr. Timothy Lethbridge, University of Ottawa, Canada

**IEEE CS TCSE Distinguished Women in Science and Engineering (WISE) Leadership Award**
Dr. Eleni Stroulia, University of Alberta

**IEEE CS TCSE Distinguished Synergy Award**
Microsoft Research, Redmond, USA

**Harlan Mills Award**
Dr. Wolfram Schulte, Microsoft Research

ACM SIGSOFT Awards

**ACM SIGSOFT Distinguished Service Award**
Martin Glinz, University of Zurich, Switzerland

**ACM SIGSOFT Influential Educator Award**
Lori Pollock, University of Delaware, USA

**ACM SIGSOFT Outstanding Research Award**
James Herbsleb, Carnegie Mellon University, USA

**ACM SIGSOFT Impact Paper Award**
Finding Bugs with a Constraint Solver
Daniel Jackson and Mandana Vaziri

In Proceedings of the 2000 ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA '00)

**ACM SIGSOFT Outstanding Doctoral Dissertation Award**
Regression Test Selection: Theory and Practice
Milos Gligoric, University of Illinois at Urbana-Champaign, Darko Marinov, advisor

Visions of 2025 and Beyond Paper Awards

**1st Prize**
Wide-Field Ethnography: Studying Software Engineering in 2025 and Beyond
David Socha, Robin Adams, Kelly Franznick, Wolff-Michael Roth, Kevin Sullivan, Josh Tenenberg, and Skip Walter

**2nd Prize**
Code Drones
Mithun P. Acharya, Chris Parnin, Nicholas A. Kraft, Aldo Dagnino, and Xiao Qu

**3rd Prize**
Theories of Everything
Pamela Zave
ICSE-10 Most Influential Paper Award (Paper appeared at ICSE 2006)

Winner
Who Should Fix This Bug?
*John Anvik, Lyndon Hiew, and Gail C. Murphy*

Runner up
Model-Based Development of Dynamically Adaptive Software
*Ji Zhang and Betty H.C. Cheng*

Best Software Engineering in Practice Paper Award
Continuous Deployment at Facebook and OANDA
*Tony Savor, Mitchell Douglas, Michael Gentili, Laurie Williams, Kent Beck, and Michael Stumm*

Software Engineering Education and Training Paper Awards

Best Full Paper
Teaching Agile - Addressing the Conflict between Project Delivery and Application of Agile Methods
*Jan-Philipp Steghöfer, Eric Knauss, Emil Alégroth, Imed Hammouda, Håkan Burden, and Morgan Ericsson*

Best Short Paper
Collaborative Software Engineering Education between College Seniors and Blind High School Students
*Collin McMillan and Amanda Rodda-Tyler*

ACM Student Research Competition (SRC) Winners: Graduate Category

To be decided at the conference

Student Contest on Software Engineering

Finalists
MeetMe, A Meeting Planner
*Manuel Gollmann, Danny Friedrich, Natascha Kania, Ronald Robertson, and Malte Kloß*
— University of Applied Sciences Neu-Ulm, Germany

CoCo: A Code Coach
*Sophia Stahl, Jan Pawellek, Dominik Sterk, and Julia Kreutzer*
— Heidelberg University, Germany

Agile TweetViz
*Kedar Pitke, Aditya Bivalkar, Tanmay Patil, Meenal Kulkarni, and Snehal Shendware*
— Arizona State University, USA

Winner
To be decided at the conference
Poster Awards

Best Poster
Continuous Assessment of Software Traceability
Patrick Rempel and Patrick Mäder

Distinguished Posters
Topsy-Turvy: A Smarter and Faster Parallelization of Mutation Analysis
Rahul Gopinath, Carlos Jensen, and Alex Groce

When to Release in Open Source Project?
Zeheng Li and LiGuo Huang

Debugging Reactive Programming with Reactive Inspector
Guido Salvaneschi and Mira Mezini

Candoia: A Platform and Ecosystem for Mining Software Repositories Tools
Nitin M Tiwari, Ganesha Upadhyaya, and Hridesh Rajan

(Presented in the ACM SIGSOFT/IEEE CS TCSE Town Hall Meeting)

Video Contest

Javier Gonzalez-Sanchez
— Arizona State University

(Presented in the ACM SIGSOFT/IEEE CS TCSE Town Hall Meeting)

Doctoral Symposium

To be decided during the conference

(Presented in the ACM SIGSOFT/IEEE CS TCSE Town Hall Meeting)

ACM Fellows

Michael Franz
Michael Rung-Tsong Lyu
Sriram Rajamani

ACM Distinguished Members

Tao Xie
Sebastian Uchitel
Margaret Burnett
Nenad Medvidovic
Nachiappan Nagappan
## Community Meetings

<table>
<thead>
<tr>
<th>Sat 14</th>
<th>Tue 17</th>
<th>Wed 18</th>
<th>Thu 19</th>
<th>Fri 20</th>
<th>Sat 21 &amp; Sun 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSR SC Lunch Meeting (San Marcos)</td>
<td></td>
<td>IEEE TCSE EC Lunch Meeting (Guadalupe)</td>
<td>ESEC/FSE 2017 SC Lunch Meeting (Guadalupe)</td>
<td>FSE 2016 OC Lunch Meeting (Pecos)</td>
<td>FSE 2016 PC 8:00 am - 6:00 pm (Ballroom B)</td>
</tr>
<tr>
<td>SIGSOFT EC Lunch Meeting (Bosque)</td>
<td></td>
<td>ICSE 2017 OC Lunch Meeting (Pecos)</td>
<td>ICSE 2017 PB Lunch Meeting (Treehouse Kitchen)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSE Board Lunch Meeting (Concho)</td>
<td></td>
<td>ICSE 2018 OC Lunch Meeting (Pecos)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOSEM EB Lunch Meeting (Guadalupe)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Journal of Software Evolution Lunch Meeting (Treehouse Kitchen)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 Years of SE 4:00 - 6:00 pm (Blanco)</td>
<td>50 Years of SE 4:00 - 6:00 pm (Canadian)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engaging Undergraduates in Your Research 7:00 - 9:00 pm (Pecos)</td>
<td>*ACM SIGSOFT / IEEE CS TCSE Town Hall 5:45 - 7:30 pm (Glass Oaks)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Meeting open to all ICSE attendees. All other meetings are by invitation only.*
General Conference Information

Conference Venue: Renaissance Austin Hotel
9721 Arboretum Boulevard
Austin Texas 78759 USA
+1-512-343-2626

Website: http://2016.icse-conferences.org
Facebook: www.facebook.com/icseconf
Twitter: @icseconf
Instagram: www.instagram.com/
On Twitter and Instagram, please use the hashtag #icse16.

Internet Access:
Free WIFI Internet access is available in the lobby, public areas, and meeting rooms using
SSID: ICSE
Password: ICSE2016

Name Badges:
Attendees must wear their name badge at all times to gain entry to the conference events. Your registration packet will contain tickets to all events based on the events you registered for. These tickets should be kept in your name badge and presented to the Conference staff upon request. If you have a dietary restriction card, please show it to your server to obtain your special meal. Keep this card with you for the duration of the Conference, including for the Banquet.

Registration Desk:
The ICSE 2016 Registration Desk is located in Plaza Booths A and B.

Registration Open Hours are:
Friday, May 13  8:00 - 9:00 pm
Saturday, May 14  7:30 - 11:30 am
Sunday, May 15  7:30 - 11:30 am, 8:00 - 9:00 pm
Monday, May 16  7:30 - 10:30 am, 1:00 - 6:00 pm
Tuesday, May 17  7:30 - 10:30 am, 2:00 - 7:00 pm
Wednesday, May 18  7:30 - 11:30 am, 1:00 - 5:00 pm
Thursday, May 19  7:30 - 11:30 am, 1:00 - 5:00 pm
Friday, May 20  7:30 - 11:30 am

Access to Proceedings:
Attendees of the main conference, workshops, and co-located events will receive a USB drive with the ICSE event proceedings. You may also download an on-line version from:
conference.computer.org/icse/2016
login: icse16
password: conf16
Transportation:
Downtown Austin is approximately 10 miles from the Renaissance Austin Hotel (15 minutes by cab).

A bus stop is approximately 1 block north of the hotel on Great Hills Trail. You can take either the number 982/983 commuter buses or the local number 3 bus to get to downtown Austin. See [http://www.capmetro.org/](http://www.capmetro.org/) for details on routes and pricing.

Cabs cost about $30-35 each way.
There are numerous taxicab services. A few are listed below:
- Yellow Cab - (512) 452-999. Website: [http://www.yellowcabaustin.com/](http://www.yellowcabaustin.com/)
- Austin Cab Company - (512) 478-2222. Website: [http://www.austincab.com/](http://www.austincab.com/)
- 10/10 Taxi - (512) 444-1010. Website: [http://1010taxi.com/](http://1010taxi.com/)

ICSE 2016 attendees will receive a 10% discount on transfer from the Austin-Bergstrom International Airport to the Renaissance Austin Hotel with Super Shuttle or ExecuCar if they book online with the link below (Discount Code: XBQ3V).
[http://groups.supershuttle.com/internationalconferenceonsoftwareengineering.html](http://groups.supershuttle.com/internationalconferenceonsoftwareengineering.html)

Full Super Shuttle fare: $20 (one way)
Estimated taxi fare: $45 (one way)

Insurance:
ICSE Organizers cannot accept responsibility for accidents that might occur. Attendees should obtain travel insurance (medical, personal accident and luggage) in their home country prior to departure.

Emergency Telephone Numbers:
Emergencies or all crimes/public order problems in-progress: 911
Crimes/public order problems after they have occurred: 311

Electric Supply:
Outlets in the United States are the "Type B" North American NEMA 5-15 standard and usually supply electricity at between 110 and 120 volts AC.

Things to do in Austin:
- Zilker Park - [https://austintexas.gov/department/zilker-metropolitan-park](https://austintexas.gov/department/zilker-metropolitan-park)
- Barton Springs Pool - [https://austintexas.gov/department/barton-springs-pool](https://austintexas.gov/department/barton-springs-pool)
- Austin Segway City Tour - [http://www.segcity.com/austin/](http://www.segcity.com/austin/)
- Local Tours (city and lake) - [http://austinducks.com/index.html](http://austinducks.com/index.html)
- Harry Ransom Center (University of Texas Campus) - [http://www.hrc.utexas.edu/](http://www.hrc.utexas.edu/)
- Music/Nightclub - [http://continentalclub.com/#intro](http://continentalclub.com/#intro)
- Music/Nightclub (Blues) - [http://www.antonesnightclub.com/](http://www.antonesnightclub.com/)
- Visitors’ Information: [http://www.austintexas.org/visit](http://www.austintexas.org/visit)
- About Austin: [http://www.austintexas.gov/resident/about-austin](http://www.austintexas.gov/resident/about-austin)
Things to do in San Antonio:

- Explore Downtown - [http://downtownsanantonio.org/](http://downtownsanantonio.org/)
  1. The River Walk is a tourist destination – a beautiful place to take a walk and grab a bite to eat while enjoying the waterfront
  2. The historic Alamo. The Alamo is a 4.2 acre complex of gardens and exhibits adjacent to the River Walk
  3. San Antonio Museum of Art
  4. The Majestic Theatre, built in 1929, is beautifully ornate, featuring a domed ceiling painted with stars and clouds
  5. The Cathedral of San Fernando, built in 1750, is the oldest cathedral in the United States
  6. The At La Villita And Market Square – is a little community of artists and an authentic Mexican market


- Six Flags Fiesta Texas offers family-friendly entertainment and high-octane roller coasters: [https://www.sixflags.com/fiestatexas](https://www.sixflags.com/fiestatexas)

- The Spurs is the home team of San Antonio and five-time NBA Championship winners. The Spurs games will give you plenty to cheer for [http://www.nba.com/spurs/](http://www.nba.com/spurs/)

- Missions Concepcion, San Jose, San Juan, and Espada make up the San Antonio Missions National Historical Park located along the San Antonio River [https://www.nps.gov/saan/planyourvisit/concepcion.htm](https://www.nps.gov/saan/planyourvisit/concepcion.htm)
Banquet at The Bullock Texas State History Museum

The ICSE 2016 Banquet takes place Thursday May 19 from 6:30 PM to 10:00 PM at The Bullock Texas State History Museum (www.TheStoryofTexas.com). Dating back to 2001, the museum is named after Bob Bullock, the State’s 38th Lieutenant Governor and a champion for the preservation of Texas history and culture. At the Bullock, you will not only enjoy a fabulous Texican Buffet and each other’s company, but also experience Texas and it’s history all under one roof.

Entertainment will include a traditional Mariachi Band and dancers (www.mariachi-amor.com) as you enter this unique venue and -- perhaps something you’ve seen only in the movies -- a live trick roper. Of course, it would be downright ‘un-Austintatious’ not to listen to live music while visiting the Live Music Capital of the World. So we are pleased to have engaged Art and Lisa (http://artandlisa.com) to liven the evening with country music.

Unique Photo-Op

Take a turn to have your photo taken on a full-sized longhorn steer and with a Miniature burro, both provided by the Cross T Ranch (www.TheCrossTRanch.com).

Downtown Austin

After the banquet, you are encouraged to take in some Austin nightlife. The Bullock is just across the street from the University of Texas campus and three blocks from both the State Capitol and Scholz’s Garden (www.scholzgarten.com). Scholz’s Garden (a beer garden and restaurant) is the oldest operating business in Texas (opened in 1866) and is truly worth visiting.

The Congress Bridge, famous for its bat population, is a block beyond the State Capitol, on 10th Street. Four blocks further down Congress puts you at 6th Street, known for its many bars and hotspots. Additional venues along 4th and 5th Streets provide ample opportunities to listen to live music and sample local entertainment. The Rainey Street Historic District also features historic homes, many of the Bungalow style, in the southeast corner of downtown Austin.
**Transportation**

The first round of buses will leave the Renaissance Austin Hotel for the Bullock Texas State History Museum at 6:00 PM, with a second round to follow around 7:00 PM (depending on traffic).

Busses will also be available starting at 8:30 PM to take attendees from the museum to Rainey Street and 6th Street. Four busses will run until 11:30 PM (last pick-up) to transport attendees back to the hotel.

For those wanting to drive, there is free parking in the underground garage at The Bullock.
General Chair
Laura Dillon, Michigan State University, USA

Program Co-Chairs
Willem Visser, Stellenbosch University, South Africa
Laurie Williams, North Carolina State University, USA

Workshop Co-Chairs
Mauro Pezzè, Università della Svizzera Italiana, Switzerland
Marija Mikić, Google Los Angeles, United States

Technical Briefings Co-Chairs
Lori Clarke, The University of Massachusetts, Amherst, USA
Carlo Ghezzi, Politecnico di Milano, Italy

Software Engineering In Practice Co-Chairs
Tao Xie, University of Illinois at Urbana-Champaign, USA
Dongmei Zhang, Microsoft Research, China

SE Education and Training Co-Chairs
Dewayne Perry, The University of Texas, Austin, USA
Janet Burge, Wesleyan University, USA

Software Engineering in Society Co-Chairs
Grace Lewis, Carnegie Mellon University, Software Engineering Institute, USA
Jon Whittle, Lancaster University, United Kingdom

Visions of 2025 and Beyond Co-Chairs
Gail Murphy, University of British Columbia, Canada
David Rosenblum, National University of Singapore, Singapore

New Faculty Symposium Co-Chairs
Margaret Burnett, Oregon State University, USA
Moonzoo Kim, KAIST, Republic of Korea

Doctoral Symposium Co-Chairs
Jim Jones, University of California, Irvine, USA
Ita Richardson, Lero - University of Limerick, Ireland

ICSE N-10 MIP Chair
Mary Lou Soffa, The University of Virginia, USA

Demonstrations Co-Chairs
Aditya Nori, Microsoft Research, India
Yuanfang Cai, Drexel University, USA

Posters Co-Chairs
Dimitra Giannakopoulou, NASA Ames Research Center, USA
James Clause, University of Delaware, USA

Student Contest on Software Engineering Co-Chairs
Jonathan Cook, New Mexico State University, USA
Carlo Alberto Furia, Chalmers University of Technology, Sweden

ACM Student Research Competition Co-Chairs
Thorna Humphries, Norfolk State University, USA
Renee Bryce, University of North Texas, USA

Video Contest Chair
Tien Nguyen, Iowa State University, USA

Finance Chair
Will Tracz, Lockheed Martin (retired), USA

Deputy Chair
William G.J. Halfond, University of Southern California, USA

Student Volunteers Co-Chairs
Miryung Kim, University of California, Los Angeles, USA
Christoph Csallner, University of Texas, Arlington, USA
Registration Chair
Robert Dyer, Bowling Green State University, USA

Proceedings Co-Chairs
Charles Zhang, The Hong Kong University of Science and Technology, China
Xiangyu Zhang, Purdue University, USA

Publications Chair
Hazel Asuncion, University of Washington, Bothell, USA

Awards Chair
Atif Memon, University of Maryland, USA

Publicity Co-Chairs
Frances Paulisch, Siemens AG, Germany
Rafael Prikladnicki, Pontificia Universidade Católica do Rio Grande do Sul, Brazil

Social Networking Chair
Felienne Hermans, Delft University of Technology, The Netherlands

Local Arrangements Co-Chairs
Jianwei Niu, University of Texas at San Antonio, USA
Camron Malik, Chair, IEEE Computer Society - Austin Chapter, USA

Web Co-Chairs
Rodion Podorozhny, Texas State University, USA
Guowei Yang, Texas State University, USA

Student Web Chair
Sonal Mahajan, University of Southern California, USA

ACM Liaisons
Farrah Khan, ACM, USA
Fran Spinola, ACM, USA

Registration Manager
Ashley Maroon, Executive Events, USA
39th International Conference on Software Engineering

Call for Submissions ICSE 2017

<table>
<thead>
<tr>
<th>Submission Dates</th>
<th>Call for Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-Aug-16</td>
<td>The International Conference on Software Engineering brings together researchers, practitioners and educators from around the world for a week of presentations and discussion around leading innovations, trends, outcomes and experiences in Software Engineering. For the first time in its nearly 40 years of history ICSE will be held in Latin America. Buenos Aires, the host city, is one of the most important business and cultural centres of the region. Renowned as a cosmopolitan city that mixes a European atmosphere with its strong Latin American roots, vibrant nightlife, tango, and incredible food and wine, Buenos Aires combined with ICSE makes an ideal destination to inspire and be inspired. We invite you to help shape ICSE 2017 through the submission to one or more of our many tracks for professional engagement. In particular, we welcome submission of technical research papers; practice and experience papers; education papers; technical briefings; proposals for topical workshops, doctoral student research prospectuses, posters and formal demonstrations. The technical research track invites submissions of high quality research papers that describe original and unpublished results on any topic of empirical or theoretical software engineering research. See the conference website for guidelines in all submission categories.</td>
</tr>
</tbody>
</table>
| 09-Jan-17        | May 20-28, 2017
Buenos Aires, Argentina
2017.icse-conferences.org |

### Organizing Committee

**General Chair**
Sebastián Uchitel
University of Buenos Aires
Imperial College London
ARGENTINA / UK

**Program Co-Chairs**
Alessandro Orso
Georgia Institute of Technology
USA
Martin Robillard
McGill University
CANADA

**Workshops Co-Chairs**
Romain Robbes
University of Chile
CHILE
Liliana Pasquale
Lero
IRELAND

**Software Engineering in Practice Co-Chairs**
David Shepherd
ABB Corporate Research
USA
Natalia Juristo
University Politecnica de Madrid
SPAIN

**New Ideas and Emerging Results Co-Chairs**
Cristian Cadar
Imperial College London
UK
Lin Tan
University of Waterloo
CANADA

**Software Engineering Education and Training Co-Chairs**
Claudia Werner
Federal University of Rio de Janeiro
BRAZIL
Jon Whittle
Lancaster University
UK

**Demonstrations Co-Chairs**
Aditya Kanade
Indian Institute of Science
INDA
Nicolas D’ippolito
University of Buenos Aires
ARGENTINA

**Technical Briefings Co-Chairs**
Mariana Milic
Google
USA
David Rosenblum
National University of Singapore
SINGAPORE

**Posters Co-Chairs**
Massimo Tivoli
University of Udine
ITALY
Fuyuki Ishikawa
National Institute of Informatics
JAPAN

**Doctoral Symposium Co-Chairs**
Harald Gall
University of Zurich
SWITZERLAND
Betty Cheng
Michigan State University
USA

**New Faculty and Researcher Symposium Co-Chairs**
Willem Visser
University of Pretoria
SOUTH AFRICA
Jane Cleland-Huang
Dartmouth University
USA

**ACM Student Research Competition Co-Chairs**
Charles Zang
Hong Kong University of Science and Technology
CHINA
Martina Maggio
Lund University
SWEDEN

**Most Influential Paper ICSE N-10 Award Chair**
Pazola Inverardi
University of Udine
ITALY

**Co-Located Events Chair**
Domenico Bianculli
University of Luxembourg
LUXEMBOURG

**Conference Chair**
Silvina Ceriani
ARGENTINA

**Publicity Chair**
Nazereno Aguirre
University of Rio Cuarto
ARGENTINA

**Proceedings Chair**
Juan Pablo Galeotti
University of Buenos Aires
ARGENTINA

**Awards Chair**
Sam Mailek
University of California
USA

**Web Chair**
Natalia Rodriguez
University of Buenos Aires
ARGENTINA

**Finance Chair**
Estephan Pavesse
Humboldt University at Berlin
GERMANY

**Student Volunteers Co-Chairs**
Jocelyn Simmonds
University of Chile
CHILE
Renzo Degiovanni
University of Rio Cuarto
ARGENTINA
Nicolas Rosner
University of Buenos Aires
ARGENTINA

**Social Networking Co-Chairs**
Daniel Mendez
Technische Universität München
GERMANY
Daniel Graziotin
University of Stuttgart
GERMANY

**Sponsorship Chair**
Santiago Ceria
Fundación S Abdelión
ARGENTINA

**IEEE Computer Society Liaison Chair**
Silvia Ceballos
Conference Business Operations Manager
IEEE Computer Society