22nd International Conference on Program Comprehension (ICPC 2014)

Editors:
Chanchal Roy
Andrew Begel
Leon Moonen

icpc 2014
hyderabad, india

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Hyderabad, India

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Message from the Chairs

We are delighted to welcome you to the 22nd International Conference on Program Comprehension (ICPC 2014), collocated with the 36th International Conference on Software Engineering (ICSE 2014) in Hyderabad, India!

Program comprehension is a vital software engineering and maintenance activity, and is necessary to facilitate reuse, inspection, maintenance, reverse engineering, reengineering, migration, and extension of existing software systems. ICPC provides an opportunity for researchers and industry practitioners to present and discuss the state-of-the-art and the state-of-the-practice in program comprehension.

We received 42 full paper submissions to the main research track from 19 different countries. Employing the same rigorous evaluation process we have used in previous years, the submissions were each reviewed by three and five reviewers. Then, program committee members were able to read and comment on the reviews for all submissions (except those for which they had a conflict) in an "open review" period facilitated by the research track program committee chairs. From the initial formal reviews and subsequent online discussions, program committee members were able to reach a clear consensus on virtually all of the submissions.

Out of the 42 submissions, 20 papers (from 13 countries) were accepted into the main research track, yielding an acceptance rate of 48%. These papers feature various program comprehension topics such as development tools, recommenders, collaborative and human aspects of software engineering, software architecture, software quality, software engineering support, and comprehension support.

In addition to the main research track, the 2014 edition of ICPC also includes an Early Research Achievements (ERA) Track, an Industry Track, and a Tool Demonstrations Track. Although separate reviewing committees were established for these tracks, each upheld the same rigorous standards as the main research track. The ERA track features 11 papers out of 24 submitted (46%). The industry track has 5 papers out of 10 submitted (50%). And the tool demo track contains 5 papers out of 9 submitted (56%). Overall, we received submissions from 22 countries and accepted submissions from 17, making ICPC 2014 a definitively international conference.

This year, we held a pilot for a new English language proofreading service. Our goal is to help non-native English speakers/writers improve their technical writing skills, enabling research track paper authors to more effectively communicate their paper's message and content to the program committee. Our talented and dedicated pool of native English-speaking and writing proofreaders (who, by day, conduct research in the ICPC field) adhered to a tight schedule of a two day turnaround as they fixed the lexical, grammatical, and English-language semantic issues in the papers. By the deadline, we had received three papers (one was subsequently withdrawn by the author). The papers were proofread and returned to the authors along with modified source files (along with diffs) at least one full day prior to the Research Track deadline.

This year, we are excited to conduct a joint pair of sessions with the 7th Workshop on Cooperative and Human Aspects of Software Engineering (CHASE 2014). Our two communities have quite a bit in common, and we encourage all attendees to meet one another and discover their common ground. We are jointly hosting a keynote address given by Dr. Ed Cutrell who manages the Technology for Emerging Markets (TEM) group at Microsoft Research in Bangalore, India. His talk, titled "Innovating in India: Designing for Constraint, Computing for Inclusion," describes how his research group designs software systems to address the needs and aspirations of people in the developing world.

This year's winners of the Most Influential Paper (MIP) award from the 12th International Workshop on Program Comprehension (IWPC 2004) are Zhihua Wen and Vassilios Tzerpos from York University in Toronto, Ontario, Canada, for their paper titled, "An Effectiveness Measure for Software Clustering Algorithms." A mix of program committee, steering committee, and long-time attendees of ICPC voted in an anonymous ballot to select this paper from all of those published at IWPC 2004. Vassilios (Bil) will give an invited talk about the work, titled "The MoJo Family: A Story about Clustering Evaluation."

We are pleased to announce that a selection of the best papers from this year's conference will be invited to submit extended versions for consideration in a special issue of *Wiley's Journal of Software: Evolution and Process (JSEP)*. The list of invitees will be announced during the opening session of ICPC 2014. In addition, we are negotiating a special section to highlight the latest program comprehension results in a practitioner-oriented publication.

Organizing a conference like ICPC 2014 is a joint effort of many individuals functioning as an effective team. We express our strongest gratitude to the organizing and program committee members whose volunteer work and commitment have brought our conference to life. We thank the ERA Track chairs Daqing Hou and Romain Robbes, the Industry Track chairs Ravindra Naik and Lile Palma Hattori, the Tool Demo Track chairs Yoshiki Higo and Iman Keivanloo, ICPC's Finance chair Bram Adams, Local Arrangements chairs Venkatesh Chopella and Hitesh Sajnani, Proceedings and Pamphlet co-chairs Kevin Schneider and Minhaz Zibran, Web and Publicity chairs Manishankar Mondal and Banani Roy and our Social Media chair Sonia Haiduc. Kudos go out to this year's proofreaders, Emily Hill and Nicholas A. Kraft. We also thank the CHASE 2014 Workshop organizers, Helen Sharp, Rafael Prikladnicki, Cleidson de Souza, and Andrew Begel, for coordinating and planning our joint sessions. We are grateful for our sponsors: Microsoft Research, Tata Consultancy Services, CQSE, Simula Research Laboratory, the IEEE Computer Society, the University of Saskatchewan, and the École Polytechnique de Montréal for necessary financial or technical support. Finally, we are grateful to all the authors who submitted high quality work and all the participants who joined the technical and social programs.

We hope that you will have a productive and pleasurable time at ICPC 2014!

Andrew Begel and Leon Moonen
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ICPC 2014 Schedule at a Glance

Venue: Hyderabad International Convention Centre (Room: MR G.04)

Monday, June 2, 2014	
08:45 – 09:00	Opening
09:00 – 09:50	Invited Talk - Most Influential Paper from IWPC 2004
09:50 – 10:30	Session: Architecture
10:30 – 11:00	Morning Break
11:00 – 12:30	Session: Supporting Software Engineers
12:30 – 13:45	Lunch Break
13:45 – 15:30	Session: Collaborative and Human Aspects
15:30 – 16:00	Afternoon Break
16:00 – 17:05	Session: Recommendations
17:05 – 17:35	Joint Session with CHASE 1 [Room: MR G.04]
17:35 – 18:00	Joint ICPC-CHASE Poster and Tool Demo Session
19:00 – 21:30	Joint ICPC-CHASE Awards Banquet [Hall 5 & 6 at conf. venue]
Tuesday, June 3, 2014	
09:00 – 09:30	Joint Session with CHASE 2 [Room: MR G.04]
09:30 – 10:30	Keynote
10:30 – 11:00	Morning Break
11:00 – 12:30	Session: Understanding Comprehension
12:30 – 13:45	Lunch Break
13:45 – 15:30	Session: Software Quality
15:30 – 16:00	Afternoon Break
16:00 – 17:30	Session: Novel Development Tooling
17:30 – 18:00	Open SC Meeting with ICPC 2015 Presentation

ICPC 2014
Hyderabad International Convention Centre (Room: MR G.04)
Hyderabad, India
—Program—

Monday, June 2

Opening
Mon, Jun 2, 08:45 – 09:00

Invited Talk - Most Influential Paper from IWPC 2004
Mon, Jun 2, 09:00 – 09:50

The MoJo Family: A Story about Clustering Evaluation (Invited Talk)
Zhihua Wen and Vassilios Tzerpos (York University, Canada)

Session: Architecture [Chair: Ravindra Naik]
Mon, Jun 2, 09:50 – 10:30

Do Architectural Design Decisions Improve the Understanding of Software Architecture? Two Controlled Experiments (Research – 15 min)
Mojtaba Shahin, Peng Liang, and Zengyang Li (Wuhan University, China; Islamic Azad University, Iran; VU University Amsterdam, Netherlands; University of Groningen, Netherlands)

Revealing the Relationship between Architectural Elements and Source Code Characteristics (Research – 15 min)
Vanius Zapalowski, Ingrid Nunes, and Daltro José Nunes (Federal University of Rio Grande do Sul, Brazil)

Morning Break
Mon, Jun 2, 10:30 – 11:00

Session: Supporting Software Engineers [Chair: Wei Le]
Mon, Jun 2, 11:00 – 12:30

Understanding LDA in Source Code Analysis (Research – 15 min)
David Binkley, Daniel Heinz, Dawn Lawrie, and Justin Overfelt (Loyola University Maryland, USA; Booz Allen Hamilton, USA)

A Diagnosis-Based Approach to Software Comprehension (Research – 15 min)
Alexandre Perez and Rui Abreu (University of Porto, Portugal)

dsOli: Data Structure Operation Location and Identification (Tool – 10 min)
David H. White (University of Bamberg, Germany)

Version History, Similar Report, and Structure: Putting Them Together for Improved Bug Localization (Research – 15 min)

Shaowei Wang and David Lo (Singapore Management University, Singapore)

Understanding the Database Manipulation Behavior of Programs (ERA – 10 min)

Nesrine Noughi, Marco Mori, Loup Meurice, and Anthony Cleve (University of Namur, Belgium)

On Mapping Releases to Commits in Open Source Systems (ERA – 10 min)

Joe F. Shobe, Md Yasser Karim, Motahareh Bahrami Zanjani, and Huzefa Kagdi (Wichita State University, USA)

Lunch Break
Mon, Jun 2, 12:30 – 13:45

Session: Collaborative and Human Aspects [Chair: Chris Parnin]
Mon, Jun 2, 13:45 – 15:30

Ranking Crowd Knowledge to Assist Software Development (Research – 15 min)

Lucas B. L. de Souza, Eduardo C. Campos, and Marcelo de A. Maia (Federal University of Uberlândia, Brazil)

How Do API Changes Trigger Stack Overflow Discussions? A Study on the Android SDK (Research – 15 min)

Mario Linares-Vásquez, Gabriele Bavota, Massimiliano Di Penta, Rocco Oliveto, and Denys Poshyvanyk (College of William and Mary, USA; University of Sannio, Italy; University of Molise, Italy)

Towards More Accurate Content Categorization of API Discussions (Research – 15 min)

Bo Zhou, Xin Xia, David Lo, Cong Tian, and Xinyu Wang (Zhejiang University, China; Singapore Management University, Singapore; Xidian University, China)

CODES: mining sourCe cOde Descriptions from developErs diScussions (Tool – 10 min)

Carmine Vassallo, Sebastiano Panichella, Massimiliano Di Penta, and Gerardo Canfora (University of Sannio, Italy)

Condensing Class Diagrams by Analyzing Design and Network Metrics using Optimistic Classification (Research – 15 min)

Ferdian Thung, David Lo, Mohd Hafeez Osman, and Michel R. V. Chaudron (Singapore Management University, Singapore; Leiden University, Netherlands; Chalmers, Sweden)

An Information Visualization Feature Model for Supporting the Selection of Software Visualizations (ERA – 10 min)

Renan Vasconcelos, Marcelo Schots, and Cláudia Werner (COPPE, Brazil; Federal University of Rio de Janeiro, Brazil)

Enabling Integrated Development Environments with Natural User Interface Interactions (ERA – 10 min)

Denis Delimarschi, George Swartzendruber, and Huzefa Kagdi (Wichita State University, USA)

Afternoon Break
Mon, Jun 2, 15:30 – 16:00

Session: Recommendations [Chair: Tien Nguyen]
Mon, Jun 2, 16:00 – 17:05

Amalgamating Source Code Authors, Maintainers, and Change Proneness to Triage Change Requests (Research – 15 min)
Md Kamal Hossen, Huzefa Kagdi, and Denys Poshyvanyk (Wichita State University, USA; College of William and Mary, USA)

Mining Unit Tests for Code Recommendation (ERA – 10 min)
Mohammad Ghafari, Carlo Ghezzi, Andrea Mocci, and Giordano Tamburrelli (Politecnico di Milano, Italy; University of Lugano, Switzerland)

Recommending Automated Extract Method Refactorings (Research – 15 min)
Danilo Silva, Ricardo Terra, and Marco Tulio Valente (Federal University of Minas Gerais, Brazil; Federal University of Lavras, Brazil)

Identifying and Locating Interference Issues in PHP Applications: The Case of WordPress (Research – 15 min)
Laleh Eshkevari, Giuliano Antoniol, James R. Cordy, and Massimiliano Di Penta (Polytechnique Montréal, Canada; Queen's University, Canada; University of Sannio, Italy)

Joint Session with CHASE 1
Mon, Jun 2, 17:05 – 17:35 [Room: MR G.04]

Prioritizing Maintainability Defects Based on Refactoring Recommendations (Industry Full – 15 min)
Daniela Steidl and Sebastian Eder (CQSE, Germany; TU München, Germany)

U Can Touch This: Touchifying an IDE (CHASE Full – 15 min)
Benjamin Biege, Julien Hoffmann, Artur Lipinski, Stephan Diehl (University of Trier, Germany)

Joint ICPC-CHASE Poster and Tool Demo Session
Mon, Jun 2, 17:35 – 18:00

Joint ICPC-CHASE Awards Banquet
Mon, Jun 2, 19:00 – 21:30 [Hall 5 & 6 at the Conference Venue]

Tuesday, June 3

Joint Session with CHASE 2
Tue, Jun 3, 09:00 – 09:30 [Room: MR G.04]

How the Evolution of Emerging Collaborations Relates to Code Changes: An Empirical Study (Research – 15 min)
Sebastiano Panichella, Gerardo Canfora, Massimiliano Di Penta, and Rocco Oliveto (University of Sannio, Italy; University of Molise, Italy)

The Hard Life of Open Source Software Project Newcomers (CHASE Full – 15 min)
Igor Steinmacher, Igor Scaliante Wiese, Tayana Conte, Marco Gerosa, David Redmiles (Universidade Tecnológica Federal do Paraná, Brazil; Federal University of Technology – Paraná - UTFPR, Brazil; UFAM, Brazil; IME - USP, Brazil; Department of Informatics, University of California, Irvine)

Keynote
Tue, Jun 3, 09:30 – 10:30

Innovating in India: Designing for Constraint, Computing for Inclusion (Keynote)
Edward Cutrell (Microsoft Research, India)

Morning Break
Tue, Jun 3, 10:30 – 11:00

Session: Understanding Comprehension [Chair: Janet Siegmund]
Tue, Jun 3, 11:00 – 12:30

On the Effect of Code Regularity on Comprehension (Research – 15 min)
Ahmad Jbara and Dror G. Feitelson (Netanya Academic College, Israel; Hebrew University of Jerusalem, Israel)

Capturing Software Traceability Links from Developers' Eye Gazes (ERA – 10 min)
Braden Walters, Timothy Shaffer, Bonita Sharif, and Huzefa Kagdi (Youngstown State University, USA; Wichita State University, USA)

Comprehension Support during Knowledge Transitions: Learning from Field (Industry Talk – 10 min)
Vikrant Kaulgud, Annervaz K. M., Janardan Misra, and Gary Titus (Accenture Technology Labs, India)

A Visualization Tool Recording Historical Data of Program Comprehension Tasks (Tool – 10 min)
Katsuhisa Maruyama, Takayuki Omori, and Shinpei Hayashi (Ritsumeikan University, Japan; Tokyo Institute of Technology, Japan)

An Empirical Comparison of Static and Dynamic Type Systems on API Usage in the Presence of an IDE: Java vs. Groovy with Eclipse (Research – 15 min)
Pujan Petersen, Stefan Hanenberg, and Romain Robbes (University of Duisburg-Essen, Germany; University of Chile, Chile)

What Is the Foundation of Evidence of Human Factors Decisions in Language Design? An Empirical Study on Programming Language Workshops (Research – 15 min)
Andreas Stefik, Stefan Hanenberg, Mark McKenney, Anneliese Andrews, Srinivas Kalyan Yellanki, and Susanna Siebert (University of Nevada at Las Vegas, USA; University of Duisburg-Essen, Germany; Southern Illinois University at Edwardsville, USA; University of Denver, USA; Washington University, USA)

Lunch Break
Tue, Jun 3, 12:30 – 13:45

Session: Software Quality [Chair: Huzefa Kagdi]
Tue, Jun 3, 13:45 – 15:30

Domain Matters: Bringing Further Evidence of the Relationships among Anti-patterns, Application Domains, and Quality-Related Metrics in Java Mobile Apps (Research – 15 min)
Mario Linares-Vásquez, Sam Klock, Collin McMillan, Aminata Sabané, Denys Poshyvanyk, and Yann-Gaël Guéhéneuc (College of William and Mary, USA; University of Notre Dame, USA; Polytechnique Montréal, Canada)

SCQAM: A Scalable Structured Code Quality Assessment Method for Industrial Software (Industry Full – 15 min)
Shrinath Gupta, Himanshu Kumar Singh, Radhika D. Venkatasubramanyam, and Umesh Uppili (Siemens, India)

Repeatedly-Executed-Method Viewer for Efficient Visualization of Execution Paths and States in Java (Tool – 10 min)
Toshinori Matsumura, Takashi Ishio, Yu Kashima, and Katsuro Inoue (Osaka University, Japan)

A Formal Evaluation of DepDegree Based on Weyuker's Properties (ERA – 10 min)
Dirk Beyer and Peter Häring (University of Passau, Germany)

Hey! Are You Committing Tangled Changes? (ERA – 10 min)
Hiroyuki Kirinuki, Yoshiki Higo, Keisuke Hotta, and Shinji Kusumoto (Osaka University, Japan)

A Semiautomated Method for Classifying Program Analysis Rules into a Quality Model (Industry Short – 10 min)
Shrinath Gupta and Himanshu Kumar Singh (Siemens, India)

An Approach for Evaluating and Suggesting Method Names using N-gram Models (ERA – 10 min)
Takayuki Suzuki, Kazunori Sakamoto, Fuyuki Ishikawa, and Shinichi Honiden (University of Tokyo, Japan; National Institute of Informatics, Japan)

Cross-Language Bug Localization (ERA – 10 min)
Xin Xia, David Lo, Xingen Wang, Chenyi Zhang, and Xinyu Wang (Zhejiang University, China; Singapore Management University, Singapore)

Afternoon Break
Tue, Jun 3, 15:30 – 16:00

Session: Novel Development Tooling [Chair: Fabian Beck]
Tue, Jun 3, 16:00 – 17:30

Automatic Documentation Generation via Source Code Summarization of Method Context (Research – 15 min)
Paul W. McBurney and Collin McMillan (University of Notre Dame, USA)

Improving Topic Model Source Code Summarization (ERA – 10 min)
Paul W. McBurney, Cheng Liu, Collin McMillan, and Tim Weninger (University of Notre Dame, USA)

A Code Obfuscation Framework using Code Clones (Industry Short – 10 min)
Aniket Kulkarni and Ravindra Metta (Tata Consultancy Services, India)

JCSD: Visual Support for Understanding Code Control Structure (Tool – 10 min)
Ahmad Jbara and Dror G. Feitelson (Netanya Academic College, Israel; Hebrew University of Jerusalem, Israel)

Plagiarism Detection for Multithreaded Software Based on Thread-Aware Software Birthmarks (Research – 15 min)
Zhenzhou Tian, Qinghua Zheng, Ting Liu, Ming Fan, Xiaodong Zhang, and Zijiang Yang (Xi'an Jiaotong University, China; Western Michigan University, USA; Xi'an University of Technology, China)

Redacting Sensitive Information in Software Artifacts (Research – 15 min)
Mark Grechanik, Collin McMillan, Tathagata Dasgupta, Denys Poshyvanyk, and Malcom Gethers (University of Illinois at Chicago, USA; University of Notre Dame, USA; College of William and Mary, USA; University of Maryland in Baltimore County, USA)

Open Steering Committee Meeting with ICPC 2015 Presentation
Tue, Jun 3, 17:30 – 18:00

"Everything here breathes size, taste, humanity, purity, and beauty, in the highest degree"
Klemens von Metternich

The IEEE International Conference on Program Comprehension (ICPC) is the principal venue for works in the area of program comprehension, which encompasses both the human activity of comprehending software, as well as the processes and technologies for supporting it. ICPC 2015 promises to provide a quality forum for researchers and practitioners from academia, industry, and government to present and to discuss state-of-the-art results and best practices in the field of program comprehension.

Location

ICPC 2015 will be held in Florence, the capital city of the Italian region of Tuscany. Florence is considered the birthplace of the Renaissance, and has been called "the Athens of the Middle Ages". It was declared a World Heritage Site by UNESCO in 1982. Due to Florence's artistic and architectural heritage, it has been ranked by Forbes as one of the most beautiful cities in the world, and the city is noted for its culture, Renaissance art and architecture and monuments.

Special Issue

The best full research papers at ICPC 2015 will be invited to be revised and extended for consideration in a special issue of the Journal of Empirical Software Engineering (EMSE) by Springer.

Important dates

Submission Deadline: January 26th, 2015
Author Notification: March 09th, 2015
Camera Ready: March 30th, 2015

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Topics of Interest

ICPC 2015 solicits full papers, Early Research Achievements (ERA) papers, tool-demonstration papers and industrial-experience papers. Topics of interest include but are not limited to

1. Cognitive theories for program comprehension, including experiments and case studies
2. Individual, team, collaborative, distributed, and adversarial program comprehension
3. Comprehension of specific types of software systems, such as web-based systems, open source, mash-ups, legacy systems, product lines, and systems of systems
4. Comprehension in the context of diverse software process models and specific lifecycle activities, such as: maintenance, reengineering, migration, security, auditing, and testing
5. Novel interfaces to support program comprehension, including searching, browsing and visualization
6. Empirical evaluations of program comprehension tools, techniques, and approaches
7. Comprehension and legal issues, such as due diligence, intellectual property, reverse engineering, and litigation
8. Issues and case studies in the transfer of program comprehension technology to industry
9. Tool support for program comprehension

How to Submit

Submissions must not have been previously published or be currently under consideration for publication elsewhere. Full papers must not exceed 10 pages for the main text, inclusive of figures, tables, appendices, etc. References may be included on up to two additional pages. For the other tracks (ERA, Tool Demonstrations, Industrial Track) papers are limited to 4 pages. All accepted papers will be published in the IEEE Digital Library and get a presentation slot.

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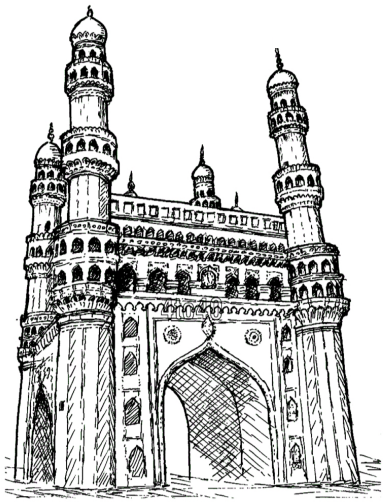

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