# Table of Contents

Message from the Chairs........................................................................................................... ix
Conference Committee............................................................................................................ x
Steering Committee ............................................................................................................... xi
Program Committee .............................................................................................................. xii
Additional Reviewers........................................................................................................... xiv

## Keynotes

Search Based Software Engineering for Program Comprehension ........................................ 3
   *Mark Harman, King's College London, United Kingdom*

Making the Code Look like the Design--Aspects and Other Recent Work .............................. 14
   *Gregor Kiczales, University of British Columbia, Canada*

## Technical Presentations

### Technical Session 1: Feature and Concept Analysis

Reducing Program Comprehension Effort in Evolving Software by Recognizing Feature Implementation Convergence ................................................................. 17
   *Jay Kothari, Trip Denton, Ali Shokoufandeh, and Spiros Mancoridis*

Recovering Concepts from Source Code with Automated Concept Identification .................. 27
   *Maurice M. Carey and Gerald C. Gannod*
Combining Formal Concept Analysis with Information Retrieval for Concept Location in Source Code ..........................................................37
  Denys Poshyvanyk and Andrian Marcus

**Technical Session 2: Dynamic Analysis**

Understanding Execution Traces Using Massive Sequence and Circular Bundle Views...................................................................................................................49
  Bas Cornelissen, Danny Holten, Andy Zaidman, Leon Moonen, Jarke J. van Wijk, and Arie van Deursen

Tracking Objects to Detect Feature Dependencies..........................................................59
  Adrian Lienhard, Orla Greevy, and Oscar Nierstrasz

WAD: A Feasibility Study Using the Wicked Audio Debugger ...........................................69
  Andreas Stefik, Roger Alexander, Robert Patterson, and Jonathan Brown

**Technical Session 3: Conceptual Models**

A Hybrid Program Model for Object-Oriented Reverse Engineering ...............................81
  Xinyi Dong and Michael W. Godfrey

From Reality to Programs and (Not Quite) Back Again....................................................91
  Daniel Ratiu and Florian Deissenboeck

**Technical Session 4: Empirical Studies**

A Comparative Study of Three Program Exploration Tools..............................................103
  Brian de Alwis, Gail C. Murphy, and Martin P. Robillard

Assessing the Comprehension of UML Class Diagrams via Eye Tracking ......................113
  Shehnaaz Yusuf, Huzefa Kagdi, and Jonathan I. Maletic

Empirical Evaluation of a UML Sequence Diagram with Adornments to Support Understanding of Thread Interactions .................................................123
  Shaohua Xie, Eileen Kraemer, and R. E. K. Stirewalt

**Technical Session 5: Mining Software Repositories**

Detecting Interaction Coupling from Task Interaction Histories ....................................135
  Lijie Zou, Michael W. Godfrey, and Ahmed E. Hassan

Mining Software Repositories for Traceability Links ....................................................145
  Huzefa Kagdi, Jonathan I. Maletic, and Bonita Sharif
Characterizing and Understanding Development Sessions ................................................................. 155
Romain Robbes and Michele Lanza

Technical Session 6: Aspects and Change

Evaluating Aspect Mining Techniques: A Case Study ................................................................. 167
Chanchal Kumar Roy, Mohammad Gias Uddin, Banani Roy, and Thomas R. Dean

Using Bayesian Belief Networks to Predict Change Propagation in Software Systems .................... 177
Siavash Mirarab, Alaa Hassouna, and Ladan Tahvildari

Technical Session 7: Static Analysis

A Non-conservative Approach to Software Pattern Detection .................................................. 189
Niklas Pettersson and Welf Löwe

Recovering Workflows from Multi Tiered E-Commerce Systems ................................................ 198
Maokeng Hung and Ying Zou

Error Report Driven Post-Mortem Analysis ............................................................................... 208
Yi Zhang and S. Purushothaman Iyer

Technical Session 8: Visualization

Interactive Views to Improve the Comprehension of UML Models – An Experimental Validation .... 221
Christian F. J. Lange and Michel R. V. Chaudron

Program Comprehension through Software Habitability .............................................................. 231
Richard Wettel and Michele Lanza

Scenario Explorer: Interactive Visualization of Use Cases ............................................................. 241
Rogardt Heldal, Jenny Samuelsson, and Ola Sundin

Short Papers Session

Metrics for Measuring the Effectiveness of Decompilers and Obfuscators .................................... 253
Nomair A. Naeem, Michael Batchelder, and Laurie Hendren

Constructing Usage Scenarios for API Redocumentation ............................................................ 259
Juanjuan Jiang, Johannes Koskinen, Anna Ruokonen, and Tarja Systä

Software Comprehension through Concern-Based Queries .......................................................... 265
Tommi Reinikainen, Imed Hammondsa, Juba Laibo, Kai Koskimies, and Tarja Systä
Enforcing Constraints between Documentary Comments and Source Code
C. Dylan Shearer and Michael L. Collard

Working Sessions

15 Years of Program Comprehension
Scott Tilley

Designing Your Next Empirical Study on Program Comprehension
Massimiliano Di Penta, R. E. K. Stirewalt, and Eileen Kraemer

Comprehending Aspect-Oriented Programs: Challenges and Open Issues
Giuseppe A. Di Lucca, Mike Smit, Bruce Fraser, Eleni Stroulia, and H. James Hoover

Tool Demonstrations

Lagrein: Visualizing User Requirements and Development Effort
Andrejs Jermakovics, Marco Scotto, Alberto Sillitti, and Giancarlo Succi

Use of a Genetic Algorithm to Identify Source Code Metrics Which Improves Cognitive Complexity Predictive Models
Rodrigo Vivanco

Author Index