

# Workshop on Program Comprehension through Dynamic Analysis (PCODA'07)

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## Abstract

*Software maintenance and evolution can be made easier if program comprehension techniques are used. Understanding a software system would typically necessitate a combination of static and dynamic analysis techniques. The aim of this workshop is to gather together researchers working in the area of program comprehension with an emphasis on dynamic analysis. We are interested in investigating how dynamic analysis techniques are used or can be used to enable better comprehension of a software system. The objective is to find common case studies, compare existing techniques, and find possible symbioses for existing solutions. Building upon the two previous editions of the workshop, we aim to set up a forum for exchanging experiences, discussing solutions, and exploring new ideas.*

## 1 Introduction

Without consistent or adequately complete documentation, maintainers are faced with the inevitable problem of understanding how the system is implemented prior to undertaking any maintenance task. Research into the discipline of program comprehension aims to reduce the impact of this problem.

Studies have shown that software engineers tend to spend up to 50% of their time trying to comprehend the structure of a software system [1]. This has led to the development of several program comprehension models and techniques such as those presented by Storey et al. [3].

PCODA focuses on program comprehension techniques that rely specifically on dynamic analysis. As such, this workshop builds on previous experiences from existing workshops and conferences such as IWPC/ICPC (International Workshop/Conference on Program Comprehension), which tends to focus on static analysis techniques leaving out dynamic analysis, and WODA (Workshop on Dynamic Analysis), which focuses on forward engineering rather than the challenges of reverse engineering.

The two previous editions of PCODA which were held in conjunction with the *Working Conference on Reverse Engineering* (WCRE) in Pittsburgh [2] and Benevento [4] respectively, showed that there certainly is an interest in the topic of program comprehension aided by dynamic analysis. In 2005 we received 13 high-quality paper submissions of which 11 were accepted, and for 2006 we had 11 high-quality submissions of which 8 were accepted. Additionally, we want to note that the format we used where one presenter summarizes a number of papers from the participants was very successful in enabling a good mix of presentations and discussion.

## 2 Topics

The main theme for this workshop is program comprehension through dynamic analysis. Topics of interest include, but are not restricted to:

- **Program comprehension models:**
  - Theories and models for software comprehension based on dynamic analysis
  - Program comprehension processes and strategies involving dynamic analysis techniques
  - Research methodologies
- **Techniques and tools:**
  - Applications of dynamic analysis techniques to program comprehension
  - Strengths and limitations of existing techniques
  - Trace analysis and exploration techniques
  - Techniques for reducing the large size of runtime information
  - Hybrid analyses that involve both static and dynamic analysis
  - Dynamic analysis tools with an emphasis on program comprehension
  - Comparisons between existing tools and approaches
  - Dynamic analysis in the context of distributed systems and webservices (or service oriented architectures)

- **Evaluation Techniques:**
  - Criteria for evaluating techniques
  - Experiments and case studies with a focus on program comprehension using dynamic analysis
  - Empirical effectiveness studies

### 3 Target audience

The workshop is intended for software engineering professionals from industry and academia with an interest in program comprehension and reverse engineering through dynamic analysis; either people who are actively engaged in reengineering projects, or people who develop or research methodologies and tools.

### 4 Goals

For each of the prospective participants we have a number of goals:

- Bring forward innovative techniques in the field
- Introduce comprehension strategies based on dynamic analysis that have proven themselves in the field
- Share results of case studies and experiments
- Find common case studies
- Compare various techniques
- Discuss how to perform empirical studies to validate your results
- Be part of a research network of reverse engineers working with dynamic analysis
- Establish collaborations
- Get feedback on your research ideas

### 5 Journal special issue

The *Journal of Software Maintenance and Evolution: Research and Practice (JSME)* published by Wiley has accepted to publish a special issue on the PCODA topic. The authors of the best papers from PCODA 2007 will be invited to submit an extended version for the special issue. This special issue is also open for non-PCODA2007 papers that are on topic. The special issue is scheduled for publication in September 2008. Deadline for submission is toward the end of December 2007.

## 6 Workshop format

### 6.1 Preparation

In order to make efficient use of the day, we want to pay special attention to the preparation of the workshop. We re-

quest from each participant to submit a (position) *paper* in advance. Participants are encouraged to read all accepted material, so that the workshop itself can be discussion-oriented instead of presentation-oriented.

### 6.2 Workshop structure

Each participant will briefly introduce himself/herself. After that, a quick summary of all papers will be given. This is done by grouping the papers according to topic. The summary is given by the “*topic leader*” who is preselected up front and specializes himself/herself in the papers.

The workshop will be **1/2 day, discussion-oriented**.

At the end of the workshop, each participant is asked whether his/her goals for the workshop were met and we also discuss possible improvements for future PCODA workshops.

## 7 Workshop proceedings

The workshop proceedings will be available to attendees of PCODA'07 and will also be available for download from the workshop website (<http://swerl.tudelft.nl/bin/view/Main/PCODA2007>).

## References

- [1] T. Corbi. Program understanding: Challenge for the 1990s. *IBM Systems Journal*, 28(2):294–306, 1989.
- [2] O. Greevy, A. Hamou-Lhadj, and A. Zaidman. Workshop on Program Comprehension through Dynamic Analysis (PCODA'05). In *Proceedings of the 12th Working Conference on Reverse Engineering (WCRE)*, page 232. IEEE Computer Society, 2005.
- [3] M.-A. D. Storey, K. Wong, and H. A. Müller. How do program understanding tools affect how programmers understand programs? In *Proceedings of the 4th Working Conference on Reverse Engineering (WCRE)*, pages 183–207. IEEE Computer Society, 1997.
- [4] A. Zaidman, O. Greevy, and A. Hamou-Lhadj. Workshop on program comprehension through dynamic analysis (PCODA'06). In *Proceedings of the 13th Working Conference on Reverse Engineering (WCRE)*, page 315. IEEE Computer Society, 2006.