

Beg, Borrow, or Steal: Using Multidisciplinary Approaches in Empirical Software Engineering Research

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ABSTRACT

The goal of this workshop is to provide an interactive forum for software engineers and empirical researchers to investigate the feasibility of applying proven methods from other research disciplines to software engineering research. Participants submitted position papers describing problems that might benefit from a multidisciplinary approach. Expert guest speakers from software engineering and other disciplines will address the issues highlighted in the papers with the goal of encouraging more multidisciplinary research.

Keywords

Software engineering, empirical methods, multidisciplinary research.

1 WORKSHOP GOALS

Theories and methods for empirical research have been developed by other disciplines over a long period of time. Just as it makes sense to re-use code within software engineering, it also makes sense to harness theories and methods from other fields to advance software engineering research.

For instance, imagine that you are an empirical researcher interested in the use of patterns. You approach an anthropologist to learn how to conduct a study. She might tell you about field studies and how ethnographies are conducted. She may suggest that you become a member of the local team, take copious notes, and over time, try to answer your questions by referring to cultural practices and the place of design patterns within them.

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Taking this further, you may speak to an experimental psychologist, to learn about the vast body of experimental knowledge, e.g., how to set up controls, how to analyze data, and write up your results. Armed with this knowledge, you can perform an experiment to compare code written using patterns with code that was not. Alternatively, you may consult an epidemiologist to learn how to take either historical data or population-based information to determine whether or not your hypotheses are valid. Here you might look at historical patterns of defect detection in software written with patterns and compare that to software written without patterns. All of these approaches have merit.

As with all borrowing, no approach from another field can be applied wholesale without being adapted in some way. Researchers need to understand the benefits and drawbacks of different approaches to identify a discipline best suited to their theoretical leanings and the constraints on their work. If this understanding is not gained, the application of methods and theories from other disciplines may result in critical errors that would invalidate the research. Therefore, it is critical that, as researchers, we understand different approaches before applying them. The goal of this workshop is to provide a forum for new and experienced software engineering researchers to consult with experts from other empirical disciplines.

2 WORKSHOP FORMAT

Interested participants were invited to submit position papers describing problems in their current research that could or already are benefiting from multidisciplinary research. These problems relate to some aspect of empirical software engineering, from research design to data analysis, from theory for understanding a phenomenon to difficulty obtaining access to a target population.

The problems and methods described in the position papers are being used to guide a selection of speakers, who will discuss how empirical methods from other disciplines can be applied within a software engineering context. Invited

speakers will be selected for their expertise in dealing with problems similar to those discussed in the position papers. Speakers may be drawn from the following disciplines:

- Psychology
- Sociology
- Anthropology
- Architecture
- Design research
- Statistics
- Medicine

However, in the true nature of multidisciplinary research, the speaker may have experience with more than one of these fields as well as software engineering.

During the morning the presentations will focus on summarizing the problems described in the position papers. Whereas in the afternoon the presentations will focus on selected solutions, i.e. methods that can be applied to solve some of the problems discussed earlier. The workshop will close with a panel and open discussion to summarize the topics discussed throughout the day. We hope that the workshop will provide a way forward for further multi-disciplinary research to ultimately benefit empirical research in software engineering.

3 PROGRAM COMMITTEE

- Steve Easterbrook, University of Toronto
- Rachel Harrison, University of Reading UK
- Juan Ramil, Imperial College UK
- Jarrett Rosenberg, Sun Microsystems
- Carolyn Seaman, University of Maryland, Baltimore County USA
- Harvey Siy, Lucent Technologies
- Norman Vinson, NRC, Canada

4 WORKSHOP REPORT

The workshop will be summarized in a report. This report may be found at: <http://www.csr.uvic.ca/icse2000>.

ACKNOWLEDGEMENTS

This workshop was inspired by a track at WESS99 (Workshop on Empirical Studies of Software Maintenance) in Oxford, UK. The theme of the workshop was "How to wade through the mire of evidence?" and the track focussed on "What can we learn from other empirically-based disciplines?" The track was chaired by Jarrett Rosenberg. Participants in the track were Juan Ramil, Carolyn Seaman, Martin Shepperd, Susan Elliott Sim, Janice Singer, Margaret-Anne Storey, and Nicholas Zvegintzov.

REFERENCES

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