

Panel Session:
**The Impact Project: Determining the Impact of
Software Engineering Research upon Practice**

Panelists: Leon J. Osterweil (Chair), University of Massachusetts, Amherst
Lori A. Clarke, University of Massachusetts, Amherst
Michael Evangelist, National Science Foundation
Jeffrey Kramer, Imperial College
Dieter Rombach, Universität Kaiserslautern
Alexander L. Wolf, University of Colorado at Boulder

1. Executive Summary

The purpose of this panel is to introduce the Impact Project to the community, and to engage the community in a broad ranging discussion of the project's goals, approaches, and methods. Some of the project's early findings and directions will be presented.

2. Background and Introduction to the Project

There seems to be considerable difference of opinion about the amount and nature of the impact that software engineering research has had upon software development practice. It is incontrovertible that a very great deal of software engineering research has been carried out over the past decades. There have been to date 22 International Conferences on Software Engineering (the last attracted nearly 350 submissions), there are two archival journals of software engineering research, the older of which is now 25 years old, and there are innumerable smaller conferences and workshops, and numerous lesser journals and magazines.

Equally incontrovertible is the enormous change in software engineering practice that has occurred over the past decades. Actual practice has evolved from one centered on batch runs of punch card programs of perhaps several thousand lines of code in languages such as Fortran and Cobol, to one centered on rapid composition of multimillion line concurrent, realtime systems composed out of ever larger, and better validated components, written in sophisticated languages.

There is an ongoing controversy over the question of how substantially software engineering research has affected this impressive progress in software development. This controversy rages in both the research and practitioner community, and puzzles both government agencies (many of which must make research funding decisions) and the public at large. While there is significant evidence that the impact has been substantial and formative, the prevailing perception seems to be quite the opposite. In any case, however, the absence of solidly researched, hard evidence about such impacts currently tends to place this controversy very much in the realm of conjecture and prejudice.

It seems timely and important to temper debates about impact with solidly researched findings. Such findings can then be used to help both the research and practitioner community to understand each other better. The findings should also clarify the essential foci and directions of both communities, hopefully leading to clearer understandings of how they can help each other better. Such understandings should be of considerable interest and value to funding agencies seeking to maximize the benefits of investment in software engineering research.

Of the most overriding importance, success in this research project should replace much of the heat of current discussions with the light of the sort of solid scholarly research that is most appropriate to a scientific community.

3. Impact Project Goals and Objectives

In view of all of this, the goal of the Impact project is to study the impact that software engineering research has had upon software development practice. The reasons for doing this include: identifying the sorts of contributions that have had substantial impact, determining the research modalities that have been relatively more successful, and anticipating the directions that software engineering research might most effectively pursue, based upon its history and positioning. Impact project research will be held to the highest standards of scrupulous scholarship. It is expected to be useful to the software engineering research and development communities, as well as to other academic disciplines, government funding agencies

and the public at large in helping with the objective assessment of the software engineering community's record of achievement.

The project is to be carried out as a special initiative of ACM Sigsoft. Funding support for the project is being sought from both the US National Science Foundation, and the European Union. The research work is to be coordinated by a steering committee, led by an Executive Committee. The work itself will have two organizational thrusts: 1) to seek, on a technology by technology basis, the source of the ideas, designs, and working prototypes of widely used software technologies, and 2) to examine the ways in which software engineering research directions and areas have been synergized into commonly used technologies.

The output of the project will be series of documents and briefings targeted to different audiences. At the base of the documentation will be a series of articulate, objective, and complete scholarly papers, each tracing the way in which software technology that is in common use has drawn upon software engineering research. Each of these papers is expected to be of journal quality and size, and is expected to eventually be published in a high quality journal. It is expected that each such paper will be the product of the joint efforts of a team of perhaps 6-10 experts on the particular area. It is anticipated that as many as 20 such papers will be produced, each studying the genesis of a different area of important contemporary software engineering practice. It is also expected that a compendium of the papers will be published as a separate volume, perhaps as part of the ICSE 2002 proceedings.

In addition to the aforementioned papers, another set of papers will be aimed at detecting crosscutting threads and issues. These papers are expected to document, again through careful scholarship, the way in which diverse software engineering research ideas and results have been woven together to produce widely used software engineering products and technologies. Among this group of papers will be some having the explicit goal of using this documented history as a firm basis for extrapolating trends, directions, and opportunities for future research and technology development.

Finally, different summaries and abstracts of these paper series will also be produced in order to reach diverse audiences through various existing publication venues. Briefing materials will also be developed based upon the materials in these reports.

It is important to note that this project is intended to be highly inclusive, involving the efforts of a very large number of members of the software engineering community, as well as those of others whose interests and expertise overlap with software engineering. In order to mitigate the risk entailed in such a large and broadly based undertaking, the project will initially entail the development of only a small number (perhaps 3-5) of reports, using experiences in producing those reports to guide the development of the final report series. Ultimately the project should entail the contributions of as many as 200 researchers. Thus, an important collateral effect of this project should be to increase the awareness and shared understanding of the true nature of software engineering research contributions to practice.

4. Structure and Approach of this Panel

This panel will present a well-rounded set of perspectives on the Impact Project. There will be presentations on the overall structure of the project, its goals and objectives, areas of foci, and funding support. Others will present the preliminary directions and findings that are to be pursued in some of the early reports to be produced by the project.