

Project Description

NSF Workshop on Software Research Strategies

Context and Motivation

In their interim report, the President's Information Technology Advisory Committee (PITAC) pointed out that Federal support for research in information technology is dangerously inadequate and recommended an increase of approximately one-billion dollars in IT research funding over the next five years. They single out software as the major area in need of support if the United States is to remain competitive in IT in the next century and argue that "increases in research on software should be given a high priority." (PITAC, p.4), and recommend that NSF assume a leadership role in basic IT research. (PITAC, p. 68)

In response, NSF convened an "NSF Workshop on a Software Research Program for the 21st Century", led by Prof. Victor Basili. The Workshop was held October 15-16, 1998; it included a broad mix of software technologists and practitioners. It recommended an overall goal of research toward building "no-surprise" software systems, and a balanced program of empirical research on the sources of software surprises; research in software and related domain sciences, product construction principles, engineering processes, and their integration. (Basili et al.).

Concurrently, NSF has been participating in the Federal Government Information Technology for the Twenty-First Century (IT²) research initiative. NSF's currently proposed IT² software research thrust emphasizes the no-surprise agenda, with additional emphasis on hardware/software co-design and building high-confidence systems (IT², p.22-23).

Via its participation in discussions of the software research program, the software engineering research community has become concerned with the considerable confusion about the nature of software engineering research and about expectations for its payoff. These range from advocacy of single "silver bullet" research solutions for the entire software problem to statements that software engineering research will never have a significant impact on software practice. A wide spectrum of software engineering researchers has indicated their willingness to participate in a workshop to help clear up such confusions, in order to provide a stronger foundation for NSF (and other) software research program planning and execution and to suggest additional strategy elements such as a set of candidate software engineering Grand Challenge problems.

Objectives

The first objective is to convene a one-and-a-half-day workshop of 20-25 software engineering researchers in Los Angeles, CA, during the period August 24-25, 1999, to address some key software research strategy issues such as:

- *What is realistic to expect from software engineering research?
- *What is realistic to expect from software practice without significant software engineering research?
- * What evidence is there that investments in software engineering research can have significant payoffs?
- *What are critical success factors for a successful software engineering program?
- *What are candidate software engineering "Grand Challenge" problems that could stimulate new research ideas and high-payoff solution approaches?

The output of the Workshop would be an Executive Summary and an annotated set of briefing charts. The goal is to produce a "no minority report" consensus of leaders in the field.

The second objective is to present and discuss the results of the workshop at an open-forum session at NSF, tentatively scheduled for September 27, 1999.

Plan and Schedule

The plan involves the participation of a core Program Committee of 9 members to initialize the set of issues to be addressed and the approach for addressing them. Following the Workshop, the Program Committee members will also participate in the September 27 briefing and discussion at NSF. The schedule includes the following major milestones:

- July 21: Finalize Workshop dates and PC members. Send PC member invitations, with plan and starter set of issues.
- July 26: PC members provide suggestions for the plan and set of issues, and for further participants.
- July 29: Send invitations to other selected participants, with revised plan and set of issues.
- July 29-
August 17: Participants and other interested parties comment on issues via email, and suggest positions on issues with rationale and pointers to evidence.
- August 17: Summarize status of issues and positions to date.
- August 24-25: Hold Workshop (see agenda below). Draft Executive Summary and NSF briefing.
- September 10: Finalize and circulate Executive Summary and briefing.
- September 27: Briefing and discussion at NSF.

Workshop Agenda

Day 1

- 7:30-8:15 a.m. Continental Breakfast
- 8:15-8:30 a.m. NSF Overview
- 8:30 -9:15a.m. Workshop Issue and Agenda Summary
- 9:15-10:00 am Broader Agenda: Galvanizing the Software Engineering Research Community
- 10:00-10:30 a.m. Break
- 10:30-12:00 Round Table discussion of Workshop issues.
- 12:00-1:00 p.m. Lunch
- 1:00-5:00 p.m. Prioritization and discussion of issues. Preparation of draft briefing charts
- 6:00-9:00 p.m. Group dinner
- 9:00- Preparation of draft briefing

Day 2

- 7:30-8:00 a.m. Continental Breakfast
- 8:00-9:15 a.m. Presentation of draft briefing and Executive Summary
- 9:15-9:30 am Break

9:30-10:45 a.m. Discussion and iteration of draft briefing and Executive Summary
10:45-11:30 am Sustaining the broader software engineering vision and agenda

Invited Participants:

The Program Committee members are:

Prof. Victor Basili, U. of Maryland
Prof. Barry Boehm, USC (chair)
Prof. Susan Graham, UC Berkeley
Prof. Nancy Leveson, MIT
Prof. Lee Osterweil, U. Mass
Dr. Dewayne Perry, Bell Labs/Lucent
Prof. William Scherlis, Carnegie Mellon U.
Prof. Richard Taylor, UC Irvine
Dr. William Wulf, NAE

The remaining Workshop invitees will be U.S. software-engineering researchers, selected based on suggestions from the Program Committee and consultation with NSF. The primary selection criteria will be strength of research contributions, and balance with respect to technical area, type of organization, age, gender, and related factors.

Budget Justification

Travel and lodging is estimated at \$1,000 per participant and activity (25 participants for the workshop; 10 for the NSF briefing discussion). Room rental and working breakfast and lunches at the USC Faculty Center is expected to be about \$3,000. There will be a group dinner on the first evening.

Facilities

We will use the USC Faculty Center, where we have held several similar workshops.

References

(PITAC). President's Information Technology Advisory Committee, "Information Technology Research: Investing in our Future," (B. Joy and K. Kennedy, co-chairs), February, 1999,
<http://www.ccic.gov/ac/report/>

(Basili et al.). V. Basili et al., "Final Report: NSF Workshop on a Software Research Program for the 21st Century," ACM Software Engineering Notes, May, 1999, pp.37-45

(IT²). National Coordination Office for Computing Information, and Communications, "Information Technology for the Twenty-First Century (IT²), June, 1999,
<http://www.ccic.gov/it2-ip/fundamental.html>