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# Invited Engineering Community SIG: The Role of Engineering Work in CHI

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**Abstract**

The Engineering Community faces a number of serious challenges around its role in the larger CHI community and its contribution to SIGCHI-sponsored conferences. This SIG is its forum to report progress on key issues for 2012, identify objectives for 2013, and develop plans to address them.

**Keywords**

Engineering; HCI; Methods; Tools; Invited

**ACM Classification Keywords**

H.5.2 [Information Interfaces and Presentation]: User Interfaces

**General Terms**

Human Factors, Design

**Introduction**

As the field of human-computer interaction (HCI) matures, engineering approaches become more important. Engineering emphasizes the application of scientific knowledge and structured and rigorous design methodology to predictably and reliably improve the consistency, economy and safety of practical problem solutions. In HCI, engineering approaches are broad,

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but have some major areas of development and application:

- (1) Structured and rigorous methodologies for interactive system design and evaluation that will enable more consistent and reliable development of new interactive systems;
- (2) Methods, languages and tools that embody scientific knowledge to improve interactive systems;
- (3) New software and hardware technologies that enable effective solutions to design problems;
- (4) Studying the performance and behavior of existing interactive systems;
- (5) Being able to deal efficiently with trade-off between system properties such as reliability, usability, safety, security, ...

These areas share the engineering values of rigor, appropriate quantification, and a concern for practical effectiveness. The Engineering Community emphasizes applications of HCI solutions in systems in such a way to reliably improve safety to life and property, or to improve the economics of operations. One aspect of more economical operations is the growing demand to produce software in a manner that is more methodical, predictable and economical.

An example is given by model-based approaches for supporting design or evaluation, which aim to help designers and developers by highlighting the key aspects of interest. This work started in research contexts and is currently considered for new standards (<http://www.w3.org/2011/01/mbui-wg-charter>).

Engineering Interactive Systems requires different methods, techniques and tools depending on the type

of targeted systems and more precisely the socio-technical environment in which they will be deployed. For instance engineering mass-market products such as games nowadays requires that engineers have strong network management skills and also knowledge about how the graphic display and input management can be optimized. In case of occurrence of faults at execution time, the usual answer from engineers is to produce a new version of the faulty functions (called patches) that requires that engineers have the capability of performing quick evolution of their software and ensuring that these updates do not compromise the non-modified functions.

In contrast, engineering safety critical interactive systems calls for methods and tools that provide a certain level of assurance that faults will not occur at execution time or (at least that they will not occur more than expected). The expectation level for faults is defined by standards that, for instance, require that faults for a critical component will have a probability of occurrence lower than  $10^{-9}$  per hour of operation. These two examples show the wide variety of systems CHI engineering community can consider, and also the large set of competences that are required to successfully engineer interactive computing systems.

#### **WHO ARE WE?**

The community of professionals who share an interest in advancing engineering in CHI is broad. We invite you to come to this SIG if you are:

- A researcher, who investigates how methods and tools that are based on the principles of science can produce usable interactive applications in a way that is more reliable and economical;

- A researcher, whose work includes investigations of advanced technology applications;
- A software engineer, developer, designer, architect, or manager, who is actively engaged in building interactive software;
- A software engineer who works on tools and systems for building interactive applications, including tools for software engineering processes.
- An educator, who prepares students for careers in the multidisciplinary field of applied HCI.

The methodical approach of engineering work lends itself well to interchanges between those of you who work on engineering applications and those who work in engineering research or education. If you see your work as relevant to our Engineering Community, you are invited join us to share your experience and ideas, learn from others, and participate in this important topic.

### **The Plan for this SIG Meeting**

This SIG is the meeting of the Engineering Community to identify key issues and begin developing positions for SIGCHI and conference leaders to address them. The issues are important to the health and success of our field. The agenda will be divided into two main sections.

#### **HOW HAVE WE ARRIVED HERE?**

In the first part of the SIG we will summarize the issues and objectives the Engineering Community chose to work on for 2012, and report our progress on them. They included:

- Recruiting highly qualified reviewers
- Defining criteria for a strong engineering contribution to papers
- Stimulate contributions and acceptance from the engineering community
- Holding a workshop in conjunction with the IFIP User Interface Engineering Working Group
- Supporting the program selection team's process to tag engineering work for an engineering track in the CHI 2012 program

#### **WHERE SHOULD WE GO NEXT?**

While the community's progress is encouraging there is much still to do. In the second part of the SIG meeting we will conduct an open, structured forum to help identify key issues for 2013, including but not limited to:

- What evaluation criteria are suitable for Engineering papers?
- Is it true that an Engineering contribution requires much more work than other types of contributions in order to be accepted at CHI? If so, why is this the case? Is there room for improvement of this situation?
- How much of the gap can Case Studies fill?
- Did CHI 2012 have more or less content than previous editions of CHI that was relevant to attendees with engineering interests?
- What should the relationship be between the CHI conference and specialized conferences such as EICS, UIST and IUI?
- How can the Engineering Community be more effective in promoting technology transition from research to practice?
- How can the discipline of HCI work better with software engineering, the project context where our field will most be beneficial?

- Are there unmet educational needs for CHI professionals to succeed in multidisciplinary engineering projects?
- Can we plan an Engineering session for CHI 2013 with the best EICS, UIST, and IUI papers?
- What can be done to continue engineering community interactions outside of and between conferences?

#### **THE DISCUSSION AT THE SIG**

The SIG is organized by five people with long experience in the area of Engineering HCI: Ruven Brooks and Fabio Paternò are Engineering co-chair for CHI 2012, Nick Graham is the chair of the steering committee of the EICS conference, Jeffrey Nichols is an active member of the UIST community and will be Program Co-Chair of IUI 2013, and Philippe Palanque has long been working in interactive safety critical systems. At the beginning of the SIG each of them will present in five minutes their views on the engineering community and how to strengthen its role, addressing the issues described before. Then, we will open the discussion with all the SIG participants. We will also consider the possibility of splitting them into small groups focusing on specific, selected sub-topics.