CALL FOR PAPERS
Third International Workshop on Software Engineering for Computational Science and Engineering
May 28, 2011
Co-located with the 2011 International Conference on Software Engineering – Honolulu
http://www.cs.ua.edu/~SECSE11

NOTE: The best papers from the workshop will be invited to submit extended versions for a special issue of *Computing in Science and Engineering*.

This workshop is concerned with the development of Computational Science and Engineering (CSE) software. Specifically:

- Scientific software applications, where the focus is on directly solving scientific problems. These applications include, but are not limited to, large parallel models/simulations of the physical world (high performance computing systems).
- Applications that support scientific endeavors. Such applications include, but are not limited to, systems for managing and/or manipulating large amounts of data.

Despite its importance, CSE has historically attracted little attention from the Software Engineering (SE) community. Indeed, the development of CSE software differs significantly from the development of business information systems, from which many of the SE best practices, tools and techniques have been drawn. These differences include, for example:

- CS&E projects are often exploring unknown science, making it difficult to determine a concrete set of requirements *a priori*.
- For the same reason, a test oracle may not exist (for example, the physical data needed to validate a simulation may not exist). The lack of an oracle clearly poses challenges to the development of a testing strategy.
- The software development process for CS&E application development may differ profoundly from traditional software engineering processes. For example, one scientific computing workflow, dubbed the "lone researcher", involves a single scientist developing a system to test a hypothesis. Once the system runs correctly and returns its results, the scientist has no further need of the system. This approach contrasts with more typical software engineering lifecycle models, in which the useful life of the software is expected to begin, not end, after the first correct execution.
- CS&E applications often require more computing resources than are available on a typical workstation. Existing solutions for providing more computational resources (e.g., clusters, supercomputers, grids) can be difficult to use, resulting in additional software engineering challenges.
- CS&E developers may have no formal knowledge of software engineering tools and techniques, and may be developing software in a very isolated fashion. For example, it is common for a single scientist in a lab to take on the (formal or informal) role of software developer and to have to rely solely on web resources to acquire the relevant development knowledge.

Therefore, in order to identify and develop appropriate methods, tools and techniques for CSE software, members of the SE community must interact with members of the CSE community. There is an increasing amount of attention being given to this effort. Recent endeavors to bring the software engineering and CS&E communities together include two special issues of *IEEE Software* (July/August 2008 and January/February 2009), a special issue of *IEEE Computing in Science and Engineering* (November 2009) and this current SECSE workshop series. The 2008 workshop (http://www.ua.edu/~SECSE08), the 2009 workshop (http://www.cs.ua.edu/~SECSE09), and the 2010 workshop (http://www.cs.ua.edu/~SECSE10) brought together computational scientists, software engineering researchers and software developers to explore issues such as:

- Those characteristics of CSE which distinguish it from general business software

development;
- The different contexts in which CSE developments take place;
- The quality goals of CSE;
- How the perceived chasm between the CSE and software engineering communities might be bridged.

This 2011 workshop will build on the results of the previous workshops.

Similar to the format of the previous workshops, in addition to presentation and discussion of the accepted papers, significant time during the 2011 workshop will be devoted to the continuation of discussions from previous workshops and to general open discussion.

Submission Instructions

We encourage submission of papers from members of the SE and the CSE communities. Papers of at most ten pages are solicited to address issues including but not limited to:
- Case studies of software development processes used in CSE applications.
- Measures of software development productivity appropriate to CSE applications.
- Lessons learned from the development of CSE applications.
- Software engineering metrics and tool support for CSE applications.
- The use of empirical studies to better understand the environment, tools, languages, and processes used in CSE application development and how they might be improved.
- V&V techniques specifically targeted for the CSE domain.

In order to increase participation, we will also accept shorter (~3-4 page) position papers. These papers will not be included in the proceedings, but will be made available to workshop participants prior to the workshop. Position papers should focus on similar topics as the full papers. For a position paper, please include POSITION PAPER in the title.

The organizing committee hopes for participation from a broad range of stakeholders from across the software engineering, computational science/engineering, and grid computing communities. We especially encourage members of the CSE application community to submit practical experience papers. Papers on related topics are also welcome. Please contact the organizers with any questions about the relevance of particular topics.

Please observe the following:
1. Papers should be at most 10 pages.
2. Format your paper according to the ICSE 2011 guidelines (http://2011.icse-conferences.org/content/submission-guidelines)
3. Submit your paper in PDF format through the ICSE workshop submission site (http://cyberchairpro.borbala.net/secsepapers/submit/)
4. Deadline for submission: January 28, 2011
5. Submission notification: February 22, 2011

For more information, please contact Jeffrey Carver (carver@cs.ua.edu).

Organizing Committee:
Jeffrey Carver, University of Alabama, USA (chair of the organizing committee)
Roscoe Bartlett, Sandia National Laboratories, USA
Ian Gorton, Pacific Northwest National Laboratory, USA
Lorin Hochstein, USC-ISI, USA
Diane Kelly, Royal Military College of Canada
Judith Segal, The Open University, UK