CALL FOR PAPERS
First International Workshop on Software Engineering for Computational Science and Engineering
Tuesday, May 13, 2008
Co-located with ICSE 2008 - Leipzig, Germany
http://www.cse.msstate.edu/~SECSE08

Overview
An important type of software that has received little attention from software engineering researchers is software developed for computational science and engineering (CS&E) applications. This software is vital for the study of many important topics from diverse application domains. A list of the top 500 supercomputers, for which many, but not all, CS&E applications are written, provides an example of the diversity of government, scientific, and commercial organizations that use CS&E and highlights its growing prevalence and impact on modern society. As an example of the importance and diversity of the types of problems addressed through CS&E, a recent article in the Computing Research News listed topics being addressed with CS&E at Los Alamos National Laboratory, including designing and maintaining nuclear weapons, simulation of the public infrastructure, climate change, HIV vaccines, defense against radiological attacks, and astrophysics. In addition to these topics, other institutions are using CS&E to study problems related to crash simulation, satellite data processing, bioinformatics, and financial modeling. In addition, there are plenty of more modest CS&E applications written in research establishments worldwide. Because many of these domains are complex and involve advanced scientific or engineering concepts, much of the CS&E software is written by domain experts rather than by software engineers. This proposal uses research and education to address the lack of emphasis the software engineering community has placed on the development of CS&E software.

Furthermore, the design, implementation, development, and maintenance of CS&E applications can differ in significant ways from the systems and development processes more typically studied by the software engineering community:

- The requirements often include conformance to sophisticated mathematical models. Therefore, the requirements may take the form of an executable model in a system such as Matlab, with the implementation involving porting to proper platform.
- Often these projects are exploring unknown science making it difficult to determine a concrete set of requirements a prioiri.
- The software development process or "workflow" 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 once 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.

- "Usability" in the context of CS&E application development may revolve around optimization to the machine architecture so that computations complete in a reasonable amount of time. The effort and resources involved in such optimization may exceed initial development of the algorithm.

Submission Instructions

We encourage submission of position papers or statements of interest from members of the software engineering or computational science and engineering communities. Please note that CS&E applications are not always written for supercomputer implementation; we are equally interested in the context where software is developed on other hardware platforms. Position papers of at most eight pages are solicited to address issues including but not limited to:

- Case studies of software development processes (workflows) used in CS&E applications.
- Measures of software development productivity appropriate to CS&E applications.
- Activity and Purpose-based benchmarks for evaluating existing or proposed CS&E architectures
- Software engineering metrics and tool support for CS&E applications.
- The design of empirical studies to better understand the environment, tools, languages, and processes used in CS&E application development and how they might be improved.

The organizing committee hopes for participation from a broad range of stakeholders from across the software engineering, computational science/engineering, and grid computing communities. Accepted position papers will be posted on the workshop website (http://www.cse.msstate.edu/~SECSE08).

Please observe the following:
1. Position papers should be at most 8 pages.
2. Format your paper according to the ICSE 2008 technical paper guidelines at http://icse08.upb.de//calls/fsguidelines.html
3. Submit your paper in PDF format to SECSE08@cse.msstate.edu
4. Deadline for submission: February 24, 2008.
5. Submission notification: March 21, 2008.

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