

OPENFRESKO ADVANCED USER AND DEVELOPER WORKSHOP

Friday, Aug. 21, 2009

UC Berkeley, Richmond Field Station, Room 19 in Building 451

The Open-source Framework for Experimental Setup and Control (OpenFresco) is an environment-independent software framework, based on modern object-oriented software design and programming methodologies, which connects finite element models with control and DAQ systems in an extensible manner to facilitate conducting hybrid experiments. The topics covered in the [OpenFresco Advanced User & Developer Workshop](#) are of great interest to intermediate and advanced hybrid simulation researchers interested in capitalizing on the capabilities of OpenFresco to conduct complex tests, and for developers interested in extending OpenFresco's capabilities or pairing OpenFresco to new FE-software applications and laboratory control and DAQ equipment. The topics to be addressed are:

- *How do I install OpenFresco on my personal computer or at my site and link it to my site's equipment and software?* You will be shown how to take advantage of the available self-installer for standard installations, as well as how to install and update the source code when you modify, extend or develop new OpenFresco capabilities.
- *What is new and improved in the latest OpenFresco 2.6 release?*
- *How do I use OpenFresco to replace an analytical portion of my structural model with an experimental one, connect it to my laboratory and run a hybrid simulation?* An example application will demonstrate how to modify an existing numerical model and combine it with OpenFresco to perform a hybrid simulation.
- *What do each of the OpenFresco objects do and what are the requirements for changing them so they all still work together?* Detailed discussions will prepare you to work with and modify the various OpenFresco commands important for conducting a hybrid simulation, such as expElement, expSite, expSetup, and expControl.
- *I know OpenFresco already works with Abaqus, LS-Dyna, Matlab, OpenSees, and SimCor, but users want to use other computer programs. One of my faculty members wants to use her finite element software to carry out a hybrid test. How do they do this?* Discussions regarding the OpenFresco GenericClient element will allow you to conduct hybrid simulations using most computer software that permits the addition of user-defined elements or provides a API.
- *Our lab uses specialized control equipment, and it may not work with OpenFresco. One of my investigators wants to implement a new form of hybrid testing. Is there something I can do to make these specialized connections?* OpenFresco already works with a wide variety of control and DAQ hardware. However, specialized linkages to equipment can be easily be implemented by modifying the expControl object. These will be discussed and demonstrated.
- *Some of our staff and users are experts and want to develop their own applications, incorporating special software features not currently available. They want to use the OpenFresco middleware as the foundation for their new applications. How can they do this?* The experimental object interfaces will be described so that OpenFresco can be easily extended.
- *How do I use OpenFresco to perform coupled analyses with multiple FE-Software codes?* The adapter element approach to coupled simulation will be discussed and demonstrated.
- *How secure is OpenFresco when executing geographically distributed hybrid simulations?*
- *Do I have to use Windows to run OpenFresco or can I run it under other operating systems?*
- *Can I try this out?* Participants will undertake a hands-on exercise to give them practice in using OpenFresco.
- *What's in the works?* The workshop provides an opportunity for you to see what's currently on the drawing board, and make suggestions for future capabilities.

Tentative Schedule

8:00 – 8:30 am	Breakfast	
8:30 – 8:45 am	Welcome and Goals of the Workshop	S. Mahin
8:45 – 10:00 am	Installing OpenFresco	H. Kim
10:00 – 10:15 am	Coffee Break	
10:15 – 11:30 am	OpenFresco Software Architecture and Tcl-Commands	A. Schellenberg V. Terzic
11:30 – 12:30 pm	Hands-on Exercise in Developing and Running a Hybrid Simulation	C. Whyte
12:30 – 1:15 pm	Lunch	
1:15 – 2:15 pm	Extending OpenFresco: Experimental Class APIs	A. Schellenberg H. Kim
2:15 – 3:15 pm	Interfacing with other FE-Software: Generic Client Element and Adapter Element	H. Kim A. Schellenberg
3:15 – 3:30 pm	Coffee Break	
3:30 – 4:30 pm	Experiences and Requirements by OpenFresco Users	V. Terzic A. Schellenberg
4:30 – 5:15 pm	Discussion Session: Future Directions and Capabilities	S. Mahin
5:15 – 5:30 pm	Closing Remarks	S. Mahin

Suggested Hardware and Software to Bring to the Workshop:

Windows: Windows XP (or later) with Microsoft Visual C++ 2008

Mac: Mac 10.5.x (Leopard) with OS X Developer Tools

Instructor Information:

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