

Student Exchange Program

University of Technology Sydney, School of Computer Science & Engineering

Diploma Theses Proposals 2010 Semester 2

Virtual 3D Worlds for Science and Engineering Education

Collaborative learning activities apply different approaches in-class or out-of-class, which embrace classroom discussions, group-based assignments and experiential-based activities; such activities can involve students more actively as well as stimulate social and interpersonal skills. Information and communication technology can support collaboration, however, a great number of pre-existing technologies and implementations have limitations in terms of the interpersonal communication perspective, limited shared activity awareness, and a lack of a sense of co-location. *Virtual 3D Worlds (V3DW)* offer an opportunity to either mitigate or even overcome these issues in a great variety of learning settings and applications domains.

The application of V3DW in *science and engineering education* not only benefits from multimodal communication channels as well as improved awareness of and interaction with members of the learning group and object of the learning environment, but also provides a powerful platform for laboratory settings to integrate remote experiments and simulations in a immersive collaborative learning environment. An important element of education in these discipline areas is understanding the role, usage, and limitations of models. A V3DW platform supports these learning areas by enabling direct comparisons of the behaviours of model simulations and real world remotely accessed experiments. A key element of this is making visible (through a simulation) “unseen” phenomena that explains real system behaviours, as well as providing different viewpoint including micro and macro world aspects that can be experienced.

In this research project a prototype based on the virtual 3D world Project Wonderland should be developed. The prototype will utilize an existing remote laboratory available through the LabShare project (see the list of current lab hardware rigs at <http://www.labshare.edu.au>) and integrate this with a suitable lab simulation within the wonderland environment. Whilst the specific experiment to be considered is open to negotiation, a typical example might be the physical loaded beam experiment, and overlaying onto this the stresses and strains that are predicted by a simulation model. Another alternative may be overlaying graphed results of vibrations predicted by simulations, and measured from physical equipment, with the Shake Table.

Further information:

<http://www.iicm.tugraz.at/home/cguetl/projects/ForceOnDipoleP1>

http://www.labshare.edu.au/index.php?option=com_content&id=83&Itemid=88

Supervisor UTS: David Lowe

Supervisor TUG: Christian Gütl

Procedure for Pre-selection (must be written in English)

1. Prepare a Short CV
including interests, programming and software design skills, practical work experiences, language skills and other relevant information
2. Progress Report (Overview) of the study program and average performance level
3. Short Application Letter (1 page)
stating motivation/reasons why to apply for the Thesis position and outlining interest in the topics of the theses proposals

Procedure for Scholarship

1. Letter of Acceptance from supervisor of Hosting University (result of preselection)
2. Application for Scholarship at Graz University of Technology

Time Schedule

- March 20th, 2010 Application as PDF File via email to cguetl@iicm.edu
- March 22th, 2010 Preliminary decision by supervisors and letter of agreement for supervision by School of Computing and Communications, University of Technology Sydney
- March 31st, 2010 Application for scholarship
Karin Leber, Office of International Relations, Graz University of Technology
- Master Thesis at Hosting University (UTS)
from July 2010 until December 2010

Further Information:

Local Contact:

Christian Gütl, cguetl@iicm.edu

Information about scholarship:

Karin Leber, karin.leber@tugraz.at

http://portal.tugraz.at/portal/page/portal/Internationale_Beziehungen/Outgoings/KUWI

Information about University of Technology Sydney, NSW, Australia

<http://www.uts.edu.au/>