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### **Subject: Short Term Student Positions**

Some short-term software development positions suitable for students of computer science, technical mathematics, or related topics are available at the Research Institute for Symbolic Computation (RISC) of the Johannes Kepler University, Linz, Austria. The positions are available within the frame of the EU project SCIEnce (Symbolic Computation Infrastructure for Europe) in the period July to December 2011. Work can be pursued part-time; the basic topics are described in the attachment but they can be also adapted to the concrete background of the participant.

Informal applications with a short description of the applicant's background and basic interest in the topics can be sent per email to <Wolfgang.Schreiner@risc.jku.at>.

Wolfgang Schreiner  
Hagenberg, June 2011

**Short Term Student Positions (July – December 2011)**

The RISC institute of the Johannes Kepler University offers software development positions for students in the frame of the EU project SCIENCE (Symbolic Computation Infrastructure for Europe). The goal of the project is to improve integration between developers and application experts in Symbolic Computation software systems.

**Topic: Service Wrapper**

Duration: 2 months

In the frame of the SCIENCE project the software package SymGrid-Services was developed. SymGrid-Services provides a set of WSRF-compliant interfaces from computer algebra systems to both Grid and Web services; it also allows a straightforward encapsulation of applications implemented in a computer algebra system as Grid/Web service components. The applicant will work with the SymGrid-Services software package and with the computational software Mathematica. The main task will be to demonstrate how to use SymGrid-Service and Mathematica together. In more precisely, the applicant must port and deploy a real life Mathematica application developed at RISC as a Web/Grid service with the software tools of the SymGrid-Services software package. Furthermore the applicant must demonstrate how the deployed Mathematica Web/Grid service can be accessed and invoked from other Mathematica kernels via the WSRF interface provided by SymGrid-Services.

**Topic: Bridge Server**

Duration: 2 months

In the frame of the SCIENCE project the Symbolic Computation Software Composability Protocol (SCSCP) which is a remote method invocation protocol was developed. By SCSCP, different kind of computer algebra systems are able to interact each other (some of them may offer services and others may employ them). A Java library called org.symcomp.scscp was also developed for treating SCSCP messages in Java programs. At RISC an interface was developed for SCSCP in Mathematica. This interface is able to provide some computational server functionality and to formalize computational client tasks based on SCSCP. The applicant extends and improves the functionality of this interface by a "bridge server" which can be placed between the SCSCP-Mathematica servers and the SCSCPMathematica clients. The bridge distributes requests received from clients among the serves by the employment of a simple load balancing mechanism. Additionally, some fault tolerance mechanism and or some more OpenMath content dictionaries for the SCSCP-Mathematica interface may be developed.

**Preferred Competences:**

- Basics of Grid Technologies (Globus 4 Toolkit Web Service Resource Framework WSRF).
- Basics of Wolfram Mathematica.
- Topic "Bridge Server": deep knowledge on object oriented programming in Java.

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