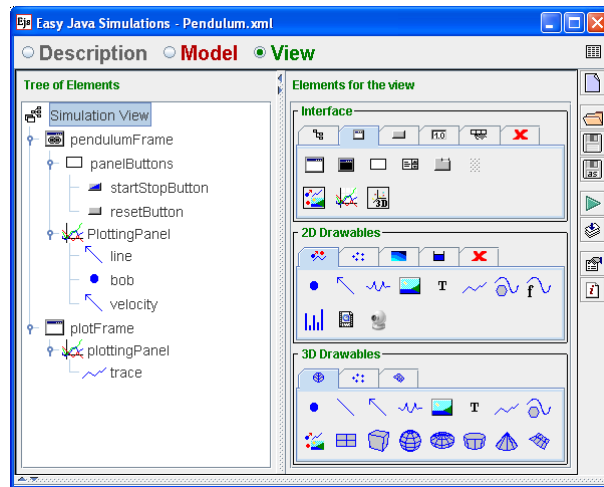


# Computational Modeling with Open Source Physics and Easy Java Simulations



**NITheP Computational Physics Workshop**  
**University of Pretoria, South Africa**  
**July 4-6, 2011**

**Leaders:** Wolfgang Christian (Davidson College, North Carolina, USA and Francisco Esquembre (University of Murcia, Spain)

**Local Organising Committee:** Nithaya Chetty (Chair), Trisha Salagaram, Walter Meyer, Quintin Odendaal and Ilsa Basson

This workshop provides a hands-on introduction to Open Source Physics (OSP) and Easy Java Simulations (EJS) to model physical systems. It combines short expositions with practical sessions where participants will work in teams on computers provided by the organizers. There will be morning and afternoon sessions with a break for lunch. Participants will study and explore, step by step, important computational examples, such as the gravitational N-body and the Ising models, to learn how they have been implemented, and then modify these examples to add new capabilities. Assistance will be provided during the sessions.

The goal of the Open Source Physics (OSP) project is to make a large number of simulations together with source code available for education using the GNU GPL open-source model. OSP provides both high-level modeling tools and a lower-level computational physics library to create computer simulations through the use of a consistent object-oriented framework. The Java-based OSP library defines objects to build interactive user interfaces, draw 2D and 3D objects, numerically solve ordinary differential equations using different algorithms, and represent data using tables and graphs.

Although the OSP library allows scientists and engineers who are familiar with Java to create programs, the implementation of a computational modelling-based pedagogy requires a Java programming effort for teachers and students. The Easy Java Simulations (EJS) modelling and

authoring tool minimizes this effort while teaching good computational techniques. EJS is a free open-source program developed to create dynamic simulations using the underlying OSP library. EJS was originally created for interactive learning under the supervision of educators but is well suited for use by researchers to prototype applications and by authors to develop and distribute Java-based curricular materials. While some programming knowledge is assumed, EJS users are encouraged to focus on modelling rather than on programming.

This workshop will benefit anyone teaching computer-based modeling as well as computational physicists wishing to adopt OSP and EJS for their own teaching and research. During the workshop we will discuss the general pedagogical and technical issues in the design of interactive computer-based tutorials as well as how existing models can be adapted to your local situation. All workshop material will be made available through the Open Source Physics Collection on the ComPADRE National Science Digital Library <http://www.compadre.org/OSP/>.

### **IMPORTANT**

The maximum number of participants is restricted to 25. Those wishing to attend should write to [Nithaya.Chetty@up.ac.za](mailto:Nithaya.Chetty@up.ac.za) before 30 April 2011 with a brief motivation for wanting to attend the workshop. Participation is free. Those applying early will be given priority. You will be notified by email whether you have been selected to attend. Morning and afternoon tea and refreshments will be provided for free, but participants are responsible for their own lunches. There are ample eating facilities on the university campus and in the Hatfield town centre. Participants are requested to arrange their own transport and accommodation in Pretoria. There are many B&D places close to the University of Pretoria campus. The workshop programme and venue details will be sent to all confirmed participants.