



COURSE ON **3D Game Programming**

Prof. Mark Minas - Universität der Bundeswehr München, Munich, Germany

In this course, students learn the core concepts of 3d game programming based on a game engine. The focus lies on a well-structured, pattern-based software development approach which is demonstrated using a simple and extensible 3d game based on Java and the game engine *jMonkeyEngine*. The course starts with a lecture part introducing the core elements of a 3d game and demonstrates good software development practice using the architecture, design, and game programming patterns, in particular:

- Model-view-controller pattern
- State pattern
- Update Method
- Visitor pattern
- Game Loop

These concepts are illustrated by a simple, extensible 3d game that makes heavy use of the model-view-controller pattern where the model is updated during the game loop, the view is based on a scene graph, and the controller connects the model and the view. The second part of the course consists of a small hands-on project where participants are taught how to add an additional non-player character to the existing game. The link to the code is provided below.

Time Schedule: Monday, May 8: 4-6 pm, Room F5
Tuesday, May 9: 2-4 pm, Room F5
Wednesday, May 10: 2-4 pm, Lab. Sammet
Thursday, May 11: 2-4 pm, Lab. Sammet

Place: Dipartimento di Informatica - Building F2,
see <http://web.unisa.it/vivere-il-campus/unisa-experience/campus-map>

Recommended literature and web-links:

- Robert Nystrom: *Game Programming Patterns*, Genever Benning, 2014, gameprogrammingpatterns.com
- *jMonkeyEngine* web site: jmonkeyengine.org
- Current game code to be extended during the course
<http://cluelab.di.unisa.it/3dgameprogramming/>

Curriculum Vitae

Prof. Mark Minas holds Diploma and Doctoral degrees in Computer Science from the Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany. In 2000, he was awarded the postdoctoral university lecturing qualification (Habilitation) in Computer Science.

He worked at the Friedrich-Alexander-Universität Erlangen-Nürnberg as a research scientist until 2002. In 1993 and 1994 he was a post-doc at the International Computer Science Institute at Berkeley, California.

In 2002, he joined the Department of Computer Science of the Universität der Bundeswehr München, Munich, Germany, as visiting professor. Since 2003, he is a full professor of Computer Science at the Institute for Software Technology. From 2010 till 2014 he has been dean of the Department of Computer Science. Last year, he co-organized the IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC'22) in Rome, Italy.

Mark Minas works in the areas of visual languages and graph transformations. He applies concepts of graph grammars in order to specify and generate graphical diagram editors, which may be used with a traditional user interface or using gesture-based and sketch-based interaction. These concepts have been realized in the tools DiaGen and DiaMeta (<https://go.unibw.de/diagen>). Analyzing diagrams based on graph grammars requires efficient graph parsing. Recent work on the tool Grappa (<https://go.unibw.de/grappa>) applies well-known concepts from string parsing to graph grammars, yielding highly efficient parsers.

This course is organized by: Prof. Gennaro Costagliola (gencos@unisa.it) - :: CLUE Lab :: - Dipartimento di Informatica and supported by the Erasmus+ Mobility for Teaching program.