

# VRVis Zentrum für Virtual Reality und Visualisierung Forschungs-GmbH

G. Stonawski<sup>1</sup> and W. Purgathofer<sup>2</sup>

<sup>1</sup>Chief Executive Officer, [stonawski@vrvis.at](mailto:stonawski@vrvis.at), [www.vrvis.at](http://www.vrvis.at)

<sup>2</sup>Scientific Director, [purgathofer@vrvis.at](mailto:purgathofer@vrvis.at)

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## Abstract

*VRVis is a research and technology transfer organization in the field of Visual Computing funded by the Federal Government of Austria and the City of Vienna since 2000. 50% of the money come from industry partners who gain significant technological advantages for their respective markets from this cooperation.*

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## 1. Introduction

VRVis is owned by Vienna University of Technology, Graz University of Technology and 22 company partners. In April 2010 VRVis moved to a new office in the 4th floor of Tech Gate Vienna with about 1100 m<sup>2</sup>.

### History

- 2000** After receiving the grant for Kplus funding, the VRVis Forschungs GmbH is founded as Ltd. company.
- 2001** At the Open house on September 13 more than 150 visitors come to see the VRVis research facilities.
- 2002** VRVis applies for its first patent.
- 2003** VRVis receives confirmation of Kplus funds until 2007.
- 2004** The Hurricane Visualization has been ranked 1st place at the Visualization Contest at the IEEE VisWeek.
- 2005** VRVis Software "STEPS" is used in surgery planning at the General Hospital in Vienna (AKH).
- 2007** VRVis receives funds as Vienna Spots of Excellence.
- 2008** VRVis, Harvard University and Microsoft start a joint project in the field of neurology.
- 2009** Organisation of the first symposium "Visual Computing Trends".
- 2010** VRVis starts as COMET K1 Center.
- 2011** VRVis and "dsts advisers to executives KEG" received the "eAward 2011 Niederösterreich".
- 2013** VRVis receives confirmation of K1-funds until 2016.

## 2. Areas of Expertise

### 2.1. Visualization - expressive illustration of complex data

The research area of visualization deals with the development of effective methods for the visual representation and interactive exploration of complex data. The high bandwidth of the visual sense is used to efficiently communicate information. Scientists, engineers and medical doctors of today are confronted with huge amounts of data that build the basis for decisions and the generation of new knowledge. The exploration and comprehension of the relevant information contained in this data cannot be accomplished with conventional means. Static images have been used very early to communicate complex information impressively and quickly. VRVis combines classic, domain specific visualization paradigms with the latest results of visualization research and technology. This results in tailored solutions for interactive visualization and exploration of complex digital data.

### 2.2. Rendering - realistic presentation and interaction

Rendering deals with creating images of objects as they appear in the real world, often with a strong emphasis on realism or interactive display algorithms. With methods like laser range scanning or photographic reconstruction, it has become feasible to capture very large areas with amazing detail. Examples of rendering applications are virtual prototyping, architectural planning, reconstruction and virtual reality applications.



Figure 1: Interactive High-Quality Lighting.

### 2.3. Visual Analysis - gaining insights through interaction

Visual analysis is the science of analytical reasoning facilitated by interactive visual interfaces. It is based on interactive visualization and extends it with (semi-) automatic data analysis techniques and considering human factors. The visual analysis meets one of the most important challenges of the modern information age. How to efficiently extract useful information out of huge amount of data generated and acquired by modern computer systems? Visual analysis is an enabling technology, which can be utilized in almost all fields of research and business domains.

### 3. Staff and Management Structure

The management structure is designed to optimally and efficiently support the joint research projects. Therefore the management of the center requires adequate personnel resources and is structured as follows: The managing director (G. Stonawski) and the scientific director (W. Purgathofer), who are supported by management support functions. The area coordinators (K. Bühler, S. Mantler and H. Piringer) are also project managers of strategic research projects and group leaders in the respective area. The group leaders coordinate all activities and are responsible for efficient communication between the project managers in their group and for assuring a balanced workload of the employees and support the project managers concerning project continuation. Currently VRVis employs about 51 highly qualified researchers. The total head count is 61. In 2012 6 master theses and 2 PhD theses were finished and 19 master theses and 17 PhD theses and 2 habilitations were ongoing.

### 4. Funding

VRVis is funded by BMVIT, BMWFJ, and ZIT - The Technology Agency of the City of Vienna within the scope of COMET - Competence Centers for Excellent Technologies. The program COMET is managed by FFG. Additional projects are funded by the FFG - Austrian Research Promotion Agency, ZIT - The Technology Agency of the City of Vienna, WWTF - Vienna Science and Technology

Fund, FWF - Austrian Science Fund, ESA - European Space Agency and the European Commission (FP7).

### 5. Extract of industrial and scientific partners

Agfa HealthCare Ges.m.b.H., AQUILAB, AIT Austrian Institute of Technology, AVL List GmbH, FREQUENTIS AG, Kapsch TrafficCom, UBIMET GmbH, Zumtobel Lighting GmbH, ETH Zurich, Fraunhofer Austria Research GmbH, Harvard University, IST Austria, KAUST - King Abdullah University of Science and Technology, Research Institute of Molecular Pathology (IMP), University of Magdeburg, Faculty of Computer Science, Virginia Tech, JOANNEUM RESEARCH Forschungsgesellschaft mbH, Federal Austrian Railways (ÖBB) and many more.

### 6. Projects 2010 - 2012

In this period 13 COMET and 22 non-COMET projects were started, 27 projects with a volume greater than €100k are still running. As an example we briefly describe the HILITE (High Quality Lighting Simulation) project: A dynamic, interactive, realistic real-time lighting simulation for complex architectural environments. The main focus of the project lies on the development of an advanced lighting simulation system, which allows real-time interactions in terms of movement and scene modification in order to provide a fast, dynamic and easy-to-use way to visualize new lighting concepts in architectural scenarios. The framework makes it possible to give users a highly realistic and interactively modifiable simulation of the illumination inside and outside a building.

### 7. Publications: 2010 - 2012

In this period 34 refereed scientific journals, 80 conference papers and 6 books/book chapters were published. The reference section lists 4 representative publications.

### References

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