AUSTRIA Vienna

Vienna University of Technology

Institute of Computer Graphics and Algorithms
(in collaboration with the Virtual Reality Group)
Vienna University of Technology
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Core Competence

Photorealistic Rendering, Global Illumination, Real-time Rendering, Image Based Rendering, Tone Mapping, Scientific Visualisation, Information Visualisation, Virtual Reality, Virtual and Augmented Environments

Head of the Institute
Werner Purgathofer

History

Computer Graphics activities started in the late 70`s initiated by Wilhelm Barth. From these a working group and later the Institute of Computer Graphics evolved. Lectures on computer graphics are given since 1983. About 40 PhD`s have completed their work since then. In 1991 the institute organized the annual conference Eurographics`91 in the former emperor?s castle in Vienna. Together with the City of Vienna a Virtual Reality Center was set up in 1998. In 2000 the institute was the initiator of the VRVis research competence center, funded by the Austrian Kplus programme and some 9 companies. Dieter Schmalstieg recently changed to the Institute of Software Technology and Interactive Systems, establishing the Virtual Reality Group in close co-operation with the renamed Institute of Computer Graphics and Algorithms.

Staff

3 Professors: Werner Purgathofer, M. Eduard Gröller, Dieter Schmalstieg.
4 Assistant professors: Thomas Theußl, Alexander Wilkie, Michael Wimmer, one vacant.
12-18 Research assistants: Alessandro Artusi, Izstvan Barakonyi, Alexandra la Cruz, Balázs Csébfalvi, Heinrich Hey, Armin Kanitsar, Hannes Kaufmann, Attila Neumann, Joseph Newman, Erich Pohn, Gerhard Reitmayr, Ivan Viola, Peter Wonka, Georg Zotti.
2 Technicians: Stephan Plepelits, Alexander Piskernik.
3 Secretaries: Anita Mayerhofer, Viktoria Daubner, Katharina Weislein.

Rooms and Locations

The institute occupies some 400 square meters and is located in the fifth floor of the informatics department building. This includes three special labs for visualisation, rendering, and virtual reality research. The VR group has around 100 square meters on the fourth floor.

Financing

As part of the Vienna University of Technology the basic staff (9 people), the rooms and other infrastructure are financed by the Austrian government. Most of the research assistants and some additional staff, as well as most special equipment are paid from projects funded by the EU or by an Austrian science foundation.

Important Recent Industrial Partners

Atronic, AVL List, Daimler Chrysler, ESA, Grundig, Imagination CS, Logica Belgium, No Limits, Sony, Technical Museum of Vienna, Tiani Medgraph

Current Research

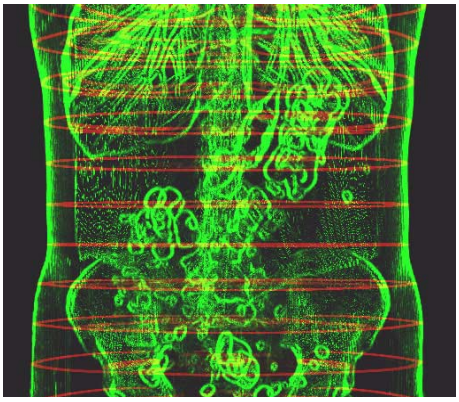
The institute is doing fundamental research as well as industry supported applied research. Realistic rendering efforts are coordinated by Alexander Wilkie. The Advanced Rendering Toolkit ART serves as a testbed for sophisticated algorithms like polarization simulation and spectrally correct rendering. The analysis of color properties and the tone mapping process are tackled among others. Real-time rendering, especially for huge data amounts, is directed by Michael Wimmer. Efficient culling and levels of detail concepts enable interactive rendering speed for multi-million polygon scenes. Impostors and other tricks help were geometric methods fail. Future projects will integrate realistic features with real-time rendering as far as possible. The virtual reality group is headed by Dieter Schmalstieg. Research is based on the Studierstube, which is our system for collaborative augmented reality that allows multiple users to experience a shared space. Augmented reality allows natural communication and collaboration among humans, while advanced interaction techniques can be used to manipulate three-dimensional data. The visualization group coached by M. Eduard Gröller was initiated in 1995. In the first years the primary research area was the visualization of dynamical systems. Topics of investigation included local and global behaviour of complex dynamical systems, visual exploration of econometric models, visualization of Poincare sections. Currently the main research focus is in the area of medical visualization and volume visualization. Topics include optimal volume sampling, angiography, curved planar reformations for vessel investigation, virtual endoscopy, salient feature extraction, fast software-based rendering techniques, non-photorealistic volume rendering styles. Recently the group also started research work in information visualization.

Important Recent Project Participations

- "PAVR", EU-TMR project, www.cs.bath.ac.uk/PAVR
- "ASH", EU-IST project, www.ashproject.org
- "Virtual Showcases", EU-IST project, www.virtualshowcases.com
- "RealReflect", EU-IST project, www.realreflect.org
- "VisMed", FFF-funded project, www.vismed.at

Current Structure and Important Partners

The Computer Graphics Group is one of two groups of the institute, the other group works on algorithms and graph drawing (Petra Mutzel). The Computer Graphics Group is organized in two work areas, one for rendering and virtual reality (Werner Purgathofer), the other for visualization (M. Eduard Gröller). The Virtual Reality Group of Dieter Schmalstieg is collaborating with us in a seamless way. Among others, we co-operate closely with the VRVis research competence center and with the Commission for Scientific Visualization at the Austrian Academy of Sciences, both located in Vienna. The student seminar CESCG is co-organised with Comenius University of Bratislava since 1997.



Future of the Lab

The graphics group at the Vienna University of Technology will continue with its activities with which it was successful during the last years. The researchers will focus on scientific visualisation, virtual and aumented reality and real-time rendering, photorealistic rendering, and similar topics. Close co-operations will continue with VRVis and our other partners, and we aim to even further develop international integration. Industry contacts shall be intensified, although the work done at the university should always stay scientific. In addition many courses must be prepared for the recently introduced masters studies "Computer Graphics and Digital Image Processing" and "Media Informatics