AUSTRIA Graz

# Graz University of Technology

Institute for Computer Graphics and Vision
(Institut für maschinelles Sehen und Darstellen)
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## Core Competence

Computer Vision, Image Processing, Object Reconstruction, Object Recognition, Virtual Habitat, Medical Imaging, Virtual/Augmented Reality, Surface Representation/Simplification, Deformable Models, Remote Sensing, Real-Time Rendering

Head of the Institute
Franz Leberl

## History

The institute was founded in 1992 by Franz Leberl as the only Austrian academic group with the charter to address both Computer Vision and Computer Graphics. It contributes primarly to the degree programs in "Telematics" and "Applied Mathematics", with more than 150 students per year attending our lectures. Since its foundation more than 90 diploma theses and more than 30 doctoral theses were completed at the institute. Our cooperations include industry partners (see below) and other academic institutions worldwide. In 2001, Prof. Milan Sonka from the University of Iowa was a guest professor at the institute.

## Staff

*1 Professor*: Franz Leberl

*2 Guest professors*: Horst Bischof, Andrej Ferko
*2 Assistant professors*: Reinhard Beichel, Markus Grabner
*2 Assistants*: Alexander Bornik, Friedrich Fraundorfer
*1 Technician*: Andreas Wurm
*3 Secretaries*: Renate Höhnel, Silke Meszaric, Andrea Zunegg
*~15 people - project staff*

## Rooms and Locations

The institute occupies one whole floor of the informatics department building (3rd floor), including a medical imaging lab (facilities for computationally intensive tasks...), a visualization center (large stereoscopic projection wall, tracking system, head mounted displays, graphics workstations) and a computer vision lab (calibrated cameras, microscopes, calibration facilities...). One research area of the VRVis (Competence center for Virtual Reality and Visualization) is located at the insitute (3 office rooms).

## Financing

As institute of the Graz University of Technology the basic staff (9 people), the rooms and other infrastructure are financed by the Austrian government. On average about 15 people (research assistants and some additional staff) are paid from projects funded by EU, Austrian science foundation and various companies.

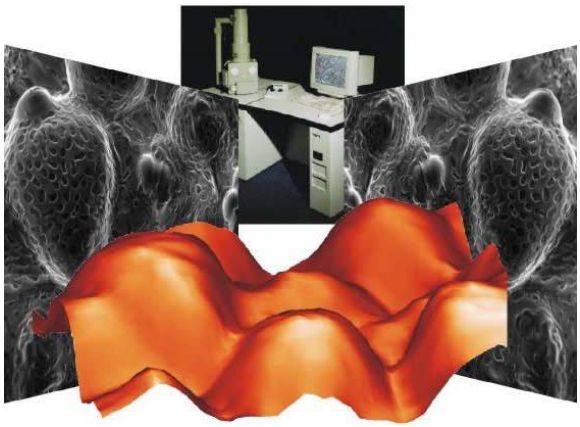
## Current Structure and Important Partners

The Computer Graphics Group is one of the groups of the institute. It closely cooperates with other

groups doing research in the fields of Computer Vision, Image Processing, Medical Imaging, Remote Sensing, and Robot Vision. There is also cooperation with the virtual habitat research group (belonging to the VRVis competence center) which is located at our institute. Besides the current guest professors there were other guest professors who spent some time at the institute eg. Seth Teller from MIT or Milan Sonka from the University of Iowa.

### Current Research

*) 3D Measurement and Virtual Reconstruction of



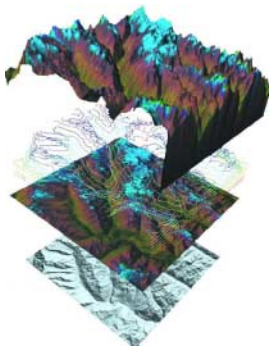
Ancient Lost Worlds in Europe (2000-2003, Investor: EU IST Project) A currently excavated archaeological site will be reconstructed for the different periods throughout the complete time of its occupation. The development of 3D acquisition systems that can measure a range of objects of different dimensions to produce accurate and convincing results will be made. Techniques will be developed to present the recorded data to scientific experts as well as unexperienced users across the internet.

*) VRVis Research Center for Virtual Reality and Visualization (2000-2004, Investor: Austrian government research program Kplus) The VRVis application research project aims on the automatic three dimensional, photorealistic modeling of urban, suburban and rural areas and on the organisation, simulation and visualisation of this data. The reconstruction and modeling steps aim on the automatic content creation for virtual environments, yielding a virtual copy of an existing urban habitat. This set of data is further processed to obtain a scene database suitable for real-time visualization.

*) Virtual Liver Surgery Planning with segmented CT Images (2001-2003, Investor: Austrian Science Fund (FWF)) The goal of this research project is to develop an experimental environment for the staging of liver operations. Special efforts will be put on two issues. First, a fully automated segmentation of the liver, its vessels and tumors will be studied. Second, the environment for the interactive, cooperative visualization using augmented reality techniques of the medical sensor data, the extracted anatomical structures, and for the use of tools to assess the best surgical approach will be developed and assessed.

### Important Recent Project Participations

- Vision based robot navigation research network (1996-2001, Investor: EU TMR project)
- Optical-Radar sensor Fusion for Environmental Applications – ORFEAS (1996-1999, Investor: European Commission, DG-XII)
- "Studierstube" Augmented Reality project (1997-1999, Investor: Austrian Science Fund (FWF))
- Integrated image analysis system for the early recognition of malignant melanoma (1997-1999, Investor: Austrian Science Fund (FWF))
- Application of Image Processing in Materials Science (1998-2001, Investor: Austrian Science Fund (FWF))



### Important Recent Industrial Partners

AVL, Daimler Chrysler, Vexcel Imaging GmbH, SkiData, Imagination CS, M&R GmbH

### Future of the Lab

The institute will continue to carefully nurturing a culture of digital visual information systems to resolve the artificial boundaries between computer graphics and computer vision. Therefore research will address projects of common interest to both graphics and vision. In particular virtual habitats, medical visual information systems, robotis. In general we look at the world with sensors, create models of the world's objects from the sensed data and organize the results for visual computation and use. This philosophy will also be reflected in the teaching activities.