GERMANY Erlangen

University of Erlangen-Nuremberg

Computer Graphics Group / Informatik 9
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Core Competence

Geometric Modeling, Subdivision Surfaces, Hierarchical Methods, CAD-applications, Surface quality, Meshing, Compression, Real-time Rendering, Global Illumination, Distributed Rendering, Image-based Rendering, Scientific Visualization, Hardware-accelerated Rendering, Pre- and Post Processing for Numerical Simulation, Virtual Reality, Medical Applications

Head of the Institute
Günther Greiner

History

The computer graphics group at Erlangen University has been founded ten years ago by Hans-Peter Seidel. After he has moved to MPI Saarbrücken, the chair has been appointed to Günther Greiner. The group - being part of the computer science department and integrated in the Faculty of Engineering - has many cooperations within the university and several local companies. Eight former members of the group meanwhile have been awarded faculty positions in Germany or abroad.

Staff

1 Full professor: Günther Greiner
1 Associate professor: vacant
1 Senior scientist: Roberto Grosso
2 Postdocs: Christof Rezk-Salama, Kai Hormann

12 Research assistants: Michael Bauer, Peter Kipfer, Ulf Labsik, Stefan Meinlschmidt, Frank Reck, Michael Scheuering, Grzegorz Soza, Salvatore Spinello, Roman Sturm, Gerd Sussner, Fernando Vega, Christian Vogelgsang,
1 technician: vacant
1 secretary: Maria Baroti.

Rooms and Locations

The institute is located in an industrial High Tech Parc between Erlangen and Nuremberg. There is more the 400 square meter of office space including a graphics lab for students.

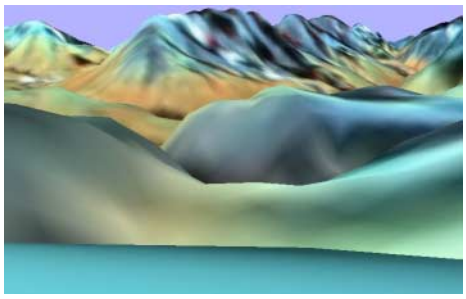
Financing

As an institute of the University of Erlangen-Nuremberg basic staff, rooms and other infrastructure are financed by the state of Bavaria. Many of the research assistants as well as some of the equipment are paid from projects funded by the Deutsche Forschungsgemeinschaft (DFG), by Federal Ministries, Bavarian Science Foundation, and cooperating industrial partners. About 50 % of the funding is obtained through these projects.

Current Structure and Important Partners

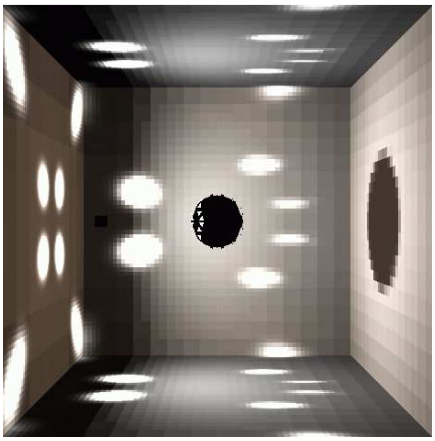
The computer graphics group in Erlangen is roughly structured in four research groups, according to the topics geometric modeling, rendering, scientfic visualization and numerical simulation. In the future an additional group in the area of augmented and virtual reality will come along. These groups are not separated --

instead, a lot of cooperation and interchange is going on. Local cooperation partners include (among others) the Simulation Group (U. Ruede) and the Computer Vision Group (H. Niemann) form the Computer Science department, the Crystal Growth Laboratory (G. Müller), the Numerical Fluid Mechanics (F. Durst) and the Sensor Technology (R. Lerch) from the faculty of Engineering and last but not least the Neurocenter (R. Fahlbusch) and the Department of Surgery (W. Hohenberger) from the Faculty of Medicine. Important local partners outside the university are Siemens and the Fraunhofer IIS.



Current Research

The computer graphics group in Erlangen conducts research in geometric modeling, rendering, scientific visualization and numerical simulation, often in cooperation with industrial partners. Handling real world problems often requires the manipulation of large data sets. Therefore in all areas one focus is the interactive handling while guaranteeing a sufficiently high accuracy or quality. This is achieved by a combination of several techniques: hierarchical models, parallel or distributed processing, hardware support whenever it is possible. In geometric modeling, additionally foci are processing of CAD data for quality inspection, design of progressive lenses, reverse engineering and subdivision modeling. In rendering there is emphasis on image-based rendering and on distributed rendering for global illumination simulation. The first topic is approached by designing implementing an integrated system having pipeline architecture, that handles all steps from the image acquisition with a general purpose digital video camera up to realtime rendering on standard graphics PC. In the area of scientific visualization, we focus on interactive volume rendering via texturing methods and novel PC graphics hardware. Applications lie in the wide area of numerical simulation and in particular in the analysis of tomographic images. E.g. interactive inspection of CT- or MR-data sets will be developped for diagnosis, therapy planning and intraoperative use. Often a complicated registration is necessary for data sets having different modalities (MR, CT, laparoscopic/endoscopic images, light fields). This registration process is another topic of intensive research. With respect to numerical simulation, we focus on post- and pre-processing. E.g. meshing, 3D-mesh handling for simulation and visualization. Moreover, the integration of the numerical simulation and the visualization in one framework is of special interest. The ultimate goal is interactive steering of complex simulation processes. Here scalability and flexibility are important issues. All methods will be designed for parallel processing, allowing the use of high performance computers (Hitachi SR 8000) as well as a clusters of PC's.



Important Recent Project Participations

- "DFG SFB 182", www-sfb.informatik.uni-erlangen.de/SFB182/
- "DFG SFB 603", sfb-603.uni-erlangen.de/
- "Graduiertenkolleg 244", www9.informatik.uni-erlangen.de/~gradkoll/
- "KONWIHR", konwihr.in.tum.de/index_e.html

Important Recent Industrial Partners

Siemens, BMW, NEC, Rupp+Hubrach, INA, SZM-Studios

Future of the Lab

The institute will continue its activites in the areas mentioned above. It is open towards new developments and will always look for new applications of Computer Graphic methods. Here special attention will be given to medicine, molecular science and biology. In addition, augmented and virtual reality will become an additional topic. In fact the currently vacant associate professorship has been advertised for this field.