Braunschweig University of Technology

Institute of Computer Graphics
Braunschweig University of Technology
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Core Competence

Photorealistic Rendering, Global Illumination, Real-time Rendering, Virtual Reality and (Semi-) Immersive Systems, Software Architectures, Digital Libraries

Head of the Institute
Dieter W. Fellner

History

Graphics activities in general can be traced back to the work of Carl Friedrich Gauss in the early days of this university. The importance of Computer Graphics, particularly of Computer Aided Geometric Design, for a technical university has been proven by the renown group of Wolfgang Böhm who layed the ground for the creation of a new Institute of Computer Graphics which has been founded in 1998. After moving into the new Computer Science Center in September 2001 it is now also operating a VR center, opened in April 2002.

Staff

1 Professor: Dieter W. Fellner
10 Research faculty: Christoph Fünfzig, Andreas Halm, Sven Havemann, Hyosun Kim, Andreas Müller, Kerstin Müller, Norbert Schenk, Kai Schweda, Thorsten Techmann, Marco Zens
2 Technical staff: Carsten Götze, Lars Schimmer
2 Administrative staff: Ina Müller, Sabine Rieche

Rooms and Locations

The institute occupies approx. 750 square meters and is located in the first floor of the recently opened Computer Science Center.

Financing

Basic funding for infrastructure and core personel is provided by the State of Lower Saxony. However, a large part of the overall annual budget comes from grants funded by the German Research Foundation (DFG), the Federal Ministry of Research and Education (bmb+f), the European Commission, and from Industry.

Current Structure and Important Partners

Within the University the institute is in close cooperation with the Institute of Robotics and the Institute of Medical Informatics. Joint research projects are also going on between the institute and the GBF, a large federal bioscience research unit located in Braunschweig.

Current Research

The Institute is focusing on two main research areas: Computer Graphics and Digital Libraries. In both areas members of the Institute are well embedded in the national and international research community, be it as partners in international research projects or as members of advisory boards, editorial boards, program committees or conference and journal reviewers. Cooperation with industry is documented by several joint R&D projects. Research

Focus Computer Graphics

- Automatic structuring of large scene geometries into optimized hierarchies
- Efficient rendering techniques: approximative rendering, ray tracing, (hierarchical) radiosity, photon maps, ...
- Subdivision surfaces - Color quantization - Graphics systems and APIs: OpenSG+ the most recent one
- Parallel rendering in (inhomogeneous) computing environments - Distributed and collaborative graphics
- Immersive display systems
- Applications of graphics algorithms to planing and simulation of micro-cellular phone systems (radio wave propagation in the GHz band) Research Focus Digital Libraries
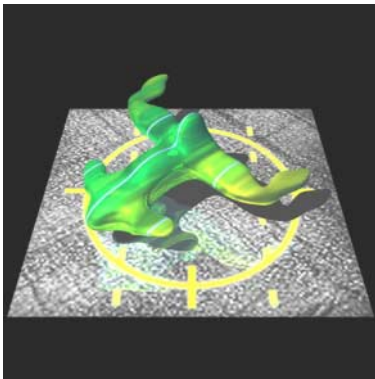
- General Documents, particularly 3D and higher-dimensional objects as first-class citizens in digital documents
- Generative modeling for the semantic representation and efficient transmission of complex documents over (low-bandwidth) communication channels as well as for the implementation of a semantic level-of-detail approach
- Initiator/coordinator of the Strategic Research Initiative V3D2: DFG-Schwerpunktprogramm Verteile Vermittlung und Verarbeitung Digitaler Dokumente
- Electronic and cross-media publishing (e.g. BMBF-Project 'MCP' – Managing Conference Proceedings)
- Workflow support for electronic documents (e.g., Eurographics Digital Library at diglib.eg.org)
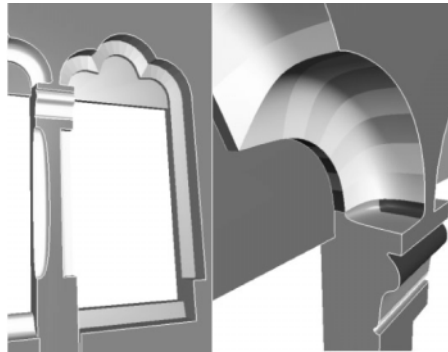
Important Recent Industrial Partners
T-Mobile, Bonn, Germany, digitalImage, Köln, Germany, TeleVirtual, UK

Important Recent Project Participations

- Strategic Research Initiative "V3D2" (Digital Library Initiative on generalized documents) funded by the German Research Foundation (DFG)
  graphics.tu-bs.de/V3D2
- "Charismatic", EU-IST project, www.charismatic-project.com
- "Open SceneGraph (OpenSG+)", bmb+f, www.opensg.org
- "Eurographics Digital Library", diglib.eg.org
- "Global Info", bmb+f, www.global-info.org

Future of the Lab
Most likely, the opening of the VR center and the availability of our 2 DAVE (for Definitely Affordable Virtual Environment) installations (1 in the institute, 1 in the computing services center) will bring a much closer cooperation with institutes in the engineering faculties and the DLR (German Aerospace) institutes in Braunschweig in the area of (virtual) traffic control and control systems as well as bio-sciences. The institute will continue to play an active role in international research efforts at the borderline between computer graphics and digital libraries.