Annual Report 2011 – 2012

INSTITUTE OF
Visual Computing

Hochschule Bonn-Rhein-Sieg
University of Applied Sciences

Imprint

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Foreword

We are proud to present the first report of the Institute of Visual Computing (IVC) 2011/12. The Institute of Visual Computing at the Bonn-Rhein-Sieg University of Applied Sciences is an academic research institution that is active in the following main fields:

- Interactive Systems
- Simulation in Virtual Environments
- Visualisation & Rendering
- Computer Vision

Although the IVC was officially founded in 2012, we are building on previous experiences of all participating members: The IVC is a joint effort of colleagues, currently from the Department of Computer Science and of the Department of Electrical and Mechanical Engineering and Technical Journalism. In our very first two years new projects have already been acquired, so that new personnel have been hired.

This report gives you a first overview of our past and current projects, partners, publications, teaching activities and some facts and figures.

Most of our projects are of interdisciplinary nature and are conducted in collaboration with other research institutions and/or companies. It is our intention to make research applicable and to foster the transfer of new knowledge into industry. Results of running projects and other research activities have been presented at scientific conferences and fairs. In addition, our members were awarded a number of prizes for their research activities.

The social highlight of the first two year period was the opening ceremony of the Institute. This report provides and conserves some impressions of this social event.

On the scientific side we are very proud of a number of excellent and award winning publications and scholarships for members of the IVC, as well as of the increase of third party funded projects in most cases with new partners from industry and science.

The international collaboration has been intensified in particular with our partners in Canada and the Middle East, based on additional funding acquired from the European Commission, DLR Aerospace Agency, German Academic Exchange Service and Alexander von Humboldt Foundation.

IVC members were extensively involved in teaching in the special topic area of Visual Computing as well as supervising excellent students in a considerable number of thesis projects.

The co-directors would like to acknowledge the special efforts all IVC team members have put into establishing the new Institute and making it a success both from the scientific and the community side.

The time span of 2011/12 covers the transition from the university-wide research focus Visual Computing to the Institute of Visual Computing. Much has changed in the last years: a major part of the IVC labs has been moved to a common floor, offices where concentrated in the vicinity, formerly separate research groups now work together towards the same objective. Our members are committed to make the IVC a success and we welcome you to join us.

We are looking forward to continue our work and research on Visual Computing together with you.

Best regards,

André Hinkenjann Rainer Herpers

Opening Ceremony

On September 7th, 2012 the Institute of Visual Computing celebrated its grand opening. Regional and international collaboration partners were invited to commemorate the foundation of the Institute together with all the faculty, co-workers and students of the research focus group and the entire University body. Officially, the Institute had been created in early 2012 by a president's board decision.

The intentions, objectives, and visions of the newly founded Institute were presented by the co-director of the Institute, Prof. Dr. André Hinkenjann and by the President of the Bonn-Rhein-Sieg University of Applied Sciences, Prof. Dr. Hartmut Ihne. "We want to increase the synergy, increase visibility to the outside and create the opportunity for larger project consortia", said Prof. Dr. André Hinkenjann. In his speech, University President Hartmut Ihne stressed that everyone in the university could benefit from the early focus on research in the Department of Computer Science.

One highlight of the ceremony was the keynote speech of Prof. Dr. Philipp Slusallek, Head of the Research Department Agents and Simulated Reality at the German Research Centre for Artificial Intelligence in Saarbrücken about "Die Welt im Browser – Interaktive 3D-Graphik für das Web" (The world in the browser – Interactive 3D-graphics for web-applications). The official speeches and the scientific talk in the great lecture hall were framed by musical plays of the Brasa Trio.

The second highlight, was the open lab tour in the newly gathered laboratory space. More than 20 research projects were on show with live demonstrations and multiple hands-on and self-explore options. Participants were able to meet face-to-face with the scientists and, for example, were able to operate a virtual lathe or practice on a bicycle simulator and experience risky traffic situations without being exposed to a real threat. Moreover, insights into the current state of high quality rendering techniques were given as well as into new developments of stereoscopic vision. The current development states of several research projects were intensively discussed and new ideas were developed within a convenient and relaxed atmosphere.

At this point, the organisers would once again like to acknowledge the special efforts all members of the Institute put into the preparations and the particular details to make this opening ceremony such a special day.

In early 2011 the research focus group (Hochschulforschungsschwerpunkt) on Visual Computing started off as a separate organisational unit within the Bonn-Rhein-Sieg University of Applied Sciences. Seed funding provided by the University included € 1.6 million for five years to build up a powerful research institution and to establish an internationally recognised platform on Visual Computing. The commitment made by the funding faculty was to match the seed funding by a factor of 1:1 with third-party funding.

In 2011, seed funding for the Institute of Visual Computing was about 16% of the year's overall funding. The funding of research mobility provided by the German Academic Exchange Service (DAAD), Alexander von Humbold Foundation (AvH) and European Union (EU) was about 12%, and funding by contract provided by companies was about 20%. The remaining budget of the third party funds in 2011 was acquired from Federal Ministry of Education and Research (BMBF), Federal Ministry of Economics and Technology (BMWi) and the State of North Rhine-Westphalia (NRW) for a number of research projects (see pages 12-20).

In 2012, third party funding was increased. The BMWi funding was roughly tripled, increasing its percentage to 32%. The IVC seed funding was about 20%, 10% of the 2012 budget was backed by research exchange and mobility programs (DAAD, AvH, EU). In 2012, the number of research projects increased to the total of 20.

Six professors and five research associates being members of the IVC were funded by the University. The remaining 15 research associates and 17 research assistants were funded by the IVC.

Within these two years, 39 scientific publications were successfully submitted to conferences, journals, workshops, symposia, and exhibitions (see pages 24-26). 19 Bachelor's and 17 Master's theses were supervised by professors of the IVC and 19 lectures were given on IVC-related topics (see page 27).

Moreover, the Institute of Visual Computing received additional awareness in national TV shows and exhibitions reporting and presenting its scientific achievements (see page 33).

2011

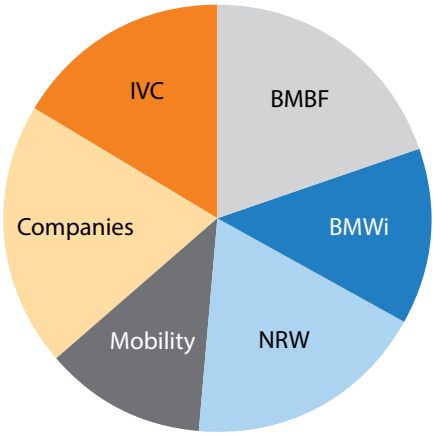


Figure 1: Relative distribution of seed (IVC) and third party funding in the year 2011

2012

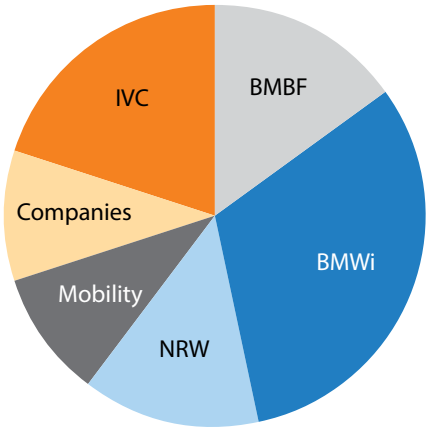
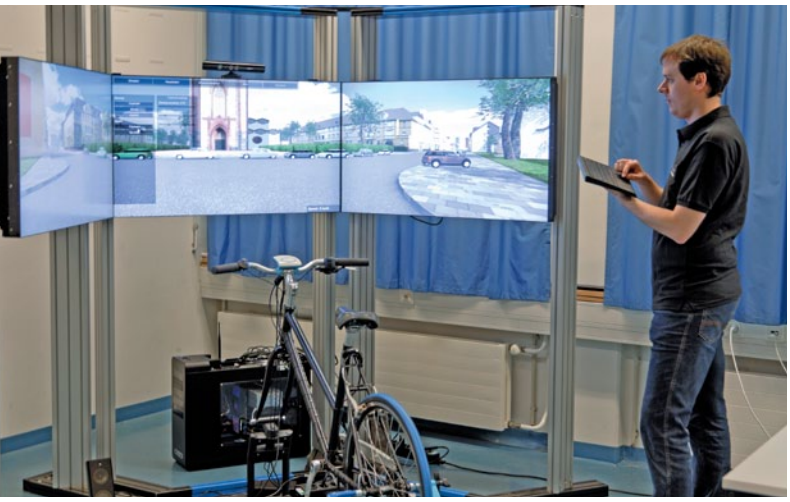


Figure 2: Relative distribution of seed (IVC) and third party funding in the year 2012



FIVIS

Immersive Bicycle Simulator

The project's objective is to develop an immersive bicycle simulator that can realistically simulate potentially dangerous situations without exposing the rider to an actual risk. The simulator is being used to teach children proper behaviour in urban traffic. Moreover, the FIVIS simulator allows easy manipulation of visual and auditory cues, providing means for systematic psychophysical experiments.

The simulator features a compact immersive visualisation system consisting of three almost bezel-free flat screens providing an up to 180° horizontal field of view. The rider interacts with the system using a mounted bicycle equipped with a steering sensor and an electric motor brake for simulating ascents. A Kinect-based markerless tracking system detects hand signs and head motion, which can be interpreted by the simulation. The 3D visualisation is computed by a single PC with a high-end graphics card running the Unity game engine.

Financial support by the German Social Accident Insurance (DGUV) grant no. FP307 and the FH³ grant No. 1736A05 is acknowledged.

Duration: 01 July 2006 – 31 May 2013
Partners: DVR e.V., IPN GmbH, RheinAhrCampus Remagen, Schauff GmbH & Ko KG,
Contact: Prof. Dr.-Ing. Rainer Herpers,
David Scherfgen, B.Sc.

AVeSi

Agent-based Traffic Simulation with Psychological Personality Profiles

The objective of the AVeSi project is to simulate a road traffic behaviour more human-like by considering risk taking and mistakes. Real-life traffic participants have to follow traffic rules, but these rules are regularly broken to varying degrees; ranging from speeding to running red light to ignoring someone's right of way. To prepare trainees to participate in road traffic, virtual environments can provide a safe setting for road safety education. However, for this training to be most effective, simulated traffic participants (agents) need to behave like their human counterparts and have to show non-ideal behaviour.

To achieve this, cognitive processes are modelled and implemented in this project. Furthermore, individual personality profiles are assigned to each agent to provide diversified behaviour and different driving types (e.g. aggressive vs. careful). Multiple related subprojects were successfully completed. These include the implementation of personality profiles and an emotion model based on psychology research, an efficient mesoscopic traffic simulation, and the definition of a semantic road network representation.

The AVeSi project is being funded by the Federal Ministry of Education and Research (BMBF) grant No. 17028X11.

Duration: 01 October 2011 – 30 September 2014
Partners: Virtual Köln, Bernhard Lang Fahrradsimulation, Institut für Arbeit und Gesundheit der DGUV (IAG), RheinAhrCampus Remagen, Universität Bonn
Contact: Prof. Dr.-Ing. Rainer Herpers,
Sven Seele, M.Sc.

SimuBridge

Systems' Simulator Controlled by a Generic PLC as an Innovative Learning Concept

The project objective is to develop a generic visual simulator of devices, systems and industrial plants, independent from a Programmable Logic Controller (PLC) vendor. This simulator platform will be part of an innovative learning concept for PLC programmers. The platform consists of a conventional PLC, a special i/o adapter, and a PC. The visual system simulator contains a PC software part and offers a number of training tasks. A capability of multilingual support of task descriptions and user interface will be integrated into the system.

Major focus areas in this project are realistic simulation of devices and their physical characteristics, realistic behaviour and reaction of the simulator on real control signals, as well as correct visual representation of real-time events and modulated signals with low latency. Special features, like the possibility to induce simultaneous multiple failures and other plant malfunctions, will be integrated into the simulator. An important aspect of correct representations and adequate reactions on high frequency signals by the simulation will be addressed as well.

Funded by the Federal Ministry of Economics and Technology (BMWi) under the Central Innovation Programme for Small and Medium Sized Enterprises (ZIM) grant No. KF2992401.

Duration: 01 July 2012 – 31 March 2015
Partners: FELTRON Elektronik-ZEISSLER & Co. GmbH.
Contact: Prof. Dr.-Ing. Rainer Herpers,
Dipl.-Ing. Timur Saitov, M.Sc.

EXAR

System for Interactive Magnetic Field Simulation

The aim of the EXAR project is to develop a system for interactive magnetic field simulation in an AR- or VR-Setup.

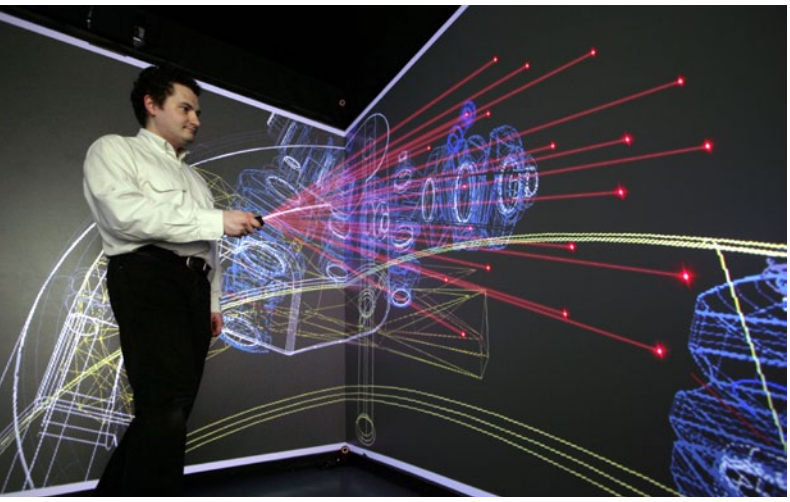
We investigate how AR/VR technology can help to develop a better understanding of the concept of fields and field lines and their relationship to the magnetic forces in typical school experiments.

The haptic feedback is provided by real magnets that are optically tracked. The field lines are calculated online with the result that the changing magnetic field of two interacting bar magnets can be explored in real-time.

We present two setups. The first setup uses a Video-See-Through Head-Mounted-Display from our project partner VRmagic with build-in optical tracking. The HMD consists of two OLED microdisplays with near-eye optics and a camera with four pixel-synchronous image sensors (two colour, two w/b infrared sensitive). In a future release both magnets will be tracked using markerless tracking. The second setup is an active stereo LCD-TV. For optical tracking of the magnets we use the "Natural Point OptiTrack" camera-based tracking system.

Funded by the Federal Ministry of Economics and Technology (BMWi) under the Central Innovation Programme for Small and Medium Sized Enterprises (ZIM) grant No. KF2644102.

Duration: 01 July 2010 – 31 October 2011
Partners: VRmagic Holding AG, Mannheim.
Contact: Prof. Dr. André Hinkenjann



MI6

Multi-User Interaction System for CAVE-type VR Environments

The project's objective is to realise a 6-DoF user input device for interaction within VR applications running in CAVE-type visualisation environments with flat projection screens.

An infrared pattern of fiducial markers is projected from behind the screens by a custom infrared projector. A hand-held input device containing a camera and a wireless transmitter is used to record and transmit the observed pattern. This approach leads to a robust identification procedure as every individual marker within the system is unique. By using an on-board FPGA in the hand-held device for image preprocessing the wireless data traffic can be reduced, allowing multiple users to work simultaneously. An initial approach using a laser projection from the hand-held device proved to be not easily scalable and unstable due to point identification problems. The device's position and orientation with respect to the CAVE can be determined and used to intuitively interact with a virtual environment.

The project is funded by the Federal Ministry of Education and Research (BMBF), within FHprofUnt program under grant No. 1759X08.

Duration: 01 July 2008 – 30 June 2012
Partners: Matrix Vision GmbH,
University of New Brunswick Fredericton, Canada
Contact: Prof. Dr.-Ing. Rainer Herpers,
Dipl.-Ing. Timur Saitov, M.Sc.

PlaSMoNa

Platform for Social Mobile Navigation

The aim is to research the combination of currently successful web 2.0 applications, especially the social networks, with satellite- and indoor-navigation.

The project PlaSMoNa deals with analysis, design and implementation of a platform for the development of event- and group-oriented mobile applications with indoor navigation. Possible applications are business applications for large scale conferences, special advertising or games for smartphones with navigation aspects.

One of the main goals is to bring together the users of social networks in a goal-oriented, localised and event-oriented way. PlaSMoNa will offer a great deal of flexibility and open interfaces for different social networks, navigation methods, types of events and smartphones. Based on social networks, a convenient and standardised environment for the development of a whole variety of new application types will evolve.

Funded by the Federal Ministry of Economics and Technology (BMWi) under the Central Innovation Programme for Small and Medium Sized Enterprises (ZIM) grant No. KF2644105.

Duration: 01 January 2012 – 31 December 2013
Partners: tarent solutions GmbH
Contact: Prof. Dr. André Hinkenjann,
Dipl.-Math. Jens Maiero, M.Sc., Martin Weier, M.Sc.

Sightwalk

Automated Anonymisation of Faces and Licence Plates within Panoramic Images

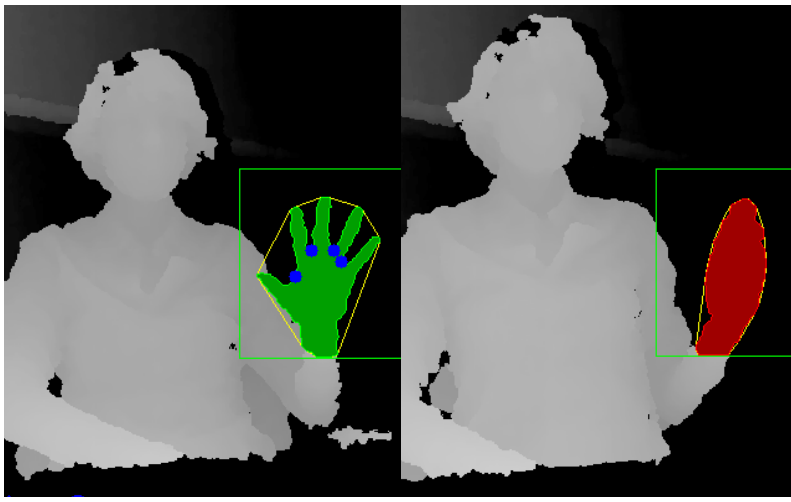
Some recently developed web-based applications, like www.sightwalk.de of the Cologne-based project partner Panogate GmbH, present interactive pictures of urban environments to the user. The enacted data protection regulations demand to anonymise recognisable faces or license plates published in the internet. This is usually done manually for each and every image.

The project intends to reduce this vast amount of work and automate this task. For the task of detecting faces, a slightly altered Viola&Jones detection algorithm has been implemented. This algorithm has been improved, in order to exclude false positives by a histogram-based post-processing approach.

The combined approach results in a detection rate of 84,53% and a 0,68 false-positive rate in all images provided by Panogate, with a detection rate of 90,42% for frontal faces and 58,84% for profile faces. This is still not sufficient for a fully automated anonymisation process. Nevertheless, it is used to reduce the workload by preselecting likely faces and guide the user to images with the highest possibility of faces.

Funded by the Ministry of Economic Affairs, Energy and Industry of the State of North Rhine-Westphalia via the FH-Extra programme.

Duration: 01 November 2010 – 31 January 2013
Partner: Panogate GmbH
Contact: Prof. Dr.-Ing. Rainer Herpers,
Thomas Hofhammer, B.Sc.



RGBD Gesture

Model-based Real-Time Gesture Tracking for AR Applications Using an RGBD Camera

For demonstration purposes a gesture-based interaction application was implemented. It demonstrates the easy arrangement of objects on a display in a 2D environment. As an input device the low budget Microsoft Kinect is used to capture depth information of the interacting user.

The natural interaction Framework OpenNI and the middleware NITE are used to find one hand in the recorded live stream. For this, the user is required to perform a "focus gesture" such as waving in order to correctly identify the position of the desired hand.

The visible hand region of the user is analysed which results in gestures such as "grabbing" and "moving". Using these simple arm and hand movements, a user is able to place and arrange objects on the screen without using standard input devices such as mouse or keyboard.

The demo application shows a windshield environment of a car, and enables the user to place car specific information, such as speedometer, fuel gauge, or navigation instruction to specific slots on the windshield. Such a field of application could be possible in the future, considering the rapid development of display devices.

Contact: Prof. Dr. André Hinkenjann,
Jessica Millberg, M.Sc.

Emotiv EPOC I and II

Computer-Brain Interface

The aim of the first project "EPOC I: User Optimisation of Sensory Motor Rhythms using an Emotiv EPOC device" was the exploration of various classification algorithms for Sensory Motor Rhythm (SMR) analysis of a possible commands for controlling a Care-O-Bot robot simulator using an Emotiv EPOC neuro-headset. For the device to be applied in the field of robotics, the brain signals from the users were to be made generic by applying various pattern recognition algorithms to study the common features of the brain signals of various individuals of a particular command.

Within the second project "EPOC II: Analysis and Evaluation of the application possibilities of an EPOC neuro-headset" capability of Emotiv neuro-headset was analysed and evaluated with respect to its application possibilities. A demo application was developed that allowed for differentiation of the neuro-commands for "left" and "right". These commands were mapped onto an external device with a picture flow application running on an Android platform. In addition, the level of current concentration was displayed on the Android device as well. The communication between the phone and the analysis computer was implemented by using a conventional TCP/IP communication protocol.

Duration: 30 March 2012 – 31 December 2012
Contact: Dr. Gernot Heisenberg,
Prof. Dr. Wolfgang Heiden

Rider Monitor for FIVIS

Riders' Head Pose and Hand Gesture Estimation for the Immersive Bicycle Simulator

Precise detection of hand gestures and head pose of the user in the bicycle simulator opens up possibilities of enhancing the simulator with the capabilities of an automated ranking system based on traffic regulations with respect to particular user actions. This can provide a real time feedback during traffic education sessions and therefore increase effectiveness of the training.

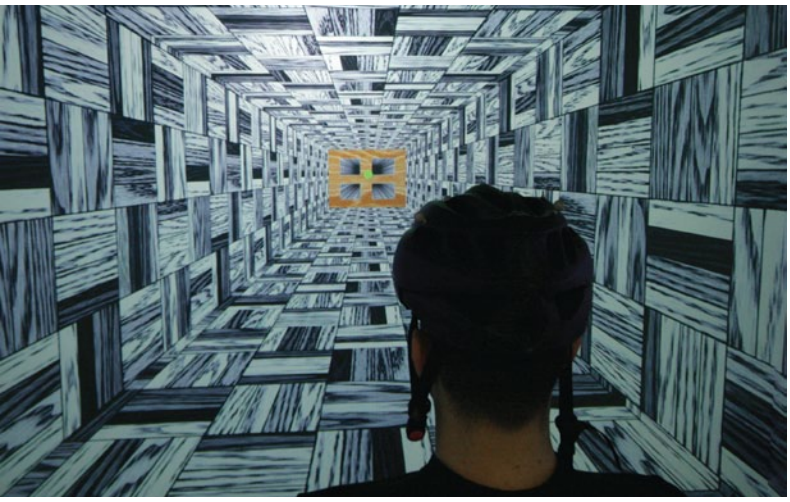
As a foundation of the development a Microsoft Kinect sensor was selected. It was placed on top of the centre screen of the FIVIS bicycle simulator system. Based on the data provided by the SDK of the sensor the developed system is able to recognise whether the subject performs a hand sign or not. The empirical parameters for the robust detection have been selected based on numerous field tests and evaluation sessions among heterogeneous testing groups.

Besides hand gesture recognition, the system provides an estimation of the user's head orientation. It is based on the FaceTrackerAPI which is part of the Kinect SDK.

The system was developed as an external application which is connected to the FIVIS simulator using one of the standard interfaces.

The extensive evaluation of the system, including participation in the trade shows has proven its effectiveness and robustness.

Contact: Prof. Dr.-Ing. Rainer Herpers



Depth Perception in VR

Depth Perception in Virtual Environments

This project explores the fundamental tasks that underlie our perception of self-motion and the ways in which existing technological solutions simulating self-motion enable or disrupt self-motion perception. The aim is to model the relevant cues (visual, audio, physical motion, etc.) for perception of movement in virtual environments. Several experiments were carried out using different kinds of virtual environments: the Immersion Square and the FIVISquare with three projection screens each at IVC laboratories, as well as the IVY at York University, Toronto, Canada, a room in which all walls, ceiling and floor are display surfaces, and the so-called VR-Trike – a VR-equipped tricycle.

Here, a subject will be asked to memorise the position of a target within a virtual corridor. This door will then vanish and the corridor begins to move. The subject then signals by pressing a button, when he/she thinks to be at the memorised depth position of the target. Viewing optic flow through one eye evoked a large over-estimation of travel distance. For low velocity conditions, monocular viewed optic flow in the upper viewing field was found to be more effective than in the lower field. For higher velocities, this effect lessened. In contrast, optic flow on the nasal retina was no more effective than on the temporal retina. Funded by the Alexander von Humboldt Foundation under the TransCoop Programme.

Duration: 01 April 2009 – 31 March 2012
Partner: York University in Toronto, Canada
Contact: Prof. Dr.-Ing. Rainer Herpers,
Dipl.-Psych. Sandra Felsner

PUG-Study

Perception of Upright Under Variation of Gravity States

The perception of upright depends on visual, gravity and body cues each of which is given a weighting by the brain. Whether a given gravity state is adequate to maintain its contribution to perception may be vital for the success of manned interplanetary travel. The relative contributions of vision, gravity, and the body to the perceptual upright were measured in ten subjects lying supine on a short-arm centrifuge. The acceleration along the body's long axis was varied from 0 to 1g. The perceptual upright was measured using OCHART following a PEST protocol while visual and acceleration cues were varied. The relative contribution of vision to the perceptual upright was higher when supine with the centrifuge stationary than when standing or with 1g exerted along the long axis. As simulated gravity was increased from 0g to 1g, its influence on the perceptual upright rose from 0% to 23% with a transition at 0.2g. The level above which acceleration had an effect occurred at a value much higher than predicted by linear acceleration thresholds (around 0.01g). On planets with gravitation greater than the transition level of 0.2g, such as Mars (0.38g), it should be enough to allow normal use of visual cues. Gravity on the moon (0.17g), however, is right in the transition zone.

Funded by the German Federal Ministry of Economics and Technology (BMWi).

Duration: 01 July 2012 – 31 December 2013
Partners: York University in Toronto, Canada,
DLR (German Aerospace Center)
Contact: Prof. Dr.-Ing. Rainer Herpers,
Thomas Hofhammer, B.Sc

GrIP

Graph-based Image Processing

Post processing of image data is one possibility of achieving an improved image quality. Available methods cover filters for changing brightness and contrast as well as scaling algorithms based on different concepts. Adding data like depth or normal values to the original image information leads to a large amount of new possibilities for post processing. Based on a combination of this information, it is e.g. possible to approximate illumination and various other effects in screen space.

The project's goal was the implementation of a graph-based framework for post processing filters, which is now called GrIP (Graph-based Image Processing). Filter graphs are implemented as XML files containing a collection of filter nodes with their parameters as well as linkage/dependency information. The system is designed to be extensible by implementing new processing nodes via a plug-in system. In order to achieve high performance, we use NVIDIA's CUDA for filter implementation.

Contact: Prof. Dr. André Hinkenjann,
Thorsten Roth, M.Sc.

IVAB (Spark)

High-Quality Rendering in the Planning of Prefabricate Houses

Various interactive, high quality 3D rendering approaches are used that will enable constructors to take easier and cost-effective decisions on interior design and fitting options.

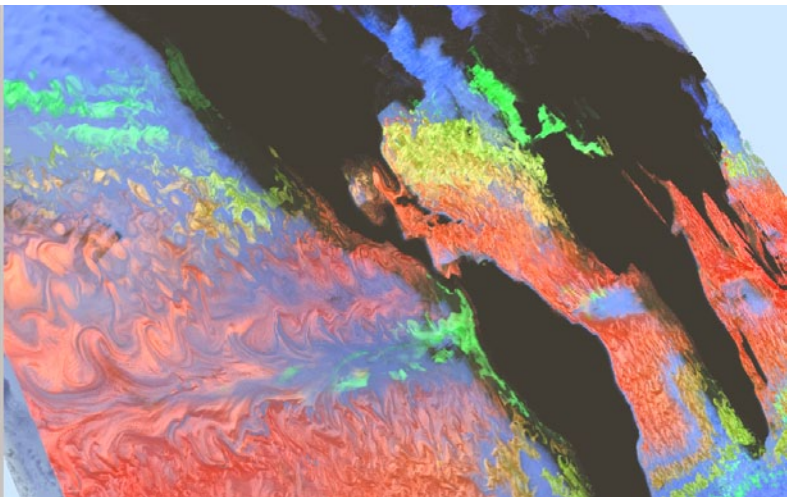
Among others, the research team uses a combination of path tracing (based on our own path tracer "Spark") and screen space post processing (based on our graph-based framework "GrIP") to overcome noise artefacts.

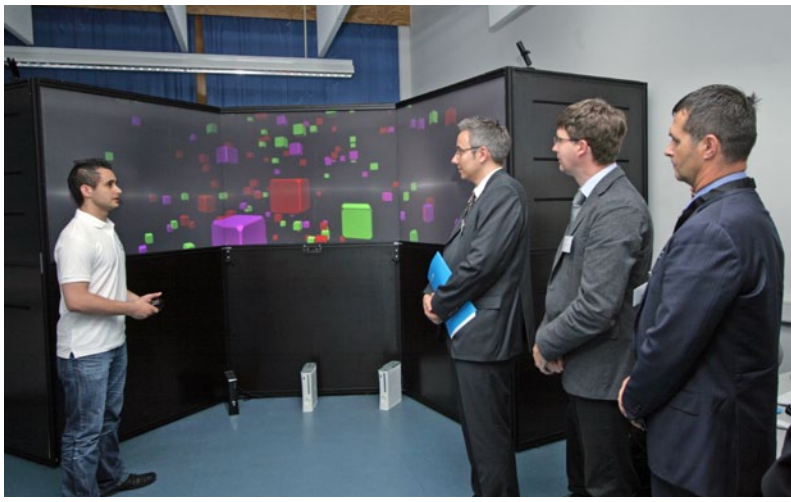
For the perception of space a realistic representation of the materials is essential as well as an especially realistic light distribution, which can be implemented using a global illumination calculation.

For the research project IVAB an overall solution is developed, which for the first time combines a realistic light distribution with a high-quality rendering of the materials for 3D representation on offer by house manufacturers.

This project is supported by the German Federal Ministry of Economics and Technology (BMWi) grant No. KF2644106ED1.

Duration: 01 January 2012 – 31 January 2013
Partners: Fraunhofer IAO, PDV-Systeme Sachsen GmbH, Softwareparadies GmbH & Co. Systemlösungen KG
Contact: Prof. Dr. André Hinkenjann,
Thorsten Roth, M.Sc., Anton Sigitov, M.Sc.





Volt

Interactive Direct Volume Rendering with CUDA

The rendering of volumetric data has reached a high level of quality today, whilst interactive frame rates are maintained. The volume renderer Volt enables semi-transparent real-time rendering of volumetric datasets with Nvidia CUDA. Direct sampling of three-dimensional space is largely bound by memory accesses, but its inherently parallel nature and the rather good spatial locality of sampling points fits to CUDA's scheme of work packet organisation and scheduling, resembling packet tracing. This project was started as a renderer, where displayed datasets could not exceed the size of the Graphics Processing Unit's memory. While the amount of memory has increased, the promises of Big Data have already led to the desire of visually analysing very large volume datasets. In Computational Fluid Dynamics, petabytes are the usual quantity. Data and displays provide the means for very detailed visualisation sessions, but hardware and algorithms have to improve. Volt has already been extended to handle large volumetric multi-resolution datasets. Current work focuses on the out-of-core memory management, the multi-resolution rendering process itself and acceleration methods.

The data for interactive low-opacity visualisation of heterogeneous regions in a climate simulation with Volt were kindly provided by DKRZ GmbH, Hamburg, Germany.

Contact: Prof. Dr. André Hinkenjann,
Oliver Jato, M.Sc.

Interactive Distributed Rendering

Distributed Rendering for Interactive Multi-Screen Systems Based on XNA Game Studio

In interactive multi-screen visualisation environments, every output device has to be constantly supplied with video information. Such visualisation environments often use large projection screens, which require high resolution visualisation data.

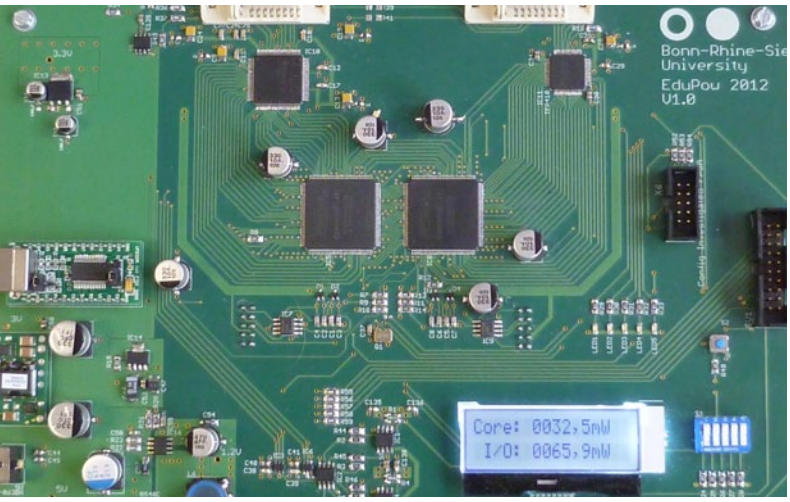
An efficient approach to master this challenge is to distribute the workload to multiple low-cost computer systems.

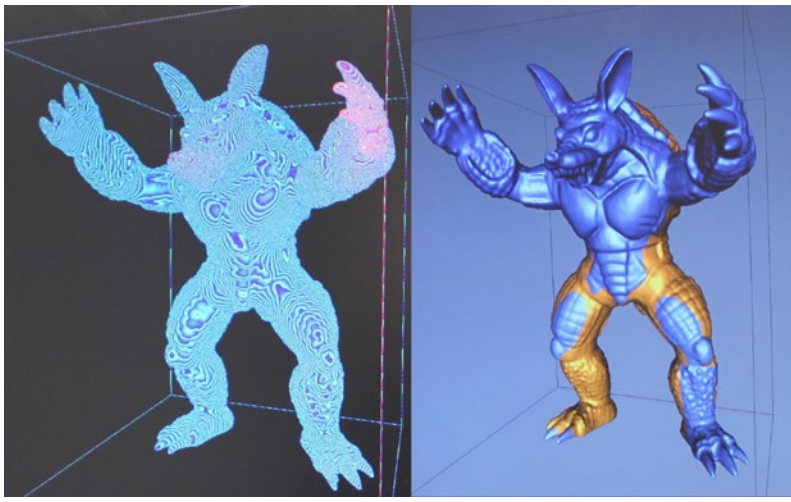
Today's game consoles are very powerful and specialised for interactive graphics applications; therefore, they are well suited to be applied for computationally expensive rendering purposes in real-time applications.

The proposed solution has been developed on Microsoft's XNA Game Studio. It supports interactive distributed rendering on multiple Xbox 360 and PC setups. Application logic synchronisation and network session management are completely handled by dXNA. The interface of dXNA is similar to XNA Game Studio's interface, which allows for efficient porting of existing projects.

It has been proven that dXNA is an efficient and lightweight solution for distributed rendering for interactive multi-screen visualisation environments.

Partners: Microsoft, Cologne
Contact: Prof. Dr.-Ing. Rainer Herpers





EduPow

Evaluation System for Low-Power Design Education

Power dissipation in electronic systems has become a design constraint as important as factors such as size, weight, cost, or time to market. University education should therefore teach low-power design to students of electrical engineering. In this project, an evaluation system is developed that can be used in hands-on lab sessions on digital design and low power design.

The system uses an FPGA (Field Programmable Gate Array) as a programmable device for image processing. Different algorithms and implementations can be programmed by students. This allows for experimentation with various factors contributing to power consumption in digital circuits. A prototype of the evaluation system is available and will be used by students in projects. This teaching experience will help to further develop this architecture.

Funding provided by Erasmus Mundus and Kreissparkasse Köln.

Contact: Prof. Dr.-Ing. Marco Winzker,
Dipl.-Ing. Andrea Schwandt

Pixelstrom

FPGA-based Image Compositing

Pixelstrom is an FPGA-based image composition system for low latency and large scale visualisation. The compositor can be used for parallel rendering cluster setups, replacing the need to send image information via a standard network. Recently, we shifted from commercially available, versatile, but expensive evaluation boards to our own PCB design. In addition we implemented and evaluated the sort-last and sort-first compositing approach where the content to be visualised is distributed across the rendering computers, allowing to display much larger scenes. Also, we developed an idea how to synchronise the incoming video signals without depending on expensive professional graphics boards and video synchronise option boards.

The system is designed to visualise large scale models/scenes and highly complex shaders in real-time. In comparison to traditional parallel graphics systems the realised FPGA-based system reduces network traffic, latency and memory accesses by directly grabbing the rendered sub-images/sub-scenes from the DVI-Ports of the render nodes. An especially designed hardware combiner merges the rendered sub-images and sub-scenes.

This project is supported by the Federal Ministry of Education and Research (BMBF) grant No. 1739X09.

Duration: 01 January 2010 – 31 December 2011
Partners: Fraunhofer IAO, imsys GmbH & Co. KG
Contact: Prof. Dr. André Hinkenjann,
Dipl.-Math. (FH) Jens Maiero, M.Sc.,
Prof. Dr.-Ing. Marco Winzker

Funding Programmes for International Cooperation

Bilateral DAAD Programmes for Co-operative Research Grants (PPP)

The Computer Vision Laboratory of the Institute for Visual Computing is working with Prof. Ken Kent from University of New Brunswick (UNB) in Canada on the development of a generic framework for Computer Vision approaches to be applied on FPGA platforms. Moreover, the realisation of several prototype implementations coupled with functional and performance evaluations of sample applications are intended to be performed. DAAD is funding the research mobility of students and staff between the Bonn-Rhein-Sieg University of Applied Sciences (BRSU) and University of New Brunswick through its programme for co-operative research grants or PPP-programmes (Programme des Projektbezogenen Austauschs).

Avempace Erasmus Mundus

Avempace is the name for the Erasmus Mundus partnership of about 20 universities in Europe and the Middle East Region (Jordan, Syria, Lebanon, Palestine) that organises a huge number of student and staff mobilities between the European and the partner region. The spectrum of scholarships varies from undergraduate exchange (up to 10 months), Master exchange and degree (up to 2 years), PhD (3 years), Postdoc (6 months) and staff exchange (1 month). The Institute for Visual Computing has so far received two PhD scholars and a number of short term exchanges funded by the European Commission. More detailed information can be found at www.avempace.eu

International Study and Training Partnerships (ISAP)

With its ISAP-programme ("Internationale Studien- und Ausbildungspartnerschaften"), DAAD is funding undergraduate and graduate student mobility for 4-10 month stays. It is a group programme for highly qualified German and foreign students who complete a fully accredited study period of one or two terms within a partnership related to the specific field. Currently, the Department of Computer Science of BRSU is offering scholarships for two Canadian partner universities: York University in Toronto and the University of New Brunswick in Fredericton.

International Dual Degree Programmes

The Department of Computer Science is developing dual degree programmes with several partner universities. The exchange programmes are installed on graduate and undergraduate level with the University of New Brunswick in Fredericton and with York University in Toronto. Funding of student and staff mobility has been issued by the Transatlantic Exchange Partnership Programme of the European Commission. Another dual degree programme with the German Jordanian University in Amman will be funded by DAAD.

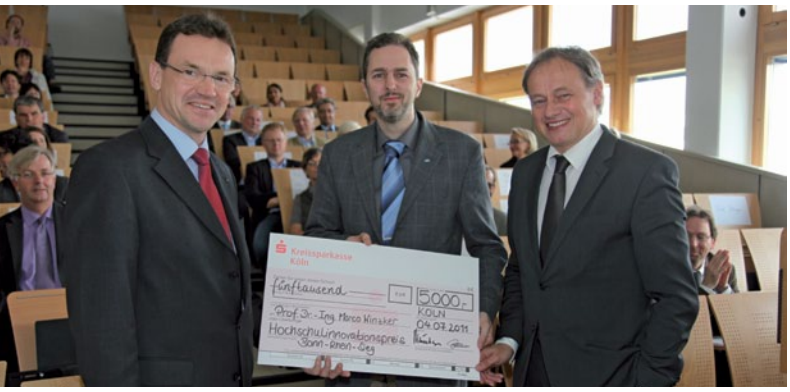
International Summer Schools

The Department of Computer Science and IVC offer a range of summer school programs for their students as well as incoming students from partner institutions. The annual summer school mounted by the department in June since 2009 is a full course (6 ECTS) on a core topic in Computer Science taught in a period of four weeks. Students from all partner universities are invited to participate in the course that is accompanied by a basic course on German language and other academic and nonacademic activities. The outgoing students from the Bonn-Rhein-Sieg University of Applied Sciences have different similar opportunities to acquire international experience by attending a summer school mounted at one of our partner institutions in Canada, Russia or Jordan.

- Summer School at York University, Toronto, July 11th - July 28th, 2011, "Database Management Systems" (CS 4411)
- Summer School at UNB, Fredericton, July 4th - August 11th, 2011, "Operating Systems I" (CS 3413)
- Summer School at UNB, Fredericton, July 4th - August 11th, 2011, "Computer Architecture and Organisation" (CS 3853)
- Summer School at Ufa State Aviation Technical University, Ufa, Russian Federation, July 16th - July 29th, 2012, "Neuroinformatics"

Contact for International cooperation and funding programmes: Prof. Dr.-Ing. Rainer Herpers, Nadine Kutz M.A.

Awards



Prof. Dr.-Ing. Marco Winzker
6 June 2011

Prof. Dr.-Ing. Marco Winzker received the innovation award of Bonn-Rhein-Sieg University of Applied Sciences for his project "Time frame for self-learning and projects".

Martin Weier
08 September 2011

Martin Weier won one of the "AFCEA Studienpreis" awards for his Master's thesis about the generation and visualisation of large vegetated areas.

Martin Weier
19 September 2011

Together with a team of authors, research associate Martin Weier received the Best Paper Award at the GI Workshop on Virtual and Augmented Reality 2011 at the University of Applied Sciences in Wedel.

Prof. Dr. Marco Winzker
23 April 2012

Prof. Dr. Marco Winzker has been awarded for the best paper at the IEEE EDUCON for his work on the 4-1-4-1-4-1 model.

Lidia Rosario Torres López
02 October 2012

Lidia Torres received the award for the best Master Thesis by a female at Bonn-Rhein-Sieg University: "Representation of Temporary Occluded Image Regions by Region-based Gaussian Mixture Models".

Martin Weier, M.Sc. in Computer Science

IVC supervisor
Prof. Dr. André Hinkenjann

External supervisor
Prof. Dr. Philipp Slusallek, University of Saarland

Research topic
Darstellung hoch komplexer Geometrien mit Level-of-Detail am Beispiel großer bewachsener Landschaften

Sven Seele, M.Sc. in Computer Science

IVC supervisor
Prof. Dr. Rainer Herpers

External supervisor
Prof. Dr. Christian Bauckhage

Research topic
Cognitive Agents for Microscopic Traffic Simulations in Virtual Environments

Publications

2011

1. Bochem, A., Deschenes, J., Williams, J., Losier, Y. and Kent, K.B.: An FPGA Design for Monitoring CAN-bus Traffic in a Prosthetic Limb Sensor Network, IEEE Rapid Systems Prototyping Symposium, Karlsruhe, Germany, pp. 30-36, 2011.

2. Bochem, A., Kent, K.B., Herpers, R.: FPGA based Real-Time Object Detection Approach with Validation of Precision and Performance, Proceedings of the 22nd IEEE International Symposium on Rapid System Prototyping, pp. 9-15, 2011.

3. Dombrowski, M., Losier, Y., Kent, K.B., Herpers, R.: Monitoring Bus Load of an Open Bus Standard-based Prosthetic Limb System, Technical Report 11-212, Faculty of Computer Science, University of New Brunswick, 2011.

4. Engels, K., Herpers, R., and Hartmann, U.: Biomechanical Computer Models, V. Klinka (Ed.), In book: Theoretical Biomechanics, ISBN: 978-953-307-851-9, 2011.

5. Heiden, W., Turek, M., Schöning, M.J.: Analysis of Chemical Sensor Data , Proceedings of the 4th Russian-German Workshop Innovation Information Technologies: Theory and Practice, pp. 76-81, 2011.

6. Heiden, W., Turek, M., Schöning, M.J.: TasteIT – Analyzing Chemical Sensor Data Using Fuzzy Logic, Proceedings of the IEEE Symposium Series on Computational Intelligence (SSCI 11), pp. 1-6, 2011.

7. Heisenberg, G., Göbel, M., Hinkenjann, A., Heiden, W., Winzker, W., Herpers, R., Scholl, R., Reinert, D.: Institute of Visual Computing at the Bonn-Rhine-Sieg University of Applied Sciences, Germany, SBC Journal on 3D Interactive Systems, Volume 2, Num. 2, pp. 32-35, 2011.

8. Herpers, R., Scherfgen, D., Kutz, M., Felsner, S., Hartmann, U., Bongartz, J., Schulzyk, O.: The FIVIS Project: An Immersive Bicycle Simulation System, Proceedings of the 4th Russian-German Workshop "Innovation Information Technologies: Theory and Practice", 2011.

9. Herpers, R., Saitov, T, Scherfgen, D., Kutz, M., Bongartz, J., Hartmann, U., Schulzyk, O., Felsner, S., Steiner, H., Reinert, D.: Multimedia Sensory Cue Processing in the FIVIS Simulation Environment, Multiple Sensorial Media Advances and Applications: New Developments in MulSeMedia, IGI Global, 2011.

10. Ihne, H., Clement, R., Herpers, R.: Graduierteninstitut an Fachhochschulen als Nukleus wissenschaftlicher Nachwuchsförderung, Die Neue Hochschule, 2011.

11. Jato, O., Hinkenjann, A.: Volt: Interaktives Volumenrendering mit CUDA, 8. Workshop Virtuelle und Erweiterte Realität der GI-Fachgruppe VR/AR, pp. 73-84, 2011.

12. Mannuß, F., Rübel, J., Wagner, C., Bingel, F., Hinkenjann, A., Augmenting Magnetic Field Lines for School Experiments, International Symposium on Mixed and Augmented Reality (ISMAR 11), 2011.

13. Nasartschuk, K., Kent, K.B., Herpers, R.: Visualisation Support for FPGA Architecture Exploration, Technical Report 11-213, Faculty of Computer Science, University of New Brunswick, 2011.

14. Roth, T., Hinkenjann, A.: GrIP: A Framework for Experiments with Screen Space Algorithms, 8. Workshop Virtuelle und Erweiterte Realität der GI-Fachgruppe VR/AR, pp. 85-96, 2011.

15. Roth, T, Hinkenjann, A.: Graph Based Post Processing of Visual Data for Interactive Graphics, Eighth UNB Research Exposition, 2011.

16. Scherfgen, D., Saitov, T., Herpers, R., Dayangac, E.: An Optical Laser-based User Interaction System for CAVE-type Virtual Reality Environments, Proceedings of the 4th Russian-German Workshop "Innovation Information Technologies: Theory and Practice", 2011.

17. Schild, J., Seele, S., Masuch, M.: YouDash3D - Exploring Depth-based Game Mechanics and Stereoscopic Video in S3D Gaming, Proceedings of the 8th International Conference on Advances in Computer Entertainment Technology, 2011.

18. Schild, J., Seele, S., Masuch, M.: Integrating Stereoscopic Video in 3D Games, Proceedings of the 10th International Conference of Entertainment Computing (ICEC 11), pp. 124-135, 2011.

2011

19. Schlösser, M., Herpers, R., Kent, K.B.: Accelerating the MMD algorithm using Multi-core Environments, Proceedings of the IEEE Pacific Rim Conference on Communications, Computers and Signal Processing (PacRim), pp. 340-345, 2011.

20. Weier, M., Hinkenjann, A., Demme, G., Slusallek, P.: SILVA: System to Instantiate Large Vegetated Areas, 8. Workshop Virtuelle und Erweiterte Realität der GI-Fachgruppe VR/AR, pp. 97-108, 2011.

21. Winzker, M., Schwandt, A., Hinkenjann, A., Maiero, J., Bues, M.: FPGA-based Image Combiner for Parallel Rendering, IEEE International Conference on Signal and Image Processing Applications, pp. 427-432, 2011.

22. Winzker, M., Schwandt, A.: Teaching Embedded System Concepts for Technological Literacy, IEEE Transactions on Education, Vol.54, pp. 210-215, 2011.

2012

1. Bochem, A., Kent, K.B., Herpers, R.: FPGA based Real-Time Object Tracking Approach with Validation of Precision and Performance, Proceedings of the 15th Euromicro Conference on Digital System Design (DSD2012), pp. 122-127, 2012.

2. Bremser, M., Mittag, U., Weber, T., Rittweger, J., Herpers, R.: Diameter Measurement of Vascular Structures in Ultrasound Video Sequences, Bildverarbeitung für die Medizin 2012, Springer Berlin Heidelberg, pp. 165-170, 2012.

3. Dombrowski, M., Kent, K.B., Herpers, R., Losier, Y., Wilson, A.: Analyzing Bus Load Data Using an FPGA and a Microcontroller, Proceedings of the 15th Euromicro Conference on Digital System Design (DSD2012), pp. 128-131, 2012.

4. Goffart, M., Dueck, G.W., Herpers, R.: A Comparison of Fixed and Variable Block Allocation in two Java Virtual Machines, Proceedings of the International Conference on Software Technology and Engineering (ICSTE 2012), 2012.

5. Harris, L.R., Herpers, R., Jenkin, M., Allison, R.S., Jenkin, H., Kaprolos, B., Scherfgen, D. und Felsner, S.: The relative contributions of radial and laminar optic flow to the perception of linear self-motion, Journal of Vision, 12 (10), pp. 1-10, 2012.

6. Heisenberg, G., Natarajan, R.K., Rezaei, Y.A., Simon, N., Heiden, W.: Robust EEG time series transient detection with a momentary frequency estimator for the indication of an emotional change, 6th Workshop of Emotion and Computing at the 35th German Conference on Artificial Intelligence (KI 2012), 2012.

7. Mannuß, F., Bingel, F., Hinkenjann, A.: Extending an Existing VR Software Framework to support AR Applications - With an Example from Physics Classes, Special Issue of SBC Journal on 3D Interactive Systems (JIS), 2012.

8. Mannuß, F., Hinkenjann, A.: From VR to AR - Adding AR Functionality to an Existing VR Software Framework, XIV Symposium on Virtual and Augmented Reality, Brazil, 2012.

9. Mathew, T.M., Herpers, R., Rittweger, J., Zange, J.: A Computer Game based Motivation System for Human Physiology Studies, Proceedings of the 3rd International Conference on Serious Games Development and Applications (SGDA2012), Springer LNCS 7528, pp. 123-134, 2012.

10. Nasartschuk, K., Herpers, R. and Kent, K. B., "Visual Exploration of Changing FPGA Architectures in the VTR Project", Euromicro Conference on Digital System Design (DSD), 2012.

11. Nasartschuk, K., Herpers, R. and Kent, K. B.: Visualisation Support for FPGA Architecture Exploration, Proceedings IEEE International Symposium on Rapid System Prototyping (RSP 2012). Tampere, Finland, 2012.

12. Schild, J., Seele, S., Masuch, M.: YouDash3D: Exploring Stereoscopic 3D Gaming for 3D Movie Theaters, Proceedings of the Stereoscopic Displays and Applications XXIII, SPIE 2012, Volume 8288, 2012.

Publications

2012

13. Seele, S., Dettmar, T., Herpers, R., Bauckhage, C., Becker, P.: Cognitive Aspects of Traffic Simulations in Virtual Environments, Simulation Notes Europe (SNE) Special Issue: Simulation of Traffic Systems - Technical Systems, Vol. 22, Num. 2, pp. 83-88, 2012.

14. Seele, S., Herpers, R., Bauckhage, C.: Cognitive Agents for Microscopic Traffic Simulations in Virtual Environments: Entertainment Computing - ICEC 2012, Springer Berlin Heidelberg, Volume 7522, pp. 318-325, 2012.

15. Seele, S., Dettmar, T., Herpers, R., Bauckhage, C., Becker, P.: Cognitive Aspects of Traffic Simulations in Virtual Environments , Tagungsband ASIM/GI-Fachgruppentreffen STS/GMMS, Workshop Simulation technischer Systeme - Grundlagen und Methoden in Modellbildung und Simulation, pp. 301-304, 2012.

16. Winzker, M.: Semester Structure with Time Slots for Self-Learning and Project-Based Learning, IEEE EDUCON Education Engineering, 2012.

17. Zotos, E. and Herpers, R.: Interactive Distributed Rendering of 3D Scenes on multiple Xbox 360 Systems and Personal Computers, IEEE Proc. Cyberworlds 2012 Darmstadt, Germany, IEEE, pp. 114-121, 2012.

SS'11

Grundlagen der medizinischen Bildverarbeitung (BCS)	Prof. Dr. Heiden
Hypermedia (BCS)	Prof. Dr. Heiden
Game Development (BCS)	Prof. Dr. Heiden, Prof. Dr. Hinkenjann
Computer Vision (MCS)	Prof. Dr.-Ing. Herpers
Praktikum Medieninformatik (BCS)	Prof. Dr. Hinkenjann
Computergrafik (BCS)	Prof. Dr. Hinkenjann
Interdisziplinäre Anwendung von Visual Computing (MCS)	Prof. Dr. Hinkenjann
Digitaltechnik 2 (BCS)	Prof. Dr.-Ing. Winzker
Programmierbare Systeme (BCS)	Prof. Dr.-Ing. Winzker
Bachelorprojekt - FPGA (BCS)	Prof. Dr.-Ing. Winzker
Digitale Signalverarbeitung - FPGA (MCS)	Prof. Dr.-Ing. Winzker

WS'11/12

EPro "Digital Hypermedia Storytelling" (BCS)	Prof. Dr. Heiden
Grundlagen Biomedizinische Informatik (BCS)	Prof. Dr. Heiden
Wissenschaftliche Visualisierung (MCS)	Prof. Dr. Heiden
Computer Vision (MCS)	Prof. Dr.-Ing. Herpers
Seminar Medieninformatik (BCS)	Prof. Dr. Hinkenjann
Interdisziplinäre Anwendung von Visual Computing (MCS)	Prof. Dr. Hinkenjann
Digitaltechnik 1 (BCS)	Prof. Dr.-Ing. Winzker
Elektronik für Technikjournalisten (BCS)	Prof. Dr.-Ing. Winzker

SS'12

Grundlagen der medizinischen Bildverarbeitung (BCS)	Prof. Dr. Heiden
Hypermedia (BCS)	Prof. Dr. Heiden
Game Development (BCS)	Prof. Dr. Heiden, Prof. Dr. Hinkenjann
Fortgeschrittene Virtuelle Umgebungen (MCS)	Dr. Heisenberg, Prof. Dr. Hinkenjann
Computergrafik (BCS)	Prof. Dr. Hinkenjann
Digitaltechnik 2 (BCS)	Prof. Dr.-Ing. Winzker
Programmierbare Systeme (BCS)	Prof. Dr.-Ing. Winzker
Bachelorprojekt - FPGA (BCS)	Prof. Dr.-Ing. Winzker
Digitale Signalverarbeitung - FPGA (MCS)	Prof. Dr.-Ing. Winzker

WS'12/13

EPro "Digital Hypermedia Storytelling" (BCS)	Prof. Dr. Heiden
Grundlagen Biomedizinische Informatik (BCS)	Prof. Dr. Heiden
Wissenschaftliche Visualisierung (MCS)	Prof. Dr. Heiden
Computer Vision (MCS)	Prof. Dr.-Ing. Herpers
Seminar Medieninformatik (BCS)	Prof. Dr. Hinkenjann
Interdisziplinäre Anwendung von Visual Computing (MCS)	Prof. Dr. Hinkenjann
Starterprojekt (BCS)	Prof. Dr.-Ing. Winzker
Elektronik für Technikjournalisten (BCS)	Prof. Dr.-Ing. Winzker

Bachelor's and Master's Theses

Bachelor's Theses 2011

Markus Andree, RealWorld Snake: Exemplarische Implementierung eines Location Based Games auf der Android Platform.
Supervised by Prof. Dr. Peter Becker.

Matthias Bremser, Continuous Diameter Measurement of Vascular Structures in Ultrasound Video Sequences.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Martin Koch, Steuerung einer virtuellen Umgebung durch Gestenerkennung mittels Kinect.
Supervised by Prof. Dr. André Hinkenjann.

Nicolas Kopp, Ein System zur intuitiven Navigation in stereoskopischen interaktiven Umgebungen.
Supervised by Prof. Dr. André Hinkenjann.

Dimitrij Mackert, Comic-Reader-Webanwendung für das Lesen von Comics auf mobilen Geräten.
Supervised by Prof. Dr. Wolfgang Heiden.

Christian Meller, Konzeption und Entwicklung einer Filterfunktion sowie der Optimierung von Zustandsspeicherungen in einer Hypermedia Novel.
Supervised by Prof. Dr. Wolfgang Heiden.

Sven Schmidt, Skeleton Tracking, Modellierung eines virtuellen Avatars und Einbindung in eine virtuelle Umgebung mittels Kinect.
Supervised by Prof. Dr. André Hinkenjann.

Stefan Schuster, Entwicklung eines 3D-Charakterisierungsmessplatzes mit anschließender Charakterisierung eines autostereoskopischen 3D-Displays.
Supervised by Prof. Dr. Robert Scholl.

Michael Wahlen, Erstellung eines Frameworks für Partikelsysteme auf der Basis von parallelen Algorithmen.
Supervised by Prof. Dr. André Hinkenjann.

Tobias Willig, MAGE – eine 2D Graphic-Engine für HTML 5.
Supervised by Prof. Dr. Wolfgang Heiden.

Evangelos Zotos, Interactive Distributed Rendering of 3D Scenes on multiple Xbox 360 Systems.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Bachelor's Theses 2012

Christoph Arping, Aufbau einer automatisierten Messapparatur zur optischen 3D Charakterisierung von autostereoskopischen 3D Multi-View Displays.
Supervised by Prof. Dr. Robert Scholl.

Arnold Maria Brinkmann, Konzeption und Implementierung eines browserbasierten Präsentationsmodus für Hypermedia Novels.
Supervised by Prof. Dr. Wolfgang Heiden.

Stefan Krämer, Echtzeitfähige Wolkensimulation für 3D-Spielwelten.
Supervised by Prof. Dr. André Hinkenjann.

Ayla Nothbaum, Evaluierung der HyperMedia Novel-Plattform auf Eignung für multimediale Tutorials.
Supervised by Prof. Dr. Wolfgang Heiden.

Pascal Schneiders, Gestenbasierte immersive Modellierung.
Supervised by Prof. Dr. André Hinkenjann.

Stephan Steenken, Parametrisierung und Evaluation eines Interlacing-Algorithmus auf verschiedenen Lentikulardisplays.
Supervised by Prof. Dr. Robert Scholl.

Maurice Velte, A MIDI Controller based on Human Motion Capture.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Hojun Yun, Approximation von Aufnahmefehlern optischer Systememit graphbasiertem Postprocessing (GrIP).
Supervised by Prof. Dr. André Hinkenjann.

Master's Theses 2011

Muhammad Usman Awais, An adaptive search tool for power point objects.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Markus Goffart, Comparison of Memory Allocation in the Jamaica and Oracle Java Virtual Machines.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Jain Lalit Prithviraj, Shape optimization of a deformable 3D face model with respect to multiple 2D views.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Thorsten Roth, Entwicklung einer graphbasierten Postprocessing-Bibliothek für Screenspace-Effekte auf Basis von NVIDIA CUDA und beispielhafte Implementierung einer Auswahl von Verfahren.
Supervised by Prof. Dr. André Hinkenjann.

Michael Schlösser, Enhancing the MMD Algorithm in Multi-core Environments.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Sven Seele, Stereoscopic 3D Games for Movie Theater Audiences.
Supervised by Prof. Dr. Wolfgang Heiden.

Muhammad Shahzad, Detection and tracking of pointing hand gestures for AR applications.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Master's Theses 2012

Enes Dayangac, Vision-based 6DoF Input Device Development with Ground Truth Evaluation.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Lidia Torres López, Representation of temporary occluded image regions by region-based Gaussian Mixture Models.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Tintu Merrin Mathew, A computer game based motivation system for human muscle strength Testing.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Jessica Millberg, Markerloses Modellbasiertes Echtzeit-Tracking für Augmented Reality Applikationen.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Nils Moritz Reichert, Correlation between Computer Recognized Facial Emotions and Informed Emotions during a Casino Computer Game.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Qaiser Riaz, Detection of humans analyzing Time-of-Flight video data.
Prof. Dr.-Ing. Rainer Herpers.

Stefan Schuster, Systementwurf eines autostereoskopischen 3D-Multiview-Interaktionssystems.
Supervised by Prof. Dr. Robert Scholl.

Anton Sigitov, Design eines Systems zur virtuellen Durchführung von Schulversuchen.
Supervised by Prof. Dr. André Hinkenjann.

Nicolas Simon, Analysieren und Bewerten der Einsatzmöglichkeiten des EPOC Neuroheadsets von Emotiv.
Supervised by Dr. Heisenberg, Prof. Dr. Heiden.

Eckart Sußenburger, Tracing Motivations in Virtual Creatures.
Supervised by Prof. Dr.-Ing. Rainer Herpers.

Programme Committees / Reviews

International Programme Committees

2011

- SVR Symposium on Virtual and Augmented Reality, Uberlândia, Brazil
- Gesellschaft für Informatik, Workshop der Fachgruppe VR/AR, Wedel, Germany
- ISVC International Symposium on Visual Computing, Las Vegas, USA
- JVRC Joint Virtual Reality Conference, Nottingham, UK
- IEEE Annual International Symposium, Virtual Reality
- IEEE International Conference on Signal and Image Processing Applications, ICSIPA 2011
- IEEE Engineering Education Conference, EDUCON 2011
- International Conference on Computer as a Tool & 8th Conference on Telecommunications, Eurocon 2011 & ConfTele 2011
- Computers & Graphics Journal, Elsevier
- JVRB Journal of Virtual Reality and Broadcasting
- Deutsche Forschungsgemeinschaft (DFG, German Research Community), 2011

2012

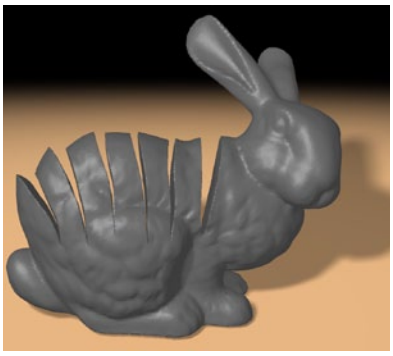
- CGVCVIP, IADIS Computer Graphics, Visualisation, Computer Vision and Image Processing Conference
- Gesellschaft für Informatik, Workshop der Fachgruppe VR/AR, Wedel, Germany
- ISVC International Symposium on Visual Computing, Las Vegas, USA
- IEEE Annual International Symposium, Virtual Reality
- WSCG International Conference on Computer Graphics, Visualiasation and Computer Vision
- IEEE Engineering Education Conference, EDUCON 2012
- IEEE Symposium on Industrial Electronics & Applications, ISIEA 2012
- IEEE Symposium on Computers and Communications, ISCC 2012
- IEEE International Conference on Teaching, Assessment, and Learning for Engineering, TALE 2012
- 20th Mediterranean Conference on Control and Automation, MED 2012
- HRK nexus, International Engineering Conference 2012
- CAVW, Journal Computer Animation and Virtual Worlds
- JVRB Journal of Virtual Reality and Broadcasting

National Programme Committees

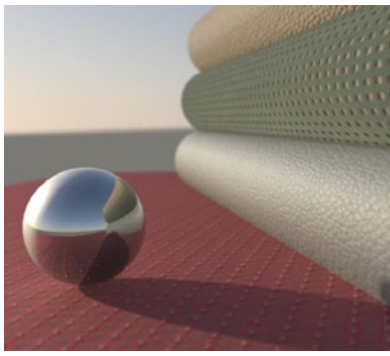
- GI, Department VR/AR, steering committee (expert)
- GI, Department Image Synthesis, steering committee
- GI, Department Graphic Data Processing (expert)
- Stifterverband (Association of Sponsors), Selection Committee Innolecture 2011
- Lehre-hoch-n – Das Bündnis für Hochschullehre (alliance for university teaching) – Member of "Community of Practice"

VC Colloquia

Prof. Dr. Rüdiger Westermann,
TU München,
Visual Computing in der Medizin,
20 January 2011



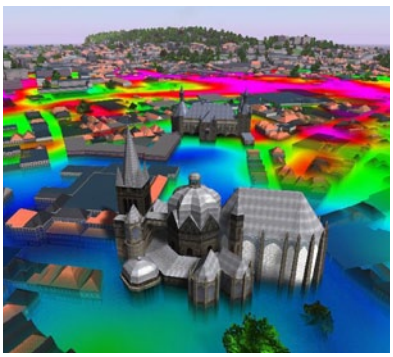
Prof. Dr. Reinhard Klein,
University of Bonn,
Towards a Perceptually Parameterized BTF Material Space,
12 January 2012



Prof. Gerhard Dueck,
University of New Brunswick, Canada,
Reversible Logic Synthesis: Status and Challenges,
10 March 2011

Prof. Laurence Harris, York Centre, Canada,
Visual and proprioceptive contributions to the perception of one's own body in space and time,
23 February 2012

Prof. Dr. Leif Kobbelt,
RWTH Aachen,
Interactive Recontruction,
11 May 2011



Prof. Dr. Didier Stricker,
German Research Center for Artifical Intelligence,
Towards Action-driven Interfaces and Adaptive Augmented Reality,
29 March 2012

Prof. Dr. Andreas Kolb, University of Siegen,
VC for Range and SAR Data,
16 June 2011

Prof. Dr. Marc Erich Latoschik, Uni. of Würzburg,
Intelligent, interaktiv, multimodal – Konzepte und Techniken neuartiger Benutzerschnittstellen,
10 November 2011

Roland Blach, Fraunhofer IAO,
Projektionsbasierte Multi-View-Systeme,
26 April 2012

Dr. George Ghinea, Brunel University, UK,
MulSeMedia – Multiple Sensorial Media-Research at Brunel University,
14 June 2012

Prof. Dr. Marc Stamminger,
University of Erlangen,
Tri/s vs. GB,
15 December 2011

Prof. Dr. Carsten Dachsbacher,
Karlsruhe Institute of Technology,
Globale Beleuchtung – ein gelöstes Problem oder eine Herausforderung?
03 July 2012

Dr. Sophie Jörg, Carnegie Mellon University, USA, Perceiving Errors in the Motions of Realistic Virtual Characters,
05 July 2012

Prof. Dr. Kenneth Kent,
University of New Brunswick, Canada,
Managing Garbage in a Java Virtual Machine,
10 December 2012

Exhibitions / Shows

FIVIS Project on TV in "Lokalzeit Bonn" (Local Time Bonn), WDR, Bonn,
23 May 2011

FIVIS Project on TV during the ARD theme week "Der mobile Mensch" (The Mobile Human) at "Die große Wissensshow mit Ranga Yogeshwar: Wie bewegt sich Deutschland?" (The Great Science Show with Ranga Yogeshwar: How does Germany move?), ARD, Cologne,
26 May 2011

EXAR and FIVIS Projects at "Tag der Technik 2011" (The Technology Day 2011), Düsseldorf,
17-18 September 2011

FIVIS Project at "Tag der Deutschen Einheit" (Day of German Unity) and "NRW-Tag" (NRW Day), Bonn,
01-03 October 2011

FIVIS Project at "Tagung der Fachberaterinnen und Fachberater Verkehrserziehung und Mobilitätsbildung" (Meeting of the counsellors and advisors for road safety education and mobility training), Haltern am See,
12-13 October 2011

EXAR Project at Ismar 2011, Basel, Switzerland,
26-29 October 2011

FIVIS Project at "Museumsmeilenfest Bonn 2012" (Museums Mile Festival 2012), Bonn,
07-10 June 2012

FIVIS Project at "Bonner Wissenschaftsnacht 2012" (Science Night in Bonn 2012), Bonn,
15 June 2012

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