TP·CG·05 @ Kent

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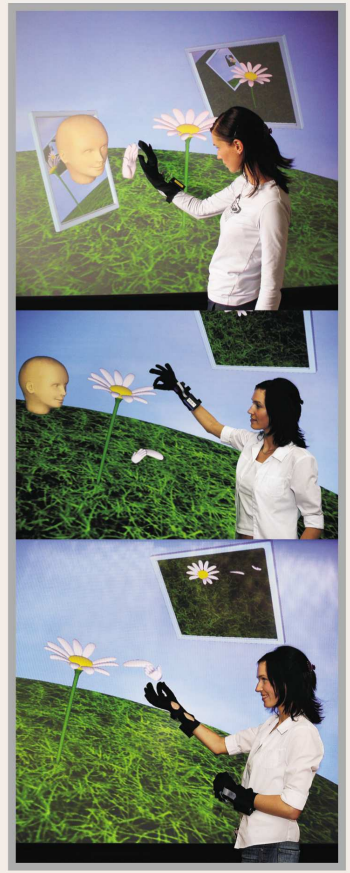
Theory and Practice of Computer Graphics 2005

Eurographics UK Chapter

Programme



The University of Kent
15 - 17 June 2005

Co-Sponsored by
Eurographics Association,
Blackwell Publishing,
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Conference Committee

Programme Chairs: Louise Lever, Mary McDerby

Local Organisation: Jonathan C. Roberts

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NOTES

NOTES

Welcome to Canterbury and the University of Kent.

This conference is the 23rd Conference organised by the UK Chapter of the Eurographics Association, and is the third **Theory and Practice of Computer Graphics** Conference (TP.CG.05).

The University was granted its royal charter in 1965 and the first students arrived in the October of that year. Hence this year is the University's 40th Anniversary. The main campus of the University is set in the beautiful city of Canterbury. Canterbury is a small city with a warm and friendly atmosphere, within easy reach of both London and France. The University of Kent has four colleges: Rutherford, Keynes, Eliot and Darwin. The main campus covers 300 acres and is just over a mile from Canterbury's city centre. Canterbury claims to have been permanently inhabited since pre-Roman times. Augustine established his first cathedral and abbey around AD 600, and in medieval times the city became a centre for pilgrimage to the shrine of St Thomas a Becket, made famous by Chaucer's Canterbury Tales. The playwright Christopher Marlowe was born here, and a few years ago the Treaty of Canterbury paved the way for the building of the Channel Tunnel.

This conference is hosted by the Computing Laboratory. The Computing Laboratory consistently achieves a high standard of teaching, and national and international recognition for our research and strong links with industry underpin all our work. Our research activity is wide ranging and takes place within focussed groups that provide a supportive community for our 50 research staff and a further 40 research students.

Research in the Laboratory benefits from broad links with industry, both in the UK and overseas. Sun Microsystems has given Kent Authorised Academic Java Campus status and we are also a Sun Target University. Sun is working closely with us to develop collaborative projects in a number of areas. The DTI sponsors the EnviSense centre based in the department, which is dedicated to supporting novel sensing techniques in the environment. Other industrial partners include BA, BAE Systems, BT, IBM, Microsoft, NAG, Nortel, Philips, and a variety of SMEs. We also offer advanced MSc modules as short courses for industry.

Arrangements

Accomodation:
The accomodation is in Tyler Court, which is marked 27 on the map.
If you arrive late you will be able to pick up your key from Rutherford College Reception which will be manned by the Caretaker until 10pm, after which it is manned by Security Staff from Campus Watch.

Registration & The conference
The conference is taking place in Keynes College, this is no. 39 on the University map.

Registration will take place in the foyer area outside Keynes Lecture Theatre 5 (KLT5)

The presentations will be in Keynes Lecture Theatres: 5 and 6 (KLT5, KLT6)

The demos will take place in Keynes Seminar Room 17 (which is next to KLT5) and just off the foyer.

Coffee tea will be in the foyer

Tutorials
After you have registered...

The Fractals tutorial will be taking place in Keynes Leture Theatre 5.

The AVS-Amira tutorial will be taking place in the Computing Laboratory in the Multimedia laboratory SE107, upstairs in the Computing Laboratory; marked 23 on the map.

Friday 17th June

PAPERS & PRESENTATIONS

11:30 Keynote (KLT5)

A Virtual Light Field for Global Illumination
Mel Slater and Pankaj Khanna

Abstract. This talk describes an algorithm that provides real-time walkthrough for globally illuminated scenes that contain mixtures of ideal diffuse and specular surfaces. A type of light field data structure is established with a large number of fixed rays that traverse a scene. The rays are partitioned into sets of parallel rays organised in a grid. Each ray is effectively segmented according to its intersections with objects in the scene. Light is propagated outward from the light sources along the precomputed fixed paths. Once this propagation has convered the scene can be rendered with almost constant time frame rate. A simplification of the data structure can also be used to speed up ray tracing. Although the method has many problems such as large memory requirements and some rendering artifacts, it is presented as a different way to think about how graphics may be done in the future. Very large fast memory may allow the 'frame buffer' to be replaced by a more complex structure that represents the distribution of light in the virtual environment. The talk may also include first results on user-based experiments in virtual reality with the VLF to examine the impact of more realistic rendering on presence.

12:30 Closing Remarks and Prizes

The Ken Brodlie Prize *will be awarded to the author(s) of the best paper on the basis of both the written paper and its presentation.*

The Terry Hewitt Prize *will be awarded to the best technical research student paper on the basis of both the written paper and its presentation.*

The Rob Fletcher Prize *will be awarded to the best student application paper on the basis of both the written paper and its presentation.*

12:45 Lunch (Eliot College Dining Hall)

Friday 17th June

PAPERS & PRESENTATIONS

SESSION ELEVEN: Virtual Reality and Environments (KLT5)

9:00 Click and Brush: A Novel Way of Finding Correlations and Relationships in Visualizations
M.A.E. Wright and J.C. Roberts

09:30 Real-time Realistic Crowd Simulation using Voronoi Diagrams
J. Champagne and W. Tang

10:00 VRECKO: Virtual Reality Framework
J. Flasar, L. Pokluda, R. Oslejsek, P. Kolcárek and J. Sochor

10:30 Ubiquitous Virtual Reality, Accessing Shared Virtual Environments through Videoconferencing Technology
T. Pfeiffer and M. Weber and B. Jung

11:00 Break (Foyer)

Wednesday 15th June

Registration
09:00 - 12:00

TUTORIALS

The following tutorials run concurrently:

Tutorial A (Keynes Lecture Theatre 1 - KLT1)
09:30 The use of Fractals and Noise in Computer Graphics
Martin Turner, University of Manchester

> *Computer games and cinema special effects owe much of their realism to the study of fractals. This short course will take you on a journey from the motion of a microscopic particle to the creation of imaginary planets.*

Tutorial B (Multimedia Laboratory, Octagon Computing Room SE107)
09:30 AVS-Amira
Chung Sybil Hoang and Mary McDerby, University of Manchester

> *This course will be an introduction to two scientific visualization toolkits: Amira and AVS/Express. Both systems work on the basis of connecting modules together which affect, amend and present data to display the results. They each provide scientific visualization methods for challenging problems in a range of fields including science, medicine and environmental, and engineering.*

Lunch 12 - 1pm (Eliot College dining hall)

Wednesday 15th June

PAPERS & PRESENTATIONS (KLT5)
13:00 Opening Remarks

13:05 Keynote

Going over old ground: archaeological visualisation and the HP Visual and Spatial Technology Centre at The University of Birmingham

Vincent Gaffney

Abstract. The HP Visual and Spatial Technology Centre (HP VISTA) at the University of Birmingham (UK) was established in March 2003. The Centre is equipped to international standards in order to undertake large scale remote sensing and visualisation projects with special emphasis on remote sensing and high definition survey. This paper will introduce the archaeological computing division of HP VISTA and describe some of the projects undertaken during the first years of the Centre's operation. These include high definition survey projects undertaken in Britain (including industrial sites at Ironbridge in Shropshire and on Catholme ritual complex in Staffordshire) and Italy (on the Roman municipium of Forum Novum in the Sabina) as well as the Centre's flagship project aimed at mapping the inundated Mesolithic land surfaces of the southern North Sea.

SESSION ONE: Animation (KLT5)

14:05 Keyframing Particles of Physically Based Systems
B. M. Dingle and J.Keyser

14:35 Real-Time Animation of Particles and Seaweeds in Underwater Scenes
Y. Coulais S. Thon, D. Ghazanfarpour and O. Terraz

15:05 Break (Foyer)

Thursday 16th June

PAPERS & PRESENTATIONS
PARALLEL SESSION SEVEN: Simulation (KLT5)

14:50 Fast Simulation of Facial Tissue Deformations Using Mass-Spring Chain Algorithm
A. Duysak and J. J. Zhang

15:15 Simulation and Visualization of a large scaled Real Time Multi-Robot system
G. Al-Hudhud, A. Ayesh & H. Istance and M. Turner

15:40 skML a Markup Language for Distributed Collaborative Visualization
D.A. Duce and M. Sagar

PARALLEL SESSION EIGHT: Interaction & Learning (KLT6)

14:50 The Data Surface Interaction Paradigm
R. Lindell and T. Larsson

15:15 Augmented Reality Scenarios for Guitar Learning
F. Liarokapis

15:40 Freehand 3D curve recognition and oversketching
L. Han, R. De Amicis and G. Conti

16:05 Break & Demos (Foyer & Seminar room 17)

CONFERENCE DINNER & CANTERBURY TOUR

16.45 Coach Pickup from The Venue nightclub by the roundabout (don't be late)
The tour will end with the Conference dinner at the County Hotel. Located on the pedestrianised high street in the heart of Canterbury.

Thursday 16th June

PAPERS & PRESENTATIONS

14:00 Keynote (KLT5)

Meshes, Unstructured Meshes and Beyond
Peter Lindstrom

Abstract. High-resolution 3D scanners and teraflop supercomputers have led to an explosion in the size and availability of acquired and synthetic geometric data sets. Today's meshes are measured in millions or even billions of elements, and greatly exceed the visualization capabilities of common desktops. While processor speed and storage size have by and large kept pace with this rapid data growth, bandwidth and latency of CPU/GPU memory and disk are quickly falling behind. As a result, it is becoming increasingly clear that we can no longer afford to ignore the importance of coherent data layout and access in graphics, or advances in algorithms and processor speed are doomed to yield diminishing returns.

We are investigating techniques for organizing and accessing geometric data in a more coherent and cache-friendly manner. Drawing upon well-known concepts in computer science, we are looking to extend techniques such as "windowed streaming" and "cache-oblivious" data structures and algorithms to the domain of unstructured meshes, with applications in offline digital geometry processing, interactive visualization, and GPU-based techniques.

Wednesday 15th June

SESSION TWO: Virtual Reality (KLT5)

15:30 Implementing an Improved Stereoscopic Camera Model
B. Froner and N. Holliman

16:00 Psychologically-Based Simulation of Human Behaviour
S.J. Rymill and N.A. Dodgson

16:30 AGM (KLT5)

18:30 Inaugural Dinner (Eliot College dining hall)

PAPERS & PRESENTATIONS

PARALLEL SESSION THREE: Rendering I (KLT5)

09:00 An Efficient Caching Technique for Rendering Translucent Materials
S-L Keng, W-Y Lee and J-H Chuang

09:30 Implementing FastMap on the GPU: Considerations on General-Purpose Computation on Graphics Hardware
G. Reina and T.Ertl

10:00 Selective Parallel Rendering for High-Fidelity Graphics
K. Debattista, V. Sundstedt, F. Pereira and A. Chalmers

PARALLEL SESSION FOUR: Work-In-Progress I (KLT6)

09:00 Developing Digital Visualization Of Virtual Heritage For Sarawak's Malay Traditional House
M.B.H.Shanat

09:20 Virtual Sculpting Using Implicit Surfaces with Scattered Data Interpolation
K. Zhang, R. A. Noble, R. J. McDermott and A. Wilson

09:40 Unifying Abstract and Physical Molecular Model Interaction
D. Thorne and S. Pettifer

10:00 Perceptually-Oriented Interest Management In Large-Scale Networked Virtual Environments
I. Dunwell and J. C. Whelan

10:30 Break & Demos (Foyer & Seminar room 17)

PAPERS & PRESENTATIONS

PARALLEL SESSION FIVE: Rendering II (KLT5)

11:15 Perceptual level of detail for efficient ray tracing of complex scenes
X.Yang and A.Chalmers

11:45 Cost Prediction Maps for Global Illumination
R.Gillibrand, K.Debattista and A.Chalmers

12:15 Towards Realism in Facial Image Archetyping: Results of a Wavelet MRF Method
B.M.Stirratt and D.Perrett

PARALLEL SESSION SIX: Work-In-Progress II (KLT6)

11:15 Perlin Noise and 2D Second-Order Tensor Field Visualization
J. Liu, J. Perrin, M. Turner and W.T. Hewitt

11:35 Simulating the Cumulative Effects of Multiple Impacts using 'Fracture Maps'
T. Clifton

11:55 Arachnid Simulation : Scaling Arbitrary Surfaces
L. ap Cenydd and W. Teahan

12:15 Visualization of Smoothed Particle Hydrodynamics fo Astrophysics
R.Walker, P.Kenny and J.Miao

12:45 Lunch & Demos (Eliot College Dining Hall & Seminar Room 17)