

M. Chen, P. Townsend and J.A. Vince (Eds)

---

# **High Performance Computing for Computer Graphics and Visualisation**

**Proceedings of the International Workshop on High  
Performance Computing for Computer Graphics and  
Visualisation, Swansea, 3-4 July 1995**



Springer

# Contents

Colour Plates .....	xiii
---------------------	------

## I Introduction

A Survey of Parallel Algorithms for Graphics and Visualization .....	3
--	---

Scott R. Whitman  
*Cray Research, Inc., USA*

Known and Potential High Performance Computing Applications in Computer Graphics and Visualization.....	23
--	----

Charles Hansen  
*Los Alamos National Laboratory, USA*

## II High Performance Rendering

GRAMMY: High Performance Graphics Using Graphics Memories .....	33
---	----

G. Knittel, A. Schilling and W. Straßer  
*University of Tübingen, Germany*

Assisting the Design and Optimisation of High Quality Parallel Renderers.....	49
--	----

Marcio Lobo Netto, Brigitta Lange and Christoph Hornung  
*Fraunhofer Institute for Computing Graphics (IGD-FHG), Germany*

A Classification Scheme for Rendering Algorithms on Parallel Computers .....	69
---	----

Alexander del Pino  
*Fraunhofer Institute for Computing Graphics (IGD-FHG), Germany*

Hybrid Scheduling for Efficient Ray Tracing of Complex Images .....	78
---	----

Erik Reinhard and Frederik W. Jansen  
*Delft University of Technology, Netherlands*

Scan-Line Methods for Parallel Rendering.....	88
---	----

Frank Dévai  
*University of Ulster, UK*

## III High Performance Volume Graphics

A Modular Massively Parallel Processor for Volumetric Visualisation Processing .....	101
---	-----

Anargyros Krikelis  
*Aspex Microsystems Ltd., UK*

<b>A Load Balancing Scheme for Parallelizing Hierarchical Splatting on a MPP System with a Non-Uniform Memory Access Architecture.....</b>	<b>125</b>
Roberto Grosso, Thomas Ertl and Rainer Klier	
<i>Universität Erlangen-Nürnberg, Germany</i>	

<b>Shared-Memory Multiprocessor Implementation of Voxelisation for Volume Visualization .....</b>	<b>135</b>
C.E. Prakash and S. Manohar	
<i>Indian Institute of Science, India</i>	

## **IV High Performance Animation and Visualisation**

<b>Parallel Processing for Photo-Realistic Emergency Lighting Visualisation .....</b>	<b>149</b>
Alan G. Chalmers and Thomas Ramstad	
<i>University of Bristol, UK</i>	

<b>Parallel Motion Synthesis.....</b>	<b>166</b>
Martin Preston	
<i>University of Manchester, UK</i>	

<b>Dynamic Terrain Generation Based on Multifractal Techniques.....</b>	<b>186</b>
Joost van Lawick van Pabst and Hans Jense	
<i>TNO Physics and Electronics Laboratory, Netherlands</i>	

## **V High Performance Virtual Environments**

<b>Collaborative and Interactive Visualization in a Distributed High Performance Software Environment .....</b>	<b>207</b>
D. Rantzau, U. Lang, R. Lang, H. Nebel, A. Wierse and R. Ruehle	
<i>University of Stuttgart, Germany</i>	

<b>Sharing Visualization Experiences Among Remote Virtual Environments.....</b>	<b>217</b>
Terrence L. Disz, Michael E. Papka, Michael Pellegrino and Rick Stevens	
<i>Argonne National Laboratory and University of Illinois at Chicago, USA</i>	

<b>Performance Models of Interactive, Immersive Visualization for Scientific Applications .....</b>	<b>238</b>
Valerie E. Taylor, Rick Stevens and Thomas Canfield	
<i>Northwestern University and Argonne National Laboratory, USA</i>	

## **VI High Performance Graphics Tools**

<b>Configuration Management of Distributed Applications and Services.....</b>	<b>255</b>
---	------------

**Morris Sloman**

*Imperial College of Science, Technology and Medicine, UK*

<b>Extensions to Linda for Graphical Applications .....</b>	<b>266</b>
---	------------

**George Wells and Alan Chalmers**

*University of Bristol, UK*

## **Glossary**

**Glossary of Graphics, Visualisation and High Performance**

<b>Computing Terms.....</b>	<b>277</b>
-----------------------------	------------

**Mark W. Jones**

*University of Wales, Swansea, UK*

<b>Author Index .....</b>	<b>289</b>
---------------------------	------------