

Piotr Bartłomiej Dubla

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SUMMARY

- **Academic:**
 - Degrees: BSc, BSc Hons, PhD (ongoing).
 - PhD in interactive global illumination in which a number of novel algorithms have been developed.
 - Development of a scalable and modular rendering system utilised by a number of colleagues in the lab.
 - Interests in high-fidelity rendering, photo-realistic image synthesis, real-time rendering and interactive global illumination and ray tracing.
- **Commercial:**
 - Five years of full-time commercial experience, two years part-time experience.
 - Number of different positions held (Project Leader, Team Leader and Developer) on a variety of projects.
 - Projects differed vastly in scope where the user-base ranged from 2 to 20,000+ users.
 - Experience working on an educational serious game project.
- **Personal:**
 - Programming since age 11.
 - General interest in computers, programming and game/graphics development from an early age. Continued work on fractals and augmented reality.

EDUCATION

University Of Warwick

Warwickshire, United Kingdom

Ph.D., Engineering, ongoing

- Title: Interactive Global Illumination on the CPU
- Advisors: Prof. Alan Chalmers and Dr. Kurt Debattista

In my PhD I have examined new algorithmic approaches to achieving interactive global illumination on the CPU by combining existing rendering algorithms with interactive ray tracing (IRT) and selective rendering (SR) methods. A framework has been introduced that identifies potential algorithms, breaks them up into relevant components and then pairs each one with an appropriate SR techniques to make full use of the available resources while maintaining spatial coherency where its most needed by IRT. Two novel algorithms have been developed that allow for global illumination at interactive rates on a desktop PC. *Adaptive interleaved sampling* combines interleaved sampling and adaptive rendering within a component-based solution into a generalised approach that allows for indirect diffuse illumination, soft shadows and participating media. *Instant Caching* presents a temporal irradiance cache that accounts for dynamic objects and changing materials without the need recalculate all the cache samples each frame. Both technique work at interactive rates and are compared against current state-of-the-art CPU techniques and are shown to be faster.

University Of Cape Town

Cape Town, South Africa

BSc (Hons), Computer Science, November 2005

- Dissertation: VizMark: Benchmarking Visibility Preprocessing
- Supervisor: Dr. James Gain
- Results: Placed on Dean's merit list, 80% (1st class)

University Of Cape Town

Cape Town, South Africa

BSc, Computer Science, November 2004

- Major: Computer Science
- Results: Placed on Dean's Merit List, 72% (2nd class)

EMPLOYMENT

The Digital Laboratory, University Of Warwick

Warwickshire, United Kingdom

Game Programmer (Part-time)

May. 2009 - Present

- Programmer on "Obesity in Childhood: a serious game", a PC-based development.
- Responsibilities include planning and design of the entire game engine along with integration of Wii peripherals such as the Wiimote and Balance Board with a focus on the implementation of the graphics engine and related technologies.
- Puzzle-adventure game with exercise-based interaction along with an educational component to teach essential nutritional information to children.
- Small budget, tight deadline with a five person team, three programmers, one artist and one manager.
- Funded by the Strategic Health Authority of the West Midlands.

The Digital Laboratory, University Of Warwick

PhD Student (Full-time)

Warwickshire, United Kingdom

Jul. 2006 - Present

- Planned and implemented an interactive global illumination framework for the purpose of testing newly developed algorithms and comparing these to existing algorithms. (PhD thesis)
- Framework consists of a modular renderer that is currently employed by several members of the research group for use in their respective research areas.
- Renderer is fully multi-threaded and runs in Windows, OSX and Linux in both 32bit and 64bit environments on a single machine as well as on a commodity cluster using MPI.
- A number of offline and interactive algorithms implemented, including:
 - Path tracing, Instant Global Illumination, Instant Radiosity, Progressive Photon Mapping

Clickthinking

Senior Developer (Flexi-time)

Cape Town, South Africa

May. 2001 - July. 2006

- Web development company developing high-end websites and full web strategies for a number of local and international clients.
- Functioned as Project Leader, Client Liaison, Team Leader and Developer on projects ranging in scope from 5 to 3000+ pages utilised by 4 to 20,000+ users.
- Developed and deployed fully custom and integrated front-end and back-end solutions in a variety of languages on multiple operating systems.
- Responsible for guiding the technical direction taken when choosing new technologies and for developing a highly customisable, modular and re-usable back-end and front-end system that was utilised on multiple projects.

Computer Science Department, University of Cape Town

Developer (Contract)

Cape Town, South Africa

Dec. 2000 - Feb. 2001

- Developed an interface to a newly acquired VR head-mounted display and 3D tracking system so that it could be combined with existing software already in use.
- Eight week project completed to specification and one week before deadline.

Scientific Data Systems: Networkd

Technical Support / Developer (Part-time)

Cape Town, South Africa

Jun. 1998 - July. 2001

- Hired as technician to perform telephone technical support for Networkd ISP, after two months became a developer.
- Planned and developed an online billing system to consolidate a number of different billing processes.
- Developed an installer CD with a number of different software packages for new customers.

PUBLICATIONS

Journal Papers

- **P. Dubla**, K. Debattista and A. Chalmers, "*Adaptive Interleaved Sampling for Interactive High Fidelity Rendering*", Computer Graphics Forum 2009, To Appear
- K. Debattista, **P. Dubla**, F. Banterle, L. P. Santos and A. Chalmers, "*Instant Caching for Interactive Global Illumination*", Computer Graphics Forum 2009, To Appear

Referred Conference Papers

- **P. Dubla**, K. Debattista, L. P. Santos and A. Chalmers, "*Wait-Free Shared-Memory Irradiance Cache*", Eurographics Workshop on Parallel Graphics and Visualization 2009
- V. Aggarwal, K. Debattista, **P. Dubla**, T. Bashford-Rogers and A. Chalmers, "*Time-constrained High-fidelity Rendering on Local Desktop Grids*", Eurographics Workshop on Parallel Graphics and Visualization 2009
- V. Hulusic, G. Czanner, K. Debattista, E. Sikudova, **P. Dubla** and A. Chalmers, "*Investigation of the beat rate effect on frame rate for animated content*", Spring Conference on Computer Graphics 2009
- J. Happa, M. Williams, G. Turley, G. Earl, **P. Dubla**, G. Beale, G. Gibbons, K. Debattista and A. Chalmers, "*Virtual Relighting of a Roman Statue Head from Herculaneum: A Case Study*", Afrigraph 2009
- D. Coulthurst, **P. Dubla**, K. Debattista, S. McIntosh-Smith and A. Chalmers, "*Parallel Path Tracing using Incoherent Path-Atom Binning*", Spring Conference on Computer Graphics 2009
- **P. Dubla**, A. Chalmers and K. Debattista, "*An Analysis of Cache Awareness for Interactive Selective Rendering*", The 16th International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision 2008
- M. Aranha, **P. Dubla**, K. Debattista, T. Bashford-Rogers and A. Chalmers, "*A Physically-Based Client-Server Rendering Solution For Mobile Devices*", 6th International Conference on Mobile and Ubiquitous Multimedia 2009

SKILLS

- **Languages:** C, C++, GLSL, Cg, CUDA, Java, Linux shell scripting, Python, MySQL, MSSQL, PHP, Javascript
- **APIs:** SSE Intrinsics, OpenGL, Trolltech QT, FMOD, OIS, FFTW, Boost, DirectX, MPI, OpenMP
- **Software:** Visual Studio 2003 - 2010, XCode, KDevelop, 3D Studio Max 9 - 10, Subversion, Photoshop, LaTeX
- **Operating Systems:** Windows (XP, Vista, 7), Linux (Redhat, Debian, Ubuntu, Fedora) and OSX.

RESEARCH EXPERIENCE AND INTERESTS

- **Interests**

- High-fidelity rendering, photo-realistic image synthesis, interactive global illumination and ray tracing, real-time rendering and augmented reality.

- **Reviewer:**

- Computer Graphics and Interactive Techniques (2007)
- Computer Graphics, Visualization, Computer Vision and Image Processing (2009).

- **Teaching:**

- Teaching Assistant for 1st and 2nd year Computer Science courses at UCT.
 - *A Crash Course in Everything Web 2.0*: 2nd year Computer Science module at University of Bristol.
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PERSONAL

- Began programming at the age of 11. Initial interests were all graphics related, early work was pure ASM in Pascal doing demo scene effects e.g. 2D bump-mapping and fire effects and basic 3D scanline renderers using gouraud-shading.
- Interested in a variety of graphics-related subjects such as fractal generation and rendering as well as augmented reality. Have been involved in a number of independent and personal game development projects.
- EU citizen with polish passport.
 - English: Native language (speaking, reading, writing)
 - Polish: Native speaker, working knowledge of reading and writing.