Pascal GAUTRON, Ph.D.

Age 32

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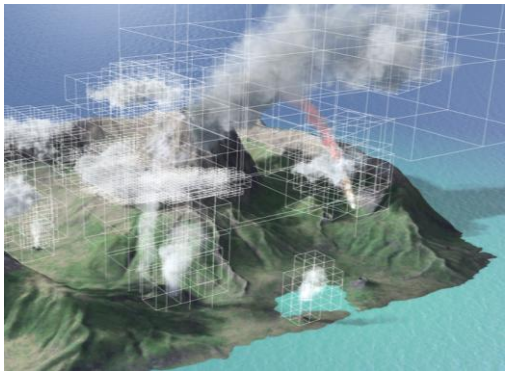

R&D Engineer in Rendering using Graphics Hardware

Current Situation

Senior Scientist, Technicolor Research & Innovation, Collective Creation Project

Technical Skills

- C/C++ 10 years experience
- Design of standalone applications and integration into existing software
- Use of UML and design patterns
- Implementation of ray tracing, subsurface scattering, irradiance/radiance caching, photon mapping
- Multithreading
- Development under MS Visual Studio .NET and Eclipse
- Use of CVS, SVN, ClearCase, Git

- GPU 9 years experience in OpenGL programming
- GLSL/Cg Shaders
- Design and implementation of GPU-Based Global Illumination: Radiance Cache Splatting
- GPU-Based volume rendering techniques

- Modeling/Rendering Software
- 3DSMax, basic knowledge of Maya and ZBrush
- Mental Ray, basic knowledge of Pixar’s RenderMan

- Languages
- Fluent English: numerous stays in the US and UK, conference presentations since 2003
- Basic German

Theoretical Background

- Rendering
- Base algorithms: Ray tracing, acceleration structures, rasterization , scanline rendering
- Global illumination: Radiosity, photon mapping, irradiance/radiance caching …
- Volume rendering and light scattering

- Geometric modelling ; Discrete geometry

- Signal and image processing

- Mathematics & Physics

Education

2006–2007 Post-Doctoral Research: “Real-time animation and rendering of virtual agents”
2003–2006 Ph.D. in Computer Science, Université de Rennes 1, France: “Radiance caching and graphics hardware for real-time global illumination in dynamic scenes“
2002–2003 Masters Degree : Signal Processing, Computer Science and Computer Graphics Internship: “Automatic parameterization of Monte-Carlo based rendering algorithms”
1998–2002 Studies in Computer Science, Physics and Mathematics, Univ. Poitiers, France

Summary of Research Work

R&D Engineering: High quality real-time rendering and Virtual humans

My goal at Technicolor Research & Innovation is the integration of lighting algorithms in the proprietary mixed reality framework as well as in the Moving Picture Company production pipeline. My duties include research on high quality shadows and indirect illumination [10], volumetric rendering [2,3,4,9,11,13], realistic virtual humans, navigation in complex sceneries [5,6,12,15], procedural modelling [1,7], software specification, documentation and robust C++ implementation. Focus on high quality streamed virtual worlds, real-time previsualization of large scenes for movie-postproduction and scalable algorithms for production rendering.

Post-Doctoral Research: Real-time animation and rendering of virtual agents

Context: This work was performed at France Telecom R&D (Rennes, France) under the supervision of G. BRETON, in collaboration with K. BOUATOUCH (IRISA, France).
Contributions: Anatomically accurate modelling and real-time rendering of human iris [17]. Development of a software framework for authoring and interacting with photorealistic virtual agents.

Ph.D.: Radiance caching and graphics hardware for realtime global illumination in dynamic scenes

Context: This thesis was prepared under the supervision of K. BOUATOUCH (IRISA, Univ. Rennes 1, France), and in close collaboration with S. PATTANAIK (University of Central Florida, Orlando, USA) and D. MENEVEAUX (Univ. Poitiers, France). Several stays in Florida.
Contributions: Definition of basis functions for efficient representation of hemispherical functions [23], and application to global illumination using radiance caching [21, 22]. Reformulation of the radiance caching algorithm for GPU implementation [20]. Definition of temporal radiance caching for flicker-free animation rendering [19]. Irradiance cache generation from photon map [16]. SIGGRAPH courses [18].

Masters Internship: Automatic Parameterization of Monte-Carlo Rendering Algorithms

Context: SIC Laboratory (Poitiers, France) under supervision of P. BLASI and L. AVENEAU.
Contribution: Definition of an adaptive method for global illumination using photon mapping. Improvement of the sampling quality and decrease of the computation time [24].

Supervisions

- **Masters students** (8x6 months) Irradiance caching; facial animation authoring; 3D displays; virtual humans…
- **PhD Student** Real time rendering of natural environments

Latest Publications

[1] C. Buron, J-E. Marvie, P. Gautron, G. Sourimant: GPU Shape Grammars – To appear in Pacific Graphics, 2012
[2] J. Esteve, J. Portsmouth, P. Gautron, J-C. Prunier, J-E. Marvie, C. Delalandre – To appear in DigiPro Symposium, 2012
[3] P. Gautron, C. Delalandre, J-E. Marvie, P. Lecocq: Volume-Aware Extinction Maps – To appear in SIGGRAPH Talks, 2012
[4] P. Gautron, C. Delalandre, J-E. Marvie: Extinction Transmittance Maps – SIGGRAPH Asia Sketch, 2011

Full List of Publications

[1] C. Buron, J-E. Marvie, P. Gautron, G. Sourimant: GPU Shape Grammars – To appear in Pacific Graphics, 2012
[2] J. Esteve, J. Portsmouth, P. Gautron, J-C. Prunier, J-E. Marvie, C. Delalandre – To appear in DigiPro Symposium, 2012
[3] P. Gautron, C. Delalandre, J-E. Marvie, P. Lecocq: Volume-Aware Extinction Maps – To appear in SIGGRAPH Talks, 2012
[4] P. Gautron, C. Delalandre, J-E. Marvie: Extinction Transmittance Maps – SIGGRAPH Asia Sketch, 2011
[5] P. Gautron, J-E. Marvie, G. Sourimant : Z^3 Culling – GPU Pro 3, A.K. Peters, 2012 – SIGGRAPH Talk, 2011
[6] J-E. Marvie, P. Gautron, P. Lecocq, O. Mocquard, F. Gérard : Streaming and Synchronization of Multi-User Worlds Through HTTP/1.1 – Web3D Symposium, 2011 – Best Paper Award
[7] J-E. Marvie, P. Gautron, P. Hirtzlin, G. Sourimant: Render-Time Procedural Per-Pixel Geometry Generation – Graphics Interface, 2011
[8] P. Gautron, J-E. Marvie, C. Buron : Real Light Grabbing – SCCG, 2011
[9] C. Delalandre, P. Gautron, J-E. Marvie, G. François: Transmittance Function Mapping – I3D Symposium, 2011
[10] G. Sourimant, P. Gautron, J-E. Marvie: Poisson-Disk Ray Marched Ambient Occlusion – I3D Symposium Posters, 2011
[11] C. Delalandre, P. Gautron, J-E. Marvie, G. François: Single Scattering in Heterogeneous Participating Media – SIGGRAPH Talk, 2010
[12] R. Lerbour, J.E. Marvie, P. Gautron: Adaptive Rendering of Planetary Terrains – WSCG 2010
[13] P. Gautron, J-E. Marvie, G. François: Volumetric Shadow Mapping – SIGGRAPH Talk, 2009
[14] J. Křivànek, P. Gautron: Practical Global Illumination with Irradiance Caching – Morgan & Claypool Eds – 2009
[15] R. Lerbour, J.E. Marvie, P. Gautron: Adaptive Streaming and Rendering of Large Terrains – WSCG 2009
[16] J. Brouillat, P. Gautron, K. Bouatouch : Photon-Driven Irradiance Cache – Pacific Graphics, 2008
[17] G. Francois, P. Gautron, G. Breton, K. Bouatouch: Image-Based Modeling of the Human Eye – IEEE TVCG, 2009 – SIGGRAPH Sketch, 2007
[18] J. Křivànek, P. Gautron, G. Ward, H.W. Jensen, E. Tabellion, P. Christensen: Practical Global Illumination With Irradiance Caching – SIGGRAPH 2007 Course #16, SIGGRAPH 2008 Course #63
[19] P. Gautron, K. Bouatouch, S. Pattanaik: Temporal Radiance Caching – IEEE TVCG, 2007 – SIGGRAPH Sketch, 2006
[20] P. Gautron, J. Křivànek, K. Bouatouch, S. Pattanaik: Radiance Cache Splatting: A GPU-Friendly Global Illumination Algorithm – EGSR, 2005 – SIGGRAPH Sketch, 2005
[21] J. Křivànek, P. Gautron, K. Bouatouch, S. Pattanaik: Improved Radiance Gradients Computation – SCCG, 2005
[22] J. Křivànek, P. Gautron, S. Pattanaik, K. Bouatouch: Radiance Caching for Efficient Global Illumination Computation – IEEE TVCG, 2005
[23] P. Gautron, J. Křivànek, S. Pattanaik, K. Bouatouch: A Novel Hemispherical Basis for Accurate and Efficient Rendering – EGSR, 2004
[24] P. Gautron, P. Blasi, L. Aveneau: Paramétrage Automatique des Algorithmes de Rendu par Méthodes de Monte Carlo – Actes des Journées de l'AFIG, 2003

Scientific Community

Reviewing for conferences SIGGRAPH, SIGGRAPH Asia, Eurographics, Eurographics Symposium on Rendering, Pacific Graphics, Spring Conference on Computer Graphics

Reviewing for journals ACM Transactions on Graphics, Computer Graphics Forum, IEEE Transactions on Visualization and Computer Graphics, IEEE Computer Graphics and Applications

Program Committee SIGGRAPH Asia 2011 sketches, SIGGRAPH 2012 Unified Jury