

Cyril Crassin

Ph.D Candidate

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<http://www.icare3d.org>

Research interests: voxel representations, real-time ray-tracing, parallel GPU algorithms & data structures, realistic rendering.

EDUCATION

- 2007 – present **Ph.D candidate in Computer Graphics.**
[UJF / INRIA](#), Grenoble, France. ARTIS Team (LJK-INRIA).
Dissertation topic: **Interactive exploration and rendering of large and detailed volumetric scenes.**
Working on hierarchical GPU data structures and algorithms for volume raycasting and raytracing of very large voxel scenes. Applications to indirect illumination. *Main aspects: rendering, volume visibility, filtering, large data sets management (out-of-core), complex GPU data structures, procedural details.*
Advisor: [Fabrice Neyret](#). Merit-based Ph.D grant **MENRT**. Ministry of Research and Higher Education.
- 2006 – 2007 **M.Sc in Computer Graphics.** With honors.
National Polytechnic Institute of Grenoble ([INPG](#)), Grenoble, France. EVASION Team (LJK-INRIA).
Structures and algorithms for real-time large and detailed procedural volumes exploration.
Advisor: [Fabrice Neyret](#). In collaboration with [Sylvain Lefebvre](#).
- 2003 – 2006 **M.Eng in Computer Science (Engineering School)** with Computer Graphics specialization.
Belfort-Montbéliard University of Technology ([UTBM](#)), Belfort, France.
Many academic projects: *3D engine based on OpenSceneGraph for [SeT](#) laboratory Virtual Reality Platform, Multi-Agent based stereo matching, large 3D terrain rendering, 3D game for mobile devices, 3D simulation of urban transports...* See www.icare3d.org for details.

PROFESSIONAL EXPERIENCE

- 2010 **NVIDIA Corporation.** Developer Technology group. *London, UK.*
2 months. Summer intern. Sparse voxel octree for indirect illumination.
- 2010 **Weta Digital.** Fx & Research group. *Wellington, NZ.*
3 months. R&D collaboration on voxel based special effects engine for movies production.
- 2008 **NVIDIA Corporation.** Developer Technology group. *London, UK.*
3 months. Summer intern. CUDA sparse voxel octree for video games.
- 2007 **INRIA Rhone-Alpes.** EVASION Team of LJK Laboratory. *Grenoble, France.*
6 months. Master's degree. Design and development of new data structures and algorithms for interactive exploration and rendering of large and detailed volumes on GPU. [Fabrice Neyret](#), [Sylvain Lefebvre](#).
- 2006 **Dassault Systemes (CAD-CAM Softwares).** Research team (3D4All). *Suresnes, France.*
6 months internship. Engineer's degree. Development of a real time 3D Navier-Stokes fluid simulation for gaseous and liquids phenomena on GPU (GPGPU). Prototype targeting *Catia* and *Virtools*.
- 2005 **French Atomic Energy Commission (CEA).** Military applications [CEA/DAM](#), *Bruyères le Chatel, France.*
6 months internship. Engineer's degree 2nd year. R&D in 3D scientific visualization and parallel computing. GPU Volume Rendering on distributed memory parallel environment for VTK (Visualization Toolkit).
- 2003 **Computer Science laboratory of Orléans University (LIFO).** *VR research team, Orléans, France.*
3 months internship. Associate's Degree. Parallel Virtual Reality R&D. Development of a distributed Virtual Reality demo on PC cluster using parallel physics simulation and cellular automata.

Invited Talks

- Dec 2009 **Building with Bricks: Cuda-based Gigavoxel Rendering** : Intel Visual Computing Research Conference. Saarbrücken, Germany.
- Nov 2009 **GigaVoxels: Voxels Come Into Play** : Crytek GmbH. Frankfurt, Germany.
- Feb 2009 **Ray-Guided Streaming for Efficient and Detailed Voxel Rendering** : MIT - CSAIL. Boston, MA.
- Sep 2008 **Real-time visualization of large detailed volumes on the GPU** : Fraunhofer - ITWM, Competence Center for HPC . Kaiserslautern, Germany.

PUBLICATIONS

Efficient Rendering of Highly Detailed Volumetric Scenes with GigaVoxels. C. Crassin, F. Neyret, S. Lefebvre, M. Sainz, E. Eisemann. In book *GPU Pro*, 2010.

Beyond Triangles : GigaVoxels Effects In Video Games. C. Crassin, F. Neyret, S. Lefebvre, M. Sainz, E. Eisemann. In *ACM SIGGRAPH 2009 : Technical Talk*, aug 2009.

GigaVoxels : Ray-Guided Streaming for Efficient and Detailed Voxel Rendering. C. Crassin, F. Neyret, S. Lefebvre, E. Eisemann. In *ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (I3D)*, feb 2009.

Interactive multiple anisotropic scattering in clouds. A. Bouthors, F. Neyret, N. Max, E. Bruneton, C. Crassin. In *Proceedings of ACM Symposium on Interactive 3D and Games (I3D)*, 2008.

Rendu interactif de nuages réalistes. A. Bouthors, F. Neyret, N. Max, E. Bruneton, C. Crassin. In *Proceedings of Journées de l'Association Francophone d'Informatique Graphique (AFIG)*, 2007.

Représentation et algorithmes pour l'exploration interactive de volumes procéduraux étendus et détaillés. C. Crassin, F. Neyret, S. Lefebvre. French Master Thesis, 2007.

TEACHING EXPERIENCE & OTHER WORKS

2008 – 2010 **Reviews for international conferences and journals** : Siggraph Asia 2009, Siggraph 2010, Eurographics 2010, MICPRO-D (Embedded Hardware Design).

2010 **GPU Summer School** at INPG (Grenoble National Polytechnic Institute). Member of the scientific committee. Teaching as NVIDIA CUDA expert.

2010 **Supervision of a master student** at INRIA. Work on shell maps representation for voxel details deformation on animated characters.

2007 – 2008 **Teaching assistant** at Joseph Fourier University (UJF), Grenoble, France. Computer Graphics, [Rendering techniques for image synthesis](#). Lectures and GPU practical courses (OpenGL 3.0 style practical course and CUDA development), Graduate level.

2007 – 2008 **Teaching assistant** at Institut National Polytechnique de Grenoble (INPG), France. Programming, *C programming and UNIX basis*. Lectures and practical courses, Undergraduate level.

2007 **Scholar scientific animation** for [Mobinet](#) (educ. platform for initiating students to game programming). Practical courses to high school students on Mobinet.

2005 – present **Maintaining on-line technical website** www.icare3d.org. Personal technical website, introducing many computer graphics projects (scholars and personals), GPU news and demos.

2007 – 2009 **Consulting** at [Digisens](#), Chambéry, France. Computed Tomography Software developer and provider. Open source GPU volume rendering library development and consulting as GPU and VR expert.

2008 **Student Volunteer** at ACM Siggraph 2008, Los Angeles, USA.

TECHNICAL SKILLS

Main skills Computer graphics, real time rendering, GPGPU, global illumination, scientific vis., parallel computing, software engineering, Math & Physics.

C/C++ 8 years experience. Use of design patterns, template metaprogramming. Major libs: STL, Boost, QT. Software design: UML. Source control: SVN, CVS, Perforce. Doxygen.

GPU 7 years experience in OpenGL. 3.5 years experience in CUDA. Shading languages (GLSL,Cg,ASM,...). OptiX. Debugging tools: gDEDebugger, AgPerfMon, Parallel Nsight.

Modeling soft. 3D Studio MAX, 3D-Coat, Blender.

Sec. skills Image processing, embedded systems, artificial intelligence, multi-agents systems.

Sec. lang. Java, x86 assembly, Visual Basic, Pascal, LISP, PROLOG, PHP, SQL, Javascript.

LANGUAGES

French Native language

English Fluent. TOEIC score: 850/990 (2005)

OTHER ACTIVITIES

Sports Mountain biking for 10 years, mountaineering, skiing, rock climbing as beginner.

Design Design of 3D short movies, 3D modeling and animation.