Guillaume Loubet

Computer Graphics Researcher – Software Engineer

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I am a research scientist and software engineer specialized in physically-based rendering techniques typically used for VFX in the film industry: path tracing, surface reflectance models, 3D geometry, participating media, etc. I worked on appearance-preserving level-of-detail techniques, differentiable rendering for scene reconstruction from photos, and specular light transport (surface scratches, caustics). I am looking for a software engineer or research scientist position in the area of Lyon (FR) starting from May 2020.

Research

Nov. 2018 – Jan. 2020 **Postdoctoral researcher at EPFL (Switzerland)**

Computer graphics, differentiable rendering, caustics and specular light paths

Advisors: Wenzel Jakob (EPFL), Nicolas Holzschuch (INRIA)

Oct. 2014 – Jun. 2018 **PhD at Univ. Grenoble Alpes (FR)**

Research topic: Computer Graphics, level-of-detail representations

Advisors: Fabrice Neyret (INRIA)

Publications:

- *Reparameterizing discontinuous integrands for differentiable rendering* (SIGGRAPH Asia 2019). New technique for handling discontinuities of visibility in a differentiable path tracer. Object reconstruction and texture optimization from photos.
- *A new microflake model with microscopic self-shadowing for accurate volume downsampling* (Eurographics 2018, **Best Paper Award**). New volume model and new algorithms for improving volume downsampling methods.
- *Hybrid mesh-volume LoDs for all-scale pre-filtering of complex 3D assets* (Eurographics 2017). New algorithms for generating appearance-preserving LODs, including material prefiltering in the mesh simplification framework, and sub-resolution detail prefiltering using voxelization and heterogeneous microflake volumes.

Education

2012 – 2014 **Master's degree in computer science & applied mathematics, ENSIMAG (FR)**

Computer graphics, computer vision, medical imaging, image processing, parallel computing.

2009 – 2012 **Bachelor's degree in computer science and applied mathematics**

Cycle prép. Polytechnique (Toulouse) and **ENSIMAG** - Grenoble INP, France

Work and research experience

Oct. – Dec. 2017 **Research and software development internship**

Walt Disney Animation Studios, Burbank, CA, USA.

Advisors: Patrick Kelly & Sean Palmer

Developed new tools for rendering with automated LODs in Hyperion (Disney's physically based renderer). I studied and implemented robust quad mesh simplification with joint material prefiltering.

Jul. – Aug. 2015 **Research and software development internship**

Weta Digital, Wellington, New Zealand. *Advisor: Antoine Bouthors*

Developed tools for automatic generation of LODs in the Look-Dev team. Computer graphics theory, C++, agile software development.

Feb. – Jul. 2014 **Research Assistant (master internship)**

INRIA Grenoble Rhône Alpes. *Advisor: Fabrice Neyret*

Studied single-scattering models for realistic and real-time rendering of dust clouds and galaxies (shaders, voxel-based rendering), procedural multi-scale noise for clouds.

Jul. – Aug. 2013 **Software engineer internship**

SurgiQual Institute, Grenoble. *Advisor: Sylvain Besson*

Studied the state of the art of real-time rendering on tablets, implemented a prototype for medical data visualization (WebGL, Javascript, PHP).

2012 – 2013 **Web Developer (part time job)**

Student job with the NSIGMA junior enterprise, Grenoble

Created a complete marketing website (Ruby On Rails, PHP, SQL, web).

Jun. 2011 **Undergraduate research internship**

Instituto de Investigaciones Marinas, Vigo, Spain

MatLab programming for data visualization.

Skills

Computer graphics Path tracing, importance sampling, multiple importance sampling, microfacet and microflake theory, mesh simplification algorithms (triangle meshes, quad meshes), BRDFs models, normal maps and displacement maps filtering, voxelization and volume downsampling, participating media rendering, differentiable rendering, glints and caustics rendering, procedural noise.

Mathematics Linear algebra, optimization, statistics (sampling, Monte Carlo estimators), analytic integration.

Computer science C++, multi-threading, CUDA, Python, automatic differentiation, scalable algorithms, Git (branches, rebasing, etc.), Linux/MacOS, CMake, Blender & Maya, Inkscape, the Gimp, profiling (Valgrind), code reviews and continuous integration (Jira), web (HTML, CSS).

Language English and Spanish (fluent), French (native speaker)

Additional information

Personal projects 3D modeling, rendering and photography: http://blog.guillaume-loubet.fr

Student at the Conservatoire de Grenoble, piano and music theory (until 2016)

Other interests Classical and folk music, history of film, hiking