Francois M. Demoullin

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Education

University of British Columbia *Vancouver, BC*

M.A.Sc. in Computer Engineering, Current GPA: 4.20, Supervisor: Dr. Tor Aamodt *Sep. 2017 - Present*

- Funded Research Assistant - Computer Architecture lab - expected graduation: January 2020
- Recipient of the Activision unrestricted academic research award and a Huawei grant for mobile ray-tracing GPU Architectures
- Current Research project: combined Raytracing and Rasterization GPU architecture acceleration, BVH hardware acceleration

B.Sc. in Computer Science, GPA: 4.10 *Sep. 2013 - Jun. 2017*

- Dean's list of honour 2013/14 and 2014/15, Teaching assistant at the Department of Computer Science

Experience

Samsung Advanced Computing Lab *San Jose, CA*

GPU Architecture Research Intern *May. 2019 - Aug. 2018*

- Designed and implemented mobile deferred rendering Benchmarks to guide GPU Architecture design
- Designed and implemented hybrid Ray Tracing Ambient Occlusion in rasterization graphics engines and studied their feasibility on mobile GPUs

Activision Blizzard - Central Technologies *Portland, ME*

Software Engineering Intern *May. 2017 - Aug. 2017*

- Credited on AAA game: Call of Duty World War 2 (over 20 million copies sold worldwide)
- Implemented CPU data stream setting optimization reducing average render time by 6ms per frame
- Low level CPU & GPU performance optimization for the rendering engine using C++ and HLSL, CPU + GPU profiling tools: PIX, PS4 Razor, VTune, Nsight

Magic Leap *Mountain View, CA*

Embedded Software Engineering Intern *Jun. 2016 - Aug. 2016*

- Implemented early tile rejection algorithm optimization, reducing average dense mapping run-time by 10%
- Implementation of dense mapping Computer Vision algorithms on embedded device using C++

GPGPU Research Group, UC Davis *Davis, CA*

Undergraduate Researcher, Supervisor: Dr. John Owens *Sep. 2015 - Jun. 2016*

- Wrote OpenGL applications for testing and demonstration of Kerry Seitz's (PhD candidate) meta-shading pipeline using Lua
- Poster at HPC 2017: Selos: Staged Metaprogramming for Shader System Development by Kerry A. Seitz, Jr., Tim Foley, John D. Owens

BNP Paribas (4th largest bank worldwide) *Luxembourg, Luxembourg*

Software Architecture Intern *Jun. 2015*

- Studied large scale log management solution in banking sector
- Outcome: Significant reduction in bug detection time and increased client data security

Projects and Publications

Hash-Based Ray Path Prediction: Skipping BVH Traversal by Exploiting Ray Locality (F. Demoullin, A. Gubran, T. Aamodt - Poster at HPG 2019)

- Limit study quantifying the utility of a hardware ray predictor, up to 40% saving of interior BVH node computations
- Project Page: here

Volume Renderer / Volumetric Ray Caster

- 3D Volume visualization tool using tri-linear or tri-cubic interpolation methods to render volumetric data sets used in medical imaging
- Custom rendering engine written in C++, OpenGL, GLSL - Presentation: here, source code: here

GPU accelerated Particle System

- Parallelized graphical application using GPU accelerated compute shaders to support the rendering of up to 1mio. particles at 60fps
- Custom rendering engine written in C++, OpenGL, GLSL - Source code: here

Skills

Programming languages: C++, C, CUDA, Verilog, Python, GLSL/HLSL, OpenGL

Languages: English, French, German, Luxembourgish, Spanish