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# BJARNI THOR ARNASON

## GAME & GRAPHICS PROGRAMMER

Highly motivated Software Engineer with a burning passion for programming and video games. Extremely interested in graphics and rendering as well as core 3D and game engine aspects. Quick learner with great work ethics and attention to detail. Willing to take on responsibility and working as a part of a team that is determined to ship only the highest quality products. **Primary strengths include:**

- **Programming:** C++ / C, C#, Python, Java, LUA, SQL, Objective-C, Perl
- **Applications:** Visual Studio, Perforce, Subversion, PIX, Photoshop, Maya, Xcode
- **Other:** HLSL & CG Shaders, Threading & Parallelism, GPU & CPU Profiling, 3D Math
- **SDK's:** DirectX, OpenGL, XNA, Gamebryo, Ogre3D, Panda3D, iPhone

**US immigration:** F1 holder with guaranteed OPT visa for 12-29 months. Eligible to apply for Green Card through my father.

## EDUCATION

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**M.Sc. Computer Science, Game Development Specialization** **2008 - 2010**

University of Southern California (USC), USA

GPA: 3.8 out of 4.0 (thus far). Expected graduation in May 2010.

**B.Sc. Computer Science** **2005 - 2008**

Reykjavik University (RU), Iceland

GPA: 9.3 out of 10 (top of my class). Exchange student for one semester at Universidad Carlos III de Madrid, Spain.

## PROFESSIONAL EXPERIENCE

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Positions were fulfilled while attending school, part-time in the fall and spring, full time in the summer and winter breaks.

**University of Southern California** **2009 - Present**

**Software Engineer (January 2009 - Present)**

- Lead engineer on **Cosmopolis** (see portfolio), a military sponsored MMO research project. Responsible for the creation of a multi threaded game engine from scratch that supports various rendering techniques such as Full Screen Ambient Occlusion, Cascaded Shadow Maps, Soft Particles, Bloom, Sun Flare, Atmospheric Scattering with Time of Day, Deformable Terrain with LOD, Realistic Ocean Rendering and Vegetation. (Programming in C# XNA, C++ and DirectX HLSL shaders)

**Course Producer - CS522 Game Engine Development (August 2009 - December 2009)**

- Assisting students with semester-long game engine projects that aim to add modules to the USC GamePipe Game Engine. Responsibilities included reviewing student's code, maintaining the SVN repository, overseeing check-ins and programming core engine components. (Programming in C++ using Ogre3D and Nvidia CG shaders)

**Mythic Entertainment (Electronic Arts)** **2009 (Summer)**

**Software Engineering Intern**

- Client engineer on the MMORPG **Warhammer Online**. Involved in 3D and game engine related parts of the game, such as collision detection, asset pipeline, performance tweaking as well as integrating the Umbra middleware for GPU frustum and occlusion culling. (Programming in C++ using Gamebryo and DirectX HLSL shaders)

**Reykjavik University / CADIA** **2006 - 2008**

**Research Assistant at RU's Center for Analysis and Design of Intelligent Agents (Summer 2008)**

- Worked on the "Humanoid Agents in Social Game Environments" research project as a client engineer responsible for visualization and rendering. (Programming in Python using the Panda3D Game Engine and Nvidia CG shaders)

**Teaching Assistant (2006 - 2008)**

- Oversaw practical sessions for the course of Information Technology (2006, 2008) (Teaching SQL and Excel) and Computer Science II (2008) (Teaching Python programming)

**Betri Lausnir / Hugur Ax / Teris** **2004 - 2008**

**Software Engineer**

- Worked part time to develop an e-learning system, various bank and financial related software and a web based content management system. (Programming in C#, C++, ASP.Net, ASP, SQL)

## RELEVANT COURSE EXPERIENCE

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Detailed descriptions, videos and full reports from the following projects are available at <http://bjarniarnason.com> .

**Advanced Game Projects (USC):** Two semester long final project course that I devoted to the **Cosmopolis** project that I had been employed to work on for one semester beforehand (see Employment Section for full description). [*See Cosmopolis in Portfolio*]

**Computer Graphics (USC):** As a final project my group created a Ray Tracing renderer from scratch using nothing but C++ and PThreads. It supports several primitives, model loading, several light types including area lights, soft shadows, procedural Perlin Noise textures, transparency and anti-aliasing as well as required optimizations to render images in a reasonable time such as threading and spatial partitioning. We also implemented Global Illumination using Photon Mapping techniques. [*See GI580 in Portfolio*]

**Game Engine Development (USC):** Semester long project where I created the GamePipe Live Editor for the USC GamePipe Engine to simplify the process of creating scenes and levels. It is written in C# but runs the GamePipe Engine (C++) in a window. We communicate with and control the GamePipe Engine with TCP/IP packets from the GLE. Functionality includes adding, deleting and modifying properties of meshes, lights, scene nodes. It also doubles as a Model Viewer for the Ogre3D model format and ParticleUniverse Particles. [*See GamePipe Live Editor in Portfolio*]

**B.Sc. Final Project (RU):** Created a new Open Source Rendering Engine and Software Development Kit for the SmartBody software from scratch, based around Python and Panda3D. I handled the Panda3D/Python part, my partner worked with SmartBody. [*See CADIA BMLR in Portfolio*]

**Independent Study Project (RU):** Semester long independent study project on building and performance tuning a real-time nature rendering framework, using OpenGL and CG Shaders in C++ and techniques such as Geometrical Clipmaps for Terrain rendering, Fresnel water rendering model and . [*See TERRAble in Portfolio*]

**Virtual Environments (RU):** Created RanPG, a 3D action RPG game that procedurally generates levels and AI opponents and uses an asset pipeline from World of Warcraft. Programmed in Python using Panda3D along with CG Shaders [*See RanPG in Portfolio*]

**Computer Graphics (RU):** Created Invaders'n'Asteroids, a 3D space shooter programmed in C++ and OpenGL. [*See Invaders'n'Asteroids in Portfolio*]

## AWARDS AND ACHIEVEMENTS

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- Microsoft **Imagine Cup 2010 US Finalist** (Game Design track) (Winner to be determined in April 2010)
- **GALA Jury Award** and **GALA Public Award** for my B.Sc. Thesis at the 8th International Conference on Intelligent Virtual Agents (IVA 2008, Tokyo)
- **Dux** (Valedictorian) of my graduating class at Reykjavik University (2008)
- Scholarship grant from Sameinaðir Verktakar (United Engineers) (2008)
- Scholarship grant from the American Scandinavian Foundation (2008)
- Elected board member of Tvíund, RU's Computer Science student organization (2006, 2007)
- Organizer of "Hringurinn", a computer game tournament with ~250 contestants (2007)
- Dean's list at Reykjavik University (2007, 2006)

## REFERENCES / RECOMMENDATIONS

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Contact information and letters of recommendation are available on request, please send an email to [arnason@bjarni.us](mailto:arnason@bjarni.us).

**Michael Zyda** - Director of the USC GamePipe Laboratory

Relationship: Instructor in the course of "Advanced Mobile Devices and Game Consoles" and "Advanced Game Projects" at USC. Has also been overseeing the Cosmopolis development from start (see Employment section).

**Jose Villeta** - Instructor at USC and Technical Director at Heavy Iron Studios

Relationship: Instructor in the course of "Game Engine Development" at USC when I took it. I am now Jose's Course Director for the course.

**Hannes Vilhjalmsson** - Professor at RU and Researcher at CADIA

Relationship: Instructor in a total of 4 courses at RU that I took, including an Individual Project and B.Sc. Final Project. I also worked as a Research Assistant at CADIA directly under him.