

MAREK VOJTKO, MSc

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<http://guildhall.smu.edu/portfolio/marco1475>

WORK EXPERIENCE

Programming Internship Tools and Development Pipeline August—October 2005
Sproing Interactive, Vienna, Austria

- Designed and implemented a shader connection and combination tool for cross-platform development.
- Later became the *Modular Arbitrary Shader System*, the topic and project of my first diploma thesis.

GAME EXPERIENCE

Lead Engineer *Nightmare* August—December 2008
The Guildhall at SMU

- Modification of the *Source* engine, 15-person team (4 programmers).
- Created animation and model exporting tools to facilitate the artists' use of the pipeline.
- Implemented a 3rd person "intelligent" camera.
- Selected by faculty as lead engineer.
- Scheduled tasks for team members, wrote documentation.
- Worked with game designer and producer to define the implementation of all gameplay systems.

Engineer *Extinction* January—April 2008
The Guildhall at SMU

- Modification of the *Unreal Tournament 2004* engine, 17-person team (4 programmers).
- Created a 3rd person camera.
- Implemented the dinosaur functionality, including special attacks and effects.
- Changed several default *Unreal* features that conflicted with the gameplay.
- Was part of a two-member team implementing the animation system.

Sole Developer *Water³* July—September 2007
The Guildhall at SMU

- Implemented a complete 2D rendering engine using Win32 and GDI+ APIs.
- Features included alpha blending, parallax scrolling, sprite-sprite, and sprite-tile collisions.
- Used XML for level descriptions and tile-placement.
- Produced all art assets (except main character).

TECHNOLOGY EXPERIENCE

Master Thesis *Procedural Forest Generation* August—December 2008
The Guildhall at SMU

- Created a graphical tool for procedural creation of forests.
- Creation is based on multiple organic, randomly generated noise textures.
- Implemented a variety of algorithms for information extraction from noise textures and compared the results.
- Improved the GUI based on user feedback to surpass interfaces of typical level generation tools.
- Results are exportable in a variety of formats are directly usable in game engines.

Master Thesis *Modular Arbitrary Shader System* February—June 2006
Upper Austria University of Applied Sciences

- Implemented a shader connection and combination tool.
- Included XML-based directed acyclic graph logic.
- Utilized on Cg's shader interfaces and unsized array features.
- Developed several example shaders including the Phong lighting model, bump mapping, and dispersion (refraction + reflection) effect.

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TECHNOLOGY EXPERIENCE

Directed Focus Study *Variance Shadow Mapping* March—May 2008

The Guildhall at SMU

- Implemented and compared several shadow mapping techniques, including basic shadow maps for spot-lights and percentage closer-filtered (PCF) soft shadow maps.
- Developed variance shadow mapping to improve the softening of edges.
- Created a demo to showcase and compare the different techniques.

Sole Developer 3D Rendering Engine September 2007—June 2008

The Guildhall at SMU

- Created an abstract interface for Direct3D and OpenGL APIs.
- Implemented synonymous HLSL and GL assembly shaders for per-pixel lighting, DOT3 bump mapping, parallax mapping, and character animation.
- Developed a custom math library (2D and 3D vectors, matrices, quaternions, intersection tests) as well as view-frustum culling capabilities.
- Programmed a file loader for BSP levels (textures, lightmaps, PVS culling), .3ds model files, and a 3D Studio Max exporter incl. a custom, chunk-based file format with compression.
- Wrote a patch-based levels-of-detail terrain system.

Sole Developer Interpreted Scripting Language March—May 2008

The Guildhall at SMU

- Wrote a grammar for a C-like, weak-typed language.
- Implemented a lexical analyzer, tokenizer, and parser creating an abstract syntax tree.
- Built a compiler for generating custom byte-code and a stack-based virtual machine for executing it.
- Features included built-in vectors, arrays, and recursive function calls.

PROGRAMMING SKILLS

Languages C/C++, C#, Java, UnrealScript, Cg, HLSL, Ruby, HTML, PHP, JSP, and L^AT_EX.

APIs Direct3D, OpenGL, FMOD, 3ds Max SDK, Win32, GDI/GDI+, OGRE, and ODE.

Graphics BSP, animation, lighting, shaders, texture synthesis, and scene graphs.

Physics Newtonian dynamics, collision detection and response, numerical integration (Forward / Backward Euler, Verlet, Velocity Verlet, Runge-Kutta), spring-mass systems, and rigid body dynamics.

Software Engineering Object-oriented and agile development, design patterns, debugging, threading, and game development on embedded systems.

Applications Microsoft Visual Studio 2003/2005, Adobe Photoshop and ImageReady, Autodesk 3D Studio Max and Maya, Subversion, Mercurial, and Microsoft Windows.

LANGUAGE SKILLS

Native language: Slovak. **Perfect** in English and German.

EDUCATION

The Guildhall at SMU Dallas, TX, USA
Masters of Interactive Technology (GPA 3.96) December 2008
specialization in Software Development

Upper Austria University of Applied Sciences Hagenberg, Austria
Graduated with distinction from Digital Media (GPA 3.56) 2004 - 2006
Master of Science in Engineering, specialization in Computer Games

Upper Austria University of Applied Sciences (GPA 3.38) Hagenberg, Austria
Graduated with distinction from Media Technology and Design 2001 - 2004
Bachelor of Science in Engineering