

## Michał Drobot

Ul. Lea 219/23, 30-133 Kraków Poland

Mobile: (+48) 691 801 632

E-mail : [hello@drobot.org](mailto:hello@drobot.org)

WWW : [drobot.org](http://drobot.org)

### Education

2005 - 2010                      MSc in Computer Science, Institute of Computer Science, Jagiellonian University, Poland

### Work experience

2008-2010                      **Visual Technical Director, Reality Pump**

I was responsible for general visual quality and performance of rendering engine. Working closely with Lead Programmers and Art Director, I took the responsibility for high level decisions, regarding rendering technology to be used/researched, level structure, asset production limits and possibilities. Depending on situation, I was leading small teams (up to 3) consisting of artists and programmers to solve visual and performance issues (dense forest rendering, large vistas, ocean and boat sailing, cityscapes, boss encounters etc...). I analyzed game runs to find and solve bottlenecks in various scenarios and levels using PIX, GPAD and other profiling and tuning software.

2008-2010                      **Rendering Technology R&D Engineer, Reality Pump**

After Two Worlds the Temptation transition to Two Worlds 2 multiplatform project (PC, X360, PS3) I took the responsibility for general Rendering Technology R&D. I conducted several research projects working closely with artists, developing cutting edge technology that is visually and computationally impressive. Every feature was brought from concept to optimization phase for all platforms utilizing GPU hardware to maximum (correct load balancing for ALU/TEX ratio on Xenos and RSX). CPU side features were optimized using vectorization and vector intrinsic. Projects included : deferred architecture optimization, hybrid light-pre pass integration, advanced materials R&D, global lighting and shadowing technology, scene rendering optimization subsystems. Several projects were used for various internal and external presentations and publications.

Examples :

- SSAO - custom, production quality implementation ( requiring only 1ms on Xenos)
- Spatial and Temporal coherence framework for fast and accurate SSAO and shadows calculation
- PSCSM with custom filtering scheme

- Dual paraboloid shadows with custom jittered filtering for omni-directional lights
- Screen Space Sub Surface Scattering for skin, wax, translucency simulation
- Fluid materials – dynamic ocean water, rivers, water pools
- Deferred transparency rendering
- Mixed resolution rendering
- Custom Edge Anti-Aliasing Solution
- Dynamic occlusion culling system using re-projection and custom hierarchical Z buffer
  - Average performance gain is over 30% (due to open world nature of game environment)
  - PS3 – implementation on SPU
    - Culling objects from G-Buffer
    - Culling shadow casters from PSCSM
  - X360 – implementation using Memory Export
    - Culling objects from G-Buffer

2007-2008                      **3D Effect Programmer, Reality Pump**

At the very beginning of new project – Two Worlds The Temptation, I took the chance and switched to 3D Effect Programmer role. I was responsible for post processing pipeline design and implementation on PC and X360 (partially on PS3). The whole system is fully HDR compatible, gamma correct and operates in linear light space when needed. Implemented components include: 64bit HDR tone-mapping with dynamic histogram based, luminance correct operators, depth of field, camera based motion blur, script based blurs, rain, god rays, color correction, custom effects and filters. Another important project was to design and implement the ‘atmosphere system’ – time of day system, integrating parameters management for: direct light, tri-spherical ambient, volumetric fog, sky, advanced specular and other visual clues, that I worked on in parallel.

2005-2007                      **3D Technical Artist, Reality Pump**

Initially started as 3D character artist, bringing new technology to project asset pipeline (introduced Z-Brush 2 and correct normal maps generation and storage methods). Later switched to Technical Artist, becoming a bridge between programmers and artists. During production of Two Worlds for PC and X360 I developed several pipelines and tools for asset building, successfully integrated them and conducted internal trainings. Moreover, I created over 50 models with full texture sets, LODs and skinning.

## Professional traits

- Strong passion and ability to R&D rendering technology
- Ability to architect and expand existing graphics technology both at high and low level
- Ability to work proactively in identifying current and future requirements of technologies
- Confidence and experience in public/internal presentations and trainings for artists, programmers and teams
- Passion and aptitude for both practical and innovative graphics development
- Programming skills : C++, C#, HLSL, GLSL
- Deep understanding of current NVidia and Ati/AMD hardware
- Experience of Xbox 360 and PlayStation 3 hardware with emphasis on rendering pipeline efficiency
- Applied knowledge of a diverse array graphical techniques and effects
- Proficiency in math, 3D geometry, algorithms and data structures
- Optimization by vectorization, assembly and intrinsic
- Understanding of CPU and GPU architectures, cache behavior, SIMD
- Objective profiling, analysis and optimization skills with focus on GPU (GPad, PiX)
- Debugging skills
- Excellent communication skills
- Experience with asset production pipelines and tools
- Experience from 3D artist's point of view
- Confidence and responsibility in helping or leading small teams of artists and programmers

## Articles published

1. 'Utilizing spatial and temporal coherence framework for real time graphics', Game Engine Gems 2, AK Peters LTD, February 2011
2. 'Quad-tree Displacement Mapping with Height Blending: Practical Detailed Multilayer Surface Rendering', GPU Pro - Advanced Rendering Techniques, AK Peters LTD, April 2010
3. 'Rendering technology behind Two Worlds: Temptation', German Game Dev Magazine, 2008

## Conferences attended and papers presented

1. 'Advanced Material Rendering' , GDC Europe Cologne 2010
2. 'Trends in Video Games', SFI 2010 (Student Computer Science Festival), Poland
3. 'Quad-tree Displacement Mapping with Height Blending: Practical Detailed Multilayer Surface Rendering', GDC Europe Cologne 2009
4. 'World of Game Development', SFI 2009 (Student Computer Science Festival), Poland
5. 'Practical use of Screen Space Ambient Occlusion', GCDC Leipzig 2008

### Teaching (lectures and workshops conducted)

- 2008-2010            Main consultant of programming section, EAG – European Academy of Games, Kraków, Poland
- Introduction to Game Development, EAG
- Introduction to Game Production, EAG
- Shader Programming, EAG
- Advanced Visual Effects, EAG
- 2007-2009            Games Workshop, Jagiellonian University
- Advanced GPU Programming, Jagiellonian University
- Open lectures , focusing on Game AI and Graphics, AGH – University of Science and Technology, Kraków, Poland
- 2006-2007            Introduction to Game Development, Jagiellonian University

### Other skills

- C2 English (Certificate of Proficiency in English 2005)
- B1 German (Zertifikat Deutsch 2005)
- B1 Russian
- Native Polish
- Driver licence AB

### Personal Traits

- Self-motivated
- Creative
- Open minded
- Solution oriented
- Communicative
- Team player
- Teaching skills

### Personal Interests

- Computer games
- Art
- Photography
- Fantasy
- Sci-Fi
- Skiing
- Snowboarding
- Judo
- Fitness
- Kite surfing