

# ANDREW D. AYE

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## EDUCATION

1993 - 2000	B.Math	Computer Science, Honors	University of Waterloo (Waterloo, ON)
1993 - 2000	B.A.Sc.	Mechanical Engineering, Honors	University of Waterloo (Waterloo, ON)
1993 -	B.A.	Film, Fine Arts Honors	University of Waterloo (Waterloo, ON)

## PROFESSIONAL EXPERIENCE

Microsoft Game Studios [Redmond, WA]

### **Senior Developer** [2010(Feb)-Current]

Working Title: Kinect Adventures (XB2)

- Performed performance and memory related optimizations and collaborated with a small team to achieve our target goals of 30 FPS. Originally the game was running at 40ms+ on the GPU with various points of synchronization stalling both the render and game thread.
- Work on issues from the Natal specific platform code, and collaborate with the platform team to isolate and fix problems.
- Primary person responsible for isolating and fixing crash bugs during finalization.

Obsidian Entertainment [Irvine, CA]

### **Lead Technical Engineer, CTG** [2007(Feb)-2009(Nov)]

Working Title: Aliens RPG (PC,XB2,PS3), Alpha Protocol (XB2,PS3), Dungeon Siege 3 (XB2,PS3)

- Responsible for key architectural elements of a new engine code base for the company that is planned to be the basis for the current and all future products. (Xbox360, PS3, PC).
- Manage and mentor a team of five people working in CTG.
- Implemented the following major systems:
  - Cross-platform rendering system and render resource manager.
  - Synchronization model between the main and render thread.
  - Asynchronous loading system for all level assets.
  - Basic scene graph for frustum culling, per-object light lists and shadows.
  - Cross-platform engine job system for cpu load balancing of work units.
  - Base actor class. They served to keep the system entities synchronized (animation, rendering, physics, pathing and game) and to serve as a base for the update cycle (especially movement) with a concentration on concurrent processing.
  - Havok integration. Abstracted the interface to Havok so it was not a future engine requirement.
  - Visual effect system that allows for significant flexibility for the artist.
  - SPU programs for skinning, memcopy replacement, shadow map filtering and debug text
- Ongoing refactoring and improvements to the engine, and particularly the render system, to maintain target code quality level and performance.
- Scheduling and planning of CTG's feature implementation list.
- Liaison with Art and Design to confirm that we met requirements and features were delivered on time and according to specification.

### **Senior Programmer** [2006(Mar)-2007(Feb)]

Shipped Games: Neverwinter Night 2 (PC)

- Analyzed and optimized the engine to improve performance for a range of PC hardware.
- Refactored parts of the rendering engine and shader code responsible for producing ill behavior, either in visual appearance or in execution time. (Render time went from 2FPS to 24-30FPS).
- Wrote a series of routines for constructing arbitrary walk surfaces based on a collection of objects (placeables) that had user defined walkable surfaces. Created a routine to validate face to face pathability that was used by the pathing system.
- Modified text and font routines to work with FreeType v2.0 and fix issues with UTF8 support.
- Troubleshooting and firefighting for the shipping product.

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**Simulation Engineer** [2003(Oct)-2006(Feb)]

Shipped Games: Bloodrayne 2 (PC,XB1,PS2), Aeon Flux (XB1,PS2), Spy Hunter 3 (XB1,PS2)

- Integrated O.D.E. (open source physics solver) into the engine code base.
- Created primitive vs triangle-mesh routines to calculate the penetration depth and normal of intersection, providing for interactions with arbitrary environments.
- Created continuous collision detection (swept volume) used for high-speed and/or small geometries.
- Corrected/Improved a majority of the existing primitive-primitive penetration functions.
- Implemented a new collision primitive (flat-capped cylinder) using a true mathematically defined cylinder. The common practice is to model a cylinder as an extruded octagon (or other n-gon).
- Improved constraint calculations for fidelity and realism for a low frequency updates.
- Implemented limitations on the system to prevent mathematical divergence in the solution system.
- Created a debugging visualization system.
- Refined collision calls for performance on console systems (specifically the PS2).
- Rigorously tested the collision system for stability and performance. Specific care was taken with floating point limitations (extreme value cases ).
- Tweaked capsule collisions to provide predictable, stable results for soft body simulation.

Confidential [Toronto, ON]

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**Consultant/Programmer** [2003(Feb)-2003(July)]

- Feasibility study for an existing film production company, expanding into video games.
- Preliminary technical design documents for game engine software design.
- Interviewed/Reviewed potential staff members for an implementation team.

Sunstorm Interactive [Indianapolis, IN]

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**Lead Programmer** [2001(Apr)-2002(Sept)]

Shipped Games (PC): Airport Tycoon II (Partial), Bridge Builder, Mahjong, Super Ball

- Managed a programming team of five people and communication with the out-sourced art team.
- Created a data driven simulation system to allow for ease of customization and expandability.
- Refined existing graphic engine for increased performance to allow for greater visual capabilities.
- Created a specifically crafted physics simulation for Bridge Builder ( truss structure simulation ).

The Microsoft Network (MSN) [Internet]

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**Forum Manager** [1994-1997]

- Created an online community for people interested in role playing games for MSN.
- Managed a community team of fifteen people.
- Responsible for multiple message boards, online chat-based games and event organization.

Steve Jackson [Internet]

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**Game Designer** [1995-1997]

- Helped with the development and testing of the INWO: Subgenius.

**Co-Op EXPERIENCE**

**Programmer** [1996(May-Aug)]

Canadian Space Agency [Montreal, QC]

- Implemented a simulation for testing a haptic device as a controller for the Canadian Arm.

**Programmer** [1995(Sep-Dec)]

Cognos [Ottawa, ON]

- Ported code base to UNIX Platforms (HPUX, DGUX, AIX, Solaris, SunOS)

**Network Specialist** [1995(Jan-Apr)]

Royal Canadian Mounted Police [Ottawa, ON]

- Engineered the RCMP PC Network for the Canadian Capital Region (Users: ~5000)

**Programmer** [1994(May-Aug)]

Royal Canadian Mounted Police [Ottawa, ON]

- Developed an in-house program for reducing police oriented paperwork

**Research Assistant** [1990 (June-Aug)]

Atomic Energy Canada [Chalk River, ON]

- Assisted in the development of an aqueous gamma radiation probe