

Nathan Allen Cournia

CONTACT INFORMATION

112 Regency Dr. Apt. 34
Central, SC 29630, USA

Voice: (864) 986-9648
E-Mail: cournia@gmail.com
Web: <http://www.cournia.com>

OBJECTIVE

To obtain a development position that utilizes my skills and background in computer graphics.

RESEARCH INTEREST

- Real-Time Soft Shadow Generation
- Real-Time Rendering
- GPU Programming
- Collaborative Virtual Environments

EDUCATION

Clemson University, Clemson, South Carolina

Ph.D., Computer Science, December 2005

Dissertation Title: Penumbra Volumes for Real-Time Generation of Perceptually Correct Soft Shadows on Modern Graphics Hardware

Adviser: Andrew T. Duchowski

Middle Tennessee State University, Murfreesboro, Tennessee

B.S., Computer Science, May 2000

RELEVANT EXPERIENCE

Rhythm & Hues, Los Angeles, California

Software Intern

April 2004 - August 2004

- Assisted with design and implementation of next generation hardware rendering platform.
- Improved proprietary animation software's real-time shadow rendering capabilities.
- Improved proprietary animation software's support for modern graphics hardware.

Clemson University, Clemson, South Carolina

Research Assistant

May 2001 - August 2005

- Designed and implemented collaborative virtual environment software used by Delta Airlines, NASA, and technical colleges for training aircraft inspectors.
- Researched classification of eye movements in virtual reality.
- Conducted research in the area of human factors and advanced technology systems.
- Experience in conducting field studies, pilot studies, data collection, and task analysis.

Teaching Assistant

Fall 2000, Spring 2000, Fall 2005

- Taught "Introduction to Computers", "Data Structures", and "Computer Science 101".

ITT Technical Institute, Greenville, South Carolina

Adjunct Instructor

August 2001 - January 2002

- Taught a course on GNU/Linux administration.

REFEREED JOURNAL PUBLICATIONS

Andrew T. Duchowski, Eric Medlin, Nathan Cournia, Hunter Murphy, Anand K. Gramopadhye, Santosh N. Nair, Jeenal Vorah, and Brian J. Melloy, "3D Eye Movement Analysis", *Behavior Research Methods, Instruments, & Computers (BRMIC)*, 34(4), November 2002, pp.573-591.

CONFERENCE PROCEEDINGS (REVIEWED)	<p>Andrew T. Duchowski, Nathan Cournia, Brian Cumming, Daniel McCallum, Anand K. Gramopadhye, Joel Greenstein, Sajay Sadasivan, and Richard A. Tyrrell, "Visual Deictic Reference in a Collaborative Virtual Environment", <i>Proceedings of Eye Tracking Research & Applications (ETRA)</i>, March 22-24, 2004, San Antonio, TX, ACM.</p> <p>Nathan Cournia, John D. Smith, and Andrew T. Duchowski, "Gaze- vs. Hand-Based Pointing in Virtual Environments", <i>Proceedings of SIGCHI 2003 (Short Talks & Interactive Posters)</i>, April 5-10, 2003, Ft. Lauderdale, FL, ACM.</p> <p>Anand Gramopadhye, Shannon Bowling, Mohammad T. Khasawneh, Sittichai Kaewkuekool, Brian J. Melloy, Andrew T. Duchowski, Eric Medlin, and Nathan Cournia, "Using Training to Improve Performance of Inspectors on the Hangar Floor", <i>Proceedings of the 16th Human Factors in Aviation Maintenance Symposium</i>, San Francisco, April, 2002</p> <p>Andrew T. Duchowski, Eric Medlin, Nathan Cournia, Anand K. Gramopadhye, Brian J. Melloy, and Santosh N. Nair, "3D Eye Movement Analysis for VR Visual Inspection Training", <i>Proceedings of Eye Tracking Research & Applications (ETRA)</i>, March 25-27, 2002, New Orleans, LA, ACM, pp. 103-110, 155.</p>												
CONFERENCE PROCEEDINGS (UNREVIEWED)	<p>Anand Gramopadhye, Andrew T. Duchowski, Joel S. Greenstein, Sittichai Kaewkuekool, Mohammad T. Khasawneh, Nathan Cournia, and Shannon Bowling, "Technology the Equalizer: Can it be Used to Improve Novice Inspection Performance?", <i>Proceedings of HCI International</i>, Crete, Greece, June 22-27, 2003.</p>												
TECHNICAL REPORTS	<p>Anand K. Gramopadhye, Brian J. Melloy, Mohammad T. Khasawneh Shannon Bowling, Sittichai Kaewkuekool, Andrew T. Duchowski, Eric Medlin, and Nathan Cournia, "Virtual Environment Technology for Aircraft Visual Inspection: Training and Job-Aiding", <i>Technical Report submitted to NASA/Ames Research Center</i>, 2002.</p>												
PRESENTATIONS	<p>Andrew T. Duchowski, "Gaze-Contingent Displays: Review and Current Trends", <i>Adaptive Displays Conference</i>, Los Angeles, CA, August 7, 2004 (invited talk). Material for this presentation was published as the following journal paper: Andrew T. Duchowski, Nathan Cournia, and Hunter Murphy, "Gaze-Contingent Displays: Review and Current Trends", <i>CyberPsychology and Behavior</i>, 7(6), 2004, Mary Ann Liebert, Inc.</p>												
SOFTWARE DEVELOPMENT PROFICIENCIES INTEREST	<p>Skills: C, C++, OpenGL, Shell Scripting, BSD network sockets, portability, others. Operating Systems: GNU/Linux, Win32</p> <ul style="list-style-type: none"> • Linux/Open Source Community • OpenGL • Ray Tracing • Game Programming 												
PROFESSIONAL SERVICE & ACTIVITIES	<table border="0" style="width: 100%;"> <tr> <td style="width: 80%;"><i>wxWidgets</i>, Contributor</td> <td style="text-align: right;">2005</td> </tr> <tr> <td><i>Gaze Contingent Display</i>, Author</td> <td style="text-align: right;">2004 - Present</td> </tr> <tr> <td><i>OpenSceneGraph</i>, Contributor</td> <td style="text-align: right;">2004 - Present</td> </tr> <tr> <td><i>Flock of Birds Library</i>, Author</td> <td style="text-align: right;">2003 - Present</td> </tr> <tr> <td><i>PrBoom</i>, Contributor</td> <td style="text-align: right;">2002</td> </tr> <tr> <td><i>Simple Direct Media Layer</i>, Contributor</td> <td style="text-align: right;">2000 - Present</td> </tr> </table>	<i>wxWidgets</i> , Contributor	2005	<i>Gaze Contingent Display</i> , Author	2004 - Present	<i>OpenSceneGraph</i> , Contributor	2004 - Present	<i>Flock of Birds Library</i> , Author	2003 - Present	<i>PrBoom</i> , Contributor	2002	<i>Simple Direct Media Layer</i> , Contributor	2000 - Present
<i>wxWidgets</i> , Contributor	2005												
<i>Gaze Contingent Display</i> , Author	2004 - Present												
<i>OpenSceneGraph</i> , Contributor	2004 - Present												
<i>Flock of Birds Library</i> , Author	2003 - Present												
<i>PrBoom</i> , Contributor	2002												
<i>Simple Direct Media Layer</i> , Contributor	2000 - Present												

PROJECTS

- **PrBoom** - Aims to be the most stable Doom port with the highest compatibility to the major Doom versions. High-res software and nice OpenGL rendering. I wrote support for user defined music. Formats supported include MP3, OGG, MIDI, etc.
- **Uber** - Clemson University Graphics Group's OpenGL renderer. I wrote most of the core of the library. I also wrote demos using the code base which displayed features such as stencil shadow volumes, bump mapping, per-pixel lighting, and toon shading.
- **YART** - Yet Another Ray Tracer - My personal ray tracer. Supports features such as POV-Ray input, object transformations, bump mapping, soft shadows, reflections, refraction, photon mapping, caustics, light attenuation, several BRDFs. Uses monte carlo ray tracing techniques for speed. Uses YACC/LEX for extensible file format input.
- **DiRT** - Distributed Rendering Tool - A distributed renderer for Maya. Used by Clemson University's Digital Production Arts department. I wrote several features/optimizations to DiRT to make it run faster and easier to use. Also wrote MUD (Must Use DiRT) a cross-platform GTK+ 2.0 client front-end.
- **midi2mel** - midi2mel takes a MIDI musical file and outputs a Maya MEL program which contains information on the musical data within the MIDI file. With this program a MEL programmer is then able to script objects in Maya according to the musical information in the MIDI file.
- **libfob** - Flock of Birds Library - libfob is a C++ interface to Ascension Technology Corporation's Flock of Birds position and orientation measurement system.

CLASSWORK

- **Compiler** - Wrote a compiler from the ground up. Supports features such as subroutines, recursion, pass by value, pass by reference, arrays multiple data types, input/output, generated x86 assembly.
- **Game Engine** - Wrote a game from the ground up using SDL. The game is data driven through a TCL based scripting language.
- **Linux Kernel** - Wrote a Permidea 2 graphics driver. Also re-wrote Linux's disk scheduler with a dynamic programming algorithm. The new scheduler showed significant increase in access time under high disk load.
- **Advanced Computer Graphics** - Wrote a particle system. Any trait of the particle system could be dynamically configured at run time. Also wrote a terrain generator.