

# Amy Ashurst Gooch

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## Education

### Northwestern University, Evanston, Illinois

Doctor of Philosophy in Computer Science, June 2006.  
Dissertation title: *Preserving Salience By Maintaining Perceptual Differences for Image Creation and Manipulation.*  
Advisor: Professor Jack Tumblin.

### University of Utah, Salt Lake City, Utah

Master of Science in Computer Science, December 1998.  
Thesis title: *Interactive Non-photorealistic Technical Illustration.*  
Advisors: Professor Peter Shirley and Professor Elaine Cohen.

### University of Utah, Salt Lake City, Utah

Bachelor of Science in Computer Engineering, June 1996.

## Employment and Research

### University of Victoria, Victoria, British Columbia, Canada

September 2006 – Present

*Assistant Professor, Department of Computer Science*

Image creation is an attempt to record a scene for presentation to a viewer. However, there is a precarious mapping between how the scene would be perceived and how the images are perceived. The human visual system does not have an absolute sense of color or intensity. Instead it is more accurate to say that the human visual system interprets images based on the relative difference between image regions. The goal of my research is to create more salient images by preserving perceptual differences between image regions during image creation and manipulation.

### Northwestern University, Evanston, IL

August 2004–September 2006

*Ph.D. Student, Department of Computer Science*

### Northwestern University, Evanston, IL

August 2003–Present

*Lecturer, School of Continuing Studies, Department of Computer Science, and School of Communication*

Create several courses to be taught to high school students (summer), undergraduates, graduates students, as well as professionals seeking Masters degrees. Please see Teaching Summary for a detailed list of courses.

### Northwestern University, Evanston, IL

February 2004–June 2004

*Consulting, Department of Psychology*

Creating software and visual stimuli, as well as handling hardware such as an eye-tracker, galvanic skin response and heart rate monitors, for perception and action research with Professor Peter Vishton.

## Employment and Research (Continued)

### University of Utah, Salt Lake City, Utah

November 1998–July 2003

*Computer Graphics Researcher, VisSim Research Group*

My research focused on increasing the effectiveness of computer graphics (CG) in conveying three-dimensional information. I conducted research which aimed at understanding the spatial information potentially available in CG imagery, determining what spatial cues are actually used when CG imagery is viewed, and using this information to create improved rendering algorithms. My work was part of an interdisciplinary effort involving computer graphics, perceptual psychology, and computational vision.

As a Computer Graphics Researcher I have worked on the design and implementation of two immersive environments. The first is a one-of-a-kind treadmill surrounded by 3 screens (210 degrees field of view). The second immersive environment consists of a nVision head-mounted display device with InterSense trackers (10' x20'). For both of these projects I developed the virtual reality software using OpenGL, WorldToolKit, and C++ on LINUX, SGI, SUN, and HP machines. I have also modeled and textured several virtual worlds using Alias|Wavefront's Maya modeling software. I worked with several cognitive psychologists to create perception experiments to evaluate the user's sense of scale, distance, and slope within these immersive environments. I was responsible for researching, evaluating and purchasing both software and hardware. I created videos from live feed and from computer displays, as well as maintain web-based documentation for the research group's software projects. I also supervised four undergraduate research interns for per year during Summer 2000, 2001, and 2002, 2003.

### University of Utah, Salt Lake City, Utah

Summer 1995–November 1998

*Research Assistant, Alpha1 Research Group*

As a research assistant during my undergraduate and graduate career, I conducted research and assisted in the development and maintenance of the Alpha.1 NURBS-based geometric modeling and manufacturing system. I created a renderer for generating non-photorealistic technical illustration of NURBS-based models using Tcl/Tk and C++ on SGI, SUN, and HP machines. I also created and maintained web-based documentation for Alpha.1 research system, and collaborated with Brown University on the Sketch/JOT project.

## Teaching Summary

### School of Communication, Northwestern University, Evanston, Illinois

Fall 2005, co-teaching CAT 380/480 *Animate Art III*. Introduce 3D geometry, shading, lighting, as well as Maya Embedded Language (MEL) as part of a 4-quarter curriculum in interactive, computer-based art and entertainment systems. This quarter focuses on three-dimensional modeling and interactive simulation. Student's work is critiqued both as works of art and as engineering. The interaction between art practice and art theory will be addressed through discussions, critiques and readings, examining issues in the interpretation, understanding and production of art and visual culture.

### Department of Computer Science, Northwestern University, Evanston, Illinois

Spring 2006, co-teaching CS 395/495 *Game Authoring Tools*. An software-engineering class disguised as a course which focuses on game production and development for multiple hardware platforms. Students will build their own 2D and 3D games on top of available game engines.

Spring 2005, CS 395/495 *Introduction to Computer Generated Animation*. An introduction to computer generated animation thru the Alias' Maya software package. Students are introduced to modeling, shading, lighting, and character set-up and animation.

## Teaching Summary (Continued)

### **School of Continuing Studies, Northwestern University, Evanston, Illinois**

Fall 2003, Fall 2004, instructor for SCS COMP SCI 351, *Introduction to Computer Graphics*, a graduate level course examining the mathematical software and hardware requirements for computer graphics systems. Special attention is paid to data structures and programming languages.

Winter 2004, instructor for SCS COMP SCI 395, *Special Topics: Advanced Computer Graphics*, a graduate level seminar course. Students read about, present, and discuss advanced graphics techniques.

Summer 2005, 2004, SCS COMP SCI 395, *Introduction to Computer Generated Animation*. An introduction to computer generated animation thru the Alias' Maya software package. Students are introduced to modeling, shading, lighting, and character set-up and animation.

### **University of Utah, Salt Lake City, Utah**

Fall 2002, lecturer in CS 5540, *Human/Computer Interaction*, a undergraduate course on human factors in the context of designing interactive applications.

Spring 2002, guest lecturer in ART 4980, *Senior Studio Seminar*, a undergraduate art course divided into two areas: creative process and professional concerns for the working artist.

Spring 2001, guest lecturer in ART 6810, *MFA Graduate Seminar*, a graduate art course divided into two areas: creative process and professional concerns for the working artist.

Spring 2001, guest lecturer in ART 4980, *Senior Studio Seminar*, a undergraduate art course divided into two areas: creative process and professional concerns for the working artist.

Winter 1997, Teaching Assistant, *Advanced Manufacturing*, Department of Computer Science, University of Utah. Tutored mechanical engineering students in the use of CAD/CAM modeling system. Aided in the creation of models and images.

Summer 1997, Teaching Assistant, *High School Summer Computing Institute*, Department of Computer Science, University of Utah. Taught high school students to use a CAD/CAM modeling system in an intensive six week summer program. Guided and encouraged students in the design of high level geometric models.

Fall 1996, Teaching Assistant, *Introduction to Unix*, Department of Computer Science, University of Utah. Assisting college students on a web-based course, both on-line and face to face.

### **Tutorials and Symposia**

ACM SIGGRAPH 2005 Course: Computer Generated Medical, Technical and Scientific Illustration.

Disney Feature Animation Inc., June 1999, Symposium: *Non-Photorealistic Rendering*

ACM Siggraph 1999, Course: *Non-Photorealistic Rendering*

## Books

*Non-Photorealistic Rendering*

Bruce Gooch and Amy Gooch.

A.K. Peters Ltd. Publishers, 2001

*Illustrative Visualization: The Art and Science of Non-Photorealistic Rendering*

Amy Gooch, Bruce Gooch, Mario Costa Sousa.

A.K. Peters Ltd. Publishers, To be published July 2007

**Juried Publications** PDFs available at <http://www.cs.northwestern.edu/amygooch/publication.html>

*Semanticons: Semantic-Based File Icons*

Vidya Setlur, Amy A. Gooch, Conrad Albrecht-Buehler, Sam Rossoff, Bruce S. Gooch  
Computer Graphics Forum / Eurographics 2005.

*Color2Gray: Saliency-Preserving Color Removal*

Amy A. Gooch, Sven Olsen, Bruce S. Gooch, and Jack Tumblin  
Journal of Transactions on Graphics / SIGGRAPH 2005.

*Enhancing Perceived Depth in Images Via Artistic Matting*

Amy A. Gooch and Bruce S. Gooch  
Eurographics Workshop on Computational Aesthetics 2005.

*Illustrative Scientific Visualization Framework*

Mario Costa Sousa, Amy A. Gooch, Bruce Gooch  
Eurographics Workshop on Computational Aesthetics, April 2005.

*The influence of restricted viewing conditions on egocentric distance perception:  
Implications for real and virtual environments.*

S. H. Creem-Regehr, P. Willemsen, Amy A. Gooch, and W. B. Thompson  
Journal of Perception, volume 34, pgs 191-204, 2005.

*Does the Quality of Computer Graphics Matter When Judging Distances in Visually Immersive Environments?*

William B. Thompson, Peter Willemsen, Amy A. Gooch, Sarah Creem-Regehr,  
Jack M. Loomis, and Andrew C. Beall.  
Journal of Presence: Teleoperators and Virtual Environments, 13(5), October 2004.

*Perceiving virtual geographical slant: Action influences perception*

Sarah H. Creem-Regehr, Amy A. Gooch, Cynthia S. Sahm, and William B. Thompson.  
Journal of Experimental Psychology: Human Perception and Performance, 30(5), pp. 811-821, 2004.

*Human Facial Illustrations: Creation and Psychophysical Evaluation*

Bruce Gooch, Erik Reinhard, and Amy Gooch.  
ACM Transactions on Graphics, 23(1), pp. 27-44, January 2004.

*Visual cues for perceiving distances from objects to surfaces*

Helen Hu, Amy A. Gooch, Sarah Creem-Regehr, and William B. Thompson.  
Journal of Presence: Teleoperators and Virtual Environments,  
Volume 11, Number 6, pp. 652-664, December 2002.

*Evaluating Space Perception in NPR Immersive Environments*

Amy Ashurst Gooch and Peter Willemsen.  
Non-Photorealistic Animation and Rendering 2002 (NPAR '02),  
Annecy, France, pp. 105-110, June 3-5, 2002.

*The Lit Sphere: A Model for Capturing NPR Shading from Art*

Peter-Pike Sloan, William Martin, Amy Gooch, and Bruce Gooch.  
Graphics Interface, pp. 143-150, 2001.

*Visual Cues for Imminent Object Contact in Realistic Virtual Environments*

Helen H. Hu, Amy A. Gooch, William B. Thompson,  
Brian E. Smits and Peter Shirley and John J. Rieser.  
Proceedings of the 11th IEEE Visualization 2000 Conference (VIS 2000), pp. 32, 2000.

*Interactive Technical Illustration*

Bruce Gooch, Peter-Pike J. Sloan, Amy Gooch, Peter Shirley, Richard Riesenfeld.  
ACM Proceedings of the 1999 Symposium on Interactive 3D graphics, pp. 31-38, April 1999.

*A Non-Photorealistic Lighting Model For Automatic Technical Illustration*

Amy Gooch, Bruce Gooch, Peter Shirley, Elaine Cohen.  
Proceedings of ACM Siggraph, pp. 447-452, 1998.

## Non-Juried Publications

*Enhancing perceived depth in images via artistic matting*

Amy A. Gooch and Bruce Gooch

Poster: ACM Proceedings of the 1st Symposium on Applied Perception in Graphics and Visualization, 2004.

*The Influence of Restricted Viewing Conditions and Egocentric Distance Perception: Implications for Real and Virtual environments*

Sarah H. Creem-Regehr, Peter Willemsen, Amy A. Gooch, William B. Thompson.

University of Utah Technical Report, UUCS-03-016, August 2003.

*The effects of restricted viewing conditions on egocentric distance judgments*

Sarah Creem-Regehr, Peter Willemsen, Amy Gooch, William Thompson.

Journal of Vision (Abstract), 3(9), p. 16a, 2003.

*Compression of distance judgments when viewing virtual environments using a head-mounted display*

William Thompson, Amy Gooch, Peter Willemsen, Sarah Creem-Regehr, Jack Loomis, Andrew Beall.

Journal of Vision (Abstract), 3(9), p. 18a, 2003.

*An Experimental Comparison of Perceived Egocentric Distance in Real, Image-Based, and Traditional Virtual Environments using Direct Walking Tasks*

Pete Willemsen and Amy Gooch.

Technical Report UUCS-02-009, School of Computing, University of Utah, February 2002.

*Perceiving virtual geographical slant: action influences perception*

Sarah H. Creem-Regehr, Amy A. Gooch, William B. Thompson

Journal of Vision (Abstract), 2(7), p. 57a, 2002.

*A Painterly Approach to Human Skin*

Peter-Pike Sloan, Bruce Gooch, William Martin, Amy Gooch, and Louise Bell.

University of Utah Technical Report UUCS-99-023.

## Funding

### Fellowship:

Helen and Robert J. Piros Fellowship 2004-2005

### Grants:

Co-PI Microsoft Research Computer Gaming Curriculum Program 2005-2006

Alias Research Donation: 9 seats of Maya Unlimited Rendering and Animation Software

## Community Activities

Reviewer:

NSF Electronic Proposal (2004)

ACM Journal Transactions on Applied Perception

ACM Journal Transactions on Graphics

ACM Non-Photorealistic Animation and Rendering Conference

ACM SIGGRAPH Conference

Eurographics Conference

Computers & Graphics: An International Journal

IEEE Visualization

IEEE Computer Graphics and Applications

IEEE Transactions on Visualization and Computer Graphics

Eurographics Symposium on Rendering (EGSR)

Graphics Interface

Graphics Interface HCI Track

Computer Graphics Forum

MidGraph 2004, 2005

Eurographics Workshop on Computational Aesthetics

## Community Activities (Continued)

Program committee member: Graphics Interface 2007

### Invited Talks:

Visualizing Pentimenti: Revealing Hidden History in Paintings. Dagstuhl Seminar on Computational Aesthetics in Graphics, Visualization and Imaging. May 2006.

Color2Gray: Saliency-Preserving Color Removal. University of Tubingen. May 2006.

Preserving Saliency By Maintaining Perceptual Differences for Image Creation and Manipulation. Purdue University. April 2006.

Preserving Saliency By Maintaining Perceptual Differences for Image Creation and Manipulation. College of William and Mary. March 2006.

Preserving Saliency By Maintaining Perceptual Differences for Image Creation and Manipulation. University of Victoria. February 2006.

Color2Gray: Saliency-Preserving Color Removal. University of Utah. July 2005.

Color2Gray: Saliency-Preserving Color Removal, ACM SIGGRAPH 2005.

Color2Gray: Saliency-Preserving Color Removal. Computational Aesthetics. May 18-20th, 2005. Girona, Spain. <http://www.computational-aesthetics.org/html/links.html>

Illustration: Lighting and Material Properties. ACM SIGGRAPH 2005, part of the SIGGRAPH 2005 Computer Generated Medical, Technical and Scientific Illustration Half-Day Course.

Perception and Computer Graphics. Washington University, Computer Science Department Colloquium. November 2003.

Perception and Computer Graphics. University of Iowa, Department of Computer Science Colloquium, February 2003.

Perception and Computer Graphics. University of Pennsylvania, GRASP lab, Dr. Kostas Daniilidis. January 2003

Non-Photorealistic Rendering. Disney Feature Animations Disney-Graph, June 1999.

Using Non-Photorealistic Rendering to Communicate Shape. ACM Siggraph 1999, part of the SIGGRAPH 1999 Non-Photorealistic Rendering Full-day Course.

A Non-Photorealistic Lighting Model For Automatic Technical Illustration, ACM Siggraph 1998 paper.

### Participant:

Dagstuhl Seminar on Computational Aesthetics in Graphics, Visualization and Imaging (May 28 - June 6, 2006)

Contributor to the first ACM/Eurographics Workshop on Computational Aesthetics (May 2005)

Panelist Northwestern University 35th Annual Career Day for Girls, February 25, 2006.

Panelist Northwestern University 34th Annual Career Day for Girls, February 26, 2005.

Panelist Northwestern University 33rd Annual Career Day for Girls, February 21, 2004.

Co-organizer for MidGraph, the MidWest Computer Graphics Meeting (2003, 2004)

Finance Chair for the first Symposium on Graphics and Perception to be held in conjunction with ACM SIGGRAPH 2004

Contributor to the first ACM Campfire on Graphics and Perception

## Computer Science References

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## Interdisciplinary Research References

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