

Chris Wojtan

CONTACT INFORMATION

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OBJECTIVE

Solve fundamental problems in applied geometry and physics-based animation through de-coupling governing equations, efficient approximations to reality, novel control mechanisms, and the development of new material models.

RESEARCH INTERESTS

Physics-based simulation for computer graphics, which includes:

- Natural phenomena animation.** Animation of deformable bodies, fluids, collision resolution.
- Numerical methods.** Finite element method, computational fluid dynamics, numerical integration, efficient data structures.
- Applied Geometry.** Mesh generation and numerical topology.
- Control of physics-simulation.** Optimization, the adjoint method, animation with constraints.

EDUCATION

Georgia Institute of Technology, Atlanta, Georgia USA

Ph.D. Student, Computer Graphics, August 2004 (expected graduation date: May 2010)

- Advisor: Greg Turk

ETH Zürich, Zürich, Switzerland

Visiting Researcher, Summer 2008

- Advisors: Markus Gross and Nils Thürey

Carnegie Mellon University, Pittsburgh, Pennsylvania USA

Visiting Researcher, Fall 2006

- Advisors: Jessica K. Hodgins and Adam W. Bargteil

University of Illinois, Urbana, Illinois USA

B.S., Computer Science, May, 2004

- Advisors: Michael Garland and Yizhou Yu

HONORS AND AWARDS

National Science Foundation Graduate Research Fellowship 2005 – 2008

Presidential Fellowship at Georgia Institute of Technology 2004 – present

James Scholar at University of Illinois 2000 – 2004

EXPERIENCE

Georgia Institute of Technology, Atlanta, Georgia USA

Graduate Student

August 2004 – present

Includes current Ph.D. research and Ph.D. level coursework.

ETH Zürich, Zürich, Switzerland

Visiting Researcher

May 2008 – August 2008

Developed a method for introducing topological changes into physical simulations using surface tracking with explicit meshes.

Supervised by Markus Gross and Nils Thürey.

Carnegie Mellon University, Pittsburgh, Pennsylvania USA

Visiting Researcher

August 2006 – February 2007

Developed a new plasticity model for finite element simulations in computer graphics.
Supervised by Jessica K. Hodgins and Adam W. Bargteil.

Graduate Research Assistant

Summer 2005

Researched methods for coupling variable-density immiscible fluids and rigid bodies.
Supervised by Peter. J. Mucha.

Graduate Teaching Assistant

Spring 2006

Taught lectures, held office hours, and graded homework for CS4451 - Computer Graphics.

Graduate Teaching Assistant

Fall 2004

Held office hours and graded homework for CS3510 - Design and Analysis of Algorithms.

Lawrence Livermore National Laboratory, Livermore, California USA

Summer Scholar

Summer 2004

Added image manipulation functionality to VisIt, the lab's *R&D 100 award*-winning scientific visualization package.
Supervised by Jeremy Meredith.

University of Illinois, Urbana, Illinois USA

Course Grader

Fall 2003

Graded homework and exams for CS257 - Numerical Methods.

PUBLICATIONS

Deforming Meshes that Split and Merge. Chris Wojtan, Nils Thürey, Markus Gross, and Greg Turk. *ACM Transactions on Graphics (SIGGRAPH 2009)* Vol 28, No. 3, 2009.

Fluid Simulation with Articulated Bodies. Nipun Kwatra, Chris Wojtan, Mark Carlson, Irfan A. Essa, Peter J. Mucha, Greg Turk. *IEEE Transactions on Visualization and Computer Graphics*, 10 Jun. 2009.

Fast Viscoelastic Behavior with Thin Features. Chris Wojtan and Greg Turk. *ACM Transactions on Graphics (SIGGRAPH 2008)* Vol 27, No. 3, 2008.

Animating Corrosion and Erosion. Chris Wojtan, Mark Carlson, Peter J. Mucha, and Greg Turk. in Proceedings of *Eurographics Workshop on Natural Phenomena 2007*.

A Finite Element Method for Animating Large Viscoplastic Flow. Adam W. Bargteil, Chris Wojtan, Jessica K. Hodgins, and Greg Turk. *ACM Transactions on Graphics (SIGGRAPH 2007)* Vol 26, No. 3, 2007.

Control of Complex Particle Systems Using the Adjoint Method. Chris Wojtan, Peter J. Mucha, and Greg Turk. in Proceedings of *ACM SIGGRAPH/Eurographics Symposium on Computer Animation 2006*.

Controllable Motion Synthesis in a Gaseous Medium. Lin Shi, Yizhou Yu, Chris Wojtan, and Stephen Cheney. *The Visual Computer* Vol. 21, No. 7, 2005, pp.474-487.

CONFERENCE TALKS

Deforming Meshes that Split and Merge. (with Nils Thürey) ACM SIGGRAPH. New Orleans, Louisiana, USA. August 7, 2009.

Fast Viscoelastic Behavior with Thin Features. ACM SIGGRAPH. Los Angeles, California, USA. August 13, 2008.

Animating Corrosion and Erosion. Eurographics Workshop on Natural Phenomena. Prague, Czech Republic. September 4, 2007.

A Finite Element Method for Large Viscoplastic Flow. (with Adam W. Bargteil) ACM SIGGRAPH. San Diego, California, USA. August 6, 2007.

Control of Complex Particle Systems Using the Adjoint Method. ACM SIGGRAPH/Eurographics Symposium on Computer Animation. Vienna, Austria. September 2, 2006.

INVITED TALKS

Viscoelastic Finite Elements for Computer Animation. ETH. Zürich, Switzerland. May 21, 2008.

Viscoelastic Finite Elements for Computer Animation. INRIA. Lorraine, France. March 1, 2008.

Control of Complex Particle Systems Using the Adjoint Method. University of Illinois. Urbana, Illinois, USA. November 15, 2006.

Control of Complex Particle Systems Using the Adjoint Method. Carnegie Mellon University. Pittsburgh, Pennsylvania, USA. Fall 2006.

INVITED LECTURES

Fluid Animation. CS7496 Computer Animation Class. Atlanta, Georgia, USA. February 25 and 27, 2009.

Using Physics in Movies and Video Games. Lockport Township High School. Lockport, Illinois, USA. August 2008.

Fluids, Cloth, and Goo: My Animation Research at Georgia Tech. CS7496 Computer Animation Class. Atlanta, Georgia, USA. April 22, 2008.

Variational Calculus and its Applications to Computer Graphics. Geometry Group at Georgia Tech. Atlanta, Georgia, USA. February 19, 2008.

Using Physics in Movies and Video Games. Lockport Township High School. Lockport, Illinois, USA. November 2005.

ACKNOWLEDGED
WORK

Water Drops on Surfaces. Huamin Wang, Peter J. Mucha and Greg Turk. *SIGGRAPH 2005*.

Pixel-Exact Rendering of Spacetime Finite Element Solutions. Yuan Zhou, Michael Garland, and Robert Haber. In Proceedings of *IEEE Visualization 2004*.

COMMUNITY

Teaching

Course TA and grader, guest lecturer for computer graphics classes taught by Greg Turk and C. Karen Liu.

Attended Conferences

SIGGRAPH 2004, 2005, 2006, 2007, 2008, 2009, Eurographics 2007, ACM SIGGRAPH/Eurographics Symposium on Computer Animation (SCA) 2006, 2007, 2008, 2009, Eurographics Workshop on Natural Phenomena 2007, Reflections|Projections 2003, 2004.

Reviewer

ACM SIGGRAPH 2005, 2007, 2008, 2009, ACM SIGGRAPH Courses 2007, SIGGRAPH Asia 2008, 2009, Computer Graphics Forum 2009, Eurographics 2006, 2007, 2009, ACM SIGGRAPH/Eurographics Symposium on Computer Animation (SCA) 2007, Eurographics Workshop on Natural Phenomena 2007.

Memberships

The Association for Computing Machinery, ACM SIGGRAPH.

SKILLS

- *Languages:* English, Russian, Spanish.
- *Programming Languages:* C, C++, Cg, CUDA, Java, Python, HTML, BASIC, L^AT_EX, MATLAB.
- *Programming Tools:* OpenGL, MPI.
- *Operating Systems:* Windows, DOS, Linux, Unix.
- *Software:* Photoshop, Paint Shop Pro, Gimp, Illustrator, Inkscape, Premiere, POVray, Gelato, Visual Studio.

PERSONAL

Background:

Citizen of USA.

Interests:

Martial arts (black belt and Illinois taekwondo gold medalist, additional training in hapkido and Brazilian jiu jitsu), social psychology, music writing and performance (guitar and vocals).