PROFESSOR CHRIS WOJTAN, PH.D.

wojtan@ist.ac.at http://pub.ist.ac.at/group_wojtan/

RESEARCH INTERESTS

Physics based Animation
Dynamics of fluids, solids, and more exotic materials

Numerical Algorithms
Numerical integration, conservation schemes, efficient data structures, finite element methods, computational fluid dynamics

Geometry Processing
Mesh generation, deformation, discretization, topology changes

Animation Control
Optimization, animation with constraints

EDUCATION

PhD Georgia Institute of Technology, Computer Science Dec 2010
Dissertation: "Animating Physical Phenomena with Embedded Surface Meshes"
Committee: Greg Turk (advisor), Peter J. Mucha, Jarek Rossignac, Irfan Essa, C. Karen Liu

BS University Name, Computer Science May 200X
Minored in Mathematics and Physics
Research Advisors: Michael Garland and Yizhou Yu

HONORS AND AWARDS

ACM Siggraph Significant New Researcher Award	2016
Eurographics Young Researcher Award	2015
Günter Enderle Best Paper Award, Eurographics	2015
European Research Council (ERC) Starting Grant	2015
Microsoft Visual Computing Award, from ÖAGM	2013
IST Austria "Golden Chalk" Best lecturer award	2013
Best Doctoral Dissertation Award from Georgia Tech chapter of Sigma Xi	2011
Outstanding Graduate Research Assistant, Georgia Tech CoC	2010
National Science Foundation Graduate Research Fellowship	2005-2008
Presidential Fellowship at Georgia Institute of Technology	2004
James Scholarship at University of Illinois	2000-2004
Dean's List at University of Illinois College of Engineering	2000-2004

EMPLOYMENT

IST Austria, *Professor*	Jan 2016 to present
IST Austria, *Assistant Professor*	Feb 2011 to Dec 2015
Georgia Institute of Technology, *Research Assistant*	Aug 2004 to Dec 2010
ETH Zürich, *Visiting Researcher*	Summer 2008, Winter 2009
Carnegie Mellon University, *Visiting Researcher*	Fall 2006
Lawrence Livermore National Laboratory, *Visiting Researcher*	Summer 2004

PUBLICATIONS

Journal Publications

Ibayashi, Hikaru, **Chris Wojtan**, Nils Thuerey, Takeo Igarashi, and Ryoichi Ando. 2018. "Simulating Liquids on Dynamically Warping Grids." IEEE Transactions on Visualization and Computer Graphics (TVCG).

Jeschke, Stefan, Tomáš Skřivan, Matthias Müller-Fischer, Nuttapong Chenanez, Miles Macklin, and **Chris Wojtan**. 2018. "Water surface wavelets." ACM Transactions on Graphics (SIGGRAPH).

Sato, Takahiro, **Chris Wojtan**, Nils Thuerey, Takeo Igarashi, and Ryoichi Ando. 2018. "Extended narrow band FLIP for liquid simulations." Computer Graphics Forum (Eurographics).

Jeschke, Stefan, and **Chris Wojtan**. 2017. "Water wave packets." ACM Transactions on Graphics (SIGGRAPH).

Manteaux, Pierre-Luc, **Chris Wojtan**, Rahul Narain, Stephane Redon, Francois Faure, and Marie-Paule Cani. 2017. "Adaptive physically based models in computer graphics." Computer Graphics Forum (Eurographics State of the Art Report).

Bojsen-Hansen, Morten, and **Chris Wojtan**. 2016. "Generalized Non-Reflecting Boundaries for Fluid Re-Simulation." ACM Transactions on Graphics (SIGGRAPH).

Da, Fang, David Hahn, Christopher Batty, **Chris Wojtan**, and Eitan Grinspun. 2016. "Surface-Only Liquids." ACM Transactions on Graphics (SIGGRAPH).

Ferstl, Florian, Ryoichi Ando, **Chris Wojtan**, Rudiger Westermann, and Nils Thuerey. 2016. "Narrow Band FLIP for Liquid Simulations." Computer Graphics Forum (Eurographics) 225-232.

Hahn, David, and **Chris Wojtan**. 2016. "Fast Approximations for Boundary Element Based Brittle Fracture Simulation." ACM Transactions on Graphics (SIGGRAPH).

Goldade, Ryan, Christopher Batty, and **Chris Wojtan**. 2016. "A Practical Method for High-Resolution Embedded Liquid Surfaces." Computer Graphics Forum (Eurographics).

Hahn, David, and **Chris Wojtan**. 2015. "High-Resolution Brittle Fracture Simulation with Boundary Elements." ACM Transactions on Graphics (SIGGRAPH).

Jeschke, Stefan, and **Chris Wojtan**. 2015. "Water Wave Animation via Wavefront Parameter Interpolation." ACM Transactions on Graphics 34 (3): 27:1-27:14.

Ando, Ryoichi, Nils Thuerey, and **Chris Wojtan**. 2015. "A Dimension-reduced Pressure Solver for Liquid Simulations." Computer Graphics Forum (Eurographics).

Ando, Ryoichi, Nils Thuerey, and **Chris Wojtan**. 2015. "A Stream Function Solver for Liquid Simulations." ACM Transactions on Graphics (SIGGRAPH).

Da, Fang, Christopher Batty, **Chris Wojtan**, and Eitan Grinspun. 2015. "Double Bubbles Sans Toil and Trouble: Discrete Circulation-Preserving Vortex Sheets for Soap Films and Foams." ACM Transactions on Graphics (SIGGRAPH).

Raveendran, Karthik, **Chris Wojtan**, Nils Thuerey, and Greg Turk. 2014. "Blending Liquids." ACM Transactions on Graphics (SIGGRAPH).

Ando, Ryoichi, Nils Thuerey, and **Chris Wojtan**. 2013. "Highly Adaptive Liquid Simulations on Tetrahedral Meshes." ACM Transactions on Graphics (SIGGRAPH).

Bernstein, Gilbert, and **Chris Wojtan**. 2013. "Putting Holes in Holey Geometry: Topology Change for Arbitrary Surfaces." ACM Transactions on Graphics (SIGGRAPH).

Bojsen-Hansen, Morten, and **Chris Wojtan**. 2013. "Liquid Surface Tracking with Error Compensation." ACM Transactions on Graphics (SIGGRAPH).

Bojsen-Hansen, Morten, Hao Li, and **Chris Wojtan**. 2012. "Tracking Surfaces with Evolving Topology." ACM Transactions on Graphics (SIGGRAPH).

Yu, Jihun, **Chris Wojtan**, Greg Turk, and Chee Yap. 2012. "Explicit Mesh Surfaces for Particle Based Fluids." Computer Graphics Forum (Eurographics). 31 (2pt4): 815-824.

Kwatra, Nipun, **Chris Wojtan**, Mark Carlson, Irfan Essa, Peter J. Mucha, and Greg Turk. 2010. "Fluid Simulation with Articulated Bodies." IEEE Transactions on Visualization and Computer Graphics (TVCG) 16 (1): 70-80.

Thuerey, Nils, **Chris Wojtan**, Markus Gross, and Greg Turk. 2010. "A Multiscale Approach to Mesh-based Surface Tension Flows." ACM Transactions on Graphics (SIGGRAPH).

Wojtan, Chris, Nils Thuerey, and Markus, Turk, Greg Gross. 2010. "Physics-Inspired Topology Changes for Thin Fluid Features." ACM Transactions on Graphics (SIGGRAPH).

Wojtan, Chris, Nils Thuerey, Markus Gross, and Greg Turk. 2009. "Deforming Meshes that Split and Merge." ACM Transactions on Graphics (SIGGRAPH).

Wojtan, Chris, and Greg Turk. 2008. "Fast Viscoelastic Behavior with Thin Features." ACM Transactions on Graphics (SIGGRAPH).

Bargteil, Adam W., **Chris Wojtan**, Jessica K. Hodgins, and Greg Turk. 2007. "A Finite Element Method for Animating Large Viscoplastic Flow." ACM Transactions on Graphics (SIGGRAPH) 26 (3): 16.

Shi, Lin, Yizhou Yu, **Chris Wojtan**, and Stephen Chenney. 2005. "Controllable Motion Synthesis in a Gaseous Medium." The Visual Computer 21 (7): 474-487.

Peer-Reviewed Conference Papers

Manteaux, Pierre-Luc, Ulysse Vimont, **Chris Wojtan**, Damien Rohmer, and Marie-Paule Cani. 2016. "Space-Time sculpting of liquid animation." Motion in Games. 61-71.

Raveendran, Karthik, Nils Thuerey, **Chris Wojtan**, and Greg Turk. 2012. "Controlling Liquids Using Meshes." ACM SIGGRAPH/Eurographics Symposium on Computer Animation (SCA).

Raveendran, Karthik, **Chris Wojtan**, and Greg Turk. 2011. "Hybrid Smoothed Particle Hydrodynamics." ACM SIGGRAPH/Eurographics Symposium on Computer Animation (SCA).

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

Wojtan, Chris, Peter J. Mucha, and Greg Turk. 2006. "Keyframe Control of Complex Particle Systems Using the Adjoint Method." ACM SIGGRAPH/Eurographics Symposium on Computer Animation. 15-23.

Peer-Reviewed Courses

Wojtan, Chris, and Matthias, Brochu, Tyson Müller-Fischer. 2011. "Liquid Simulation with Mesh-based Surface Tracking." SIGGRAPH Courses. ACM.

Ph.D. Dissertation

Wojtan, Chris. 2010. "Animating Physical Phenomena with Embedded Surface Meshes." PhD Thesis, Georgia Institute of Technology.

PRESENTATIONS AND INVITED LECTURES

Keynote Addresses and Award Talks

"Surface-Only Methods for Simulating Flow and Fracture", Pacific Graphics Keynote talk, Okinawa, Japan, October 13, 2016.

"Probing Nature with Computer Graphics", ACM SIGGRAPH Conference on Computer Graphics and Interactive Techniques, ACM SIGGRAPH Significant New Researcher Award talk. Anaheim, California, USA, July 25, 2016.

"Deforming Meshes with Topological Changes." ¨OAGM / AAPR 2013 - The 37th Annual Workshop of the Austrian Association for Pattern Recognition. Microsoft Visual Computing Award talk. Innsbruck, Austria. May 23-24, 2013.

"Deforming Meshes that Split and Merge." Spring Conference on Computer Graphics. Smolenice castle, Slovakia. May 4, 2012.

"Deformable Surfaces with Topology Changes for Physics-Based Animation." Central European Seminar on Computer Graphics (CESG 2011). Bratislava, Slovakia. May 2–4, 2011.

Workshops

"Water Surface Waves." Einstein Workshop: Geometry and Physics in Computer Graphics. Technical University Berlin, Berlin, Germany. April 9-11, 2018.

"Water Surface Waves." Bellairs Workshop on Computer Animation: Simulation and learning from the living world. Bellairs Research Institute, St. James, Barbados. February 9-16, 2018.

"Water Wave Packets." Geometry Workshop in Obergurgl 2017. Obergurgl, Austria. September 21–26, 2017.

"Computing Fracture Surface Patterns", Geometry and Materials Sciences workshop (GEMS 2016), Okinawa, Japan, October 15, 2016.

"How to make a Big Splash: Efficient Simulation of Natural Phenomena at Large Scales", HiVisComp, Behemian Forest, Czech Republic, February 5, 2016.

"A Stream Function Solver for Liquid Simulations." Geometry Workshop in Seggau 2015. Seggau, Austria. July 10-12, 2015.

"Putting Holes in Holey Geometry." Geometry Workshop in Strobl 2013. Strobl, Austria. August 28-September 1, 2013.

"Surface Tracking for Physical Simulation and Computer Graphics." Summer school on Discrete and Computational Geometry. Demino, Yaroslavl, Russia. July 22-August 2, 2013.

"Deforming Meshes with Topological Changes." The MIT Symposium on Computer Graphics. Massachusetts Institute of Technology, Cambridge, Massachusetts, USA. March 25, 2013.

"Deforming Meshes that Split and Merge." VisionDay 2012. Technical University of Denmark, Lyngby, Denmark. May 30, 2012.

"Fast and Detailed Surface Tension Simulation." Geometry Workshop in Obergurgl 2011. Obergurgl, Austria. June 12–23, 2011.

"Lagrangian Surfaces for Fluid Animation." Bellairs Workshop on Computer Animation: Reduced Physics, Simulation, and Control. Bellairs Research Institute, St. James, Barbados. February 22-26, 2010.

Invited Presentations

"Surface-Only Methods for Simulating Flow and Fracture", University of Innsbruck, Innsbruck, Austria, July 3, 2018.

"Algorithms for Accelerating Large-Scale Liquid Simulations", University of Tokyo, Tokyo, Japan, October 18, 2016.

"Flow and Fracture: Recent research from the Wojtan group at IST Austria", Disney Animation Studios, Burbank, California, USA, July 29, 2016.

"Flow and Fracture: Recent research from the Wojtan group at IST Austria", Dreamworks Animation, Glendale, California, USA, July 22, 2016.

"How to make a Big Splash: Efficient Simulation of Natural Phenomena at Large Scales", Institutewide Fourth Year Colloquium Lecture, IST Austria, Klosterneuburg, Austria, September 30, 2016.

"How to make a Big Splash: Efficient Simulation of Natural Phenomena at Large Scales", Disney Animation Studios, Burbank, California, USA, August 14, 2015.

"How to make a Big Splash: Efficient Simulation of Natural Phenomena at Large Scales", Pixar Studios, Emeryville, California, USA, April 8, 2015.

"A General Framework for Bilateral and Mean Shift Filtering", Google Headquarters, Mountainview, California, April 7, 2015.

"How to make a Big Splash: Efficient Simulation of Natural Phenomena at Large Scales", Industrial Light & Magic, San Francisco, California, USA, April 6, 2015.

"How to make a Big Splash: Efficient Simulation of Natural Phenomena at Large Scales", University of California, Berkeley, April 3, 2015.

"How to make a Big Splash: Efficient Simulation of Natural Phenomena at Large Scales", Stanford University, April 2, 2015.

"Math, Science, and Computer Simulations", Lockport Township High School, Illinois, USA, March 31, 2015.

"How to make a Big Splash: Efficient Simulation of Natural Phenomena at Large Scales", University of Illinois in Urbana Champaign, March 30, 2015.

"Compensating for Defects in Geometric Models and Liquid Surfaces." Technical University of Denmark, Lyngby, Denmark. December 10, 2014.

"Big Splash: Efficient Simulation of Natural Phenomena at Extremely Large Scales", ERC interview in Brussels, Belgium, Sept 29 2014.

"Compensating for Defects in Geometric Models and Liquid Surfaces." INRIA, Grenoble, France. February 20, 2014.

"Deformable Surfaces with Topology Changes for Physics-Based Animation." Technical University of Vienna. Vienna, Austria. October 21, 2011.

"Physics-Inspired Topology Changes for Thin Fluid Features." California Institute of Technology, Pasadena, California. July 30, 2010.

"Deformable Surfaces for Physics-Based Animation." ETH Zürich, Switzerland. July 19, 2010.

"Deformable Surfaces for Physics-Based Animation." Institute of Science and Technology Austria. Klosterneuburg, Austria. April 14, 2010.

"Deformable Surfaces for Physics-Based Animation." University of Utah. Salt Lake City, Utah. April 21, 2010.

"Mesh-based Surface Tracking with Topology Changes." Institute of Science and Technology Austria. Klosterneuburg, Austria. November 13, 2009.

"Meshy Fluids!" Carnegie Mellon University computer graphics research retreat, Pittsburgh, Pennsylvania, USA. October 17, 2009.

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

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

"Finite Element Goop with Embedded Surface Meshes." Carnegie Mellon University computer graphics research retreat, Pittsburgh, Pennsylvania, USA. July 11, 2007.

"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.

FUNDING

"Big Splash: Efficient Simulation of Natural Phenomena at Extremely Large Scales", e1,500,000. European Research Council (ERC) Starting Grant 638176 , 2015-2020.

"Embedded Meshes for Flow and Fracture" (Listed as senior personnel), $466,478. National Science Foundation Award 1017014, 2010-2013.

TEACHING EXPERIENCE

IST Austria, Klosterneuburg, Austria
Professor

Courses Taught

Data Science and Scientific Computing (core course) Co-taught with Bernd Bickel and Gasper Tkacik	Spring 2018
Numerical Algorithms	February–April 2017
Modeling (core course), co-taught with Nick Barton	Fall 2015
Modeling (core course), co-taught with Caroline Uhler	Spring 2015
Differential Equations	May–July 2014
Image Processing, co-taught with Christoph Lampert	Feb–May 2014
Differential Equations	March–May 2012
Differential Equations	May–July 2013

Post-doctoral Researchers Mentored

Stefan Jeschke	2012–2016
Ryoichi Ando	2014–2016
Ewa Gajda-Zagorska	2015–2019
Camille Schreck	2016–present
Patrick Blies	2017-2018

Ph.D. Students Advised

Karthik Raveendran, co-advised at Georgia Tech with Greg Turk	2009–2014
Morten Bojsen-Hansen	2011–2016
Jakob Egger	2011–2013
David Hahn	2013–2017
Tomáš Skřivan	2018–present
Georg Sperl	2018–present

Peter Synak	2018–present

Rotation Students Advised

Jakob Egger	Fall 2011
Maurizio Morri	Spring 2012
David Hahn	Fall 2012
Bo Wu	Spring 2013
Ruslan Guseinov	Fall 2014
Ran Zhang	Spring 2015
Rok Grah	Fall 2015
Peter Synak	Fall 2015
Nishchal Agrawal	Spring 2016
Davide Scarselli	Spring 2016
Amelie Royer	Spring 2016
Sergey Avvakumov	Spring 2016
Tomáš Skřivan	Fall 2016
Georg Sperl	Spring 2017
Christian Hafner	Spring 2018
Julia Lyudchik	Fall 2018

Research Interns Supervised

Bhavna Mahadevan (co-advised with Greg Turk)	Summer 2010
Sahil Singla	Summer 2012
Shashwat Garg	Summer 2012
Ryoichi Ando	2012–2014
Ryan Goldade	2014
Selver Pepic	2015
Julia Lyudchik	2016
Hikaru Ibayashi	2016
Klint Qinami	2017
Kryštof Kolář	2017
Takahiro Sato	2017
Dalila Saulebekova	2018

Georgia Institute of Technology, Atlanta, GA, USA
Teaching Assistant, Computer Science

CS4451 Design and Analysis of Algorithms	Fall 2004
CS4451 Computer Graphics	Spring 2006

University of Illinois, Urbana-Champaign, IL, USA
Teaching Assistant, Computer Science

CS257 Numerical Methods	Fall 2003

PROFESSIONAL SERVICE

Conference Organization

Minisymposium co-organizer with David Hahn,
World Congress on Computational Mechanics (WCCM) 2018
Papers Chair, Symposium on Computer Animation (SCA) 2016
Conflict of Interest Coordinator, SIGGRAPH 2019

Advisory Boards and Sorting Committees

Eurographics Sorting Committee 2018

Program Committees

SIGGRAPH 2012, 2013, 2015, 2017, 2018
SIGGRAPH Asia 2011, 2019
Eurographics 2015
Symposium on Computer Animation (SCA) 2011, 2012, 2013, 2014, 2015
Symposium on Geometry Processing (SGP) 2012, 2013, 2014, 2016
Shape Modeling International (SMI) 2013, 2016

Peer-Reviewed Articles for:

- SIGGRAPH
- SIGGRAPH Asia
- SIGGRAPH Courses
- ACM Transaction on Graphics
- Eurographics
- Computer Graphics Forum
- Symposium on Computer Animation (SCA)
- Symposium on Geometry Processing (SGP)
- Eurographics Workshop on Natural Phenomena
- Computers and Graphics
- Graphical Models
- Graphics Interface
- IEEE Transactions on Pattern Analysis & Machine Intelligence (PAMI)
- IEEE Computer Graphics and Applications (CGA)
- IEEE Transactions on Visualization and Computer Graphics (TVCG)

Ph.D. Thesis Defense Committees

Juraj Onderik. Comenius University, Bratislava	September 30, 2011
Jihun Yu. New York University	September 7, 2011
Karthik Raveendran. Georgia Tech	July 29, 2014
Asger Nyman Christiansen. Denmark Technical University	December 11, 2014
Viktoriia Sharmanska. IST Austria	February 13, 2015
Fang Da. Columbia University	June 9, 2016
Murat Tugrul. IST Austria (Exam chair)	June 27, 2016
Morten Bojsen-Hansen. IST Austria (Ph.D. Advisor)	July 15, 2016
David Hahn. IST Austria (Ph.D. Advisor)	June 26, 2017
Alexander Kolesnikov. IST Austria (Exam chair)	February 26, 2018
Mabel Iglesias-Ham. IST Austria (Exam chair)	May 30, 2018
Olivier Mercier, University of Montreal	Jun 6, 2018

Ph.D. Proposal Committees

Karthik Raveendran. Georgia Tech	August 21, 2013

Qualifying Exam Committees

Arjun Radhakrishna. IST Austria (Exam chair)	March 15, 2011
Viktoriia Sharmanska. IST Austria	September 6, 2011
Morten Bojsen-Hansen. IST Austria	September 6, 2012
Jakob Egger. IST Austria	March 15, 2012
David Hahn. IST Austria	August 19, 2013
Damaris Ketino Rangel Guerrero. IST Austria (Exam chair)	November 28, 2014
Chaitanya Paranjape. IST Austria	January 28, 2015
Ran Zhang. IST Austria	January 28, 2016
Ruslan Guseinov. IST Austria	January 29, 2016
Karla Hulyev. IST Austria (Exam chair)	February 15, 2016
Rok Grah. IST Austria (Exam chair)	January 25, 2017
Georg Sperl. IST Austria	January 26, 2018
Tomáš Skřivan. IST Austria	January 30, 2018
Laura Schmid. IST Austria (Exam chair)	April 27, 2018
Peter Synak. IST Austria	July 30, 2018
Georg Arnold. IST Austria (Exam chair)	October 4, 2018
Christian Hafner. IST Austria	February 27, 2019

Other Service

IST Austria

- Head of Scientific Computing scientific service unit 2018-present
- Chair of female faculty recruiting committee 2018-present
- Mentor to 1st year Ph.D. students 2012-2014, 2016-present
- Work & Family Audit committee 2018
- Visiting scientists committee 2016, 2017
- Internal events committee 2015, 2016, 2017 (chair)
- Interdisciplinary projects committee 2014, 2015, 2016
- Participation in open campus day 2013, 2019
- Annual retreat planning committee 2011, 2012

Georgia Institute of Technology

- PhD student recruiting activities, 2005–2010

External Service

- Give inspirational lectures on mathematics, physics, and computer science to high school students in Lockport Township High School, Lockport, IL, USA. (2005, 2008, 2015)