

ALLA SAFONOVA

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA
Doctor of Philosophy in Computer Science
Title: Reducing the search space for physically realistic human motion synthesis
Advisor: Jessica Hodgins
Committee: Nancy S. Pollard, Christopher G. Atkeson, Jovan Popovic
9/01 – 9/06

Georgia Institute Of Technology, Atlanta, GA
Master of Science, Computer Science
9/09 – 5/01, GPA: 4.0/4.0

Stevens Institute Of Technology, Hoboken, NJ
Bachelor of Science, Computer Science
5/95 – 12/97, Major GPA: 3.9/4.0

Saratov State University, Saratov, Russia
Undergraduate student, Department of Physics
9/91 – 1/94

RESEARCH INTERESTS

My current research interests are in computer animation and computer graphics. In particular, they include human motion synthesis, compact human motion representation, animation for naive users, interactive control, animation of cartoon characters, and use of virtual worlds in studying human motion.

PROFESSIONAL EXPERIENCE IN ACADEMIA

9/2007 – current University Of Pennsylvania Philadelphia, PA
Assistant Professor

9/2006 – 8/2007 Carnegie Mellon University Pittsburgh, PA
Postdoctoral Fellow
Performed research in the area of Computer Animation under the supervision of Professor Jessica Hodgins.

9/2001 – 9/2006 Carnegie Mellon University Pittsburgh, PA
Graduate Research Assistant
Performed research in the area of Computer Animation under the supervision of Professor Jessica Hodgins including:

- An algorithm for synthesis of physically realistic human motion based only on the rough sketch. We have developed two different approaches that build a compact (reduced-space) representation of human motion based on available motion capture data and search that representation for a motion that matches

sketch and constraints specified by the user.

- The analysis of physical correctness of a motion synthesized by interpolation of few human motions.
- An algorithm for segmenting motion capture data into distinct behaviors based on intrinsic dimensionality of the data.
- Using constrained optimization to adapt motion capture data to control the motion of a humanoid robot for free-space, upper body gesture.

9/1999 – 5/2001 Georgia Institute Of Technology Atlanta, GA

Graduate Research Assistant

Performed research in the area of Computer Graphics under the supervision of professor and director of GVU center Jarek Rossignac including:

- The derivation of a compact and simple Piecewise Circular approximation (PCA) scheme for 3D curves.
- A new formulation of the Edgebreaker algorithm used to compress 3D meshes (this new formulation leads to a much simpler implementation of the algorithm) and on extending the Edgebreaker algorithm to meshes with handles.

PROFESSIONAL EXPERIENCE IN INDUSTRY

2/2005 – 6/2005 Honda Research Institute Mountain View, CA

Research Internship

Developed an optimization software for adapting human motion to the control of Honda humanoid robot (ASIMO).

1/97 – 7/99 All Source Processing Inc. Parsippany, NJ

Software Engineer

Participated in the research, design and implementation of a polygon based real time terrain rendering algorithm.

5/96 – 9/96 Sony Electronics Inc. Park Ride, NJ

Software Engineer, Internship

Implemented an image processing application responsible for performing a number of standard algorithms such as image rotation, scaling and dithering.

TEACHING EXPERIENCE

Spring 2010 University of Pennsylvania Philadelphia, PA

Instructor

Instructor for Physically Based Animation (CIS 563).

Spring 2009 University of Pennsylvania Philadelphia, PA

Instructor

Instructor for Physically Based Animation (CIS 563).

Spring 2008 University of Pennsylvania Philadelphia, PA

Instructor

Instructor for Physically Based Animation (CIS 563).

Fall 2008 <i>Instructor</i>	University of Pennsylvania	Philadelphia, PA
Instructor for Physically Based Character Animation (CIS 700/005).		
Spring 2007 <i>Instructor</i>	Carnegie Mellon University	Pittsburgh, PA
Instructor for Computer Graphics class (CS 15-462).		
Spring 2003 <i>Graduate Teaching Assistant</i>	Carnegie Mellon University	Pittsburgh, PA
Served as a teaching assistant for Animation Art and Technology class.		
Spring 2002 <i>Graduate Teaching Assistant</i>	Carnegie Mellon University	Pittsburgh, PA
Served as a teaching assistant for a Computer Animation class.		
Spring 2000 <i>Graduate Teaching Assistant</i>	Georgia Institute Of Technology	Atlanta, GA
Served as a teaching assistant for Computer Science Theory class.		
Fall 1999 <i>Graduate Teaching Assistant</i>	Georgia Institute Of Technology	Atlanta, GA
Served as a teaching assistant for Computer Science Theory class.		

PUBLICATIONS

Journal and Magazine Articles, Book Chapters:

- C. Ren, L. Zhao and A. Safonova, "**Human Motion Synthesis with Optimization-based Graphs**", accepted to Computer Graphics Forum (Proceedings of Eurographics 2010)
- L. Zhao and A. Safonova, "**Achievement Good Connectivity in Motion Graphs**", *Graphical Models Journal*, 2009
- A. Safonova, J. Hodgins, "**Synthesizing Human Motion From Intuitive Constraints**", *Artificial Intelligence Techniques for Computer Graphics*, Springer-Verlag, 2009
- A. Safonova, J. Hodgins, "**Interpolated motion graphs with optimal search**", *ACM Transactions on Graphics Journal*, (SIGGRAPH 2007), August 2007
- A. Safonova, J. Hodgins, N. Pollard, "**Synthesizing Physically Realistic Human Motion in Low-Dimensional, Behavior-Specific Spaces**", *ACM Transactions on Graphics Journal*, (SIGGRAPH 2004), August 2004
- A. Safonova and J. Rossignac, "**Compressed Piecewise Circular Approximation of 3D Curves**", *Computer-Aided Design (CAD)*, May 2003.
- H. Lopes, J. Rossignac, A. Safonova, A. Szymczak and G. Tavares, "**Edgebreaker: A Simple Compression Algorithm for Surfaces with Handles**", *Computers&Graphics International Journal*, 2003

- J. Rossignac, A. Safonova, A. Szymczak, “**Edgebreaker on a Corner Table: A simple technique for representing and compressing triangulated surfaces**”, *Hierarchical and Geometrical Methods in Scientific Visualization*, Farin, G., Hagen, H. and Hamann, B., eds. Springer-Verlag, 2001

Full-length Publications at Conferences:

- J. T. Kider, M. Henderson, M. Likhachev, A. Safonova, “**High-dimensional Planning on the GPU**”, accepted to IEEE International Conference on Robotics and Automation (ICRA) 2010
- L. Zhao, A. Normoyle, S. Khanna and Alla Safonova, “**Automatic Construction of a Minimum Size Motion Graph**”, SIGGRAPH/ Eurographics Symposium on Computer Animation (SCA), 2009
- M. Yang, J. Lu, A. Safonova, and K. J. Kuchenbecker, “**GPU Methods for Real-Time Haptic Interaction with 3D Fluids**”, IEEE International Workshop on Haptic Audio-Visual Environments and Games (HAVE), November 2009
- L. Zhao and A. Safonova, “**Achievement Good Connectivity in Motion Graphs**”, *ACM SIGGRAPH/ Eurographics Symposium on Computer Animation (SCA), 2008, Best Paper Award*
- A. Safonova, J. Hodgins, “**Synthesizing Human Motion From Intuitive Constraints**”, *International Conference on Computer Graphics and Artificial Intelligence, (3IA), June 2008*
- A. Safonova, J. Hodgins, “**Analyzing the Physical Correctness of Interpolated Human Motion**”, *ACM SIGGRAPH/ Eurographics Symposium on Computer Animation (SCA), 2005*
- J. Barbic, A. Safonova, J.-Y. Pan, C. Faloutsos, J. K. Hodgins, and N. S. Pollard, “**Segmenting Motion Capture Data into Distinct Behaviors**”, *Proceedings of Graphics Interface, May 2004*
- A. Safonova, N. S. Pollard, and J. K. Hodgins, “**Optimizing Human Motion for the Control of a Humanoid Robot**”, *2nd International Symposium on Adaptive Motion of Animals and Machines (AMAM2003)*, Kyoto, Japan, March 2003.
- H. Lopes, J. Rossignac, A. Safonova, A. Szymczak and G. Tavares, “**Edgebreaker: A Simple Compression Algorithm for Surfaces with Handles**”, *ACM Symposium on Solid Modeling*, June 2002
- J. Rossignac, A. Safonova, A. Szymczak, “**Edgebreaker on a Corner Table: A simple technique for representing and compressing triangulated surfaces**”, *Shape Modeling International Conference*, May 2001

Short Length Publications at Conferences:

- Mark Henderson, Joseph T. Kider Jr., Maxim Likhachev, Alla Safonova, “**High-Dimensional Planning on the GPU**”, NVIDIA GPU Technology Conference, 2009, **Best Poster Award**
- M. Yang, J. Lu, Z. Zhou, A. Safonova, and K. J. Kuchenbecker, “**A GPU-Based Approach for Real-Time Haptic Rendering of 3D Fluids**”, *SIGGRAPH Asia Sketch*, December 2008

- J. Romano, A. Safonova, and K. J. Kuchenbecker, “**Real-Time Graphic and Haptic Simulation of Deformable Tissue Puncture**”, *Medicine Meets Virtual Reality*, December 2008

PROFESSIONAL SERVICES

- **Member of Program Committee:** ACM SIGGRAPH 2010, ACM SIGGRAPH/ Eurographics Symposium on Computer Animation (SCA) 2009, International Conference on Computer Graphics and Artificial Intelligence, (3IA) 2008, ACM SIGGRAPH/ Eurographics Symposium on Computer Animation (SCA) 2008
- **Session Chair:** ACM SIGGRAPH/Eurographics Symposium on Computer Animation (SCA), 2009 and 2008
- **Reviewer:** Siggraph 2009, SIGGRAPH ASIA 2009, SCA 2009, Eurographics 2009, TOG 2009, Graphical Models Journal 2009, Siggraph 2008, SIGGRAPH ASIA 2008, SCA 2008, Eurographics 2008, TOG 2008, Graphical Models Journal 2009, TVCG 2008, Siggraph 2007, SCA 2007, Siggraph 2006, SCA 2006, Siggraph 2005, SCA 2004, Siggraph 2004, SCA 2004 and other journals and conferences
- **NSF PANEL:** Small Panel, 2009
- Mentor for students in the CRA-W Distributed Mentoring Program for Women for two years
- Mentor for undergraduate , master and Ph.D students

TECHNICAL SKILLS

- Programming Languages: C++, C, Matlab, TI DSP Assembly, AMPL
- Libraries: OpenGL, Mesa, GLUT, FLTK
- Tools: Maya, Open Inventor, VC++/MFC
- Platforms: Windows XP/2000, UNIX , Windows NT

REFERENCES

Prof. Jessica Hodgins
Robotics Institute, Carnegie Mellon University
jkh@cs.cmu.edu

Prof. Nancy Pollard
Robotics Institute, Carnegie Mellon University
nsp@cs.cmu.edu

Prof. Jovan Popovic
MIT Computer Science and Artificial Intelligence Laboratory
jovan@csail.mit.edu

Prof. Jarek Rossignac
Interactive and Intelligent Division
College of Computing, Georgia Institute of Technology
jarek@cc.gatech.edu

CITIZENSHIP STATUS

Citizen of USA