Dr. Yili Zhao

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Education

University of Southern California, Los Angeles, CA
Ph.D. in Computer Science, August 2009 - August 2014
Dissertation Title: *Plant Substructuring and Real-time Simulation Using Model Reduction*
Committee: Jernej Barbič (advisor), Gaurav S. Sukhatme, Ulrich Neumann, Igor Kukavica, Stefan Schaal

Peking University, Beijing, China
M.S. in Computer Science, September 2006 - July 2009
Thesis Title: *Acceleration Techniques in Rendering Large-scale and Complex Scenes*

Nanjing University of Aeronautics and Astronautics, Nanjing, Jiangsu, China
B.S. in Computer Science, September 2002 - June 2006 (Ranked 2nd **out of 268**)
Thesis Title: *Research on Segmentation of three-dimensional Meshes with Color and Texture*

Visa Status

H-1B: H-1B visa began on October 1, 2015;

Working Experience

Facebook Menlo Park, CA
Research Scientist, March 2015 - present

- Design and develop the Facebook ads ranking system, which significantly boost prediction accuracy, ads quality, and company revenue. I designed and implemented scalable, and reliable algorithms to speed up the prediction process, lower the query latency, memory usage, system workload etc., and improve the ranking precision, and ads quality. I also built and optimized the feed ads ranking models, quality models by mixing several techniques such as probability theory, numerical optimization, machine learning, signal processing, feature engineering etc.

- Design and develop Facebook ads backend infrastructure that ingests billions of user events in real-time, and transform them into denormalized, flat data, ready for the immediate use in Facebook machine-learning system.

Oculus, Facebook Menlo Park, CA
Research Scientist, December 2014 - March 2015

- Designed and developed a system to construct and optimize geometric models of human hands from the sampled data.

Nimble VR (acquired by Facebook), San Francisco, CA
Research Engineer, October 2014 - November 2014

- Designed and developed visualization tools to analyze the recognition rates of the hand tracking system.

Research Experience

University of Southern California, Los Angeles, CA
Graduate Research Assistant, advisor: Jernej Barbič, August 2010 - August 2014

- **Developed a biomechanical model to set the mass density, stiffness, and damping properties of branches and leaves in complex botanical systems.**
  Published at ACM SIGGRAPH 2017.

- **Developed a robust system to convert static, triangle meshes of botanical objects into nonlinear FEM mechanical models suitable for physically based simulation.** Published at ACM SIGGRAPH 2013. I delivered the 20-minute SIGGRAPH presentation.

- **Developed a real-time system for simulation of anatomically realistic plants (trees, flowers, bushes, forests, etc.).** See Figure 1. Published at ACM SIGGRAPH 2011.
  Video 1: Oregon White Oak, realistic anatomy, adult tree, 120,000 leaves
  Video 2: Real-time physically-based simulation of plants

- **Developed an algorithm to simulate time-varying, geometrically complex, penalty-based distributed contact between many rigid objects and articulated objects.** Published at IEEE Transactions on Visualization and Computer Graphics.
  Video: Implicit Multibody Penalty-based Distributed Contact

- **Code contributor to Vega FEM library**, a computationally efficient and stable C/C++ physics library for three-dimensional deformable object simulation.
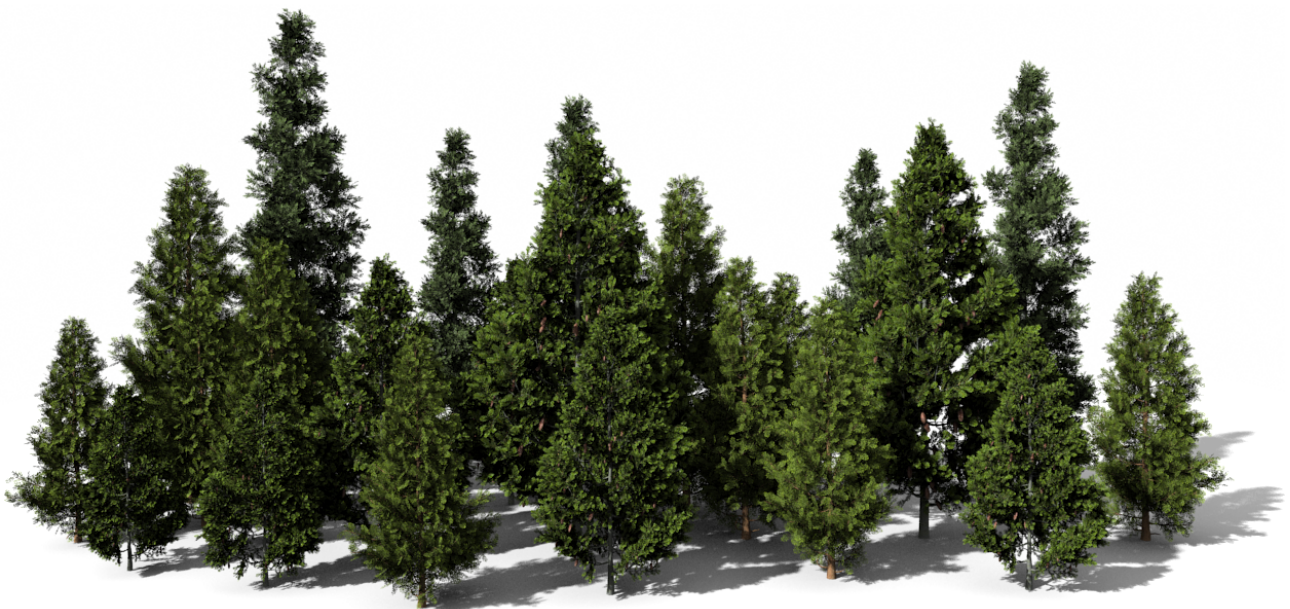

Figure 1: Simulating forest in randomized wind: 3 species, **24** trees, **1,920,525** triangles, **180,795** domains, **139,418** reduced DOFs, simulation fps: **3** Hz. [**video**]

University of Southern California, Los Angeles, CA
Graduate Research Assistant, advisor: Suya You, August 2009 - May 2010

- Developed an **augmented reality** system that allows user to virtually walk in a **large-scale** and **complex scene** with many textured three-dimensional building models.

Peking University, Beijing, China

Graduate Research Assistant, advisor: Guoping Wang, September 2006 - July 2009

- Developed algorithms to accelerate rendering of a **large-scale, complex** scene with many three-dimensional massive models (funded by China National High-tech Research and Development Program).

- Developed algorithms to detect and repair the irregularities on three-dimensional triangle meshes (funded by National Grand Fundamental Research Program of China).

Nanjing University of Aeronautics and Astronautics, Nanjing, Jiangsu, China

Undergraduate Research Assistant, advisor: Songcan Chen, Liyan Zhang, September 2005 - June 2006

- Developed an algorithm based on quadric error metrics to segment three-dimensional triangle meshes with color and texture properties.

Publications

Bohan Wang, **Yili Zhao**, Jernej Barbič: "**Botanical Materials Based on Biomechanics.**" *ACM Transactions on Graphics*, Vol. 36, No. 4, (SIGGRAPH 2017) (July 2017)

Hongyi Xu*, **Yili Zhao***, Jernej Barbič: "**Implicit Multibody Penalty-based Distributed Contact.**" IEEE Transactions on Visualization and Computer Graphics (TVCG), Vol. 20(9), 2014 (*** joint first authors**)

Yili Zhao and Jernej Barbič. "**Interactive authoring of simulation-ready plants.**" *ACM Transactions on Graphics*, Vol. 32, No. 4, (SIGGRAPH 2013) (July 2013)

Jernej Barbič and **Yili Zhao**. "**Real-time large-deformation substructuring.**" *ACM Transactions on Graphics*, Vol. 30, No. 4, (SIGGRAPH 2011) (July 2011)

Skills

Strong research & programming experience in numerical optimization, computer graphics, animation, physically-based simulation, machine learning and applied math.

Solid experience in designing, developing, and debugging software, written mostly in C++, using state-of-the-art algorithms and procedures.

Solid knowledge of calculus, advanced linear algebra, classical mechanics, Finite Element Method, robotics, numerical methods, Object Oriented Programming, C/C++, C++11, computer architecture, parallel programming.

Languages: C/C++ (since 2002), Python, Presto, HiveQL, LATEX, HTML;

Tools: vi, gcc, Makefiles (Linux), git, OpenMP, OpenGL, GLUT, Intel MKL library, wxWidgets, GLUI, gnuplot, Subversion, yafaray (raytracing engine).

Software: MS Visual Studio, MATLAB, Autodesk Maya, Adobe Photoshop, Adobe Illustrator, Adobe After Effects.

Platforms: Mac OS X, Linux, Windows. All three used on a regular basis.

Paper Reviews

- SIGGRAPH 2016, 2017

- SIGGRAPH Asia 2015, 2016, 2017

- Eurographics 2017

- Pacific Graphics 2014, 2015, 2016

- Graphical Models 2016, 2017

- Neurocomputing 2016

- Computers & Graphics 2013

- CASA 2017

Honors and Awards

Best Poster for Visual Presentation, Department of Computer Science, USC, 2012, 2013

Chiang Chen Scholarship, Peking University, 2006 (**1 of 20** winners, university-wide)

Excellent Graduate 2006, NUAA, June 2006 (**top 1%**)

Bronze medal, the 29th ACM International Collegiate Programming Contest (Hangzhou site, 2005)

Member of Outstanding Student Program, NUAA, An elite subset of University Undergraduate Program, 2003 - 2004 (Ranked 2nd **out of 32**)

Excellent Student Scholarship, 1st Prize , NUAA, 2003 - 2006 (Consecutive **4** years, **top 2%**)

Personal

I like swimming, free style. I swim 1 mile (nonstop) every day in USC Daland's Swim Stadium.

References

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