

Dr. Mark Kim

CONTACT INFORMATION	Computer Scientist Oak Ridge National Laboratory Scientific Data Group Oak Ridge National Laboratory PO BOX 2008 MS6057 Oak Ridge TN. 37831-6057 USA		Cell: +1-801-414-7924 E-mail: kimmb@ornl.gov ««««< HEAD WWW: mark.pages.ornl.gov Update: June 2017 ===== WWW: www.sci.utah.edu/~mkim Update: November 2017 »»»»> 1f50f475e23b2c4ad2f7edd286fe7d74846a9090
RESEARCH INTERESTS	Scientific Visualization, GPGPU, HPC Visualization, in situ visualization , ray tracing, Stream Processing, surface flow visualization, volume rendering		
EDUCATION	University of Utah , Salt Lake City, UT. Ph.D., School of Computing, November 2015 <ul style="list-style-type: none">• Thesis Topic: <i>GPU-Enabled Surface Visualization</i>• Adviser: Professor Charles (Chuck) Hansen• Area of Study: Scientific Visualization University of Wisconsin, Madison , Madison, WI. B.S., Computer Science and Philosophy 2002		
RESEARCH EXPERIENCE	Computer Scientist , Oak Ridge National Laboratory Scientific Data Group		April 2018 to Present
	<ul style="list-style-type: none">• Group Lead: Scott Klasky• Team Lead: David Pugmire• Scientific Visualization.		
	Postdoctoral Researcher , Oak Ridge National Laboratory Scientific Data Group		Sept 2016 to April 2018
	<ul style="list-style-type: none">• Group Lead: Scott Klasky• Team Lead: David Pugmire• Scientific Visualization.		
	Postdoctoral Researcher , University of Utah Scientific Computing and Imaging Institute School of Computing		November 2015 to September 2016
	<ul style="list-style-type: none">• Advisor: Charles Hansen• Current work focuses on compression for volume data using stream processing		
	Graduate Research Assistant , University of Utah Scientific Computing and Imaging Institute School of Computing		August 2008 to November 2015
	<ul style="list-style-type: none">• Advisor: Charles Hansen• Accelerated particle mesh extraction using the GPU and the closest point embedding.• Developed efficient, near real-time unsteady flow visualization techniques using the closest point embedding on the GPU.		
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PUBLICATIONS

1. Kim, M., S. Klasky, and D. Pugmire. “Dense Texture Flow Visualization using Data-Parallel Primitives”. In: *Eurographics Symposium on Parallel Graphics and Visualization*. Ed. by H. Childs and F. Cucchietti. The Eurographics Association, 2018.
2. Pugmire, D., A. Yenpure, M. Kim, J. Kress, R. Maynard, H. Childs, and B. Hentschel. “Performance-Portable Particle Advection with VTK-m”. In: *Eurographics Symposium on Parallel Graphics and Visualization*. Ed. by H. Childs and F. Cucchietti. The Eurographics Association, 2018.
3. Klasky, S. et al. “A View from ORNL: Scientific Data Research Opportunities in the Big Data Age”. In: *2018 IEEE 38th International Conference on Distributed Computing Systems (ICDCS)*. July 2018, pp. 1357–1368.
4. Kim, M., T. Evans, S. Klasky, and D. Pugmire. “In Situ Visualization of Radiation Transport Geometry”. In: *Proceedings of the In Situ Infrastructures on Enabling Extreme-Scale Analysis and Visualization*. ISAV’17. Denver, CO, USA: ACM, 2017, pp. 7–11.
5. Kim, M. and C. Hansen. “Closest Point Sparse Octree for Surface Flow Visualization”. In: *Proceedings of IS&T Visualization and Data Analysis, 2017*. (Feb. 2017).
6. Klasky, S. et al. “Exacution: Enhancing Scientific Data Management for Exascale”. In: *2017 IEEE 37th International Conference on Distributed Computing Systems (ICDCS)*. June 2017, pp. 1927–1937.
7. Kress, J., R. M. Churchill, S. Klasky, M. Kim, H. Childs, and D. Pugmire. “Preparing for In Situ Processing on Upcoming Leading-edge Supercomputers”. In: *Supercomputing Frontiers and Innovations* 3.4 (Dec. 2016), pp. 49–65.
8. Kim, M. and C. Hansen. “Surface Flow Visualization using the Closest Point Embedding”. In: *2015 IEEE Pacific Visualization Symposium* (Apr. 2015).
9. Kim, M. and C. Hansen. “GPU Surface Extraction with the Closest Point Embedding”. In: *Proceedings of IS&T/SPIE Visualization and Data Analysis, 2015*. Feb. 2015.
10. Kim, M., G. Chen, and C. Hansen. “Dynamic Particle System for Mesh Extraction on the GPU”. In: *Proceedings of the 5th Annual Workshop on General Purpose Processing with Graphics Processing Units*. GPGPU-5. London, England: ACM, May 2012, pp. 38–46.
11. Gyulassy, A., N. Kotava, M. Kim, C. Hansen, H. Hagen, and V. Pascucci. “Direct Feature Visualization Using Morse-Smale Complexes”. In: *IEEE Transactions on Visualization and Computer Graphics* 18.9 (Sept. 2012), pp. 1549–1562.
12. UV, K., M. Kim, D. Gerszewski, J. Anderson, and M. Hall. “Assembling Large Mosaics of Electron Microscope Images using GPU”. In: *Proceedings of the 2009 Symposium on Application Accelerators in High Performance Computing (SAAHPC’09)*. 2009.

INVITED TALKS

1. Kim, M. *Data Parallel Primitives and Scientific Visualization*. Oak Ridge, TN.: Oak Ridge National Laboratory., Mar. 2018.
2. Kim, M. *Floating Point Array Compression on the GPU*. San Jose, CA.: GTC 2017., May 2017.
3. Kim, M. *GPU-enabled Particle Systems for Visualization*. Oak Ridge, TN.: Oak Ridge National Laboratory, Mar. 2015.
4. Kim, M. *Dynamic Particle System for Mesh Extraction on the GPU*. Salt Lake City, UT.: IAMCS-KAUST Workshop on Computational Biomedicine and Geophysics., Apr. 2012.
5. Kim, M. *Implicit Surfaces with a Particle System on the GPU*. College Station, TX.: IAMCS Workshop: Visualization in Biomedical Computation., Feb. 2011.
6. Kim, M. *GPGPU with CUDA*. KAUST, Saudia Arabia.: Pervasively Parallel Solutions for Partial Differential Equations Workshop, May 2010.

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M. Kim and T. Evans and S. Klasky and D. Pugmire. In Situ Visualization of Radiation Transport Geometry *In Situ Infrastructures for Enabling Extreme-scale Analysis and Visualization, 2017.*, November 2017.

Scott Klasky and Eric Suchyta and Mark Ainsworth and Qing Liu and Ben Whitney and Matthew Wolf and Jong Youl Choi and Ian T. Foster and Mark Kim and Jeremy Logan and Kshitij Mehta and Todd Munson and George Ostrouchov and Manish Parashar and Norbert Podhorszki and David Pugmire and Lipeng Wan. Exacution: Enhancing Scientific Data Management for Exascale, *37th IEEE International Conference on Distributed Computing Systems ICDCS 2017*. June 5-8, 2017

M. Kim and C. Hansen. Closest Point Sparse Octree for Surface Flow Visualization. *Proceedings of IS&T Visualization and Data Analysis, 2017.*, February 2017.

. J. Kress, R.M. Churchill, S. Klasky, M. Kim, H. Childs, D. Pugmire. Preparing for In Situ Processing on Upcoming Leading-edge Supercomputers *Supercomputing Frontiers and Innovations, No. 4 Vol. 3 2016.*, October 2016.

M. Kim and C. Hansen. Surface Flow Visualization using the Closest Point Embedding *2015 IEEE Pacific Visualization Symposium*, April 2015.

M. Kim and C. Hansen. GPU Surface Extraction with the Closest Point Embedding. *Proceedings of IS&T/SPIE Visualization and Data Analysis, 2015.*, February 2015.

J. Bronson and S. Sastry and M. Kim and J. Levine and R. Whitaker. Towards Tetrahedral Meshing with Decoupled Element and Boundary Constraints. *22nd International Meshing Roundtable (Research Note)*. October 2013.

M. Kim and G. Chen and C. Hansen. Dynamic Particle System for Mesh Extraction on the GPU. *Proceedings of the 5th Annual Workshop on General Purpose Processing with Graphics Processing Units [GPGPU-5]*, 44(6):38–46, May 2012.

A. Gyulassy and N. Kotava and M. Kim and C. Hansen and H. Hagen and V. Pascucci. Direct Feature Visualization Using Morse-Smale Complexes. *IEEE Transactions on Visualization and Computer Graphics*, 18(9):1549–1562, September 2012.

Kannan UV and M. Kim and D. Gerszewski and J.R. Anderson and M. Hall. Assembling Large Mosaics of Electron Microscope Images using GPU. *Proceedings of the 2009 Symposium on Application Accelerators in High Performance Computing (SAAHPC'09)*, 2009.

PUBLICATIONS

M. Kim. GPU-enabled Particle Systems for Visualization. Oak Ridge, TN. Oak Ridge National Laboratory. March 2015.

M. Kim. Dynamic Particle System for Mesh Extraction on the GPU. Salt Lake City, UT. IAMCS-KAUST Workshop on Computational Biomedicine and Geophysics. April 5, 2012.

M. Kim. Implicit Surfaces with a Particle System on the GPU. College Station, TX. IAMCS Workshop: Visualization in Biomedical Computation. February 23, 2011.

M. Kim. GPGPU with CUDA. KAUST, Saudia Arabia. Pervasively Parallel Solutions for Partial Differential Equations Workshop. May 2–5, 2010. »»»» 1f50f475e23b2c4ad2f7edd286fe7

INVITED TALKS

TEACHING EXPERIENCE

University of Utah, Salt Lake City, UT.

Teaching Assistant

August 2014 to December 2014

- Teaching Assistant for CS4600: Introduction to Computer Graphics
 - Fall 2014
 - Held office hours to help students with their programming assignments.
 - Javascript and WebGL.

Teaching Assistant

August 2007 to May 2008

- Teaching Assistant for CS6150: Advanced Algorithms
 - Autumn 2007
 - Responsible for office hours to assist graduate students with homework.
 - Assisted with grading homework assignments.
- Teaching Assistant for CS5530: Database System
 - Autumn 2007
 - Conduct office hours to assist senior-level undergraduate students with homework and projects.
 - Grade homework.
- Teaching Assistant for CS5600: Introduction to Computer Graphics
 - Spring 2008
 - Held office hours to help senior-level undergraduate students with their programming assignments.
 - C/C++ and OpenGL.

PROFESSIONAL
EXPERIENCE

Oak Ridge National Laboratory, Oak Ridge, TN.

Computer Scientist

April 2018 to present

- Scientific Data Group
- Scientific Visualization.

Oak Ridge National Laboratory, Oak Ridge, TN.

Postdoctoral Researcher

September 2016 to April 2018

- Scientific Data Group
- Scientific Visualization.

University of Utah, Salt Lake City, UT.

Postdoctoral Researcher

November 2015 to September 2016

- Supervisor: Charles (Chuck) Hansen
- Current work focuses on compression for volume data using stream processing (GPGPU).

Lawrence Livermore National Laboratory, Livermore, CA.

Graduate Intern

May 2015 to July 2015

- Advisor: Peter Lindstrom
- As part of the PSAAP project, developed an initial GPU implementation of ZFP, a compression library for volume data.

Los Alamos National Laboratory, Los Alamos, NM.

Graduate Intern

May 2009 to August 2009

- Advisor: Pat McCormick
- Worked with a computational biologist on Kohonen maps for the GPU.

Graduate Intern

May 2008 to August 2008

- Advisor: Pat McCormick
- Implemented a CPU volume renderer for Lyman-Alpha visualization for the Scout framework.
- Implemented a particle-particle particle mesh simulation in CUDA.