Kenneth Weiss

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Education

Ph.D., Computer Science, University of Maryland, College Park, Spring 2011.
  Thesis title: Diamond-based models for scientific visualization.
  Advisor: Leila De Floriani

M.S., Computer Science, University of Maryland, College Park, 2006.

B.S., Computer Science, Binghamton University, 2004

B.A., Mathematics, Binghamton University, 2004
  Honors: Summa Cum Laude

Research and Professional Experience

Lawrence Livermore National Laboratory – Livermore, CA

Computer scientist, Applied Simulations and Quality (ASQ), January 2014 – PRESENT.
  Marbl project, Spring 2015 – PRESENT
  Axom computer science toolkit, Spring 2015 – PRESENT.
  KULL project, January 2014 – June 2015.

Postdoctoral researcher, Center for Applied Scientific Computing (CASC), January 2012 – January 2014.
  Project: Distributed and multiresolution streaming analysis of petascale data.
  Mentor: Dr. Peter Lindstrom

Summer Scholar, Institute for Scientific Computing Research (ISCR), Summer 2006.

University of Maryland, College Park – College Park, MD

Faculty Research Associate, Summer 2011 – December 2011.
Graduate Research Assistant, Fall 2006 – Spring 2011.
  Project: A multiresolution approach to modeling and visualizing multidimensional scalar fields.
  Advisor: Prof. Leila De Floriani

Università di Genova – Genova, Italy

Visiting Scholar, Geometry and Graphics Group, Summers 2007, 2009, 2011 and 2013.

Sandia National Laboratories – Albuquerque, NM

Technical Intern, Center for Cyber Defenders Program (CCD), Summer 2005 – Spring 2006.

Microsoft Corporation – Redmond, WA

Lead Student Ambassador, Mid-Atlantic Region, Fall 2004 – Spring 2006.
Student Ambassador, University of Maryland, College Park, Fall 2004 – Spring 2006.
Student Ambassador, Binghamton University, Spring 2003 – Spring 2004.

Binghamton University – Vestal, NY

Research Assistant, Graphics And Image Computing Laboratory, Summer 2003 – Spring 2004.

Project: Automating tumor detection in CT images.

Undergraduate advisor: Prof. Lijun Yin.

Softsight Inc. – Vestal, NY

Programmer, Spring 2002.

Publications

Refereed Journal Articles

1. K. Weiss and P. Lindstrom. Adaptive multilinear tensor product wavelets. *IEEE Transactions on Visualization and Computer Graphics (Proceedings IEEE Visualization 2015)*, 22(1):985–994, Jan. 2016.

2. K. Weiss, F. Iuricich, R. Fellegara, and L. De Floriani. A primal/dual representation for discrete Morse complexes on tetrahedral meshes. *Computer Graphics Forum (Proceedings Eurovis 2013)*, 32(3):361–370, 2013.

3. K. Weiss and L. De Floriani. Modeling multiresolution 3D scalar fields through Regular Simplex Bisection. In H. Hagen, editor, *Scientific Visualization: Interactions, Features, Metaphors*, volume 2 of *Dagstuhl Follow-Ups*, pages 360–377. Schloss Dagstuhl–Leibniz-Zentrum für Informatik, Dagstuhl, Germany, 2011.

4. D. Canino, L. De Floriani, and K. Weiss. IA*: An adjacency-based representation for non-manifold simplicial shapes in arbitrary dimensions. *Computers & Graphics (Proceedings Shape Modeling International 2011)*, 35(3):747–753, June 2011.

5. K. Weiss and L. De Floriani. Simplex and diamond hierarchies: Models and applications. *Computer Graphics Forum*, 30(8):2127–2155, 2011.

6. K. Weiss and L. De Floriani. Isodiamond hierarchies: An efficient multiresolution representation for iso-surfaces and interval volumes. *IEEE Transactions on Visualization and Computer Graphics*, 16(4):583 – 598, July-August 2010.

7. K. Weiss and L. De Floriani. Diamond hierarchies of arbitrary dimension. *Computer Graphics Forum (Proceedings Symposium on Geometry Processing 2009)*, 28(5):1289–1300, July 2009.

8. K. Weiss and L. De Floriani. Supercubes: A high-level primitive for diamond hierarchies. *IEEE Transactions on Visualization and Computer Graphics (Proceedings IEEE Visualization 2009)*, 15(6):1603–1610, November-December 2009.

Refereed Conference Publications

9. R. Fellegara, F. Iuricich, L. De Floriani, and K. Weiss. Efficient computation and simplification of discrete Morse decompositions on triangulated terrains. In *Proceedings ACM SIGSPATIAL GIS*, ACM SIGSPATIAL '14. ACM, November 2014.

10. L. De Floriani, F. Iuricich, R. Fellegara, and K. Weiss. A spatial approach to morphological feature extraction from irregularly sampled scalar fields. In *Proceedings of the Third ACM SIGSPATIAL International Workshop on GeoStreaming*, IWGS '12, pages 40–47, New York, NY, 2012. ACM.

11. K. Weiss, R. Fellegara, L. De Floriani, and M. Velloso. The PR-star Octree: A spatio-topological data structure for tetrahedral meshes. In *Proceedings ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, ACM GIS '11, pages 92–101, Chicago, IL, November 1–4 2011. ACM.

12. M. A. Yalçın, K. Weiss, and L. De Floriani. GPU algorithms for diamond-based multiresolution terrain processing. In *Eurographics Symposium on Parallel Graphics and Visualization*, EGPGV '11, pages 121–130, Bangor, Wales, April 10–11 2011.

13. K. Weiss and L. De Floriani. Bisection-based triangulations of nested hypercubic meshes. In S. Shontz, editor, *Proceedings 19th International Meshing Roundtable*, IMR '10, pages 315–333, Chattanooga, Tennessee, October 3–6 2010.

14. K. Weiss, L. De Floriani, and M. Mesmoudi. Multiresolution analysis of 3D images based on discrete distortion. In *International Conference on Pattern Recognition*, ICPR '10, pages 4093–4096, Istanbul, Turkey, August 2010. IEEE Computer Society.

15. K. Weiss and L. De Floriani. Simplex and diamond hierarchies: Models and applications. In H. Hauser and E. Reinhard, editors, *Eurographics 2010 - State of the Art Reports*, EG STAR '10, pages 113–136, Norrköping, Sweden, 2010. Eurographics Association. (*Refereed proposal*).

16. K. Weiss and L. De Floriani. Sparse terrain pyramids (BEST PAPER AWARD). In *Proceedings ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, ACM GIS '11, pages 115–124, Irvine, CA, 2008. ACM.

17. K. Weiss and L. De Floriani. Multiresolution interval volume meshes. In H.-C. Hege, D. Laidlaw, R. Pajarola, and O. Staadt, editors, *IEEE/ EG Symposium on Volume and Point-Based Graphics*, EG PBGVG '08, pages 65–72, Los Angeles, California, USA, 2008. Eurographics Association.

18. K. Weiss and L. De Floriani. Modeling and visualization approaches for time-varying volumetric data. In G. Bebis, R. Boyle, B. Parvin, D. Koracin, P. Remagnino, F. Porikli, J. Peters, J. Klosowski, L. Arns, Y. Chun, T. Rhyne, and L. Monroe, editors, *Advances in Visual Computing (ISVC '08)*, volume 5359 of *Lecture Notes in Computer Science*, pages 1000–1010. Springer, 2008.

19. L. Yin and K. Weiss. Generating 3D views of facial expressions from frontal face video based on topographic analysis. In *Proceedings ACM international conference on Multimedia*, ACM SIGMM '04, pages 360–363, New York, NY, USA, 2004. ACM.

Refereed Book Chapters

20. L. De Floriani, F. Iuricich, P. Magillo, M. Mesmoudi, and K. Weiss. Discrete distortion for 3D data analysis. In L. Linsen, H. Hagen, B. Hamann, and H.-C. Hege, editors, *Visualization in Medicine and Life Sciences II*, Mathematics and Visualization, pages 3–25. Springer Verlag, Berlin Heidelberg, 2011.

Refereed Short Papers, Posters and Extended Abstracts

21. R. Fellegara, K. Weiss, and L. De Floriani. An efficient approach for verifying manifold properties of simplicial complexes. In S. Canann, editor, *Proceedings 25th International Meshing Roundtable*, IMR '16, Washington, D.C., September 27–30 2016.

22. K. Weiss, G. Zagaris, R. Rieben, and A. Cook. Spatially accelerated shape embedding in multimaterial simulations. In S. Canann, editor, *Proceedings 25th International Meshing Roundtable*, IMR '16, Washington, D.C., September 27–30 2016.

23. E. DeSantola, J. Backes, G. Zagaris, K. Weiss, M. Larsen, and C. Harrison. Accelerated signed distance queries for performance portable multimaterial simulations. Salt Lake City, UT, Nov 13–18 2016.

24. K. Weiss and P. Lindstrom. Adaptive Regular Simplex Bisection (RSB) wavelets. In *NSF Workshop on Barycentric Coordinates in Geometry Processing and Finite/Boundary Element Methods*, New York, NY, July 25–27 2012.

25. K. Weiss and L. De Floriani. Nested refinement domains for tetrahedral and diamond hierarchies. In *IEEE Visualization 2010 Poster Compendium*, IEEE VIS '10, Salt Lake City, Utah, October 24–29 2010.

26. L. Yin, K. Weiss, and X. Wei. Face modeling from frontal face image based on topographic analysis. In *ACM SIGGRAPH Posters*, page 86, New York, NY, USA, 2004. ACM.

Preprints

- D. Gunderman, K. Weiss, and J. A. Evans. Exact moment computation for planar rational trimmed regions. *Submitted for publication*.

- R. Fellegara, K. Weiss, P. Magillo, and L. De Floriani. Tetrahedral Trees: A family of hierarchical spatial indexes for tetrahedral meshes. *Submitted for publication*.

- R. Fellegara, K. Weiss, and L. De Floriani. The Stellar Tree: A compact representation for simplicial complexes and beyond. *Computing Research Repository (CoRR)*, abs/1707.02211, 2017.

Invited Talks, Conference Presentations and Tutorials *(selected)*

- Visualizing hierarchical performance data with nested stacked bar charts. In *ASQ Exascale joint code meeting*. LLNL, Livermore, CA, September 23 2015.

- Leveraging web technologies for rapid visual debugging. In *ASQ code collaboration meeting*. LLNL, Livermore, CA, March 10 2015.

- Adaptive multilinear tensor product wavelets. In *IEEE Visualization 2015*. Chicago, IL, October 29 2015.

- Fine-grained multiresolution hierarchies for scientific visualization. In *SLAC Early Career Scientist Associate Forum*. Stanford University, October 4 2013.

- Efficient and effective mesh representations for shape modeling and analysis. In *Symposium for Geometry Processing (SGP) Graduate School*. Eurographics Association, July 1 2013.

- A primal/dual representation for discrete Morse complexes on tetrahedral meshes. In *Eurovis 2013*. Eurographics, Leipzig, Germany, June 20 2013.

- The PR-star Octree: A spatio-topological data structure for tetrahedral meshes. In *ACM SIGSPATIAL GIS 2011*. ACM, Chicago, IL, November 2 2011.

- Diamond based models for scientific visualization. In *The Technion Pixel Club*. Technion – Israel Institue of Technology, Haifa, Israel, June 27 2011.

- IA*: An adjacency-based representation for non-manifold simplicial shapes in arbitrary dimensions. In *Shape Modeling International (SMI) 2011*. Herzliya, Israel, June 24 2011.

- GPU algorithms for diamond-based multiresolution terrain processing. In *Eurographics Symposium on Parallel Graphics and Visualization (EGPGV) '11*. Llandudno, Wales, April 11 2011.

- Bisection-based triangulations of nested hypercubic meshes. In *19th International Meshing Roundtable (IMR)*. Chattanooga, TN, October 6 2010.

- Simplex and diamond hierarchies: Models and applications. In *Eurographics State of the Art Reports '10*. Norrköping, Sweden, May 6 2010.

- Supercubes: A high-level primitive for diamond hierarchies. In *IEEE Visualization '09*. Atlantic City, NJ, October 16 2009.

- Diamond hierarchies of arbitrary dimension. In *Symposium on Geometry Processing (SGP) '09*. Berlin, Germany, July 16 2009.

- Sparse terrain pyramids. In *ACM SIGSPATIAL GIS '08*. Irvine, CA, November 6 2008.

- Multiresolution interval volume meshes. In *IEEE/EG Symposium on Volume and Point-Based Graphics (EGPGV) '08*. Los Angeles, CA, August 10 2008.

- Sound technology in games. In *Graphics Seminar Series*. University of Maryland, College Park, College Park, MD, April 16 2007.

- Decomposition and compression of regularly sampled geometry. In *Graphics Seminar Series*. University of Maryland, College Park, College Park, MD, May 1 2006.

Teaching Experience

Guest Lecturer – University of Maryland, College Park

Geometric and Solid Modeling (CMSC 741), Fall 2010.
Instructor: Hanan Samet.

Collaborated on organization of course, lectured three sessions and closely supervised research projects of seven graduate students in collaboration with Leila De Floriani.

Teaching Assistant – University of Maryland, College Park

Introduction to Computer Graphics (CMSC 427), Spring 2006.
Instructor: David Mount.

Introduction to Computer Graphics (CMSC 427), Fall 2005.
Instructor: Amitabh Varshney.

Object-Oriented Programming II (CMSC 132), Spring 2005.
Instructors: Fawzi Emad, Chau-Wen Tseng.

Object-Oriented Programming II (CMSC 132), Fall 2004.
Instructors: Bill Pugh, Fawzi Emad.

Course Assistant – Binghamton University

Data Structures in C++ (CS 240), Fall 2003.
Instructor: Steaphan Greene.

Activities and Service

Advising

David Gunderman (co-advising Ph.D. with John Evans)
Dept. of Applied Math, CU Boulder – exp. graduation 2021.

Riccardo Fellegara (co-advised Ph.D. with Leila De Floriani)
DIBRIS department, University of Genova – graduated 2014.

Summer students

David Gunderman (CU Boulder) – Summer 2019 & Summer 2020

Marko Sterbentz (Northwestern) – Summer 2019

Hirish Chandrasekaran (UCSB) – Summer 2018

Raine Yeh (Purdue) – Summer 2017 & Summer 2018

Austin Stromme (UW-Seattle) – Summer 2017

Jordan Backes (U. Missouri) – Summer 2016

Evan DeSantola (CMU) – Summer 2016

Journal Editorial Boards

ACM Transactions on Spatial Algorithms and Systems (TSAS) – Information director, 2012 – PRESENT.

Conference Program Committees

International Conference on Image Analysis and Processing (ICIAP) – 2015

Eurographics Conference (Short Papers) – 2012-2014.

Eurographics Italian Chapter Conference – 2011, 2010.

Peer Reviewing

Journals

ACM Transactions on Graphics (ToG)

ACM Transactions Spatial Algorithms and Systems (TSAS)

IEEE Transactions on Visualization and Computer Graphics (TVCG)

Computer Graphics Forum

Graphical Models (GMOD)

Computers & Graphics

Computers & Geosciences

The Visual Computer

Computer Aided Design (CAD) Journal

Conferences

ACM SIGGRAPH

ACM SIGGRAPH Asia

IEEE Visualization

Eurographics

Symposium on Geometry Processing (SGP)

Shape Modeling International (SMI)

ACM SIGSPATIAL GIS

Computer Graphics International (CGI)

Eurographics Symposium on Parallel Graphics and Visualization (EGPGV)

CAD/Graphics

Eurographics Italian Chapter Conference

International Meshing Roundtable (IMR)

Eurographics/IEEE Symposium on Visualization (EuroVis)

IEEE/EG International Symposium on Volume Graphics

Mathematics of Surfaces

Solid and Physical Modeling (SPM)

International Symposium on Visual Computing (ISVC)

Pacific Graphics

International Conference on Computer Graphics Theory and Applications (GRAPP)

SIBGRAPI