

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.

Committee: Leila De Floriani (advisor), Larry Davis, Samuel Goward,
David Mount, Hanan Samet and Amitabh Varshney.

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

Overall GPA: 3.875.

B.S./B.A., Dual degree in Computer Science and Mathematics, Binghamton University, 2004

Overall GPA: 3.941, *GPA in Major (CS):* 4.0, *GPA in Major (Math):* 4.0.

Honors: *Summa Cum Laude*

Research Experience

University of Maryland, College Park – College Park, MD

Faculty Research Associate, Summer 2011 – PRESENT.

Graduate Research Assistant, Fall 2006 – Spring 2011.

Project: A multiresolution approach to modeling and visualizing multidimensional scalar fields.

Advisor: Prof. Leila De Floriani

Development of dimension-independent multiresolution models and adaptive extraction algorithms for representing and visualizing discrete scalar fields including terrain and volumetric datasets.

Evaluation of the efficiency of these models through a template-based implementation in C++.

Communication of results through conference presentations and journal publications.

Università di Genova – Genova, Italy

Visiting Scholar, Geometry and Graphics Group, Summer 2007, Summer 2009 and Summer 2011.

Collaboration with researchers in Italy and France on discrete notions of curvature (distortion) and representations for simplicial complexes, leading to several publications.

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.

Implementation in C++ of multithreaded *active contours* (energy-based deformable splines) to find contours of tumors in medical datasets.

Modeling of user faces from video sequences through an analysis of topographic features.

Employment

Lawrence Livermore National Laboratory – Livermore, CA

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

Project: Progressive techniques for efficient processing of massive geospatial datasets.

Mentor: Dr. Valerio Pascucci.

Creation of an efficient model for representing and progressively visualizing time-varying geospatial vector data overlaid on raster image data.

Implementation of a KML parser in C++ for import/export of geospatial data and for associating metadata with the dataset.

Integration of vector data into existing multiresolution raster-based geospatial browser.

Sandia National Laboratories – Albuquerque, NM

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

Project: Visualization for kernel-level security “firewall” in Microsoft Windows.

Manager: Robert Hutchinson.

Development of techniques to visualize events between the kernel and shell of an OS.

Design of interactive user interface in C# to aid in discovery of interesting security events.

Microsoft Corporation – Redmond, WA

Lead Student Ambassador, Mid-Atlantic Region, Fall 2004 – Spring 2006.

Oversaw the progress of eleven Student Ambassadors on college campuses in the region.

Student Ambassador, University of Maryland, College Park, Fall 2004 – Spring 2006.

Student Ambassador, Binghamton University, Spring 2003 – Spring 2004.

Campus liaison between Microsoft, faculty and students for the .NET platform.

Creation and presentation of workshops on .NET and related technologies.

Softsight Inc. – Vestal, NY

Programmer, Spring 2002.

Project: Embroidery simulation via texture mapping.

Supervisors: Dr. Richard Eckert and Dr. David Goldman.

Implementation of low-level texture mapping algorithm in C++ to simulate embroidered logos.

Publications

Refereed Journal Articles

1. 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.
2. 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.

3. K. Weiss and L. De Floriani. Simplex and diamond hierarchies: Models and applications. *Computer Graphics Forum*, 30(8):2127–2155, 2011.
4. K. Weiss and L. De Floriani. Isodiamond hierarchies: An efficient multiresolution representation for isosurfaces and interval volumes. *IEEE Transactions on Visualization and Computer Graphics*, 16(4):583–598, July-August 2010.
5. 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.
6. 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

7. 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.
8. 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, EGPVG '11*, pages 121–130, Bangor, Wales, April 10–11 2011.
9. 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.
10. 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.
11. 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).
12. 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.
13. 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.
14. 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.
15. 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

16. L. De Floriani, F. Iurichich, 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 Posters and Extended Abstracts

17. 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.
18. 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.

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

- 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 Institute 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*Program Committee Member*

Eurographics Conference (Short Papers) – 2012.

Eurographics Italian Chapter Conference – 2011, 2010.

*Peer Reviewing***Journals**

IEEE Transactions on Visualization and Computer Graphics (TVCG) – 2011, 2008, 2007.

Computers & Graphics – 2011.

Computers & Geosciences – 2011.

Graphical Models (GMOD) – 2011, 2010.

The Visual Computer – 2008, 2007.

Computer Aided Design (CAD) Journal – 2008.

Computer Graphics Forum – 2008.

ACM Transactions on Graphics (ToG) – 2006.

Conferences

Eurographics – 2012, 2010, 2009, 2008, 2007.

IEEE Visualization – 2011, 2010, 2009, 2008.

Symposium on Geometry Processing (SGP) – 2011, 2010, 2009, 2008, 2007.

Shape Modeling International (SMI) – 2011, 2008, 2007.

ACM SIGSPATIAL GIS – 2011, 2010.

Computer Graphics International (CGI) – 2011, 2010.

Eurographics Symposium on Parallel Graphics and Visualization (EGPGV) – 2011.

CAD/Graphics – 2011.

ACM SIGGRAPH – 2010.

ACM SIGGRAPH Asia – 2010.
Eurographics Italian Chapter Conference – 2010.
International Meshing Roundtable (IMR) – 2010.
Eurographics/IEEE Symposium on Visualization (EuroVis) – 2010.
IEEE/EG International Symposium on Volume Graphics – 2010, 2007, 2006.
Mathematics of Surfaces – 2009.
Solid and Physical Modeling (SPM) – 2008.
International Symposium on Visual Computing (ISVC) – 2008.
Pacific Graphics – 2007.
International Conference on Computer Graphics Theory and Applications (GRAPP) – 2007.
SIBGRAPI – 2007.

Memberships

IEEE Computer Society.
ACM SIGGRAPH.
Eurographics.
Upsilon Pi Epsilon, the Computer Science Honor Society.
President, Iota Chapter, Fall 2002 – Spring 2004.
Golden Key International Honour Society.
Phi Eta Sigma, Freshman Honor Society.

Student Volunteer

IEEE Visualization – 2007, 2006.
ACM SIGGRAPH – 2007.

Honors and Awards

Best Paper Award, ACM SIGSPATIAL GIS, 2008.
Recipient, International Meshing Roundtable Graduate Student Travel Grant, 2010.
Recipient, Stony Brook Modeling Week Graduate Student Travel Grant, 2008.
Recipient, University Award for Student Excellence, Binghamton University, 2004.
Recipient, Department of Computer Science Award for Service, Binghamton University, 2004.
Recipient, Upsilon Pi Epsilon–Microsoft Scholarship, 2003.
Finalist, Binghamton University Exemplary Student Award, 2003.
Student Marshall, Watson School of Engineering Commencement Ceremony, May 2004.
National Dean's List, 2003.
Dean's List, Binghamton University, 2000–2004.