

Janine Camille Bennett

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Career Objective Advance the state of the art in data analysis and visualization research while developing software tools that contribute to the solution of practical problems in science discovery and information understanding.

Research Interests Scientific Visualization, Data Analysis, Mesh Parameterization, Computational Geometry, Combinatorial Topology, Material Boundaries, Feature Segmentation, Visualization and Analysis of Uncertain Data

Education	12/2008	Ph.D. Computer Science	University of California, Davis Focus: Computer Graphics (primary), Computer Theory (secondary) GPA: 3.75
	3/2004	M.S. Computer Science	University of California, Davis Focus: Computer Graphics (primary), Computer Theory (secondary) GPA: 3.75
	6/2000	B.S. Eng. Computer Science <i>with honors</i>	University of California, Davis Minors: Math & Spanish GPA: 3.47

Professional Experience	1/2009 - Present	Senior Member of the Technical Staff	Sandia National Laboratories Principal Investigator “Topology for Statistical Modeling of Petascale Data,” DOE ASCR. Developing and implementing new topological and statistical techniques to characterize features in extreme-scale data. Deploying algorithms on turbulent combustion simulation data in conjunction with scientists at the Combustion Research Facility.
	9/2004 - 9/2008	Lawrence Scholar	Lawrence Livermore National Lab Designed new algorithms and data structures and implemented software to robustly cross-parameterize meshes of arbitrary and differing genus using tools from Morse theory.
	9/1998 - 9/2004	Research Assistant – CIPIC/IDAV	University of California, Davis Designed new algorithms and data structures and implemented software in several areas of computer graphics including: visualization of paleo-magnetic vectors in 3D, material boundaries, topological analysis of vector fields, and surface smoothing.
	1/2001 - 12/2001	Teaching Assistant C++ Programming	University of California, Davis Collaborated on curriculum and exam development, project specifications and graded exams. Held regular office hours and taught discussion sections.
	6/2003 - 9/2003	Scientist/Engineering Technical Scholar	Lawrence Livermore National Lab Designed and implemented an algorithm that generates a convex mapping for volumetric meshes with non-convex boundaries.
	6/2001 - 9/2001	Scientist/Engineering Technical Scholar	Lawrence Livermore National Lab Developed a kd-partitioning algorithm for use on massive data sets along with MPI code to transfer the partitioned data sets between nodes of a Linux cluster.
	6/2000 – 12/2000	Scientist/Engineering Technical Scholar	Lawrence Livermore National Lab Parallelized a volume renderer using Pthreads for use on a 48-Processor SGI Onyx2 with 8 Infinite Reality pipes running IRIX 6.5.7.

Honors and Awards	2004 - 2008	Lawrence Scholar	Lawrence Livermore National Lab
	2001 - 2004	GAANN Fellowship	University of California, Davis
	1995 - 2000	Regent's Scholarship	University of California, Davis
	1995	Edward Frank Kraft Scholarship	University of California, Davis
	1999 – Present	Tau Beta Pi	National Engineering Honor Society
Skills	<ul style="list-style-type: none"> - Programming Languages: C/C++, MATLAB, Python - Tools/APIs: Visual Studio, Perforce, MATLAB, OpenGL, STL, GLUT, FLTK, Pthreads, MPI, VTK - Operating Systems: Windows, Linux, Unix - Proficient in Spanish 		
Professional Memberships	<ul style="list-style-type: none"> - Institute of Electrical and Electronics Engineers (IEEE) - Association for Computing Machinery (ACM) 		
Professional Service	Paper Reviews	<ul style="list-style-type: none"> - IEEE Vast 2011 - Computer Aided Geometric Design 2011 - IEEE Infovis 2010 - IEEE Visualization Conference 2006, 2010 - Symposium on Computational Geometry 2007 	
	Committees	<ul style="list-style-type: none"> - Sandia Women's Committee - Sandia Women's Inreach Committee - Visualization and Graphics Group Visibility Committee 2005 	
	Leadership	<ul style="list-style-type: none"> - Student Representative to UC Davis Computer Science Department 2000 	
	Student Volunteer	<ul style="list-style-type: none"> - ACM SIGGRAPH 1999 & 2000 	
Refereed Publications	<ul style="list-style-type: none"> - Janine Bennett, Vaidyanathan Krishnamoorthy, Shusen Liu, Ray Grout, Evatt Hawkes, Jacqueline Chen, Jason Shepherd, Valerio Pascucci, Peer-Timo Bremer, "Feature-Based Statistical Analysis of Combustion Simulation Data", IEEE Transactions on Visualization and Graphics, Dec. 2011, pg. 1822-1831. - David Thompson, Joshual Levine, Janine Bennett, Attila Gyulassy, Peer-Timo Bremer, Valerio Pascucci, and Philippe Pebay, "Analysis of Large-Scale Scalar Data Using Hixels", In Proceedings of IEEE Symposium on Large-Scale Data Analysis and Visualization, 2011(to appear). - Janine Bennett, Peer-Timo Bremer, Jacqueline Chen, Ray Grout, Andrea Gruber, Attila Gyulassy, Evatt R. Hawkes, Hemanth Kolla, and Valerio Pascucci, "Conditional Analysis of DNS Combustion Data Using Local and Global Shape Characteristics", in Proceedings of SciDAC 2011 Scientific Discovery through Advanced Computing, Journal of Physics Conference Series, 2011 (to appear). - Philippe Pébay, David Thompson, Janine Bennett, Ajith Mascarenhas, "Design and Performance of a Scalable, Parallel Statistics Toolkit", 12th IEEE International Workshop on Parallel and Distributed Scientific and Engineering Computing (PDSEC-11), Anchorage, Alaska, USA May 16-20, 2011. - Philippe Pébay, David Thompson, and Janine Bennett, "Computing contingency statistics in parallel: Design trade-offs and limiting cases", in Proceedings of IEEE International Conference on Cluster Computing. Heraklion, Crete, Greece, Sep. 2010. - Janine Bennett, Philippe Pébay, Diana Roe, David Thompson, "Numerically Stable, Single Pass, Parallel Statistics Algorithms", in Proceedings of IEEE International Conference on Cluster Computing, New Orleans, Louisiana, Aug. 2009. - Janine Bennett, Valerio Pascucci, Kenneth Joy, "A Genus Oblivious Approach to Cross Parameterization", in Computer Aided Geometric Design, Volume 25, September 2008, pg. 592-606. - Janine Bennett, Valerio Pascucci, Kenneth Joy, "Genus Oblivious Cross Parameterization: Robust Topological Management of Intersurface Maps", in Proceedings of Pacific Graphics 2007, pg 238-247. 		

- John C. Anderson, Janine Bennett, Kenneth I. Joy, “Marching Diamonds for Unstructured Meshes”, in Proceedings of IEEE Visualization 2005, pg. 423-429.
- Karim Mahrous, Janine Bennett, Gerek Scheuermann, Bernd Hamann, Kenneth I. Joy, “Topological Segmentation in Three-Dimensional Vector Fields”, in IEEE Transactions on Visualization and Computer Graphics, Volume 10, Number 2, March/April 2004, pg. 198-205.
- Janine Bennett, Karim Mahrous, Bernd Hamann, Kenneth I. Joy, “A Segmentation Approach to Scientific Visualization”, in Proceedings of the ACM Spring Conference in Computer Graphics, 2003, pg. 9-16.
- Karim Mahrous, Janine Bennett, Bernd Hamann, Kenneth I. Joy, “Improving Topological Segmentation of Three-Dimensional Vector Fields”, in Proceedings of the ACM Symposium on Data Visualization 2003, pg. 203-212.
- Janine Bennett, Richard Cook, Nelson Max, Deborah May, and Peter Williams, “Parallelizing a High Accuracy Hardware-Assisted Volume Renderer for Meshes with Arbitrary Polyhedra”, in Proceedings of the IEEE Symposium on Parallel and Large Data Visualization and Graphics, 2001, pg. 150-156.

Conference

Presentations/ Invited talks

- “Computational Science Panel”, Grace Hopper Celebration of Women in Computing, Portland, OR, Nov. 2011, Janine Bennett and Carol Woodward.
- “Feature-based Statistical Analysis of Combustion Simulation Data”, IEEE Vis, Providence RI, Oct. 2011, Janine Bennett, Vaidyanathan Krishnamoorthy, Shusen Liu, Ray Grout, Evatt Hawkes, Jacqueline Chen, Jason Shepherd, Valerio Pascucci, and Peer-Timo Bremer.
- “Analysis of Large-Scale Data using Hixels”, DOE Applied Mathematics PI Meeting, Reston VA, October 2011, David Thompson, Janine Bennett, Joshua Levine, Attila Gyulassy, Valerio Pascucci, Peer-Timo Bremer, Philippe Pebay.
- “Data Analysis and Visualization of Petascale Combustion Science Simulation Data”, CScADS Workshop on Data Storage and Analysis for Scientific Discovery, Lake Tahoe, CA, Jul. 2011, Janine Bennett, Jacqueline Chen, Hemanth Kolla, Ajith Mascarenhas, and Hongfeng Yu.
- “Feature-based Statistical Analysis and Visualization of Combustion Science Simulation Data”, Bay Area Scientific Computing Day, Stanford CA, May 2011, Janine Bennett, Vaidyanathan Krishnamoorthy, Shusen Liu, Ray Grout, Evatt Hawkes, Jacqueline Chen, Jason Shepherd, Valerio Pascucci, and Peer-Timo Bremer.
- “Heat Release and Turbulence Statistics From a Direct Numerical Simulation of a Reacting Jet in Cross-Flow Parameterized in a Jet Natural Coordinate System Developed From Scalar Quantities”, 13th International Conference on Numerical Combustion, Apr. 2011 Corfu, Greece, Ray Grout, Peer-Timo Bremer, Andrea Gruber, Janine Bennett, Jacqueline Chen, Attila Gyulassy.
- “UC Davis Pathways Career Symposium: Engineering and Physical Sciences Careers Beyond Academia”, UC Davis, Jan. 30 2010, Janine Bennett.
- “Topological and Statistical Methods for Segmentation and Feature Detection”, Exxon Mobile, Sep. 2009, Janine Bennett.
- “Data Discovery from Combustion Science Simulations”, CScADS Workshop on Scientific Analysis and Visualization for Petascale Computing, Lake Tahoe, CA, Aug. 2009, Jacqueline Chen, Janine Bennett, Ray Grout, Ajith Mascarenhas, Chun Sang Yoo, Hongfeng Yu.
- “Gearing up for Graduate School”, University of California, Davis, 2006, Janine Bennett.

Open Source Software

- VTK at <http://www.vtk.org>:
- vtkPPCAStatistics: a parallel Principal Component Analysis class
 - vtkKMeans: a K-Means clustering class
 - vtkPKMeans: a parallel K-Means clustering class

Posters

- “Conditional Analysis of DNS Combustion Data using Local and Global Shape Characteristics”, SciDAC 2011 Workshop, July 2011. Janine Bennett, Peer-Timo Bremer, Jacqueline Chen, Ray Grout, Andrea Gruber, Attila Gyulassy, Evatt R. Hawkes, Hemanth Kolla, and Valerio Pascucci.
- “Robust Topological Management of Domain Meshes”, Lawrence Livermore National Laboratory Student-Employee Graduate Research Fellowship Symposium, Sept. 2007, Janine Bennett, Valerio Pascucci, Kenneth Joy.
 - “Parameterization and Morphing of 2-Manifold Meshes of Arbitrary Genus”, Lawrence Livermore National Laboratory Student-Employee Graduate Research Fellowship Symposium, Sept. 2006, Janine Bennett, Valerio Pascucci, Kenneth Joy.
 - “Parameterization of 2-Manifold Meshes of Arbitrary Genus with Generalization to Higher Dimensions”, Lawrence Livermore National Laboratory Student-Employee Graduate Research Fellowship Symposium, Sept. 2005, Janine Bennett, Valerio Pascucci, Kenneth Joy.
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Technical Reports

- Janine Bennett, David Day, Scott Mitchell, “Summary of the CSRI Workshop on Combinatorial Algebraic Topology (CAT): Software, Applications, & Algorithms”, Technical Report SAND2009-7777, Sandia National Laboratories, Feb. 2010.
 - Janine Bennett, Philippe P Pébay, David Thompson. “Scalable k-means statistics with Titan”, Technical Report SAND2009-7855, Sandia National Laboratories, Nov. 2009.
 - Lisa Ice, Nathan Fabian, Kenneth Moreland, Janine Bennett, David Thompon, David Karelitz, Andrea Scott, “Scalable Analysis Tools for Sensitivity Analysis and UQ (3160) Results”, Technical Report SAND2009-6032, Sandia National Laboratories, Sep. 2009.
 - Janine Bennett, Jacqueline Chen, “Data Discovery from Combustion Science Simulations”, Science Matters!, Sandia National Laboratories, Sep. 2009.
 - David Thompson, Ray Grout, Nathan Fabian, Janine Bennett, “Detecting Combustion and Flow Features In Situ Using Principal Component Analysis”, Technical Report SAND2009-2017, Sandia National Laboratories, Apr. 2009.
 - Janine Bennett, Philippe Pébay, Diana Roe, David Thompson, “Scalable multi-correlative statistics and principal component analysis with Titan”, Technical Report SAND2009-1687, Sandia National Laboratories, Mar. 2009.
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