Computational Research Division
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Education

Ph.D., Computer Science, Department of Computer Science, University of Kaiserslautern, Germany, September 2003. Dissertation title: *Visualization of Adaptive Mesh Refinement Data and Topology-based Exploration of Volume Data*. Advisors: Dr. Hans Hagen (University of Kaiserslautern), Dr. Bernd Hamann (University of California, Davis) and Dr. Gerik Scheuermann (University of Kaiserslautern).

M.S., Computer Science (Minor Physics), Department of Computer Science, University of Kaiserslautern, Germany, May 1999. Thesis title: *Interactive Visualization of Vector Fields Using Tetrahedral Hierarchies*. Advisors: Dr. Hans Hagen (University of Kaiserslautern) and Dr. Bernd Hamann (University of California, Davis)

B.S., Computer Science (Minor Physics), Department of Computer Science, University of Kaiserslautern, Germany, September 1995.

Professional Experience

Research Experience

Current Appointments

Deputy Group Lead, Data Analytics & Visualization (DAV) Group, Data Science & Technology (DST) Department, Computational Research Division, Lawrence Berkeley National Laboratory, Berkeley, California, U.S.A., January 2017 – present.

Staff Scientist/Engineer, Data Analytics & Visualization (DAV) Group, Data Science & Technology (DST) Department, Computational Research Division, Lawrence Berkeley National Laboratory, Berkeley, California, U.S.A., January 2015 – present.

Adjunct Associate Professor, Department of Computer Science, University of California, Davis, California, U.S.A., July 2014 – present.

Past Appointments

Research Scientist/Engineer, Visualization Group and NERSC Analytics, Computational Research Division, Lawrence Berkeley National Laboratory, Berkeley, California, U.S.A., March 2008 – December 2014.

Adjunct Assistant Professor, Department of Computer Science, University of California, Davis, California, U.S.A., July 2008 – June 2014.

Participating Guest, Institute for Scientific Computing Research, Lawrence Livermore National Laboratory, Livermore, California, U.S.A., December 2006 – December 2008.

Visualization and Analytics Engineer (Computer Systems Engineer), Visualization Group, Computational Research Division, Lawrence Berkeley National Laboratory, Berkeley, California, U.S.A., January 2007 – February 2008.

Assistant Project Scientist, Institute for Data Analysis and Visualization, University of California, Davis, California, U.S.A., August 2006 – December 2006.

Guest Researcher, Life Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, California, U.S.A., September 2003 – December 2006.

Postdoctoral Researcher, Institute for Data Analysis and Visualization (formerly Center for Image Processing and Integrated Computing), University of California, Davis, California, U.S.A., September 2003 – July 2006.

Doctoral Research

Visiting Scholar, Center for Image Processing and Integrated Computing, University of California, Davis, California, U.S.A., October 2002 – August 2003, February 2001 – July 2001, February 2000 – June 2000.

Guest Student Assistant, Visualization Group, National Energy Research Scientific Computing Center, Lawrence Berkeley National Laboratory, Berkeley, California, U.S.A., October 2000 – August 2003.

Research Assistant, AG Graphische Datenverarbeitung und Computergeometrie, Department of Computer Science, University of Kaiserslautern, Germany, September 2001 – September 2002, October 2000 – January 2001.

Student Employee, Visualization Group, National Energy Research Scientific Computing Center, Lawrence Berkeley National Laboratory, Berkeley, California, U.S.A., June 2000 – September 2000.

Researcher, German Research Center for Artificial Intelligence GmbH, Kaiserslautern, Germany (in collaboration with tecmath GmbH & Co KG, Kaiserslautern, Germany), September 1999 – January 2000.

Masters Research

Visiting Scholar, Center for Image Processing and Integrated Computing, University of California, Davis, California, U.S.A., September 1998 – June 1999.

Research Assistant

Research Assistant, Project "Visualisierung Parametrisch Editierbarer Raumkomponenten," AG Graphische Datenverarbeitung und Computergeometrie, Department of Computer Science, University of Kaiserslautern, Germany, August 1996 – September 1997.

Undergraduate Research Assistant, Project "Knowledge Validation and Exploration by Global Analysis,", German Research Center for Artificial Intelligence GmbH, Kaiserslautern, Germany, April 1995 – September 1995.

Teaching Experience

Guest Lecturer, Software Engineering for Scientific Computing, (CS294-73), Instructor: Phil Colella, Electrical Engineering and Computer Science Department, University of California, Berkeley, U.S.A., November 7th, 2017.
Held one lecture on large-scale data visualization using VisIt.

Guest Lecturer, Special Topics in Astrophysics (Astronomy 250), Instructor: Peter Nugent, Astronomy Department, University of California, Berkeley, U.S.A., April 8th, 2015.
Held one lecture on large-scale data visualization using VisIt.

Adjunct Assistant Professor, Computer Graphics (ECS-175), Department of Computer Science, University of California, Davis, California, U.S.A., October 2013 – December 2013.
Responsible for all aspects of class: planning and holding lectures, devising homework assignments and supervising teaching assistant.

Guest Lecturer, Special Topics in Astrophysics (Astronomy 250), Instructor: Peter Nugent, Astronomy Department, University of California, Berkeley, U.S.A., April 9th, 2013.
Held one lecture on large-scale data visualization using VisIt.

Guest Lecturer, Software Engineering for Scientific Computing, (COMPSCI 194-73/COMPSCI 294-73), Instructor: Phil Colella, Electrical Engineering and Computer Science Department, University of California, Berkeley, U.S.A., November 15th, 2011.
Held one lecture on large-scale data visualization using VisIt.

Teaching Assistant, Visualisierungssysteme in Naturwissenschaft und Technik (Visualization Systems in Science and Technology), Department of Computer Science, University of Kaiserslautern, Germany, October 2001 – March 2002.
Devised homework and lab assignments, prepared several lectures about volume visualization, headed discussion section.

Lecturer (Instructor), Introduction to Software Development and Object-Oriented Programming (ECS-40), Department of Computer Science, University of California, Davis, California, U.S.A., April 2001 – June 2001.
Responsible for all aspects of class: planning and holding lectures, devising homework assignments, supervising teaching assistants and reader.

Teaching Assistant, Datenstrukturen (Data Structures), Department of Computer Science, University of Kaiserslautern, Germany, April 1998 – July 1998.
Headed discussion section, graded homework, assisted in creating homework assignments.

Teaching Assistant, Einführung in die Informatik (Introduction to Computer Science), Department of Computer Science, University of Kaiserslautern, Germany, October 1997 – March 1998.
Headed discussion section, graded homework, assisted in creating homework assignments.

Other Relevant Professional Experience

System Administrator and Consultant, ProBuy Einkaufsdienstleistungen, Mannheim, Germany, May 1991 – September 1998.
Administered network of NeXT workstations; advised on network set-up, software use and system configuration.

Research Grants

Co-PI, "Physical Modelling for Virtual Manufacturing Systems and Processes," Deutsche Forschungsgemeinschaft (DFG), German Research Foundation, International Research Training Group (IRTG), second phase, EUR 5,301,780, with Jan C. Aurich (PI and Co-Director), Bernd Hamann (Co-PI), Bahram Ravani (Co-PI and Co-Director) and Tarek I. Zohdi (Co-PI and Co-Director), January 1, 2019 – June 30, 2023.

PI, "Network Computing for Experimental and Observational Data Management," Laboratory Directed Research and Development (LDRD), Lawrence Berkeley National Laboratory, US\$ 150,000 direct cost (FY 2019), with David Donofrio (Co-PI), October 1, 2018 – September 30, 2019 (with possible extension through September 30, 2021).

Deputy PI, "Scalable Analysis Methods and In Situ Infrastructure for Extreme Scale Knowledge Discovery," Department of Energy, Office of Advanced Scientific Computing Research (Renewal proposal for project with same name ending August 31, 2017), US$ 4,200,000, with Wes Bethel (Lead PI), Nicola Ferrier (Co-PI & Deputy PI), Matthew Wolf, Earl Duque, Patrick O'Leary (Co-PIs), September 1, 2017 – August 31, 2020.

Senior Personnel, "RAPIDS: a SciDAC Institute for Resource and Application Productivity through computation, Information, and Data Science," Department of Energy, Office of Advanced Scientific Computing Research (Scientific Discovery through Advanced Computing), US$6,000,000, with Robert Ross (PI) and Lenny Oliker (PI), September 1, 2017 – August 31, 2020.

PI (LBNL Effort), "ECP ALPINE: Algorithms and Infrastructure for In Situ Visualization and Analysis," Department of Energy, Exascale Computing Project, US$989,320 (LBNL portion, overall project funding level US$4,946,600), with James P. Ahrens (Lead PI), Hank Childs (Deputy PI), Eric Brugger (Lawrence Livermore National Laboratory PI) and Berk Geveci (Kitware, Inc. PI), January 1, 2017 – September 30, 2019.

Co-PI, "ScienceSearch: Automated Metadata using Machine Learning," Department of Energy, Office of Advanced Scientific Computing Research (Machine Learning and Understanding for High Performance Computing Scientific Discovery, LAB 16-1675), US$ 1,950,000, with Katie Antypas (Lead PI), Lavanya Ramakrishnan (Co-PI), September 15, 2016 – September 14, 2019.

Deputy PI for Analysis Projects, "Scalable Analysis Methods and In Situ Infrastructure for Extreme Scale Knowledge Discovery," Department of Energy, Office of Advanced Scientific Computing Research (Scientific Data Management, Analysis and Visualization at Extreme Scale 2, LAB 14-1043), US$ 4,050,000, with Wes Bethel (Lead PI), Venkat Vishwanath (Co-PI & Deputy PI), Matthew Wolf, Earl Duque, Patrick O'Leary (Co-PIs), September 1, 2014 – August 31, 2017.

Co-I, "Towards Exascale: High Performance Visualization and Analytics Program, " Department of Energy, Office of Advanced Scientific Computing Research, LBNL Visualization Base Research Program, US$ 2,200,000, with E. Wes Bethel (PI), Hank Childs, Hari Krishnan, Dmitriy Morozov, Talita Perciano, Prabhat, Daniela Ushizima (Co-Is), October 1, 2014 – September 30, 2017.

- **Co-PI**, "Physical Modelling for Virtual Manufacturing Systems and Processes," Deutsche Forschungsgemeinschaft (DFG), German Research Foundation, International Research Training Group (IRTG), first phase, EUR 5,300,080, with Jan C. Aurich (PI and Co-Director), Bernd Hamann (Co-PI), Bahram Ravani (Co-PI and Co-Director) and Tarek I. Zohdi (Co-PI and Co-Director), July 1, 2014 – December 31, 2018 (joined project as Co-PI in 2016).

Co-PI, "Graph-based Analysis and Visualization of Multimodal Multi-resolution Large-scale Neuropathology Data," Laboratory Directed Research and Development (LDRD), Lawrence Berkeley National Laboratory, US$ 240,000 direct cost (FY 2014), US$ 303,000 direct cost (FY 2015), with Aydın Buluç (PI), Lenny Oliker, Dmitriy Morozov and Daniela Ushizima (co-PIs), October 1, 2013 – September 30, 2015.

Co-PI, "Development of Protein (Co-)Localization Atlases at Multiple Scales in Eukaryotes," Laboratory Directed Research and Development (LDRD), Lawrence Berkeley National Laboratory, US$ 390,000 direct cost (FY 2013), US$ 456,000 direct costs requested (FY 2014), with Gary Karpen and Damir Sudar (co-leads), Sue Celniker, Roger Hoskins and Erwin Frise (co-PIs), October 1, 2012 – September 30, 2014.

Co-PI, "Modeling Subsurface Reactive Transport Processes from Mineral Surface-to-Pore-to-Continuum," Laboratory Directed Research and Development (LDRD), Lawrence Berkeley National Laboratory, US$ 200,000 direct cost (FY 2013), US$ 170,000 direct cost (FY 2014), with David Trebotich (PI), Greg Miller, Carl Steefel (co-PIs), October 1, 2012 – September 30, 2014).

Co-I, "Towards Exascale: High Performance Visualization and Analytics," Department of Energy, Office of Advanced Scientific Computing Research, LBNL Visualization Base Research Program, US$ 2,175,000, with E. Wes Bethel (PI), Hank Childs, Prabhat, Daniela Ushizima, Jörg Meyer, David Camp, Burlen Loring, Harinarayan Krishnan (Co-Is), October 1, 2011 – September 30, 2014.

PI, "Topology-based Visualization and Analysis of High-dimensional Data and Time-varying Data at the Extreme Scale," Department of Energy, Office of Advanced Scientific Computing Research (ASCR Scientific Data Management and Analysis at Extreme Scale LAB 10-256), US$ 515,000, October 1, 2010 – September 30, 2013.

Co-PI, "(SciDAC-e) Visualization and Analysis for Nanoscale Control of Geologic CO_2," Department of Energy, Office of Advanced Scientific Computing Research (Scientific Insight Through Advanced Computing), US$ 427,000, with E. Wes Bethel (PI) and Daniela Ushizima (Co-PI), October 1, 2010 – September 30, 2011.

PI (LBNL effort), "Visualization and Analysis in Support of Fusion Science," Department of Energy, Scientific Insight Through Advanced Computing: Computational Magnetohydrodynamics LAB 07-20, US$ 130,000 (LBNL portion: US$ 40,000) with Allen Sanderson (overall PI, University of Utah), Sean Ahern (ORNL PI), July 2008 – September 2010.

Co-I, "High Performance, Petascale Visualization and Analytics," full proposal, Department of Energy, LBNL Visualization Base Research Program, US$ 1,725,000, with E. Wes Bethel (PI) and Prabhat (Co-PI), October 1, 2008 – September 30, 2011.

Co-PI, "Topology-based Methods for Analysis and Visualization of Noisy Data," full proposal, Foundations of Computing Processes and Artifacts, National Science Foundation, US$ 300,000, with Bernd Hamann (PI), Valerio Pascucci (Co-PI), September 1, 2007 – August 31, 2010.

Co-PI (only until leaving UC Davis), "The transcription network controlling Drosophila development," subcontract, Lawrence Berkeley National Laboratory, US$ 112,978, with Bernd Hamann (PI), August 1, 2006 – July 31, 2007.

Co-PI, "Analysis and visualization of scientific data using topology-based methods," subcontract, Lawrence Livermore National Laboratory, US$ 17,231, with Bernd Hamann (PI) and Vijay Natarajan (Co-PI), August 1, 2006 – September 30, 2006.

Co-PI, "The transcription network controlling *Drosophila* development," subcontract, Lawrence Berkeley National Laboratory, US$ 116,896, with Bernd Hamann (PI), August 1, 2005 – July 31, 2006.

Co-PI, "Topological analysis for scientific visualization," subcontract, Lawrence Livermore National Laboratory, US$ 74,613, with Bernd Hamann (PI) and Vijay Natarajan (Co-PI), April 1, 2005 – September 30, 2005.

Publications

Refereed Publications

Journal Papers

[J-24] Liebmann, T., **Weber, G. H.**, and Scheuermann, G., Hierarchical correlation clustering in multiple 2d scalar fields, in: *Computer Graphics Forum (Special Issue, Proceedings Eurographics/IEEE Symposium on Visualization)*, 37(3), `doi:10.1111/cgf.13396`, June 2018.

[J-23] Beketayev, K., Yeliussizov, D., Morozov, D., **Weber, G. H.**, and Hamann, B., Measuring the error in approximating the sub-level set topology of sampled scalar data, in: *International Journal of Computational Geometry & Applications*, 28(1):57–77, `doi:10.1142/S0218195918500036`, Mar. 2018.

[J-22] Murugesan, S., Bouchard, K., Brown, J. A., Hamann, B., Seeley, W. W., Trujillo, A., and **Weber, G. H.**, Brain Modulyzer: Interactive visual analysis of functional brain connectivity, in: *IEEE Transactions on Computational Biology and Bioinformatics*, 14(4):805–818, `doi:10.1109/TCBB.2016.2564970`, July/Aug. 2017.

[J-21] **Weber, G. H.**, Bandstra, M. S., Chivers, D., Elgammal, H. H., Hendrix, V., Kua, J., Maltz, J., Muriki, K., Ong, Y., Song, K., Quinlan, M., Ramakrishnan, L., and Quiter, B. J., Web-based visual data exploration for improved radiological source detection, in: *Concurrency and Computation: Practice and Experience*, 29(18):e4203, `doi:10.1002/cpe.4203`, Sept. 2017.

[J-20] Lukasczyk, J., Maciejewski, R., **Weber, G. H.**, Garth, C., and Leitte, H., Nested tracking graphs, in: *Computer Graphics Forum (Special Issue, Proceedings Eurographics/IEEE Symposium on Visualization)*, 36(3):12–22, `doi:10.1111/cgf.13164`, July 2017, best paper award.

[J-19] **Weber, G. H.**, Carpendale, S., Ebert, D., Fisher, B., Hagen, H., Shneiderman, B., and Ynnerman, A., Apply or die: On the role and assessment of application papers in visualization, in: *IEEE Computer Graphics & Applications*, 37(3):96–104, `doi:10.1109/MCG.2017.51`, 2017.

[J-18] Murugesan, S., Bouchard, K., Chang, E., Dougherty, M., Hamann, B., and **Weber, G. H.**, Multi-scale visual analysis of time-varying electrocorticography data via clustering of brain regions, in: *BMC Bioinformatics*, 18(Suppl 6):236, `doi:10.1186/s12859-017-1633-9`, 2017.

[J-17] Friesen, B., Almgren, A., Lukić, Z., **Weber, G. H.**, Morozov, D., Beckner, V., and Day, M., *In Situ* and in-transit analysis of cosmological simulations, in: *Computational Astrophysics and Cosmology*, 3(4):1–18, `doi:10.1186/s40668-016-0017-2`, Aug. 2016.

[J-16] Oesterling, P., Heine, C., **Weber, G. H.**, and Scheuermann, G., Visualizing nD point clouds as topological landscape profiles to guide local data analysis, in: *IEEE Transactions on Visualization and Computer Graphics*, 19(3):514–526, `doi:10.1109/TVCG.2012.120`, 2013.

[J-15] Ushizima, D. M., Morozov, D., **Weber, G. H.**, Bianchi, A. G., Sethian, J. A., and Bethel, E. W., Augmented topological descriptors of pore networks for material science, in: *IEEE Transactions on Visualization and Computer Graphics (Proceedings IEEE Vis 2012)*, 18(12):2041–2050, `doi:10.1109/TVCG.2012.200`, 2012.

[J-14] Beketayev, K., **Weber, G. H.**, Haranczyk, M., Bremer, P. T., Hlawitschka, M., and Hamann, B., Topology-based visualization of transformation pathways in complex chemical systems, in: *Computer Graphics Forum (Special Issue, Proceedings Eurographics/IEEE Symposium on Visualization)*, 30(3):663–672, `doi:10.1111/j.1467-8659.2011.01915.x`, 2011.

[J-13] Bremer, P. T., **Weber, G. H.**, Tierny, J., Pascucci, V., Day, M. S., and Bell, J. B., Interactive exploration and analysis of large scale turbulent combustion using topology-based data segmentation, in: *IEEE Transactions on Visualization and Computer Graphics*, 17(9):1307–1324, `doi:10.1109/TVCG.2010.80`, 2011.

[J-12] Childs, H., Pugmire, D., Ahern, S., Whitlock, B., Howison, M., Prabhat, **Weber, G. H.**, and Bethel, E. W., Extreme scaling of production visualization software on diverse architectures, in: *IEEE Computer Graphics and Applications*, 30(3):22–31, `doi:10.1109/MCG.2010.51`, 2010.

[J-11] Rübel, O., **Weber, G. H.**, Huang, M. Y., Bethel, E. W., Biggin, M. D., Fowlkes, C. C., Hendriks, C. L., Keränen, S. V. E., Eisen, M. B., Knowles, D. W., Malik, J., Hagen, H., and Hamann, B., Integrating data clustering and visualization for the analysis of 3d gene expression data, in: *IEEE Transactions on Computational Biology and Bioinformatics*, 7(1):64–79, `doi:10.1109/TCBB.2008.49`, 2010.

[J-10] Bremer, P. T., **Weber, G. H.**, Pascucci, V., Day, M. S., and Bell, J. B., Analyzing and tracking burning structures in lean premixed hydrogen flames, in: *IEEE Transactions on Visualization and Computer Graphics*, 16(2):248–260, `doi:10.1109/TVCG.2009.69`, 2010.

[J-9] Rübel, O., Geddes, C. G. R., Cormier-Michel, E., Wu, K., Prabhat, **Weber, G. H.**, Ushizima, D. M., Messmer, P., Hagen, H., Hamann, B., and Bethel, E. W., Automatic beam path analysis of laser wakefield particle acceleration data, in: *Computational Science & Discovery*, 2(1):015005, `doi:10.1088/1749-4699/2/1/015005`, 2009.

[J-8] **Weber, G. H.**, Rübel, O., Huang, M. Y., DePace, A., Fowlkes, C. C., Keränen, S. V. E., Luengo Hendriks, C. L., Hagen, H., Knowles, D. W., Malik, J., Biggin, M. D., and Hamann, B., Visual exploration of three-dimensional gene expression using physical views and linked abstract views, in: *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, 6(2):296–309, `doi:10.1109/TCBB.2007.70249`, 2009.

[J-7] Dillard, S. E., Natarajan, V., **Weber, G. H.**, Pascucci, V., and Hamann, B., Topology-guided tessellation of quadratic elements, in: *International Journal of Computational Geometry & Applications*, 19(2):195–211, `doi:10.1142/S0218195909002903`, 2009.

[J-6] Fowlkes, C. C., Luengo Hendriks, C. L., Keränen, S. V., **Weber, G. H.**, Rübel, O., Huang, M. Y., Chatoor, S., DePace, A. H., Simirenko, L., Henriquez, C., Beaton, A., Weiszmann, R., Celniker, S., Hamann, B., Knowles, D. W., Biggin, M. D., Eisen, M. B., and Malik, J., A quantitative spatiotemporal atlas of gene expression in the *Drosophila* blastoderm, in: *Cell*, 133(2):364–374, `doi:10.1016/j.cell.2008.01.053`, 2008.

[J-5] **Weber, G. H.**, Bremer, P. T., and Pascucci, V., Topological landscapes: A terrain metaphor for scientific data, in: *IEEE Transactions on Visualization and Computer Graphics (Special Issue: Proceedings of IEEE Visualization 2007)*, 13(6):1416–1423, `doi:10.1109/TVCG.2007.70601`, 2007.

[J-4] Staadt, O. G., Natarjan, V., **Weber, G. H.**, Wiley, D. F., and Hamann, B., Interactive processing and visualization of image data for biomedical and life science applications, in: *BMC Cell Biology*, 8(Suppl 1):S10, `doi:10.1186/1471-2121-8-S1-S10`, 2007.

[J-3] **Weber, G. H.**, Dillard, S. E., Carr, H., Pascucci, V., and Hamann, B., Topology-controlled volume rendering, in: *IEEE Transactions on Visualization and Computer Graphics*, 13(2):330–341, `doi:10.1109/TVCG.2007.47`, 2007.

[J-2] Gu, S., Anderson, I., Kunin, V., Cipriano, M., Minovitsky, S., **Weber, G. H.**, Amenta, N., Hamann, B., and Dubchak, I., TreeQ-VISTA: An interactive tree visualization tool with functional annotation query capabilities, in: *Bioinformatics*, 23(6):764–766, `doi:10.1093/bioinformatics/btl643`, 2007.

[J-1] Luengo Hendriks, C. L., Keränen, S. V. E., Fowlkes, C. C., Simirenko, L., **Weber, G. H.**, DePace, A. H., Henriquez, C., Kaszuba, D. W., Hamann, B., Eisen, M. B., Malik, J., Sudar, D., Biggin, M. D., and Knowles, D. W., Three-dimensional morphology and gene expression in the *Drosophila* blastoderm at cellular resolution I: Data acquisition pipeline, in: *Genome Biology*, 7(12):R123, `doi:10.1186/gb-2006-7-12-r123`, 2006.

Book Chapters

[B-18] Carr, H. A., Tierney, J., and **Weber, G. H.**, Pathological and test cases for Reeb analysis, in: Carr, H., Fujishiro, I., Sadlo, F., and Takahashi, S., eds., *Topological Methods in Data Analysis and Visualization V: Theory, Algorithms, and Applications*, Mathematics and Visualization, Springer International Publishing, 2018, in press.

[B-17] Oesterling, P., Heine, C., **Weber, G. H.**, Morozov, D., and Scheuermann, G., Computing and visualizing time-varying merge trees for high-dimensional data, in: Carr, H., Garth, C., and Weinkauf, T., eds., *Topological Methods in Data Analysis and Visualization IV: Theory, Algorithms, and Applications*, Mathematics and Visualization, pp. 87–101, `doi:10.1007/978-3-319-44684-4_5`, Springer International Publishing, May 2017, best paper award.

[B-16] Oesterling, P., Heine, C., **Weber, G. H.**, and Scheuermann, G., A topology-based approach to visualize the thematic composition of document collections, in: Biemann, C. and Mehler, A., eds., *Text Mining*, Theory and Applications of Natural Language Processing, pp. 63–85, `doi:10.1007/978-3-319-12655-5_4`, Springer International Publishing, 2014.

[B-15] Beketayev, K., Yeliussizov, D., Morozov, D., **Weber, G. H.**, and Hamann, B., Measuring the distance between merge trees, in: Bremer, P. T., Hotz, I., Pascucci, V., and Peikert, R., eds., *Topological Methods in Data Analysis and Visualization III: Theory, Algorithms, and Applications*, Mathematics and Visualization, pp. 151–166, `doi:10.1007/978-3-319-04099-8_10`, Springer-Verlag, 2014.

[B-14] Morozov, D. and **Weber, G. H.**, Distributed contour trees, in: Bremer, P. T., Hotz, I., Pascucci, V., and Peikert, R., eds., *Topological Methods in Data Analysis and Visualization III: Theory, Algorithms, and Applications*, Mathematics and Visualization, pp. 89–102, `doi:10.1007/978-3-319-04099-8_6`, Springer-Verlag, 2014.

[B-13] **Weber, G. H.** and Hauser, H., Interactive visual exploration and analysis, in: Hansen, C. D., Chen, M., Johnson, C. R., Kaufman, A. E., and Hagen, H., eds., *Scientific Visualization: Uncertainty, Multifield, Bio-Medical and Scalable Visualization*, Mathematics and Visualization, pp. 161–174, `doi:10.1007/978-1-4471-6497-5_15`, Springer-Verlag, 2014.

[B-12] Childs, H., Brugger, E., Whitlock, B., Meredith, J., Ahern, S., Pugmire, D., Biagas, K., Miller, M., Harrison, C., **Weber, G. H.**, Krishnan, H., Fogal, T., Sanderson, A., Garth, C., Bethel, E. W., Camp, D., Rübel, O., Durant, M., Favre, J. M., and Navratil, P., VisIt: An end-user tool for visualizing and analyzing very large data, in: Bethel, E. W., Childs, H., and Hansen, C., eds., *High Performance Visualization: Enabling Extreme-Scale Scientific Insight*, pp. 357–371, CRC Press, Boca Raton, FL, 2012.

[B-11] Childs, H., Pugmire, D., Ahern, S., Whitlock, B., Howison, M., Prabhat, **Weber, G. H.**, and Bethel, E. W., Visualization at extreme-scale concurrency, in: Bethel, E. W., Childs, H., and Hansen, C., eds., *High Performance Visualization: Enabling Extreme-Scale Scientific Insight*, pp. 291–306, CRC Press, Boca Raton, FL, 2012.

[B-10] **Weber, G. H.**, Bremer, P. T., and Pascucci, V., Topological cacti: Visualizing contour-based statistics, in: Peikert, R., Hauser, H., Carr, H., and Fuchs, R., eds., *Topological Methods in Data Analysis and Visualization II: Theory, Algorithms, and Applications*, pp. 63–76, Springer-Verlag, Heidelberg, Germany, 2012.

[B-9] Rübel, O., Keränen, S. V. E., Biggin, M. D., Knowles, D. W., **Weber, G. H.**, Hagen, H., Hamann, B., and Bethel, E. W., Linking advanced visualization and matlab for the analysis of 3D gene expression data, in: Linsen, L., Hagen, H., Hamann, B., and Hege, H. C., eds., *Mathematical Methods for Visualization in Medicine and Life Sciences II*, pp. 267–286, Springer-Verlag, Heidelberg, Germany, 2012.

[B-8] **Weber, G. H.**, Bremer, P. T., Day, M. S., Bell, J. B., and Pascucci, V., Feature tracking using Reeb graphs, in: Pascucci, V., Tricoche, X., Hagen, H., and Tierny, J., eds., *Topological Methods in Data Analysis and Visualization: Theory, Algorithms, and Applications*, pp. 241–253, Springer-Verlag, Heidelberg, Germany, 2011.

[B-7] Ushizima D.M., Geddes C.G.R., Cormier-Michel E., Bethel E.W., Jacobsen J., Prabhat, Rübel O., **Weber G.H.**, Messmer P, Hamann B and Hagen H., Automated detection and analysis of particle beams in laser-plasma accelerator simulations, in: *Machine Learning*, pp. 367–389, IN-TECH, ISBN 978-953-7619-X-X, 2010.

[B-6] Hlawitschka, M., **Weber, G.H.**, Anwander, A., Carmichael, O.T., Hamann, B. and Scheuermann, G., Interactive Volume Rendering of Diffusion Tensor Data, in: Laidlaw, D.H. and Weickert, J., eds., *Visualization and Processing of Tensor Fields: Advances and Perspectives*, pp. 161–176, Springer-Verlag, Heidelberg, Germany, 2009.

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Conference Abstracts

[A-21] Beketayev, K., **Weber, G. H.**, Bremer, P.-T. , Hlawitschka, M., Hamann, B., Haranczyk, M., Topology-based visualization of transformation pathways in complex chemical systems using metro maps, in: *Proceedings 241st ACS National Meeting & Exposition*, Anaheim, California, March 27–31, 2011.

[A-20] Keränen, DePace, A., Hammonds, A., Fisher, B., Rübel, O., **Weber, G.H.**, Henriquez, C., Fowlkes, C., Luengo Hendriks, C.L., Bethel, E.W., Hagen, H., Hamann, B., Malik, J., Celniker, S., Knowles, D.W., Eisen, M.B. and Biggin, M.D, On computational analysis of quantitative, 3D spatial expression in Drosophila blastoderm in: RECOMB Regulatory Genomics, Systems Biology, DREAM4 2009, Boston, Massachusetts, December 2–6, 2009.

[A-19] Rübel, O., Prabhat, Wu, K., Childs, H.R., Meredith, J.S., Geddes, C.G.R., Cormier-Michel, E., Ahern, S., **Weber, G.H.**, Messmer, P., Hagen, H., Hamann, B. and Bethel, E.W., Application of High-performance Visual Analysis Methods to Laser Wakefield Particle Acceleration Data, in: Linsen, L. and Meyer, J., eds., IEEE Visualization 2008 Posters, IEEE Computer Society Press, Los Alamitos, California, 2008.

[A-18] Luengo Hendriks, C.L., Keränen, S.V.E., Arbelaez, P., **Weber, G.H.**, Fowlkes, C.C., Henriquez, C., Kaszuba, D.W., Hamann, B., Malik, J., Biggin, M.D., Knowles, D.W., A morphology and gene expression atlas of Drosophila embryogenesis, in: 49th Annual Drosophila Research Conference, San Diego, California, April 2–6, 2008.

[A-17] Fowkles, C.C., Luengo Hendriks, C.L., Keränen, S.V.E., DePace, A.H., **Weber, G.H.**, Rübel, O., Huang, M.-Y., Chatoor, AS., Simirenko, L., Henriquez, C., Beaton, A., Weiszmann, R., Celniker, S., Hamann, B., Eisen, M.B., Knowles, D.W., Biggin, M.D., Malik, J., Building a quantitative spatio-temporal atlas of gene expression in the Drosophila blastoderm, in: Eight International Conference on Systems Biology (ICSB 2007), Long Beach, California, October 1–6, 2007.

[A-16] Rübel, O., **Weber, G.H.**, Huang, M.-Y., Bethel, E.W., Biggin, M.D., Fowlkes, C.C., Luengo Hendriks, C.L., Keränen, S.V.E., Eisen, M.B., Knowles, D.W., Malik, J., Hagen, H., Hamann, B., Applications of visualization and data clustering to 3d gene expression data, in: Kindlmann, G. and Linsen, L., eds., IEEE Visualization 2007 Posters, IEEE Computer Society Press, Los Alamitos, California.

[A-15] Knowles, D.W., Luengo Hendriks, C.L., Keränen, S.V.E., Fowlkes, C.C., DePace, A., **Weber, G.W.**, Rübel, O., Huang, M.-Y., Hamann, B., Eisen, M.B., Malik, J., Biggin, M.B., Berkeley Drosophila transcription network project: morphology and gene expression atlas, in: Cold Spring Harbor Genome Informatics, 2007.

[A-14] Sudar, D., Luengo Hendriks, C.L., Fowlkes, C.C., Keränen, S.V.E., Simirenko, L., **Weber, G.H.**, Rübel, O., Huang, M.-Y., DePace, A., Henriquez, C., Li, X.-Y., Chu, H.C., Kaszuba, D.W., Beaton, A., Celniker, S., Hamann, B., Eisen, M.B., Malik, J., Knowles, D.W. and Biggin, M.D., Imaging and visualization for 3-D gene expression analyses in Drosophila embryos, in: Microscopy & Microanalysis 2007 Meeting, Ft. Lauderdale, Florida, August 5-9, 2007.

[A-13] Keränen, S.V.E., Luengo Hendriks, C.L., Fowlkes, C.C., Simirenko, L., **Weber, G.H.**, DePace, A.H., Henriquez, C., Kaszuba, D.W., Hamann, B., Eisen, M.B., Malik, J., Sudar, D., Biggin, M.D. and Knowles D.W., Three-dimensional morphology and gene expression in the Drosophila blastoderm at cellular resolution, in: 15th Annual International Conference on Intelligent Systems for Molecular Biology (ISMB) & 6th European Conference on Computational Biology (ECCB), Vienna, Austria, July 21–25, 2007.

[A-12] Keränen, S.V.E., Luengo Hendriks, C.L., Fowlkes, C.C., Simirenko, L., **Weber, G.H.**, Rübel, O., Huang, M.-Y., DePace, A., Henriquez, C., Li, X.-Y., Chu, H.C., Kaszuba, D.W., Beaton, A., Celniker, S., Hamann, B., Eisen, M.B., Malik, J., Knowles, D.W. and Biggin, M.D., Virtual embryos as tools for 3d gene expression analyses, in: 15th Annual International Conference on Intelligent Systems for Molecular Biology (ISMB) & 6th European Conference on Computational Biology (ECCB), Vienna, Austria, July 21–25, 2007.

[A-11] Luengo Hendriks, C.L., Fowlkes, C.C., Keränen, S.V.E., Simirenko, L., **Weber, G.H.**, Rübel, O., Huang, M.-Y., DePace, A.H., Henriquez, C., Li, X.-Y., Chu, H.C., Kaszuba, D.W., Beaton, A., Celniker, S., Hamann, B., Eisen, M.B., Malik, J., Knowles, D.W., Biggin, M.D., Virtual embryos as tools for 3D gene expression analyses, in: 48th Annual Drosophila Research Conference, Philadelphia, Pennsylvania, March 7–11, 2007.

[A-10] Keränen, S.V.E., Luengo Hendriks, C.L., Fowlkes, C.C., Simirenko, L., **Weber, G.H.**, Rübel, O., Huang, M.-Y., DePace, A., Henriquez, C., Li, X.-Y., Chu, H.C., Kaszuba, D.W., Beaton, A., Celniker, S., Hamann, B., Eisen, M.B., Malik, J., Knowles, D.W., Biggin, M.D., Virtual embryos as tools for 3d gene expression analyses, in: Cold Spring Harbor Computational Cell Biology, 2007.

 [A-9] Luengo Hendriks, C.L., Keränen, S.V.E., Fowlkes, C., **Weber, G.H.**, Huang, M.-Y., Rübel O., Hamann, B., Sudar, D., Malik, J., Biggin, M.D. and Knowles, D.W., Quantitative live imaging describes morphogenetic nuclear movements in early *Drosophila* embryo, in: SAC XXIII International Congress, Québec City, Canada, May 20–24, 2006.

 [A-8] Luengo Hendriks, C.L., Keränen, S.V.E, Fowlkes, C.C., **Weber, G.H.**, Rübel, O., Huang, M.-Y., Peng, H., DePace, A., Simirenko, L., Hamann, B., Sudar, D., Malik, J., Eisen, M.B., Biggin, M.D. and D.W. Knowles, Quantitative live imaging describes morphogenetic nuclear movements prior to gastrulation, 47th Annual *Drosophila* Research Conference, Houston, Texas, March 29–April 2, 2006.

 [A-7] Knowles, D.W., Luengo Hendriks, C.L., Keränen, S.V.E., Fowlkes, C.C., **Weber, G.H.**, Rübel, O., Huang, M.-Y., Peng, H., DePace, A., Simirenko, L., Hamann, B., Sudar, D., Malik, J., Eisen, M.B. and Biggin, M.D., Berkeley *Drosophila* Transcription Network Project: 3D blastoderm gene expression atlas, 47th Annual *Drosophila* Research Conference, Houston, Texas, March 29–April 2, 2006.

[A-6] Fowlkes, C.C., Luengo Hendriks, C.L., Keränen, S.V.E., DePace, A., **Weber, G.H.**, Rübel, O., Huang, M.-Y., Simirenko, L., Hamann, B., Eisen, M.B., Sudar, D., Knowles, D.W., Biggin, M.D. and Malik, J., Complex interactions between d/v and a/p patterning systems before gastrulation revealed by a 3-D atlas of gene expression patterns, 47th Annual *Drosophila* Research Conference, Houston, Texas, March 29–April 2, 2006.

[A-5] Keränen, S.V.E., Luengo Hendriks, C.L., Fowlkes, C.C., **Weber, G.H.**, Rübel, O., Huang, M.-Y., Simirenko, L., DePace, A.H., Henriquez, C.N., Peng, H., Sudar, J.D., Hamann, B., Malik, J., Eisen, M.B., Biggin, M.D. and Knowles, D.W., A morphogenetic framework for analyzing gene expression in Drosophila melanogaster blastoderms, in: Poster Abstract Proceedings of Integrating Evolution, Development and Genomics 2006, http://www.evodevo.org, p. 37, 2006.

[A-4] Keränen, S.V.E., Luengo Hendriks, C.L., Fowlkes, C.C., **Weber, G.H.**, Rübel, O., Huang, M.-Y., Simirenko, L., Sudar, D., Hamann, B., Malik, J., Eisen, M.B., Biggin, M.D. and Knowles, D.W., A morphogenetic framework for analyzing gene expression in *Drosophila* melanogaster blastoderms, 47th Annual Drosophila Research Conference, Houston, Texas, March 29-April 2, 2006.

[A-3] Huerta, N., Murphy, M. A., Natarajan, V., **Weber, G. H.**, Hamann, B. and Sumner, D. Y., Three-dimensional reconstruction of intricate archean microbial structures using neutron computed tomography and serial sectioning, poster presentation, abstract number IN43B-0331, in: Abstract Proceedings of American Geophysical Union (AGU) Fall Meeting 2005, Eos Trans. AGU, 86(52), Fall Meeting Suppl., AGU Meetings Department, Washington, D.C., 2005.

[A-2] **Weber, G.H.**, Luengo Hendriks, C.L., Dillard, S.E., Yu, D.Y., Rübel, O., Keränen, S.V.E, Sudar, D. and Hamann, B., Visualization tools for three-dimensional gene expression data in *Drosophila*, in: *46th Annual Drosophila Research Conference*, San Diego, California, March 30-April 3, 2005.

[A-1] Luengo Hendriks, C.L.,Knowles, D.W., Keränen, S.V.E., **Weber, G.H.**, Biggin, M.D. and D. Sudar, Automated delineation of cells and nuclei and quantification of gene expression in 3D Images of whole *Drosophila* blastoderm embryos, in: *46th Annual Drosophila Research Conference*, San Diego, California, March 30-April 3, 2005.

Technical Reports

[T-6] Bethel, E. W., Camp, D., Childs, H., Howison, M., Krishnan, H., Loring, B., Meyer, J., Prabhat, Rübel, O., Ushizima, D., and Weber, G., Towards exascale: High performance visualization and analytics – project status report, Technical Report LBNL-5767E, Lawrence Berkeley National Laboratory, Berkeley, CA, USA, 94720, Apr. 2012, status report for DOE Exascale Research Conference in Portland, OR.

[T-5] **Weber, G. H.** and Bremer, P. T., In-situ analysis: Challenges and opportunities, Technical Report LBNL-5692E, Lawrence Berkeley National Laboratory, Berkeley, CA, USA, 94720, Apr. 2012, position paper for DOE Exascale Research Conference in Portland, OR.

[T-4] **Weber, G. H.**, Beketayev, K., Bremer, P. T., Hamann, B., Haranczyk, M., Hlawitschka, M., and Pascucci, V., Comprehensible presentation of topological information, Technical Report LBNL-5693E, Lawrence Berkeley National Laboratory, Berkeley, CA, USA, 94720, Apr. 2012, status report for DOE Exascale Research Conference in Portland, OR.

[T-3] MacCarthy, B., Carr, H., and **Weber, G. H.**, Topological galleries: A high level user interface for topology controlled volume rendering, Technical Report LBNL-5019E, Lawerence Berkeley National Laboratory, Berkeley, California, U.S.A., 2011.

[T-2] Dillard, S. E., **Weber, G. H.**, Carr, H., Pascucci, V. and Hamann, B., Topology-controlled volume rendering, in: Bhumiratana, B., ed., *Proceedings of the 2005 UC Davis Student Workshop on Computing*, Technical Report CSE-2005-22, pp. 24–25, 2005.

[T-1] Kreylos, O., **Weber, G. H.**, Bethel, E. W., Shalf, J. M., Hamann, B., and Joy, K. I., Remote interactive direct volume rendering of AMR data, Technical Report LBNL-49954, Lawerence Berkeley National Laboratory, Berkeley, California, U.S.A., 2006.

Presentations

Invited Talks

ECP ALPINE Algorithm Overview, Dagstuhl Seminar 18271: In Situ Visualization for Computational Science, Schloss Dagstuhl (Leibniz-Zentrum für Informatik), Wadern, Germany, July 2018.

Topological Analysis at the Extreme Scale: Finding Features in Large Data Sets Faculty of Mathematics, Computer Science, and Natural Sciences RWTH Aachen September, 2017

Topological Analysis at the Extreme Scale: Finding Features in Large Data Sets/Re-thinking Visualization for the Exascale, Keynote at Visualization and Data Analysis 2017, 2017 IS&T International Symposium on Electronic Imaging (EI 2017), Burlingame, California, February 2017.

Topological Analysis at the Extreme Scale: Finding Features in Large Data Sets, Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, New Mexico, October 2016.

Time-Varying Merge Trees, Division for Media and Information Technology (MIT), Campus Norrköping of Linköping University, Norrköping, Sweden, September 2016.

Visual Exploration and Analysis of Brain Connectivity: Approaches and Challenges, Dagstuhl Seminar 16261: Integration of Expert Knowledge for Interpretable Models in Biomedical Data Analysis, Schloss Dagstuhl (Leibniz-Zentrum für Informatik), Wadern, Germany, June/July 2016.

In Situ Visualization and Analysis, ASTRONUM 2016—the 11th International Conference on Numerical Modeling of Space Plasma Flows, Monterey, California, USA, June 2016.

Scientific Visualization of Big Data, "Learning from other domains – Big Data and Visualization" session. 4th Workshop on Next-Generation Analytics for the Future Power Grid, Richland, Washington, September 2015.

Topological Analysis at the Extreme Scale: Finding Features in Large Data Sets, "Emerging Trends for Big Data in HPC" session, International Supercomputing Conference, Leipzig, Germany, June 2014.

Topological Analysis at the Extreme Scale: Finding Features in Large Data Sets, University of Leipzig, Leipzig, Germany, June 2014.

Topological Analysis at the Extreme Scale. University of Leeds, Leeds, England, June 2014.

Topological Analysis of Large Scale Data, Campus Norrköping of Linköping University, Norrköping, Sweden, May 2013.

Geometric Comparisons in Porous Media Simulations [and Experiments], Minisymposium on Numerics for Highly Heterogeneous Media, SIAM Conference on Computational Science & Engineering (CSE13), Boston, MA, U.S.A., February 2013.

Topological Analysis at the Extreme Scale: Current State and Future Directions, DOE Exascale Research Conference, Arlington, VA, U.S.A, October 2012.

Visualization of Adaptive Mesh Refinement Data with VisIt: Parallel, Crack-free Isosurfaces, ASTRONUM-2012—the 7th International Conference on Numerical Modeling of Space Plasma Flows, Big Island, HI, U.S.A., June 2012.

In-situ Analysis: Challenges and Opportunities, DOE Exascale Research Conference, Portland, OR, U.S.A, April 2012.

Parallel Extraction of Crack-free Isosurfaces from Adaptive Mesh Refinement Data, Dagstuhl Scientific Visualization Seminar, Schloss Dagstuhl (Leibniz-Zentrum für Informatik), Wadern, Germany, June 2011.

Topology-based Feature Definition and Analysis, ASTRONUM 2010—the 5th International Conference on Numerical Modeling of Space Plasma Flows, San Diego, CA, U.S.A., June 2010.

Recent Advances in VisIt: Streamlines and Query-Driven Visualization, ASTRONUM-2009—the 4th International Conference on Numerical Modeling of Space Plasma Flows, Chamonix, France, June/July 2009.

Visual Exploration of Turbulent Combustion and Laser-Wakefield Accelerator Simulations, Paul Scherer Institut, Villigen, Switzerland, June 2009.

The Contour Spectrum Revisited, Dagstuhl Scientific Visualization Seminar, Schloss Dagstuhl (Leibniz-Zentrum für Informatik), Wadern, Germany, June 2009.

Integrating Data Analysis and Visualization, SCI Institute, University of Utah, Salt Lake City, Utah, U.S.A., December 2008.

Current VACET/NERSC Analytics Efforts for Accelerator Modeling Data, SciDAC Community Petascale Project for Accelerator Science and Simulation (ComPASS) Collaboration Meeting, University of California, Los Angeles, CA, December 2008.

Integrating Data Analysis and Visualization, University College Dublin, Dublin, Ireland, September 2008.

Visualization and Analysis of Adaptive Mesh Refinement Data with VisIt, Invited talk at ASTRONUM-2008—the 3rd International Conference on Numerical Modeling of Space Plasma Flows, St John, U.S. Virgin Islands, June 2008.

Introduction into VisIt. Astrophysics Computation Discussion Group, University of California, Berkeley, California, U.S.A., February 2008.

Integrating Data Analysis and Visualization, Department of Computer Science Colloquium, University of California, Davis, California, U.S.A., October 2007.

Current State of the Art in Adaptive Mesh Refinement Visualization, Keynote at ASTRONUM-2007—the 2nd International Conference on Numerical Modeling of Space Plasma Flows, Hotel Concorde Montparnasse, Paris, France, June 2007.

Topology-based exploration of scalar fields, Institute for Scientific Computing Research and Center for Applied Scientific Computing Seminar, Lawrence Livermore National Laboratory, Livermore, California, U.S.A., March 2004.

Topology-based exploration of scalar fields, Simon Fraser University, Vancouver, British Columbia, Canada, February 2004.

Topology-based exploration of scalar fields, University of California, Santa Cruz, California, U.S.A., July 2003.

Visualization of adaptive mesh refinement data, Albert-Einstein Institut (Max-Planck-Institut fuer Gravitationsphysik) Potsdam and Konrad-Zuse-Zentrum fr̈ Informationstechnik Berlin (ZIB), Germany, February 2002.

Conference Panels & Tutorials

Hanqui Guo, Harsh Bhatia, Han-Wei Shen, **Weber, G.H.**, and Tino Weinkauf, Tutorial on Recent Feature Tracking Techniques and Applications, tutorial at: IEEE VIS 2018, Berlin, Germany, October 2018.

Weber, G.H., Application Papers: What are they and how should they be evaluated? panel at: Visualization and Data Analysis 2017, 2017 IS&T International Symposium on Electronic Imaging (EI 2017), Burlingame, California, February 2017.

Weber, G.H. and Brian Fisher, Application Papers: What are they and how should they be evaluated? panel at: IEEE VIS 2016, Baltimore, Maryland, October 2016.

Oeltze, S., Doleisch, H,. Hauser, H. and **Weber, G.H.**, Interactive Visual Analysis of Scientific Data tutorial at: IEEE VisWeek 2012, Seattle, Washington, October 2012.

Weber, G.H., Bremer, P.-T., Carr, H. and Gyulassy, A., Scalar Topology in Visual Data Analysis, tutorial at: IEEE VisWeek 2009, Atlantic City, New Jersey, October 2009.

Conference/Workshop Presentations without Proceedings

Weber, G.H., Lukić, Z., Morozov, D. and Nugent, P., IsoFind: Halo Finding Using Merge Trees, talk at: Department of Energy Computer Graphics Forum (DOE CGF), Monterey, California, May, 2016.

Weber, G.H., Oesterling, P., Heine, C., Morozov, D. and Scheuermann, G., Computing and Visualizing Time-Varying
Merge Trees for High-Dimensional Data, talk at: TopoInVis 2015, Annweiler, Germany, May 2015.

Weber, G.H. and Morozov, D., Distributed Contour Trees, talk at: TopoInVis 2013, Davis, CA, USA, March 2013.

Weber, G.H., Bremer, P.-T. and Pascucci, V., Topological Cacti: Visualizing Contour-based Statistics, talk at: TopoInVis 2011, Zürich, Switzewrland, April 2011.

Weber, G.H. and Childs, H., VACET: Deploying Technology for Visualizing and Analyzing Astrophysics Simulations, talk at: SciDAC Computational Astrophysics Consortium Meeting, Menlo Park, CA, May 2010.

Weber, G.H., Bremer, P.-T., Day, M.S., Bell, J.B. and Pascucci, V., Feature Tracking Using Reeb Graphs, talk at: Department of Energy Computer Graphics Forum (DOE CGF), Monterey, California, April, 2009.

Weber, G.H., Bremer, P.-T., Day, M.S., Bell, J.B. and Pascucci, V., Feature Tracking Using Reeb Graphs, talk at: TopoInVis 2009, Snowbird, Utah, February 2009.

Weber, G.H., Visualization Tools for Adaptive Mesh Refinement Data, talk at: Department of Energy Computer Graphics Forum (DOE CGF), Duck, North Carolina, April 2008.

Weber, G.H., Accelerating Remote Display Performance for GUI-based Applications, talk at: Department of Energy Computer Graphics Forum (DOE CGF), Duck, North Carolina, April 2008.

Weber, G.H., Visual Data Analysis for the Berkeley Drosophila Transcription Network Project, talk at: Department of Energy Computer Graphics Forum (DOE CGF), Peaceful Valley, Colorado, April/May 2007.

Weber, G.H., PointCloudXplore: A Visualization Tool to Examine Quantitative Relationships Between 3D Gene Expression Pattern, talk at: International Workshop on Visualization in Medicine and Life Sciences–Current Challenges, State-of-the-art Approaches, and Future Directions, Rügen, Germany, July 2006.

Weber, G.H., PointCloudXplore: A Visualization Tool to Examine Quantitative Relationships Between 3D Gene Expression Patterns, talk at: Quantitative Modeling of Gene Expression and Morphology in the Drosophila Blastoderm, Lawrence Berkeley National Laboratory, Berkeley, California, March 2006.

Knowles, D.W., Luengo Hendriks, C.L., Keränen, S.V.E., Fowlkes, C.C., **Weber, G.H.**, Rübel, O., Peng H., DePace A., Hamann, B., Sudar, J. D., Eisen, M. B., Biggin, M. D. and Malik J., Berkeley Drosophila transcription network pro ject: 3D blastoderm gene expression atlas, talk at: *Genome Informatics*, Cold Spring Harbor, New York, October/November 2005.

Weber, G.H., Luengo Hendriks, C.L., Dillard, S.E., Ju, D.Y., Rübel, O., Keränen, S.V.E., Sudar, J.D. and Hamann, B., Visualization tools for 3D gene expression data in Drosophila, poster at: Nanotechnology and Cancer Collaborative Conference, co-organized by the University of California, Davis, and Lawrence Livermore National Laboratory, University of California, Lodi, California, U.S.A., July 2005.

Wilson, D.W., **Weber, G.W.**, Slankard, T., Hamann, B. and Kutter, B.L. Visualization in experimental earthquake engineering, talk at: *CITRIS Workshop on Sensors, Sensor Networks, and Sensor Applications*, Davis, California, U.S.A., June, 2004.

Shah, N.Y., Couronne, O., Pennacchia, L.A., Brudno, M., Batzoglou, S., Bethel, E.W., Rubin, E.M., Hamann, B., **Weber, G.H.** Dubchak, I.L., Phylo-VISTA: Interactive visualization of DNA multiple alignments, poster at: UC Davis CONNECT Regional Life Sciences Summit, Sacramento, California, U.S.A., March 2004.

Demos and Exhibits

Rübel, O., **Weber, G.H.**, Huang, M.-Y., Fowlkes, C.C., Keränen, S.V.E., Luengo Hendriks, C.L., Biggin, M.D., Hagen, H., Knowles, D.W., Malik, J., Sudar, J.D. and B. Hamann, Interactive visualization of measured gene-expression patterns in three dimensions at cellular resolution, exhibit at: Supercomputing 2005, Seattle, Washington, U.S.A., November, 2005.

Weber, G.H., Rübel, O., Huang, M.-Y.,Fowlkes, C.C., Keränen, S.V.E., Luengo Hendriks, C.L., Biggin, M.D., Hagen, H., Knowles, D.W., Malik, J., Sudar, J.D. and B. Hamann, Interactive visualization of measured gene-expression patterns in three dimensions at cellular resolution, interactive demo at: IEEE Visualization 2005, Minneapolis, Minnesota, U.S.A., October, 2005.

Fuller, A.R., Hamann, B., Joy, K.I., Jones, E.G., Linsen, L., Ohlshausen, B.A., Slankard, T.W., Stone, J., Vivodtzev, F., **Weber, G.H.**, Wiley, D.F. and Yau, P.C., Brain Atlas Mapping, exhibit at: Neuroscience 2004, The Society for Neuroscience 34th Annual Meeting, San Diego, California, U.S.A., November, 2004.

Weber, G.H., Linsen, L., Vivodtzev, F., Fuller, A.R., Yau, P.C., Hamann, B., Joy, K.I., Jones, E.G., Kreylos, O., Ohlshausen, B.A., Stone, J., Surface segmentation of brain cortices in MRI data, exhibit at: Neuroscience 2003, The Society for Neuroscience 33rd Annual Meeting, New Orleans, Louisiana, U.S.A., November 2003.

Service

Conference/Workshop Chair or Co-chair

Papers Co-Chair, IEEE VIS (SciVis), Vancouver, Canada, October 2019.

Organizing Committee, In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV 2018), Dallas, Texas, USA, November 2018.

Papers Co-Chair, IEEE VIS (SciVis), Berlin, Germany, October 2018.

Organizing Committee & General Chair, In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV 2017), Denver, Colorado, USA, November 2017.

Organizing Committee, ISC Workshop on In-Situ Visualization 2017, Frankfurt, Germany, June 2017.

Posters Co-Chair, IEEE Visualization (SciVis), Phoenix, Arizona, USA, October 2017.

Organizing Committee, In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV 2016), Salt Lake City, Utah, USA, November 2016.

Posters Co-Chair, IEEE Visualization (SciVis), Baltimore, Maryland, USA, October 2016.

Visualization Co-Chair, 11th International Symposium on Visual Computing, Las Vegas, Nevada, USA, December 2015.

Organizing Committee & Publications Chair, In Situ Infrastructures for Enabling Extreme-Scale Analysis and Visualization (ISAV 2015), Austin, Texas, USA, November 2015.

Workshop Co-Chair, Visualization in Environmental Sciences (EnvirVis), Cagliari, Sardinia, Italy, May 2015.

Local A/V Chair, IEEE Visualization, Sacramento, California, USA, October 28–November 1, 2007.

Birds-of-a-Feather Co-Chair, IEEE Visualization, Sacramento, California, USA, October 28–November 1, 2007.

Conference/Workshop Program Committees

International Program Committee, EuroVis, Porto, Portugal, June 2019.

International Program Committee, Topology-Based Methods in Visualization (TopoInVis) 2017, Tokyo, Japan, February 2017.

International Program Committee, EuroVis Short Papers, Barcelona, Spain, June 2017.

Program Committee, IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC) 2016 Workshop "High Performance Computing and Big Data in Molecular Engineering (HBME)," Hydrabad, India, December 2016.

International Program Committee, EuroVis, Groningen, The Netherlands, June 2016.

International Program Committee, EuroVis Short Papers, Groningen, The Netherlands, June 2016.

Program Committee, ISC Workshop on In-Situ Visualization 2016, Frankfurt, Germany, June 2016.

International Program Committee, Symposium on Visualization in High Performance Computing at SIGGRAPH Asia 2015, Kobe, Japan, November 2015.

International Program Committee, Topology-Based Methods in Visualization (TopoInVis) 2015, Annweiler, Germany, May 2015.

International Program Committee, EuroVis, Cagliari, Sardinia, Italy, May 2015.

International Program Committee, EuroVis Short Papers, Cagliari, Sardinia, Italy, May 2015.

International Program Committee, 4th IEEE Symposium on Biological Data Visualization, Boston, MA, July 2014.

International Program Committee, EuroVis, Swansea, Wales, United Kingdom, June 2014.

International Program Committee, EuroVis Short Papers Program Committee, Swansea, Wales, United Kingdom, June 2014.

International Program Committee, Workshop Visualization in Environmental Sciences (EnvirVis), Swansea, Wales, United Kingdom, June 2014.

International Program Committee, IEEE SciVis 2013, Atlanta, GA, October 2013.

International Program Committee, 3rd IEEE Symposium on Biological Data Visualization, Atlanta, GA, October 2013.

International Program Committee, EuroVis Short Papers, Leipzig, Germany, June 2013.

International Program Committee, Workshop Visualization in Environmental Sciences (EnvirVis), Leipzig, Germany, June 2013.

Program Committee, Workshop, Topological Methods in Data Analysis and Visualization (TopoInVis) 2013, Davis, CA, March 2013.

International Program Committee, SPIE Visualization and Data Analysis (VDA) 2013, Burlingame, CA, January 2013.

International Program Committee, IEEE Vis 2012, Seattle, WA, October 2012.

International Program Committee, 2nd IEEE Symposium on Biological Data Visualization, Seattle, WA, October 2012.

International Program Committee, Third Eurographics Workshop on Visual Computing for Biology and Medicine (VCBM), Norrköping, Sweden, September, 2012.

International Program Committee, IEEE Vis, Providence, RI, October 2011.

International Program Committee, 1st IEEE Symposium on Biological Data Visualization, Providence, RI, October 2011.

International Program Committee, EuroVis, Bergen, Norway, May/June 2011.

Program Committee, Workshop, TopoInVis 2011: Fourth Workshop on Topology-Based Methods in Visualization, Zürich, Switzerland, April 2011.

International Program Committee, EuroVis, Bordeaux, France, June 2010.

Organizing Committee, Refactoring Visualization from Experience (ReVisE) Workshop, Atlantic City, New Jersey, October 12, 2009.

International Program Committee, EuroVis, Berlin, Germany, June 2009.

Program Committee, Workshop, Topology-Based Methods in Visualization (TopoInVis), Snowbird, Utah, February 2009.

International Program Committee, Workshop on Knowledge-Assisted Visualization (KAV 2008), Columbus, Ohio, USA, October 2008.

International Program Committee, First Workshop on Knowledge-Assisted Visualization (KAV 2007), Sacramento, California, USA, October 2007.

Program Committee, IADIS International Conference on Computer Graphics and Visualization 2007, Lisbon, Portugal, 2007.

Organizing Committee, 4th High-End Visualization Workshop, Obergurgl, Austria, 2007.

Program Committee, Workshop, Topology-Based Methods in Visualization (TopoInVis), Grimma, Germany, 2007.

Miscellaneous Conference Service

Session chair "IEEE SciVis: Conference Track - Vectors, Acceleration, and Hardware," Chicago, Illinois, October 29, 2015.

Setup of web server for IEEE Visualization (1999).

Reviewer for Funding Agencies

Department of Energy Early Career Research Program, Reviewer, 2017.

National Science Foundation, Division of Information & Intelligent Systems, Panelist, 2016.

Department of Energy Early Career Research Program, Reviewer, 2016.

National Science Foundation, Division of Information & Intelligent Systems, Panelist, 2014.

National Science Foundation, Division of Information & Intelligent Systems, Panelist, 2013.

Department of Energy Early Career Research Program, Reviewer, 2013.

Department of Energy Early Career Research Program, Panelist, 2011.

National Science Foundation, Office of Infrastructure, Reviewer, 2010.

Department of Energy SBIR Phase II program, Reviewer, 2010.

Department of Energy SBIR Phase I program, Panelist, 2009.

Technical Paper Reviewer for Journals, Conferences and Books

IEEE Transactions on Visualization and Computer Graphics (2001–2017).

Computer Graphics Forum (2016).

IEEE Visualization (2000–2017).

IEEE VAST (2008–2010, 2016).

IEEE InfoVis (2008–2012, 2016–2017).

IEEE Pacific Visualization Symposium (PacificVis) (2009 & 2015 & 2017).

BMC Bioinformatics (2014).

International Conference on Parallel Processing (2014).

ACM Symposium on Computational Geometry (2013).

Journal of Visualization (2012).

Joint Eurographics – IEEE VGTC Symposium on Visualization (2002–2013).

Second International Workshop on Visualization in Medicine and Life Sciences (2009).

SciDAC conference (2009).

Computer Graphics and Applications (2009).

International Journal of High Performance Computing (2009)

Eurographics (2009).

International Conference on Numerical Modeling of Space Plasma Flows (ASTRONUM) (2007–2010).

International Journal of Software and Informatics (2007–2008).

Concurrency and Computation: Practice and Experience (2007, 2009).

Journal of the Earth Simulator (2007).

Books "Mathematical Methods for Visualization in Medicine and Life Sciences" and "Visualization Techniques for Applications in Medicine and Life Sciences," Springer-Verlag (2007).

Information Visualization (Palgrave Macmillan Journals) (2006).

Book "Mathematical Foundations of Scientific Visualization, Computer Graphics, and Massive Data Exploration," Springer Verlag.

Pacific Graphics (2003).

The Visual Computer (2001).

IASTED International Conference on Computer Graphics (2002).

Book "Hierarchical and Geometrical Methods in Scientific Visualization," Springer-Verlag.

Book "Geometric Modeling for Scientific Visualization," Springer Verlag.

Other

Participated in "Restructuring IEEE VIS for the Future" workshop, bringing together leaders in the visualization technical community to define the future of the VIS conference, Schloss Dagstuhl (Leibniz-Zentrum für Informatik), Wadern, Germany, May 2018

Served as technical reviewer for the SHI Sustainable Research Pathways Institute 2017 workshop, presented overview of Data Analysis and Visualization group portfolio and represented DAV group at workshop, Berkeley, CA, December 2017.

Administration of graphics group web server at IDAV (2003–2006).

Coordinator for establishing an "Agreement of Cooperation" between the University of California, Davis and the University Kaiserslautern, 2003/2004.

Professional Memberships

Institute of Electrical and Electronics Engineers Computer Society (IEEE Computer Society).

Institute of Electrical and Electronics Engineers Computer Society Visualization and Graphics Technical Committee on (IEEE VGTC).

Awards and Recognition

Awards

Lawrence Berkeley National Laboratory Spot Award in recognition of "much needed modernization of the Data Analytics and Visualization Group website transforming a system dating from 2001 to one that should last us at least another 10 years, through 2028," July 2018.

Interim Winner in the Berkeley Lab Inclusion Conversation Challenge (finished as one of the top 10 points winners after the first nine rounds of the challenge).

Best paper award for paper "Nested Tracking Graphs" at Eurographics/IEEE Symposium on Visualization (EuroVis), Barcelona, Spain, June 2017.

Best paper award for paper "Parallel Peak Pruning for Scalable SMP Contour Tree Computation" at IEEE Symposium on Large Data Analysis and Visualization (LDAV), Baltimore, MD, October 2016.

Best paper award for paper "Hierarchical Spatio-temporal Visual Analysis of Cluster Evolution in Electrocorticography Data" at BrainKDD: The 3nd International Workshop on Data Mining and Visualization for Brain Science, Seattle, WA, October 2016.

Lawrence Berkeley National Laboratory Spot Award (two awards), September 2016.

– In recognition of the effort required to respond to the enormous number of letters of intent, pre-proposals and final proposals required for the DOE Exascale Computing Program (ECP).
– In recognition of the rapid, comprehensive and high-quality contributions to the SciDAC-4 Institutes RFI on a very short turn-around that included a federal 3-day holiday weekend. The SciDAC-4 program promises to be a very important initiative for computational science at LBNL.

Best paper award for "Accelerating Science with the NERSC Burst Buffer Early User Program" at Cray User Group (CUG), London, England, May 8–12, 2016.

Best paper award for "Computing and Visualizing Time-Varying Merge Trees for High-Dimensional Data" at Topology-Based Methods in Visualization (TopoInVis) 2015, Kurhaus Trifels, Annweiler, Germany, May 20–22, 2015.

Lawrence Berkeley National Laboratory Spot Award in recognition "for your outstanding contribution to the successful porting and deployment of the VisIt visualization application on Franklin for the NERSC community," November 2009.

"People's Choice Award" at the SciDAC 2008 Visualization Nigh for a visual animation of climate simulations (effort headed by Prabhat) and runner-up for a visualization of magneto-rotational instability and turbulent angular momentum transport.

Lawrence Berkeley National Laboratory Spot Award in recognition of "High impact scientific visualization consulting for climate scientists from the NCAR Geophysical Fluid Dynamics Laboratory, who ran climate models at resolution many times higher than standard models on NERSC's Cray XT4 in the Fall of 2007," March 2008.

Finalist at the Genetics Society of America 2007 Drosophila Image Award.

Best Teaching Assistant, Department of Computer Science, University of Kaiserslautern, Germany, Summer Semester, 1998.

News Coverage

News story "Berkeley Researchers Use Machine Learning to Search Science Data," in: LBNL Computational Research News, June 19, 2018.

News story "Brain Modulyzer Provides Interactive Window Into the Brain," in: LBNL Computational Research News, October 10, 2016.

News story "CUG Honors NERSC Burst Buffer Early User Program with 'Best Paper'," in NERSC Center News, May 11, 2016.

News story "'Sidecars' Pave the Way for Concurrent Analytics of Large-Scale Simulations," in: LBNL Computational Research News, November 2, 2015.

News story "Throwing a Lifeline to Scientists Drowning in Data," in: LBNL Computational Research News, July 31, 2013.

News story "Brain Visualization Prototype Holds Promise for Precision Medicine: Berkeley Lab, UCSF and Oblong Industries Show Brain Browser at Summit, " in: LBNL Computational Research News, May 3, 2013.

"A map for fly explorers," Research highlight discussing [J-7], in: Nature Methods, 5, 466, doi: 10.1038/ nmeth0608-466, 2008.

News story "Deciphering Development: Quantifying Gene Expression through Imaging," BioScience, Vol. 57, No. 8, September 2007, pp. 648–652, The American Institute of Biological Sciences, Washington, D.C., `http://www.aibs.org/bioscience/`.

Recognition

Cover SciDAC Review, Issue 13, Summer 2009.

Back cover of *IEEE Visualization 2007, IEEE Transactions on Visualization and Computer Graphics,* 13(5), 2007.

Cover of *IEEE Transactions on Visualization and Computer Graphics,* 13(2), 2007.

Interview in *American Scientist*, Volume 95, pp. 69–71, January/February 2007.

Image in *Advanced Foundations for American Innovation — Supplement to the President's Budget FY 2004,* National Science and Technology Council, Executive Office of the President of the United States, Arlington, Virginia, p. 18, September 2003.

Cover of *IEEE 2003 Symposium on Parallel and Large-data Visualization (PVG 2003)* proceedings, IEEE Computer Society Press, Los Alamitos, California, October 2003.

Student Exam Committee Service

Preston, A., Ph.D. qualifying exam committee member, Computer Science, University of California at Davis, January 2019.

Murugesan, S., Ph.D. qualifying exam committee member, Computer Science, University of California at Davis, August 2015.

Capps, A., Ph.D. qualifying exam committee chair, Computer Science, University of California at Davis, January 2015.

Beketayev, K., Ph.D. qualifying exam committee member, Computer Science, University of California at Davis, May 2011 and April 2013.

Demir, D., Master's candidacy committee member, Computer Science, University of Utah, November 2011.

Rübel, O., Ph.D. defense committee member, Computer Science, University of Kaiserslautern, November 2009.

Feng, L., Ph.D. qualifying exam committee member, Computer Science, University of California at Davis, March 2008.

Dillard, S., Ph.D. qualifying exam committee member, Computer Science, University of California at Davis, September 2007.

Huang, M.-Y., Ph.D. qualifying exam committee member, Computer Science, University of California at Davis, 2006.

Co-supervision of Students and Postdoctoral Researchers

Sohns, J.-T., M.Sc. student, Distributed topology-conrtrolled volume rendering, Department of Computer Science, University of Kaiserslautern, Germany, January 2018 – July 2018.

Lukasczyk, J., Ph.D. student, Presentation of topological information, International Research Training Group/Department of Computer Science, University of Kaiserslautern, November 2016 – present.

Murugesan, S., Ph.D. student, Visualization of functional brain connectivity, Department of Computer Science, University of California, Davis, July 2014 – November 2017.

Liebmann, T., Ph.D. student, Visualzation and analysis of uncertain scalar fields, Department of Computer Science, University of Leipzig, Germany, LBNL visiting student, January 2016 – April 2016.

Fay, C., Special Study for Advanced Undergraduates (ECS 199), Illustrtive brain surface rendering, University of California, Davis, Winter Quarter 2014.

Oesterling, P., Ph.D. student, Topological analysis of time-varying data, Department of Computer Science, University of Leipzig, Germany, LBNL visiting student, September 2012 – December 2012.

Morozov, D., Postdoctoral researcher, Lawrence Berkeley National Laboratory, January 2011 – October 2013.

Demir, D., M.Sc. student, Terrain-based visualization of topological data, Scientific Computing and Imaging Institute, University of Utah, LBNL Summer student, Summer 2010 and 2011.

Virgil Griffith, Ph.D. student, Analysis of climate data, California Institute of Technology, DOE Computational Science Graduate Fellowship student, Summer 2010.

Hlawitschka, M., Postdoctoral researcher, Department of Computer Science, University of California, Davis, November 2008 – March 2011.

Beketayev, K., Ph.D. student, Extracting topological information from noisy scientific data sets, Department of Computer Science, University of California, Davis, October 2008 – September 2013.

Rübel, O., Ph.D. student, Statistics- and visualization-based methods for interactive scientific data analysis with applications in imaging and computational sciences, International Research Training Group "Visualization of Large and Unstructured Data Sets Applications in Geospatial Planning, Modeling, and Engineering, " February 2006 – November 2009.

Huang, M.-Y., Ph.D. student, Visualization methods for bio-medical imaging data sets, Department of Computer Science, University of California, Davis, July 2005 – 2012.

Dillard, S.E., Ph.D. student, Topological structures in scientific visualization, Department of Computer Science, University of California, Davis, April 2004 – December 2007.

Slankard, T.W., M.Sc. student, Experimental and digital imaging data analysis and visualization, Department of Computer Science, University of California, Davis, September 2004 – August 2007.

Hlawitschka, M., Visiting Ph.D. student, Visualization of tensor fields with a focus on diffusion tensor imaging, University of Leipzig, Germany, May 2006 – October 2006.

Wong, G., Undergraduate Researcher, Visualization of Quantitative Gene Expression Data, April 2006 – September 2006.

Rübel, O., M.Sc. student, Integrating data analysis and visualization for exploration of 3d gene expression data, June 2005 – January 2006.

Rübel, O., Study Thesis, Using linked scatterplots and 3d embryo views for visualization of 3d gene expression data in Drosophila melanogaster, March 2005 – June 2005.

Ju, D.Y., Undergraduate Researcher, Visualization of segmentation results for 3d gene expression analysis, July 2004 – June 2005.

Dillard, S.E., Undergraduate Researcher, Topology-guided volume rendering, Department of Computer Science, University of California, Davis, December 2003 – March 2004.

Shah, N., Ph.D. student, Visualization methods for comparative and functional genomics data exploration application, Department of Computer Science, University of California, Davis, July 2003 – September 2005.

Rauwendaal, R.R., Undergraduate Researcher, Topology-based segmentation of terrain data, Department of Computer Science, University of California, Davis, April 2003 – September 2004.

Slankard, T.W., Undergraduate Researcher, Experimental earthquake data visualization, Department of Computer Science, University of California, Davis, January 2003 – August 2004.

Fang, D.C., M.Sc. Thesis, Extracting geometrically continuous isosurfaces from adaptive mesh refinement data, Department of Computer Science, University of California, Davis, December 2002 – June 2003.

Öhler, M., Study Thesis, Parallel volume rendering of adaptive mesh refinement data, University of Kaiserslautern, Germany, July 2002 – January 2003.

Schneider, M., Study Thesis, Visualization of experimental earthquake data, University of Kaiserslautern, Germany, January 2002 – December 2002.