

# Carlos Eduardo Scheidegger

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## Research Interests

- Scientific Visualization, Geometric Processing, Computer Graphics

## Education

- PhD (in progress), Computer Science Since January 2005, Expected 2009  
University of Utah  
Advisor: Prof. Dr. Cláudio Silva
- B.S., Computer Science cum laude March 2004  
Universidade Federal do Rio Grande do Sul (Brazil)  
Advisor: Prof. Dr. João Comba

## Honors and Awards

- Best Paper Award at IEEE International Conference on Shape Modeling and Applications, 2008.
- IBM PhD Fellowship 2008.
- Best Paper Award at IEEE Visualization 2007.
- IBM PhD Fellowship 2007.
- School of Computing Distinguished TA Award, 2005.
- Brazilian Computer Society Distinguished Student Award, 2004.
- Graduated cum laude in Computer Science, total combined GPA of 3.75, 2004.
- First place, Entrance exam, Computer Science, Federal University of Rio Grande do Sul, 1999.

## Refereed Journal Publications

- [1] *Bandwidth Selection and Reconstruction Quality in Point-Based Surfaces*. H. Wang, C. Scheidegger, C. Silva. IEEE Transactions on Visualization and Computer Graphics. To appear, 2009.
- [2] *Edge Transformations for Improving Quality of Marching Methods*. C. Dietrich, C. Scheidegger, J. Schreiner, J. Comba, L. Nedel, C. Silva. IEEE Transactions on Visualization and Computer Graphics, 15(1):150–159, 2009.

- [3] *Revisiting Histograms and Isosurface Statistics*. C. Scheidegger, J. Schreiner, B. Duffy, H. Carr, C. Silva. IEEE Transactions on Visualization and Computer Graphics (Proceedings of IEEE Visualization 2008), 14(6):1659–1666, 2008.
- [4] *Edge Groups: an Approach for Understanding the Mesh Quality of Marching Methods*. C. Dietrich, C. Scheidegger, J. Comba, L. Nedel, C. Silva. IEEE Transactions on Visualization and Computer Graphics (Proceedings of IEEE Visualization 2008), 14(6):1651–1658, 2008.
- [5] *VisComplete: Automating Suggestions for Visualization Pipelines*. D. Koop, C. Scheidegger, S. Callahan, J. Freire, C. Silva. IEEE Transactions on Visualization and Computer Graphics (Proceedings of IEEE Visualization 2008), 14(6):1691–1698, 2008.
- [6] *Querying and Creating Visualizations by Analogy*. C. Scheidegger, H. Vo, D. Koop, J. Freire, C. Silva. IEEE Transactions on Visualization and Computer Graphics (Proceedings of IEEE Visualization 2007), 13(6):1560–1567, 2007. **Best paper award**.
- [7] *Tackling the Provenance Challenge One Layer at a Time*, C. Scheidegger, D. Koop, E. Santos, H. Vo, S. Callahan, J. Freire, C. Silva, Concurrency and Computation: Practice and Experience, 20(5):473–483, 2008.
- [8] *High Quality Extraction of Isosurfaces from Regular and Irregular Grids*. J. Schreiner, C. Scheidegger, C. Silva. IEEE Transactions on Visualization and Computer Graphics (Proceedings of IEEE Visualization 2006), 12(5):1205–1212, 2006.
- [9] *Direct (Re)Meshing for Efficient Surface Processing*. J. Schreiner, C. Scheidegger, S. Fleishman, C. Silva. Computer Graphics Forum (Proceedings of Eurographics 2006), 25(3):527–536, 2006.
- [10] *Practical CFD simulations on the GPU using SMAC*. C. Scheidegger, J. Comba, R. Cunha. Computer Graphics Forum, 24(4):715–728, 2005.
- [11] *Computation on GPUs: from a programmable pipeline to an efficient stream processor*. J. Comba, C. Dietrich, C. Pagot, C. Scheidegger. Revista de Informática Teórica e Aplicada, 10(1):41–70, 2003.

## Refereed Conference Publications

- [12] *End-to-End eScience: Integrating Workflow, Query, Visualization, and Provenance at an Ocean Observatory*, B. Howe, P. Lawson, R. Bellinger, E. Anderson, E. Santos, J. Freire, C. Scheidegger, A. Baptista, C. Silva. IEEE International Conference on e-Science 2008.
- [13] *Toward Provenance-Enabling ParaView*, S. P. Callahan, J. Freire, C. Scheidegger, C. Silva, H. Vo. Second International Provenance and Annotation Workshop (IPAW 2008).
- [14] *Optimal Bandwidth Selection for MLS Surfaces*, H. Wang, C. Scheidegger, C. Silva. Proceedings of Shape Modelling International (SMI), 2008. **Best paper award**.
- [15] *Examining Statistics of Workflow Evolution Provenance: A First Study*, L. Lins, D. Koop, E. Anderson, S. P. Callahan, E. Santos, C. Scheidegger, J. Freire, C. Silva. Proceedings of the 20th International Conference on Scientific and Statistical Database Management (SSDBM), 2008.
- [16] *Querying and Re-Using Workflows with VisTrails* C. E. Scheidegger, H. T. Vo, D. Koop, J. Freire, C. Silva. Demo, ACM SIGMOD 2008.

- [17] *Hardware-Assisted Point-Based Volume Rendering of Tetrahedral Meshes*, E. Anderson, S. Callahan, C. Scheidegger, J. Schreiner, C. Silva. Proceedings of the Brazilian Symposium on Computer Graphics and Image Processing (SIBGRAPI 2007).
- [18] *Managing Rapidly-Evolving Scientific Workflows*. J. Freire, C. Silva, S. Callahan, E. Santos, C. Scheidegger, H. Vo. Proceedings of the International Provenance and Annotation Workshop (IPAW), 2006. Invited paper.
- [19] *Managing the evolution of dataflows with VisTrails*. S. Callahan, J. Freire, E. Santos, C. Scheidegger, C. Silva, H. Vo. Proceedings of the IEEE Workshop on Workflow and Data Flow for Scientific Applications (SciFlow), 2006.
- [20] *VisTrails: Visualization Meets Data Management*. S. Callahan, J. Freire, E. Santos, C. Scheidegger, C. Silva, H. Vo. Demo, ACM SIGMOD 2006.
- [21] *VisTrails: Enabling Interactive Multiple-View Visualizations*. L. Bavoil, S. Callahan, P. Crossno, J. Freire, C. Scheidegger, C. Silva, H. Vo, Proceedings of IEEE Visualization, pages 135-142, 2005.
- [22] *Triangulating Point-Set Surfaces With Bounded Error*. C. Scheidegger, S. Fleishman, C. Silva. Proceedings of the third Eurographics/ACM Symposium on Geometry Processing, pages 63-72, 2005.
- [23] *Boolean Operations on Surfel-Bounded Solids Using CBSP-Trees*. M. Farias, C. Scheidegger, J. Comba, L. Velho. Proceedings of SIBGRAPI 2005 (XVIII Brazilian Symposium on Computer Graphics and Image Processing).
- [24] *Navier-Stokes on Programmable Graphics Hardware using SMAC*. C. Scheidegger, J. Comba, R. Cunha, Proceedings of XVII SIBGRAPI – II SIACG 2004, pages 208-315, 2004.

## Other

- [25] *Direct Volume Rendering: A 3D Plotting Technique for Scientific Data*. S. Callahan, J. Callahan, C. Scheidegger, C. Silva. IEEE/AIP Computing in Science and Engineering, 10(1):88–92, 2008.
- [26] *A Unified Projection Operator for MLS Surfaces*. T. Ochotta, C. Scheidegger, J. Schreiner, Y. Lima, R. M. Kirby, C. Silva. SCI Institute Tech Report UUSCI-2007-006.
- [27] *Visualization in Radiation Oncology: Towards Replacing the Laboratory Notebook*. E. Anderson, S. Callahan, G. T. Y. Chen, J. Freire, E. Santos, C. Scheidegger, C. Silva, H. Vo. *Manuscript*.
- [28] *Using Provenance to Streamline Data Exploration through Visualization*. S. Callahan, J. Freire, E. Santos, C. Scheidegger, C. Silva, H. Vo. *Manuscript*.
- [29] *GPUs como processadores de propósito geral*. (In portuguese: GPUs as general purpose processors) C. Scheidegger. B.Sc. thesis. Advisor: Prof. Dr. J. Comba. December 2003.

## Software contributions

- *VisTrails*. One of the lead designers and developers of VisTrails, an open source provenance-aware system for exploratory scientific workflows and visualization. Available at <http://www.vistrails.org>. (Over 7,000 downloads.)
- *Afront*. One of the developers of Afront, a program to generate well-shaped triangle meshes out of many different types of input data. Available at <http://afront.sourceforge.net>. (Over 1,000 downloads.)

- *Macet*. One of the developers of Macet, a variant of Marching Cubes geared towards generation of high-quality meshes. Available at [http://www.sci.utah.edu/~cscheid/vis2008/edge\\_groups](http://www.sci.utah.edu/~cscheid/vis2008/edge_groups) .
- *PGHFlow*. Lead designer and developer for PGHFlow, a system for solving the incompressible Navier-Stokes equations on programmable graphics hardware. Available at <http://www.sci.utah.edu/~cscheid/smac>.

## Professional Experience

- *Intern at VisTrails Inc.* Supervisor: Dr. Steven Callahan. Summer 2008.
- *Research Intern at the IBM Watson Research Center.* Supervisor: Dr. Wagner T. Correa. Summer 2006.
- *Research Intern at Lawrence Livermore National Laboratories.* Research topics: Point-based graphics and computational topology. Supervisor: Dr. Valerio Pascucci. Summer 2005.
- *Teaching Assistant for CS3510: Algorithms and Data Structures.* Supervisor: Prof. Dr. Cláudio Silva. Jan 2005 – May 2005.
- *Research Intern at the University of Utah.* Topics: Point-based graphics and algorithms. Supervisor: Prof. Dr. Cláudio Silva. May 2004 – Aug 2004.
- *Undergraduate Research Assistant.* Research topics: Applied computational geometry and GPU-based algorithms. Supervisor: Prof. Dr. João Comba. Department of Computer Science, Federal University of Rio Grande do Sul. Aug 2002 – Dec 2004.
- *Undergraduate Research Assistant.* Research topics: Computer-Aided Design, Geographical Information Systems. Supervisor: Prof. Dr. Benamy Turkienicz. Department of Architecture, Federal University of Rio Grande do Sul. Feb 2001 – Jul 2002.

## Computer Skills

- Programming: C, C++, Scheme, Haskell, Python, OpenGL, GPU programming languages (OpenGL arb\_fp, GLSL, Cg)
- Systems: UNIX (Linux and OS X), Windows

## Language Skills

- English: fluent
- Brazilian Portuguese: native