

# Carlos D. Correa

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## Profile

Computer Scientist in the field of Computer Graphics, Video Processing and Information Visualization, interested in positions that require outstanding analytical, programming and research skills in the search and development of new and efficient ways of generating, analyzing and visualizing large and complex data.

## Education

- University of California, Davis — Postdoctoral Scholar, Computer Science, 2010
- Rutgers University, New Jersey — Ph.D., Electrical and Computer Engineering, 2007
- Rutgers University, New Jersey — M.Sc., Electrical and Computer Engineering, 2003
- EAFIT University, Colombia — B.Sc., Computer Science, 1998

## Experience

**Postdoctoral Researcher.** Center for Applied Scientific Computing, Lawrence Livermore National Lab. May 2010 - present

- Develop novel visual representations of large ensembles of multi-dimensional data.
- Create novel techniques for quantifying and visualizing uncertainty in high-dimensional data sets.

**Postdoctoral Researcher.** Visualization and Interface Design Innovation Lab and The Institute for Ultrascale Visualization. University of California, Davis. Sep. 2007 - April. 2010

- Author software for creating compelling illustrations and narratives from video clips.
- Create new mathematical models and algorithms to represent data transformations for Visual Analytics.
- Author *netzen*, a software tool for visualization and analysis of social and other scale-free networks.
- Develop a GPU-based image processing pipeline for the analysis and classification of 3D images.
- Foster interdisciplinary collaboration with partners in academia and industry.

**Research Assistant.** Center for Advanced Information Processing, Rutgers University, New Brunswick, NJ. Jan. 2001 - May 2007

- Coined the term *illustrative deformation* to refer to novel rendering techniques for generating illustrations from scientific data and shapes.
- Developed and optimized a volume animation software pipeline for the manipulation of large 3D images, using innovative computer graphics algorithms and exploiting GPU parallel computing capabilities.
- Authored and co-authored several papers in the area of visualization and computer graphics.
- Led the development of a mixed-reality collaborative environment for remote training and education.
- Created novel algorithms, user interaction tools and middleware components for distributed virtual environments in a variety of platforms and mobile devices.

**Research Assistant and Consultant.** Virtual Reality Laboratory and Conexiones Project. EAFIT University, Colombia, 1997-2000

- Designed software for an educational multi-user immersive virtual environment.
- Led the creation of a start-up company to provide solutions based on interactive computer graphics.
- Developed graphics and networking components for educational multimedia software.

## Skills

**Computer Graphics and Image Processing:** OpenGL, GPU programming (Cg, GLSL), Java3D, VTK, Matlab, OpenCV, Hardware-accelerated computer graphics, Digital Signal Processing.

**Data Analysis and Visualization:** Data Mining, Visual Analytics, Quantitative Analysis, Sensitivity Analysis and Uncertainty, Network analysis, Numerical Methods, Optimization.

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**Programming:** Object oriented programming, C/C++, Java, Python, GPU-based parallel computing, GUI programming (Qt, FLTK, MFC, Java), UML, Design patterns, Distributed and parallel programming.

**Operating Systems:** Linux, Windows, Mac OS, UNIX.

## Selected Publications (full publication list available upon request)

- Visualizing Social Networks. Carlos D. Correa and Kwan-Liu Ma. To Appear in Social Network Data Analytics. Ed. Charu Aggarwal, Springer (2011).
- Visual Reasoning about Social Networks using Centrality Sensitivities. Carlos D. Correa, Tarik Crnovrsanin and Kwan-Liu Ma. To Appear : *IEEE Transactions on Visualization and Computer Graphics*, 2011.
- Dynamic Video Narratives. Carlos D. Correa an Kwan-Liu Ma. *ACM Transactions on Graphics* 29(4), (SIGGRAPH 2010).
- Visualization by Proxy: A Novel Framework for Deferred Interaction with Volume Data. Anna Tikhonova, Carlos D. Correa and Kwan-Liu Ma. *IEEE Transactions on Visualization and Computer Graphics*, 16(6), 2010 (Proc. IEEE Visualization 2010)
- Flow-based Scatterplots for Sensitivity Analysis. Yu-Hsuan Chan, Carlos D. Correa and Kwan-Liu Ma. *Proceedings of IEEE VAST Symposium, 2010*.
- The Occlusion Spectrum for Volume Visualization and Classification. Carlos D. Correa and Kwan-Liu Ma. *IEEE Trans. on Visualization and Computer Graphics*, vol. 15, 2009.
- A Framework for Uncertainty-Aware Visual Analytics. Carlos D. Correa, Yu-Hsuan Chan and Kwan-Liu Ma. To Appear: *IEEE VAST 2009 Symposium, 2009*
- Flow visualization in science and mathematics. Nelson Max, Carlos Correa, Chris Muelder, Shi Yan, Cheng-Kai Chen and Kwan-Liu Ma. *Journal of Physics: Conference Series (SciDAC 2009 Conference) 180*, 2009
- Social Network Discovery based on Sensitivity Analysis. Tarik Crnovrsanin, Carlos D. Correa and Kwan-Liu Ma. *Proc. Intl. Conf. Advances in Social Networks Analysis and Mining*, Athens, Greece, July 2009.
- Visualizing what Lies Inside. Carlos D. Correa. VisFiles, *ACM SIGGRAPH Computer Graphics Quarterly*, Volume 43, Number 2, May 2009.
- Size-based Transfer Functions: A New Volume Exploration Technique. Carlos D. Correa and Kwan-Liu Ma. *IEEE Trans. on Visualization and Computer Graphics*, vol. 14, no. 6, pp. 1380-1387, Nov/Dec, 2008.

## Awards

- Co-PI of NSF Award. "Modeling the Uncertainty Due to Data/Visual Transformations Using Sensitivity Analysis", 2010 - 2012.
- Co-PI of the project "Visual Analytics Tools for Enterprise Information Management", recognized with a 2008 Innovation Research Award from HP Labs.
- VAST Challenge Award for Intuitive Social Network Graphs, 2008.
- Young Researcher program beneficiary from the Colombian National Sciences Institute, January, 2000
- Received honors in graduation from Computer Science, EAFIT University, December, 1998.
- Full scholarship for B.Sc. studies for high academic achievement, EAFIT University, 1994.

## Activities

- International Program Committee Member: IEEE Visualization 2011, IEEE Pacific Visualization Symposium 2010, 2011, VisApp 2011
- Reviewer for: IEEE Transactions on Visualization and Computer Graphics, 2006 - 2010, IEEE Transactions on Image Processing 2010, Computer Graphics Forum, 2008-2010. Computer Graphics and Applications, 2007 - 2009. ACM SIGGRAPH Asia, 2008, Eurographics/IEEE-VGTC Symposium on Visualization, 2008-2010. ACM CHI 2005-2006. ACM Group 2003-2005.