Dr. JOÃO LUIZ DIHL COMBA

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Research Interests

Visual Analytics, Data Science, Information and Scientific Visualization, Visual Analytics, Geometric Algorithms and Data Structures, High-Performance Computing, Graphics Hardware and Games.

Education Summary

2010 - 2011	University of Utah	Sabbatical Leave
1993 - 2000	Stanford University, United States	Ph.D in Computer Science, Advisor: Leonidas J Guibas
1988 - 1991	UFRJ	MSc. in Systems Engineering and Computing
1983 - 1987	UFRGS	BSc. in Computer Science.

Professional Affiliations

Co-editor of the Visualization Corner of the Computing in Science & Engineering, Member of the Editorial Board of Computer & Graphics, IEEE and ACM Member.

Professional Duties:

- **Co-Chair of the Visualization Corner, journal Computing in Science & Engineering**
- **Associate Editor of the Computer & Graphics Journal**
- **Conference Chair:**
  - Co-chair, Tutorials, IEEE VISUALIZATION 2016 and IEEE VISUALIZATION 2015
  - Co-chair, Program Committee – Brazilian Workshop on Visual Analytics, Information Visualization and Scientific Visualization (WVIS 2015, WVIS 2014, WVIS 2013, WVIS 2012.
  - Chair, Birds of a Feather. IEEE Visualization 2010
  - Co-chair, Workshops. SIBGRAPI 2010
  - Co-chair, Program Committee, Eurographics Symp. on Parallel Graphics and Visualization 2009
  - Co-chair, Workshop of Theses and Dissertations. SIBGRAPI 2007
  - Co-chair, Award Student Prize. Computer Graphics International (CGI) 2007
  - Co-chair, Posters. SIBGRAPI 2006
  - Co-chair, Program Committee. SIBGRAPI/II SIACG 2004

Selected Projects as Principal Investigator:

1. **2020-2021. FAPERGS**. CIDIA-19: Data Science and Artificial Intelligence to Combat COVID-19.
2. **2019**-2021. **CNPq**. Generalization of DataCubes for Visual Event Analysis and Detection in HealthCare Data.
3. **2018-2021. CAPES COFECUB International Collaboration Brazil/France**. Formation and Analysis of Groups in Big Data using Visualization Techniques.
4. **2017-2020. CNPq**. Algorithms and Data Structures for the Visualization of Time Series Data
5. **2014-2016. CAPES BRANETEC International Collaboration Brazil/Netherlands**. SIIS - Smart Interactive Imaging Systems.
6. **2012-2015. CNPq**. Visualization and Analysis of Time Series Data Associated with Cardiac Frequency.
7. **2009-2012.CNPq/NSF International Collaboration Brazil/United States** – High Performance Computing using GPU Clusters

Selected Journal Publications (Complete list at **http://www.inf.ufrgs.br/~comba/comba-publication.html**)

1. ZEGARRA, FABIAN C. ; C. IPENZA, JUAN C.; OMIDVAR-TEHRANI, BEHROOZ ; MOREIRA, VIVIANE P. ; AMER-YAHIA, SIHEM ; **COMBA, JOÃO L. D**. **Visual exploration of rating datasets and user groups.** Future Generation Computer Systems, v. 105, p. 547-561, 2020. http://dx.doi.org/10.1016/j.future.2019.12.011
2. **COMBA, JOÃO L. D**; WEISKOPF, DANIEL ; Comba, Joao ; WEISKOPF, DANIEL . **The Past and Future of Visualization for Computing in Science and Engineering**. COMPUTING IN SCIENCE & ENGINEERING, v. 22, p. 94-99, 2020. http://dx.doi.org/10.1109/MCSE.2020.2986694
3. VERNIER, E. ; SONDAG, M. ; **COMBA, JOÃO L. D.**; SPECKMANN, B; TELEA, A.; VERBEEK, K. **Quantitative Comparison of Time-Dependent Treemaps**. COMPUTER GRAPHICS FORUM (ONLINE), v. 39, p. 394-404, 2020. http://dx.doi.org/10.1111/cgf.13989
4. VERNIER, E. ; GARCIA, R. ; SILVA, I. P. ; **COMBA, JOÃO L. D**; TELEA, ALEXANDRU. **Quantitative Evaluation of Time-Dependent Multidimensional Projection Techniques**. COMPUTER GRAPHICS FORUM, v. 39, p. 241-252, 2020. http://dx.doi.org/10.1111/cgf.13977
5. ALLES, GUILHERME REZENDE ; **COMBA, JOÃO L. D**.; VINCENT, JEAN-MARC; NAGAI, SHIN; SCHNORR, LUCAS MELLO. **Measuring phenology uncertainty with large scale image processing**. Ecological Informatics, v. 59, p. 101109, 2020. http://dx.doi.org/10.1016/j.ecoinf.2020.101109
8. DE LARA PAHINS, CICERO AUGUSTO ; FERREIRA, NIVAN ; **COMBA, JOÃO L. D**. **Real-Time Exploration of Large Spatiotemporal Datasets based on Order Statistics**. IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS, v. 1, p. 1-1, 2019. https://doi.org/10.1109/TVCG.2019.2914446
9. MALQUI, JOSE LUIS SOTOMAYOR ; ROMERO, NOEMÍ MARITZA LAPA ; GARCIA, RAFAEL ; ALENDAR, HANDE ; **COMBA, JOÃO L. D**. **How do Soccer Teams Coordinate Consecutive Passes? A Visual Analytics System for Analysing the Complexity of Passing Sequences Using Soccer Flow Motifs**. COMPUTERS & GRAPHICS-UK, v. 1, p. 1-12, 2019. http://dx.doi.org/10.1016/j.cag.2019.08.010
10. TOSS, J. ; PAHINS, C. A. L. ; RAFFIN, B. ; **COMBA, JOÃO L. D**. **Packed-Memory Quadtree: a cache-oblivious data structure for visual exploration of streaming spatiotemporal big data**. COMPUTERS & GRAPHICS-UK, v. 76, p. 117-128,

2018. http://dx.doi.org/10.1016/j.cag.2018.09.005

11. GARCIA, R. ; SILVA, B. C. ; TELEA, A. ; TORRESEN, J. ; **COMBA, JOÃO L. D. A task-and-technique centered survey on visual analytics for deep learning model engineering**. COMPUTERS & GRAPHICS-UK, v. 77, p. 30-49, 2018. http://dx.doi.org/https://doi.org/10.1016/j.cag.2018.09.018
12. PAHINS, CICERO; STEPHENS, SEAN; SCHEIDEGGER, CARLOS ; **COMBA, JOÃO L. D**. **Hashedcubes: Simple, Low Memory, Real-Time Visual Exploration of Big Data**. IEEE Transactions on Visualization and Computer Graphics, v. 23, p. 1-1, 2017. http://dx.doi.org/10.1109/tvcg.2016.2598624
13. **COMBA, JOÃO L. D**.; SADLO, FILIP; WEISKOPF, DANIEL. **A Report from VIS 2016**. Computing in Science & Engineering (Print) v. 19, p. 82-90, 2017. http://dx.doi.org/10.1109/MCSE.2017.38
14. MACHADO, VINICIUS ; LEITE, ROGER ; MOURA, FELIPE ; CUNHA, SERGIO ; SADLO, FILIP ; **COMBA, JOÃO L. D.** . **Visual Soccer Match Analysis using Spatiotemporal Positions of Players**. COMPUTERS & GRAPHICS, v. 68, p. 84-95, 2017. http://dx.doi.org/10.1109/tvcg.2016.2598624
15. TOSS, JULIO; **COMBA, JOÃO L. D**.; RAFFIN, BRUNO. **Parallel Voronoi Computation for Physics-Based Simulations**. Computing in Science & Engineering (Print), v. 18, p. 88-94, 2016. http://dx.doi.org/10.1109/MCSE.2016.52
16. LEITE, ROGER A.; SCHNORR, LUCAS MELLO; ALMEIDA, JURANDY; ALBERTON, BRUNA; MORELLATO, LEONOR PATRICIA C.; TORRES, RICARDO DA S.; **COMBA, JOÃO L. D**. **PhenoVis - A Tool for Visual Phenological Analysis of Digital Camera Images Using Chronological Percentage Maps.** Information Sciences, v. 372, p. 181-195, 2016. http://dx.doi.org/10.1016/j.ins.2016.08.052
17. OLIVEIRA, GUILHERME; SOTOMAYOR, JOSE L.; TORCHELSEN, RAFAEL P.; SILVA, CLÁUDIO T.; **COMBA, JOÃO L. D**. **Visual analysis of bike-sharing systems.** Computers & Graphics, v.60, p. 119-129, 2016. http://dx.doi.org/10.1016/j.cag.2016.08.005
18. POCO, J., DORAISWAMY, H., VO, H., **COMBA, JOÃO L. D**.., FREIRE, J., SILVA, C. **Exploring Traffic Dynamics in Urban Environments Using Vector-Valued Functions**. Computer Graphics Forum,v.34,p.161-170, 2015. http://dx.doi.org/10.1111/cgf.12628
19. MAULE, M., **COMBA, JOÃO L. D**, TORCHELSEN, R., BASTOS, R. **Memory-optimized order-independent transparency with Dynamic Fragment Buffer**. Computers & Graphics, v. 38, p. 1-9, 2014. http://dx.doi.org/10.1016/j.cag.2013.07.006
20. ETIENE, T., JONSSON, D., ROPINSKI, T., SCHEIDEGGER, C., **COMBA, JOÃO L. D**.., NONATO, L., KIRBY, R. M., YNNERMAN, A., SILVA, C. **Verifying Volume Rendering Using Discretization Error Analysis**. IEEE Transactions on Visualization and Computer Graphics, v. 20, p. 140-154, 2014. http://dx.doi.org/10.1109/tvcg.2013.90
21. SILVA, LUIS F., SCHEIDEGGER, LUIZ F., ETIENE, TIAGO, **COMBA, JOÃO L. D**., NONATO, LUIS G., SILVA, C. T. **A Weighted Delaunay Triangulation Framework for Merging Triangulations in a Connectivity Oblivious Fashion**. Computer Graphics Forum, v. 33, p. 18-30, 2014. http://dx.doi.org/10.1111/cgf.12274
22. SALINET JR, J.L., OLIVEIRA, G. N., VANHEUSDEN, F.J., **COMBA, JOÃO L. D**. SCHLINDWEIN, F.S., NG, G.A. **Visualizing Intracardiac Atrial Fibrillation Electrograms Using Spectral Analysis**. Computing in Science & Engineering, v. 15, p. 79-87, 2013. http://dx.doi.org/10.1109/MCSE.2013.37
23. HA, L. K., KRUGER, J., **COMBA, JOÃO L. D**., SILVA, C. T, JOSHI, S. **ISP: An Optimal Out-Of-Core Image-Set Processing Streaming Architecture for Parallel Heterogeneous Systems**. IEEE Transactions on Visualization and Computer Graphics, v. 18, p. 838-851, 2012. http://dx.doi.org/10.1109/TVCG.2012.32
24. BEZERRA, C.E, **COMBA, JOÃO L. D**. GEYER, CLÁUDIO F. R. **Adaptive load-balancing for MMOG servers using KD-trees**. Computers in Entertainment, v. 10, p. 1-16, 2012. http://dx.doi.org/10.1145/2381876.2381881
25. PAGOT, C., OSMARI, D.K., SADLO, F., WEISKOPF, D., ERTL, T., **COMBA, JOÃO L. D**. **Efficient Parallel Vectors Feature Extraction from Higher-Order Data**. Computer Graphics Forum, v. 30, p. 751-760, 2011. http://dx.doi.org/10.1111/j.1467-8659.2011.01924.x
26. SADLO, F., HUFFINGER, M., PAGOT, C., OSMARI, D., **COMBA, JOÃO L. D**., ERTL, T., MUNZ, C., WEISKOPF, D. **Visualization of Cell-Based Higher-Order Fields**. Computing in Science & Engineering, v.13, p.84-91, 2011. http://dx.doi.org/10.1109/MCSE.2011.53
27. OLIVEIRA, G. N., TORCHELSEN, R. P., **COMBA, JOÃO L. D**. WALTER, MARCELO, BASTOS, R. **Geodesic-Driven Visual Effects over Complex Surfaces**. The Visual Computer, v. 27, p. 917-928, 2011. http://dx.doi.org/10.1007/s00371-011-0615-6
28. VO, H. T., **COMBA, JOÃO L. D**. GEVECI, B., SILVA, CLÁUDIO T. **Streaming-enabled Parallel Dataflow Framework in VTK**. Computing in Science & Engineering, v. 13, p. 72-83, 2011file://localhost/. http/::dx.doi.org:10.1109:MCSE.2011.88
29. MAULE, M., TORCHELSEN, R., BASTOS, R., **COMBA, JOÃO L. D**. **A Survey of Raster-Based Transparency Techniques**. Computers & Graphics, v. 35, p. 1023-1034, 2011. http://dx.doi.org/10.1016/j.cag.2011.07.006
30. VO, H. T; OSMARI, D. K.; SUMMA, B.; **COMBA, JOÃO L. D**..; SILVA, C.T.S. **Streaming-enabled parallel dataflow architecture for multicore systems**. Computer Graphics Forum, 29(3), 2010. http://dx.doi.org/10.1111/j.1467-8659.2009.01704.x
31. TORCHELSEN, R.; PINTO, F. M; BASTOS, R., **COMBA, JOÃO L. D**. **Approximate on-Surface Distance Computation using Quasi-Developable Charts**. Computer Graphics Forum, v. 28, p. 1781-1789, 2009. http://dx.doi.org/10.1111/j.1467-8659.2009.01555.x
32. DIETRICH, C., SCHEIDEGGER, C.; **COMBA, JOÃO L. D**.,NEDEL, L., SILVA, C. T. **Marching cubes without skinny triangles**. Computing In Science & Engineering, March/April 2009, Vol. 11, No. 2. Pages 82-87. http://dx.doi.org/10.1109/MCSE.2009.34
33. DIETRICH, C., SCHEIDEGGER, C.; SCHREINER, J., **COMBA, JOÃO L. D**.., NEDEL, L., SILVA, C.T. **Edge Transformations for Improving Mesh Quality of Marching Cubes**. IEEE Transactions on Visualization and Computer Graphics, Volume 15, No 1, Pages 150-159, 2009. http://dx.doi.org/10.1109/TVCG.2008.60
34. DIETRICH, C., SCHEIDEGGER, C., **COMBA, JOÃO L. D**., NEDEL, L., SILVA, C. T. **Edge Groups: An Approach to Understanding The Quality of Marching Methods**. IEEE Transactions on Visualization and Computer Graphics, Volume 14, No 6, Pages 1651-1658, 2008. http://dx.doi.org/10.1109/TVCG.2008.122BERNARDON, F., HA, Linh; CALLAHAN, S., **COMBA, JOÃO L. D**.., SILVA, C. T. **Transfer Function Specification for Rendering Disparate Volumes**. Parallel Computing, v.33, p.391 - 405, 2007. http://dx.doi.org/10.1109/MCSE.2008.158