

# Curricular Summary

Luis Gustavo Nonato

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## 1. Education

1991	Bachelor Degree in Mathematics	Universidade Estadual Paulista - UNESP
1994	Master in Applied Mathematics	Pontifícia Universidade Católica do Rio de Janeiro
1998	Doctorate in Mathematics	Pontifícia Universidade Católica do Rio de Janeiro
2008–2009	Post-doctorate	Scientific Computing and Imaging Institute - University of Utah

## 2. Professional experience

1998–1999	Pontifícia Universidade Católica do Rio de Janeiro	Assistant Professor
1999–2006	Universidade de São Paulo - ICMC - USP	Assistant Professor
2006–2012	Universidade de São Paulo - ICMC - USP	Associate Professor
2009–2010	SCI Institute - University of Utah	Visiting Scholar
2012–2015	Universidade de São Paulo - ICMC - USP	Associate Professor - Level III
2015–	Universidade de São Paulo - ICMC - USP	Full Professor
2016–	New York University	Visiting Professor

### Administrative Positions

10/2013–10/2015	Head of the Dept. of Applied Mathematics and Statistic - ICMC-USP
11/2015–10/2016	Coordinator of the Industrial Master Graduate Program - MECAI/ICMC-USP
10/2011–09/2013	President of the Special Committee on Computer Graphics and Image Processing - Brazilian Computer Society

## 3. Selected Publications

(full list of publications in [http://conteudo.icmc.usp.br/pessoas/gnonato/full\\_pubs.pdf](http://conteudo.icmc.usp.br/pessoas/gnonato/full_pubs.pdf))

1. A. Dal Col, P. Valdivia, F. Petronetto, F. Dias, C.T. Silva, L.G. Nonato. Wavelet-based Visual Analysis of Dynamic Networks, *IEEE Trans. Vis. Comp. Graph. (PrePrint)*, 2017.
2. A. Sagrista, S. Jordan, A. Just, F. Dias, L.G. Nonato and F. Sadlo. Topological Analysis of Inertial Dynamics, *IEEE Trans. Vis. Comp. Graph. (IEEE SciVis)*, 23(1):950–959, 2017.
3. A. Dal Col, P. Valdivia, F. Petronetto, F. Dias, C.T. Silva, L.G. Nonato. Wavelet-Based Visual Analysis for Data Exploration, *Computing in Science & Engineering*, 19(5):85-91, 2017.
4. M. Sandim, D. Cedrim, L.G. Nonato, P. Pagliosa and A. Paiva. Boundary detection in particle-based fluids, *Comput. Graph. Forum (EuroGraphics)*, 35(2):215–224, 2016.
5. E. Gomez, W. Casaca, D. Coimbra, I. Hartmann, G. Taubin, L.G. Nonato. Dealing with Multiple Requirements in Geometric Arrangements, *IEEE Trans. Vis. Comp. Graph.*, 22:1223-1235, 2016.
6. A. Barbosa, F. Paulovich, A. Paiva, S. Goldenstein, F. Petronetto, L.G. Nonato. Visualizing and Interacting with Kernelized Data, *IEEE Trans. Vis. Comp. Graph.*, 22:1314-1325, 2016.
7. G. Cantareira, L.G. Nonato, F. Paulovich. MoshViz: A Detail+Overview Approach to Visualize Music Elements, *IEEE Trans. on Multimedia*, 18(11):2238–2246, 2016.
8. P. Joia, F. Petronetto, and L.G. Nonato. Uncovering Representative Groups in Multidimensional Projections, *Comput. Graph. Forum (EuroVis)*, 34(3):281–290, 2015.
9. P. Valdivia, F. Dias, F. Petronetto, C. Silva e L. G. Nonato. Wavelet-based Visualization of Time-Varying Data on Graphs, *IEEE VAST*, pp. 1-9, 2015.
10. P. Pagliosa, F.V. Paulovich, R. Minghim, H. Levkowitz, L.G. Nonato. Projection inspector: Assessment and synthesis of multidimensional projections, *Neurocomputing*, 150:599-610, 2015.

11. E. Amorim, E.V. Brazil, J. Mena-Chalco, L. Velho, L.G. Nonato, F. Samavati, M.C. Sousa. Facing the High-dimensions: Inverse Projection with Radial Basis Functions. *Computers & Graphics*, 48:35-47, 2015.
12. E. Gomez-Nieto, F. San Roman, P. Pagliosa, W. Casaca, E. Helou, M.F. de Oliveira, L.G. Nonato. Similarity Preserving Snippet-Based Visualization of Web Search Results, *IEEE Trans. Vis. Comp. Graph.*, 20:457-470, 2014.
13. T. Etienne, D. Jonsson, T. Ropinski, C. Scheidegger, J. Comba, L.G. Nonato, M.K. Kirby, A. Ynnerman, C.T. Silva. Verifying Volume Rendering Using Discretization Error Analysis, *IEEE Trans. Vis. Comp. Graph.*, 20:140-154, 2014.
14. W. Casaca, L.G. Nonato, G. Taubin. Laplacian Coordinates for Seeded Image Segmentation, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp.384-391, 2014.
15. L.F. Silva, L.F. Scheidegger, T. Etienne, J. Comba, L.G. Nonato, C.T. Silva. A Weighted Delaunay Triangulation Framework for Merging Triangulations in a Connectivity Oblivious Fashion. *Comp. Graph. Forum*, 33:18-30, 2014.
16. W. Casaca, A. Paiva, E. Gomez-Nieto, P. Joia, L.G. Nonato. Spectral Image Segmentation Using Image Decomposition and Inner Product-Based Metric. *Journal of Mathematical Imaging and Vision*, 45:227-238, 2013.
17. F. Petronetto, A. Paiva, E. Helou, D. Stewart, L.G. Nonato. Mesh-Free Discrete Laplace-Beltrami Operator, *Comp. Graph. Forum*, 32:214-226, 2013.
18. M. Berger, J. Levine, L.G. Nonato, G. Taubin, C.T. Silva. A benchmark for surface reconstruction, *ACM Trans. on Graphics*, 32(2), 20:1-20:17, 2013.
19. G.M.H. Mamani, L.G. Nonato, F.V. Paulovich. User-driven Feature Space Transformation, *Comp. Graph. Forum (EuroVis)*, 32(3):291-299, 2013.
20. F.V. Paulovich, F.M.B. Toledo, G.P. Telles, R. Minghim and L.G. Nonato. Semantic Wordification of Document Collections, *Comp. Graph. Forum (EuroVis)*, 31:1145-1153, 2012.
21. H. Bhatia, S. Jadhav, P.-T. Bremer, G. Chen, J. Levine, L.G. Nonato, V. Pascucci. Flow Visualization with Quantified Spatial and Temporal Errors using Edge Maps, *IEEE Trans. on Vis. and Comp. Graph.*, 18(9):1383-1396, 2012.
22. T. Etienne, L.G. Nonato, C. Scheidegger, J. Tierny, T Peters, V. Pascucci, M. Kirby, C. Silva. Topology Verification for Isosurface Extraction, *IEEE Trans. on Vis. and Comp. Graph.*, 18(6):952-965, 2012.
23. P. Joia, F. Paulovich, D. Coimbra, J.A. Cuminato, L.G. Nonato. Local Affine Multidimensional Projection, *IEEE Trans. on Vis. and Comp. Graph. (IEEE Visualization - Honorable Mention Award)*, 7(12):2563-2571, 2011.
24. H. Bhatia, S. Jadhav, P.-T. Bremer, G. Chen, J.A. Levine, L.G. Nonato, V. Pasucci. Edge Maps: Representing Flow with Bounded Error, *IEEE Pacific Visualization Symposium (Best Paper Award)*, pp. 75-82, 2011.
25. J. Tierny, J. Daniels, L.G. Nonato, C.T. Silva, V. Pascucci. Inspired Quadrangulation, *Computer-Aided Design (SIAM Conf. Geom. Phys. Model. - SPM)*, 43:1516-1526, 2011.
26. F.V. Paulovich, D.M. Eler, C.P. Botha, R. Minghim and L.G. Nonato. Piecewise Laplacian-based Projection for Interactive Data Exploration and Organization, *Comp. Graph. Forum (EuroVis)*, 30(3):1091-1100, 2011.
27. J. Daniels, M.A.S. Lizier, M. Siqueira, C. Silva, L.G. Nonato. Template-based Quadrilateral Meshing. *Computers & Graphics (Shape Modeling International-SMI)*, 35(3):471-482, 2011.
28. J. Daniels, E. Anderson, L.G. Nonato, and C. Silva Interactive Vector Field Feature Identification, *IEEE Trans. on Vis. and Comp. Graph. (IEEE SciVis)*, 16(6):1560-1568, 2010.
29. F. Paulovich, C. Silva, and L.G. Nonato. Two-Phase Mapping for Projecting Massive Data Sets, *IEEE Trans. on Vis. and Comp. Graph. (IEEE InfoVis)*, 16(6):1281-1290, 2010.

30. M. Berger, L.G. Nonato, V. Pascucci, and C. Silva. Fiedler Trees for Multiscale Surface Analysis, *Computers & Graphics (Shape Modeling International-SMI)*, 34(3):272-281, 2010.
31. C. Tuttle, L.G. Nonato, and C.T. Silva A Structured, Space Efficient Technique for Pedigree Visualization, *IEEE Trans. on Vis. and Comp. Graph. (IEEE InfoVis)*, 16(6):1063-1072, 2010.
32. T. Etienne, C. Scheidegger, L.G. Nonato, R.M. Kirby, C.T. Silva. Verifiable Visualization for Isosurface Extraction, *IEEE Trans. on Vis. and Comp. Graph. (IEEE SciVis)*, 15(6):1077-2626, 2009.
33. A. Gyulassy, L.G. Nonato, P.-T. Bremer, C. Silva, V. Pascucci. Robust Topology-based Multiscale Analysis of Scientific Data, *Computing in Science and Engineering*, 11(5):88–95, 2009.
34. M. Siqueira, D. Xu, J. Gallier, L.G Nonato, D.M. Morera, L. Velho. A New Construction of Smooth Surfaces from Triangle Meshes Using Parametric Pseudo-Manifolds, *Computers & Graphics (Shape Modeling International-SMI)*, 33(3):331-340,2009.
35. M.A.S. Lizier, D.C. Martins-Jr., A.J. Cuadros-Vargas, R.M. Cesar-Jr., L.G. Nonato. Generating Segmented Meshes from Textured Color Images. *Journal of Visual Communication and Image Representation*, 20:190–203, 2009.
36. A.J. Cuadros-Vargas, M. Lizier, R. Minghim, L.G. Nonato. Generating Segmented Quality Meshes from Images. *Journal of Mathematical Image and Vision* 33:11–23, 2009.
37. J.P. Gois, A.L. Nakano, L.G. Nonato, G. Buscaglia. Front tracking with moving-least-squares surfaces. *Journal of Computational Physics*, 227:9643–9669, 2008.
38. J.P. Gois, V. Polizelli-Junior, T. Etienne, E. Tejada, A. Castelo, L.G. Nonato, T. Ertl. Twofold adaptive partition of unity implicits. *The Visual Computer*, 24:1013–1023, 2008.
39. F. Paulovich, L.G. Nonato, R. Minghim, H. Levkowitz. Least Square Projection: a fast high precision multidimensional projection technique and its application to document mapping. *IEEE Trans. on Vis. and Comp. Graph.*, 14:564–575, 2008.
40. O. Bruno, L.G. Nonato, M.A. Pazoti, J. Batista. Topological multi-contour decomposition for image analysis and image retrieval. *Pattern Recognition Letters*, 29(11):1675–1683, 2008.
41. K.C. Estacio, L.G. Nonato, N. Mangiavacchi, G.F. Carey. Combining CVFEM and meshless front-tracking in Hele-Shaw mold filling simulation. *International Journal for Numerical Methods in Fluids*, 56:1217–1223, 2008.
42. L.G. Nonato, M.A.S Lizier, J. Batista, M.C.F. Oliveira, and A. Castelo. Topological Triangle Characterization with Application to Object Detection from Images. *Image and Vision Computing* 26(8):1081-1093, 2008.
43. H.H. Biscaro, L.G. Nonato, A. Castelo, M.C.F. de Oliveira. A Topological Approach for Surface Reconstruction from Sample Points, *The Visual Computer (Computer Graphics International - CGI)*, 23:793–801, 2007.
44. F.V. Paulovich, L.G. Nonato, R Minghim. Visual mapping of text collections through a fast high precision projection technique. *Information Visualisation*, p.282–290, 2006.
45. E. Tejada-Gamero, J.P. Gois, L.G. Nonato, A. Castelo, T. Ertl. Hardware-accelerated Extraction and Rendering of Point Set Surfaces. *Eurographics/IEEE-VGTC Symposium on Visualization*, p.21–28, 2006.
46. A. Castelo, L.G. Nonato, M. Siqueira, R. Minghim, G. Tavares. The  $J_1^a$  Triangulation: an adaptive triangulation in any dimension. *Computers & graphics*, 30(5):737–753, 2006.
47. L.G. Nonato, A.J. Cuadros-Vargas, R. Minghim, M.C.F. Oliveira. Beta-Connection: Generating a Family of Models from Planar Cross Sections. *ACM Transactions on Graphics*, 24(4):1239–1258, 2005.
48. L.G. Nonato, A. Castelo, J.E.P.P de Campos, H.H. Biscaro, R. Minghim. Tetrahedron Topological Characterization with Application in Volumetric Reconstruction, *International Journal of Shape Modeling*, 11(2):189–216, 2005.
49. F.S. Sousa, N. Mangiavacchi, L.G. Nonato, A. Castelo, M.F. Tome, V.G. Ferreira, J.A. Cuminato, S. McKee. A Front-tracking/Front-capturing Method for the Simulation of 3D Multi-fluid Flows with Free Surfaces, *Journal of Computational Physics*, 198(2):469–499, 2004.

50. L.G. Nonato, A. Castelo, R. Minghim, and J.E. Batista. Morse Operators for Digital Planar Surfaces and their Application to Image Segmentation. *IEEE Transactions on Image Processing*, 13(2):216-227, 2004.
51. E. Tejada-Gamero, R. Minghim, and L.G. Nonato. On Improved Projection Techniques to Support Visual Exploration of Multi-Dimensional Data Sets. *Information Visualization*, 2(4):218-231, 2003.
52. L.G. Nonato, R. Minghim, M.C.F. de Oliveira, and G. Tavares. A Novel Approach for Delaunay 3D Reconstruction with a comparative analysis in the Light of Applications. *Comp. Graph. Forum*, 20(2):161-174, 2001.

#### 4. Research Grants (Coordinator or PI)

- **Thematic Project**

Challenges in Exploratory Visualization of Multidimensional Data: Paradigms, Scalability and Applications

Fapesp #2011/22749-8

Period: 09/2012 to 11/2016

Position: Coordinator

- **Fapesp Cepid**

CeMEAI: Center for Mathematical Sciences Applied to Industry

Fapesp #2013/07375-0

Period: 07/2013 to 06/2018

Position: Principal Investigator

- **Special Visiting Research - PVE - CNPq**

Discrete Differential Forms on Surfaces: Paradigms, Foundations, and Applications

CNPq #400749/2014-9

Period: 10/2014 a 09/2017

Position: Coordinator

- **Productivity in Research - CNPq (level 1C)**

Exploratory Visualization of Large Data Sets.

CNPq #302643/2013-3.

Period: 03/2014 a 02/2018

- **Projeto Universal CNPq**

Projeto Universal: Spectral and Topological Methods for Modeling, Processing and Visualizing Massive Data

CNPq #560030/2010-0

Period: 10/2010 - 09/2012

Position: Coordinator

- **Probal-Capes/DAAD**

Geometric Modeling, Deformation, and Visualization of Massive Data CAPES/DAAD #262/07

Period: 2006-2008

Position: Coordinator

- **Fapesp - Auxilio Individual**

Topological Data Structures and Mesh Generation from Sample Data

Fapesp #2003/07375-0

Period: 02/2003 to 01/2015

Position: Coordinator

#### 5. Concluded Supervisions

- Doctorate
  - Erik Gomez-Nieto, Optimal Layout Construction, 2017.
  - Adriano Barbosa, Kernelized Data Visualization, (in Portuguese), 2016.
  - Paulo Joia Filho, Projection Methods for Group Identification and Multidimensional data Comparison using Distinct Similarity Metrics (in Portuguese), 2015.
  - Wallace Casaca, Graph Laplacian for Spectral Clustering and Seeded Image Segmentation, 2014.
  - Marcos Aurelio Batista, Animating Fluids in Still Images (in Portuguese), 2011
  - Mario A. S. Lizier, Mesh Generation and Refinement from Textured Images (in Portuguese), 2009
  - Kemelli C. Estacio - Fluid Flow Simulation on Point Set Surfaces (in Portuguese), 2008
  - Alex J. Cuadros-Vargas, Generating Segmented Tetrahedral Meshes from Images (in Portuguese), 2006
  - Helton Bísvaro - Reconstruction from Scattered Points: A Topological Approach (in Portuguese), 2005
- Master
  - Jorge Henrique Piazzentin Ono. Music Data Set Visualization (in Portuguese), 2015.
  - Lucas de Carvalho Pagliosa. Web-based Multidimensional Data Visualization (in Portuguese), 2015.
  - Martha Dias Ferreira. Cover Song Identification in Large Data Sets (in Portuguese), 2014.
  - Paola Llerena Valdivia. Norm Correction for Point Cloud Surfaces Smoothing (in Portuguese), 2013.
  - Erick Gomez Nieto. Multidimensional Projection of Web Search (in Portuguese), 2012.
  - Fernando Bissi Pires - Regular Triangulations and Applications (in Portuguese), 2008.
  - Alex Gimenes - Navier Stokes Simulation on Digital Images (in Portuguese), 2008.
  - Luis Gustavo Pinheiro Machado - Quality mesh generation for terrain modeling (in Portuguese), 2007.
  - Rodrigo Duran - Human Viewing Simulation (in Portuguese), Universidade de São Paulo, 2005.
  - Ana Paula Resende Malheiro - Modeling and Visualizing 2D Meshes (in Portuguese), 2005.
  - Daniel R. Izquierdo Peña - Moving Least Square for Finite Differences Method (in Portuguese), 2002.
  - Patrícia S. H. Cateriano - Visualizing and Navigating on Unstructured Volumetric Data (in Portuguese), 2002.
  - Alex J. Cuadros Vargas - Beta-Connection: A Family of Models Generated from Planar Cross Sections (in Portuguese), 2001.
  - Rogério Eduardo da Silva - A Simulator for Human Viewing using Ray Tracing (in Portuguese), 2001.

## 5. Ongoing Supervisions

- Doctorate
  - Markus Diego, Hierarchical Graph Visualization (Capes Fellowship).
  - Paola Valdivia, Graph Signal Processing, (Fapesp Fellowship).
  - Alcebiádes Dal Col Júnior, Graph Signal Processing for Visualization, (Fapesp Fellowship).
  - Rodrigo Contreras, Symmetries for High-dimensional Data Visualization, (Fapesp Fellowship).
- Master
  - Evandro Ortigossa, Visualização de Séries Temporais Hierárquicas, (Capes - início em Fevereiro 2016).

## 7. Academic quantitative indicators

60 Journal papers, 61 Conference papers, 2 Book chapters, 4 Best paper awards, 2 Honorable Mention paper award, 5 Post-Doctorate supervisions, 7 PhD concluded, 14 Master concluded, 12 Undergraduate supervision concluded.

## 8. Links to web pages

- Personal Page: <http://www.icmc.usp.br/pessoas/gnonato/>
- ResearcherID: D-5782-2011
- MyCitation: <http://scholar.google.com/citations?user=p2tLSUsAAAAJ>

## 9. Additional Information

- Post-doctorate supervisions

- Dimaz Matínez Morera. Point-set Surface Geometry Processing, Fapesp: 02/2008 - 08/2008.
- Paulo Pagliosa. Multidimensional Data Visualization, Capes: 08/2011 - 07/2012.
- Fabiano Petronetto. Multidimensional Data Visualization, Fapesp: 09/2013 - 08/2014.
- Fabio Dias. Graph Signal Processing for Visualization, Fapesp: 09/2014 - 08/2016.
- Wallace Casaca. Visualization and Pattern Recognition, Fapesp: 01/2015 - 12/2016.
- Dalia B. Correa. Discrete Differential Forms on Triangle Surfaces, CNPq: 07/2015 - 06/2017.

- Prizes and Awards

Paper Awarded:

- Honorable Mention paper award Sibgrapi 2017
- Honorable Mention paper award Sibgrapi 2016
- Honorable Mention paper award Sibgrapi 2015
- Best paper award Sibgrapi 2013
- Best paper award Sibgrapi 2012
- Best paper award PacificVis 2011
- Honorable Mention IEEE Information Visualization 2011

Students Awarded:

- Erick Gomez-Nieto - Best PhD dissertation, WTD - Sibgrapi, 2017.
- Wallace Casaca - Best Dissertation, University of São Paulo, Exact and Earth Sciences, 2016.
- Wallace Casaca - Odelar Leite Linhares Ward - Brazilian Society of Computational and Applied Mathematics, 2016.
- Wallace Casaca - Honorable Mention PhD dissertation - Capes PhD Dissertation Contest in Computer Science, 2015.
- Wallace Casaca - Best PhD dissertation - Latin America PhD dissertations Contest (CLEI CLTD), 2015.
- Paulo Joia Filho - Finalist of the Brazilian Computer Society Dissertation Contest, 2016.
- Evandro Ortigossa - Best Undergraduate Work, WUW - Sibgrapi, 2015.
- Helton H. Biscaro - Best PhD dissertation, WTD - Sibgrapi, 2005.

- Other Academic Activities

**Co-Editor:** SBMAC SpringerBriefs in Applied Mathematics and Computational Sciences (10/2017 - 09/2019);

**Associate Editor:** Computer Graphics Forum (04/2011 - 03/2014);

**Invited Editor:** The Visual Computer Journal (2009), Computer Graphics Forum (2010);

**Invited Speaker:** IV Workshop on Interactive Data Visualization (2013), National Conference on Computational and Applied Mathematics - CNMAC (2012), Northeast Applied Mathematics Conference - ERMAC (2012), EuroRV<sup>3</sup> workshop - EuroVis (2015);

**Program Committee:** IEEE InfoVis (2009,2010), IEEE SciVis (2016,2017), EuroVis (2013,2014,2015), IVAPP (2009,2010,2013,2015-2017), Sibgrapi (2006-2008, 2010-2017);

**Program (co)Chair:** Sibgrapi (2009), Sibgrapi-WTD (2006), CSBC-CTIC (2012), CLEI- SLCGRVPI (2015), WVIS (2007,2010,2012,2013,2015,2017);  
**Scientific Societies:** IEEE member, Brazilian Computer Society member, Brazilian Applied Mathematics Society member.