Francisco Javier Blanco-Silva

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Education

Department of Mathematics, Purdue University **West Lafayette, Indiana, USA**
Ph.D. in Mathematics *August 2007*
Dissertation title: The curvelet transform–A generalized definition and approximation properties

Department of Mathematics, Purdue University **West Lafayette, Indiana, USA**
M.Sc. in Mathematics *May 2002*
Applied Mathematics Program

Department of Mathematics, Universidad Complutense de Madrid **Madrid, Spain**
B.Sc. in Mathematical Sciences *September 1997*
Major in Pure Mathematics: Geometry and Topology

Research Interests

Approximations and Expansions (Approximation Theory), Harmonic Analysis, Mathematical Imaging, Numerical Analysis, Scientific Computing.

Work Experience

Department of Mathematics, University of South Carolina **1523 Greene Street, Columbia, SC 29208**
Instructor *07/2014 – present*

- Teaching under-graduate courses in Mathematics, all levels.
- Director or the Math Placement Exam program.
- UofSC High School Math Contest Committee Chair

Part-time Instructor *08/2011 – 06/2014*
Teaching under-graduate courses in Mathematics, all levels

Research Assistant Professor *08/2007 – 05/2010*
Post-doctoral position with the Industrial Mathematics Institute

- Research on the development of multiresolution formulated algorithms to enable high compression rates using non-linear approximation methods, enhanced procedures for Hausdorff metric estimation, and the efficient structures for organization of digital urban terrain data.
- Research on systematic approaches to extracting high resolution information from HAADF–STEM images which will be beneficial to the characterization of beam sensitive materials. The idea is to treat *several, possibly many* low electron dose images with specially adapted digital image processing concepts at a minimum allowable spatial resolution. The goal is to keep the overall cumulative electron dose as low as possible while still staying close to an acceptable level of physical resolution.

Tizona Scientific Solutions LLC **Lexington, SC, USA**
Owner *07/2011 – present*
Scientific Consulting Company: Tizona delivers solutions to commercial clients through sophisticated analysis and development of graphic-intensive, easily accessible software suites.

School of Mathematics, University of Minnesota **127 Vincent Hall, 206 Church St. S.E., Minneapolis, MN 55455**
Teaching Assistant *08/01/2005–04/30/2006*
Recitation Instructor and Grader: Partial Differential Equations, Abstract Algebra (both Graduate Courses)

Department of Mathematics, Purdue University **150 N. University Street, West Lafayette, IN 47907**
Teaching Assistant *08/01/1999–06/31/2007*
Lecturer, Recitation Instructor and Grader for several undergraduate courses in Algebra, Trigonometry, Calculus, Geometry and Differential Equations

Publications

Books and book chapters

- Francisco J. Blanco-Silva. *Mastering Scipy*. Packt Publishing. Expected publication date: September 2014. ISBN: 978-1-78398-474-9
- Francisco J. Blanco-Silva. *Learning Scipy for Numerical and Scientific Computing*. February 2013. Packt Publishing. ISBN 978-1-7821-6162-2
- P. Binev, F. J. Blanco-Silva, D. Blom, W. Dahmen, P. Lamby, R. Sharpley and T. Vogt. *High Quality Image Formation*

by Nonlocal Means Applied to High-Angle Annular Darkfield Scanning Transmission Electron Microscopy (HAADF-STEM). Chapter 5 of Modeling Nanoscale Imaging in Electron Microscopy, Springer, New York, 2012. ISBN 978-1-4614-2190-0

Articles accepted for publication

- F. J. Blanco-Silva, *Curvelet elements for low frequency analysis*. (accepted for publication in the Missouri Journal of Mathematical Sciences)
- F. J. Blanco-Silva, S. Gruver, C. Rizcalla, *Modeling the impact of Ebola and bushmeat hunting on western lowland gorillas*. EcoHealth (June 2007).
- F. J. Blanco-Silva, *Sobre demostración automática de un problema geométrico*. Bol. Asoc. Prof. Puig Adams (October 1999) 78–81.

Service

Department of Mathematics, University of South Carolina **1523 Greene Street, Columbia, SC 29208**
— *2007–present*

- Member of Textbook Committee for the course MATH 122 "Calculus for Business Administration and Social Sciences" (Fall 2013, Spring 2014)
- Directed two 10-week research projects with several undergraduate students—from Morris College and the University of South Carolina—as part of their funded DOE Environmental Monitoring, and SCAMP programs. (Summer 2013, Summer 2014)
- Co-organization of Workshop "Getting to Know the Courses" with Prof. Anton Schep (Fall 2008)

Equalis `www.equalis.com`
Featured blogger *2011 – present*

Department of Mathematics, Purdue University **150 N. University Street, West Lafayette, IN 47907**
— *1999-2007*

- Graduate Representative (December 2001–January 2003)
- Teaching Assistant Peer Mentor (April 2003–July 2005)
- "Homework on the Web" project (June 2003–July 2005)

ONCE (*Organización Nacional de Ciegos Españoles*, the Spanish Blind Society) **Madrid, Spain**
— *09/1998 – 05/1999*

In cooperation with the Department of Mathematics, Universidad Complutense de Madrid. Recording to audio tapes several textbooks used in Mathematics Lectures at the Department of Mathematics.

Expository and Research Talks

Invited Talks

- *Searching for the SS Central America*. Carolina Math Seminar. Columbia College. Columbia (South Carolina, USA) October 2014
- *Computational Geometry and the NAO robot*. CDH Open House. University of South Carolina. Columbia (South Carolina, USA) October 2014
- *Computational Geometry in Python*. USC Python Users Group. University of South Carolina. Columbia (South Carolina, USA) September 2014
- *Learning Scipy for Numerical and Scientific Computing*. USC python Users Group. University of South Carolina. Columbia (South Carolina, USA) October 2013
- *Mathematical Imaging*. University of South Carolina. Columbia (South Carolina, USA) May 2013
- *The Role of Approximation Theory in the Van Gogh Project*. SIAM Student Seminar, University of South Carolina. Columbia (South Carolina, USA) December 2012
- *Equivalence of Smoothness spaces by means of frames of discrete shearlets on the cone and curvelets*. Mathematics Colloquium, Augusta State University. Augusta (Georgia, USA) November 2011.
- *Super-resolution reconstruction in HAADF STEM*. Institut für Geometrie und Praktische Mathematik. RWTH Aachen University. (Aachen, Germany) July 2009.
- *Function Spaces via Curvelet Decompositions*. IMI Seminar. Department of Mathematics, University of South Carolina, Columbia (South Carolina, USA) May 2007.

Contributed Talks

- *Super-resolution reconstruction in HAADF STEM*. SEMS Anual Meeting. Charleston (South Carolina, USA) May 2010.
- *Equivalence of smoothness spaces by means of frames of discrete shearlets on the cone and curvelets*. 33^{rd} SIAM Southeastern-Atlantic Section Conference. University of South Carolina, Columbia (South Carolina, USA) April 2009.
- *Smart Multi-scale Nano-Imaging*. SC08 International Conference for High Performance Computing, Networking, Storage and Analysis. Austing Convention Center, Austin (Texas, USA) November 2008.
- *An Alternative Construction of Curvelets. Applications to Characterization of Regularity*. Simpòsio Sobre Problemas Inversos Honrando Alberto Calderón. IMPA, Rio de Janeiro (Brazil) January 2007.
- *Curvelets and Approximation Theory*. Seminar. Institute of Mathematics and its Applications (IMA), University of

Minnesota, Minneapolis (Minnesota, USA) 2006.

At work Research Talks

- *Super-resolution Reconstruction in Electron Microscopy.* IMI and Nanocenter International Seminar Series 2009—Imaging in Electron Microscopy. University of South Carolina, Columbia (South Carolina, USA) April 2009.
- *The Hunt for a Bellman Function*. Analysis Seminar. University of South Carolina, Columbia (South Carolina, USA) September 2008.
- *Edge Detection using the Hidden Markov Tree Model for the Complex Wavelet Transform*. IMI Seminar. IMI, University of South Carolina, Columbia (South Carolina, USA) May 2008.
- *Analysis of point, line and corner singularities with the Dual-Tree Complex Wavelet Transform*. IMI Seminar. IMI, University of South Carolina, Columbia (South Carolina, USA) April 2008.
- *Mathematical Imaging*. Computational Nano Meeting. Nanotechnology Center, University of South Carolina, Columbia (South Carolina, USA) February–March 2008.
- *Hilbert Transform Pairs of Wavelets*. Classical Analysis and Approximation Theory Seminar. Department of Mathematics, University of South Carolina. Columbia (South Carolina, USA) October 2007.
- *The Dual-Tree Complex Wavelet Transform*. IMI Seminar. Department of Mathematics, University of South Carolina. Columbia (South Carolina, USA) September 2007.

Poster Sessions

- *Wavelets vs. Curvelets—Mathematical Models for Natural Images*. Workshop of Natural Images (together with Bradley J. Lucier). IMA, University of Minnesota, Minneapolis (Minnesota, USA) 2006.
- *Applications of the Curvelet Transform to Imaging*. The Society of Sigma Xi Graduate Student Research Poster Competition, Purdue University, West Lafayette (Indiana, USA) 2006.
- *Modeling the impact of Ebola and bushmeat hunting on western lowland gorillas*. The Society of Sigma Xi Graduate Student Research Poster Competition, Purdue University, West Lafayette (Indiana, USA) 2006.