Marilyn Y. Vazquez

Research Interests

Computational and applied mathematics. Large data analysis. Image processing. Numerical analysis.

Education

2013–2018	**Ph.D., Applied Mathematics**, *George Mason University*.
Advisor	Tim Sauer
2013–2015	**M.S., Applied Mathematics**, *George Mason University*.
2009–2013	**B.S., Applied Mathematics**, *California State University, Long Beach*.
Thesis Title	Multi-scale Vessel Extraction Using Curvilinear Filter-Matching Applied to Digital Photographs of Human Placentas
Advisor	Jen-Mei Chang
2009–2013	**B.A., Mathematical Economics and Economic Theory**, *California State University, Long Beach*.

Presentations

- "Density Based Clustering Applied to Image Segmentation," *2017 SIAM Annual Meeting*, Pittsburgh, PA, July 2017.

- "Scaling Learning Algorithms Towards AI," *Non-Linear Data Analysis Seminar*, Fairfax, VA, April 2015.

- "Cut-Cluster-Classify Algorithm for Image Segmentation," *IPAM Modern Math Workshop*, Long Beach, CA, October 2016.

- "Cut-Cluster-Classify Algorithm for Image Segmentation," *SACNAS National Diversity in STEM Conference*, Long Beach, CA, October 2016.

- "Cut-Cluster-Classify Algorithm for Image Segmentation," *2016 SIAM Annual Meeting*, Boston, MA, March 2016.

- "Diffusion Maps for Image Segmentation," *Norbert Wiener Center's February Fourier Talks, University of Maryland*, College Park, MD, February 2016.

- "Model Reduction Techniques for Spatiotemporal Data Analysis in Drought Modeling," *Expeditions in Training, Research, and Education for Mathematics and Statistics Seminar*, Fairfax, VA, June 2015.

- "Model Reduction Techniques for Spatiotemporal Data Analysis in Drought Modeling," *Student Research Talks*, Fairfax, VA, April 2015.

- "Model Reduction Techniques for Spatiotemporal Data Analysis in Drought Modeling," *Fifth Annual SIAM Mid-Atlantic Regional Mathematical Student Conference and Industrial Days*, Fairfax, VA, March 2015.

- "Multi-scale Vessel Extraction Using Curvilinear Filter-Matching Applied to Digital Photographs of Human Placentas," *Joint Mathematics Meeting*, San Diego, CA, January 2013

- "Nullspace Completions for Matrix Equations," *MAA SoCal-Nevada Regional Fall Meeting, California State University, Long Beach*, October 2012

- "Vascular Network Extraction of Small Vessels on Placental Surfaces," *24th Annual Student Research Competition, California State University, Long Beach*, February 2012.

- "Vascular Network Extraction of Small Veins on Placental Surfaces," *4th Annual Women in Mathematics Symposium, Loyola Marymount University*, Los Angeles, CA, January 2012.

- "Vascular Network Extraction of Small Veins on Placental Surfaces," *MAA SoCal-Nevada Regional Fall Meeting, California State University, Los Angeles*, October 2011.

▬ Publications

- M. Vazquez, T. Berry, T. Sauer, "Manifold Learning Applied to Image Segmentation." *Manuscript in preparation.*
- C. Domeniconi, P. Mani, J. M.B., L. Beer, S. Tari, G. Bal, "The Hubness Phenomena." *Manuscript in preparation.*
- J.-M. Chang, N. Huynh, M. Vazquez, C. Salafia, "Vessel enhancement with multi-scale and curvilinear filter matching for placenta images," [PDF, 556 KB] Proceedings of the 2013 20th International Conference on Systems, Signals and Image Processing (IWSSIP), 125—128, 2013.

▬ Teaching

2015–2017	**Computational and Technical Skills Lecturer**, *Summer EXTREEMS program, George Mason University*
2015	**Lecturer**, *Quatitative Reasoning, George Mason University*

▬ Honors

2016–2017	Industrial Immersion Program Fellowship Recipient, *George Mason University*
2016	Presidential Summer Fellowship Recipient, *George Mason University*
2015–2016	SIAM Student Chapter Representative in National Meeting, *George Mason University*
2013-2015	Presidential Scholar, *George Mason University*
2013	Robert D. Rhodes Award for Outstanding Baccalaureate in the Department of Mathematics and Statistics, *California State University, Long Beach*
2013	Wallace Atherton Memorial Award for Outstanding Senior in the Department of Economics, *California State University, Long Beach*
2013	College of Natural Sciences and Mathematics Departmental Honors Award, *California State University, Long Beach*
2013	Finalist for the College of Liberal Arts Outstanding Baccalaureate Student Award, *California State University, Long Beach*
2012	Exceptional Student Achievement Award from the College of Liberal Arts, *California State University, Long Beach*
2012	Honorable Mention: 24th Annual Student Research Competition, *California State University, Long Beach*

2012	Phi Beta Kappa: National Academic Honor Society, *California State University, Long Beach*
2009-2013	President's Honor List, *California State University, Long Beach*
2009	Golden Key International Honour Society, *California State University, Long Beach*
2008	Phi Theta Kappa: International Honor Society of the Two Year College, *Santa Ana College*

Research Experience

○ *Visiting Researcher.* "Clustering for Image Processing." 2016–2017. National Institute of Standards and Technology. Computational and Theoretical Mathematics Department. Collaborators: G. Dogan, A. Reid and S. Langer.

○ *Women in Data Science and Mathematics Research Collaboration Workshop.* "The Hubness Phenomena." Summer 2017. ICERM. Brown University. Collaborators: C. Domeniconi, S. Tari, P. Mani, E. Beer, J. Metcalf-Burton, G. Bal, and H. Fairbanks.

○ *Mathematical Problems in Industry.* "Hybrid Programmatic TV Markets ." Summer 2016. Duke University. Collaborators: E. Palmer, M. Sirlanci, P. Narayanan. M. Chugunova, I. de Teresa. Advisors: D.Edwards, B. Emerick, E. Goldwyn, M. Montes de Oca.

○ *Graduate Student Mathematical Modeling Camp.* "Low Atmospheric Climate Modeling for Forensic Investigations." Summer 2016. Rensselaer Polytechnic Institute. Collaborators: B. Song, T. Le, etc. Advisor: S. Bohun.

○ *Independent Research.* "Spectral Clustering ." Summer 2015. George Mason University. Collaborators: Tyrus Berry. Advisor: Tim Sauer.

○ *Independent Research.* "Climate Spatiotemporal Pattern Analysis ." 2014-2015. George Mason University. Collaborators: M. Baqui, P. Houser. Advisor: Maria Emelianenko.

○ *Mason Modeling Days.* "Climate Spatiotemporal Pattern Analysis ." Summer 2014. George Mason University. Collaborators: M. Baqui, L. Donato, A. Moskey, N. Oderio, C. Sun. Advisors: Maria Emelianenko, Paul Houser. NSF Grant DMS-1056821.

○ *Research Experience for Undergraduates.* "Nullspace Completions for Matrix Equations." Summer 2012. California State University, Channel Islands. Collaborators: J. Buchholz, W. Chang, M. Cruz, L. Jean-Louis. Advisor: Geoffrey Buhl. NSF Grant DMS-1005740.

○ *Senior Thesis.* "Multi-Scale Vessel Extraction Using Curvilinear Filter-Matching Applied to Digital Photographs of Human Placentas." 2011-2013. California State University, Long Beach. Collaborator: N. Huyhn. Advisor: Jen-Mei Chang.

○ *Mathematical Modeling Course.* "Vein Route Tracing." Spring 2011. California State University, Long Beach. Collaborators: J. Giddings, N. Huyhn, Z. Schoenrock. Advisor: Jen-Mei Chang.

Outreach

2016	**Executive Board Member**, *AWM Chapter at George Mason University*
Duties	Guided the new president and helped with the transition
	Co-managed the annual budget
	Mentored the new graduate students
	Co-organized Professional Development Workshop

2014-2015	**President**, *AWM Chapter at George Mason University*
Duties	Registered our chapter as an official George Mason student organization
	Recruited active members for the chapter
	Assisted in the organization and logistics of the food drive
	Planned and hosted an outreach to Centerville High School ladies with interests in math and sciences
	Mentored the undergraduate members
2015	**Vice President**, *SIAM Chapter at George Mason University*
Duties	Supported the new president
	Assisted in the SIAM Meeting hosted at George Mason University
	Represented the chapter at the CSE SIAM meeting
2014	**Secretary**, *SIAM Chapter at George Mason University*
Duties	Organized the annual Faculty Symposium
	Supported the president in the transition to the new president
2014-2016	**Judge**, *Fairfax County Science and Engineering Fair, George Mason University*
Duties	Judged posters for different age categories
	Actively involved the students to present their projects
	Assisted in judging for special categories
	Encouraged the students to continue their scientific pursues
2014-2017	**Proctor**, *Northern Virginia Regional MATHCOUNTS competition*
Duties	Supervise exam administration
	Distribute exam materials
	Graded exams and recorded school scores
2011–2012	**Secretary of the Math Student Association**, *California State University, Long Beach*
Duties	Support the president and engage the group
	Assist with some of the paper work
2009–	**Youth Worker**, *La Semilla Calvary Chapel*
Duties	Coordinate youth outings and activities throughout the year
	Lead teenage girls in group devotionals
	Assist in the coordination of the annual youth retreat
2007–2012	**Sunday School Teacher**, *La Semilla Calvary Chapel*
Duties	Make the Bible alive and understandable for children between the ages of 2-6 years old
	Update the yearly lessons calendar

Additional Information

Programming	Python	Numerical	MATLAB
Typesetting	LaTeX	Applications	MS Offices
OS	Windows, MAC OS X, Linux	Languages	English, Spanish