F. ANTONIO MEDRANO
Curriculum Vitae

Texas A&M University Corpus Christi
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Corpus Christi, TX 78412

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EDUCATION

Ph.D.   University of California, Santa Barbara, 2014
Department of Geography
Emphasis on Modeling, Measurement and Computation

M.S.   University of California, Santa Barbara, 2009
Media Arts and Technology Program
Emphasis on Multimedia Engineering

B.S.   Harvey Mudd College, 2002
Engineering, *with honors*
Emphasis on Systems Engineering

ACADEMIC AND RESEARCH POSITIONS

Assistant Professor — Texas A&M University–Corpus Christi (January 2019–present)
Department of Computing Sciences, Geospatial Computing Science Program
Conrad Blucher Institute for Surveying and Science

Postdoctoral Researcher — University of California, Santa Barbara (August 2017–December 2018)
Bren School of Environmental Science & Management

Co-Founder — Arogi, Inc., Santa Barbara, CA (February 2016–February 2017)

Postdoctoral Researcher — University of California, Santa Barbara (April 2015–January 2016)
Center for Spatial Studies, Department of Geography

Visiting Professor — Universitat Jaume I, Castellón de la Plana, Spain (September–October 2015)
Geographic Information Systems I (SIW009)

Instructor — University of California, Santa Barbara (Winter 2011, Spring 2013, Winter 2018)
Introduction to Optimization for Geographic Problems (GEOG 191)

Instructor — University of California, Santa Barbara (Summer 2013)
Maps and Spatial Reasoning (GEOG W 12, online course)

Instructor — University of California, Santa Barbara (Winter 2006, 2007, 2008)
Mathematics for Digital Signal Processing (MAT 202)

Teaching Assistant — University of California, Santa Barbara (various quarters)
Intro to Geographic Information Systems, Intro to Optimization for Geographic Problems, Geography of Europe, Mathematics of Engineering, Media Digital Signal Processing, Intro to C Programming and MATLAB, Statics, Intro to Mechanical Engineering Design, Advanced Mechanical Engineering Lab, Intro to Machine Shop

GRANTS AND FELLOWSHIPS

2020–2025   NSF Grant – AI Institute: Artificial Intelligence for Environmental Sciences, #2019758, Senior Personnel, $19,900,512

2021-2022   TAMUCC Division of Research and Innovation Student Research Competition, Awardee: Abhishek Phadke, Advisor: Antonio Medrano, $775

2020-2021   TAMUCC Division of Research and Innovation Student Research Competition, Awardee: Marina Vicens Miquel, Advisor: Antonio Medrano, $800

2016   NSF SBIR Phase I: Advanced Data Analytics for Public Safety, #1549445, $149,905

2010–2014   Graduate Research Assistantship, funding from Argonne National Laboratories, (Summer–Fall 2010, Fall 2011–Winter 2013, Summer–Winter 2014)

2010   University of California Transportation Center Graduate Fellowship, $30,000

REFEREED ARTICLES AND BOOK CHAPTERS

2021   Medrano, F.A. Effects of Raster Terrain Representation on GIS Shortest Path Analysis. *PLOS ONE*. **16**(4) DOI: [10.1371/journal.pone.0250106](#)

2020   Medrano, F.A. The Complete Vertex *p*-Center Problem. *EURO Journal on Computational Optimization* **8,** 327–343. DOI: [10.1007/s13675-020-00131-y](#).

2018   Church, R. and F.A. Medrano. Location-Allocation Modeling and GIS. *The Geographic Information Science & Technology Body of Knowledge (3rd Quarter 2018 Edition)*, John P. Wilson (ed). DOI: [10.22224/gistbok/2018.3.4](#).

2016   Lafia, S., J. Jablonski, W. Kuhn, S. Cooley, & F.A. Medrano. Spatial Discovery and the Research Library. *Transactions in GIS*. **20**, 399–412. DOI: [10.1111/tgis.12235](#).

2015   Medrano, F.A. & R.L. Church. A Parallel Computing Framework for Finding the Supported Solutions to a Biobjective Network Optimization Problem. *Journal of Multi-Criteria Decision Analysis*. **22**, 244-259. DOI: [10.1002/mcda.1541](#).

2014   Scaparra, M.P., R.L. Church & F.A. Medrano. Corridor Location: The Multi-Gateway Shortest Path Model. *Journal of Geographical Systems*. **16**, 287–309. DOI: [10.1007/s10109-014-0197-8](#).

2014   Medrano, F.A. & R.L. Church. Corridor Location for Infrastructure Development: A Fast Bi-Objective Shortest Path Method for Approximating the Pareto Frontier. *International Regional Science Review*. **37**, 129–148. DOI: [10.1177/0160017613507772](#).

2013   Medrano, F.A. & R.L. Church. "A Parallel Algorithm to Solve Near-Shortest Path Problems on Raster Graphs." *In* Shi, X., Kindratenko, V. & Yang, C. eds. *Modern accelerator technologies for geographic information science.* Springer, 83–94. DOI: [10.1007/978-1-4614-8745-6_7](#).

CONFERENCE PROCEEDINGS, RESEARCH REPORTS, AND THESES

2022   Phadke A., F.A. Medrano, J. Brahmbhatt & S. Ustymenko. "*A Framework for an Optimized Smart Energy System*", 2022 International Symposium on Electrical, Electronics and Information Engineering (ISEEIE 2022), Chiang Mai, Thailand, February 25-27, 2022. *(Accepted, pending publication)*

2022   Phadke A., F.A. Medrano, J. Brahmbhatt "*A Conceptual Framework for a Blockchain-based Tax payment Financial Service*." 2021 International Conference on Computational Science and Computational Intelligence (CSCI) 2021, December 15-17, Las Vegas, Nevada *(Accepted, pending publication)*

2022   Phadke A., F.A. Medrano, S. Ustymenko "*A Review of Vehicular Micro Clouds*" 2021 International Conference on Computational Science and Computational Intelligence (CSCI) 2021, December 15-17, Las Vegas, Nevada *(Accepted, pending publication)*

2022   Phadke, A., F.A. Medrano & S. Ustymenko. *Applications of Blockchain in E-government*. 2021 European conference on Computer Science and Technology, Budapest, Hungary. December 14, 2021 *(Accepted, pending publication)*

2021   Phadke, A & A. Medrano. A Resilient Multi-UAV System of Systems (SoS). *Academia Letters*, Article 1659. DOI: [10.20935/AL1659](10.20935/AL1659)

2016   Kuhn, W., M. Hegarty, A. Ballatore, K. Doehner, A. Medrano & D. Janelle. *Report on the Center for Spatial Studies*. Center for Spatial Studies, University of California at Santa Barbara

2015   Cooley, S., S. Lafia, A. Medrano, D. Stephens & W. Kuhn. *Spatial Discovery Expert Meeting—Final Report*. Center for Spatial Studies and UCSB Library, University of California, Santa Barbara.

2014   Medrano, F.A. *Corridor Location: Generating Competitive and Efficient Route Alternatives*. Ph.D. Dissertation, Geography, University of California, Santa Barbara.

2014   Medrano, F.A. & R.L. Church. *A Parallel Biobjective Shortest Path Algorithm*. Santa Barbara: Geotrans Report 2014-12-01.

2013   Medrano, F.A. & R.L. Church. *Strahler Stream Order Inspired Gateway Shortest Path Subsets*. Santa Barbara: Geotrans Report 2013-12-01.

2013   Medrano, F.A. & R.L. Church. *An Exact Biobjective Shortest Path Method with Gateway Heuristic and Supported Point Upper-Bounds*. Santa Barbara: Geotrans Report 2013-06-01.

2012   Medrano, F.A. & R.L. Church. *A new parallel algorithm to solve the near- shortest-path problem on raster graphs.* Santa Barbara: Geotrans Report RP-01-12-01.

2011   Medrano, F.A. & R.L. Church. *Transmission corridor location: Multi-path alternative generation using the k-shortest path method.* Santa Barbara: Geotrans Report RP-01-11-01.

2009   Medrano, F.A. *Optical position sensors with applications in servo feedback subwoofer control*. M.S. Thesis, Media Arts and Technology Program, University of California, Santa Barbara.

CONFERENCE PRESENTATIONS AND INVITED TALKS

2019   F.A. Medrano. "The Complete Vertex p-Center Problem: An Exact Set Covering Method with Brute Force Combinatorics." *INFORMS Annual Meeting*, Seattle, WA. October 20–23, 2019.

2019   F.A. Medrano. "The Complete p-Center Problem: A Planning Tool for Urban Location Coverage Optimization." *International Workshop on Urban Operations Research (IWUOR 2019)*, Nagoya, Japan, July 19–21, 2019.

2019   F.A. Medrano. "The Complete Vertex p-Center Problem: An Exact Set Covering Method." *30th European Conference on Operational Research (EURO)*, Dublin, Ireland, June 23–26, 2019.

2019   F.A. Medrano. "A Set Covering Trade-Off to Solve the Complete Vertex p-Center Problem." *25th International Conference on Multi-Criteria Decision Making (MCDM)*, Istanbul, Turkey. June 16–21, 2019.

2019   F.A. Medrano. "Effects of Raster Terrain Representation on GIS Spatial Network Analysis." *International Network Optimization Conference (INOC)*, Avignon, France, June 12–14, 2019.

2019   F.A. Medrano. "Brute Force Spatial Optimization: When It's Okay." *American Association of Geographers (AAG) Annual Meeting*, Washington DC. April 3–7, 2019.

2018   F.A. Medrano. "The Complete Vertex p-Center Problem: A Fast Set Covering Method." *American Association of Geographers (AAG) Annual Meeting*, New Orleans, LA. April 10–14, 2018.

2018   F.A. Medrano "GIS Data For Spatial Analysis: What To Avoid At All Costs!", *Bren School of Environmental Science & Management Seminar*, University of California, Santa Barbara. March 5, 2018.

2018   F.A. Medrano. "Understanding the Effects of Attribute Scale and Connectivity on GIS Raster Network Analysis." *Western Regional Science Association Annual Meeting (WRSA)*, Pasadena, CA. February 11–14, 2018.

2017   F.A. Medrano. "The Complete p-Center Problem: A Fast Set Covering Method." *64th Annual North American Meetings of the RSAI (NARSC)*, Vancouver, BC. November 8–11, 2017.

2017   F.A. Medrano. "GIS Data for Spatial Analysis: What to Avoid at All Costs!" *Environmental Studies Department seminar*, Zamorano University, Honduras. March 24, 2017

2017   F.A. Medrano. "Spatial Analysis." *GIS course guest lecture*, Zamorano University, Honduras. March 24, 2017

2016   F.A. Medrano. "The Clarity of Disruption." *TEDx Santa Barbara*, Santa Barbara, CA. August 20, 2016. (https://tedxsantabarbara.com/2016/antonio-medrano/)

2016   F.A. Medrano. "Attribute Scale on GIS Raster Data: What to Avoid at All Costs!" *ThinkSpatial brownbag seminar at the Center for Spatial Studies*, University of California, Santa Barbara. January 26, 2016.

2015   F.A. Medrano and R.L. Church. "GIS Raster Data for Multi-Objective Shortest Path Analysis: The Elephant in the Room." *62nd Annual North American Meetings of the RSAI (NARSC)*, Portland, OR. November 11–14, 2015.

2015   F.A. Medrano and R.L. Church. "Spatial Data for Multiobjective Shortest Path Analyses: Small Decisions with Large Consequences." *INFORMS Annual Meeting*, Philadelphia, PA. November 1–4, 2015.

2015   F.A. Medrano. "Modeling Wicked Spatial Problems: Lessons Learned from my Ph.D. Dissertation." *Invited talk at the Center for Spatial Studies*, University of California, Santa Barbara, February 18, 2015.

2014   F.A. Medrano. "Corridor Location: Generating Competitive and Efficient Route Alternatives." *Ph.D. Defense Presentation*, University of California, Santa Barbara, December 5, 2014.

2014   F.A. Medrano and R.L. Church. "A Simple Framework for Parallel Multi-Objective Optimization using Java." *61st Annual North American Meetings of the RSAI (NARSC)*, Bethesda, MD. November 12–15, 2014.

2014   F.A. Medrano and R.L. Church. "A Simple Framework for Parallel Multi-Objective Optimization using Java" *INFORMS Annual Meeting*, San Francisco, CA. November 9–12, 2014.

2014   F.A. Medrano and R.L. Church. "A Simple Framework for Parallel Multi-Objective Optimization using JAVA." *20th Conference of the International Federation of Operational Research Societies (IFORS)*, Barcelona, Spain. July 13–18, 2014.

2013   F.A. Medrano and R.L. Church. "Fast Generation of Spatially Diverse One-To-One Shortest Path Options." *60th Annual North American Meetings of the RSAI (NARSC)*, Atlanta, GA. November 13–16, 2013.

2013   F.A. Medrano and R.L. Church. "Between Terrain and an NP-hard Place: Challenges of Solving Multiobjective Shortest Paths on GIS Networks." *INFORMS Annual Meeting*, Minneapolis, MN. October 6–9, 2013.

2013   F.A. Medrano and R.L. Church. "Improved Upper Bounds for a Two-Phase Biobjective Shortest Path Algorithm." *International Conference on Multi-Criteria Decision Making (MCDM)*, Málaga, Spain. June 16–21, 2013.

2013   F.A. Medrano and R.L. Church. "Corridor Location for Infrastructure Development: Solving For The Pareto-Frontier Of Solutions." *Western Regional Science Association Annual Meeting (WRSA)*, Santa Barbara, CA. February 24–27, 2013.

2013   F.A. Medrano and R.L. Church. "New Methods for Solving the Bi-Objective Shortest Path Problem." *13th INFORMS Computing Society Conference (ICS)*, Santa Fe, NM. January 6–8, 2013.

2012   F.A. Medrano. "Gateway to Computationally Efficient Corridor Location." *Invited Talk at Argonne National Laboratory*, Lemont, IL. November 28, 2013.

2012   F.A. Medrano and R.L. Church. "A Parallel Algorithm to Solve Near-Shortest Path Problems on Raster Graphs." *MAT4GIScience 2012 (workshop associated with GIScience 2012)*, Columbus, OH. September 18, 2012.

2012   F.A. Medrano and R.L. Church. "An Efficient Heuristic for Generating Unsupported Non-Dominated Solutions in a Bi-Objective Shortest Path Problem." *International Symposium on Location Decisions (ISOLDE XII)*, Nagoya & Kyoto, Japan. July 19–24, 2012.

2011   F.A. Medrano and R.L. Church. "Modeling Corridor Location Alternatives: New Methods and Future R&D Needs." *Invited talk at the Department of Energy Headquarters*, Washington DC. November 1, 2011.

2010   F.A. Medrano and R.L. Church. "Transmission Corridor Location: A Wicked Public Problem." *Invited talk at Argonne National Laboratory*, Lemont, IL. November 18, 2010.

2009   F.A. Medrano and R.L. Church. "Differentiated Least Cost Path Selection on Raster Networks." *Colloquium for the Department of Geography,* University of California, Santa Barbara. October 30, 2009.

2009   F.A. Medrano. "Optical Position Sensors with Applications in Servo Feedback Subwoofer Control." *Masters Defense Presentation*, University of California, Santa Barbara. February 13, 2009.

CERTIFICATIONS, AWARDS, AND HONORS

Tau Beta Pi engineering honor society, Omega chapter, member
State of California, Engineer in Training, #EIT115948
California Non-Residential Title 24-2001 Certified Energy Plans Examiner

CONFERENCE ORGANIZATION

2015   Spatial Information for Human Health (with M. Castro, M. Duckham and W. Kuhn) Santa Barbara, CA. December 9–11, 2015.

2015   Expert Meeting on Spatial Discovery (with D. Stephens and W. Kuhn) Santa Barbara, CA. June 17–18, 2015.

PROFESSIONAL SOCIETY MEMBERSHIPS

Association of American Geographers (AAG) lifetime member
- Spatial Analysis and Modeling (SAM)
- GI Science & Systems (GISS)

Institute for Operations Research and the Management Sciences (INFORMS)
- Section on Location Analysis (SOLA)
- Multiple Criteria Decision Making (MCDM) Section
- Computing Society
- Optimization Society

Regional Science Association International (RSAI)

Western Regional Science Association (WRSA)

RESEARCH INTERESTS

Spatial Optimization: Linear and Integer Programming, Heuristics, Multi-Objective Optimization, Location Modeling & Analysis, Location-Allocation and Covering Models, GIS and Geographical Analytics

Combinatorial Optimization & Path Algorithms: High Performance Computing on Big Data, Efficient Algorithms for Multi-Objective and Spatially Diverse Routing Problems

Resource Management and Infrastructure Development: Resource location and allocation for optimal performance and/or resiliency to climate change and other dynamic conditions. Spatial location of infrastructure design to optimize multi-criteria performance.

UNIVERSITY COMMITTEES

S&E Research Enhancement Committee (2020–2022)

Wes Tunnel Distinguished Lecturers Selection Committee (2019–2021)

Ad-Hoc Course Evaluation Committee, Committee Member (2021–2022)

Hiring Committee, Department of Computing Sciences, TAMUCC (2019–2021, various positions)

Hiring Committee, Conrad Blucher Institute, TAMUCC (2019)

Computer Committee, Department of Geography, UCSB (2011–2014)

Events Committee, Department of Geography, UCSB (2008–2011)

JOURNAL REVIEWER

International Journal of Geographic Information Science
Transactions in GIS
Computers & Operations Research
Operations Research for Healthcare
Geographic Information Science & Technology Body of Knowledge
Networks and Spatial Economics
Geographical Analysis
Computers, Environment and Urban Systems
PLOS ONE
ACM Transactions on Spatial Algorithms and Systems
Journal of Geographical Systems