

Gonzalo R. Arce

Charles Black Evans Professor · JPMorgan Chase Senior Faculty Fellow

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Dept. of Electrical and Computer Engineering · Institute of Financial Services Analytics · University of Delaware

Charles Black Evans Professor of Electrical and Computer Engineering at the University of Delaware and JPMorgan Chase Senior Faculty Fellow at the Institute of Financial Services Analytics. Editor-in-Chief of the IEEE Transactions on Computational Imaging, and Fellow of the IEEE, SPIE, OPTICA, and the National Academy of Inventors. Twice named Fulbright-Nokia Distinguished Chair in Information and Communications Technologies at Aalto University, Finland. Research spans computational imaging and sensing, compressive spectral and LiDAR imaging, generative AI for Earth science, graph and hypergraph signal processing, and nonlinear signal processing. Author of 6 books, 23 book chapters, 27 U.S. patents, and over 245 journal and 335 conference publications; principal or co-principal investigator on close to \$30 million in research funding. Has supervised 54 doctoral and 49 master's students and 6 post-doctoral researchers.

EDUCATION

Ph.D. in Electrical Engineering Purdue University, West Lafayette, IN <i>Dissertation: Theory and Analysis of Median Filters.</i>	1982
M.S. in Electrical Engineering Purdue University, West Lafayette, IN	1980
B.S. in Electrical Engineering · <i>Summa Cum Laude</i> University of Arkansas, Fayetteville, AR	1979

PROFESSIONAL EXPERIENCE

Charles Black Evans Professor & JPMorgan Chase Senior Faculty Fellow University of Delaware, Newark, DE · Department of Electrical and Computer Engineering, and Institute of Financial Services Analytics	2014 to present
Fulbright-Nokia Distinguished Chair in Information and Communications Technologies Aalto University, Helsinki, Finland	2010–2011, 2017–2018
Charles Black Evans Distinguished Professor and Chairman University of Delaware, Newark, DE · Department of Electrical and Computer Engineering	2004–2009
Professor and Chairman University of Delaware, Newark, DE · Department of Electrical and Computer Engineering	2000–2004
Interim Chairman University of Delaware, Newark, DE · Department of Electrical and Computer Engineering	1999
Professor (1992–1996), Associate Professor (1987–1992), Assistant Professor (1982–1987) University of Delaware, Newark, DE · Department of Electrical and Computer Engineering	1982–1996

Visiting Member of Technical Staff Unisys Corporate Research Center, Reston, VA	1985
Research Assistant Purdue University, West Lafayette, IN · School of Electrical and Computer Engineering	1980–1982

AWARDS AND HONORS

Editor-in-Chief, IEEE Transactions on Computational Imaging	12/2024
Fellow of OPTICA (formerly the Optical Society of America)	2023
Fellow of the National Academy of Inventors	2023
Fellow of the International Society for Optics and Photonics (SPIE), for contributions to computational imaging	2019
JPMorgan Chase Senior Faculty Fellow, Institute of Financial Services Analytics	2017 to present
Fulbright-Nokia Distinguished Chair in Information Technologies and Communications	2017
JPMorgan Chase Scholar, Institute of Financial Services Analytics	2014–2016
Fulbright-Nokia Distinguished Chair in Information Technologies and Communications, Helsinki, Finland	2010–2011
Elected Member, Arkansas Academy of Engineering, University of Arkansas	2008
DuPont Science and Engineering Awards	1998, 2002, 2008
Fellow of the IEEE, for contributions on the theory and applications of nonlinear signal processing	2000
Fellow, Center for Advanced Studies, University of Delaware	1998
ARL ATIRP Federated Laboratory Symposium Best Paper Award	1997
Best Scientific Paper Award, Whitaker Foundation and Rehabilitation Engineering Society of North America (RESNA)	1995
ASEE Teaching Fellow	1992
Sperry Corporation Research Award	1985
National Science Foundation Research Initiation Award	1983

AWARDS TO STUDENTS SUPERVISED

Allan P. Colburn Prize in Mathematical Sciences and Engineering, awarded for the most outstanding dissertation in the engineering and mathematical disciplines, to four doctoral students under my supervision: **Xu Ma** (2010), **Yinbo Li** (2006), **Juan G. Gonzalez** (2002), and **Kenneth Barner** (1992).

RESEARCH AREAS

Computational imaging and sensing; compressive sensing; compressive spectral, polarimetric and X-ray tomographic imaging; computational satellite LiDAR and generative diffusion models for Earth science; graph and hypergraph signal processing; nonlinear and robust signal processing (median, weighted median and myriad filters); computational lithography; digital halftoning; visual cryptography, watermarking and QR-code security; financial services analytics.

POST-DOCTORAL SUPERVISION

- **Iftekar Mirza** (PhD Delaware, jointly with D. Prather): Compressive spectral imaging, 2010 - 2012.
- **Jan Bacca** (PhD Delaware): Voronoi dithering for multitone, 2007-2009.
- **InKoo Kang** (PhD KAIST - Korea): Visual cryptography and authentication, 2007-2009.
- **Jose L. Paredes** (PhD Delaware): UWB communications with compressive sensing, 2006, 2008 - 2009.
- **Daniel L. Lau** (PhD University of Delaware): Electronic printing, 2001.
- **Sudhakar Kalluri** (PhD University of Delaware): Communications theory, 1998.

PH.D. STUDENT SUPERVISION

- **Run Li**, “Learning Directed Graphs from Data,” in progress.
- **Zhihuan Dong**, “Causal Hypergraphs,” in progress.
- **Carlos Mundo Levano**, “Directed Hypergraph Networks,” in progress.
- **Kyle Regan**, “Computational mass spectroscopy,” in progress.
- **Nicolas Bello**, “Hypergraph Transformer Neural Networks,” in progress.
- **Fuli Wang**, “HyperGraph neural networks,” 2025, now at Apple research.
- **Nestor Porras**, “Multimodal transformers for satellite lidars,” in progress.
- **Carlos Restrepo**, “Generative Projections for Superresolution X-Ray Tomography,” in progress.
- **Abdullah Alrushud**, “Colored Coded Compressive Spectral Imaging,” in progress.
- **Michael Don**, “Antenna Pattern Characterization via Compressive Phase Retrieval,” in progress.
- **Andres Ramirez**, “Generative Diffusion Models in Compressive LiDAR Imaging for Earth Science,” in progress.
- **Xiao Ma**, “LED-based compressive spectral temporal imaging,” 2022. Now with Qualcomm.
- **Karelia Pena**, “Learning in high-dimensional settings: QR Codes and Hypergraphs,” 2023. Now with Intuit.
- **Maria Daniela Dapena**, “Blue noise sampling of graph signals in large graphs”, 2022. Now with Lighting AI.
- **Edgar Salazar**, “Coded imaging from the Visible to the X-rays”, 2022. Now with the University of Pennsylvania.
- **Juan Florez**, “Graph Signal Processing and its applications to spectral imaging”, (Co-advised with K. Barner), 2022.
- **Angela Cuadros**, “Compressive Spectral CT imaging,” 2021. Now with Mathworks.
- **Alejandro Parada**, “Blue Noise Sampling on Graphs,” 2020. Now with the University of Pennsylvania.
- **Laura Galvis**, “Coded Aperture Design in Compressive Spectral Imaging,” 2018. Now with Universidad Industrial de Santander, Colombia.
- **Chen Fu**, “Polarimetric spectral imaging,” 2019. Now with Sony Research Laboratory.
- **Juan Becerra**, “Iterative sparse recovery from high-dimensional measurements,” 2017. Now with Universidad de Sevilla, Spain.
- **Claudia Correa**, “Optical coding in compressive spectral imaging systems and the multi-resolution reconstruction problem,” 2017. Now with Boston University.
- **Hoover Rueda**, “Compressive coded-aperture multimodal imaging systems,” 2017. Now with Boston University.
- **Andre Rauh**, “Fast Algorithms for Selection and Multidimensional Sparse Fourier Transform,” 2015.
- **Gonzalo Garateguy**, “Optimal embedding of QR codes into color, gray scale and binary images,” 2014. Now with Mathworks.
- **Henry Arguello**, “Coded aperture optimization in compressive spectral imaging,” 2013. Now with Universidad Industrial de Santander, Colombia.
- **Ana Ramirez**, “Compressive spectral image classification,” 2013. Now with Universidad Industrial de Santander, Colombia.

- **Jirar Helou** (F. Kiamilev co-advisor), “CMOS architectures for threshold data converters,” 2011. Now with Intel.
- **Ivan Barrera**, “Statistical Approaches to Congestion Control in Internet Routers,” 2010. Now with Intel.
- **Zhongmin Wang**, “Ultra Wide Band Compressed Sensing,” 2010. Now with Qualcomm.
- **Xu Ma**, “Optimization of resolution enhancement techniques in optical lithography,” Winner of the Allan P. Colburn Best Dissertation Award as the most outstanding doctoral dissertation in engineering, mathematics, and computer sciences, 2009. Currently on the faculty at the Beijing Institute of Technology.
- **Michael Wilson**, “Projectile Navigation and the application to magnetometers,” 2007. Now with the Army Research Laboratories.
- **Jan Bacca**, “Blue Noise Methods for Hexagonal Grids and Multitone Dithering,” 2007. Now with the University Nacional de Colombia in Bogota.
- **Renwei Ge**, “Information Security in Mobile Ad Hoc Networks,” 2006. Now with Qualcomm.
- **Yinbo Li**, “Nonlinear signal processing in the complex domain and high dimensions,” Winner of the Allan P. Colburn Best Dissertation Award as the most outstanding doctoral dissertation in engineering, mathematics, and computer sciences, 2005. Now with Qualcomm.
- **Liangping Ma** (K. Barner co-advisor), “Signal processing analysis and algorithms for internet congestion control,” 2005. Now with San Diego Research Center.
- **Karen Bloch**, “Signal analysis methods for biological data,” 2004. Now with DuPont.
- **Sebastian Hoyos** (B. Sadler co-advisor), “Mixed signal high speed processing solutions for broadband systems and technologies,” 2004. Now with the faculty at Texas A & M University.
- **Zhi Zhou**, “Advances on digital video and visual cryptography,” 2004. Now with Google Research.
- **Cesar Nino**, “New imaging technologies in halftoning: data hiding, color modeling and color matching,” 2002. Now with Pontificia Universidad Javeriana, Bogota, Colombia.
- **Jose Luis Paredes**, “New robust signal processing tools for multimedia and communications,” 2001. Now with the faculty at the University of Los Andes, Venezuela.
- **Alexander Flaig**, “Nearfield spot-beamforming,” Aug. 2000. Now with Texas Instruments.
- **Liehua Xie**, “Authentication codes and watermarking for multimedia communications in lossy networks,” May 2000. Now with Eye Cast.
- **Daniel L. Lau** (N. C. Gallagher co-supervisor), “Modern digital halftoning,” May 1999. Now with the faculty at the University of Kentucky.
- **Sudhakar Kalluri**, “Nonlinear adaptive algorithms for robust signal processing and communication in impulsive environments,” Dec. 1998. Now with Intel.
- **Juan G. Gonzalez**, “Robust technologies for wireless communications in non-gaussian environments,” Winner of the Allan P. Colburn Best Dissertation Award as the most outstanding doctoral dissertation in engineering, mathematics, and computer sciences, May 1997.
- **David E. Griffith**, “Robust time-frequency representations for signals in alpha-stable noise: methods and applications,” December 1997. Now with NIST.
- **Edwin A. Heredia**, “A piecewise polynomial theory for nonlinear signal processing,” May 1996. Now with Microsoft Research.
- **Yeong T. Kim**, “Permutation and combination filter lattices and their applications in nonlinear signal processing,” Aug. 1993. Now VP of Samsung America.
- **Timothy Hall**, “Permutation and combination weighted order stastic filters for image processing,” May 1994. Now with NIST.
- **Martin Mueller**, “Tomographic algorithms and synthetic detector arrays,” May 1993. Now with Siemens Corp.
- **Kenneth E. Barner**, “Permutation filters: a new group theoretic class of non-linear filters,” Winner of the Allan P. Colburn Best Dissertation Award as the most outstanding doctoral dissertation in engineering, mathematics, and computer sciences, May 1993. Now with the faculty at the University of Delaware.
- **Shoupu Chen**, “Micro-structured adoptive filter theory for robust signal processing,” May 1992. Now with Kodak Research.

- **David C. Brown** (C. Ih co-supervisor), "Scene segmentation and definition for autonomous robotic navigation using structured light processing," May 1989. Now with the Army Research Laboratories.

M.S. STUDENT SUPERVISION

- **Nestor Parra**, "Compressive Lidar for Earth Sensing," in progress.
- **Carlos Restrepo**, "Instant coded X-ray computed tomography via nonlinear reconstruction," 2023.
- **Alvaro Aguirre**, "Multispectral array demosaicing," 2023.
- **Kyle Regan**, "MALSI tof Mass Spectroscopy denoising," in progress.
- **Ken Liu**, "StaticCode CT: coded aperture strategies," 2022.
- **Xiao Ma**, "LED-based compressive spectral temporal imaging," 2017.
- **Yuksel Karahan**, "Improved depth map upsampling Using Iterative Joint Trilateral Filter," 2017.
- **Angela Cuadros**, "Coded aperture design by uniform sensing in compressive X-ray tomosynthesis systems," 2016.
- **Hoover Rueda**, "Higher order discretization model for coded aperture spectral imaging systems," 2015.
- **Kai Wang**, "Coded aperture compressive tomosynthesis," 2014.
- **Sergio Matiz**, "Analog joint source channel coding for wireless optical communications and image transmission," 2013.
- **Claudia Correa**, "Lapped-windowed reconstructions in compressive spectral imaging," 2013.
- **Diego Pienovi**, "Threshold data converters," 2009.
- **Xu Ma**, "Generalized Inverse Lithography Methods for Phase-shifting Mask Design," 2008.
- **Rafael Nunez**, "Fast Sample Myriad Computation," 2008.
- **Andres Medina**, "Statistical Approach to Neighborhood Congestion Control," AdHoc Network Congestion control, 2007.
- **Liangping Ma**, "New packet delay network protocols based on robust signal processing," 2007.
- **Alvaro Gonzalez**, "Alpha Stable Human Visual System Models for Digital Halftoning," 2007.
- **J. Bacca**, "Spectral design of weighted median filters: a general iterative approach," 2003.
- **F. Faheem**, "Digital multitone using gray level separation," Dec. 2002.
- **A. M. Khan**, "Stochastic Moire," Jan. 2002.
- **N. Grabowski**, "Sigma Delta Modulation Using Weighted Median Filters," Jan. 2002.
- **S. Hoyos**, "Mixed-signal architectures for printed circuit board channels," Aug. 2001.
- **C. Nino**, "Data embedding in digital halftones with screen mask codes," May. 2000.
- **S. Hasan**, "Elimination of interference terms of discrete wigner distribution using nonlinear filtering," 1999.
- **Y. Berananda**, "Adaptive myriad filters for image processing in alpha-stable impulsive noise," 1999.
- **J. Paredes**, "Stack filters, stack smoothers, and mirrored threshold decomposition," 1998.
- **L. Xie**, "Watermarking digital image signatures for authentication," 1998. Now with Eye Cast.
- **A. Flaig** (K. Barner co-supervisor), "Affine-order-statistic filters: medianization of linear FIR filters," 1998.
- **F. Strobel**, "Wavelet encoded zero tree compressed still image transmission using a partial reliability/partial order transport protocol," (Technical University Uhlm FHTE), May 1997.
- **H. Cui** (N. C. Gallagher co-supervisor), "The development of a simulator for neuromorphic circuits," Fall 1996.
- **Y. Kim** (A. Khayrallah co-supervisor), "Nonlinear filters in robust data compression of speech signals," 1996.
- **A. Flaig**, "Fuzzy order-statistics," (Technical University Aalen FHTE), 1996.
- **P. Zurbach**, "Weighted myriad filters for image processing," June, 1996.
- **L. Li**, "Detection of evoked potentials as a method for brain computer interfacing," Fall 1996.
- **J. Gonzalez** (K. Barner co-supervisor), "A new approach to suppressing abnormal tremor through signal equalization," 1995.
- **D. Griffith**, "Partially decoupled volterra filters: formulation and adaptive algorithms," 1994.

- **M. Tian**, “Transform domain adaptive order stastic based filters,” Aug 1994.
- **W. Reynolds**, “Micro-statistics in adaptive antenna arrays,” Aug. 1992.
- **R. Hardie**, “Ranking multivariate data and its use in color image estimation,” May 1990.
- **K. Barner**, “Optimal detection schemes for the restoration of images with signal dependent noise,” Dec. 1989.
- **T. Hu**, “Applications of subband decomposition to data compression,” Dec. 1989.
- **R. Feehs**, “Optimal detection approaches to image restoration: signal independent noise,” Dec. 1989.
- **R. Foster**, “Algorithms architectures and the VLSI implementation of ranked-order filters for multidimensional signal processing,” May 1988.
- **T. Rao**, “Fourier based analysis of ordered dither halftoning,” Dec 1988.
- **S. Fontana**, “Temporal ranked filters for stationary and motion compensated imagery,” Dec. 1986.
- **M. Mc Loughlin**, “Deterministic properties of two-dimensional medial type filters,” Dec. 1985.
- **R. Crinon**, “Theoretical analysis of the median filtering of impulse type noise,” May 1984.
- **J. Dalton**, “Visual model based image halftoning using markov random field error diffusion,” Dec. 1984.

SELECTED CONTRACTS AND GRANTS

Summary: As principal investigator or co-principal investigator, I have been responsible for close to \$30 million in research funding from various DoD organizations, NSF, and Industry.

The 12 most recent of 84 grants and contracts; the complete list is in the full CV.

- **D. Hong (PI), G. R. Arce (Co-PI)** “Low-Rank Tensor Methods for Scalable Hypergraph Signal Processing” UDRF Strategic Initiative, \$60,000, 2025-2026.
- **A. Donellan (PI), G. R. Arce (Co-PI)**, with four other Co-PI’s at Purdue, U. Washington, NASA Goddard. “NASA NNH23ZDA001N: Creating a NASA Surface Topography and Vegetation (STV) Novel Observing System (NOS), \$3,000,000, (UD \$390,000) 02/2025 - 02/2028
- **G. R. Arce (PI)**, “NASA DSI24: Generative AI for High-Resolution for multi-modal sensor fusion Observation STV system, \$600,000, 06/2025 - 06/2028
- **G. R. Arce**, “NASA 80NSSC25K7395: Remote Sensing Optimization Using Machine Learning, \$135,000 , 02/2025 - 02/2028.
- **G. R. Arce**, “Zeteo Tech, Inc: Deep Learning for Aerosol Mass Spectroscopy,” \$60,000 07/2024 - 06/2025.
- **G. R. Arce**, “EAGER IMPRESS-U: Generative Compression for Compressive Lidar,” NSF Grant, \$300,000 , 10/2024 - 09/2026.
- **G. R. Arce** “100K CLIMA: ,” US-Colombia Partnerships for Forest Health Sensing and Renewable Energy,” Partners of the Americas, \$35,000 , 06/2024 - 05/2025
- **G. R. Arce** and **D. L. Lau**, “t-HGSP: Hypergraph Signal Processing and Networks with t-Products,” NSF CCF Grant 2230161, \$600,000 , 7/1/2023 – 6/30/2026.
- **D. L. Lau** and **G. R. Arce**, “Learning Hypergraphs in Complex Systems,” DEPSCoR AFOSR, \$600,000 , 8/1/2022 – 7/30/2025.
- **G. R. Arce** and **R. Vargas**, “Computational Lidar Sensing for Earth Science,” UNIDEL21O-UD AI CTR-ARCE PILOTR, \$15,000 , 2/1/2023 – 1/30/2024.
- **G. R. Arce**, “Sampling and Deep Learning Reconstruction of LiDAR Waveforms,” NASA Grant Number 80NSSC22K1099, \$40,000, 6/01/22- 5/31/23.
- **G. R. Arce**, **Amo Tong**, “Planetary LiDAR Compressive Point-Cloud Sampling and Machine Learning High- Resolution Reconstruction”, NASA EPSCoR RID, \$28,000 , 8/1/2021 – 6/30/2022

SELECTED PATENTS

The 8 most recent of 27 patents; the complete list is in the full CV.

- [1] **M. Don** and **G. R. Arce**, “Antenna radiation pattern compressive sensing,” US Patent US12095515B2, September 17, 2024.

- [2] M. McLoughlin and R. Kliegman and T. Cornish and V. Berkout and S. E. and **G. R. Arce** and K. Regan, “Methods and systems for detecting aerosol particles,” US Patent US11996279B2, 2024.
- [3] **G. R. Arce** and C. Fu and M. Don. “Compressive spectral imaging via polar coded aperture.” U.S. Patent No. 11,137,287. 05 Oct. 2021.
- [4] A. Cuadros and **G. R. Arce**. “Pixelated K-edge coded aperture system for compressive spectral X-ray imaging.” U.S. Patent No. 10987071. 27 April 2021.
- [5] A. Cuadros and **G. R. Arce**, “Pixelated K-edge coded aperture system for compressive spectral X-ray imaging.” US Patent 10,874,361. Dec 12, 2020.
- [6] **G. R. Arce**, G. J. Garateguy, S. X. Wang, and D. L. Lau, “Method to store a secret QR code into a colored secure QR code,” US Patent 10,832,110, November 10, 2020.
- [7] **G. R. Arce**, G. J. Garateguy, S. X. Wang, and D. L. Lau, “System and method for embedding of a two dimensional code with an image.” US Patent 510,817,971 October 27, 2020.
- [8] **G. R. Arce**, G. J. Garateguy, S. X. Wang, and D. L. Lau, “System and method for embedding a two dimensional code in video images.” US Patent 10,614,540 April 7, 2020.

SELECTED KEYNOTE AND INVITED TALKS

The 8 most recent of 54 keynote and invited talks; the complete list is in the full CV.

- [1] “Computational LiDAR from Space: Towards the next generation of satellite lidar systems” 2026 8th International Conference on Image, Video and Signal Processing (IVSP 2026), Tokyo, Japan March 19, 2026.
- [2] “Computational LiDAR from Space: Super-resolution via generative AI” Erasmus Workshop on Information technologies, Serbia, March 18, 2026.
- [3] “Computational Satellite Lidar Imaging.” ICIP 2025 workshop on Time-Resolved Computational Imaging. Sept 14–17, 2025 (Anchorage, AK).
- [4] “Optimal illumination pattern for satellite compressive LiDAR using generative AI” SPIE Defense + Commercial Sensing, SPIE 2025.
- [5] “High Altitude High-Resolution Computational Lidar Imaging with Generative AI, “Invited Talk at Synthetic Aperture Technal Group, Sensor Array and Multichannel Technical Committee, IEEE Signal Processing Society. December 16, 2024.
- [6] “Super-resolution Satellite Compressive Lidar via Generative Diffusion Networks, “Keynote talk at the 2024 Workshop on Adaptive, Compressive, and Computational Imaging, Montevideo, Uruguay, Nov. 2024.
- [7] “High Altitude Computational Lidar Imaging and Surveillance, “Invited Talk at the SPIE Symposium on Defense and Commercial Sensing (SPIE), National Harbor, MD, April 2024.
- [8] “High Altitude Computational Lidar Imaging and Surveillance, “Invited Talk at the Army Research Laboratory, Aberdeen, Nov. 2023.

BOOKS

- [1] V. Kumar, **G. R. Arce**, and A. S. Rao, Handbook of Statistics: Multi-Dimensional Signal Processing, Elsevier, 2024.
- [2] X. Ma and **G. R. Arce**, “Computational Lithography,” Wiley & Sons, 2010.
- [3] D. Lau and **G. R. Arce**, “Modern Digital Halftoning,” 2nd ed., CRC Press, 2008.
- [4] **G. R. Arce**, “Nonlinear Signal Processing,” Wiley & Sons, 2004.
- [5] K. Barner and **G. R. Arce**, editors, “Nonlinear Signal and Image Processing,” CRC Press, 2004.
- [6] D. Lau and **G. R. Arce**, “Modern Digital Halftoning,” Marcel Dekker, New York, 2001.

BOOK CHAPTERS

- [1] **G. R. Arce**, A. Ramirez, N. Porras, M. Stephen, “Computational Satellite Lidars,” in “V. Kumar, **G. R. Arce**, and A. S. Rao, Handbook of Statistics: Multi-Dimensional Signal Processing”, Elsevier, 2024.
- [2] **G. R. Arce**, A. Ramirez, H. Rueda, H. Arguello and C. Correa, “Compressive Spectral Imaging,” in “Wiley Encyclopedia of Electrical and Electronics Engineering”, John Wiley & Sons, Inc., 2016.
- [3] D. L. Lau, **G. R. Arce**, G. Garateguy, “Methods of Dither Array Construction Employing Models of Visual Perception,” in “Perceptual Digital Imaging: Methods and Applications”, CRC Press / Taylor & Francis, 2012.
- [4] **G.R. Arce**, Z. Wang, G. Di Crescenzo, “Visual Cryptography from Halftone Error Diffusion,” in “Visual Cryptography and Secret Image Sharing”, CRC Press / Taylor & Francis, 2011.
- [5] **G. R. Arce**, K. Barner, “Nonlinear Image Filtering,”The Essential Guide to Image Processing (A. Bovik, Ed.) Elsevier, 2008.
- [6] **G. R. Arce**, J. L. Paredes, J. Bacca, “Nonlinear Image Filtering,” The Essential Guide to Image Processing (A. Bovik, Ed.) Elsevier, 2008.
- [7] **G. R. Arce**, Y. Li, “Advances in Nonlinear Signal and Image Processing,” “Multichannel Weighted Medians,” (S. Marshall, G. Sicuranza ed.), pp. 273-299, Hindawi Publishing Corporation, 2006.
- [8] **G. R. Arce**, J. L. Paredes, J. Bacca, “Nonlinear Filtering for Image Analysis and Enhancement,” in “Handbook of Image and Video Processing,” (A. Bovik, ed.), pp. 81-100, Second Edition, Academic Press, 2005.
- [9] **G. R. Arce**, G. D. Crescenzo, Z. Zhou “Visual Cryptography,” in “The Handbook of Image and Video Processing,” Second Edition, A. Bovik, Editor, Academic Press, 2005
- [10] G. Di Crescenzo, R. Graveman, R. Ge, and **G. R. Arce**, “Approximate message authentication and biometric entity Authentication,” in Financial Cryptography and Data Security, Eds. A. S. Patrick and M. Yung, Lecture notes in Computer Science, Springer-Verlag, 2005.
- [11] **G. R. Arce**, J. G. Gonzalez and Y. Li, “Weighted Myriad Filters,” Chapter 5 in Nonlinear Signal and Image Processing: Theory, Methods, and Applications, ed. K. E. Barner and **G. R. Arce**, CRC Press, Nov. 2003
- [12] L. Russo, J. Paredes, and **G. R. Arce**, “Multichannel image compression and denoising using bijection mappings,” “ATIRP Research Advances, UMD Press 2002.
- [13] K .M. Bloch and **G. R. Arce**, “Analyzing Protein Sequences using Signal Analysis Techniques,” “Computational and Statistical Approaches to Genomics”, (W. Zhang and I. Shmulevich, ed.), pp. 113-124, Kluwer Academic Publishers, 2002.
- [14] **G. R. Arce**, J. Paredes, “Recent developments in stack filtering and smoothing,” in Advances in Imaging and Electron Physics, P. W. Hawkes, Editor, Academic Press, 2001.
- [15] **G. R. Arce** and J. Paredes, “Image enhancement with weighted medians,” in “Nonlinear Image Processing,” S. Mitra and G. Sicuranza, Editors, pp 27-67, Academic Press, 2000.
- [16] D. Lau and **G. R. Arce**, “Digital Halftoning,” “in Nonlinear Image Processing,” S. Mitra and G. Sicuranza, Editors, Academic Press, 2000.
- [17] **G. R. Arce**, J. Paredes, and J. Mullan, “Image Enhancement and Analysis Using Nonlinear Filters,” in Handbook of Image Processing, A. Bovik, Editor, Academic Press, 1999.
- [18] **G. R. Arce**, Y. T. Kim, and K. E. Barner, “Order statistic filtering and smoothing of time series: Part I,” Invited chapter in the Handbook of Statistics16 Order Statistics and Their Applications, C. R. Rao and N. Balakrishnan, Editors, 1999.
- [19] K. E. Barner and **G. R. Arce**, “Order statistic filtering and smoothing of time series: Part II,” Invited paper to appear in the Handbook of Statistics16 Order Statistics and Their Applications, C. R. Rao and N. Balakrishnan, Editors, 1999.
- [20] **G. R. Arce** and K. E. Barner, “Nonlinear Signal Processing,” in the Encyclopedia of Electrical and Electronics Engineering,” J. G. Webster, Editor, Wiley, 1999.

- [21] **G. R. Arce** and N. C. Gallagher, “BTC image coding using median filter roots,” in Bloch Truncation Coding, IEEE Press, 1994.
- [22] **G. R. Arce** and R. Foster, “Detail preserving ranked order based filters for image processing,” in Digital Image Processing”, R. Chellappa ed., IEEE Press, 1992.
- [23] **G. R. Arce**, T. Nodes, and N. C. Gallagher, “Median Filters: Theory for One and Two Dimensional Filters,” in Advanced Topics in Signal Processing, T. S. Huang ed., JAE Press, 1986.

SELECTED JOURNAL PAPERS

The 20 most recent of 245 journal papers; the complete list is in the full CV.

- [1] Carlos M. Restrepo-Galeano and **Gonzalo R. Arce**, “Focal spot mitigation with dynamic sampling conditions for high-resolution X-ray CT via diffusion priors,” *Opt. Express* 34, 250-267 (2026)
- [2] O. Ieremeiev et al., “Objective and Subjective Quality Assessment of Forest Landscapes Reconstructed Using Generative Diffusion Models From Compressed Satellite LiDAR Data,” in *IEEE Access*, vol. 13, pp. 213107-213123, 2025, doi: 10.1109/ACCESS.2025.3644825
- [3] Zhen Fang, Xu Ma, **Gonzalo R. Arce**, Degradation-estimated hybrid unfolding transformer network for efficient hyperspectral image reconstruction, *Optics & Laser Technology*, Volume 192, Part A, 2025, 113338, ISSN 0030-3992, <https://doi.org/10.1016/j.optlastec.2025.113338>.
- [4] Zhen Fang, Xu Ma, **Gonzalo R. Arce**, A deep estimation-enhancement unfolding framework for hyperspectral image reconstruction, *Infrared Physics & Technology*, Volume 153, 2026, 106282, ISSN 1350-4495, <https://doi.org/10.1016/j.infrared.2025.106282>.
- [5] N. Porras-Diaz, A. Ramirez-Jaime, **G. R. Arce** and M. Stephen, “Toward Submeter Satellite Surface Topography and Vegetation Mapping Using LiDAR/RGB Constrained Generative Diffusion,” in *IEEE Transactions on Geoscience and Remote Sensing*, vol. 63, pp. 1-14, 2025, Art no. 5706114, doi: 10.1109/TGRS.2025.3627143.
- [6] Makarichev, V.; Ramirez-Jaime, A.; Porras-Diaz, N.; Vasilyeva, I.; Lukin, V.; Arce, G.; Okarma, K. On the Lossless Compression of HyperHeight LiDAR Forested Landscape Data. *Remote Sens.* 2025, 17, 3588. <https://doi.org/10.3390/rs17213588>
- [7] Yuanji Shen, Jun Dai, Mingxian Wang, **Gonzalo R. Arce**, Stock price trend forecasting based on multi-channel complementary network with CEEMDAN decomposition and transformer residual prediction, *Expert Systems with Applications*, Volume 299, Part B, 2026, 130028, ISSN 0957-4174, <https://doi.org/10.1016/j.eswa.2025.130028>.
- [8] Jinyu Zhang, Xu Ma, Weili Chen, Hantang Chen, and **Gonzalo R. Arce**, “Cascade deep polarization network for precise image semantic segmentation,” *Appl. Opt.* 64, 8139-8150 (2025).
- [9] Abdullah K. Alrushud, Edgar Salazar, and Gonzalo Arce, “Illumination pattern optimization in compressive X-ray Compton backscattering imaging,” *Opt. Express* 33, 29957-29971 (2025).
- [10] Qile Zhao, Xianhong Zhao, Xu Ma, Xudong Chen, and **Gonzalo R. Arce**, “Fast alternating minimization algorithm for coded aperture snapshot spectral imaging based on sparsity and deep image priors,” *Appl. Opt.* 64, 4121-4131 (2025).
- [11] Shengen Zhang, Xu Ma, Chaojun Huang, Fuli Wang, **Gonzalo R. Arce**, Model-driven optical proximity correction via hypergraph convolutional neural networks and its experimental demonstration, *Optics & Laser Technology*, Volume 183, 2025, 112199, ISSN 0030-3992, <https://doi.org/10.1016/j.optlastec.2024.112199>.
- [12] Chaojun Huang, Xu Ma, Shengen Zhang, Mu Lin, Néstor Porras-Díaz, **Gonzalo R. Arce**, Block-based inverse lithography technology with adaptive level-set algorithm, *Optics & Laser Technology*, Volume 182, Part B, 2025, 112211, ISSN 0030-3992, <https://doi.org/10.1016/j.optlastec.2024.112211>.
- [13] Ramirez-Jaime A, Arce GR, Porras-Diaz N, Ieremeiev O, Rubel A, Lukin V, Kopytek M, Lech P, Fastowicz J, Okarma K. Generative Diffusion Models for Compressed Sensing of Satellite LiDAR Data: Evaluating Image Quality Metrics in Forest Landscape Reconstruction. *Remote Sensing.* 2025; 17(7):1215. <https://doi.org/10.3390/rs17071215>
- [14] Li J, Ma X, Paruchuri A, Alrushud A, Arce GR. Color-Coded Compressive Spectral Imager Based on Focus Transformer Network. *Sensors.* 2025; 25(7):2006. <https://doi.org/10.3390/s25072006>

- [15] A. Ramirez-Jaime, N. Porras-Diaz, **G. R. Arce** and M. Stephen, “Super-Resolved 3-D Satellite Lidar Imaging of Earth via Generative Diffusion Models,” in *IEEE Transactions on Geoscience and Remote Sensing*, vol. 63, pp. 1-19, 2025, Art no. 4404519, doi: 10.1109/TGRS.2025.3543670.
- [16] Shengen Zhang, Xu Ma, **Gonzalo R. Arce**, “Robust source and polarization joint optimization for thick-mask lithography imaging,” *J. Micro/Nanopattern. Mats. Metro.* 23(4) 043201 (31 October 2024) <https://doi.org/10.1117/1.JMM.23.4.043201>
- [17] C. M. Restrepo-Galeano and **G. R. Arce**, “Super-Resolution in Low Dose X-ray CT via Focal Spot Mitigation With Generative Diffusion Networks,” in *IEEE Transactions on Computational Imaging*, vol. 10, pp. 1111-1123, 2024, doi: 10.1109/TCI.2024.3430487.
- [18] Hantang Chen, Xu Ma, Jihui Wang, Qile Zhao, and **Gonzalo R. Arce**, “Sparse-angle optical projection tomography based on multi-layer sparsity and deep image priors,” *Appl. Opt.* 63, 5137-5143 (2024)
- [19] N. Porras-Diaz, A. Ramirez, **G. R. Arce**, K. Pena-Pena, D. Harding, M. Stephen, J. McKinnon, R. Vargas, “Transformer end-to-end optimization of compressive lidars using imaging spectroscopy side-information,” *IEEE Trans. on Geoscience and Remote Sensing*, May 2024.
- [20] F. Wang, K. Pena-Pena, **G. R. Arce**, “Hypergraphs Neural Networks via t-product Tensor Representations” *IEEE Trans. on Signal and Information Processing over Networks*, pp. 1-15, April 2024.

SELECTED CONFERENCE PAPERS

The 9 most recent of 335 conference papers; the complete list is in the full CV.

- [1] Yifan Wang, **Gonzalo R. Arce**, Guangmo Tong, “Generalization Performance of Hypergraph Neural Networks,” *The Web Conference (WWW) 2025*, pp. 1273–1291. DOI: 10.1145/3696410.3714586.
- [2] A. Paruchuri, Andres Ramirez-Jaime, **Gonzalo R. Arce**, A. Alrushud, Xu Ma, R. Radpour, “Spectral-Cam: High-Resolution Low-Cost Spectral Imaging Using DSLR Cameras.” *ICASSP 2025*, pp. 1–5. DOI: 10.1109/ICASSP49660.2025.10887725.
- [3] Christian Newman-Sanders, Andres Ramirez-Jaime, Nestor Porras-Diaz, **Gonzalo R. Arce**, Mark Stephen. “Optimal illumination pattern for satellite compressive LiDAR using generative AI.” *SPIE Defense + Commercial Sensing (Machine Learning from Challenging Data 2025)*, *Proc. SPIE 13460*, paper 134600B. DOI: 10.1117/12.3053692.
- [4] Abdullah Alrushud, Edgar Salazar, Gonzalo Arce. “A Grayscale Coded Illumination for Compressive X-ray Compton Backscattering Imaging.” *Optica Imaging Congress 2025 / Computational Optical Sensing and Imaging (COSI 2025)*, paper JM3B.7 (Seattle, Aug 18–21, 2025). DOI: 10.1364/COSI.2025.JM3B.7.
- [5] Andres Ramirez-Jaime, Nestor Porras-Diaz, **Gonzalo R. Arce**, David J. Harding, Mark Stephen, James MacKinnon. “Super-Resolution of Satellite Lidars for Forest Studies Via Generative Adversarial Networks.” *IGARSS 2024*, pp. 2271–2274.
- [6] Nestor Porras-Diaz, Andres Ramirez-Jaime, **Gonzalo R. Arce**, Rodrigo Vargas, David J. Harding, Mark Stephen, James MacKinnon. “Multi-Modal Transformer for Compressive LiDARs Using Hyperspectral Imaging Side-Information.” *IGARSS 2024*, pp. 2451–2454.
- [7] **Gonzalo R. Arce**, Andres Ramirez-Jaime, Nestor Porras-Diaz. “High altitude computational lidar emulation and machine learning reconstruction for Earth sciences.” *Proc. SPIE 13036 (Big Data VI: Learning, Analytics, and Applications)*, June 2024. DOI: 10.1117/12.3025299.
- [8] Hoover Rueda-Chacón, **Gonzalo R. Arce**. “Optimization of color-coded apertures for compressive multi-spectral and depth imaging.” *Proc. SPIE 13038 (Dimensional Optical Metrology and Inspection for Practical Applications XIII)*, 2024. DOI: 10.1117/12.3013955.
- [9] F. Wang, K. Pena-Pena, W. Qian and **G. R. Arce**, “A Unified View Between Tensor Hypergraph Neural Networks And Signal Denoising,” *2023 31st European Signal Processing Conference (EUSIPCO)*, Helsinki, Finland, pp. 1968-1972, 2023.