Rei Sanchez-Arias, Ph.D.

Data science researcher and educator with extensive experience in the **application and development of statistical learning and data mining methods**. Research interests include: numerical optimization, data mining, machine learning, and data science education.

ACADEMIC POSITIONS

Current | 2024

Faculty Director Master of Applied Data Science (MADS)
Teaching Assistant Professor

Chapel Hill, NC — University of North Carolina at Chapel Hill

- School of Data Science and Society (SDSS)
- Works with SDSS leadership in curriculum design and assessment efforts for MADS.
- Supervises a team of 10+ Section Instructors (SI) that teach for MADS.
- Contributes to MADS program operations (capstone, strategy, webinars, immersion, course scheduling, and others).

- Courses taught at UNC:

DATA 750 Mathematical Tools for Data Science (Summer 2024)	DATA 780 Machine Learning (Fall 2024, Spring 2025)
DATA 710 Introduction to Applied Data Science (Fall 2024, Spring 2025)	

2024 | 2018

Data Science Faculty

Lakeland, FL — Florida Polytechnic University

- Department of Data Science and Business Analytics
- Assistant Professor (2018 - 2024). Promoted to Associate Professor (2024).
- Performed research and teaching in data science supporting undergraduate and graduate programs in data science and business analytics.
- Supervised graduate students in projects and thesis work.
- Developed multiple undergraduate and graduate data science courses.

- Courses taught at Florida Poly:

COP 2073 Foundations of Data Analytics	CAP 4770 Data Mining and Text Mining
CIS 3301 Business Intelligence	STA 3241 Statistical Learning
CDA 4910 Directed Research	IDC 4942 Data Analytics Capstone 1
QMB 5565 Quantitative Methods	CAP 5771 Data Mining and Text Mining
CAP 5320 Data Wrangling and Exploratory Data Analysis	CAP 5735 Data Visualization and Reproducible Research
COP 5090 Scientific Computing	COP 5727 Advanced Database Systems
CAP 4793 Advanced Data Science	Thesis 1, Thesis 2, Graduate Project

2024 | 2021

Assistant Chair Department of Data Science and Business Analytics

Lakeland, FL — Florida Polytechnic University

- Worked with Department Chair in all department operations, including but not limited to: curriculum design, program assessment, scheduling, recruitment, advising, documentation for accreditation, and other institutional activities.

2018 | 2016

Program Director MS in Big Data Analytics

Miami, FL — St. Thomas University

- Responsible for curriculum design and assessment, admissions, student advising, teaching of core classes, staffing, and program design.

CONTACT

reisanar@unc.edu
@reisanar
reisanar
reisanar
reisanar.com

View this CV online with links at reisanar.com

TECHNICAL SKILLS

- Project Management
- Scientific Writing
- Curriculum Design
- Data Mining
- Statistical Learning
- R
- Python
- Tableau
- SQL
- MATLAB
- Unix Shell

Last updated on 2025-03-01

2018 | 2016

Assistant Professor of Applied Mathematics
Miami, FL — St. Thomas University

- Performed research and teaching in data analytics and applied mathematics
- Supervised undergraduate students during the Summer Research Institute.
- Served as Faculty Liason for Dual Enrollment program.
- Served as Applied Mathematics and Data Science program coordinator.

- Courses taught at STU:

MAC 1147 Precalculus	COP 2073 Introduction to Data Science
MAC 2311 Calculus 1	MAD 2104 Discrete Mathematics
MAT 502 Statistical Methods	CIS 546 Data Visualization
CIS 543 Programming for Big Data Analytics	CIS 544 Data Mining and Machine Learning
CIS 626 Big Data Analytics Applications	CIS 627 Big Data Analytics Capstone
MAT 602 Applied Machine Learning	

2016 | 2014

Assistant Professor of Applied Mathematics
Boston, MA — Wentworth Institute of Technology

- Taught courses for Applied Mathematics and Engineering majors.
- Served as Academic Advisor for Applied Mathematics students.
- Nominated and served as the Faculty Advisor for the Society of Industrial and Applied Mathematics (SIAM) Student Chapter.
- Coordinated multiple sections of MATH 2860; reviewed and developed material for MATH 1900, MATH 3700, and MATH 5000
- Member of the Science Committee for the BS in Engineering program.
- Courses taught at WIT:

MATH 1500 Precalculus	MATH 1850 Engineering Calculus II
MATH 3700 Operations Research	MATH 2860 Linear Algebra
MATH 2300 Discrete Mathematics	MATH 2500 Differential Equations
MATH 2800 Finite Math	MATH 2025 Multivariable Calculus
MATH 1900 Intro to Operations Research	MATH 5000 Applied Math Capstone

RESEARCH TRAINING

2014 | 2013

Postdoctoral Researcher
Army High Performance Computing Research Center (AHPCRC)

- Postdoctoral Researcher for the Army High Performance Computing Research Center (AHPCRC). Army Research Lab (ARL) funded work in collaboration with The University of Texas at El Paso and Stanford University.
- Advisors: Dr. Martine Ceberio, Dr. Miguel Argaez
- Emphasis: Reduced-order modeling, data analytics, and numerical optimization methods for problems with sparse structure.

2013 | 2009

Research Assistant
El Paso, TX — The University of Texas at El Paso

- Research Assistant in the Computational Science Program, for the Army High Performance Computing Research Center (AHPCRC) grant. PI: Dr. Miguel Argaez and Dr. Leticia Velazquez
- Implementation of conjugate gradient based methods for large Karush–Kuhn–Tucker (KKT) systems in constrained optimization.
- Algorithmic implementation of ℓ_1-optimization problems.
- Applications in compressed sensing, large scale parameter estimation, and supervised learning problems.

INDUSTRY EXPERIENCE

2012 | 2011

Research Intern
The Woodlands, TX — Repsol USA

- Research and Innovation Geophysics Department (Summer 2011, 2012).
- Worked on seismic image segmentation and classification via sparse representation with Dr. German Larrazabal and Dr. Pablo Guillen
- Studied and implemented absorbing boundary conditions for the wave equation. Worked on dip and azimuth angles computation for seismic ray tracing with Dr. German Larrazabal.

OTHER TEACHING EXPERIENCE

2013

Adjunct Instructor
The University of Texas at El Paso

- Instructor for *MATH 2301 Mathematics for the Social Sciences* (Spring and Fall).

2008

Teaching Assistant
El Paso, TX — The University of Texas at El Paso

- Grader for MATH 1411 Calculus I, MATH 2300 Discrete Mathematics, MATH 1319 Math in the Modern World, and MATH 3323 Matrix Algebra.
- Grader and responsible for MATLAB and problem solving sessions in MATH 5345 Numerical Optimization.

2008 | 2007

Teaching Assistant
Cali, Colombia — Universidad del Valle

- Tutor and recitation leader for Calculus, Linear Algebra, and Differential Equations courses for engineering students.

EDUCATION

2013 | 2008

Ph.D. Computational Science
El Paso, TX — The University of Texas at El Paso

- Dissertation Title: *"A Convex Optimization Algorithm for Sparse Representation and Applications in Classification Problems"*. Advisor: Dr. Miguel Argaez.
- Area of Study: Sparse Optimization and Supervised Learning. GPA: 4.0/4.0

2011 | 2008

M.S. Computational Science
El Paso, TX — The University of Texas at El Paso

- Thesis Title: *"A Sparse Representation Technique for Classification Problems"*. Advisor: Dr. Miguel Argaez.
- Area of Study: ℓ_1-optimization methods. GPA: 4.0/4.0

2007 | 2002

B.S. Mathematics
Cali, Colombia — Universidad del Valle

- Thesis Title: *"A Hierarchic a Posteriori Estimate for the Approximation of a Nonlinear Elastic Problem"*, Honors Distinction. Advisor: Dr. Jairo Duque.
- Area of Study: Finite Element Methods for Elasticity Problems. GPA: 4.4/5.0

Sample Coursework: Computational Methods for Linear Algebra, Numerical Optimization, Numerical Partial Differential Equations, Numerical Analysis, Mathematical and Computer Modeling, Parallel Programming, Advanced Algorithms, Data Mining and Machine Learning, Convex Optimization, Digital Signal Processing, Geophysical Inverse Theory.

AWARDS

2022

IEOM Outstanding Service Award
Orlando, FL — IEOM 7th NA Conference

- Served as **conference associate chair** for the Industrial Engineering and Operations Management (IEOM) 7th North American Conference, June 11-14, 2022.

2022

Best Paper Award
Austin, TX — SRSA 2022

- Award for **Best Paper Published in 2021 in the *Review of Regional Studies***, announced at the Southern Regional Science Assoaciation Annual Meeting 2022. (co-authors: Jim Dewey, Kristopher Kindle and Sravani Vadlamani).

2021

Best Track Paper Award
Monterrey, Mexico — IEOM 6th NA Conference

- Best paper award in the **data analytics and big data track**, in the Industrial Engineering and Operations Management (IEOM) 6th North American Conference.

2020

Ablaze Excellence in Teaching Award
Lakeland, FL — Florida Polytechnic University

- The **Excellence in Teaching Award** is designed to encourage, reward, and publicly acknowledge sustained excellence in teaching by members of the University's faculty.

"The Excellence in Teaching Award recognizes excellence in teaching practices that reflect the highest standards in pedagogy, a record of outstanding teaching effectiveness within and outside the classroom, the ability to inspire, promote, and sustain the intellectual development of students, course and program development, fostering of critical thinking, and independent inquiry of students."

Link: award announcement https://bit.ly/reiAblaze

2019 **Travel Award NSF Big Data Spoke**
Chattanooga, TN — University of Tennessee at Chattanooga

- NSF funded **Big Data Spoke Bootcamps**. *Data Wrangling and Electronic Health Records Analysis* using R. H. Qin (University of Tennessee at Chattanooga), E. Fong and Z. Miao (Center for Health Systems Innovation at the Oklahoma State University). Held July 29th - August 2nd, 2019.

2018 **Travel Award NSF Proposal Workshop**
Alexandria, VA — National Science Foundation

- NSF CISE Proposal Writing Workshop, held April 9-10, 2018.

2015 **Travel Award NCORE**
Washington, DC — NCORE

- Travel award as Faculty Mentor for The National Conference on Race and Ethnicity in American Higher Education (NCORE)

2014 **Travel Award NSF NIMBioS**
Knoxville, TN — NIMBioS

- NSF funded tutorial at the National Institute for Mathematical and Biological Synthesis (NIMBioS). Topics: *"Computing in the Cloud: What Every Computational Life Scientist Should Know"*.

2014 **Travel Award NSF Workshop**
Evanston, IL — Northwestern University

- NSF Funded Workshop, Academic Careers Workshop held March 27-30, 2014.

2014 **Outstanding Ph.D. Dissertation Award**
El Paso, TX — The University of Texas at El Paso

- **Outstanding Ph.D. Dissertation Award Computational Science Program**.

2013 **Best Student Paper Award**
Edmonton, Canada — IFSA/NAFIPS Congress 2013

- Best Student Interval Paper Award, for the paper *"Sparse Fuzzy Techniques Improve Machine Learning"*, with M. Argaez and C. Servin.

2013 **Academic Excellence Award**
El Paso, TX — The University of Texas at El Paso

- **Academic Excellence Graduate Student Award** UTEP College of Science. Presented during pre-commencement on May 10, 2013.

2012 **Best Oral Presentation**
El Paso, TX — The University of Texas at El Paso

- Second Place. UTEP Graduate Research Expo, held November 9, 2012.

FUNDING

2022 **Broadband Feasibility Study**
Lakeland, FL — Federal American Rescue Plan

- *"Feasibility Study to Address Broadband Connectivity Issues in Polk County"*.
  PI: Dr. Shahram Taj. **Co-PI and Project Manager**: Dr. Rei Sanchez-Arias
- Amount awarded: **$250,000.00** (Summer 2022)

Polk County commissioned Florida Poly to conduct a feasibility study to consider the delivery of broadband Internet to all residential and business customers throughout the region. This study was conducted to provide an analysis of available service in Polk County and provide necessary data and guidance for future grant funding requests.

Link: News article
https://bit.ly/reiBEAD

2021 **nanoHUB Champions Program**
West Lafayette, IN — Purdue University

- nanoHUB NCN Purdue University. *"Utilizing Modern Data Exploration and Visualization Tools for STEM Applications and Datasets"*.
- **PI: Dr. Rei Sanchez-Arias**
- Amount awarded: **$5,000.00** (Summer 2021)

2020 **AMI Seed Award Program**
Lakeland, FL — Advanced Mobility Institute (AMI)

- Florida Polytechnic University Advanced Mobility Institute (AMI). *"Enhancing simulation and testing of emergency medical service vehicles in AVs settings"*.
- **PI: Dr. Rei Sanchez-Arias**, Co-PI: Dr. Grisselle Centeno.
- Amount awarded: **$15,887.00** (Summer 2020 - Spring 2021)

SOFTWARE

2021

`tidystem`: tidyverse Data Science Tools for STEM Applications and Datasets
Rei Sanchez-Arias (nanoHUB Champion Summer 2021)

- Interactive tool available at https://nanohub.org/resources/tidystem (doi:10.21981/B5R8-M191)
- Description: This tool provides introductory materials for exploratory data analysis using powerful tools from the tidyverse family of R packages, utilizing datasets from different STEM applications and case studies, that can be introduced as working examples for hands-on classwork activities in different courses.

2020

Interactive Learning Tools for Scientific Computing and Data Analysis
Cindy Nguyen and Rei Sanchez-Arias.

- Interactive tool available at https://nanohub.org/resources/rjupyternb (doi:10.21981/ZGZK-AM94).
- Description: A collection of Jupyter notebooks illustrating root-finding methods and numerical optimization techniques with applications in science, engineering, and data analysis.

REFEREED ARTICLES IN JOURNALS

2024

Endoscopic sleeve gastroplasty: stomach location and task classification for evaluation using artificial intelligence
Dials, J., Demirel, D., **Sanchez-Arias, R.** , Halic T., De S., Gromski M.

- In: International Journal of Computer Assisted Radiology and Surgery, 2024. doi.org/10.1007/s11548-023-03054-2

2024

Accurate Loss Prediction of Realistic Hollow-Core Anti-Resonant Fibers Using Machine Learning
Jewani Y., Petry M., **Sanchez-Arias R.**, Amezcua-Correa R., Habib Md S.

- In: IEEE Journal of Selected Topics in Quantum Electronics, IEEE Journal of Selected Topics in Quantum Electronics, vol. 30, no. 6: *Advances and Applications of Hollow-Core Fibers*, pp. 1-8, 2024, doi.org/10.1109/JSTQE.2024.3366476

2023

Understanding the State of Broadband Connectivity: An Analysis of Speedtests and Emerging Technologies
Sanchez-Arias R., Jaimes L., Taj S, and Habib Md S.

- In: IEEE Access, vol. 11, pp. 101580-101603. 2023. doi.org/10.1109/ACCESS.2023.3313231

2023

Skill Level Classification and Performance Evaluation for Endoscopic Sleeve Gastroplasty
Dials J., Demirel D., **Sanchez-Arias R.**, Halic T., Kruger U., De S., Gromski M.

- In: Surgical Endoscopy, vol. 37, 6, pp. 4754-4765. 2023. doi.org/10.1007/s00464-023-09955-2

2021

State Marijuana Laws and Traffic Fatalities
Dewey J., Kindle K., Vadlamani S. and **Sanchez-Arias R.**

- In: Review of Regional Studies, vol. 51, no. 3, pp. 246-265, 2021. doi.org/10.52324/001C.30970

Award for Best Paper Published in 2021 in the *Review of Regional Studies*.

2017

A Machine Learning Approach to Designing Guidelines for Acute Aquatic Toxicity
Husowitz B. and **Sanchez-Arias R.**

- In: Journal of Biometrics & Biostatistics, vol. 8, no. 6., pp. 1-11. 2017. doi.org/10.4172/2155-6180.1000385

2014

Accurate Prediction of Major Histocompatibility Complex Class II Epitopes by Sparse Representation via ℓ_1-minimization
Bonavides-Aguilar C., **Sanchez-Arias R.**, Lanzas C.

- In: BioData Mining, vol. 7, 23, pp. 1-14. 2014. doi.org/10.1186/1756-0381-7-23

2014

$\sqrt{x^2+\mu}$ is the Most Computationally Efficient Smooth Approximation to $|x|$
Ramirez C., **Sanchez R.**, Kreinovich K., Argaez M.

- In: Journal of Uncertain Systems, vol. 8, no. 3, pp 205-210. 2014. http://www.worldacademicunion.com/journal/jus/jusVol08No3paper08.pdf

2012

Face Recognition from Incomplete Measurements via ℓ_1-minimization

Argaez M., **Sanchez R.**, Ramirez C.

- In: American Journal of Computational Mathematics, vol. 2, no. 4, pp 287-294. 2012. doi.org/10.4236/ajcm.2012.24039

REFEREED ARTICLES IN CONFERENCE PROCEEDINGS

2023

Meta-Analysis of the Machine Learning Operations Open Source Ecosystem

Zimmerman I., Silge J., Abedin P., and **Sanchez-Arias R.**

- In: Proceedings of the IEEE International Conference on Machine Learning Applications, pp. 922-925, 2023. doi.org/10.1109/ICMLA58977.2023.00136

2022

A Supervised Learning Approach to Assessing Accounts Receivable Risk in Small-to-Medium Enterprises

Dewey J., Ingram C., **Sanchez-Arias R.**

- In: Proceedings of the 7th North American Conference on Industrial Engineering and Operations Management (IEOM), pp. 1805-1815. 2022. doi.org/10.46254/NA07.20220419

2022

Application of Network Models to Assist in Data Science Curriculum Using Program and Course Learning Outcomes

Yoshia O., **Sanchez-Arias R.**, Taj S.

- In: Proceedings of the 7th North American Conference on Industrial Engineering and Operations Management (IEOM), pp. 2264-2273. 2022. doi.org/10.46254/NA07.20220490

Graduate Student Paper Competition (sponsored by Siemens) Award. Paper presented by co-advised graduate student Orel Yoshia (MS in Data Science graduate). IEOM 7th NA Conference, Orlando, FL. June 2022.

2021

Dimensionality Reduction and Text Mining for Smart Content Filtering of an Online Health Forum

Sanchez-Arias R., Batista R. W., Nicklas L. and Akioyamen P.

- In: Proceedings of the 6th North American Conference on Industrial Engineering and Operations Management (IEOM), pp. 2367-2374, 2021. doi.org/10.46254/NA06.20210419

2020

A Methodology for Estimating Hospital Intensive Care Unit Length of Stay Using Novel Machine Learning Tools

Batista R. W. and **Sanchez-Arias R.**

- In: Proceedings of the 19th IEEE International Conference on Machine Learning and Applications (ICMLA), Miami, FL, pp. 827-832, 2020. doi.org/10.1109/ICMLA51294.2020.00135

2020

A Framework for Intelligent Navigation Using Latent Dirichlet Allocation on Reddit Posts About Opiates

Akioyamen P., Nicklas L. and **Sanchez-Arias R.**

- In: Proceedings of the 4th International Conference on Compute and Data Analysis (ICCDA 2020). Association for Computing Machinery (ACM), New York, NY, USA, pp. 190–196, 2020. doi.org/10.1145/3388142.3388156

ICCDA paper is work with Fulbright Canada Killam Fellow Peter Akioyamen (Undegraduate student at Western University)

2019

Unsupervised Learning on the Health and Retirement Study using Geometric Data Analysis

Sanchez-Arias R. and Batista R. W.

- In: Proceedings of the 18th IEEE International Conference on Machine Learning and Applications (ICMLA), Boca Raton, FL, pp. 335-340, 2019. doi.org/10.1109/ICMLA.2019.00063

2019

Street Network Generation with Adjustable Complexity Using k-Means Clustering

Goss Q., Akbas M. I., Jaimes L. G. and **Sanchez-Arias R.**

- In: 2019 IEEE SoutheastCon, Huntsville, AL, USA, pp. 1-6, 2019. doi.org/10.1109/SoutheastCon42311.2019.9020392

2013

Sparse Fuzzy Techniques Improve Machine Learning

Sanchez R., Servin C., Argaez M.

- In: Joint World Congress of the International Fuzzy Systems Association and Annual Conference of the North American Fuzzy Information Processing Society IFSA/NAFIPS, pp. 531-535. 2013. doi.org/10.1109/IFSA-NAFIPS.2013.6608456

2011 **Sparse Representation via ℓ_1-minimization for Underdetermined Systems in Classification of Tumors with Gene Expression Data**
Sanchez R., Argaez M., Guillen P.

- In: IEEE 33rd Annual International Conference Proceedings of the Engineering in Medicine and Biology Society, pp. 3362 - 3366. 2011. doi.org/10.1109/IEMBS.2011.6090911

2011 **Characterization of Subcortical Structures During Deep Brain Stimulation Utilizing Support Vector Machines**
Guillen P., Martinez-de-Pinson F., **Sanchez R.**, Argaez M., Velazquez L.

- In: IEEE 33rd Annual International Conference Proceedings of the Engineering in Medicine and Biology Society, pp. 7949 - 7952. 2011. doi.org/10.1109/IEMBS.2011.6091960

2011 **Performance Comparison of an HPC ℓ_1-optimization Algorithm for Compressed Sensing**
Hernandez, M., Olaya, J., **Sanchez, R.**, Ramirez, C., Romero, R., Velazquez, L., Argaez, M.

- In: IEEE proceedings of Department of Defense High Performance Computing Modernization Program Users Group Conference, pp. 391-400. 2011.

2011 **An ℓ_1-algorithm for Underdetermined Systems and Applications**
Argaez, M., Ramirez, C., **Sanchez, R.**

- In: IEEE proceedings of the North American Fuzzy Information Processing Society, pp. 1 - 6. 2011. doi.org/10.1109/NAFIPS.2011.5752016

2010 **Hybrid Optimization Schemes for Wing Modeling of Micro-Aerial Vehicles**
Velazquez, L., Argaez, M., **Sanchez, R.**, Ramirez, C., Hernandez, M., Culbreth, M., Jameson A.

- In: IEEE proceedings of Department of Defense High Performance Computing Modernization Program Users Group Conference, pp. 149-154. 2010. doi.org/10.1109/HPCMP-UGC.2010.48

TALKS

2025 **AI-Enhanced Learning: Building Appreciation for the Mathematics Behind Machine Learning and Data Mining**
Invited Speaker in the SIAM Minisymposium on “Navigating the Future of Higher Education: The Role of AI in Teaching, Research, and Extension”, part of the at the Joint Mathematics Meetings (JMM)

- Invited Talk, January 2025. Seattle, WA

2024 **Applied Math Powering Data Science Solutions to Problems in Industry, Society, and Academic Research**
Panel Speaker at the 103rd Meeting of the Southeastern Section of the Mathematical Association of America (MAA-SE)

- Invited Talk. March 2024. Knoxville, TN.

2023 **Data Analytics Panel**
Panel Speaker in the IEOM 8th North American International Conference

- Invited Talk. June 2023. ▶

2023 **Impact of Computing and Analytics in IEOM Careers**
Webinar, South American Chapters, IEOM. With S. Taj and D. Demirel.

- Invited Talk. January 2023. ▶

2022 **Motivating the Study of Applied Mathematics Concepts with Data Mining Projects**
LatinX in the Mathematical Sciences Conference. Institute of Pure and Applied Mathematics (IPAM), University of California, Los Angeles (UCLA)

- Invited Talk. July 2022. Los Angeles, CA.

2022 **A Supervised Learning Approach to Assessing Accounts Receivable Risk in Small-to-Medium Enterprises**
7th North American Conference on Industrial Engineering and Operations Management (IEOM). June 2022

- Contributed Talk. June 2022. Orlando, FL.

▶: Virtual Presentation

Invited as scientific session speaker in the area of statistics and data analysis for the conference sponsored by the Institute for Pure and Applied Mathematics (IPAM) at UCLA

The INFORMS Teaching Effectiveness Colloquium features speakers from business and engineering schools who address different aspects of incorporating and assessing effective teaching techniques in OR/MS/analytics undergraduate or graduate curriculum.

2022 **Strategies for the Use of Computational Notebooks in Data Science Teaching and Research**
UTC Data Science Conference: Using Data Science to Enhance Student Research Training and Education in Pandemic
• Invited Talk. June 2022.

2022 **The Role and Impact of Applied Mathematics in Data Science and Machine Learning Applications**
SIAM Student Chapter at Georgia Gwinnett College
• Invited Talk. April 2022.

2021 **The Role and Impact of Applied Mathematics in Data Science and Machine Learning Applications**
Annual Meeting of the Colombian Section of the Society of Industrial and Applied Mathematics (Co-SIAM)
• Invited Talk. November 2021.

2021 **Dimensionality Reduction and Text Mining for Smart Content Filtering of an Online Health Forum**
The 6th North American Conference on Industrial Engineering and Operations Management (IEOM)
• Contributed Talk. November 2021.

2021 **Computational Notebooks for Teaching and Learning Data Science and Business Analytics**
INFORMS 2021 Teaching Effectiveness Colloquium.
• Invited Talk. October 2021.

2021 **Exploring Data Mining and Machine Learning Applications in STEM**
Purdue University SROP, Bridges and NCN URE Seminar
• Invited Talk. July 2021.

2021 **`dplyr`, `ggplot2` and Other `tidyverse` Friends: Modern Tools for Data Exploration and Visualization**
nanoHUB Champions Series
• Contributed Talk. June 2021.

2021 **The Big Role of Applied Mathematics and Statistics in Data Science**
Miami Dade College (MDC) Mathematics and Statistics Awareness Month
• Invited Talk. April 2021.

2021 **The Experience of Pursuing a PhD in the United States**
US Embassy in Colombia and the Centro Cultural Colombo Americano, Dia del Idioma at Universidad Autónoma de Occidente
• Invited Talk. April 2021.

2021 **Finding Structure in Reddit With Text Mining and Dimensionality Reduction: the Case of Miscarriage Experiences**
Healthcare Systems Process Improvement Conference
• Contributed Talk. February 2021.

2020 **A Methodology for Estimating Hospital Intensive Care Unit Length of Stay Using Novel Machine Learning Tools**
19th IEEE International Conference on Machine Learning and Applications
• Contributed Talk. December 2020.

2020 **Teaching Science and Engineering Using Jupyter Notebooks**
Summer 2020 Webinar Series Utilizing nanoHUB Tools for Materials Science Education
• Invited Talk. August 2020.

2020 **Using Jupyter Notebooks for Data Analysis and Scientific Computing**
Workshop Series for nanoHUB Florida Users Group
• Invited Talk. July 2020.

2020 **Unsupervised Learning Problems in Data Science**
Board of Trustees Meeting. Florida Polytechnic University

• Invited Talk. February 2020. Lakeland, FL.

2018 **Data Science of Social Networks**
St. Thomas University, Library Lecture Series

• Invited Talk. April 2018. Miami, FL.

2017 **A Discussion on Data Analytics and Machine Learning Applications for Engineering and Science**
Florida International University, Department of Biomedical Engineering, (Wallace H. Coulter Lecture Series)

• Invited Talk. October 2017. Miami, FL.

2017 **Data Science and Big Data Analytics for Social Good**
Marines 4th Civil Affairs Group (CAG) Planning Exercise

• Invited Talk. July 2017. Miami, FL.

2016 **A Duality Approach For Sparse Representation In Classification**
SIAM Annual Meeting 2016

• Contributed Talk. July 2016. Boston, MA.

2014 **Sparse Representation via ℓ_1-optimization and Supervised Learning**
Department of Biomedical Engineering Seminar. Universidad de Los Andes

• Invited Talk. July 2014. Bogota, Colombia.

2014 **Sparse Regularization for Data Mining and Approximation**
VIII Pan-American Workshop: Applied and Computational Mathematics. Universidad del Norte

• Contributed Talk. July 2014. Barranquilla, Colombia.

2014 **Sparse Regularization for Data Mining and Approximation**
Institute of Mathematical Sciences Seminar. Universidad de Antioquia

• Invited Talk. July 2014. Medellin, Colombia.

2013 **Introduction to Sparse Optimization and Applications in Machine Learning**
Taller de Avances en Matemática Aplicada y Biomatemática 2013, Two-day mini-course at Universidad Autónoma de Occidente

• Invited Talk. November 2013. Cali, Colombia.

2012 **Sparse Representation and Applications in Classification**
UTEP 2nd Annual Graduate Research Expo

• Contributed Talk. November 2012. El Paso, TX.

2011 **Sparse Representation via ℓ_1-minimization for Underdetermined Systems in Classification of Tumors with Gene Expression Data**
IEEE 33rd Annual International Conference of the Engineering in Medicine and Biology Society

• Contributed Talk. August 2011. Boston, MA.

2011 **An ℓ_1-algorithm for Underdetermined Systems and Applications**
North American Fuzzy Information Processing Society, NAFIPS 2011

• Contributed Talk. March 2011. El Paso, TX.

2010 **Hybrid Optimization for Parameter Estimation Problems**
The International Conference for High Performance Computing (SC10). Demonstration at AHPCRC booth

• Invited Talk. November 2010. New Orleans, LA.

2010 **Hybrid Optimization Schemes for Parameter Estimation Problems**
Army High Performance Research Computing Center (AHPCRC) Annual Review. Stanford University

• Contributed Talk. July 2010. Palo Alto, CA.

2009 **A Path Following Method for Large Scale ℓ_1-underdetermined Problems**
6th Joint UTEP/NMSU Workshop on Mathematics, Computer Science and Computational Sciences

• Contributed Talk. November 2009. El Paso, TX.

2009 **A Path Following Method for Large Scale ℓ_1-underdetermined Problems**
XVII Colombian Congress of Mathematics

• Contributed Talk. August 2009. Cali, Colombia.

TECHNICAL REPORTS

2018 **Semi-supervised Learning Methods for Early Prediction and Forecasting of Clinical Deterioration**
Sanchez-Arias R., Sole A., Rojas J.

• Technical Report for MediKos Inc, 2018.

WORK IN PROGRESS

Machine Learning Framework for the Prediction of Response to Radiation Therapy Using Gene Expression Profiles
Rico F. , Centeno C., **Sanchez-Arias R.**, Kuzniac L., Eschrich S. and Torres-Roca J.

The Cyber-Attack Iceberg: Evidence from an Extended Event Study of the Impact on Securities Prices
Frino A., Galati L., Mollica V., **Sanchez-Arias R.**, Webb R.

Graph Kernels for Unsupervised Learning Methods in Text Mining
Nicklas L., **Sanchez-Arias R.**

POSTERS

2020 **Attitudes Towards Hot Lanes Using Dimensionality Reduction And Clustering**
Transportation Research Board Annual Meeting

• Washington, DC. January 2020. (Presented by S. Vadlamani and Y. Lou)

2019 **Unsupervised Learning on the Health and Retirement Study using Geometric Data Analysis**
18th IEEE International Conference on Machine Learning and Applications

• Boca Raton, FL, December 2019. (With R. Batista)

2019 **Exploratory Analysis of Citrus Farming Amidst the "Greening" Problem in Polk County, Florida**
2019 Florida Academy of Sciences Annual Meeting

• Melbourne, FL. March 2019. (Presented by Miguel Amaral and Melba Horton)

2018 **Analysis of Microbial Communities Reflect Diel Vertical Migration in the Gulf**
SACNAS: The National Diversity in STEM Conference

• San Antonio, TX, October 2018. (Presented by Claudia Gorbea)

2018 **Music Data Mining Using Audio Features Extracted from Spotify**
STU Summer Research Institute 10th Annual Symposium

• Miami Gardens, FL, October 2018. (Presented by S. Benito)
• Sandy Benito won "outstanding poster presentation award" for this work.

2018 **Text Mining and Pattern Recognition for Online Reviews**
Miami-Dade College Undergraduate Research Symposium

• Miami, FL, September 2018. (Presented by Maudeline Deus)
• Maudeline Deus won second-place for "best poster presentation award".

2012 **Dimensionality Reduction and Sparse Representation for Classification**
SIAM Annual Meeting

• Minneapolis, MN. July 2012.

2011 **Hybrid Optimization Schemes For Parameter Estimation Problems**
Army High Performance Computing Research Center Program Management Board Meeting
• Stanford University, Palo Alto, CA. November 2011.

2011 **Characterization of Subcortical Structures During Deep Brain Stimulation Utilizing Support Vector Machines**
IEEE 33rd Annual International Conference of the Engineering in Medicine and Biology Society
• Boston, MA. August 2011.

2011 **A Sparse Representation Technique for Classification Problems**
7th International Congress on Industrial and Applied Mathematics - ICIAM 2011
• Vancouver, BC Canada. July 2011.

2010 **An Algorithm for Constrained ℓ_1-minimization Problems and Applications**
Sixth Blackwell-Tapia Conference
• Columbus, OH. November 2010.

2010 **A Path Following Method for Large Scale ℓ_1-underdetermined Problems**
Minority Serving Institutions Research Partnerships Consortium Conference
• Baltimore, MD. April 2010.

2009 **A Path Following Method for Large Scale ℓ_1-underdetermined Problems**
The International Conference for High Performance Computing (SC09)
• Portland, OR USA. November 2009.

2009 **A Fixed Point Algorithm for ℓ_1 Large Scale Underdetermined Systems**
UTEP SACNAS Research Expo 2009
• El Paso, TX. April 2009.

2008 **Parallel Global Optimization Schemes for Parameter Estimation Problems**
The International Conference for High Performance Computing (SC08)
• Austin, TX. November 2008.

SELECTED PRESS

2023 **"Polk County awarded $4.1 million to expand access to high-speed internet"**
ABC Actions News Tampa Bay
• Featured on TV interview to comment on the broadband feasibility study that was used to apply for the award.

2023 **"Dutch Charlemagne Fellow explores deep tech startups"**
Florida Poly News
• Featured as collaborator of Sabine Kerssens, a Charlemagne Prize Fellow, for potential use of data mining methods to understanding and analyze deep tech innovation and survival.

2023 **"Florida Poly researchers' work lays foundation for expanded high-speed internet access"**
Florida Poly News Website
• Featured as the Co-PI and Project Manager of the **broadband feasibility study** for Polk County, Florida. The study helped the county support its application for federal grants for broadband infrastructure in the region.

2023 **"Fulbright Senior Scholar shares research on true cost of cyberattacks"**
Florida Poly News Website
• Featured as part of the international research group working with **Fulbright Senior Scholar Professor Alex Frino**.

2023 "Drawing upon Florida Poly study, Polk County seeks grants to expand broadband access"
The Ledger Lakeland Newspaper

- Featured as investigator of the broadband feasibility study for Polk County, used to apply for federal grants for improved broadband access.

2022 "Florida Poly launches two new master's degree programs"
Florida Poly News Website

- Story about graduate programs development at Florida Poly.

2022 "Data Science and Business Analytics charge ahead at Florida Poly"
Florida Poly News Website

- Featured for participation and organizing efforts of the IEOM 2022 Conference.

2022 "Rei Sanchez-Arias: Biography"
Lathisms Website

- Featured as one of the 2022 Latinx and Hispanics in the Mathematical Sciences, during Hispanic Heritage Month.

2021 "Lifelong love of learning inspires Dr. Sanchez-Arias to help students succeed"
Florida Poly News Website

- Story for the National Hispanic Heritage Month.

2020 "Data science student creates nanoHUB tool to enhance remote education"
Florida Poly News Website

- Story about data science student experience in **Purdue University** nanoHUB URE/UCEE program working under my supervision.

2020 "Opening doors for students and faculty: summer programs deliver educational gateway tools developed by students"
Science Gateways Community Institute

- The Science Gateways Community Institute, funded by NSF in 2016, shared a post about Purdue University's program in which I supervised a data science student.

2020 "Data science researchers at Florida Poly work to improve online community use"
Florida Poly News Website

- Article regarding **Peter Akioyamen, Killam Fellow** (student from Western University) experience and work at Florida Poly under my supervision, during his **Fulbright Canada** exchange program.

2020 "Florida Poly cements partnership with prestigious Brazilian university"
Florida Poly News Website

- For this collaborative effort, I worked with a Florida Poly graduate student to apply data mining and data visualization methods for information processing from data centers at Facens' smart campus.

PROFESSIONAL DEVELOPMENT

Department Chairs Workshop
Institute for Academic Leadership, The Florida State University, Howey-in-the-Hills, Florida, June 4-7, 2023.

Proposal Writing Institute
Council on Undergraduate Research, University of Wisconsin at Oshkosh, Wisconsin, July 13-17, 2023.

Data Visualization Workshop
Southern Data Science Conference, Atlanta, GA, April 13, 2019.

Computer and Information Science and Engineering (CISE) Proposal Writing Workshop
National Science Foundation (NSF) Headquarters, Alexandria, VA April 9-10, 2018.

ACADEMIC SUPERVISION AND MENTORING

Thesis and Graduate Project Advisor

Florida Polytechnic University, St. Thomas University

- Final Project Advisor for **Isabel Zimmerman**, MS in CS Data Science Track.
  Florida Polytechnic University. Graduation term: Spring 2023.
  Topic: ***Meta-analysis of the machine learning operations open source ecosystem***.

- Final Project Advisor for **Yordanos Jewani** MS in Data Science.
  Florida Polytechnic University. Graduation term: Spring 2023.
  Topic: ***Prediction Evaluation of Confinement Loss of Hollow Core Optical Fiber Using Machine Learning Algorithms***.

- Final Project Advisor for **Gabriel Mantini** MS in Data Science.
  Florida Polytechnic University. Graduation term: Fall 2022.
  Topic: ***Text Mining for Data Science Programs Benchmarking***.

- Final Project Advisor for **Jeffrey DuBois** MS in CS Data Science Track.
  Florida Polytechnic University. Graduation term: Spring 2022.
  Topic: ***Interactive Credit Union Peer and Performance Analysis Dashboard***.

- Final Project Advisor for **Angel Sarmiento**. MS in CS Data Science Track.
  Florida Polytechnic University. Graduation term: Fall 2021.
  Topic: ***Data-Driven STEM Curriculum Design and Education with Unsupervised Learning Techniques***.

- Final Project Supervisor for **Greg Dills**. MS in CS Data Science Track.
  Florida Polytechnic University. Graduation term: Summer 2021.
  Topic: ***Association Rule Mining for Spot Rate Quoting Process Improvement***.

- Final Project Supervisor for **Katie Dills**. MS in CS Data Science Track.
  Florida Polytechnic University. Graduation term: Summer 2021.
  Topic: ***Logistics Store Forecast Workspace and Analytics***.

- Thesis Advisor for **Levi Nicklas**. MS in CS Data Science Track.
  Florida Polytechnic University. Graduation term: Spring 2021.
  Topic: ***Graph Kernels for Text Mining in Unsupervised Learning***.

- Final Project Supervisor for **Morgan Nibert**. MS in CS Data Science Track.
  Florida Polytechnic University. Graduation term: Spring 2021.
  Topic: ***Sentiment Analysis and Clustering for Content Recommendation System Using Microblogging Data***.

- Final Project Supervisor for **Diego De Paula**. MS in CS Data Science Track.
  Florida Polytechnic University. Graduation term: Spring 2021.
  Topic: ***Data Mining and Analytics Applications for Interconnected Data Centers in a Smart Campus*** (with Dr. Regiane Relva Romano from Facens, Brazil).

- Thesis Supervisor for **Roberto Batista**. MS in CS Data Science Track.
  Florida Polytechnic University. Graduation term: Spring 2020.
  Topic: ***Unsupervised and Supervised Machine Learning Methods for Healthcare Applications using Diversified Data Sources***.

- Final Project Supervisor for **Adam Seevers**. MS in CS Big Data Analytics.
  Florida Polytechnic University Graduation term: Spring 2020.
  Topic: ***Data Analytics and Predictive Modeling for Social Networks Data***.

- Final Project Supervisor for **Jonathan Ferrer**. MS in CS Big Data Analytics.
  Florida Polytechnic University Graduation term: Spring 2019.
  Topic: ***Supervised Machine Learning Algorithm for the IB Program in Hillsborough County Florida***.

- Capstone Project Supervisor for **Yasshin Lozano**. MS in Big Data Analytics.
  St. Thomas University Graduation term: Summer 2018.
  Topic: ***Development of an Analytics App for the Canvas Learning Management System***.

- Capstone Project Supervisor for **Javier Rojas**. MS in Big Data Analytics.
  St. Thomas University Graduation term: Summer 2017.
  Topic: ***Predictive Modeling and Development of an Early Warning Score for Patient Deterioration***.

Former graduate students have pursued careers with IBM, MidFlorida Credit Union, Posit PBC (RStudio), Publix, Saddle Creek Logistics, The Hartford, Turner & Townsend, Florida International University, Air Force Institute of Technology, among others

Thesis/Project Committee Member
Florida Polytechnic University

- George Westergaard: (thesis committee member) MS in Computer Science. Graduation term: Spring 2024. (Advisor: Dr. Demirel)
- Yasar Kakdas: (thesis committee member) MS in Computer Science. Graduation term: Spring 2024. (Advisor: Dr. Demirel)
- Alejandro Cabrera: (thesis committee member) MS in Computer Science. Expected Graduation: Fall 2023. (Advisor: Dr. Karaman)
- Kevan Baker: (thesis committee member) MS in Computer Science. Graduation term: Spring 2023. (Advisor: Dr. Demirel)
- Chinmoy Modak: (project advisory committee member) MS in Computer Science. Graduation Term: Fall 2022. (Advisor: Dr. Demirel)
- Orel Yoshia: (project advisory committee member) MS in CS Data Science track. Graduation Term: Spring 2022. (Advisor: Dr. Taj)
- Ethan Bard: (project advisory committee member) MS in CS Data Science track. Graduation Term: Spring 2022. (Advisor: Dr. Shi)
- Vin Seixas: (thesis commmittee member) MS in Computer Science. Graduation Term: Spring 2022. (Advisor: Dr. Elish)
- James Dials: (thesis committee member) MS in Computer Science. Graduation Term: Fall 2021. (Advisor: Dr. Demirel)
- Jordan Jones: (project advisory committee member) MS in Computer Science. Graduation term: Fall 2021. (Advisor: Dr. Demirel)
- Steves Sestari: (thesis committee member) MS in Computer Science. Graduation term: Spring 2021. (Advisor: Dr. Towle)
- Xin Wang: (thesis committee member) MS in Computer Science. Graduation term: Spring 2021. (Advisor: Dr. Jaimes)
- Joshua Olabisi: (thesis committee member) MS in CS Data Science track. Graduation Term: Spring 2020. (Advisor: Dr. Centeno)
- Michael Nelson: (thesis committee member) MS in CS Data Science track. Graduation Term: Spring 2020. (Advisor: Dr. Vadlamani)
- Anita Silwal: (project advisory committee member) MS CS Analytics Track. Graduation Term: Spring 2019. (Advisor: Dr. Vadlamani)
- Kiran Dundu: (project advisory committee member) MS in Logistics Analytics. Graduation Term: Fall 2019. (Advisor: Dr. Taj)

Academic Advisor and Mentor
Fulbright Students

- Fulbright Germany Mentor Fall 2023.
  Jan Hery (Karlsruhe University of Applied Sciences)
  Semester abroad at Florida Polytechnic University, MS in Data Science coursework.

- Fulbright Germany Mentor Fall 2023, Spring 2024.
  Alexander Burkhart
  MS in Data Science, Florida Polytechnic University.

- Fulbright Germany Mentor Fall 2022, Spring 2023.
  Tom Mann
  MS in Engineering Management, Florida Polytechnic University.

- Fulbright Canada Killam Fellow Mentor Fall 2019.
  Peter Akioyamen's (Western University, Applied Mathematics and Data Science)
  Semester abroad at Florida Polytechnic University.

Undergraduate Advisor
Florida Polytechnic University, St. Thomas University

- nanoHUB URE NCN Mentor Summer 2020.
  Cindy Nguyen's (Florida Polytechnic University, Data Science)
  Undergraduate Computational Education Experience with nanoHUB
  (with Dr. Tanya Faltens, Network for Computational Nanotechnology at Purdue University)

- STU Summer Research Institute 2017 and 2018 Mentor and Supervisor.
  Eliana Espinosa, Sierra Hawthorne (STU, Applied Mathematics),
  Jayden Carr (STU, Computer Science),
  Sandy Benito and Celeste Pereira (STU, Biology),
  Kevin Osorio, Acxel Vega, Jose Muguira, Sabrina Romero (MDC, Computer Science),
  Maudeline Deus (MDC, Mathematics)

SERVICE

Present | 2024

University of North Carolina at Chapel Hill

Faculty Task Force for SDSS Artificial Intelligence Strategy
Search Committee Chair SDSS Teaching Assistant Professor (TAP AY25-26)
Search Committee Chair for MADS Section Instructor Position
Search Committe Member for SDSS Student Services Mananager Position

Present | 2019

INFORMS

Education Outreach Committee Member

2024 | 2018

Florida Polytechnic University

Curriculum and Assessment Committee Chair DSBA
Graduate Curriculum Council Member
Scenarios of the Future, COVID-19 Campus Planning Subgroup
DSBA Student Club Faculty Advisor
Strategic Plan Sub-committee Member
Academic Integrity Panel Member
Data Science and Business Analytics Faculty Hiring Committee

2022

Industrial Engineering and Operations Management Society

IEOM Conference Associate Chair

- Worked with IEOM operations manager, conference chair and coordinator, and other IEOM team members to organize the IEOM North American Conference in Orlando, Florida held in June 2022.

2020

University of Tennessee at Chattanooga

Evaluation Panel Student Coding Bootcamp

- Member of the evaluation panel for the “Analyze COVID-19 Data with R and Google CoLab” event. Organized by Dr. Hong Qin, UTC, December 2020.

2018 | 2017

St. Thomas University

Computer Science Faculty Hiring Committee Chair
General Education Committee Member
Faculty Lead Dual Enrollment Program
Dean School of Science Search Committee Member

2016 | 2015

Wentworth Institute of Technology

Faculty Advisor, SIAM Student Chapter
Applied Mathematics Faculty Hiring Committee Member

2013 | 2011

The University of Texas at El Paso

UTEP SIAM Student Chapter Vice-president
UTEP Graduate Research Expo Judge (Fall 2012)

Professional Affiliations:

Society for Industrial and Applied Mathematics (SIAM)

Institute for Operations Research and the Management Sciences (INFORMS)

Institute of Electrical and Electronics Engineers (IEEE)

Industrial Engineering and Operations Management (IEOM)