Javier Salazar Cavazos

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Education

PhD	**University of Michigan**, Electrical & Computer Engineering	Ann Arbor, MI, USA
	• Dissertation: TBD/WIP	Aug 2021 – present
	• Advisors: Laura Balzano 🔗, Jeffrey Fessler 🔗, and Scott Peltier 🔗	
MS	**University of Michigan**, Electrical & Computer Engineering	Ann Arbor, MI, USA
	• GPA: 3.95/4.0 🔗	Aug 2021 – May 2023
	• Concentration: Signal/Image Processing & AI/Machine Learning	
BS	**University of Texas**, Electrical Engineering	Arlington, TX, USA
	• GPA: 4.0/4.0 🔗, summa cum laude	Aug 2015 – May 2020
	• Capstone Project: Wheelchair Dynamometer 🔗	
BS	**University of Texas**, Mathematics	Arlington, TX, USA
	• GPA: 4.0/4.0 🔗, summa cum laude	Aug 2015 – May 2020

Industry Experience

KLA 🔗, Algorithm Engineering Intern — Ann Arbor, MI, USA — May 2025 – Aug 2025

- Worked with the reticle/photomask electron beam team on an image processing problem to mitigate artifacts present in SEM images for better defect inspection (less false positives).
- Designed a fast algorithm to remove artifact structures that made it into the production codebase for real-world use. Click here for more details 🔗.

KLA 🔗, Algorithm Engineering Intern — Ann Arbor, MI, USA — May 2024 – Aug 2024

- Worked with the reticle/photomask team to group majority image patterns and outliers to augment defect classification systems.
- Designed deep learning clustering and outlier detection algorithms to reduce customer intervention time in reticle development. Click here for more details 🔗.

Precision Design 🔗, Co-Founder — Arlington, TX, USA — 2020 – present

- I designed an aftermarket 3rd brake light for Ford F150/Raptor model trucks. Myself, along with my business partner, sell these products on our site precisiondesign.us 🔗. We have shipped over 500 units to date. Click here for product drawings 🔗.

Olsson 🔗, Assistant Electrical Engineer — Fort Worth, TX, USA — Aug 2020 – Aug 2021

- Designed electrical power distribution systems for data center clients and analyzed systems for short circuit analysis, arc flash mitigation, and breaker setting coordination. Click here for a time current curve (TCC) example 🔗.

Brohard Architecture 🔗, Architectural Draftsman — Dallas, TX, USA — Sept 2017 – July 2019

- Designed building models using Autodesk Revit and created floor plans, ceiling plans, interior/exterior elevation plans, and perspective plans for commercial & residential projects. Click here for an example project 🔗.

Premier Surveying 🔗, AutoCAD Technician — Plano, TX, USA — Jan 2015 – Aug 2017

- Drafted residential title surveys using Autodesk AutoCAD Civil3D and analyzed field data, city plats, FEMA flood maps, title commitments, and easements to construct drawings. Click here for a title survey example ⎋.

Publications

Smooth optimization algorithms for global and locally low-rank regularizers　　　　2025
Rodrigo Lobos, *Javier Salazar Cavazos*, Raj Rao Nadakuditi, Jeffrey A. Fessler
10.48550/arXiv.2505.06073 ⎋ (Under review at SIAM Journal on Optimization)

ALPCAHUS: Subspace Clustering for Sample-wise Heteroscedastic Data　　　　2025
Javier Salazar Cavazos, Jeffrey A. Fessler, Laura Balzano
10.48550/arXiv.2505.18918 ⎋ (Under review at IEEE Transactions on Signal Processing, TSP)

Alzheimers Disease Classification in Functional MRI With 4D Joint Temporal-Spatial Kernels in Novel 4D CNN Model　　　　May 2025
Javier Salazar Cavazos, Scott Peltier
10.48550/arXiv.2506.02060 ⎋ (International Society for Magnetic Resonance in Medicine, ISMRM)

ALPCAH: Subspace Learning for Sample-wise Heteroscedastic Data　　　　Jan 2025
Javier Salazar Cavazos, Jeffrey A. Fessler, Laura Balzano
10.48550/arXiv.2505.07272 ⎋ (IEEE Transactions on Signal Processing, TSP)

Sample-wise Heteroscedastic PCA with Tail Singular Value Regularization　　　　Aug 2023
Javier Salazar Cavazos, Jeffrey A. Fessler, Laura Balzano
10.48550/arXiv.2307.02745 ⎋ (14th Conference on Sampling Theory and Applications, SampTA)

Certifications

Linux Essentials ⎋, Linux Professional Institute (LPI): Covered the fundamentals such as basic concepts of open source, Linux command line, understanding files and scripts, and security/permissions

A+ ⎋, Computing Technology Industry Association (CompTIA): Covered various aspects of computer hardware, software, networking, security, and troubleshooting to manage IT infrastructures

Solidworks Associate in Mechanical Design ⎋, Dassault Systèmes: Covered the fundamentals of 3D modeling, assembly design, and simulation using Solidworks software

AutoCAD Professional ⎋, Autodesk: Covered the fundamentals of 2D drafting and design documentation using AutoCAD software

F.E. Electrical and Computer ⎋, National Council of Examiners for Engineering and Surveying (NCEES): Covers topics such as circuits, electronics, control systems, and digital systems

Languages

Programming: Proficient with Python, Pytorch, Julia, LaTeX; basic familiarity with MATLAB and C

Traditional: English (native), and Spanish (native)

Awards

Rackham Merit Fellow (RMF): The RMF Award is a highly competitive named fellowship awarded to students who have outstanding academic qualifications, show exceptional potential for scholarly success in their graduate program, and demonstrate promise for contributing to wider academic, professional, or civic communities

Mathematic Academic Excellence (MAE): The MAE Award is a departmental award granted by the math department from the University of Texas system to students that demonstrate potential and excellence in the field of mathematics

Projects

Modern Vision architectures ⎋

- Implemented various modern vision architectures such as Vision Transformer, ConvNeXT, MLP-Mixer, and VAE, for Alzheimers disease classification in structural MRI using the ADNI dataset.

Human Pose Estimation ⧉

- Implemented a vision transformer (ViT) model for human pose estimation using the COCO dataset. The model predicts the locations of keypoints on the human body from images.

Matrix Factorization Review ⧉

- Wrote a literature review paper on solving matrix factorization problems that are useful for things like matrix sensing, phase retrieval, and PCA-like problems.

Metropolis-Hastings Sampling ⧉

- Implemented the Metropolis-Hastings (Markov chain Monte Carlo) algorithm for sampling from complex distributions. This method is widely used in Bayesian statistics for generating samples from posterior distributions.

Zeroth-Order Optimization Methods ⧉

- Implemented various zeroth-order optimization algorithms (no gradient function, only cost function). These methods are useful for optimizing black-box functions where gradient information is not available or expensive to compute.

Computer Vision Algorithms ⧉

- Implemented various classical and deep learning methods for computer vision tasks in Python/PyTorch such as: scene recognition (VGG network), panorama stitching (with SIFT features), image blending (laplacian pyramids), image generation (diffusion models), image autoencoders (VAE), Neural style transfer (GANs), and object detection (FCOS detector w/ CNN).

Wheelchair Dynamometer ⧉

- Designed and built the software and electrical hardware components of a wheelchair dynamometer to measure the power output of wheelchair athletes. This system acts as a treadmill for wheelchair users.

Machine Learning Algorithms ⧉

- Implemented various machine learning algorithms from scratch in MATLAB such as linear regression (LR), linear discriminent analysis (LDA), expectation maximization (EM), k-Means clustering, k-Nearest Neighbors (kNN), and multilayer perceptron (MLP).

Stochastic Models & Simulations ⧉

- Stochastic modeling is useful for many real-world scenerios. From random number generation, Markov chains, random walks, and Black-Scholes option pricing, and more. I implemented simulations of these processes in Mathematica to analyze their properties and behaviors.

Numerical Analysis Algorithms ⧉

- Numerical analysis is the study of mathematical numerical algorithms such as ODE solvers, Taylor approximations, matrix solvers, root finders, numerical integration, and more. In this project, I implemented several numerical analysis algorithms in MATLAB from scratch and analyzed their performance and accuracy.

Image/Video Compression ⧉

- Implemented two different compression techniques DPCM and DCT for video compression. The DCT method is commonly used in MPEG/JPEG algorithms for MP4/JPG files.

WiFi Antenna Design ⧉

- Designed, optimized, and tested a 2.4GHz/5GHz wifi antenna using ANSYS HFSS modeling software and electronic equipment such as a vector network analyzer (VNA) and spectrum analyzer.

Teaching

EECS551, Matrix Methods for Signal Processing, Data Analysis, & Machine Learning, University of Michigan: This is a course where I lead a weekly discussion that covers coding algorithms in Julia for machine learning tasks using linear algebra techniques. Moreover, we go through example questions to reinforce course material and exam preparation. This is besides the usual GSI expectations of dealing with homework assignments, tests, and office hours

EECS351, Digital Signal Processing, University of Michigan: This is a DSP course where I lead a weekly discussion reinforcing course material through further mathematical analysis and examples

Undergraduate Research Opportunity Programs

MRI Mesh & Sling Segmentation ⧉, Research Assistant, UT Southwestern Medical Center
Dallas, TX, USA
Aug 2018 – Sept 2019
- Researched machine learning methods of identification and segmentation of meshes & slings, along with common pelvic floor features, in MR images for radiologist assistance in 3D visualization-guided surgery planning.
- Presented Automatic Segmentation & 3D Visualization of MR Images of Pelvic Floor ⧉ at the Modern Challenges in Imaging ⧉ conference located at Tufts University, Medford, Massachusetts.

Iceberg Path Prediction ⧉, Summer Intern, Dartmouth College
Hanover, NH, USA
May 2018 – Aug 2018
- Researched the mathematics of Bayesian inference methods for iceberg prediction tracking by modeling partial differential equations, simulated the model using Markov chain Monte Carlo sampling techniques, and predicted drag coefficients for iceberg path modeling.

Mathematics of Medical Imaging ⧉, Research Intern, UT Arlington
Arlington, TX, USA
Aug 2016 – Aug 2017
- Researched and implemented the mathematics of computerized tomography such as Radon transform and filtered backprojection for image reconstruction of artificial phantoms.