

# Carlos Salinas

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## OBJECTIVE

ABD PhD student in theoretical mathematics. Experience with research mathematics, wavelet image compression, numerical analysis, numerical linear algebra, and neural networks. Advanced knowledge of Python, R, and (Postgre)SQL. Practical experience with C, C++, and SQL. Very fast learner.

## EDUCATION

*Master of Science, Mathematics*  
Purdue University, West Lafayette, IN  
GPA 3.73

August 2020

*Bachelor of Science, Mathematics*  
University of Texas–Pan American, Edinburg, TX  
GPA 3.86

May 2014

## SKILLS

*Programming languages:* Python, Matlab/Octave, C++, C, R, Java, Lisp  
*Python packages:* numpy, scikit-learn, matplotlib, pandas, keras, spaCy  
*R packages:* ggplot, tidyverse, tidymodels, dplyr, forcats, modelr, shiny  
*Misc. software:* Emacs, Vim, SQL, Git, Latex, Mathematica, LibreOffice, Google Docs  
*Operating systems:* Linux (Debian, Fedora), FreeBSD, Windows  
*Languages:* English (native), Spanish (native), Russian (fluent), Persian (conversant)

## WORK EXPERIENCE

*Graduate Student/Teaching Assistant*  
Department of Mathematics, Purdue University, West Lafayette, IN

August 2014–May 2020

- Led two to three recitation sections per semester for Purdue's undergraduate level math courses including Calculus 1, 2, 3, and Differential Equations/Linear Algebra.
- Analyzed students' performance on homework, quizzes, and midterms with Libreoffice's Cal (an open-source clone of MS Excel).
- Graded and designed homework/quizzes for undergraduate linear algebra as well as the graduate level Advanced Mathematics for Engineers.
- Maintained a university associated website to which I uploaded relevant course material such as quiz and homework solutions, recitation notes, and quiz and midterm statistics, cut-off ranges.
- Studied the properties of finite quotients of finitely generated nilpotent groups.
- Studied the zeta function associated to finite quotients of the free nilpotent group and wrote code in Sage to compute coefficients its coefficients.

*Experimental Algebra & Geometry Lab System Admin/Research Assistant*  
University of Texas–Pan American, Department of Mathematics, Edinburg, TX

September 2013–May 2014

- Managed the Geometry Lab's Fedora cluster.
- Maintained an operational CUDA computing workstation for carrying out numerical simulations and experiments.
- Kept the lab's 3D printer in tip-top shape by updating its software, cleaning extruder residue from the nozzle, and replacing and ordering filament.
- Engaged with local schools in math and geometry related outreach activities.
- Performed in several skits for Dr. Lawton's *Your Teachers Are Lying To You!* outreach program.
- Wrote an algorithm in Mathematica to study the trace of representations in character varieties taking advantage of the cyclic property of the trace operator.
- Discovered a correspondence between so-called 2-special pairs and pairs of orientable necklaces.
- Published the associated sequence in the On-line Encyclopedia of Integer Sequences under A237623.
- Presented results at Howard University's Workshop on Character Varieties and Geometric Structures.

## TALKS

*Cybenko's Approximations by superpositions of sigmoidal functions*

Spring 2019

Machine Learning and Information Processing Reading Group, Purdue University, West Lafayette, IN

- Introduced the audience to a foundational result in the study of artificial neural networks.
- Proved the necessary lemmas to show that sigmoidal functions can approximate any continuous function.

*Wavelet image compression*

Fall 2015

Department of Mathematics, Purdue University, West Lafayette, IN

- Wrote with a team an implementation of a wavelet image compression algorithm in C.
- Presented functional code to the audience and explained specifics behind the compression algorithm.
- Worked on the Q-coder part of the algorithm which is type of entropy coding used to compress binary sequences.