

# MAURICIO TEC

## Research Scientist

@ mauriciogtec@utexas.edu    512-739-8196    Austin, TX    <https://mauriciogtec.github.io/>  
@mauriciogtec    [linkedin.com/in/mauriciogtec](https://www.linkedin.com/in/mauriciogtec)    [github.com/mauriciogtec](https://github.com/mauriciogtec)

## EXPERIENCE

### Research Intern

Intel AI - Movidius

📅 Summer 2019

Movidius provides solutions for deploying vision algorithms at ultra-low power

Investigated the resilience of image-recognition neural networks in mission-critical scenarios. Detected vulnerabilities and characterized failures with respect to bit errors—common in hardware accelerators. Developed a small-overhead mitigation strategy. Coded in Python Tensorflow. Research paper coming soon.

### Graduate Research Assistant

The University of Texas at Austin

📅 2018 – 2019

Large-scale spatiotemporal density smoothing (with Prof. James G. Scott)

Developed a fast algorithm for smoothing statistical estimates along the edges of a graph with noisy and sparse data in each vertex. Coded in Julia and tested on a Linux supercomputer with attention to memory efficiency and parallelism at all levels: distributed, multithreading and vectorization. Applied the method to ride-sharing data in a case study to detect spatiotemporal effects in driver productivity.

endingglobalhunger.org (with Prof. Kate Weaver)

Created a web app and a Python toolkit with scrapers and content analysis tools for tracking vote information and news from Members of Congress on Food Security policy issues.

### Data Scientist

CIBanco

📅 2016 – 2017

Financial group that offers portfolio management, and brokerage services

Developed an in-house portfolio optimization toolkit using R and C++ used for successful mid-term investment strategies. Implemented a data warehouse and a wide range of reporting tools using SQL, R, and Shiny.

## OTHER RESEARCH PROJECTS

### Variational Models for Commonsense Knowledge Extraction

with Prof. James G. Scott

We propose a novel framework to mitigate the problems in extracting information of commonsense knowledge of quantitative attributes from text corpora. We are developing robust graph smoothing and variational Bayesian neural network techniques that leverage language models and word embeddings to produce denoised correlation-aware and semantic-aware resources; thus, enabling a pipeline for the automatic construction of high-quality quantitative attributes in knowledge bases that is robust to noise in web text corpora.

### Textworld Competition

with Prof. Stephen Walker

Investigated the principles behind Google Alpha's Zero reinforcement learning algorithm (e.g., MCTS, residual networks) for playing board games and replicated it for small Go boards. Designed an agent based on similar techniques that plays text-based games (e.g. Zork) and participated in the TextWorld competition, achieving 10th place. Used NLTK and Transformer-based neural networks for the agent.

### Random Clique Covers

with Prof. Sinead Williamson

Proposed Random Network models based on clique covers that match the local clustering coefficient and sparsity of real-world networks, outperforming state-of-the-art models for sparse networks in Bayesian frameworks.

## EDUCATION

### Ph.D. in Statistics

The University of Texas at Austin, USA

📅 2017 to date

GPA: 4.0

Advisor: James G. Scott

### M.Sc. in Mathematics

University of Cambridge, UK

📅 2014 – 2015

Cambridge Trust Scholarship (full funding)  
SEP Scholarship (4k USD stipend)

### B.Sc. Applied Mathematics

ITAM, Mexico

📅 2007 – 2012

Bailleres Scholarship (full funding)

### Exchange student

Universite Paris Dauphine, France

📅 2011-2012

Masters (M1) Applied Mathematics  
All courses in French

## SKILLS

### Computing

Python   R   Julia   C++

Parallel Computing   Linux

### Statistics / Machine Learning

Deep Learning

Natural Language Processing

Bayesian Machine Learning

Reinforcement Learning

Graph Algorithms

## LANGUAGES

- English (fluent)
- Spanish (fluent)
- French (advanced)
- German (beginner)

## PUBLICATIONS

### Journal Articles

- Zuniga-Garcia, Natalia et al. (2019). "Evaluation of Ride-Sourcing Search Frictions and Driver Productivity: A Spatial Denoising Approach". In: *Transportation Research Part C*.

### Conference Proceedings

- Williamson, Sinead and Mauricio Tec (2019). "Random clique covers for graphs with local density and global sparsity". In: *Proceedings of the Thirty Fifth Conference on Uncertainty in Artificial Intelligence (UAI)*.

### Preprints

- Tec, Mauricio, James G. Scott, and Natalia Zuniga-Garcia (2019). *Large-Scale Spatiotemporal Density Smoothing with the Graph-fused Elastic Net: Application to Ride-sourcing Driver Productivity Analysis*. URL: <https://github.com/mauriciogtec/RideAustinSpatioTemporalDensitySmoothing>.

## TEACHING

### Teaching Assistant


[The University of Texas at Austin](#)

 2017 – 2019

- Biostatistics
- International Economics with Python
- Data Analysis for Health Sciences

### Lecturer

[Instituto Tecnológico Autónomo de México](#)

 2015 – 2017


- Multivariate Statistics
- Markov Decision Processes
- Computational Statistics
- Stochastic Processes
- Numerical Analysis
- Quantitative Methods for Finance

Undergraduate student dissertations advised:

- Mauricio Gonzalez. *A backbone decomposition for Galton-Watson processes in continuous time* (2016).
- Sofia Samaniego. *An application of Manifold Learning to image classification* (2016).
- Michelle Audirac. *Portfolio optimization with risk parity implied returns* (2017).


## REFEREES

### Prof. James G. Scott

 The University of Texas at Austin  
Department of Statistics


 [james.scott@mcombs.utexas.edu](mailto:james.scott@mcombs.utexas.edu)

### Prof. Stephen G. Walker

 The University of Texas at Austin  
Department of Statistics

 [s.g.walker@math.utexas.edu](mailto:s.g.walker@math.utexas.edu)

### Prof. Beatriz Rumbos

 Instituto Tecnológico Autónomo de México (ITAM)  
Department of Mathematics

 [rumbos@itam.mx](mailto:rumbos@itam.mx)

## ORGANIZATIONAL

### Student Liaison

[The University of Texas at Austin](#)

 2019 to date

Graduate student host of the seminar speakers at the Department of Statistics and Data Science.

### GSA Representative

[The University of Texas at Austin](#)

 2017 – 2018

Representative of the students of the Department of Statistics at the Graduate Student Assembly (GSA) of the University of Texas.

### Communication Officer

[The University of Cambridge](#)

 2015

Co-organizer of the 50th Wolfson College Research Event at the University of Cambridge.