# **Mauricio Tec**

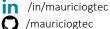
Hi! I am an inquisitive Ph.D. student at UT Austin. Passionate for the art of mathematics and computers, I began my career tackling real-world problems with economic and financial data. Today, I seek to contribute to ongoing AI research from two perspectives: by developing scalable, parallelizable and decentralized algorithms, and by harnessing Probability and Statistics to provide insights and suggest smarter models. Please reach out if you want to collaborate.

## Contact

+1 (512) 739 8196



mauriciogtec@gmail.com



/mauriciogtec



@mauriciogtec

## Education

## University of Texas at Austin, USA

PhD Candidate, Statistics GPA: 4.0/4.0 2017 to date

#### University of Cambridge, UK

MS Mathematics, Cambridge Trust Scholar 2014 - 2015

#### Instituto Tecnologico Autonomo de Mexico (ITAM), Mexico

BS Applied Mathematics, Bailleres Scholar 2007 - 2013

#### **Universite Paris Dauphine, France**

**Exchange Student** 2011 - 2012

## Skills

## Computing

- · Advanced Python, R. Julia, C++, Matlab
- · Parallel computing in Intel's High-Performance Computing Linux clusters

#### **Machine Learning, Statistics**

- Deep Learning
- Bayesian Nonparametrics
- · Reinforcement Learning
- · Dynamic Models and Particle Filters
- · Network Data and Models
- · Random Forests ad GBMs
- · Natural Language Processing
- · Statistical Analysis
- · Time-Series Forecasting

## Languages

Fluent in English, Spanish and French Basic German.

## Leisure

I like hiking and cycling. You can find me by the river near Austin's Zilker Park. I enjoy playing piano and guitar.

## Research

## University of Texas at Austin, PhD Statistics

Sep 2017 to Date

### Predictive densities with total variation denoising for large networks Advisor: Prof. James G. Scott

- · Developed a novel parallelizable ADMM algorithm for fitting densities on large networks with spatiotemporal edge smoothing. Exploring extensions to conditional densities using nested logistic regression and deep neural networks.
- Tested the methodology on the University of Texas' Stampede2 supercomputer using Ride Austin data (Uber-type non-profit) to study spatiotemporal discrepancies in driver productivity. Achieved ~2000x speed-up over serial code.

### Natural Language Processing for policy and food security advocacy Advisors: Prof. Kate Weaver, Eleanor Crook Foundation, James G. Scott

· Designed a Python toolkit and web app that track vote information and news from Members of Congress on Food Security policy issues. Skills: topic modeling, text summarization, web scraping, search engines.

#### Other research

- · Proposed Random Network models based on clique covers that match the local clustering coefficient and sparsity of real-world networks, outperforming stateof-the-art models for sparse networks in Bayesian frameworks (with Prof. Sinead Williamson).
- Investigated the use of fast online dynamic Bayesian nonparametric density estimation techniques in non-stationary bandit problems in Reinforcement Learning (with Prof. Stephen G. Walker).

## **Publications**

Williamson, S., Mauricio Tec. "Random clique covers for graphs with local density and global sparsity". Submitted to AISTATS 2019. Preprint arXiv:1810.06738.

Zuniga-Garcia, N., Mauricio Tec, J. G. Scott, N. Ruiz-Juri, R. Machemehl. "Evaluation of Ride-Sourcing Search Frictions and Driver Productivity: A Spatial Denoising Approach". Preprint arXiv:1809.10329. Presented at INFORMS 2018. In review for publication by Transportation Research Part C.

## **Teaching**

#### Teaching Assistant, Department of Statistics, University of Texas at Austin Aug 2017 to May 2017

• (i) International Public Policy with Python (ii) Data Analysis for Health Sciences.

#### Lecturer - Department of Statistics, Instituto Tecnologico Autonomo de Mexico Aug 2015 - Jul 2017 & Jan 2013 - Aug 2014

- · Designed and taught courses in Statistics, Data Science and Reinforcement Learning for students of Applied Mathematics.
- · Used diverse data science technologies in teaching, including Github, Python (NumPy, Pandas, Tensorflow, Scikit-learn, Jupyter Notebooks), R (Rcpp, Shiny, Rmarkdown, tidyverse), Matlab, Julia, STAN and C++.

## Industry

### CI Banco - Data Scientist

Jan 2016 - Aug 2017

Financial group in Mexico that offers portfolio management, and brokerage services

- · Saved five hours of manual daily work by implementing a data warehouse and a comprehensive set of performance reporting tools using SQL, R, and Shiny.
- Developed an in-house portfolio optimization toolkit using R and C++, achieving automated profitable mid-term investment strategies.

#### CIDAC - Research Analyst

Jan 2013 - Aug 2014

Independent think-tank devoted to the evaluation and engineering of public policy in Mexico

- · Proposed policy evaluation metrics and performance indexes using multivariate statistics, influencing their adoption by the National Health Institute of Mexico (IMSS) and the International Labor Organization (ILO) in Latin America.
- · Targeted multiple audiences and organizations for media coverage and fundraising by drafting and editing publications, plan proposals, reports, presentations, and blog posts