Andres Potapczynski

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EDUCATION

New York University   *Sep 2021 - May 2026 (expected)*
PhD in Data Science - Advisor: Andrew G. Wilson

Columbia University   *Sep 2017 - May 2019*
M.S. in Data Science

Instituto Tecnológico Autónomo de México (ITAM)   *Aug 2009 - May 2015*
B.S. in Applied Mathematics (top 1%)
B.A. in Economics (top 3%)

RESEARCH EXPERIENCE

Andrew G. Wilson's Lab (NYU)   *Aug 2021 -*

- **Compositional Linear Algebra**   Constructed a numerical linear algebra framework to exploit the structure present in several machine learning applications and beyond (NeurIPS 2023).

- **Automatic Feature Reweighing**   Developed a simple and fast method for ameliorating the reliance on spurious features for a given model (ICML 2023).

- **Using Neural Networks to Solve PDEs**   Proposed a methodology to approximate the solutions of partial differential equations using neural networks that is scalable and memory-efficient (ICLR 2023).

- **Tight PAC-Bayes Bounds and Generalization**   Developed a compression technique to derive PAC-Bayes bounds and studied their relationship to diverse generalization properties (NeurIPS 2022).

- **Low-Precision training for Gaussian Processes**   Proposed a multi-faceted approach involving successfully train GPs in half precision. (UAI 2022).

Mortimer B. Zuckerman Mind Brain Behavior Institute   *Sep 2019 - May 2021*
Advisor: John P. Cunningham

- **Gaussian Process training via Russian Roulette Estimators**   Studied the biases introduced by approximate methods and eliminates them via randomized truncation estimators (ICML 2021).

- **Conjugate Priors for the Continuous Bernoulli and Continuous Categorical**   Studied and characterized the conjugate priors for the continuous Bernoulli and continuous categorical distributions.

- **Invertible Gaussian Reparameterization: Revisiting the Gumbel-Softmax**   Introduced a better performing and more extensible family of continuous relaxations (NeurIPS 2020).

Nowcasting with Google Trends (Undergraduate Thesis)   *Jan 2018 - May 2018*

- Formulated a novel algorithm for bandwidth selection in Kernel Regression and showed what Google searches were indicative of unemployment, influenza and crime.

DATA SCIENCE PROJECTS

Helping Neoway Classify Food and Beverages Clients   *Jan 2019 - May 2019*

- Lead, organized and guided a team in constructing different Machine Learning models to classify clients based on their menus posted on their website.

Predicting Mortgage Default for Smart Lending Mexico   *Sep 2018 - Dec 2018*

- Uncovered that the trigger events theory (shocks to payment ability) was the most consistent economical theory to predict mortgage default in Mexico.

WORK EXPERIENCE

McKinsey & Company *Sep 2015 - June 2017*

- Engaged in 6 different projects in the Telecom and CPG industries with diverse teams from London, New York, Peru, India, Miami and Mexico City. Gained an in-depth knowledge about the types of data that those industries gather as well as the relevant problems that they face.

- Constructed different analytical models for the diverse client's challenges. Some examples are: a game theory model that predicted the response of the competition given a change of offer. Or, the promotional effectiveness time-series models and its visualizations.

PROGRAMMING

- Python (PyTorch, JAX, NumPy, SciPy), Bash, Matlab, R.

ACADEMIC AWARDS / FELLOWSHIPS

- Banco de Mexico's FIDERH Fellowship for graduate studies.

- Generation Representative (similar to Valedictorian), criteria includes: GPA rank, thesis and outreach.

- Honorific mention for Applied Mathematics thesis (ITAM).

- Honorific mention for Economics thesis (ITAM).

TEACHING EXPERIENCE

- TA for Machine Learning @ Columbia University (CS) *Jan 2019 - May 2019*
- TA for Intro to Real Math Analysis @ ITAM (Math) *Jan 2014 - May 2014*
- TA for Advanced Macroeconomics @ ITAM (Econ) *June 2011 - May 2013*

PUBLICATIONS

- Potapczynski*, A., Finzi*, M., Pleiss, G., and Wilson, G. A. "Exploiting Compositional Structure for Automatic and Efficient Numerical Linear Algebra". NeurIPS 2023.

- Qui*, S., Potapczynski*, A., Izmailov, P., and Wilson, G. A. "Simple and Fast Group Robustness by Automatic Feature Reweighting". ICML 2023.

- Finzi*, M., Potapczynski*, A., Choptuik, M., and Wilson, G. A. "A Stable and Scalable Method for Solving Initial Value PDEs with Neural Networks". ICLR 2023.

- Lofti*, S., Finzi*, M., Kapoor*, S., Potapczynski*, A., and Wilson, G. A. "PAC-Bayes Compression Bounds So Tight That They Can Explain Generalization!". NeurIPS 2022.

- Maddox*, J. W., Potapczynski*, A., and Wilson, G. A. "Low-Precision Arithmetic for Fast Gaussian Processes". UAI 2022.

- Potapczynski*, A., Wu*, L., Biderman*, D., Pleiss, G., and Cunningham, J.P. "Bias-Free Scalable Gaussian Processes via Randomized Truncations". ICML 2021.

- Gordon-Rogriguez, E., Loaize-Ganem, G., Potapczynski, A., and Cunningham, J.P. "On the Normalizing Constant of the Continuous Categorical Distribution", (arXiv 2204.13290).

- Potapczynski, A., Loaiza-Ganem, G., and Cunningham, J.P. "Invertible Gaussian Reparameterization: Revisiting the Gumbel-Softmax", NeurIPS 2020.

Note: * implies equal contribution.