

# ANDRES MORALES

DATA SCIENTIST - STATS

MIND OVER DATA

## INTERESTS

Impact assessment of critical decisions (AI + public policies)  
Safe and Ethical AI  
Causal and explainable AI  
Statistical modelling  
Sampling theory  
Anomaly detection

## CONTACT



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## LANGUAGES

Spanish  
English  
French

## PROGRAMING

Python, R, SAS, Stata.

## EDUCATION

### Ph.D (c), Polytechnique Montréal

2019 - TO DATE

Canada-France

- Ethical AI Lifecycle Framework (EALF): Technical framework for impact assessment and safety optimization of AI models. Leveraging statistical and causal inference for safe and ethical AI.
- Some results:** Uncovered racial biases in medical AI algorithms, innovating in causal discovery methods, and assessing the bio-political impacts of AI.

### M.Sc Statistics, University of Montreal

2017 - 2019

Canada

- Proposed a semisupervised approach for anomaly detection and diagnosis using sequential data.
- Combined techniques of non-parametric statistics, quality control, and deep learning to provide a tool that allows online faults detection and a diagnosis of the failures.
- Result:** Presented my work in the IEEE conference in 2019 in Macao, China.

### B.Sc Statistics, National University of Colombia

2005 - 2010

Colombia

## WORK EXPERIENCE

### AI Researcher - Polytechnique - LABAC

2018 - TO DATE

Canada - France

- R&D of generative AI; auto-encoders; mixture density networks.
- Unsupervised and self-supervised learning.
- Achievement:** Optimization of an anomaly detection system in the paper manufacturing industry.

### AI Researcher (intern) - Rolls Royce

2019 - 2023

Canada

- R&D of explainable AI algorithms that meet the needs of all stakeholders (inspectors, analysts, managers, government).
- Some results:** Addressing engineering and methodological issues for system safety. Implementing cutting-edge strategies to enhance system acceptance, usability, and sustainability. End-User-Centered Explainable AI model in aircraft maintenance AI.

## PAST EXPERIENCE < 2013

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### Data scientist - National University of Colombia

2013, Colombia

- Research to improve care for chronic diseases.
- Missing data estimation for environmental (hydrology and meteorology) time series.

### Data scientist - ICFES

2012 - 2013, Colombia

- Quantitative assessment of the national education.
- Value-Added modelling in higher education.

### Data scientist - National Administrative Department of Statistics

2011 - 2012, Colombia

- Survey methods planning with imperfect frames.
- Weights estimation for complex surveys.
- Estimation of national social indicators.

### Teacher assistant - National University of Colombia

2011, Colombia

- Probability and biostatistics courses.

## SPECIAL INTEREST

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My Blog + Photography  
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## Data scientist/ Consulting - G|Exponencial

2012 - 2023

Colombia-US-Iraq

- Developing sampling methods for evaluating public policies and social programs in underdeveloped countries.
- Randomized population studies, probabilistic sampling, non-response statistical models, calibration.
- Variance estimation and statistical modelling.

**Some key achievements:** Assessing the impact of health policies on children, pregnant women, indigenous populations and sex workers; evaluating property rights security perceptions in conflict areas (PRINDEX - COLOMBIA); and measuring women's empowerment in agriculture (WEAI - IRAQ).

## Data scientist - Education Office of Bogotá

2014

Colombia

- Statistical and unsupervised ML modelling (PCA, SVM, KNN, etc).
- Measuring citizen abilities and attitudes using Item Response Theory (IRT).

## PUBLICATIONS

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### 2023 - An insight into racial bias in dermoscopy repositories: A HAM10000 dataset analysis

[Submitted: Journal of the European Academy of Dermatology and Venereology.](#)

### 2023 - Graph models for engineering design: Model encoding, and fidelity evaluation based on dataset and other sources of knowledges

[Artificial Intelligence for Engineering Design, Analysis and Manufacturing.](#)

### 2022 - Toward safe AI

[AI and SOCIETY - Journal of Knowledge, Culture and Communication.](#)

### 2022 - An explanation space to align user studies with the technical development of Explainable AI

[AI and SOCIETY - Journal of Knowledge, Culture and Communication.](#)

### 2016 - On the Practices and Challenges of Measuring Higher Education Value Added: The Case of Colombia.

[Assessment and Evaluation in Higher Education.](#)

## CONFERENCE PRESENTATIONS

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### COLOMBIA 2023 - Exposing racial disparities of AI-based imaging classifiers for pigmented skin lesions diagnosis

[32° International statistics symposium](#) - Colombia

### CHINA 2019 - Case study: A semisupervised methodology for anomaly detection and diagnosis.

[IEEE International Conference on Industrial Engineering and Engineering Management.](#) - Macau, China.