

# JUAN ANTONIO ROBLEDO LARA

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## Experience

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### Tecnologico de Monterrey

Oct 2024 – Present

Senior Research Programmer

Mexico City, Mexico

- Developed machine learning models and tools to analyze and simulate complex socio-economic and environmental data.
- Collaborated with teams to implement data-driven solutions for climate modeling and decarbonization.
- Optimized data preprocessing workflows and computational processes for large-scale analysis.

### Georgia Institute of Technology

May 2023 – Dec 2023

Graduate Researcher

Atlanta, GA, USA

- Developed a manipulation framework with Python and ROS for a mobile robot to execute pick-and-place tasks.
- Developed software for a robot assistant to localize misplaced objects in homes using ROS and Python.
- Integrated navigation, manipulation, speech recognition, and perception capabilities into a mobile manipulator robot.
- Integrated pre-trained deep learning models for object classification in images to create a database of household items.

### IPICyT

Aug 2021 – Jul 2022

Research Engineer

San Luis Potosi, Mexico

- Developed an ETL pipeline in Python to collect, process, and store air quality data from sensors in a database.
- Implemented data preprocessing techniques using Pandas to clean and transform raw sensor data for analysis.
- Visualized time series data using Matplotlib to analyze trends in CO2 levels, enhancing data-driven decision-making.
- Performed regression analysis to calibrate sensors and validate the accuracy of measurements against commercial air quality monitors, achieving a correlation coefficient ( $R^2$ ) above 0.9.
- Automated data acquisition to reduce manual effort, significantly accelerating the analysis workflow.

### Brigham and Women's Hospital

Jun 2019 – Jan 2020

Research Trainee under Prof. Yu Shrike Zhang

Boston, MA, USA

- Developed a 3D printer capable of printing small constructs made of biomaterials for tissue engineering applications.
- Created paper-based devices for in vitro tissue modeling, utilizing extrusion-based hydrogel bioprinting techniques.
- Conducted original research that led to publications in renowned academic journals.

## Education

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### Georgia Institute of Technology

Aug 2022 – May 2024

M.S. in Computer Science (Specialization in Machine Learning)

Atlanta, GA, USA

### Tecnologico de Monterrey

Aug 2016 – Jun 2021

B.S. in Mechatronics Engineering

San Luis Potosi, Mexico

## Technical Skills

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**Programming Languages:** Python (Advanced), SQL (Intermediate), JavaScript (Basic)

**Frameworks & Tools:** Pandas, Scikit-Learn, PyTorch, NumPy, SciPy, Matplotlib, Seaborn, Git, Linux.

## Projects

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### Environmental Data Analysis and Predictive Modeling

Tecnologico de Monterrey

- Developed a pipeline for acquiring, preprocessing, and modeling World Bank environmental and socio-economic data.
- Evaluated regression models (Linear, Lasso, Ridge), achieving an  $R^2$  of 0.984 and an RMSE of 0.193.
- Conducted scenario analysis showing that a 10% GDP increase results in a 2.3% average rise in CO2 emissions.

### Songs Mood Prediction

Georgia Institute of Technology

- Developed a machine learning pipeline to predict the mood of a song based on its audio features.
- Trained a Random Forest model, achieving an accuracy and F1 score of 0.964.

### Diabetes Prediction

Georgia Institute of Technology

- Developed a machine learning pipeline to predict if a woman has diabetes based on medical data.
- Trained a Random Forest model, achieving an accuracy of 0.8 and an F1 score of 0.71.