ARMANDO I. MANCILLA BUSTOS

Zapopan, Mexico | armando.mancilla.b@gmail.com | armmancilla.github.io

Professional Profile

Physics graduate with strong experience in stochastic modeling, high-performance computing, and data analysis. Proven ability to communicate, collaborate and build predictive models using Python and Fortran. Seeking a data analyst/scientist role where I can leverage analytical and coding skills to solve real-world problems.

Experience

Research assistant.   (08/2024 - 05/2025)
Universidad de Guadalajara | Guadalajara, Mexico.
Thesis Research Project. Supervised by Dr. Thomas Gorin and Dr. Soham Biswas.
Annihilating Random Walks:
- Built a parallelized high-performance Fortran simulation for broad stochastic systems of above 1,000 interacting particles, reducing execution time up to 50%.
- Reduced extensive data results by 80% with Python/Jupyter, while keeping key characteristics, significantly accelerating post-processing.
- Examined and visualized large time (>100,000 steps) behavior and proposed an empirical formula to predict concentration decay for cases with similar diffusion.

Intern.   (02/2024 - 06/2024)
Universidad de Guadalajara | Guadalajara, Mexico.
Professional Practices. Educational Tool developed under the supervision of Dr. Thomas Gorin.
Simulations of Thermodynamic Systems:
- Improved previous codes to simulate multiple cases at a time. Collected 4 different Monte Carlo algorithms into a single SciLab (MATLAB open-source alternative) program allowing users to adjust system parameters with a console-based User Interface (UI).
- Optimized algorithmic efficiency to handle thermodynamic systems with more than 100 particles, balancing real-time performance and accuracy.
- Included results visualization to allow for intuitive interpretation of non-ideal systems. Produced teacher-focused documentation with use cases and theory summaries.

Research assistant.   (12/2022 - 06/2023)
Universidad de Guadalajara | Guadalajara, Mexico.
PRO-SNI Scholarship. Supervised by Dr. Thomas Gorin and Dr. Soham Biswas.
Memory and Resetting Effects on the Random Walks:
- Modeled stochastic systems with over 100,000 realizations, for random walkers with probability-dependent resetting/memory, using parallelized high-performance Fortran programs.
- Investigated characteristic statistical properties for each case to identify critical thresholds between diffusive/subdiffusive dynamics and defined differential models to predict system behavior.
- Visualized data and model solutions (distributions, variance, kurtosis) in Python/Jupyter.

Research Assistant. (05/2021 - 09/2021)
Universidad de Guadalajara | Guadalajara, Mexico.
PRO-SNI Scholarship. Supervised by Dr. Thomas Gorin.
Epidemic Models for Immunity and Social Distancing:
- Extended a time-dependent epidemic model to study COVID-19 waves in Mexico (Python/Pandas), processing CONACYT-provided national and state data (2 years of records).
- Led data cleaning, developing an algorithm to automate the process for any individual dataset, addressing specific issues in data collection, targeting up to 95% of anomalies.
- Analyzed the epidemic time-series to identify infection waves. Collaborated closely with Dr. Gorin to produce a mathematical model describing the growth and decay behavior of infections.
- Evaluated output parameters to create a dynamic estimate of the reproductive number while illustrating the impacts of real-world phases and government decisions (lockdown timing, immunity, and the effectiveness of public policy).

Education

Bachelor's Degree in Physics. (08/2018 - 10/2025)
Universidad de Guadalajara. Guadalajara, Mexico.
Expected October 2025 | Thesis in progress

Skills

Languages: English (Fluent), Spanish (Native)
Technical: Python (Pandas, NumPy), Fortran (OMP), MATLAB (Mid), SQL (Basic querying skills)
Data Tools: Jupyter Notebook, Matplotlib, Git, LaTeX (Overleaf), Power Bi (Self-Learning)
Concepts: Monte Carlo Algorithms, Stochastic Modeling, Time-Series Analysis, Statistical Physics
Extra: HTML, CSS, JavaScript (Basic) (Selft-taught to build my Portfolio)

Portfolio: armmancilla.github.io | GitHub: armmancilla | Includes additional information about all the projects listed here, as well as details about some smaller projects.