Eugenio D. Macias

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EDUCATION   GPA: 4.0

Brown University,   Providence, RI | *Aug 2022 – May 2026*
B.S. Applied Mathematics–Computer Science (**Honors**), *B.A. Mathematics*

Graduate Coursework: Real Analysis, Hilbert & Banach Spaces, Probability Theory, Mathematical Statistics, Scientific Deep-Learning, Unsupervised Markov Processes, Complex Analysis

Clubs: Chess Club (2010 ELO), Quant Trading at Brown, International House (BUGS)

EXPERIENCE

Citi – **Quantitative Analyst Intern**: *Equity Derivatives*   NYC | *Jun 2025 – Aug 2025*
- Automated pricing diagnostics in a Python-C++ interface for exotic derivatives in EMEA, NAM, APAC books.
- Validated live payoff fair values and Greeks via stochastic/local vol MC and PDE solvers; accelerated runtime by $2.5\times$
- Obtained 1st place (540+ participants,) in Citi's firmwide ML Competition and 2nd in internal market-making challenge
- Built a LightGBM+DART+SHAP regression model with Bayesian optimization on 6M+ rates exotics-structured notes; trained Swish-activated NNs, achieving the lowest MSE & 60% faster inference than competitors

D. E. Shaw & Co. – *Latitude Fellowship*   NYC | *Apr 2024 – May 2024*
- Built airline sector revenue forecast via multivariate time-series regression in Python; achieved $R^2 = 0.87$ on test set
- Explored alpha-generating signals and execution latency effects for equities and ETFs

Bridgewater Associates – *Investment Immersion Program*   Westport, CT | *Feb 2024 – Mar 2024*
- Researched macro indicators for alpha strategies; conducted a case study predicting interest rates and inflation using yield curves, breakeven inflation, macro releases)
- Backtested statistical arbitrage strategies across multi-asset signals; identified persistent alpha in top decile

Buddywise AI – *Founder's Associate Intern*   Berlin, Germany | *May 2023 – Jul 2023*
- Researched and optimized datasets for ML pipelines in safety-critical computer vision; reduced processing time by 35%
- Secured $50,000 in Mixpanel credits; improved A/B testing and UI KPI visibility by 40%

PROJECTS

Honors Senior Thesis: ***Weak-Form PDE Discovery for Stochastic Collective Dynamics***
Advisor: Prof. Björn Sandstede (Python, PyTorch, JAX, SciPy, LaTeX)
- Predict stochastic dynamics via weak-form sparse regression (WSINDy), operator learning, and LSTMs on time series
- Infer governing PDEs from alignment rules and Morse potentials using manifold, spectral, regression, and POD
- Quantify uncertainty and forecast long-horizon behavior, stability, bifurcation of SPDEs under stochastic perturbations

Structure-Preserving DeepLearning for Charged Particle Dynamics *(PINNs, PNNs, SympNets)*
- Modeled Hamiltonians in electromagnetic fields using Poisson systems and NNS; achieved sub-0.007 MSE and parameter recovery within 2% using. Incorporated PDE loss and automatic differentiation
- Designed invertible NNs inspired by Lie-Darboux transforms to learn symplectomorphisms from electrons trajectory flow

Market-Neutral Long-Short Strategy *(Python, Scikit-Learn, Matplotlib)*
- Applied PCA to extract market factors from 5000 stocks; regressed returns to estimate idiosyncratic alpha
- Built a long-short portfolio (top/bottom quintile alpha); backtested Sharpe Ratio: 2.12 with out-of-sample validation

Research Paper: Fourier Analysis and Laplace's Equation *(LaTeX, MATLAB)*
- Wrote a 50-page paper on the use of Fourier Series to solve Laplace's 2D equation under 4 Dirichlet boundary conditions

AWARDS

- **Citadel Invitational Terminal 2024**: Trading hackathon by Citadel Securities
- **Point72 & Correlation1**: Data Scholar 2024
- **PUTNAM 2024**: top 20% Nationwide
- **IYMC**: Silver Medalist, Mathematics Open Category
- **STEM Olympiad**: 1st place in Math-Geo-Tech (National, BiH); 13th globally (4,600 participants).
- **Sprint Award**: $7,000 grant to support a research-focused internship.
- **Shelby Davis Scholar**: Full tuition merit award at Brown

SKILLS & INTERESTS

Programming: Python, Java, C++, R
Libraries: TensorFlow, PyTorch, NumPy, Pandas, Scikit-learn, Matplotlib, FastAPI, LightGBM, Optuna, SHAP, Streamlit
Languages: Spanish (native), English (fluent), German (B1), French (A2)
Interests: Classical Guitar (3rd National, Mexico), Travel (35 countries), Running (3 marathons), Math Notes