

# PETER A. SAYEGH

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## EDUCATION

### Columbia University

New York, NY

#### MS in Electrical Engineering – Nikola Tesla Scholarship

Expected Dec 2026

Coursework: Digital Signal Processing, Adv. Analog Integrated Circuits, Power Electronics, MOS Transistors, Analog-Digital Interfaces in VLSI, Embedded AI, Communication Circuits

Activities: Department Representative for Electrical Engineering within the Engineering Student Graduate Council (EGSC)

### Ecole Polytechnique

Palaiseau, FR

#### BS in Mathematics and Physics, GPA: 3.75/4.0

Jun 2025

Coursework: Convex Optimization, Stochastic Processes, Electrodynamics, Adv. Quantum Physics, Thermodynamics, Statistical Physics, Condensed Matter, Algorithms, Numerical Analysis, Web Programming, Object-Oriented Programming, Machine Learning

## ELECTRICAL ENGINEERING PROJECTS

### Columbia University

New York, NY

#### Runway Detection for Autonomous Aircrafts

Sep - Dec 2025

- Developed Hough Transform and RANSAC filtering pipeline, validated on ~6,000 simulated flight approach images
- Implemented geometric validation constraints (parallelism, vanishing point) under varying weather and distance conditions

### Columbia University

New York, NY

#### On-chip CMOS Feedback Amplifier Design

Sep - Dec 2025

- Designed a two-stage Miller-compensated OTA in 0.25 μm CMOS, achieving 95 dB gain, 81.5° phase margin, and 407 kHz closed-loop bandwidth with <1% overshoot
- Optimized compensation network (3 pF, 1 kΩ) to drive 20 pF load while consuming 247 μA, 50% below power budget

### Columbia University

New York, NY

#### All-Region DC Model for MOSFET with Physics-based Parameter Extraction

Sep - Dec 2025

- Developed MOSFET model incorporating mobility degradation, body effect, and channel length modulation effects
- Achieved O(N) complexity at 380 μs per evaluation with continuous DC characteristics passing industry benchmark tests

### Ecole Polytechnique - Center for Theoretical Physics

Palaiseau, FR

#### Dynamic Stability and Levitation Control in Magnetic Levitation (Maglev) Systems

Feb 2024 - Jul 2025

- Designed and constructed a scaled Maglev train prototype using magnetic field analysis, achieving 96% theoretical validation
- Extrapolated results to a real Electromagnetic Suspension engine scale, predicting capacity within 2% of Shanghai Maglev

## EXPERIENCE

### Ecole Polytechnique - Hydrodynamics Laboratory

Palaiseau, FR

#### Bachelor Thesis Research Intern

Jan - Mar 2025

- Devised a neural network framework leveraging JAX to model Rogue Waves, with less than 0.5% error
- Enhanced model performance via causal training algorithms, reducing convergence time by 60%
- Applied numerical wave analysis methods, attaining a 2% average L<sup>2</sup> error against analytical solutions

### TriSpan LLP

New York, NY

#### Private Equity Intern

Jul - Aug 2024

- Streamlined Profit & Loss reporting across 10 portfolio companies using Excel

- Conducted Leveraged Buyout modeling using Excel and Bloomberg terminals

- Drafted valuation reports using Discounted Cash Flow analysis for portfolio companies worth \$200M+ in assets

## TECHNICAL SKILLS

**Programming Languages:** Python, C++, Arduino, R, MATLAB, HTML, CSS, JavaScript, QML

**Data Science and Machine Learning:** TensorFlow, Keras, JAX/Optax, scikit-learn, NumPy, SciPy, pandas, statsmodels

**AI Frameworks:** DSPy, Agno, Gepa

**Scientific Computing:** QuTiP, Scikit-HEP, PySpice

**Hardware and Circuit Design:** Cadence Spectre, PLECS, LTSpice

**Tools and platforms:** LaTeX, Git, Jupyter

**Languages:** French (Native), Arabic (Native), German (Advanced), Spanish (Intermediate)