

Stefan Talpa

470-815-7884 | stalpa3@gatech.edu | [linkedin.com/in/stefan-talpa/](https://www.linkedin.com/in/stefan-talpa/)

EDUCATION

Georgia Institute of Technology

Atlanta, GA

BS/MS in Computer Science & Mathematics; Major GPA: 4.0

Aug. 2020 – May 2024

Concentrations: Theory, Modeling & Simulation, Applied Mathematics

Courses: Numerical Analysis, Probability Theory, Stochastic Processes, Quantum Information/Quantum Computing, Math Statistics, Data Structures and Algorithms, Applied Combinatorics, Computational Problem Solving

EXPERIENCE

Imperial College London

May 2022 – August 2022

Quantum Machine Learning Intern

- Improved on current medical image processing techniques, using Quantum-Classical Transfer Learning. Used a 10,000 image sample for training and benchmarking.
- Implemented PennyLane and Qiskit for more optimal computation of quantum gradients and compatibility with Pytorch.
- Developed a model that recognises COVID-19 thought CT scans with 96% accuracy.

Software/Hardware Co-Design for Intelligence and Efficiency Lab

May 2022 – August 2022

Software Research Intern

- Implemented Pytorch version of Complex-Valued Neural Network (CVNN) and tested it on MNIST FFT data
- Generalized the toy ConvNet architecture to the ResNet architecture
- Performed unstructured pruning over ResNet version to achieve comparable performance

Inter Business Partner

June 2021 – Present

Quantitative Researcher

- Enhanced performance of the company through developing a quantitative model to identify signals of the customs market, automizing the declaration-creating process, and analyzing large company datasets.
- Statistically analyzed world supply chain data to identify countries to work with, increasing client flow by 25%
- Implemented an algorithm to reduce the declaration-creating process by almost 50%, doubling annual profit.

Georgia Institute of Technology

August 2020 – Present

Quantum Computing Researcher

- Developed optimization software using Qiskit and Game API, to enhance quantum circuits from quantum assembly files
- Amplified neural network accuracy through reduction of circuit noise on abstract architectures using LSTM to select optimization steps.
- Assisted in the invention of a more efficient noise estimation function for circuits, reducing the error by 60%.

PROJECTS

- **Optimization using Competitive Gradient Descent:** Performed analysis of mathematics behind CGD and developed a more powerful numerical model, which can be used for complex optimization problems like cyber-physical attack prevention, pairs trading, and 2-player game theory problems.
- **Experimental Trading Algorithm:** Built trading strategies by utilizing mathematical and physical theories, not widely used in financial markets. Profitable examples are: Chaos Theory - finding patterns in highly sensitive dynamical systems, Spectral Theory - studying high dimensional data through finding eigenvalues of their matrix forms, and Estimation Theory - approximates values of "weights" in Machine Learning models.
- **Applications of Quantum Graphs:** Created a neural network to calculate eigenvalues of abstract quantum graphs and designed visualization of eigenvalue distribution. This can be used to structurize seemingly chaotic systems and model their future behavior.
- **IBM Quantum Challenge:** Improved financial portfolio modeling software through the utilization of Qiskit Finance Library. Maximized the revenue of battery-based energy storage using Quantum approximate optimization algorithm. Predicted the excited states energies of complex molecules using NumPy and Variational Quantum Eigensolver. Employed a QSVM for Image Classification research.

TECHNICAL SKILLS

Programming Languages: Python, C++, Julia, SQL, MatLab, R, Java, LaTeX

Languages: Russian (Native), English (Fluent), Hebrew (Intermediate)

Libraries: Pytorch, NumPy, Pandas, Qiskit, PennyLane, Matplotlib, Scipy, PyGSP

Tools: Linux, Tableau, Microsoft Office (Excel, Word, PowerPoint)

Certifications: AWS Developer