

# Noel Elias

[nelias@utexas.edu](mailto:nelias@utexas.edu) | [noelkelias.github.io](https://noelkelias.github.io)

## EDUCATION

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**The University of Texas at Austin**, Austin, TX

December 2024

*Bachelor of Science in Computer Science & Mathematics*

Coursework: Grad Cryptography, Grad Computer Security, Distributed Systems, Trustworthy Machine Learning, Stochastic Processes, Cloud Computing, Linear Algebra, Honors Vector Calculus, Algorithms, Computer Architecture, Data Structures, Operating Systems, Number Theory, Real Analysis, Algebraic Structures

## SKILLS

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**Technical Skills:** Python, Rust, Java, C/C++, MATLAB

**Tools/Frameworks:** PyTorch, Circom, NumPy, OpenCV, Rest APIs, CI/CD Pipelines, Docker, Kubernetes

## EXPERIENCE

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**LINC Lab & UT Cryptography Group**, UT Austin

August 2023 - Present

*Undergraduate Researcher*

- Creating succinct cryptographic primitives for batch arguments and functional commitments utilizing polynomial techniques alongside pairing and lattice assumptions.
- Developed dynamic and efficient Rust based tools for non-homogeneous mathematical proof verification utilizing incrementally verifiable computation techniques like Nova.
- Implemented efficient and robust large language models training methods for encoded and private data distributions utilizing information-theoretic approaches.

**Apple**, Boulder, CO

May - August 2023

*Software Engineering Intern*

- Built an internal Python package that can analyze results, catalog failures and deploy notifications. 5000+ users.
- Designed and developed an automated evaluation codebase for multiple augmented reality based computer vision and machine learning algorithms within the Vision Pro.

**Applied Research Laboratories**, Austin, TX

Jan - December 2022

*Machine Learning Researcher*

- Built and deployed binary, one-class, and siamese Python machine learning pipelines utilizing novel CNN architectures for various passive sonar data distributions.
- Developed novel denoising algorithm for extracting spectrographic signatures from noisy audio signal data utilizing Score-CAM analysis.

**Thinkery**, Austin, TX

Nov 2018 - August 2021

*Software Engineering Intern*

- Led the development and production of an AR app implementing MIT Media labs computational thinking strategies to teach students programming.
- Implemented Vuforia Augmented Reality SDK for feature tracking and detection, Unity Scripting APIs in C# and JavaScript for 3D animations, and Android Studio for the building the app framework

## PROJECTS

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### MULTI-THREADED WEB SERVER

- Built multi-threaded HTTP Web Server in C and Rust by safely implementing thread pools to reduce response time with concurrency. Implemented asynchronous optimized HTTP requests and evaluated scaling performance by deploying unit test testing pipelines. Used: Rust & C, POSIX Threads, C Socket-Lib, Rust Thread & TCP API

### TEXAS COVID-19 WEB APP

- Created, tested, and validated LSTM neural networks, DBSCAN unsupervised clustering algorithms, and regression algorithms to create models to predict the spread of COVID-19 using a variety of contributing factors with a 92% accuracy. Devised automated pipeline with cron and AWS back end and Dash front end for Heroku web app. Used: AWS (EC2, S3 storage, and Elastic Beanstalk), TensorFlow, Pandas, Jupyter Notebooks, Numpy, Matplotlib, Scikit-learn, Heroku, Dash, Cron, Seaborn

## PUBLICATIONS

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**Pairing-Based Batch Arguments for NP with a Linear-Size CRS** [[PDF](#)]

*In Progress*

**MultiTok: Variable-Length Tokenization for Efficient LLMs Adapted from LZW Compression** [[PDF](#)]

Noel Elias, Homa Esfahanizadeh, Kaan Kale, Sriram Vishwanath, Muriel Medard. *Submitted to IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2025.

**Lova: A Novel Framework for Verifying Mathematical Proofs with Incrementally Verifiable Computation** [[PDF](#)]

Noel Elias. *CIFRIS*, 2024.

**TexShape: Information Theoretic Sentence Embedding for Language Models** [[PDF](#)]

Kaan Kale, Homa Esfahanizadeh, Noel Elias, Oguzhan Baser, Muriel Medard, Sriram Vishwanath. *IEEE International Symposium on Information Theory (ISIT)*, 2024.

**A Novel Score-CAM based Denoiser for Spectrographic Signature Extraction without Ground Truth** [[PDF](#)]

Noel Elias. *IEEE International Joint Conference on Neural Networks (IJCNN)*, 2023.

**Audio Classification of Low Feature Spectrograms Utilizing Convolutional Neural Networks** [[PDF](#)]

Noel Elias. *IEEE International Conference on Machine Learning and Applications (ICMLA)*, 2022.

**Robust estimation of bacterial cell count from optical density** [[PDF](#)]

Jacob Beal, Natalie G. Farny, et. all & iGEM Interlab Study Contributors. *Communications Biology*, 2020.

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Kaan Kale, Homa Esfahanizadeh, [Noel Elias](#), Oguzhan Baser, Muriel Medard, Sriram Vishwanath. *IEEE International Symposium on Information Theory (ISIT)*, 2024.

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