Noel Elias

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EDUCATION

The University of Texas at Austin, Austin, TX   Aug 2021 – Dec 2024
Bachelor of Science in Mathematics
Bachelor of Science in Computer Science with Special Departmental Honors
Thesis: Pairing-Based Batch Arguments for NP with a Linear-Size CRS
Thesis Committee: Dr. David Wu (Advisor), Dr. Brent Waters, Dr. Scott Aaronson

HONORS AND AWARDS

- UT Austin College of Natural Science Undergraduate Research Panelist – September 2024
- UT Austin College of Natural Sciences Research Distinction – March 2024
- UT Austin Undergraduate Research Fellowship – February 2024
- UT Austin University Honors - (2022, 2023, 2024)
- Andy Grove Undergraduate Scholarship – August 2021

PUBLICATIONS

1. **Pairing-Based Batch Arguments for NP with a Linear-Size CRS** [PDF]
   Noel Elias, David Wu, Binyi Chen. *Submitting to Annual International Cryptology Conference (CRYPTO)*, 2025.
2. **MultiTok: Variable-Length Tokenization for Efficient LLMs Adapted from LZW Compression** [PDF]
   Noel Elias, Homa Esfahanizadeh, Kaan Kale, Sriram Vishwanath, Muriel Medard. *Under revision for IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2025.
3. **Lova: A Novel Framework for Verifying Mathematical Proofs with Incrementally Verifiable Computation** [PDF]
   Noel Elias. *CIFRIS: Topics in Applied Cryptography*, 2024.
4. **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.
5. **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.
6. **Audio Classification of Low Feature Spectrograms Utilizing Convolutional Neural Networks** [PDF]
   Noel Elias. *IEEE International Conference on Machine Learning and Applications (ICMLA)*, 2022.
7. **Robust estimation of bacterial cell count from optical density** [PDF]
   Jacob Beal, Natalie G. Farny, et. all & iGEM Interlab Study Contributors. *Communications Biology,* 2020.

RESEARCH EXPERIENCE

UT Cryptography Group, UT Austin   Jan 2024 – Present
Undergraduate Researcher
- Creating succinct cryptographic primitives with polynomials under Dr. David Wu (UT) and Dr. Binyi Chen (Stanford).

LINC Lab + Network Coding and Reliable Communications Group, UT Austin & MIT   Aug 2023 – Present
Undergraduate Researcher
- Working on creating efficient and robust large language models using information-theoretic approaches. Advised by Dr. Sriram Vishwanath (UT), Dr. Muriel Medard (MIT), and Dr. Homa Esfahanizadeh (Nokia Bell Labs).

Applied Cryptography Group, UT Austin   Dec 2022 – Present
Undergraduate Researcher
- Building cryptographic tools for mathematical proof verification & researching error-correcting code-based SNARKs.

Applied Research Laboratories, Austin, TX   Jan – Dec 2022
Machine Learning Researcher
- Developed semi-supervised machine learning pipelines for passive sonar data distributions.

Ellington Lab, UT Austin   Jan 2018 – Aug 2020
Undergraduate Researcher
- Conducted wet-lab research and LAMP experiment analysis under Dr. Andrew Ellington (UT).

PROFESSIONAL EXPERIENCE

Apple, Boulder, CO   May – Aug 2023
Software Engineering Intern
Thinkery, Austin, TX   Nov 2018 – Aug 2021
Software Engineering Intern