

MICHAEL NEUDER

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EDUCATION

Harvard University <i>Master of Science, Computational Science and Engineering</i>	2020 - 2021 Cambridge, MA
University of Colorado <i>Bachelor of Arts, Computer Science & Bachelor of Arts, Mathematics</i>	2015 - 2020 Boulder, CO
University of Oxford <i>Visiting Student</i>	2018 Oxford, UK

INDUSTRY EXPERIENCE

Google <i>Software Engineer III — Cloud Platform</i>	August 2021-Present Cambridge, MA → New York, NY
<ul style="list-style-type: none">Control-plane engineer for a cloud storage SaaS backup and disaster recovery product.Promoted from Software Engineer II (L3) to Software Engineer III (L4) October 2022.	
Google <i>Software Engineering Intern</i>	
<ul style="list-style-type: none">Summer 2020; Madison, WI (remote due to COVID-19); Network Infrastructure<ul style="list-style-type: none">Increased throughput of the multi-cloud high-performance networking stack by 2x.Summer 2019; Cambridge, MA; Google Flights<ul style="list-style-type: none">Deployed an internal data retrieval service that reduced end-to-end latency by 3x.Fall 2018; Sunnyvale, CA; Google Workspace<ul style="list-style-type: none">Leveraged an NLP model to recommend managed applications for corporate devices.	
Lockheed Martin & LASP¹ <i>Software Engineering Intern</i>	Feb 2017 - Oct 2017 Boulder, CO
<ul style="list-style-type: none">User interfaces. Created and tested graphical interfaces using the Qt framework in Python and C++.	

RESEARCH EXPERIENCE

EconCS Group, Harvard University <i>Research Assistant under supervision of Dr. David C. Parkes</i>	August 2019 - August 2021 Cambridge, MA
<ul style="list-style-type: none">Distributed consensus. Studied Proof-of-Stake consensus of two major blockchains, Ethereum and Tezos.	
Santa Fe Institute <i>Undergraduate Research Fellow: Summer 2018 REU</i>	June 2018 - August 2018 Santa Fe, NM
<ul style="list-style-type: none">Computer vision. Applied object detection algorithms to drone footage of migrating caribou herds.	
Bradley Lab, University of Colorado <i>Research Assistant under supervision of Dr. Elizabeth Bradley</i>	April 2017 - Present Boulder, CO
<ul style="list-style-type: none">Information theory. Presented a novel algorithm to detect local noise in time-series data.	
Mozer Lab, University of Colorado <i>Research Assistant under supervision of Dr. Michael Mozer</i>	March 2017 - May 2019 Boulder, CO
<ul style="list-style-type: none">Machine learning. Encoded image quality evaluation metrics into deep convolutional neural networks.	

¹Laboratory of Atmospheric and Space Physics <https://lasp.colorado.edu/home/>

CRYPTO EXPERIENCE

Open-source contributions

- **Erigon** Refactored req/resp domain network encoding: [issue](#). Implementing the consensus-layer specification directly into Erigon: [issue](#). [PR list](#).
— *Topics*: [beacon chain spec](#), [p2p spec](#), goLang.
- **Aztec connect bridges** Currently implementing a bridge contract to interact privately with **Zora**, which is a smart-contract based NFT marketplace. [PR list](#).
— *Topics*: privacy, solidity, [foundry](#).
- **Prsym** Addressed a number of code-health concerns around the prysm wallet and keymanager integration: [issue](#) & [PR list](#).
— *Topics*: bazel, protocol buffers, gRPC, goLang.

Research

- **Game-theoretic analysis of Ethereum and Tezos Proof-of-Stake mechanisms**. See (1), (2), (5) below. (5) resulted in a spec change and is described in this [note](#) from Vitalik. We also presented the results at the [reorg.wtf](#) summit.
- **Strategic liquidity provisioning in Uniswap-v3**. See (3) below. One of the earlier LP papers.

PUBLICATIONS

- (1) **M. Neuder**, D. J. Moroz, R. Rao, D. C. Parkes, “Defending Against Malicious Reorgs in Tezos Proof-of-Stake,” *ACM Conference on Advances in Financial Technologies (AFT) 2020*. <https://doi.org/10.1145/3419614.3423265>.
- (2) **M. Neuder**, D. J. Moroz, R. Rao, D. C. Parkes, “Selfish Behavior in the Tezos Proof-of-Stake Protocol,” *Cryptoeconomic Systems (CES) Conference 2020*. <https://arxiv.org/pdf/1912.02954.pdf>.
- (3) **M. Neuder**, D. J. Moroz, R. Rao, D. C. Parkes, “Strategic Liquidity Provision in Uniswap v3,” <https://arxiv.org/pdf/2106.12033.pdf>.
- (4) **M. Neuder**, E. Bradley, E. Dlugokencky, J. W. C. White, J. Garland, “Detection of Local Mixing in Time Series using Permutation Entropy,” *Physical Review E* 103, 022217. <https://doi.org/10.1103/PhysRevE.103.022217>.
- (5) **M. Neuder**, D. J. Moroz, R. Rao, D. C. Parkes, “Low-cost attacks on Ethereum 2.0 by sub-1/3 stakeholders,” *Workshop on Game Theory in Blockchain at the 16th Conference on Web and Internet Economics (WINE)*. https://econcs.pku.edu.cn/wine2020/wine2020/Workshop/GTiB20_paper_8.pdf.
- (6) J. Garland, T. Jones, **M. Neuder**, J. W. C. White, E. Bradley, “An information-theoretic approach to extracting climate signals from deep polar ice cores,” *Chaos: An Interdisciplinary Journal of Nonlinear Science* 29:101105 (2019). <https://doi.org/10.1063/1.5127211>.
- (7) J. Garland, T. Jones, **M. Neuder**, V. Morris, J. W. C. White, E. Bradley, “Anomaly Detection in Paleoclimate Records using Information Theory,” *Entropy* 20(12):931 (2018). <https://doi.org/10.3390/e20120931>.
- (8) **M. Neuder**, M. Mozer, “Image Evaluation Using Deep Learning,” *Colorado Journal of Applied Mathematics* Fall 2018 Edition:43-54 (2018). github.com/michaelneuder/image_quality_analysis/blob/master/final.pdf

TALKS

- **Detection of Local Mixing in Time Series using Permutation Entropy** - 2021 European Geosciences Union General Assembly.
- **Low-cost attacks on Ethereum 2.0 by sub-1/3 stakeholders** - Workshop on Game Theory in Blockchain at the 16th Conference on Web and Internet Economics 2020. [video](#).
- **Defending Against Malicious Reorgs in Tezos** - ACM Advances in Financial Technology 2020. [video](#).
- **Selfish Behavior in the Tezos PoS Protocol** - Cryptoeconomic Systems Conference 2020. [video](#).
- **Animal Tracking using Deep Learning** - Santa Fe Institute 2018. [video](#).

AWARDS

- **2020.** *Computer Science Discovery Learning Award.* Recognizes graduating seniors from the University of Colorado who excelled in academic research.
- **2019-2020.** *Sieglinde Talbott Haller Scholarship in Mathematics.* Given to high performing Math majors at the University of Colorado.
- **2019.** *Honorable Mention: Computing Research Association Outstanding Undergraduate Researcher Award.* Nominated by Dr. Liz Bradley.
- **2017.** *Phi Beta Kappa.* Elected junior year for completing 100 credit hours with a GPA greater than 3.7.
- **2015-2020.** *President Joseph A. Sewall Esteemed Scholar Award.* Merit-based scholarship given to Colorado residents to attend the University of Colorado.
- **2015-2020.** *Dean's List.* Earned for achieving a GPA of 3.75 or greater as a full-time student.

TECHNICAL STRENGTHS

Languages	C++, Go, Python. Learning Rust and Solidity.
Tools	git, TensorFlow, Keras, gRPC, protocol buffers, Linux, Jupyter, LaTeX