

# MICHAEL (mike) NEUDER

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📄 [michaelneuder.github.io](https://michaelneuder.github.io)  
🌐 Princeton, New Jersey, USA

## EDUCATION

<b>Princeton University</b> <i>Doctoral student, Computer Science</i> ↳ Under the supervision of Prof. <a href="#">Matt Weinberg</a> ↳ Supported by an Ethereum Foundation PhD Fellowship (FY25-2276)	Aug. 2025 - Present Princeton, NJ
<b>Harvard University</b> <i>Master of Science, Computational Science</i>	Aug. 2020 - May. 2021 Cambridge, MA
<b>University of Colorado</b> <i>Bachelor of Arts, Computer Science</i> <i>Bachelor of Arts, Mathematics</i>	Aug. 2015 - May. 2020 Boulder, CO

## ACADEMIC EXPERIENCE

<b>EconCS Group, Harvard University</b> <i>Research Assistant supervised by Prof. <a href="#">David C. Parkes</a></i>	Aug. 2019 - Aug. 2021 Cambridge, MA
<b>Santa Fe Institute</b> <i>Undergraduate Research Fellow: Summer 2018 REU</i>	Jun. 2018 - Aug. 2018 Santa Fe, NM
<b>Bradley Lab, University of Colorado</b> <i>Research Assistant supervised by Prof. <a href="#">Elizabeth Bradley</a></i>	Apr. 2017 - Aug. 2021 Boulder, CO
<b>Mozer Lab, University of Colorado</b> <i>Research Assistant supervised by Prof. <a href="#">Michael Mozer</a></i>	Mar. 2017 - May. 2019 Boulder, CO

## INDUSTRY EXPERIENCE

<b>The Ethereum Foundation</b> <i>Researcher – Applied Research Group (ARG)</i>	Mar. 2023 - May. 2025 New York, NY
<b>Google</b> <i>Software Engineer (L3 → L4) – Cloud Storage</i> <i>Software Engineering Intern – Network Infrastructure</i> <i>Software Engineering Intern – Flights</i> <i>Software Engineering Intern – Mobile Device Management</i>	Aug. 2021 - Feb. 2023 (Cambridge, MA) Summer 2020 (remote) Summer 2019 (Cambridge, MA) Fall 2018 (Sunnyvale, CA)
<b>Lockheed Martin &amp; LASP<sup>1</sup></b> <i>Software Engineering Intern</i>	Feb. 2017 - Oct. 2017 Boulder, CO

## JOURNAL AND CONFERENCE PUBLICATIONS (REVERSE CHRONOLOGICAL)

- M. Bahrani, **M. Neuder**, S. M. Weinberg, “Selfish mining under general stochastic rewards,” (2025) *Advances in Financial Technologies (AFT’25)*.  
<https://doi.org/10.4230/LIPIcs.AFT.2025.20>. (full version on arxiv: <https://arxiv.org/abs/2502.20360>.)
- **M. Neuder**, M. Pai, and M. Resnick, “Optimizing Exit Queues for Proof-of-Stake Blockchains: A Mechanism Design Approach,” (2024) *Advances in Financial Technologies (AFT’24)*.  
<https://doi.org/10.4230/LIPIcs.AFT.2024.20>.

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

- Z. Fan, F. Marmolejo-Cossio, D. J. Moroz, **M. Neuder**, R. Rao, and D. C. Parkes, “Strategic Liquidity Provision in Uniswap v3,” (2023) *Advances in Financial Technologies (AFT’23)*.  
<https://doi.org/10.4230/LIPIcs.AFT.2023.25>.
- **M. Neuder**, E. Bradley, E. Dlugokencky, J. W. C. White, J. Garland, “Detection of Local Mixing in Time Series using Permutation Entropy,” (2021) *Physical Review E* 103.  
<https://doi.org/10.1103/PhysRevE.103.022217>.
- **M. Neuder**, D. J. Moroz, R. Rao, D. C. Parkes, “Defending Against Malicious Reorgs in Tezos Proof-of-Stake,” (2020) *ACM Conference on Advances in Financial Technologies (AFT’20)*.  
<https://doi.org/10.1145/3419614.3423265>.
- **M. Neuder**, D. J. Moroz, R. Rao, D. C. Parkes, “Selfish Behavior in the Tezos Proof-of-Stake Protocol,” (2020) *Cryptoeconomic Systems (CES’20) Conference*. <https://arxiv.org/pdf/1912.02954>.
- 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,” (2019) *Chaos: An Interdisciplinary Journal of Nonlinear Science* 29:101105. <https://doi.org/10.1063/1.5127211>.
- J. Garland, T. Jones, **M. Neuder**, V. Morris, J. W. C. White, E. Bradley, “Anomaly Detection in Paleoclimate Records using Information Theory,” (2018) *Entropy* 20(12):931. <https://doi.org/10.3390/e20120931>.

## WORKSHOP PAPERS AND OTHER LIGHTLY REFEREED PUBLICATIONS

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- P. Garimidi, **M. Neuder**, T. Roughgarden, “Tullock Contests in the Wild: Applications in Blockchains,” (2025) *ACM SIGecom Exchanges, Vol. 23, No. 1*.  
[https://www.sigecom.org/exchanges/volume\\_23/1/GARIMIDI.pdf](https://www.sigecom.org/exchanges/volume_23/1/GARIMIDI.pdf).
- **M. Neuder**, D. J. Moroz, R. Rao, D. C. Parkes, “Low-cost attacks on Ethereum 2.0 by sub-1/3 stakeholders,” (2020) *Workshop on Game Theory in Blockchain, Conference on Web and Internet Economics (WINE)*.  
<https://arxiv.org/pdf/2102.02247>.

## ACADEMIC TALKS

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- **Selfish mining under general stochastic rewards**  
Advances in Financial Technology, *AFT 2025*. [recording.](#) [slides.](#)
- **Optimizing Exit Queues for Proof-of-Stake Blockchains**  
Advances in Financial Technology, *AFT 2024*. [slides.](#)
- **Low-cost attacks on Ethereum 2.0 by sub-1/3 stakeholders**  
Workshop on Game Theory in Blockchain, *WINE 2020*. [recording.](#) [slides.](#)
- **Defending Against Malicious Reorgs in Tezos**  
ACM Advances in Financial Technology, *AFT 2020*. [recording.](#) [slides.](#)
- **Selfish Behavior in the Tezos PoS Protocol**  
Cryptoeconomic Systems Conference, *CES 2020*. [recording.](#) [slides.](#)
- **Animal Tracking using Deep Learning**  
Santa Fe Institute REU Presentation, *SFI 2018*. [recording.](#)

## AWARDS & FUNDING

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**2025-2030** Ethereum Foundation PhD Fellowship (award FY25-2276; \$200,000).  
**2020** Computer Science Discovery Learning Award (University of Colorado).  
**2019** Sieglinde Talbott Haller Scholarship in Mathematics (University of Colorado).  
**2019** Honorable Mention: Computing Research Assoc. Outstanding Undergraduate Researcher. [link.](#)  
**2017** Phi Beta Kappa (University of Colorado). [link.](#)  
**2015-2020** President Joseph A. Sewall Esteemed Scholar Award (University of Colorado). [link.](#)  
**2015-2020** Dean’s List (University of Colorado). [link.](#)

## PROFESSIONAL SERVICE

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Columbia CryptoEconomics Workshop (CCE).

↳ **2023, 2024, 2025**

The Latest in DeFi Research (TLDR) Conference.

↳ **2024, 2025**

Crypto & Blockchain Economics Research Forum (CBER) Conference.

↳ **2025, 2026**

Workshop on Decentralized Finance (DeFi) at Finanacial Cryptography.

↳ **2026**

Symposium On Discrete Algorithms (SODA).

↳ **2026**

Crypto Academic Summer School at Edge City.

↳ **2024**

dYdX MEV Committee.

↳ **2023**

*Organizing Committee.* [link.](#)

*Program Committee.* [link.](#)

*Program Committee.* [link.](#)

*Program Committee.* [link.](#)

*External Reviewer.*

*Organizing Committee.* [link.](#)

*Committee Member.* [link.](#)

## BLOCKCHAIN ARTICLES (NON-PEER REVIEWED) (BY TOPIC)

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### **Proof-of-Stake**

ETH, the asset

- My (e)thesis: settlement, data availability, execution – in that order.
- Issuance Issues – Tertiary Treatise.
- Issuance Issues – Subsequent Soliloquy.
- Issuance Issues – Initial Issue.

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Ethereum Consensus

- Concurrent Block Proposers in Ethereum, *with Max Resnick.*
- Rollup-Centric Roadmap (2024 version), *with Alex Stokes.*
- A set-theoretic view of Ethereum coteries.
- Time, slots, and the ordering of events in Ethereum, *with Georgios Konstantopoulos.*

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Increase the MAX\_EFFECTIVE\_BALANCE

- EIP-7251: Increase the MAX\_EFFECTIVE\_BALANCE.
- A modest proposal, *with Francesco D’Amato, Aditya Asgaonkar, Justin Drake.*
- Slashing penalty analysis; EIP-7251, *with Barnabe Monot.*
- Validator consolidation in EIP-7251, *with Francesco D’Amato, Mikhail Kalinin.*
- FAQ on EIP-7251, *with Francesco D’Amato, Mikhail Kalinin, dAppLion.*

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Exit/Withdrawal queues

- EIP-7922: Dynamic exit queue rate limit, *with Mikhail, Mallesh.*
- Adding flexibility to Ethereum’s exit queue, *with Mikhail Kalinin, Mallesh Pai.*
- ELI5: Ethereum Validator Exits, *with Mallesh Pai.*

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Liquid staking & restaking

- The Risks of LRTs, *with Tarun Chitra.*
- Musings on “two-tiered” staking, a native Liquid Staking Token design.
- Magnitude and direction of Lido attack vectors.

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Data availability/blobs

- Blob gossip and validation before and after PeerDAS.
- On the future of the blob mempool, *with Julian Ma.*

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### **Maximal Extractable Value (MEV)**

Enshrined Proposer-Builder Separation (ePBS)

- Why enshrine Proposer-Builder Separation, *with Justin Drake.*
- Payload-timeliness committee (PTC), *with Francesco D’Amato.*
- Equivocation attacks in mev-boost and ePBS, *with Francesco D’Amato.*

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- Relays in a post-ePBS world, *with Jon, Hasu, Tomasz, Chris, Toni.* [link.](#) [tweet.](#)
- ePBS – the infinite buffet. [link.](#) [tweet.](#)
- Consider the ePBS. [link.](#) [tweet.](#)
- Decoupling ExecutionPayload validity from Data Availability. [link.](#) [tweet.](#)

#### Censorship resistance

- EIP-7547: Inclusion lists. [link.](#)
- No free lunch – a new inclusion list design, *with Vitalik Buterin.* [link.](#) [tweet.](#)
- Unconditional inclusion lists, *with Toni Wahrstatter.* [link.](#) [tweet.](#)
- Resistance is not futile; CR in mev-boost. [link.](#) [tweet.](#)
- Inclusion lists: execution, consensus, & engine spec overview. [link.](#) [tweet.](#)
- Inclusion Lists PoC Specification. [link.](#) [tweet.](#)
- The Case for ILECTRA. [link.](#) [tweet.](#)

#### Relays

- Optimistic Relay Proposal, *with Justin Drake.* [link.](#)
- An optimistic weekend. [link.](#) [tweet.](#)
- Towards enshrined PBS – an optimistic roadmap. [link.](#)
- Optimistic relays and where to find them, *with Ankit Chiplunkar.* [link.](#) [tweet.](#)
- Bid cancellations considered harmful, *with Thomas Thiery.* [link.](#) [tweet.](#)

#### **Miscellanea**

- Overnight reverse repurchases and the Fed’s balance sheet. [link.](#) [tweet.](#)
- On Ethereum Prover Market Design, *with Maryam Bahrani.* [link.](#) [tweet.](#)
- On incentivizing anonymous participation, *with Maryam Bahrani.* [link.](#) [tweet.](#)
- Mechan-stein (alt. Franken-ism). [link.](#) [tweet.](#)
- On block-space distribution mechanisms, *with Pranav Garimidi, Tim Roughgarden.* [link.](#) [tweet.](#)
- Execution Tickets, *with Justin Drake.* [link.](#) [tweet.](#)
- How I learned to stop worrying and love mev-burn, *with Justin Drake, Toni Wahrstatter.* [link.](#) [tweet.](#)
- Timing Games: Implications and Possible Mitigations, *with Caspar Schwarz-Schilling.* [link.](#) [tweet.](#)

## **BLOCKCHAIN PRESENTATIONS, PODCASTS, & PANELS**

### **Presentations**

- Selfish Mining under General Stochastic Rewards – *IC3 Winter Retreat. January 2026.* [slides.](#)
- Adversarial procurement – *Columbia CryptoEconomics (CCE). December 2025.* [recording.](#) [slides.](#)
- First Principles of Blockchains – *World Bank Session. November 2025.* [slides.](#)

#### EthCC[8] (July 2025) – Cannes, France

- Blobs and the future of the blob mempool – *EthCC main event.* [recording.](#) [slides.](#)
- Blob futures and the blob mempool – *Blockspace Futures Day.* [recording.](#) [slides.](#)
- Revisiting Ethereum’s Exit Queue – *Beam Chain Call #4. April 2025.* [recording.](#) [slides.](#)
- Validator incentives – *Oxford-Harvard Conference on DeFi. January 2025.* [slides.](#)

#### DEVCON 7 (November 2024) – Bangkok, Thailand

- ETH is permissionless money – *DEVCON Main stage.* [recording.](#) [slides.](#)
- The ticker is ETH – *Bankless Summit.* [recording.](#) [slides.](#)
- Neutrality in Ethereum – *Harvard Club of New York City. October 2024.* [slides.](#)
- Separating MEV and Staking Rewards – *CBER Webinar. September 2024.* [recording.](#) [slides.](#)
- More slides about Ethereum Blockspace – *Scroll Protocol Symposium. August 2024.* [recording.](#) [slides.](#)
- More slides about PBS – *MEV Workshop, Stanford Blockchain Conf. August 2024.* [recording.](#) [slides.](#)
- Postmodern Staking – *9<sup>th</sup> Annual IC3 Blockchain Camp. June 2024.* [slides.](#)
- Is restaking the new staking? – *CBER Forum Annual Conference. May 2024.* [recording.](#) [slides.](#)
- State of the Ethereum Union (1/N perspective) – *ETHBoston. April 2024.* [slides.](#)

#### ETHDenver (March 2024) – Denver, USA

- Execution Tickets – *Beyond the Block (Titan Builder & Hashkey Capital).* [recording.](#) [slides.](#)

- The Risks of LRTs – *Research Day (SevenX Ventures)*. [recording](#). [slides](#).
- No Free Lunch – *Columbia CryptoEconomics Working Session*. December 2023. [recording](#). [slides](#).
- Enshrining PBS – *Center for Digital Finance & Technologies*. December 2023. [slides](#).

#### DevConnect (November 2023) – Istanbul, Turkey

- Increase the MAX\_EFFECTIVE\_BALANCE – *EthStaker Staking Gathering*. [recording](#). [slides](#).
- A set theoretic view of Ethereum coteries – *LidoConnect*. [recording](#). [slides](#).
- Why it’s hard to enshrine PBS – *Archetype MEV Lunch*. November 2023. [recording](#). [slides](#).

#### EthCC[6] (July 2023) – Paris, France

- Towards Enshrined Proposer-Builder Separation – *EthCC main event*. [recording](#). [slides](#).
- Ethereum PBS R&D Roadmap – *Modular Summit*. [recording](#). [slides](#).
- Increase the MAX\_EFFECTIVE\_BALANCE – *Kiln Rendez-vous*. [recording](#). [slides](#).
- Reorgs in PoS – *MEV Roast; Reorg Edition*. August 2021. [recording](#). [slides](#).

#### **Podcasts**

- Pectra Explained – *Coinbase Institutional Webinar*. May 2025. [recording](#).
- ETH is Permissionless Money – *Cryptoria*. December 2024. [English](#). [Chinese](#).
- Ethereum’s North Star – *The Gwart Show*. October 2024. [recording](#).
- The Future of Ethereum: Is This The Right Track? – *Bankless*. October 2024. [recording](#).
- The Ethereum Roadmap is NOT Off Track! – *Bankless*. September 2024. [recording](#).
- ETH Insights: Discussing MaxEB – *Coinbase Webinar*. April 2024. [recording](#). [article](#).
- PeepAnEIP: EIP-7547 – *Ethereum Cat Herders*. April 2024. [recording](#).
- Endgame 2.0: A Guide to Vitalik’s Ethereum Roadmap – *Bankless*. February 2024. [recording](#).
- We’re Pretty Sure Mike and Max Can Fix MEV – *The Gwart Show*. February 2024. [recording](#).
- PeepAnEIP: EIP-7251 – *Ethereum Cat Herders*. February 2024. [recording](#).
- Eigenlayer In 2024 (co-host) – *Bankless*. December 2023. [recording](#).
- An Incomplete Guide to PBS – *Uncommon Core 2*. September 2023. [recording](#).

#### **Panels**

- Restaking Panel – *Staking Rewards: Staking Summit*. November 2024. [recording](#).
- Decentralization Panel – *Espresso: Beyond the Baselayer*. March 2024. [recording](#).
- Decentralize or Bust – *bloXroute & ETHStaker*. March 2024. [recording](#).
- Alignment Panel – *EigenLayer Restaking Summit*. November 2023. [recording](#).
- PBS & Beyond – *MEVDay Paris*. July 2023. [recording](#).

## **OPEN SOURCE CONTRIBUTIONS**

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### EIP-7547: Inclusion Lists (python) (repo)

- EIP (Ethereum Improvement Proposal). [link](#).
- Spec Overview (Consensus, Execution, and Engine API specifications). [link](#).
- Proof-of-Concept Specification. [link](#).
- Compilation of Related Work. [link](#).

### EIP-7251: Increase the MAX\_EFFECTIVE\_BALANCE (python) (repo)

- EIP (Ethereum Improvement Proposal). [link](#).
- Minimal Spec Change (Consensus specifications). [link](#).
- Compilation of Related Work. [link](#).

### MEV-boost Relay: Optimistic Processing (golang) (repo)

- Main pull request & design documentation. [link](#).
- Header-only parsing optimization. [link](#).
- Pull request list. [link](#).
- Proposal. [link](#).
- Builder Onboarding. [link](#).

Erigon (Ethereum Execution Layer Client) ([golang](#)) ([repo](#))

- Refactored req/resp domain network encoding.
- Consensus spec implementation.
- Pull request list.

[link.](#)  
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Prysm (Ethereum Consensus Layer Client) ([golang](#)) ([repo](#))

- Keymanager code-health refactor.
- Pull request list.

[link.](#)  
[link.](#)

STRUMPACK (High-performance matrix math package) ([C++](#)) ([repo](#))

- Mixed-precision (`float64` & `float32`) iterative refinement.
- Pull request list.
- Write-up.

[link.](#)  
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OptRBC (Optimal solutions in 2D Rayleigh-Benard Convection) ([FORTAN](#)) ([repo](#))

- Multiprocessor implementation using [openmp](#).
- Write-up.

[link.](#)  
[link.](#)

Image quality convolutional neural networks. ([python](#)) ([repo](#))

- Write-up.
- Example network.

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## MISCELLANEA: FUN WRITING & SOFTWARE

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### Writing

- Tattoo probabilistic analysis.
- Solo-staking rig.
- NBA draft probabilistic analysis.
- Shakespeare Zipf-ian analysis.

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### Software

- Monte Carlo numerical demonstrations. ([python](#))
- Connect Four PyQT application. ([python](#))
- Terminal implementation of games. ([perl](#))
- Rubik's cube solver. ([C++](#))

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