

# MICHAEL (mike) NEUDER

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💻 [michaelneuder.github.io](https://michaelneuder.github.io)

🌐 Princeton, New Jersey, USA

## EDUCATION

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### Princeton University

*Doctoral student, Computer Science*

↳ Under the supervision of Prof. [Matt Weinberg](#)

↳ Supported by an Ethereum Foundation PhD Fellowship (FY25-2276)

Aug. 2025 - Present

Princeton, NJ

### Harvard University

*Master of Science, Computational Science*

Aug. 2020 - May. 2021

Cambridge, MA

### University of Colorado

*Bachelor of Arts, Computer Science*

*Bachelor of Arts, Mathematics*

Aug. 2015 - May. 2020

Boulder, CO

## ACADEMIC EXPERIENCE

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### EconCS Group, Harvard University

*Research Assistant supervised by Prof. [David C. Parkes](#)*

Aug. 2019 - Aug. 2021

Cambridge, MA

### Santa Fe Institute

*Undergraduate Research Fellow: Summer 2018 REU*

Jun. 2018 - Aug. 2018

Santa Fe, NM

### Bradley Lab, University of Colorado

*Research Assistant supervised by Prof. [Elizabeth Bradley](#)*

Apr. 2017 - Aug. 2021

Boulder, CO

### Mozer Lab, University of Colorado

*Research Assistant supervised by Prof. [Michael Mozer](#)*

Mar. 2017 - May. 2019

Boulder, CO

## INDUSTRY EXPERIENCE

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### The Ethereum Foundation

*Researcher – Applied Research Group (ARG)*

Mar. 2023 - May. 2025

New York, NY

### Google

*Software Engineer (L3 → L4) – Cloud Storage*

Aug. 2021 - Feb. 2023 (Cambridge, MA)

*Software Engineering Intern – Network Infrastructure*

Summer 2020 (remote)

*Software Engineering Intern – Flights*

Summer 2019 (Cambridge, MA)

*Software Engineering Intern – Mobile Device Management*

Fall 2018 (Sunnyvale, CA)

### Lockheed Martin & LASP<sup>1</sup>

*Software Engineering Intern*

Feb. 2017 - Oct. 2017

Boulder, CO

## JOURNAL AND CONFERENCE PUBLICATIONS (REVERSE CHRONOLOGICAL)

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- 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](https://arxiv.org/pdf/1912.02954.pdf).
- 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 REFEREEED 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](https://arxiv.org/pdf/2102.02247.pdf).

## ACADEMIC TALKS

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- **Selfish mining under general stochastic rewards**  
 Advances in Financial Technology, *AFT 2025*. [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

- |   |   |
|---|---|
| <p><b>2026</b> Workshop on Decentralized Finance (DeFi) at Financial Cryptography.</p> <p><b>2026</b> Symposium On Discrete Algorithms (SODA).</p> <p><b>2025</b> Crypto &amp; Blockchain Economics Research Forum (CBER) Conference.</p> <p><b>2023, 2024, 2025</b> Columbia CryptoEconomics Workshop (CCE).</p> <p><b>2024, 2025</b> The Latest in DeFi Research (TLDR) Conference.</p> <p><b>2024</b> Crypto Academic Summer School at Edge City.</p> <p><b>2023</b> dYdX MEV Committee.</p> | <p><i>Program Committee.</i> <a href="#">link</a>.</p> <p><i>External Reviewer.</i></p> <p><i>Program Committee.</i> <a href="#">link</a>.</p> <p><i>Organizing Committee.</i> <a href="#">link</a>.</p> <p><i>Program Committee.</i> <a href="#">link</a>.</p> <p><i>Organizing Committee.</i> <a href="#">link</a>.</p> <p><i>Committee Member.</i> <a href="#">link</a>.</p> |
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## BLOCKCHAIN ARTICLES (NON-PEER REVIEWED) (BY TOPIC)

### Proof-of-Stake

ETH, the asset

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

### Ethereum Consensus

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

### Increase the MAX\_EFFECTIVE\_BALANCE

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

### Exit/Withdrawal queues

- EIP-7922: Dynamic exit queue rate limit, *with Mikhail Mallesh*. [link](#).
- Adding flexibility to Ethereum's exit queue, *with Mikhail Kalinin, Mallesh Pai*. [link](#). [tweet](#).
- ELI5: Ethereum Validator Exits, *with Mallesh Pai*. [link](#). [tweet](#).

### Liquid staking & restaking

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

### Data availability/blobs

- Blob gossip and validation before and after PeerDAS. [link](#). [tweet](#).
- On the future of the blob mempool, *with Julian Ma*. [link](#). [tweet](#).

### Maximal Extractable Value (MEV)

Enshrined Proposer-Builder Separation (ePBS)

- Why enshrine Proposer-Builder Separation, *with Justin Drake*. [link](#). [tweet](#).
- Payload-timeliness committee (PTC), *with Francesco D'Amato*. [link](#). [tweet](#).
- Equivocation attacks in mev-boost and ePBS, *with Francesco D'Amato*. [link](#). [tweet](#).
- 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 Thiry*. [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

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### **Presentations**

- First Principles of Blockchains – *World Bank Session*. November 2025. [slides](#).
- Revisiting Ethereum's Exit Queue – *Beam Chain Call #4*. April 2025. [recording](#) [slides](#).
- Validator incentives – *Oxford-Harvard Conference on DeFi*. January 2025. [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 Conference*. 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](#).
- No Free Lunch – *Columbia CryptoEconomics Working Session*. December 2023. [recording](#) [slides](#).
- Enshrining PBS – *Center for Digital Finance & Technologies*. December 2023. [slides](#).
- Why it's hard to enshrine PBS – *Archetype MEV Lunch*. November 2023. [recording](#) [slides](#).
- Reorgs in PoS – *MEV Roast; Reorg Edition*. August 2021. [recording](#) [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](#).

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

- ETH is permissionless money – *DEVCON Main stage*. [recording](#) [slides](#).
- The ticker is ETH – *Bankless Summit*. [recording](#) [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](#).

### 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](#).

### 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](#).

## 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](#).
- 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 – *EignenLayer 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. [link](#).
- Consensus spec implementation. [link](#).
- Pull request list. [link](#).

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

- Keymanager code-health refactor. [link](#).
- Pull request list. [link](#).

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

- Mixed-precision (float64 & float32) iterative refinement. [link](#).
- Pull request list. [link](#).
- Write-up. [link](#).

## 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.

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

## **MISCELLANEA: FUN WRITING & SOFTWARE**

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### Writing

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

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

### Software

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

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