

# MICHAEL (mike) NEUDER

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🌐 Colorado, USA

## EDUCATION

### Harvard University

*Master of Science, Computational Science*

2020 - 2021

*Cambridge, Massachusetts*

### University of Colorado

*Bachelor of Arts, Computer Science*

2015 - 2020

*Bachelor of Arts, Mathematics*

*Boulder, Colorado*

## ACADEMIC EXPERIENCE

### EconCS Group, Harvard University

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

August 2019 - August 2021

*Cambridge, MA*

### Santa Fe Institute

*Undergraduate Research Fellow: Summer 2018 REU*

June 2018 - August 2018

*Santa Fe, NM*

### Bradley Lab, University of Colorado

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

April 2017 - August 2021

*Boulder, CO*

### Mozer Lab, University of Colorado

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

March 2017 - May 2019

*Boulder, CO*

## INDUSTRY EXPERIENCE

### The Ethereum Foundation

*Researcher – Applied Research Group (ARG)*

March 2023 - May 2025

*New York, NY*

### Google

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

August 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*

## PUBLICATIONS & CORRESPONDING TALKS (REVERSE CHRONOLOGICAL)

(1) M. Bahrani, **M. Neuder**, S. M. Weinberg, “Selfish mining under general stochastic rewards,” (2025) *preprint*. <https://arxiv.org/pdf/2502.20360>.

(2) **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)*.

<https://arxiv.org/pdf/2406.05124>.

– [Conference talk](#). September 24, 2024.

(3) 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)*.

<https://doi.org/10.4230/LIPIcs.AFT.2023.25>.

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

- (4) **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>.
- (5) **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>.  
 – [Conference talk](#). December 8, 2020.
- (6) **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)*.  
<https://doi.org/10.1145/3419614.3423265>.  
 – [Conference talk](#). October 21, 2020.
- (7) **M. Neuder**, D. J. Moroz, R. Rao, D. C. Parkes, “Selfish Behavior in the Tezos Proof-of-Stake Protocol,” (2020) *Cryptoeconomic Systems (CES) Conference*. <https://arxiv.org/pdf/1912.02954>.  
 – [Conference talk](#). March 7, 2020.
- (8) 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>.
- (9) 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>.

## AWARDS

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- 2025-2030** Ethereum Foundation PhD Grant ( $\approx 200k$  USD).  
**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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- 2025** Crypto & Blockchain Economics Research Forum (CBER) Conference. *Program Committee*. [link](#).  
**2023, 2024** Columbia CryptoEconomics Workshop (CCE). *Organizing Committee*. [link](#).  
**2024, 2025** The Latest in DeFi Research (TLDR) Conference. *Program Committee*. [link](#).  
**2024** Crypto Academic Summer School at Edge City. *Organizing Committee*. [link](#).  
**2023** dYdX MEV 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. [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, Malleesh.* [link.](#)
- Adding flexibility to Ethereum’s exit queue, *with Mikhail Kalinin, Malleesh Pai.* [link.](#) [tweet.](#)
- ELI5: Ethereum Validator Exits, *with Malleesh 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.](#)

### **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.](#)

#### 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

- 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**

- 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.](#)

#### DEVCON 7 (November 2024)

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

#### ETHDenver (March 2024)

- Execution Tickets – *Beyond the Block (Titan Builder & Hashkey Capital).* [recording.](#) [slides.](#)
- The Risks of LRTs – *Research Day (SevenX Ventures).* [recording.](#) [slides.](#)

#### DevConnect (November 2023)

- Increase the MAX\_EFFECTIVE\_BALANCE – *EthStaker Staking Gathering.* [recording.](#) [slides.](#)
- A set theoretic view of Ethereum coteries – *LidoConnect.* [recording.](#) [slides.](#)

#### EthCC (Community Conference) (July 2023)

- 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.](#) [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**

#### 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](#). [link.](#)
- Write-up. [link.](#)

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

- Write-up. [link.](#)
- Example network. [link.](#)

## MISCELLANEA: FUN WRITING & SOFTWARE

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### Writing

- Tattoo probabilistic analysis. [link.](#) [tweet.](#)
- Solo-staking rig. [link.](#) [tweet.](#)
- NBA draft probabilistic analysis. [link.](#)
- Shakespeare Zipf-ian analysis. [link.](#)

### Software

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