MICHAEL (mike) NEUDER

✉ michael.neuder@gmail.com
🖥 michaelneuder.github.io
🌎 brooklyn, ny

EDUCATION

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

ACADEMIC EXPERIENCE

EconCS Group, Harvard University	August 2019 - August 2021
Research Assistant supervised by Dr. David C. Parkes	*Cambridge, MA*
Santa Fe Institute	June 2018 - August 2018
Undergraduate Research Fellow: Summer 2018 REU	*Santa Fe, NM*
Bradley Lab, University of Colorado	April 2017 - August 2021
Research Assistant supervised by Dr. Elizabeth Bradley	*Boulder, CO*
Mozer Lab, University of Colorado	March 2017 - May 2019
Research Assistant supervised by Dr. Michael Mozer	*Boulder, CO*

INDUSTRY EXPERIENCE

The Ethereum Foundation	March 2023 - Present
Researcher – Applied Research Group (ARG)	*New York, NY*
Google	
Software Engineer (L3 → L4) – Cloud Storage	August 2020 - March 2021 (*Cambridge, MA*)
Software Engineering Intern – Network Infrastucture	Summer 2020 (*remote*)
Software Engineering Intern – Flights	Summer 2019 (*Cambridge, MA*)
Software Engineering Intern – Mobile Device Management	Fall 2018 (*Sunnyvale, CA*)
Lockheed Martin & LASP[1]	Feb 2017 - Oct 2017
Software Engineering Intern	*Boulder, CO*

PUBLICATIONS & CORRESPONDING TALKS (REVERSE CHRONOLOGICAL)

(1) **Michael Neuder**, Mallesh Pai, and Max Resnick, "Optimizing Exit Queues for Proof-of-Stake Blockchains: A Mechanism Design Approach," *in submissino to ACM Conference on Advances in Financial Technologies (AFT) 2024*. https://arxiv.org/abs/2406.05124.

(2) Zhou Fan, Francisco Marmolejo-Cossio, Daniel Moroz, **Michael Neuder**, Rithvik Rao, and David C. Parkes, "Strategic Liquidity Provision in Uniswap v3," *ACM Conference on Advances in Financial Technologies (AFT) 2023*. https://doi.org/10.4230/LIPIcs.AFT.2023.25.

(3) **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*, 2021. https://doi.org/10.1103/PhysRevE.103.022217.

   – [Poster Presentation](). 2021 European Geosciences Union General Assembly. *April 13, 2021.*

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[1]Laboratory of Atmospheric and Space Physics: https://lasp.colorado.edu/home/.

(4) **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, Conference on Web and Internet Economics (WINE) 2020*. https://econcs.pku.edu.cn/wine2020/wine2020/Workshop/GTiB20_paper_8.pdf.

– Conference talk. *December 8, 2020.*

(5) **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.

– Conference talk. *October 21, 2020.*

(6) **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.

– Conference talk. *March 7, 2020.*

(7) 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.

(8) 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.

AWARDS

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

2023 & 2024 Columbia CryptoEconomics Workshop (CCE).   *Organizing Committee.* link.
2024 Workshop on Blockchains and Decentralized Finance (@EC).   *Program Committee.* link.
2024 The Latest in DeFi Research (TLDR) Confrerence.   *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)

Proof-of-Stake

Ethereum Consensus

○ Issuance Issues – Tertiary Treatise.   link. tweet.
○ Issuance Issues – Subsequent Soliloquy.   link. tweet.
○ Issuance Issues – Initial Issue.   link. tweet.
○ 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.

EIP-7251 (link) – Increase the `MAX_EFFECTIVE_BALANCE`

○ 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.

EIP-7547 (link) – Inclusion Lists

○ 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.

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.

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.

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 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, PANELS, & PODCASTS

Presentations

- ○ Postmodern Staking – 9th *Annual IC3 Blockchain Camp. June 2024*.   slides.
- ○ Is restaking the new staking? – *CBER Forum Annual Conference. May 2024*.   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.

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.

Panels

- ○ 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](#).

Podcasts
- 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](#).

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

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.