

Ashok Vardhan Makkuva

CONTACT	Email: ashok.makkuva@epfl.ch ; Homepage: https://ashokvardhan.github.io/
INTERESTS	Machine learning, information theory, coding theory, and statistics
EDUCATION	University of Illinois at Urbana-Champaign (UIUC) Ph.D., Electrical and Computer Engineering, 2017 - 2022 4.0/4.0 – Advisor: Pramod Viswanath M.S., Electrical and Computer Engineering, 2015 - 2017 4.0/4.0 – Advisor: Yihong Wu Indian Institute of Technology Bombay (IIT Bombay) B.Tech., Electrical Engineering, 2011 - 2015 9.62/10.0 – Advisor: Vivek Borkar
PROFESSIONAL EXPERIENCE	<ul style="list-style-type: none">• École Polytechnique Fédérale de Lausanne (EPFL) - Postdoctoral Researcher [Sep'22 -] Mentor: Michael Gastpar• Amazon AWS AI Labs, NYC - Applied Data Science Intern [May-Aug'19] Mentors: Ashish Khetan, Zohar Karnin• Morgan Stanley Strats & Modeling, Mumbai - Quant Analyst Intern [May-Jul'14] Mentor: Manikantan Srinivasan
PATENTS	<ul style="list-style-type: none">• Non-linear encoding and decoding for reliable wireless communication [2022] A.V. Makkuva, X. Liu, M.V. Jamali, H. Mahdavifar, S. Oh, P. Viswanath [google patents]
SELECT AWARDS	<ul style="list-style-type: none">• Best Paper Award: ACM Mobihoc [2019]• Joan and Lalit Bahl Fellowship, UIUC (awarded twice) [2019, 2020]• Sundaram Seshu International Student Fellowship, UIUC [2018]• Qualcomm Innovation Fellowship Finalist (among 174 applicants) [2018]• All India Rank 32: Awarded fellowship in IISc for undergraduate studies (declined) [2011]• Bronze medal, Mathematics Olympiad, IIT Bombay [2013]• Gold Medal for All India Rank 8 in the International Mathematics Competition, SOF [2010]
REFERENCES	<ul style="list-style-type: none">• Erdal Arıkan, Professor, Bilkent University — arikan@bilkent.edu.tr• Pramod Viswanath, Professor, Princeton University — pramodv@princeton.edu• Sewoong Oh, Professor, University of Washington — sewoong@cs.washington.edu• Michael Gastpar, Professor, EPFL — michael.gastpar@epfl.ch• Martin Jaggi, Associate Professor, EPFL — martin.jaggi@epfl.ch• Hyeji Kim, Assistant Professor, UT Austin — hyeji.kim@austin.utexas.edu• Hessam Mahdavifar, Associate Professor, U. Michigan — hessam@umich.edu
INVITED TALKS	1. KO codes (US, Canada, Europe, and India) [2021-2022] <ul style="list-style-type: none">• SiA Group Seminar, <i>MIT</i>• ISL Colloquium, <i>Stanford University</i>• BASiCS Group Seminar, <i>UC Berkeley</i>• TheSys Group Seminar, <i>Carnegie Mellon University</i>• ECE department seminar, <i>University of Toronto</i>

- Signal and Information Processing Lab Seminar, *ETH Zürich*
- Information Processing Group Seminar, *EPFL*
- Prof. Arya Mazumdar's group seminar, *UCSD*
- ITML Group Seminar, *IST Austria*
- School of Technology and Computer Science Seminar, *TIFR*
- EE & CS Joint Seminar, *IISc*

2. Learning in Gated Neural Networks (US and India)

[2018-2020]

- Machine learning and Optimization Seminar, *University of Washington*
- Machine learning Seminar, *Carnegie Mellon University*
- EE & CS Joint Seminar, *IIT Madras*
- EE Department Seminar, *IIT Bombay*
- School of Technology and Computer Science Seminar, *TIFR*
- Theory Group Seminar, *Microsoft Research India*

MENTORING

- [Ranvir Rana](#) (PhD at UIUC → Co-founder & CTO at Kaleidoscope Blockchain)
Publication #4 (ACM Mobihoc '19), **Best paper award**
- [Xiyang Liu](#) (PhD at University of Washington)
Publication #12 (JSAIT '23), #10 (ICML '21), and #9 (ISIT '21), **Qualcomm Fellowship Winner**
- [Mohammad Vahid Jamali](#) (PhD at U. Michigan → Samsung)
Publication #12 (JSAIT '23), #10 (ICML '21), and #9 (ISIT '21), **Qualcomm Fellowship Winner**
- [Ashwin Hebbar](#) (MS at UIUC → PhD at Princeton)
Publication #13 (ICML '23) and #11 (ISIT '22)
- [Viraj Nadkarni](#) (MS at UIUC → PhD at Princeton)
Publication #13 (ICML '23)
- [Sravan Kumar Ankireddy](#) (PhD at UT Austin)
Publication #11 (ISIT '22)
- [Marco Bondaschi](#) (PhD at EPFL)
Preprint #14

TEACHING

Graduate Teaching Assistant: 3 semesters at UIUC, 5 semesters at IIT Bombay [2013-2020]

- UIUC: Information Theory (ECE 563), Representation Learning (ECE 598), Detection and Estimation Theory (ECE 561)
- IIT Bombay: Linear Algebra (MA 106), Differential Equations I-II (MA 108, MA 208), Complex Analysis (MA 205) & Electricity and Magnetism (PH 103)

SCHOLASTIC ACHIEVEMENTS

- Offered a Quantitative Analyst position at **Goldman Sachs** (declined) [2015]
- Secured **10/10** GPA at IIT Bombay, Spring 2014 - 2015
- Secured **All India Rank 14** in 41st National Mathematical Talent Competition [2010]
- Secured **All India Rank 32** in AIEEE among 10,65,100 students [2011]
- Secured **All India Rank 287** in IIT-JEE among 4,85,000 students [2011]

ACADEMIC SERVICE

Reviewer

- Conferences: NeurIPS 2023, AISTATS 2022, NeurIPS 2019, ISIT 2018
- Journals: International Journal of Computer Vision (IJCV) 2020

Program Committee, CSL Student Conference

[2018-2019]

- Served as a session chair for machine learning track and invited keynote speakers from reputed universities across the world

- PREPRINTS 14. LASER: Linear Compression in Wireless Distributed Optimization
A.V. Makkuva*, M. Bondaschi*, T. Vogels, M. Jaggi, H. Kim, M. Gastpar [\[arxiv\]](#)
- PUBLICATIONS 13. CRISP: Curriculum based Sequential Neural Decoders for Polar Code Family
S.A. Hebbbar*, V. Nadkarni*, **A.V. Makkuva**, S. Bhat, S. Oh, P. Viswanath
International Conference on Machine Learning (ICML), 2023 [\[arxiv\]](#)
12. Machine Learning-Aided Efficient Decoding of Reed-Muller Subcodes
M.V. Jamali, X. Liu, **A.V. Makkuva**, H. Mahdavifar, S. Oh, P. Viswanath
IEEE Journal on Selected Areas in Information Theory (JSAIT), 2023 [\[arxiv\]](#)
11. TinyTurbo: Efficient Turbo Decoders on Edge
S.A. Hebbbar*, R. Mishra*, S.K. Ankireddy, **A.V. Makkuva**, H. Kim, P. Viswanath
IEEE International Symposium on Information Theory (ISIT), 2022 [\[arxiv\]](#)
10. KO codes: Inventing Nonlinear Encoding and Decoding for Reliable Wireless Communication via Deep-learning
A.V. Makkuva*, X. Liu*, M.V. Jamali, H. Mahdavifar, S. Oh, P. Viswanath
International Conference on Machine Learning (ICML), 2021 [\[arxiv\]](#)
9. Reed-Muller Subcodes: Machine Learning-Aided Design of Efficient Soft Recursive Decoding
M.V. Jamali, X. Liu, **A.V. Makkuva**, H. Mahdavifar, S. Oh, P. Viswanath
IEEE International Symposium on Information Theory (ISIT), 2021 [\[arxiv\]](#)
8. Optimal transport mapping via input convex neural networks
A.V. Makkuva*, A. Taghvaei*, J.D. Lee, S. Oh
International Conference on Machine Learning (ICML), 2020 [\[arxiv\]](#)
7. Learning in Gated Neural Networks
A.V. Makkuva, S. Oh, S. Kannan, P. Viswanath
International Conference on Artificial Intelligence and Statistics (AISTATS), 2020 [\[arxiv\]](#)
6. Breaking the gridlock in Mixture-of-Experts: Consistent and Efficient Algorithms
A.V. Makkuva, S. Oh, S. Kannan, P. Viswanath
International Conference on Machine Learning (ICML), 2019 [\[arxiv\]](#)
5. Learning One-hidden-layer Neural Networks under General Input Distributions
W. Gao*, **A.V. Makkuva***, S. Oh, P. Viswanath
International Conference on Artificial Intelligence and Statistics (AISTATS), 2019 [\[arxiv\]](#)
4. Barracuda: The Power of ℓ -polling in Proof-of-Stake Blockchains
G. Fanti, J. Jiao, **A.V. Makkuva**, S. Oh, R. Rana, P. Viswanath
ACM International Symposium on Mobile Ad Hoc Networking and Computing (ACM Mobihoc), 2019 (Best paper award) [\[arxiv\]](#)
3. Equivalence of additive-combinatorial linear inequalities for Shannon entropy and differential entropy
A.V. Makkuva, Y. Wu
IEEE Transactions on Information Theory, 2018 [\[arxiv\]](#)
2. On additive-combinatorial affine inequalities for Shannon entropy and differential entropy
A.V. Makkuva, Y. Wu
IEEE International Symposium on Information Theory (ISIT), 2016 [\[ieee xplore\]](#)
1. Event-driven stochastic approximation
N. Sahasrabudhe, **A.V. Makkuva**, V.S. Borkar
Indian Journal of Pure and Applied Mathematics, 2016 [\[springer\]](#)