Adway Girish

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Third-Year Ph.D. Candidate
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Research Interests

Information and coding theory and its applications to **security**, **learning** and **communication**

Education

EPFL (*Swiss Federal Institute of Technology in Lausanne*) — *Lausanne, Switzerland*
Ph.D. in Computer and Communication Sciences — Sep. 2022–Present
Advisor: Prof. Emre Telatar, CGPA: 5.90/6

IIT Bombay (*Indian Institute of Technology Bombay, IITB*) — *Mumbai, India*
B.Tech. in Electrical Engineering — Jul. 2018–May 2022
With Honors in Electrical Engineering and Minor in Mathematics, CGPA: 9.60/10

Publications

*, † denote equal contribution

Refereed conference proceedings

[C7] **A. G.**, S. Shamai, and E. Telatar, "On entropy-constrained Gaussian channel capacity via the moment problem," in *IEEE International Symposium on Information Theory (ISIT, to appear)*, 2025 [arXiv]

[C6] A. Nagle*, **A. G.***, M. Bondaschi, M. Gastpar, A. V. Makkuva†, and H. Kim†, "Fundamental limits of prompt compression: A rate-distortion framework for black-box language models," in *The Thirty-Eighth Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2024 [Also **oral** (top 4 of 58) at ICML TF2M workshop 2024][arXiv]

[C5] A. V. Makkuva*, M. Bondaschi*, C. Ekbote, **A. G.**, A. Nagle, H. Kim, and M. Gastpar, "Local to global: Learning dynamics and effect of initialization for transformers," in *The Thirty-Eighth Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2024 [Also poster at ICML TF2M workshop 2024][arXiv]

[C4] A. V. Makkuva*, M. Bondaschi*, **A. G.**, A. Nagle, M. Jaggi, H. Kim, and M. Gastpar, "Attention with Markov: A curious case of single-layer transformers," in *The Thirteenth International Conference on Learning Representations (ICLR, to appear)*, 2025 [**Spotlight** (top 5%) at ICLR; also poster at ICML MI workshop 2024][arXiv]

[C3] F. Z. Faizal, **A. G.**, M. K. Hanawal, and N. Karamchandani, "ICQ: A quantization scheme for best-arm identification over bit-constrained channels," in *International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)*, 2023 [IEEE Xplore]

[C2] S. Sharma, **A. G.**, D. Jeff, G. Sresth, S. Bhalerao, V. M. Gadre, C. H. Srinivas Rao, and P. Radhakrishna, "Micro-Doppler parameter estimation using variational mode decomposition with finite rate of innovation," in *IEEE International Conference on Signal Processing and Communications (SPCOM)*, 2022 [IEEE Xplore]

[C1] S. Sharma, **A. G.**, N. P. Rakhashia, V. M. Gadre, S. ul Haque, A. Ansari, R. B. Pachori, P. Radhakrishna, and P. Sahay, "Theoretical analysis of an inverse Radon transform based multicomponent micro-Doppler parameter estimation algorithm," in *National Conference on Communications (NCC)*, 2022 [IEEE Xplore]

Awards and Prizes

- EDIC fellowship for first year of PhD at EPFL [2022–23]
- Institute Academic Prize for being the second-best academic performer in the EE department at IITB [2020–21]
- IITB Undergraduate Research Award (URA01) for work in radar signal processing [2020]
- Urvish Medh Memorial Prize for being the highest-ranked student in the EE department at IITB [2018]

- Kishore Vaigyanik Protsahan Yojana (KVPY) fellowship from the Indian Institute of Science (IISc) [2016]
- National Talent Search (NTS) scholarship by National Council of Educational Research and Training (NCERT) [2016]

Academic Achievements

- Grade 6/6 (exceptional performance, over 95%) in seven graduate-level courses at EPFL [2022–present]
- AP grade (top 2%) in Digital Communications, Data Analysis at IITB [2021, 2019]
- All-India ranks of 43 in JEE (Advanced) and 55 in JEE (Main) for admission to IITB [2018]
- Final stage of Indian team selection for international chemistry and astronomy olympiads (IChO and IOAA) [2018]
- All-India Rank of 35 in KVPY for admission to IISc [2016]

Industry Experience

Evaluation of Baseband Behavioural Models for Power Amplifiers *Summer Internship*

Texas Instruments (India), Bangalore, India May 2021–Jul. 2021

- Performed literature review of Volterra series and Memory Polynomial models and identified reasonable ones to pursue
- Implemented these models on MATLAB, obtaining considerable improvement over those presently in use
- Devised a 'peeling' algorithm to make the model implementable on an FPGA and ready for use in a real product

Presentations

Contributed talks

- Entropy-constrained Gaussian channel capacity via moment matching. *ISIT 2025, Ann Arbor, USA* [Jun. 2025 (sched.)]
- A moment-matching problem with an entropy constraint. *INFORMS APS conference 2025, Atlanta, USA* [Jun. 2025 (sched.)]
- Fundamental limits of prompt compression. *ICML TF2M workshop 2024, Vienna, Austria* [Jul. 2024]
- ICQ: A quantization scheme for best-arm identification over bit-constrained channels. *WiOpt 2023, Singapore* [Aug. 2023]

Posters

- Fundamental limits of prompt compression. *NeurIPS 2024, Vancouver, Canada* [Dec. 2024]
  ICML TF2M workshop 2024, Vienna, Austria [Jul. 2024]
- Local to global: Effect of initialization on transformers. *NeurIPS 2024, Vancouver, Canada* [Dec. 2024]
  ICML TF2M workshop 2024, Vienna, Austria [Jul. 2024]
- Input-entropy constrained channel capacity. *European School of Information Theory 2024, Eindhoven, Netherlands* [Jun. 2024]
- Attention with Markov: Single-layer transformers. *EDIC Open House 2024, Lausanne, Switzerland* [Mar. 2024]

Teaching and Responsibility

Academic service

- Reviewer for conferences: ISIT (2025, 2024) [2024–present]
- Reviewer for workshops: ISIT Compression and Learning (2025), ICML Neural Compression (2023) [2023–present]

Teaching

- Graduate Teaching Assistant for information theory and digital communications a total of 5 times at EPFL [2023–present]
- Teaching Assistant for calculus and electromagnetism a total of 4 times at IITB [2019–22]

Mentoring and leadership

- RAMP Mentor for EPFL PhD applicants, EPIC buddy for admitted PhD students at EPFL [2023–present]
- Summer of Science Mentor for signal processing, coding theory, probability and information theory at IITB [2020–24]
- Institute Student Mentor for first-year undergraduates at IITB [2021–22]
- Class Representative for the 2018–22 batch of B.Tech. in Electrical Engineering at IITB [2018–19]

Relevant Graduate-Level Coursework

- **Mathematics**
  Functional analysis II, Ergodic theory, Convex optimization, Finite fields and their applications, Fourier analysis, Basic algebra, Complex analysis, Real analysis
- **Probability, statistics and learning**
  Empirical processes, Learning theory, Stochastic calculus, Markov chains and algorithmic applications, Advanced probability and random processes, Stochastic optimization, Online learning and bandit algorithms, Estimation and identification
- **Communication theory and systems**
  Quantum information theory, Modern digital communications, Advanced topics in information theory, Information theory and coding, Error-correcting codes, Communication networks, Wireless and mobile communication