Adway Girish

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Third-Year Ph.D. Candidate
Information Theory Laboratory, Information Processing Group (IPG)
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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

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

Conference proceedings

[C5] 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 *Advances in Neural Information Processing Systems (to appear)*, vol. 37, 2024 [Also **oral** (top 4 of 58) at ICML TF2M workshop 2024][arXiv]

[C4] 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 *Advances in Neural Information Processing Systems (to appear)*, vol. 37, 2024 [Also poster at ICML TF2M 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]

Workshop papers

[W1] A. V. Makkuva*, M. Bondaschi*, **A. G.**, A. Nagle, M. Jaggi, H. Kim, and M. Gastpar, "Attention with Markov: A framework for principled analysis of transformers via Markov chains," in *ICML Workshop on Mechanistic Interpretability*, 2024[arXiv]

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 6.0 (exceptional performance, over 95%) in five 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) *[2018]*
- Final stage of Indian team selection for international chemistry and astronomy olympiads (IChO and IOAA) *[2018]*
- All-India Rank of 35 in KVPY *[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

Teaching and Responsibility

Academic service

- Reviewer for conferences and workshops: ICML NCW '23, ISIT '24 *[2023–present]*

Teaching

- Graduate Teaching Assistant for information theory and digital communications at EPFL *[2022–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 *[2020–2024]*
- 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

(default)*: EPFL, **: IITB and EPFL, *: IITB*

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

Extracurriculars

- Intermediate course in Table Tennis under the National Sports Organization at IITB *[2018–19]*
- Best All-Rounder on graduation from Ryan International School Bangalore *[2016]*
- Deputy Education Minister in the Student Council at Ryan International School Bangalore *[2014–15]*
- Completed 19 credits in electronic keyboard from the Trinity College of Music London *[2007–13]*