Abijith Jagannath Kamath

PhD Student, Department of Electrical Engineering
Indian Institute of Science, Bengaluru

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EDUCATION

Indian Institute of Science (IISc.), Bengaluru, India   2020 – present
PhD in Electrical Engineering   CGPA: 8.90/10
Thesis Title: Neuromorphic Sampling — Theory and Algorithms
Selected Coursework: Time-Frequency Analysis, Pattern Recognition and Neural Networks,
          Advanced Convex Optimisation, Computational Imaging

National Institute of Technology Karnataka (NITK), Surathkal, India   2015 – 2019
Bachelor of Technology in Electrical and Electronics Engineering   CGPA: 9.17/10
Project Title: Signals, Shapes and Fourier Descriptors
Selected Coursework: Digital Signal Processing, Matrix Theory and Stochastic Processes,
          Advanced Digital Signal Processing, Information Theory

EXPERIENCE

Indian Institute of Science
Project Assistant   2019

- Project title: Neuromorphic Sampling
- Funding agencies: Pratiksha Trust, Institute of Eminence *(IoE)* Fund

AWARDS AND PROFESSIONAL ACTIVITIES

- Awards
  - Ministry of Education, Government of India *Prime Minister's Research Fellowship*   2020 – 25
  - Department of Electrical Engineering, IISc. *Outstanding Teaching Assistant Award*   2024
  - Qualcomm *Innovation Fellowship* India   2025
- Professional Activities (selected)
  - *Vice-Chair*, IEEE IISc. *SPS* Student Chapter   2020 – 21
  - *Student Branch Secretary*, IEEE NITK Student Branch   2018 – 19
  - Reviewer at *IEEE Access*, *IEEE Comm. Lett.*, *Elsevier Signal Processing*
    IEEE ICASSP, *IEEE SPCOM*, *SampTA*, *Asilomar*

TEACHING

- E9 310 Computational Imaging   2024
- E9 222 Signal Processing in Practice   2023
- E9 241o Digital Image Processing   2022 – 23
- E9 213 Time-Frequency Analysis   2021 – 23

REFEREES

Prof. Chandra Sekhar Seelamantula   *PhD Research Supervisor*
Professor, Department of Electrical Engineering,   E-mail: css@iisc.ac.in
Indian Institute of Science   Webpage | Google Scholar

Prof. CMC Krishnan   *Project Supervisor*
Associate Professor, Department of Electrical and Electronics Engineering   E-mail: cmckrishnan@nitk.edu.in
National Institute of Technology Karnataka   Google Scholar

SELECTED PUBLICATIONS

Journal Articles

2. **A. J. Kamath**, S. B. Patil, and C. S. Seelamantula, "DeepFRI: A deep plug-and-play technique for finite-rate-of-innovation signal reconstruction," *IEEE Trans. Signal Process.*, 2025, (in print). DOI: 10.1109/TSP.2025.3589394

1. K. K. R. Nareddy, **A. J. Kamath**, and C. S. Seelamantula, "Tight-frame-like analysis-sparse recovery using non-tight sensing matrices," *SIAM J. Imag. Sci.*, 2024. DOI: 10.1137/23M1625846

Preprints

3. **A. J. Kamath** and C. S. Seelamantula, "Neuromorphic sampling of sparse signals," 2023. arXiv: 2310.15750 [eess.SP]. [Online]. Available: https://arxiv.org/abs/2310.15750

2. **A. J. Kamath** and C. S. Seelamantula, "Neuromorphic sampling of signals in shift-invariant spaces," 2023. arXiv: 2306.05103 [eess.SP]. [Online]. Available: https://arxiv.org/abs/2306.05103

1. **A. J. Kamath**, S. Rudresh, and C. S. Seelamantula, "Time encoding of finite-rate-of-innovation signals," 2021. arXiv: 2107.03344 [eess.SP]. [Online]. Available: https://arxiv.org/abs/2107.03344

Conference Articles

10. **A. J. Kamath** and C. S. Seelamantula, "Neuromorphic unlimited sampling for high-dynamic-range video acquisition," in *IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP)*, invited paper, 2025. DOI: 10.1109/ICASSP49660.2025.10889295

9. **A. J. Kamath**, A. S. Bhandiwad, and C. S. Seelamantula, "On the design of weakly-convex regularizers for solving linear inverse problems," in *IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP)*, 2025. DOI: 10.1109/ICASSP49660.2025.10889256

8. **A. J. Kamath**, K. K. R. Nareddy, and C. S. Seelamantula, "Method of alternating proximations for solving linear inverse problems," in *Proc. IEEE Int. Conf. Signal Process. Comm. (SPCOM)*, 2024. DOI: 10.1109/SPCOM60851.2024.10631653

7. **A. J. Kamath** and C. S. Seelamantula, "Neuromorphic sensing meets unlimited sampling," in *Proc. IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP)*, 2024. DOI: 10.1109/ICASSP48485.2024.10447840

6. K. K. R. Nareddy, **A. J. Kamath**, and C. S. Seelamantula, "Image restoration with generalized $L2$ loss and convergent plug-and-play prior," in *Proc. IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP)*, 2024. DOI: 10.1109/ICASSP48485.2024.10446244

5. A. S. Bhandiwad, **A. J. Kamath**, S. Asokan, and C. S. Seelamantula, "Variational analysis of adversarial regularization for solving inverse problems," in *Proc. IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP)*, 2024. DOI: 10.1109/ICASSP48485.2024.10446385

4. **A. J. Kamath** and C. S. Seelamantula, "Multichannel time-encoding of finite-rate-of-innovation signals," in *Proc. IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP)*, 2023. DOI: 10.1109/ICASSP49357.2023.10096150

3. **A. J. Kamath** and C. S. Seelamantula, "Differentiate-and-fire time-encoding of finite-rate-of-innovation signals," in *Proc. IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP)*, 2022. DOI: 10.1109/ICASSP43922.2022.9746159

2. S. Rudresh, **A. J. Kamath**, and C. S. Seelamantula, "A time-based sampling framework for finite-rate-of-innovation signals," in *Proc. IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP)*, 2020, pp. 5585–5589. DOI: 10.1109/ICASSP40776.2020.9053120

1. **A. J. Kamath**, S. Rudresh, and C. S. Seelamantula, "FRI modelling of Fourier descriptors," in *Proc. IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP)*, 2019, pp. 5092–5096. DOI: 10.1109/ICASSP.2019.8682685

Talks and Demonstrations

5. A. Prabakar, A. S. Bhandiwad, **A. J. Kamath**, and C. S. Seelamantula, "Weakly-convex regularizers for magnetic resonance imaging," in *Int. Symp. Comput. Sensing (ISCS)*, 2025

4. S. Kulur, D. Balasubramanian, **A. J. Kamath**, and C. S. Seelamantula, *Neuromorphic unlimited sampling beyond bandlimited signals*, IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP), Show-and-tell Demo, 2025

3. S. S. Yadav, K. S. Akash, A. J. Kamath, C. S. Seelamantula, and C. S. Thakur, "Neuromorphic radar for gesture recognition," in *IEEE ICASSP Show-and-tell Demo*, 2025

2. S. Kulur, S. Anand, **A. J. Kamath**, S. S. Yadav, C. S. Thakur, and C. S. Seelamantula, *Modulo sampling meets neuromorphic encoding — A hardware proof*, IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP), Show-and-tell Demo, 2024

1. **A. J. Kamath** and C. S. Seelamantula, "Neuromorphic sampling," in *Asilomar Conf. Signals Syst. Comput. (ACSSCS)*, 2021

PATENTS

1. S. Kulur, S. Anand, **A. J. Kamath**, S. S. Yadav, C. S. Thakur, and C. S. Seelamantula, *A neuromorphic unlimited sampling method and a plug-and-play system thereof*, Indian Patent 202441018543 (in process), 2024