CHANDRA SEKHAR SEELAMANTULA

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Chandra Sekhar Seelamantula

Name of the faculty member: Chandra Sekhar Seelamantula
Designation: Professor
Department: Electrical Engineering
Date of birth: August 5, 1976
Nationality: Indian
Languages: RWS: Telugu, Hindi, English, Kannada; S: Tamil
(R: read; W: write; S: speak)

1. Education

Degree	University/Institution	Class obtained/Distinction
B.E. (1995-1999)	Osmania University College of Engineering, Department of Electronics and Communication Engineering (ECE), Hyderabad	First rank holder and recipient of The Outstanding Student award, Prof. K. K. Nair Gold Medal, and Best Thesis Award
Ph.D. (1999-2005)	Indian Institute of Science, Bangalore, Department of Electrical Communication Engineering (ECE)	PhD Fellowship from IBM India Research Lab

2. Professional Career

From	To	Designation
June 1, 2020	May 31, 2024	Chair, GATE-JAM Office, IISc; Organizing Chair (GATE 2024)
September 27, 2020	date	Professor, Department of Electrical Engineering
September 27, 2014	September 26, 2020	Associate Professor, Department of Electrical Engineering
July 20, 2009	September 26, 2014	Assistant Professor, Department of Electrical Engineering
July 2012	July 2021	Adjunct Faculty, Centre for Neuroscience
April 1, 2006	July 15, 2009	Postdoctoral fellow, Biomedical Imaging Group, Ecole polytechnique fédérale de Lausanne, Switzerland
October 1, 2005	March 15, 2006	Technology Consultant, M/s. Esqube Communication Solutions Private Limited, Bangalore (an IISc startup company)

1. Honors and Professional Recognition

Awards

1. Outstanding Editorial Board Member Award, IEEE Transactions on Image Processing, 2022.
2. Recipient of Grand Challenges Exploration — India (Round 5) research award funded by Bill and Melinda Gates Foundation and Biotechnology Industrial Research Assistance Council (BIRAC), Government of India, for the project entitled, "AI for Wireless Capsule Endoscopy."
3. Qualcomm Innovation Fellowship awards — 9 awards since 2019, co-recipient with PhD students.
4. Digital Health Prize at the National Bio-Entrepreneurship Competition 2018 organized by Biotechnology Industrial Research Assistance Council (BIRAC) and Centre for Cellular and Molecular Platforms (C-CAMP) under the auspices of the Department of Biotechnology (DBT).
5. Top 10% Best Paper Award at IEEE International Conference on Image Processing 2014.
6. Prof. Priti Shankar Teaching Award, 2013, conferred by the Indian Institute of Science, Bangalore.

Professional Recognition

7. Elected to IEEE Bio-imaging and Signal Processing Technical Committee in June 2025.
8. Elected to Steering Committee, IEEE International Symposium on Biomedical Imaging (ISBI) in June 2025, serving as IEEE Signal Processing Society (SPS) Liaison.
9. Elected to IEEE Technical Committee on Computational Imaging, 2020 onward (serving second term).

10. Member, Awards Board, IEEE Technical Committee on Computational Imaging (serving second term).
11. Senior Member, IEEE since October 2012.
12. Expert member of Department of Biotechnology (DBT) and Technology Development Board (TDB) panels for evaluating proposals and on-site visits, reviewer and PAC-EECE member, Science and Engineering Research Board.

Editorial Roles

13. Editorial Board Member, Nature Scientific Data, 2024 onward.
14. Senior Area Editor, IEEE Transactions on Image Processing, March 2022 onward.
15. Associate Editor, IEEE Transactions on Image Processing, March 2018 to March 2020.
16. Senior Area Editor, IEEE Signal Processing Letters, May 2017 to May 2021 (served two terms).
17. Associate Editor, IEEE Signal Processing Letters (2013-2017; served two terms).
18. Associate Editor, Society for Photonics and Industrial Electronics (SPIE) Journal of Electronic Imaging (2014-2018; served two terms).

Professional Service

19. Organizing Chair, GATE 2024; Chair, GATE-JAM Office (2022-2024), Vice-Chair (2020-2022).
20. Tutorials Co-Chair, IEEE International Symposium on Biomedical Imaging (ISBI) 2020.
21. General Chair, International Conference on Signal Processing and Communications (SPCOM) 2020.
22. Organizing Committee, IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2025, April 6-11, 2025, Hyderabad. This was the first-ever ICASSP held in India and also the Golden Jubilee edition. and I am a part of the committee that bid for hosting ICASSP in India and also part of the Organizing Committee.
23. Publicity Chair and Organizing Committee member, Interspeech 2018, a premier international conference in the area of speech processing held under the auspices of International Speech Communication Association (ISCA). I was a part of the committee that bid for Interspeech 2018 in India. Interspeech was held in India for the first time ever in 2018.
24. Chair, IEEE Signal Processing Society Bangalore Chapter (2018-2021); Vice-Chair (2014-2018) and Treasurer (2010-2013).
25. Session Chair at several editions of Interspeech, IEEE International Symposium on Biomedical Imaging (ISBI), IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), IEEE International Conference on Image Processing (ICIP), Sampling Theory and Applications (SampTA), etc.
26. Affiliate member, IEEE Signal Processing Theory and Methods Technical Committee, IEEE Bio-imaging and Signal Processing Technical Committee.
27. Organizing Committee member of the Brain, Computation, and Learning (BCL) Workshop series at IISc, starting from 2017, then in 2018, 2019, and again in 2023. Member of the Brain, Computation, and Data (BCD) Group at IISc.
28. Anchor advisor for Giftolexia, a C-CAMP start-up company under Karnataka Start-up Advancement Program (K-SAP BIO 50), and Scientific Advisor for Infyuva, (a former PhD's startup), on AI Based Healthcare Diagnostics, at Manipal University Technology Business Incubator (MUTBI).

2. Research Expertise and Selected Publications in the Past Five Years

My research expertise lies in Computational Imaging, Generative AI, and Artificial Intelligence/Machine Learning with primary focus on Healthcare applications and emphasis on explainability and interpretability. Over the past decade, our research has focused on advancing the state of the art and breaking fundamental limits in these areas, as demonstrated by the publication record. My major strength is in encapsulating and formulating real-world problems arising in various contexts in the fields of biomedical imaging, neuroscience, neuroimaging, speech processing, computer vision, etc. and developing practically viable strategies and computationally efficient algorithms supported on a strong and sound mathematical formulation. This core competency has enabled me to seamlessly navigate across various application areas. As evidenced by the publications in premier venues, we have developed original formalisms and techniques in diverse problem settings.

The following is a selected list of international peer-reviewed publications in the past five years. Each publication is accompanied by a brief description of the contribution and the impact of the publication.

1. M. Bakshi and C. S. Seelamantula, "EfficientNet-B1 based diabetic retinoapthy detection from ultra-widefield fundus images," Proceedings of Medical Image Computing and Computer-Assisted Intervention (MICCAI) Challenge on Ultra-widefield Fundus Imaging for Diabetic Retinopaty, Lecture Notes in Computer Science, Springer, pp. 135-143, October 2024.
   — We address the MICCAI challenge of optimizing the performance of a detector for diabetic retinopathy (DR) from ultra-widefield fundus images, focusing on balancing model accuracy and latency. This MICCAI challenge prioritized "area under the receiver operating characteristic curve" (AUROC) and central processing unit (CPU) time for the detection problem. We proposed EfficientNet-B1 for solving this problem and it gave a high AUROC value of 0.9055 on the UWF4DR test dataset while maintaining a minimal forward pass time.

2. Kartheek K. Nareddy, A. J. Kamath, and C. S. Seelamantula, "Tight-frame-like analysis-sparse recovery using nontight sensing matrices," vol. 17, iss. 3, **SIAM Journal on Imaging Sciences**, 2024. (IF: 2.1)
   — Random Gaussian sensing matrices satisfy the restricted isometry property, which is crucial for solving the sparse recovery problem using convex optimization techniques. However, tight-frame sensing matrices result in minimum mean-squared-error recovery given oracle knowledge of the support of the sparse vector. If the sensing matrix is not tight, could one achieve the recovery performance assured by a tight frame by suitably designing the recovery strategy? This paper presents the theory and algorithms for performing successful sparse recovery using nontight sensing matrices.

3. R. Mangalwedhekar, N. Singh N., C. S. Thakur, C. S. Seelamantula, M. Jose, D. Nair, (2022), "Achieving nanoscale precision using Neuromorphic localization microscopy," **Nature Nanotechnology**. (IF: 40.523)
   — In this breakthrough invention, we showed how nanoscale fluorescent objects can be imaged below the diffraction limit with a precision below 20 nm. This is the first successful attempt that combines neuromorphic detection with computational deep learning approaches for localization and tracking with nanoscale precision and millisecond temporal resolution.

4. S. Asokan and C. S. Seelamantula, "Euler-Lagrange analysis of generative adversarial networks," **Journal of Machine Learning Research (JMLR)**, vol. 24, pp. 1-100, 2023. (IF: 5.177)
   — In this mammoth 100-page publication, we rigorously investigated the functioning of generative adversarial networks from a variational standpoint and addressed the optimality of the discriminator. We established for the first time that the optimal discriminator solves the Poisson partial differential equation (PDE), and solved the PDE in very high-dimensional spaces (typically, a million dimensions) using Fourier representations.

5. S. Asokan and C. S. Seelamantula, "Spider GAN — Leveraging friendly neighbors to accelerate GAN training," Proceedings of **IEEE Computer Vision and Pattern Recognition (CVPR)**, 2023. (h5-index: 389; IF: 23.46)
   — In this paper, we introduced a new generative model that transforms one dataset to another using a GAN instead of starting with random Gaussian noise. We also introduced a new distance metric to quantify proximity between datasets. The proposed generative model achieves accelerated convergence by an order of magnitude and produces state-of-the-art performance scores.

6. S. Mache, P. K. Pokala, K. Rajendran, and C. S. Seelamantula, "Introducing nonuniform sparse proximal averaging network for seismic reflectivity inversion," **IEEE Transactions on Computational Imaging**, vol. 9, pp. 475-489, May 2023. (IF: 4.99)
   — This publication is the first-of-its-kind successful attempt at using a sparsity driven, deep learning approach for computationally solving the inverse problem of seismic reflectivity imaging. Performance validation on Marmousi2 simulated model and 3-D real field measurements from the Penobscot 3D survey off the coast of Nova Scotia, Canada show that the proposed approaches give superior accuracy with 600x faster inference than the state-of-the-art optimization algorithms, making it ideal for real-time seismic signal processing.

7. J. R. Harish Kumar, C. S. Seelamantula, J. H. Gagan, Y. S. Kamath, N. I. R. Kuzhuppilly, U. Vivekanand, P. Gupta, and S. Patil, "Cháksu: A Glaucoma-specific fundus image database," **Nature Scientific Data**. (IF: 8.9)
   — This paper is part of a large-scale translational effort in the context of "AI for Eyecare." To make glaucoma diagnostics accurate and customized to the Indian population, we created an Indian ethnicity color fundus imaging database named Chákṣu comprising 1345 images acquired using three commercially available devices. Chákṣu is the largest Indian-ethnicity-specific fundus image database with expert annotations and would aid in the development of AI based glaucoma diagnostics.

8. S. Mache, A. Chatterjee, K. Rajendran, and C. S. Seelamantula, "Hilbert-Huang transform and energy rate functions for earthquake source characterization — A study from the Japan Trench," **Bulletin of the Seismological Society of America**, vol. 112 (6), pp. 2847–2858, 2022. (IF: 3.14)
   — In this collaborative effort with leading earthscience researchers, we deployed powerful signal processing tools to analyze earthquake energy release duration and frequency content. We introduced a new, computationally efficient measure namely the "energy rate function" to quantify energy release. Based on real data from six earthquakes, we showed a strong correlation between the proposed measure to the benchmark moment rate function and source time function.

9. P. K. Pokala, R. V. Hemadri, and C. S. Seelamantula, "Iteratively reweighted minimax-concave penalty minimization for accurate low-rank plus sparse matrix decomposition," **IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)**, 2021, doi: 10.1109/TPAMI.2021.3122259. (IF: 24.314)
   — In this high-impact publication, we introduced a new nonconvex penalty, namely the minimax concave penalty for performing low-rank and sparse matrix decomposition. We presented computationally efficient algorithms with provable convergence guarantees and demonstrated applications to important computer vision problems.

10. J. Sadasivan, J. K. Dhiman, and C. S. Seelamantula, "Musical noise suppression using a low-rank and sparse matrix decomposition approach," **Speech Communication**, vol. 125, pp. 41-52, 2020. (IF: 2.723)
    — This paper demonstrates how the problem of musical noise suppression in speech enhancement techniques can be effectively solved using a low-rank and sparse matrix decomposition technique. This research is an incredible illustration of the cross-fertilization of ideas between image processing and speech processing.

11. S. Asokan and C. S. Seelamantula, "Teaching a GAN what not to learn," Proceedings of **Neural Information Processing Systems (NeurIPS)**, 2020. (h5 index: 309)
    — This paper builds a generative model based on what the famous Persian poet Rumi once said, "The art of knowing is knowing what to ignore." A GAN is trained not only on positive samples that it must model, but also on negative samples that it must avoid. We showed that this new formulation of the generative model accelerates the learning capability of the GAN.

12. A. R. Mangalore, C. S. Seelamantula, and C. S. Thakur, "Neuromorphic fringe projection profilometry," **IEEE Signal Processing Letters**, vol. 27, pp. 1510-1514, 2020. (IF: 3.201)
    — This is the first paper to demonstrate fringe projection profilometry using a neuromorphic vision sensor. The sensors are asynchronous and event-driven and produce sparse measurements. In this paper, we showed how accurate 3-D reconstruction may be performed using neuromorphic measurements.

13. S. K. Shastri, S. Rudresh, R. Anand, S. Nagesh, C. S. Seelamantula, and A. K. Thittai, "Axial super-resolution in ultrasound imaging with application to non-destructive evaluation," vol. 108, no. 106183, **Ultrasonics**, December 2020. (IF: 4.062)
    — In this paper, we presented a systematic approach for achieving axial super-resolution in ultrasound imaging. We established the equivalence between ultrasound image reconstruction and sub-Nyquist sampling and presented an efficient model-based method for achieving super-resolution reconstruction three-fold below the theoretical resolution limit.

14. A. Mahurkar and C. S. Seelamantula, "Minkowski-algebra-based super-sparse array design for superresolution ultrasound imaging," **IEEE Signal Processing Letters**, vol. 27, pp. 1060-1064, 2020. (IF: 3.201)
    — This paper demonstrates how two sparse subarrays could be used for performing computationally efficient convolutional beamforming without compromising on the beampattern and lateral resolution. The tools from abstract Minkowski algebra are leveraged for design of the subarray. The technique offers a significant reduction in the number of array elements.

15. S. Mukherjee and C. S. Seelamantula, "Quantization-aware phase retrieval," **Special issue on Mathematical Optics, Imaging, and Applications**, **International Journal of Wavelets, Multiresolution, and Information Processing (Invited paper)**, 2020. (IF: 1.276)
    — In this invited paper to a special issue, we addressed for the first time the problem of reconstructing a signal from the magnitude measurements alone, subject to the realistic constraint of quantization. We developed a quantization-aware phase retrieval formalism and an efficient reconstruction algorithm for signal reconstruction that gives about 5 to 6 dB higher reconstruction accuracy than the benchmark techniques.

16. J. R. Harish Kumar, C. S. Seelamantula, A. Mohan, R. Shetty, T. J. M. Berendschot, and C. A. B. Webers, "Automatic analysis of normative retinal oximetry images," **PLoS ONE**, May 2020. (IF: 3.752)
— In this paper, we presented an automatic technique for the measurement of oxygen saturation in retinal arterioles and venules using dual-wavelength retinal oximetry images. The technique is based on segmenting an optic-disc-centered ring-shaped region of interest and subsequent analysis of the oxygen saturation levels. The results exhibit high consistency with manual annotations across the dataset indicating that the automated technique is an accurate alternative to the manual procedure.

17. J. Sadasivan, S. Mukherjee, and C. S. Seelamantula, "Signal denoising using the minimum-probability-of-error criterion," vol. 9, e3, **APSIPA Transactions on Signal and Information Processing**, Jan. 2020. (IF: 4.00)
— We considered signal denoising via transform-domain shrinkage based on a novel risk criterion called the minimum probability of error (MPE), which measures the probability that the estimated parameter lies outside an ε-neighborhood of the true value. The denoising performance of MPE turns out to be better than that obtained using the minimum MSE-based approaches formulated within Stein's unbiased risk estimation (SURE) framework, especially in the low signal-to-noise ratio (SNR) regime.

18. J. R. Harish Kumar, C. S. Seelamantula, Y. S. Kamath, and R. Jampala, "Rim-to-disc ratio outperforms cup-to-disc ratio for glaucoma prescreening," **Nature Scientific Reports**, 9:7099, 2019. (IF: 4.997)
— In this trendsetting paper, we presented a novel and fully automated fundus image processing technique for glaucoma prescreening based on the rim-to-disc ratio (RDR). We showed the inadequacy of using the cup-to-disc ratio (CDR), which was a de facto metric up until this publication. The technique accurately segments the optic disc and optic cup and then computes the RDR based on which it is possible to differentiate a normal fundus from a moderate, or severely glaucomatous classes following the disc-damage-likelihood scale (DDLS). This is the first engineering attempt at using RDR and DDLS to perform glaucoma severity assessment.

19. J. Sadasivan, C. S. Seelamantula, N. R. Muraka, "Speech enhancement using a risk estimation approach," vol. 116, pp. 12-29, **Speech Communication**, January 2020. (IF: 2.723)
— In this paper, we developed a risk estimation framework for speech enhancement, wherein we optimize an unbiased estimate of the risk instead of the actual risk. Among the risk estimation-based techniques, the quality of the denoised speech is higher and is quantified in terms of speech quality and subjective listening scores for perceptual risk-based estimation techniques than the standard mean-square error techniques.

20. H. Sundar, T. V. Sreenivas, and C. S. Seelamantula, "TDOA-based multiple source localization without association ambiguity," **IEEE/ACM Transactions on Audio, Speech, and Language Processing**, vol. 26, no. 11, pp. 1976-1990, November 2018. (IF: 4.364)
— Multiple source localization using time-differences of arrival (TDOAs) is challenging because of the ambiguity involved in associating the TDOAs computed across microphone pairs to the sources. We showed that the association ambiguity of the TDOAs can be effectively resolved using the inverse delay interval region (IDIR), introduced in this paper. We showed that the direction-of-arrival error is within 2 degrees and the spatial localization error is less than 30 cm for a speaker.

21. B. A. Shenoy, S. Mulleti, and C. S. Seelamantula, "On 2-D Hilbert integral equations, generalized minimum-phase signals, and phase retrieval," **IEEE Transactions on Signal Processing**, vol. 66, no. 14, pp. 3906-3917, July 15, 2018. (IF: 5.028)
— One-dimensional (1-D) causal signals admit Hilbert integral relations between the real and imaginary parts of their Fourier spectra. For 1-D minimum-phase signals, the log-magnitude and phase spectra also admit such Hilbert relations. Such results were not available in 2-D. In this paper, we extend these results to 2-D signals. We first established the Hilbert integral equations for 2-D first-quadrant signals. and partial Hilbert transform relations between the real and imaginary parts of the spectrum.

22. S. Mukherjee and C. S. Seelamantula, "Phase retrieval from binary measurements," **IEEE Signal Processing Letters**, pp. 348-352, vol. 25, no. 3, March 2018. (IF: 3.201)
— We considered the novel problem of signal reconstruction from quadratic measurements that are binary encoded. This publication is the first to consider the effect of quantization in the context of phase retrieval. Binary measurements are fast to acquire and inexpensive in terms of hardware. For signal reconstruction, we employed a consistency criterion and developed a projected gradient-descent scheme with high accuracy reconstruction.

23. S. Rudresh, S. Nagesh, and C. S. Seelamantula, "Asymmetric pulse modeling for FRI sampling," vol. 66, no. 8, pp. 2027-2040, **IEEE Transactions on Signal Processing**, 2018. (IF: 5.028)

— We showed that among the class of unitary operators that are linear and invariant to translation and scale, the fractional Hilbert (FrH) operator is unique for parametrically modeling pulse asymmetry. We demonstrate how this key result could be used for sampling a pulse train with variable asymmetry. These signals cannot be accommodated in the Shannon sampling framework and therefore, we develop an alternative and high-performant sampling scheme.

24. K. S. Chandran, C. S. Seelamantula, and S. Ray, "Duration analysis using matching pursuit algorithm reveals longer bouts of gamma rhythm," vol. 119, pp. 808-821, **Journal of Neurophysiology**, 2018. (IF: 2.714)
— Gamma oscillations (30–80 Hz) have been hypothesized to provide a temporal reference frame for coordination of spiking activity. Several studies showed that gamma occurs in very short bursts. We disproved those claims and provided a robust estimate of the duration. The median duration of gamma is greater than 300 ms, much longer than previous estimates — this is a seminal finding in neuroscience.

25. A. Bhowmik, S. Shit, and C. S. Seelamantula, "Training-free, single-image super-resolution using a dynamic convolutional network," **IEEE Signal Processing Letters**, vol. 25, no. 1, pp. 85-89, Jan. 2018. Featured in the **Top 10 popular articles of the journal** for three consecutive months. (IF: 3.201)
— Our method relies on constructing a dynamic convolutional network (DCN) to learn the relation between the consecutive scales of Gaussian and Laplacian pyramids, which is used to predict the detail at a finer scale, thus leading to super-resolution. The proposed DCN approach results in about 0.8 and 0.3 dB gain in peak signal-to-noise ratio for 2× and 3× super-resolution, respectively.

5. Glimpses of Translational Research Contributions

- Co-founder, **etherX.ai**, an IISc startup (incubation in process), together with Prof. Chetan Thakur from ESE, IISc. The objective of this startup is to develop AI powered imaging solutions for deployment on the edge. Our first product in the portfolio is SUSHRUT — a portable, handheld ultrasound imaging device developed completely inhouse by our joint PhD student.

- Scientific Advisor, Infyuva Tech Solutions Private Limited, originally incubated in Manipal Universal Technology Business Incubator (MUTBI), Manipal. This is the startup of my former PhD student, Dr. Harish Kumar J.R., who is now a faculty member at BITS Bangalore.

- **Six trial licenses** of the Nayana glaucoma prescreening app (TRL-8) developed by us were issued to Remidio Innovative Solutions, a Bangalore based startup company, through Intellectual Property office of IISc. The Nayana app was demonstrated at the **TechExpo** organized at Indian Institute of Technology (IIT) Delhi on August 4, 2019, under the auspices of the IMPRINT India program.

- A handheld fundus imaging device (TRL-7) was demonstrated at the S20 summit held in IISc on February 25, 2023, as part of the DeepTech Showcase. Honorable Minister of Finance Nirmala Sitharaman was present at the DeepTech Showcase.

- Scientific Advisor for Giftolexia, a C-CAMP Bangalore incubated startup, which was selected by World Economic Forum to join the TechPioneers Class of 2023.

- Technology transfer to Carl Zeiss India (Bangalore) Private Limited — on explainable AI based classification system for detection of retinal pathologies, and volumetric computation of retinal fluid accumulation (TRL-6).

- Technology transfer to Boeing Data Analytics Division (Bangalore) — on explainable AI based foreign object debris detection (TRL-6).

- Technology transfer to Centre for Development of Advanced Computing (CDAC) Trivandrum on novel interpolation strategies in the context of sofware defined radio (TRL-7).

- Showcased Glaucoma Pre-screening App at the National Bio-Entrepreneurship Competition (NBEC) 2018 and won the Digital Health Prize (picture on the right). NBEC is organized by Centre for Cellular and Molecular Platforms (C-CAMP) jointly with Department of Biotechnology's Biotechnology Industrial Research Assistance Council (BIRAC) Regional Entrepreneurship Centre (BREC).

- Creation of Chákṣu — an Indian ethnicity specific database for glaucoma diagnostics. This is the first-of-its-kind effort in the country where a large gold standard database specific to Indian population and glaucoma disease has been created with the images annotated by five expert ophthalmologists.

- Spectrum Lab YouTube channel**:** Video demonstrations of our healthcare product portfolio.

    - ChákṣuAI: Last-Mile Vision Care Powered by AI
    - Lung segmentation in X-ray and CT images for Covid-19 diagnostics
    - Nayana: Glaucoma prescreening App for an Android phone (TRL-8)
    - Nayana: Glaucoma prescreening App for the iPhone (TRL-8)
    - Automated segmentation for Wireless Capsule Endoscopy
    - Spectrum Lab's iCare platform
    - Automated Segmentation in Wireless Capsule Endoscopy
    - Artery/vein classification from single wavelength retinal fundus images

6. Guidance of Students

Degree	Status	Distinctions
Ph.D.	Awarded: 14 In progress: 9	Two Ph.D.s received Prof. D. J. Badkas Medal for outstanding PhD thesis. One of the medalists, Dr. Satish Mulleti, is an Assistant Professor at IIT Bombay. Another Ph.D. (Dr. Siddarth Asokan) received Prof. Satish Dhawan Award and Institution of Engineers (India) award for outstanding doctoral dissertation. Two former Ph.D.s are running startups: Dr. Ravi Shenoy: Lightmetrics and Dr. Harish Kumar: Infyuva SPCOM Doctoral Dissertation Award - 1 (Recipient, Dr. Subhadip Mukherjee is presently an Assistant Professor at IIT Kharagpur). One Ph.D. (Dr. Aniruddha Adiga) is a Research Assistant Professor at the Biocomplexity Institute, Virginia Tech. USA. One Ph.D. (Dr. Harish Kumar JR) is an Associate Professor at BITS Pilani, Bangalore Campus. The other Ph.D.s are well settled in the corporate sector. Ph.D. students received the following fellowships during their PhD: Deity Visvesvaraya fellowship - 1 Prime Minister's Research Fellows - 3 Qualcomm Innovation Fellowships - 9 Tata Consultancy Ph.D. Fellowship - 1 Microsoft Research Fellowship - 1 Robert Bosch Ph.D. Fellowship - 1
Masters by Research	Awarded: 9	Two M.Tech.(Research) students won The Alfred Hay Medal for outstanding MTech(Res) thesis.
Master of Technology	Awarded: 40+ In progress: 6	Two students received Prof. N. R. Khambati Memorial Award, one of whom is an Assistant Professor at Dartmouth College. Two students received Prof. I. S. N. Murthy Medal, one of whom continued for a Ph.D. and became an Assistant Professor at IIT Kharagpur.
Postdocs	No. advised: 6	Several of them are working as Data Scientists in leading corporate organizations across the world.

7. Funded Projects

7.1 Sponsored research projects

Sl. No.	Title	Funding agency	PI/ Co-PI	Total grant (in lakhs)	Duration	Sanction date	Other investigators
1	Exploring the dynamics of acoustic landscape in field cricket choruses using microphone arrays	Council for Scientific and Industrial Research	Co-PI	21	2010 to 2014	15 May 2013	Prof. Rohini Balakrishnan (Centre for Ecological Sciences, IISc)

Sl. No.	Title	Funding agency	PI/ Co-PI	Total grant (in lakhs)	Duration	Sanction date	Other investigators
2	Development of text-to-speech synthesis systems for Indian languages - Phase II	Department of Information Technology	Co-PI	89	2012 to 2017	26 Dec. 2011	Prof. Hema Murthy (IITM), Prof. S. R. M. Prasanna (IITG), Prof. K. S. Rao (IITKGP), Prof. K. Prahallad (IIITH), Dr. A. K. Sao (IIT Mandi), A. Saha (CDAC Kolkata), Dr. V. K. Bhadran (CDAC Trivandrum), B. C. Singh (CDAC Mumbai), Dr. H. Patil (DAIICT, Gandhinagar)
3	Interdisciplinary centre in neuroscience	Department of Science and Technology	Co-PI	1300 (My share was 25 lakhs)	2010 to 2014	16 Mar. 2010	Prof. V. Ravindranath (CNS), Prof. A. Murthy (CNS), Prof. S. Mani (CNS), Prof. G. Rangarajan (MA), Prof. C. V. Madhavan (CSA), Prof. D. N. Dutt (ECE)
4	Robust and efficient signal processing techniques for multicomponent FM signal parameter estimation	Indian Space Research Organization (ISRO) - IISc Space Technology Cell	PI	13	2012 to 2015	29 Feb. 2012	-
5	Voice-activated camera steering (Demo-1, Demo-2)	XII Plan Grant	PI	6	2014 to 2016	10 Mar. 2014	-
6	Sparsity based reconstruction in high-frequency SONAR imaging	Defense Research and Development Organization (DRDO) - IISc joint research programme	PI	25	2014 to 2018	1 Jan.2014	Dr. P. Murali Krishna (Naval Physical and Oceanographic Laboratory, Cochin)
7	Development of a 3-D Riesz scanner	ISRO-IISc Space Technology Cell	PI	15	2015 to 2018	8 Apr. 2015	Mr. Manish Saxena, ISRO Space Applications Centre, Ahmedabad
8	Masters project grants in signal processing and machine learning (4 projects)	Robert Bosch Centre for Cyberphysical Systems at IISc	PI	6	2016 to 2017	1 Sept. 2016	-
9	Sub-Nyquist sampling — Challenges, fundamental limits, algorithms and applications	Science and Engineering Research Board	PI	34	2016 to 2018	30 Sept. 2016	-

Sl. No.	Title	Funding agency	PI/ Co-PI	Total grant (in lakhs)	Duration	Sanction date	Other investigators
10	A low-cost, portable, super-resolution ultrasound scanner** (IMPRINT Project)	Ministry of Human Resource Development and Ministry of Health and Family Welfare	PI	82	2016 to 2020	29 Nov. 2016	-
11	An automated and efficient glaucoma prescreening system** (IMPRINT Project)	Ministry of Human Resource Development and Indian Council for Medical Research	PI	61	2017 to 2019	27 Feb. 2017	Dr. Yogish Kamath, Kasturba Medical College, Manipal, Karnataka
12	Satellite image denoising in hardware	ISRO-IISc Space Technology Cell	PI	16	2017 to 2020	28 March 2017	Dr. GN Rathna, EE, IISc
13	Satellite image denoising and deconvolution in multiplicative noise	ISRO-IISc Space Technology Cell	PI	18	2018 to 2020	30 Oct. 2018	Dr. Debajyoti Dhar and Mr. Ashutosh Gupta (ISRO, Space Applications Centre Ahmedabad)
14	Three-dimensional reconstruction using a neuromorphic event-based camera	Pratiksha Trust Initiative	PI	5	2018 to 2019	27 Jul. 2018	Dr. Chetan Singh Thakur (DESE, IISc)
15	In pursuit of a neuromorphic sampling theory	Pratiksha Trust Initiative	Co-PI	10	2019 to 2020	23 Mar. 2019	Dr. Chetan Singh Thakur (DESE, IISc)
16	Development of a high-speed neuromorphic imaging system	Institute of Eminence (IoE) funding of the Indian Institute of Science	PI	155	2019 to 2021	22 Aug. 2019	Prasanta Ghosh (EE), Kunal Chaudhury (EE), Muthuvel Arigovindan (EE), Soma Biswas (EE), Rajiv Soundararajan (ECE), Chetan Thakur (DESE), R. V. Babu (CDS), Ramsharan Rangarajan (ME), Aloke Kumar (ME), Deepak Nair (CNS), Sundarrajan Asokan (IAP), Gopalkrishna Hegde (CeNSE) all from IISc
17	Theoretical analysis of generative adversarial networks (GANs)	Robert Bosch Centre for Cyberphysical Systems, IISc	PI	2	2019 to 2020	7 Sept. 2019	-

Sl. No.	Title	Funding agency	PI/ Co-PI	Total grant (in lakhs)	Duration	Sanction date	Other investigators
18	iCare — Artificial intelligence powered solutions for eyecare	Science and Engineering Research Board -- Teachers Associateship for Research Excellence (SERB-TARE)	Co-PI	18	2019 to 2022	19 Nov. 2019	Mr. Harish Kumar J.R. from Manipal Institute of Technology, Manipal; Also QIP PhD candidate in the lab
19	Adaptive low-rank sparse decomposition	Science and Engineering Research Board scheme for Mathematical and Theoretical Sciences Research (SERB-MATRICS)	PI	6	2020 to 2023	10 Feb. 2020	-
20	A robust, non-convex optimization framework for analysis and synthesis sparse models	Science and Engineering Research Board — Core Research Grant	PI	23	2021 to 2024	31 Mar. 2021	Prof. Prasanta Kumar Ghosh (EE, IISc)
20	Seismic source characterization using state-of-the-art signal processing and machine learning techniques	Ministry of Earth Sciences	PI	7	2023 to 2025	26 May 2023	Prof. Surendra Nadh Somala (Civil Engineering, IIT Hyderabad)
21	AI powered diagnostics for wireless capsule endoscopy	Bill & Melinda Gates Foundation & DBT-BIRAC	PI	2	2020 to 2022	October, 2020	-

Sl. No.	Title	Funding agency	PI/ Co-PI	Total grant (in lakhs)	Duration	Sanction date	Other investigators
23	Enhancing effectiveness and accessibility of ophthalmological image analysis through modern machine learning	Ministry of Education (SPARC program)	PI	74.04	2024-2027	May 2024	Prof. Gaurav Sharma (U. Rochester, USA) and Prof. Thrasos Pappas (Northwestern U., USA)
24	Neuromorphic processing for radar	ISRO-IISc Space Technology Cell	PI	22.25	2025-2027	April 2025	Prof. Chetan Singh Thakur (ESE, IISc), Mr. Ayush Jha (ISRO, Ahmedabad)
25	A million frames per second computational neuromorphic imager	Anusandhan National Research Foundation (ANRF)	PI	64.70	2025-2028	March 2025	Prof. Prasanta Kumar Ghosh (EE, IISc)

** IMPRINT is a highly competitive funding program launched by the Ministry of Human Resource Development. About 2,500 proposals were received from all over India and about 10% were selected for funding, 5% with partial funding, and 5% with full funding. Two of our proposals received full funding.

7.2 International collaborative projects

Title	Funding agency	PI/Co-PI/Co-iInvestigator	Total grant (in Rs. crores)	Duration (years)	Sanction date	Other investigators
Use of seismic microtremors in engineering seismology: Approaches used in Mexico and India to reduce the seismic risk	Indo-Mexico Joint Research Programme, Ministry of Science and Technology, International Bilateral Cooperation Division	Co-PI	0.19	2017-2020	7 March 2017	Prof. Kusala Rajendran (Centre for Earth Sciences, IISc), Prof. Francisco Jose Chavez Garcia, U. National Autonoma de Mexico (UNAM), Mexico City
PRAIMA — Phase retrieval for advanced imaging applications	Indo-Austria Joint Research Personnel Exchange Programme	Co-PI	0.06	2018-2021	11 June 2019	Dr. Bettina Heise, Johannes Kepler University, Linz, Austria, and RECENDT, Linz, Austria

7.3 Collaborative projects with the industry

Title	Funding agency	PI/Co-PI/	Total grant (in Rs. lakhs)	Duration (years)	Other investigators
Centre for Excellence in AI for Eyecare	Carl Zeiss India Pvt. Ltd. (CSR Grant)	PI	150	2024 to 2027	-
A novel super-sparse-array-based super-resolution ultrasound imaging system	Semiconductor Research Corporation	PI	27	2020-2023	Dr. Chetan Singh Thakur (ESE, IISc) and Mr. Shabbir Amjhera Wala (Texas Instruments, Bangalore). Texas Instruments Bangalore is our industry partner.

7.4 Consulting projects with the industry

Title	Funding agency	PI/ Co-PI	Total grant (in Rs. lakhs)	Duration (years)	Other investigators
Separation of biosignals acquired by sensors in medical applications	Hewlett Packard (HP) Labs, USA	PI	7	August 2013 to July 2014	-
Detection and quantification of surface irregularities and foreign debris using advanced artificial intelligence (AI) approach	The Boeing Company	Co-PI	30K USD	June 2022 to June 2023	Prof. R. Venkatesh Babu (CDS, IISc)
Development of monolithic and specialized neural network architecture for optical coherence tomography (OCT) image classification and design of an explainable artificial intelligence (AI) system through indicative visualization	Carl Zeiss Bangalore Private Limited	PI	38	June 2021 to June 2023	-
Anomaly detection inside aircraft fuel tanks	The Boeing Company	Co-PI	20K USD	July to December 2024	Prof. R. Venkatesh Babu (CDS, IISc) and Prof. Suresh Sundaram (AE, IISc)

7.5 Highlights of industry interaction

1. As part of the IMPRINT India Initiative, we developed new image processing algorithms and software for fully automated glaucoma analysis and detection, which is critical in prescreening applications. The parameters used for prescreening are more clinically pertinent and different from the conventionally deployed cup-to-disc ratio metric and offer a significantly superior performance. Our software is readily deployable on Android and iOS devices. Validations have been conducted independently as well as jointly with fundus-on-phone device manufacturers such as Remidio, Forus, and Bosch. Six trial licenses have been granted to M/s. Remidio Innovative Solutions Private Limited, Bangalore through the IISc Intellectual Property and Technology Licensing office. In collaboration with the Department of Ophthalmology, Kasturba Medical College Hospital, Manipal, Karnataka, we have also created an Indian ethnicity specific glaucoma database. This is the first-of-its-kind gold standard glaucoma database in the Indian setting, collected from 650 patients and five expert doctors provided ground-truth annotations.
2. Our project with HP labs, USA was on the use of inertial sensors for acquiring biosignals in medical applications. The objective was to perform signal separation and extract specific parameters for performing classification. We also developed algorithms for fall detection using inertial sensor data. The problem of fall detection is important in a hospital scenario and home-care for the lonely and elderly.
3. Our project with Texas Instruments (TI), Bangalore is focused on developing sparse array approaches for performing super-resolved ultrasound imaging. The hardware platform for executing the project and technical support is provided by TI. We developed computationally efficient algorithms keeping the hardware constraints in mind. Dr. Chetan Thakur and team (ESE, IISc) developed the hardware. The project is for a duration of three years and is funded by the Semiconductor Research Corporation, which is a world-class technology research consortium.
4. Our project with The Boeing Company, USA is focused on developing a benchmark database and associated AI algorithms for foreign object detection and surface irregularity identification, particularly for mission-critical applications. The foreign objects may be found in highly vulnerable areas such as the fuel tank of an airplane where it is not always feasible for a human to enter into for examination. We created a benchmark dataset that can be used for validation of various AI algorithms and also developed a suite of explainable AI algorithms for foreign object detection.
5. Our project with Carl Zeiss Bangalore Privated Limited is aimed at developing a state-of-the-art AI engine both for classification of various retinal pathologies from optical-coherence tomography images. The deep learning models also provide a means of assessing and visualizing what parts of the image gave rise to the desired classification outcome and determining whether those are also clinically relevant. The techniques developed also led to accurate computation of the retinal fluid volume. This translational research project involves working closely with doctors and incorporating their feedback to refine the machine learning models, thereby improving their reliability and deployability.

8. Teaching

E9-222: Signal Processing in Practice (introduced in 2022; lab course offered jointly with 10 other faculty members)
E9-213: Time-Frequency Analysis (every year since 2010)
E9-241: Digital Image Processing (2010 to 2020)
E9-282: Neural Signal Processing (2014 to 2020; jointly with Prof. Supratim Ray, Centre for Neuroscience, IISc)
Received consistently high ratings and teaching feedback from students, which also led to the Prof. Priti Shankar Teaching Award by IISc.

9. Educational/Short-Term Courses Organized

Workshop	Sponsoring agency	Duration	Target group	Funding
Learning Sparse Representations for Signal Processing (Lead organizer)	National Mathematics Initiative	February 20-22, 2015	Research students in Signal Processing and Machine Learning	~ 5 lakhs

Workshop	Sponsoring agency	Duration	Target group	Funding
First workshop on Brain, Computation and Learning (Organizing Committee member and speaker)	Pratiksha Trust	January 9-13, 2017	Researchers in Machine Learning and Neuroscience	~ 30 lakhs
Short-term course on Digital Signal Processing and Applications (Organizer and speaker)	NXP Semiconductors, Bangalore	February 27 to March 3, 2017	NXP engineers	~4 lakhs
Winter School on Speech and Audio Processing (WiSSAP) (Organizing Committee member)	International Speech Communication Association, Defense R&D Organization, Adobe, Mathworks	January 26-29, 2017	Signal Processing Researchers	~ 5 lakhs
Second workshop on Brain, Computation, and Learning (Organizing Committee member)	Pratiksha Trust	January 8-12, 2018	Researchers in Machine Learning and Neuroscience	~ 20 lakhs
Third workshop on Brain, Computation, and Learning (Organizing Committee member)	Pratiksha Trust	June 24-29, 2019	Researchers in Machine Learning and Neuroscience	~ 20 lakhs
IEEE SPS Winter School on Biomedical Signal and Image Processing (Organizing Committee member and speaker)	IEEE Signal Processing Society	November 12-14, 2019	Students and researchers in Biomedical Signal/ Image Processing	~ 3 lakhs
Sixth Workshop on Brain, Computation, and Learning (Organizing Committee member)	Pratiksha Trust	January 9-13, 2023	Researchers in Machine Learning, Translational Neuroscience	~25 lakhs
Winter School on Speech and Audio Processing (WiSSAP) (Organizing Committee member)	Indian Speech Communication Association	December 18-21, 2023	Students and researchers in the areas of music information retrieval	~ 15 lakhs

10. Leadership and Service Roles at the Institute

1. June 1, 2023 to May 31, 2024: Organizing Chair, GATE-2024. Leading a national-level GATE committee comprising 24 Professors from IISc and IITs. We brought in major reforms in the system and also introduced a new GATE test paper on Data Science and Artificial Intelligence.
2. June 1, 2022 to May 31, 2024: Chair, GATE-JAM Office, IISc.
3. June 1, 2020 to May 31, 2022: Vice-Chair, Graduate Aptitude Test in Engineering (GATE) and Joint Admission test for Masters (JAM). GATE and JAM are nation-wide entrance examinations organized jointly by Indian Institute of Science and Indian Institutes of Technology (IITs) and are taken by about a million candidates every year.
4. Convener, Program Curriculum Committee of the Master of Technology in Signal Processing (M.Tech.(SP)) program, Division of Electrical, Electronics, and Computer Sciences (EECS), IISc, since August 1, 2022. We revamped the course curriculum and resurrected the M.Tech.(SP) program.
5. Convener, Program Curriculum Committee of the Master of Technology in Artificial Intelligence (M.Tech. (AI)) program, newly introduced by the Division of Electrical, Electronics, and Computer Sciences (EECS), IISc. (August 1, 2020 to July 31, 2022); Formerly member of the committee (August 1, 2018-July 31, 2020).
6. With the help of the M.Tech.(AI) PCC, and under the leadership of Dean (EECS), IISc, I set up state-of-the-art the AI labs in four departments of the Division of EECS. The labs are used by several faculty members for conducting tutorials and workshops that have a programming component.

7. Member of the committee that drafted the Faculty Handbook of the Indian Institute of Science.
8. Coordinator, Visual Analytics Thematic Cluster at IISc, 2017 to 2022.
9. Member, Board of Studies, Undergraduate Program at IISc (Bachelor of Science (Research)) since May 2015 to 2022.
10. Member, Electrical Engineering Department Curriculum Committee (August 2018 onward).
11. Chairman of the committee for recruiting lab instructors for the undergraduate program at IISc (2017).
12. Senate nominee for about 25 comprehensive examinations and general tests in IISc.
13. Convener, EECS Divisional Retreat for Strategic Planning, December 2016.
14. Team Lead for conducting GATE, JAM, and KVPY national-level entrance exams in various states in India.
15. Member of the Evaluation Committee for Technical Staff Promotion, 2016.
16. Mooted the idea of a DST-FIST proposal and was a member of the departmental committee that drafted the proposal on "Smart Energy Systems Infrastructure." The proposal was successful and received INR 6.49 crores of funding spread over the duration 29.09.2016 to 28.09.2021.

11. Membership of Professional Bodies

1. Executive President and founding member of Indian Speech Communication Association (IndSCA) (founded 2019)
2. Senior member, The Institute of Electrical and Electronics Engineers (IEEE)
3. Member, IEEE Signal Processing Society, USA
4. Member, Indian Unit for Pattern Recognition and Artificial Intelligence (An affiliate of International Association for Pattern Recognition)
5. Member of the Association of Computing Machinery (ACM)
6. Member of The Optical Society of America, The Optical Society of India
7. Member of International Speech Communication Association
8. Life member, The Institution of Electronics and Telecommunication Engineers (IETE), New Delhi

12. Distinguished Visitors Hosted

Sl. No.	Name of the visitor	University	Duration
1	Alessandro Foi	Tempere University, Finland	April 18-22, 2025
2	Thrasos Pappas	Northwestern University, USA	January 14-31, 2025
3	Gaurav Sharma	University of Rochester, USA	August 4-11, 2024 January 14-31, 2025
4	Ayush Bhandari	Imperial College, London, UK	July 7-8, 2024
5	Ashok Veeraraghavan	Rice University, USA	June 27, 2024
6	Ayush Bhandari	Imperial College, London, UK	June 1-2, 2022
7	Yonina Eldar	Weizmann Institute of Science, Israel	December 18, 2019
8	Gaurav Sharma	University of Rochester, USA	September 10, 2019
9	Achuta Kadambi	Washington University, USA	June 14, 2019
10	Vivek Goyal	Boston University	December 3, 2018
11	Mathews Jacob	Iowa State University	July 16-19, 2018
12	Mohammad Emtiyaz Khan	RIKEN, Japan	November 2, 2018
13	Mathew Magimai-Doss	Idiap & Ecole polytechnique fédérale de Lausanne	April 3, 2018
14	Kumar Vijay Mishra	United States Army Research Labs	December 20, 2017
15	Yoram Bresler	University of Illinois at Urbana-Champaign	October 17, 2016

Sl. No.	Name of the visitor	University	Duration
16	Israel Cohen	Technion, Israel	January 8-11, 2016
17	Akihiko (Ken) Sugiyama	NEC Japan	December 14, 2015
18	Michael Elad	Technion, Israel	February 20-22, 2015
19	Justin Romberg	Georgia Tech., USA	February 20-22, 2015
20	Roger Moore	University of Sheffield, UK	December 15, 2014

13. Selected Invited Talks

Sl. No.	Title of the talk	Event	Duration
1	Generalized weighted lp minimization for accurate interferometric phase estimation	Symposium on Phase Retrieval, Joint Annual Conference of the German Mathematical Society and the Austrian Mathematical Society, University of Passau, Germany	September 27 to October 1, 2021.
2	Neuromorphic Sampling	Asilomar Conference on Signals, Systems and Computers	October 31-November 3, 2021
3	Time-encoded sampling	Sampling Theory and Its Applications, IIT Indore	January 24-29, 2021
4	Healthcare in the age of AI	Keynote talk, IEEE SPS Winter School on Biomedical Signal and Image Processing	November 12-14, 2019
5	Deep learning for sparse coding	Winter School on Speech and Audio Processing (WiSSAP) 2019	January 27-29, 2019
6	Unrolled iterative algorithms for sparse coding	Special session on Deep Learning at International Conference on Signal Processing and Communications (SPCOM), IISc	July 16-19, 2018
7	There's more to a spectrogram than meets the eye	Special session on Speech Processing at the International Conference on Signal Processing and Communications (SPCOM), IISc	July 16-19, 2018
8	The BIG bang	Twenty Years of Biomedical Imaging and Splines (TYBIS), Ecole polytechnique fédérale de Lausanne	March 23, 2018
9	ESOLA: Epoch-synchronous overlap-add for speech applications	Winter School in Speech and Audio Processing (WiSSAP), Indian Institute of Technology Guwahati	January 19-22, 2018
10	Sub-Nyquist sampling	Tutorial at the Osmania University College of Engineering Centenary Conference, Hyderabad	December 29-30, 2017
11	Deep learning meets sparse coding	Brain, Computation, and Learning workshop, IISc, funded by Pratiksha Trust	January 9-12, 2017
12	The Riesz transform -- A new tool for spectro-temporal analysis of speech signals	Keynote talk, IEEE Israel Section International Conference on the Science of Electrical Engineering (ICSEE), Symposium on Speech and Audio Processing, held in Eilat, Israel	November 16-18, 2016
13	What can signal processing do for coherent imaging?	Johannes Kepler University (Zentrum fur Oberflachen und Nanoanalytik), Linz, Austria	June 28, 2016

Sl. No.	Title of the talk	Event	Duration
14	Phase retrieval in shift-invariant spaces and application to optical imaging	Volkswagen Stiftung MOIMA Symposium on Mathematical Optics, Image Modelling, and Algorithms, at Schloss Herrenhausen, Hannover, Germany	June 20-23, 2016
15	Exact phase retrieval in principal shift-invariant spaces	Department of Electrical Engineering, Indian Institute of Technology Bombay, Mumbai	May 12, 2016
16	Sub-Nyquist sampling -- Recent advances and applications	Tutorial at Twenty Second National Conference on Communications (NCC), Indian Institute of Technology Guwahati	March 4, 2016
17	Speech prosody modification	Workshop on Text-to-Speech synthesis, Dhirubhai Ambani Institute of Information and Communication Technology, Gandhinagar	June 16-19, 2014
18	Active shapes	Visualization and Data Analytics Seminar, Department of Computer Science, University of Vienna, Austria	May 21, 2014

14. Full List of Publications

Peer-Reviewed International Journal publications

1. M. Bakshi and C. S. Seelamantula, "EfficientNet-B1 based diabetic retinoapthy detection from ultra-widefield fundus images," Proceedings of Medical Image Computing and Computer-Assisted Intervention (MICCAI) Challenge on Ultra-widefield Fundus Imaging for Diabetic Retinopaty, Lecture Notes in Computer Science, Springer, pp. 135-143, October 2024.
2. Kartheek K. Nareddy, A. J. Kamath, and C. S. Seelamantula, "Tight-Frame-Like Analysis-Sparse Recovery Using Nontight Sensing Matrices," vol. 17, iss. 3, SIAM Journal on Imaging Sciences, 2024. (IF: 2.1)
3. Mangalwedhekar R., Singh N., Thakur C.S., Seelamantula C.S., Jose M., Nair D., (2022), "Achieving nanoscale precision using Neuromorphic localization microscopy," Nature Nanotechnology. (IF: 40.523)
4. S. Asokan and C. S. Seelamantula, "Euler-Lagrange analysis of generative adversarial networks," Journal of Machine Learning Research (JMLR), vol. 24, pp. 1-100, 2023. (IF: 5.177)
5. S. Asokan and C. S. Seelamantula, "Spider GAN — Leveraging friendly neighbors to accelerate GAN training," Proceedings of IEEE Computer Vision and Pattern Recognition (CVPR), 2023. (h5-index: 389; IF: 23.46)
6. S. Mache, P. K. Pokala, K. Rajendran, and C. S. Seelamantula, "Introducing nonuniform sparse proximal averaging network for seismic reflectivity inversion," IEEE Transactions on Computational Imaging, vol. 9, pp. 475-489, May 2023. (IF: 4.99)
7. J. R. Harish Kumar, C. S. Seelamantula, J. H. Gagan, Y. S. Kamath, N. I. R. Kuzhuppilly, U. Vivekanand, P. Gupta, and S. Patil, "Cháksu: A Glaucoma-specific fundus image database," Nature Scientific Data. (IF: 11.2)
8. S. Mache, A. Chatterjee, K. Rajendran, and C. S. Seelamantula, "Hilbert-Huang transform and energy rate functions for earthquake source characterization — A study from the Japan Trench," Bulletin of the Seismological Society of America, vol. 112 (6), pp. 2847–2858, 2022. (IF: 3.14)
9. P. K. Pokala, R. V. Hemadri, and C. S. Seelamantula, "Iteratively reweighted minimax-concave penalty minimization for accurate low-rank plus sparse matrix decomposition," IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2021, doi: 10.1109/TPAMI.2021.3122259. (IF: 24.314)
10. J. Sadasivan, J. K. Dhiman, and C. S. Seelamantula, "Musical noise suppression using a low-rank and sparse matrix decomposition approach," Speech Communication, vol. 125, pp. 41-52, 2020. (IF: 2.723).
11. A. R. Mangalore, C. S. Seelamantula, and C. S. Thakur, "Neuromorphic fringe projection profilometry," IEEE Signal Processing Letters, vol. 27, pp. 1510-1514, 2020. (IF: 3.201)
12. S. K. Shastri, S. Rudresh, R. Anand, S. Nagesh, C. S. Seelamantula, and A. K. Thittai, "Axial super-resolution in ultrasound imaging with application to non-destructive evaluation," vol. 108, no. 106183, Elsevier Ultrasonics, December 2020.

13. A. Mahurkar and C. S. Seelamantula, "Minkowski-algebra-based super-sparse array design for superresolution ultrasound imaging," IEEE Signal Processing Letters, vol. 27, pp. 1060-1064, 2020. (IF: 3.201)
14. S. Mukherjee and C. S. Seelamantula, "Quantization-aware phase retrieval," Special issue on Mathematical Optics, Imaging, and Applications, International Journal of Wavelets, Multiresolution, and Information Processing (Invited paper), 2020. (IF: 1.276)
15. J. R. Harish Kumar, C. S. Seelamantula, A. Mohan, R. Shetty, T. J. M. Berendschot, and C. A. B. Webers, "Automatic analysis of normative retinal oximetry images," PLoS ONE, May 2020.
16. J. Sadasivan, S. Mukherjee, and C. S. Seelamantula, "Signal denoising using the minimum-probability-of-error criterion," vol. 9, e3, APSIPA Transactions on Signal and Information Processing, January 2020.
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18. J. Sadasivan, C. S. Seelamantula, N. R. Muraka, "Speech enhancement using a risk estimation approach," vol. 116, pp. 12-29, Speech Communication, January 2020.
19. H. Sundar, T. V. Sreenivas, and C. S. Seelamantula, "TDOA-based multiple source localization without association ambiguity," IEEE/ACM Transactions on Audio, Speech, and Language Processing, vol. 26, no. 11, pp. 1976-1990, November 2018.
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22. S. Rudresh, S. Nagesh, and C. S. Seelamantula, "Asymmetric pulse modeling for FRI sampling," vol. 66, no. 8, pp. 2027-2040, IEEE Transactions on Signal Processing, 2018.
23. K. S. Chandran, C. S. Seelamantula, and S. Ray, "Duration analysis using matching pursuit algorithm reveals longer bouts of gamma rhythm," vol. 119, pp. 808-821, Journal of Neurophysiology, 2018.
24. A. Bhowmik, S. Shit, and C. S. Seelamantula, "Training-free, single-image super-resolution using a dynamic convolutional network," IEEE Signal Processing Letters, vol. 25, no. 1, pp. 85-89, Jan. 2018. This article featured in the Top 10 popular articles of IEEE Signal Processing Letters for three consecutive month.
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27. S. Rudresh and C. S Seelamantula, "Finite-rate-of-innovation-based super-resolution radar imaging," IEEE Transactions on Signal Processing, vol. 65, no. 19, pp. 5021-5033, 2017.
28. A. Chaturvedi, S. K. Nagaraj, S. S. Gorthi, and C. S. Seelamantula, "An efficient microscale technique for determining the erythrocyte sedimentation rate," Journal of the Society for Laboratory Automation and Screening (SLAS) Technology, vol. 22, no. 5, pp. 565-572, 2017.
29. A. S. Murthy, C. S. Seelamantula, and T. V. Sreenivas, "Optimum short-time polynomial regression for signal analysis," Sadhana Journal of the Indian Academy of Sciences, vol. 41, no. 11, pp. 1245-1260, Nov. 2016.
30. S. Mulleti, B. A. Shenoy, and C. S. Seelamantula, "FRI sampling on structured nonuniform grids — Application to super-resolved optical imaging," IEEE Transactions on Signal Processing, vol. 64, no. 15, pp. 3841-3853, 2016.
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