

SRIRAM GANAPATHY

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Interests

My research interests include signal processing, machine learning, deep learning, auditory neuroscience, robust speech recognition and audio applications like information extraction, enhancement and coding.

Current Position

I am an Assistant Professor at the Electrical Engineering, Indian Institute of Science, Bangalore. I manage the Learning and Extraction of Acoustic Patterns (LEAP) laboratory where the activities are focussed on information extraction and analysis of acoustic signals like speech and audio as well as in analyzing the neural code of speech and language.

Education

PhD, Center of Language and Speech Processing (4.0/4.0) Johns Hopkins University, Baltimore, USA.	Jan. 2009-Dec. 2011
Master of Engineering, Signal Processing (7.4/8.0) Indian Institute of Science, Bangalore, India.	Aug. 2004-July. 2006
Bachelor of Technology, Electronics and Communications (82%) College of Engineering, Trivandrum, India	Oct. 2000- June. 2004

Skills

Programming: MATLAB, C, Python, HTML.

Tools: HTK, PyTorch, Kaldi, Latex, Theano, Tensorflow.

Operating Systems: Unix/Linux, Windows, Mac OS X

Honors and Awards

Verisk AI Faculty Award - 2021

Technical Area Pick Award - Journal of Acoustical Society of America, 2019

Subject Editor - Elsevier Speech Communications Journal, from January 2019 (extended Jan 2021).

Plenary Perspective Talk - Interspeech 2018 conference, Hyderabad, India.

Dept. of Atomic Energy, Young Scientist Research Award, 2018.

Young Investigator Award, Prathiksha Trust, Indian Institute of Science Bangalore.

Microsoft Award - “Best Summer Workshop Award in Artificial Social Intelligence”.

Early Career Research Award, Department of Science and Technology, India, May 2017

IEEE Senior Member, April, 2017.

Master Inventor, IBM T.J. Watson Research Center, New York, USA, 2014.

Best tutorial presentation, Interspeech 2014 on “The Art and Science of Speech Feature Engineering”, Singapore.

Best outgoing student award for M.E. Signal Processing, Dept. of ECE, Indian Institute of Science, Bangalore, 2006.

Organization and Chair Positions

General Co-Chair, “Winter School of Speech and Audio Processing (WISSAP)”, Trivandrum, Kerala, Jan. 2019.

Interspeech Sponsorship Committee Chair, Interspeech 2018, Hyderabad, India.

Experience

Asst. Prof, Electrical Engg. IISc Bangalore. *Feb. 2016 -*
Leading the research activities in learning and extraction of acoustic patterns (LEAP) labs - working on understanding the human encoding of speech and language, classifying natural and synthetic speech (spoof detection), speaker verification in multi-lingual conditions, unsupervised filter learning and noise robust speech recognition, low complexity wake-up word detection, language recognition.

Research Staff Member, IBM T.J Watson Center, NY, USA. *Dec.2011 - Dec. 2015*
Research on signal analysis and processing of noisy and degraded radio channel speech for biometric applications like speaker and language recognition as well as speech activity detection. These technologies are developed for the U.S. Government under the Defense Advanced Research Project Agency. Full-time employment (40 hours per week).

Research Intern, IBM T.J Watson Center, NY, USA. *June 2010 - Aug 2010*
The main focus of this internship was to develop feature normalization techniques for speaker verification in far-field reverberant environments. Full-time employment (40 hours per week).

Research Assistant, Idiap Research Institute, Switzerland. *Oct. 2006 - Jan 2009*
The goal of this work was to investigate the use of long-term energy summarization of speech signals for speech recognition and coding applications. Full-time employment (40 hours per week).

Teaching

Course Instructor E9 309 - “Advanced Deep Learning”, Indian Institute of Science, Aug-Dec 2020.

Course Instructor in - “Digital Health and Imaging - PG certification program” with Talents Print, for modules of signal processing and deep learning.

Course Instructor E9 205 - “Machine Learning for Signal Processing”, Indian Institute of Science, Aug-Dec 2016, 2017, 2018 and 2019.

Course Instructor for “E9-261 - Speech Information Processing”, Indian Institute of Science, Jan-April, 2016, 2017, 2018, 2019 and 2020. (Jointly given with Dr. Prasanta Ghosh).

Course Instructor - “Machine Learning for Sensory Signals”, Center for Continuing Education, Indian Institute of Science, Jan-Apr 2017.

Course Instructor - “Deep Learning : Theory and Practice”, Center for Continuing Education, Indian Institute of Science, Jan-Apr 2018, 2019, 2020.

Teaching Assistant for “Information processing of sensory signals”, for Spring 2009, Spring 2010, Johns Hopkins University.

External Talks and Seminars

“Analyzing Speech Using EEG”, MS Ramaiah Institute of Technology, December 2019, Bangalore.

“Speaker and Language Recognition in the Wild” - Invited perspective talk, Interspeech 2018, Hyderabad.

“Language learning and the brain”, University College London, July 2018.

“Deep Learning for Multi-channel Speech Processing”, Samsung Research India, Bangalore, November, 2017.

“Introduction to Speech Recognition” - Department of Psychophysics, Carnegie Mellon University, August, 2017.

“Deep Learning - Theory and Practice”, Rajiv Gandhi Institute of Technology, Kottayam, Kerala, April, 2017.

“Introduction to Deep Learning”, DRDO CAIR labs, Bangalore, Dec. 2016.

“Machine Learning for Speech Processing”, IIIT- Bangalore, Sept. 2016.

“Deep Learning for Speech Processing”, IBM India Research Labs, February 2016.

“The Art and Science of Speech Feature Engineering”, Tutorial at Interspeech, Singapore, Sept. 2014.

“Algorithms in Speech Signal Processing”, College of Engineering, Trivandrum, India, Nov., 2013.

“Robust Processing of Noisy and Degraded Channel Speech”, Computational Science and Artificial Intelligence Laboratory, MIT, Cambridge, USA, Oct., 2013.

“Dealing with Noisy Speech Using Autoregressive Models”, Idiap Research Institute, Martigny, Switzerland, Aug, 2013.

“Signal analysis using autoregressive models of amplitude modulation”, Electrical and Computer Engineering, University of Texas, Dallas, Feb. 2013.

“Frequency Domain Linear Predictive Analysis of Speech”, Indian Institute of Science, Bangalore, India, Nov. 2011.

“Signal modeling with long term feature processing”, Raytheon BBN Technologies, Cambridge, MA, USA, July 2011.

Professional Memberships

IEEE Signal Processing Society - Senior Member.

International Speech Communication Association (ISCA).

Patents

“Method for System Combination in Audio Analytics Application”, with IBM Watson Center, USA. [Granted June 2017].

“Spectral Noise Shaping in Audio Coding Based on Spectral Dynamics in Frequency Sub-bands”, with Qualcomm Inc, [Approved Nov. 2011].

“Temporal Masking in Audio Coding Based on Spectral Dynamics in Frequency Subbands”, with Qualcomm Inc, [Approved May 2009].

Publications

Google scholar page - <https://scholar.google.co.in/citations?user=cgpzrtcAAAAJ&hl=en>

I. Thesis

S. Ganapathy, "Signal Analysis using Autoregressive Models of Amplitude Modulation ", Johns Hopkins University, Jan. 2012

II. Peer Reviewed Journals

- P. Agrawal, **S. Ganapathy**, "Interpretable Representation Learning for Speech and Audio Signals Based on Relevance Weighting," IEEE Transactions and Audio, Speech and Language Processing, Vol. 28, pp. 2823--2836, 2020.
- N. Sharma, V. Krishnamohan, **S. Ganapathy**, A. Gangopadhyay, L. Fink, "Acoustic and linguistic features influence talker change detection", JASA - Express letters, Vol. 147 (5), 2020.
- S. Babu, D. Vijayasenan and **S. Ganapathy**, "Automatic Speaker Profiling from Short Duration Speech Data", Elsevier Speech Communications, April 2020.
- B. Padi, A. Mohan and **S. Ganapathy**, "Towards Relevance and Sequence Modeling in Language Recognition", IEEE Transactions on Audio, Speech and Language Processing, March, 2020.
- S. Ramoji and **S. Ganapathy**, "Supervised I-vector Modeling for Language and Accent Recognition", Elsevier Journal on Computer, Speech and Language, Oct. 2019.
- A. Kanagasundaram, S. Sridharan, S. Ganapathy and C. Fookes, "A Study on Pairwise LDA for X-vector based Speaker Recognition", IET Electronic Letters, (2019).
- P. Agrawal and **S. Ganapathy**, "Modulation Filter Learning Using Deep Variational Networks for Robust Speech Recognition", IEEE Journal of Selected Topics in Signal Processing, May 2019.
- A. Soman, Madhavan C. R., K. Sarkar, and **S. Ganapathy**, "An EEG Study On The Brain Representations in Language Learning", IOP Journal on Biomedical Physics and Engineering Express, January 2019.
- N. Sharma, S. Ganesh, **S. Ganapathy** and L. Holt, "Talker change detection: A comparison of human and machine performance", Journal of Acoustical Society of America, December 2018. [**JASA Technical Area Pick Award**]
- V. S. Kadimesetty, S. Gutta, **S. Ganapathy**, and P. K. Yalavarthy, "Convolutional Neural Network based Robust Denoising of Low-Dose Computed Tomography Perfusion Maps", IEEE Transactions on Radiation and Plasma Medical Sciences, August 2018.
- S. Gutta, V. S. Kadimesetty, S. K. Kalva, M. Pramanik, **S. Ganapathy** and P. K. Yalavarthy, "Deep Neural Network Based Bandwidth Enhancement of Photoacoustic Data", Journal of Biomedical Optics, October 2017.
- G. Kocavs, L. Toth, D. V. Compernelle and **S. Ganapathy** , "Increasing the Robustness of CNN Acoustic Models using ARMA Spectrogram Features and Channel Dropout", Elsevier Pattern Recognition Letters, September 2017.
- P. Agrawal and **S. Ganapathy**, "Unsupervised Modulation Filter Learning for Noise-Robust Speech Recognition", Journal of Acoustical Society of America, September 2017.
- S. Ganapathy**, "Multi-variate Autoregressive Spectrogram Modeling for Noisy Speech Recognition", IEEE Signal Processing Letters, July 2017.
- S. Ganapathy**, M. Omar, "Auditory Motivated Front-end for Noisy Speech Using Spectro-temporal Modulation Filtering", Journal of Acoustical Society of America, EL343-349, Vol. 136(5), Nov. 2014.

S. Ganapathy, S. H. Mallidi and H. Hermansky, "Robust Feature Extraction Using Modulation Filtering of Autoregressive Models", IEEE Transactions on Audio, Speech and Language Processing, Vol. 22(8), pp. 1285-1295, Aug. 2014.

S. Ganapathy and J. Pelecanos, "Enhancing Frequency Shifted Speech Signals in Single Side Band Communication", IEEE Signal Processing Letters, Vol. 20(12), pp. 1231-1234, Oct. 2013.

S. Ganapathy and H. Hermansky, "Temporal Resolution Analysis in Frequency Domain Linear Prediction", Journal of Acoustical Society of America, EL436-442, Vol. 132(5), Oct. 2012.

S. Ganapathy, S. Thomas and H. Hermansky, "Temporal envelope compensation for robust phoneme recognition using modulation spectrum", Journal of Acoustical Society of America, Vol. 128(6), pp. 3769-3780, Dec. 2010.

S. Ganapathy, P. Motlicek and H. Hermansky, "Autoregressive Models Of Amplitude Modulations In Audio Compression", IEEE Transactions on Audio, Speech and Language Processing, Vol. 18(6), pp.1624-1631, Aug. 2010.

P. Motlicek, **S. Ganapathy**, H. Hermansky and H. Garudadri, "Wide-Band Audio Coding based on Frequency Domain Linear Prediction", EURASIP Journal on Audio, Speech, and Music Processing, Vol. 2010(3), pp. 1-14, Jan. 2010.

S. Ganapathy, S. Thomas and H. Hermansky, "Modulation Frequency Features For Phoneme Recognition In Noisy Speech", Journal of Acoustical Society of America, EL8-12, Vol. 125(1), Jan. 2009.

S. Thomas, **S. Ganapathy** and H. Hermansky, "Recognition of Reverberant Speech Using Frequency Domain Linear Prediction", IEEE Signal Processing Letters, Vol. 15, pp. 681-684 Nov. 2008.

III. Conferences

N. Sharma, P. Krishnan, R. Kumar, S. Ramoji, S. R. Chetupalli, R. Nirmala, P. K. Ghosh and **S. Ganapathy**, "Coswara -- A Database of Breathing, Cough, and Voice Sounds for COVID-19 Diagnosis ", Interspeech 2020, Beijing, October 2020.

S. Ramoji, P. Krishnan and **S. Ganapathy**, "Neural PLDA Modeling for End-to-end Speaker Verification", Interspeech 2020, Beijing, October 2020.

P. Agrawal and **S. Ganapathy**, "Robust Raw Waveform Speech Recognition Using Relevance Weighted Representations", Interspeech 2020, Beijing, October 2020.

V. Krishnamohan, A. Soman, A. Gupta and **S. Ganapathy**, "Audiovisual Correspondence Learning in Humans And Machines", Interspeech 2020, Beijing, October 2020.

A. Purushothaman, A. Sreeram, R. Kumar and **S. Ganapathy**, "Deep Learning Based Dereverberation of Temporal Envelopes for Robust Speech Recognition", Interspeech 2020, Beijing, October 2020.

P. Singh and **S. Ganapathy**, "Deep Self-Supervised Hierarchical Clustering for Speaker Diarization", Interspeech 2020, Beijing, October 2020.

S. R. Chetupalli and **S. Ganapathy**, "Context Dependent RNNLM for Automatic Transcription of Conversations", Interspeech 2020, Beijing, October 2020.

J. Reddy and **S. Ganapathy**, "Deep Canonical Correlation Analysis For Decoding The Auditory Brain", IEEE EMBC, Toronto, Canada, July 2020.

S. Ramoji, P. Krishnan, B. Mysore, P. Singh and **S. Ganapathy**, "LEAP System for SRE19 Challenge -- Improvements and Error Analysis", Speaker Odyssey Workshop, November, 2020.

S. Ramoji, P. Krishnan, and **S. Ganapathy**, "NPLDA: A Deep Neural PLDA Model for Speaker Verification", Speaker Odyssey Workshop, November, 2020.

N. Sharma, V. Krishnamohan, **S. Ganapathy**, A. Gangopadhyay and L. Fink "On The Impact of Language Familiarity In Talker Change Detection", ICASSP 2020.

A. Purushothaman, A. Sreeram and **S. Ganapathy** "3-D Feature and Acoustic Modeling for Far-Field Speech Recognition", ICASSP 2020.

R. Kumar, A. Sreeram, A. Purushothaman and **S. Ganapathy** "Unsupervised Neural Mask Estimator For Generalized Eigen-Value Beamforming Based ASR", ICASSP 2020.

N. Takahashi, M. Singh, S. Basak, P. Sudarsanam, **S. Ganapathy**, Y. Mitsufuji "Improving Voice Separation by Incorporating End-to-end Speech Recognition", ICASSP 2020.

K. Praveen, A. Gupta, A. Soman and **S. Ganapathy** "Second Language Transfer Learning in Humans and Machines Using Image Supervision", IEEE ASRU, Singapore. 2019.

S. Bansal, K. Malhotra, **S. Ganapathy**, "Speaker and Language Aware Training for End-to-End ASR", IEEE ASRU, Singapore, 2019 [**Short-listed for Best Paper Award**].

N. Ryant, K. Church, C. Cieri, A. Cristia, J. Du, **S. Ganapathy** and M. Liberman, "The Second DIHARD Diarization Challenge: Dataset - task - and baselines", INTERSPEECH, Graz, Austria, 2019.

P. Singh, Harsha Vardhan M A, **S. Ganapathy** and A. Kanagasundaram, "LEAP Diarization System for the Second DIHARD Challenge", INTERSPEECH, Graz, Austria, 2019.

B. Padi, A. Mohan and **S. Ganapathy**, "Attention based Hybrid I-vector BLSTM Model for Language Recognition", INTERSPEECH, Graz, Austria, 2019.

K. Malhotra, S. Bansal and **S. Ganapathy**, "Active Learning Methods for Low Resource End-To-End Automatic Speech Recognition", INTERSPEECH, Graz, Austria, 2019.

P. Agrawal and **S. Ganapathy**, "Unsupervised Raw Waveform Representation Learning for ASR", INTERSPEECH, Graz, Austria, 2019.

A. Kanagasundaram, S. Sridharan, **S. Ganapathy** and P. Singh, "A Study of X-vector Based Speaker Recognition on Short Utterances", INTERSPEECH, Graz, Austria, 2019.

N. Sharma, S. Ganesh, **S. Ganapathy** and L. Holt, "Analyzing human reaction time for talker change detection", ICASSP 2019, Brighton UK, May 2019.

S. Ramoji, A. Mohan, Bhargavram M, A. Bhatia, P. Singh, Harsha V, **S. Ganapathy**, "The LEAP Speaker Recognition System for NIST SRE 2018 Challenge", ICASSP 2019, Brighton UK, May 2019.

P. Agrawal, **S. Ganapathy**, "Deep variational filter learning models for speech recognition", ICASSP 2019, Brighton UK, May 2019.

S. Babu, D. Vijayasenan and **S. Ganapathy**, "A Deep Neural Network Based End-to-End Model for Joint Height And Age Estimation From Short Duration Speech", ICASSP 2019, Brighton UK, May 2019.

B. Padi, A. Mohan, S. Ganapathy, "End-to-end language recognition using attention based hierarchical gated recurrent unit models", ICASSP 2019, Brighton UK, May 2019.

S. Ramoji, **S. Ganapathy**, "Supervised i-vector modeling - Theory and Applications", Interspeech 2018, Hyderabad, India, September, 2018.

P. Agrawal, **S. Ganapathy**, "Comparison of unsupervised modulation filter learning methods for ASR", Interspeech, Hyderabad, India, September, 2018.

A. Cristia, S. Ganesh, M. Casillas and **S. Ganapathy**, "Talker diarization in the wild: The case of child-centered daylong audio-recordings", Interspeech, Hyderabad, India, September, 2018.

R. Kumar, V. Yeruva and **S. Ganapathy**, "On Convolutional LSTM Modeling for Joint Wake-Word Detection and Text Dependent Speaker Verification", Interspeech 2018, Hyderabad, India, September, 2018.

S. Ganapathy and M. Harish, "Far-Field Speech Recognition Using Multivariate Autoregressive Models", Interspeech 2018, Hyderabad, India, September, 2018.

B. Padi, S. Ramoji, V. Yeruva, S. Kumar, **S. Ganapathy**, "The LEAP Language Recognition System for LRE 2017 Challenge - Improvements and Error Analysis", Odyssey: The speaker and language recognition workshop, June 2018.

N. Sajjan, S. Ganesh, N. Sharma, **S. Ganapathy** and N. Ryant "Leveraging LSTM Models for Overlap Detection in Multi-Party Meetings", ICASSP, Calgary Canada, April 2018.

S. Ganapathy and V. Peddinti "3-D CNN Models for Far-Field Multi-Channel Speech Recognition", ICASSP, Calgary Canada, April 2018.

N. Ryant et al. "Enhancement and Analysis of Conversational Speech: JSALT 2017", ICASSP, Calgary Canada, April 2018.

Ansari T, R. Kumar, S. Singh, **S. Ganapathy** "Unsupervised HMM Posteriograms for Language Independent Acoustic Modeling in Zero Resource Conditions", IEEE ASRU, Dec. 2017.

Ansari T, R. Kumar, S. Singh, **S. Ganapathy** "Deep Learning Methods For Unsupervised Acoustic Modeling - LEAP Submission to ZeroSpeech Challenge 2017", IEEE ASRU, Dec. 2017.

A. Siddhant, P. Jyothi and **S. Ganapathy** "Leveraging Native Language Speech For Accent Identification Using Deep Siamese Networks", IEEE ASRU, Dec. 2017.

P. Agarwal, **S. Ganapathy**, "Speech Representation Learning Using Unsupervised Data-Driven Modulation Filtering for Robust ASR", Interspeech 2017, Stockholm, Sweden.

N. Kumar, R. K. Das, S. Jelil , Dhanush B K, H. Kashyap ,K. S. Murty, **S. Ganapathy**, R. Sinha and S. R. M. Prasanna, "IITG-Indigo System for NIST 2016 SRE Challenge", Interspeech 2017, Stockholm, Sweden.

Dhanush B. K., Suparna S., Aarthy R., Likhita C., Shashank D., Harish H., **S. Ganapathy**, "Factor Analysis Methods for Joint Speaker Verification and Spoof Detection", ICASSP, New Orleans, March, 2017.

S. Sadjadi, J. Pelecanos and **S. Ganapathy**, "The IBM Speaker Recognition System: Recent Advances and Error Analysis", Interspeech, San Francisco, September, 2016.

D. Dimitriadis, S. Thomas and **S. Ganapathy**, "An investigation on the use of ivectors for improved ASR robustness", Interspeech, San Francisco, Sept. 2016.

S. Sadjadi, **S. Ganapathy** and J. Pelecanos, "The IBM 2016 Speaker Recognition System", Odyssey, Spain, June, 2016.

S. Sadjadi, **S. Ganapathy** and J. Pelecanos, "Speaker Age Estimation On Conversational Telephone Speech Using Senone Posterior Based I-vectors", ICASSP, Shanghai, 2016.

S. Ganapathy, S. Thomas, D. Dimitriadis, S. Rennie "Investigating Factor Analysis Features for Deep Neural Networks In Noisy Speech Recognition", Interspeech, Dresden, Germany, Sept. 2015.

S. Ganapathy, "Robust Speech Processing Using ARMA Spectrograms", ICASSP, Brisbane, April, 2015.

- S. Sadjadi, J. Pelecanos and **S. Ganapathy**, "Nearest Neighbor Discriminant Analysis for Language Recognition", ICASSP, Brisbane, April, 2015.
- S. Ganapathy**, K. J. Han, M. Omar, M. V. Segbroeck and S. Narayan, "Robust Language Identification Using Convolutional Neural Networks", Interspeech, Singapore, 2014.
- S. Thomas, **S. Ganapathy**, G. Saon and H. Soltau, "Analyzing Convolutional Neural Networks For Speech Activity Detection In Mismatched Acoustic Conditions", ICASSP, Florence, 2014.
- M. Omar and **S. Ganapathy**, "Shift-Invariant Features for Speech Activity Detection in Adverse Radio-Frequency Channel Conditions", ICASSP, Florence, 2014.
- G. Saon, S. Thomas, H. Soltau, **S. Ganapathy** and B. Kingsbury, "The IBM Speech Activity Detection System for the DARPA RATS Program", Interspeech, Lyon, Aug. 2013.
- K. J. Han, **S. Ganapathy**, M Li, M. Omar and S. Narayan, "TRAP Language Identification System for RATS Phase II Evaluation", Interspeech, Lyon, Aug. 2013.
- H. Mallidi, **S. Ganapathy** and H. Hermansky, "Robust Speaker Recognition Using Spectro-Temporal Autoregressive Models", Interspeech, Lyon, Aug. 2013.
- S. Ganapathy**, M. Omar and J. Pelecanos, "Unsupervised Channel Adaptation For Language Identification Using Co-training", ICASSP, Vancouver, May, 2013.
- S. Ganapathy**, M. Omar and J. Pelecanos, "Noisy Channel Adaptation in Language Identification", IEEE SLT, Miami, Dec, 2012.
- S. Ganapathy** and H. Hermansky, "Robust Phoneme Recognition Using High Resolution Temporal Envelopes", Interspeech, Portland, Sept. 2012.
- S. Thomas, **S. Ganapathy**, A. Jansen and H. Hermansky, "Data-driven Posterior Features for Low Resource Speech Recognition Applications", Interspeech, Portland, Sept. 2012.
- S. Ganapathy**, S. Thomas and H. Hermansky, "Feature Extraction Using 2-D Autoregressive Models For Speaker Recognition", ISCA Speaker Odyssey, June 2012.
- S. Thomas, H. Mallidi, **S. Ganapathy** and H. Hermansky, "Adaptation Transforms of Auto-Associative Neural Networks as Features for Speaker Verification", ISCA Speaker Odyssey, June 2012.
- D. Gomero et al. "The UMD-JHU 2011 Speaker Recognition System", ICASSP, Japan, Mar. 2012.
- S. Thomas, **S. Ganapathy** and H. Hermansky, "Multilingual MLP Features For Low-resource LVCSR Systems", ICASSP, Japan, Mar. 2012.

- S. Ganapathy**, P. Rajan and H. Hermansky, "Multi-layer Perceptron Based Speech Activity Detection for Speaker Verification", IEEE WASPAA, Oct. 2011.
- H. Mallidi, **S. Ganapathy** and H. Hermansky, "Modulation spectrum analysis for recognition of reverberant speech", Interspeech, Italy, Aug. 2011.
- S. Ganapathy**, J. Pelecanos and M. Omar, "Feature Normalization for Speaker Verification in Room Reverberation", ICASSP, Prague, May 2011.
- S. Garimella, **S. Ganapathy** and H. Hermansky, "Sparse Auto-associative Neural Networks: Theory and Application to Speech Recognition", Interspeech, Japan, Sept. 2010.
- S. Thomas, **S. Ganapathy** and H. Hermansky, "Cross-lingual and Multi-stream Posterior Features for Low-resource LVCSR Systems", Proc. of Interspeech, Japan, Sept. 2010.
- S. Thomas, K. Patil, **S. Ganapathy**, N. Mesgarani, H. Hermansky, "A Phoneme Recognition Framework based on Auditory Spectro-Temporal Receptive Fields", Proc. of Interspeech, Japan, Sept. 2010.
- S. Ganapathy**, S. Thomas and H. Hermansky, "Robust Spectro-Temporal Features Based on Autoregressive Models of Hilbert Envelopes", ICASSP, Dallas, USA, March 2010.
- S. Ganapathy**, S. Thomas and H. Hermansky, "Comparison of Modulation Features For Phoneme Recognition", ICASSP, Dallas, USA, March 2010.
- S. Ganapathy**, S. Thomas, and H. Hermansky, "Temporal Envelope Subtraction for Robust Speech Recognition Using Modulation Spectrum", IEEE ASRU, 2009.
- S. Ganapathy**, S. Thomas, P. Motlicek and H. Hermansky, "Applications of Signal Analysis Using Autoregressive Models for Amplitude Modulation", IEEE WASPAA 2009.
- S. Ganapathy**, S. Thomas and H. Hermansky, "Static and Dynamic Modulation Spectrum for Speech Recognition", Proc. of Interspeech, Brighton, UK, Sept. 2009.
- S. Thomas, **S. Ganapathy** and H. Hermansky, "Tandem Representations of Spectral Envelope and Modulation Frequency Features for ASR", Proc. of Interspeech, Brighton, UK, Sept. 2009.
- S. Thomas, **S. Ganapathy** and H. Hermansky, "Phoneme Recognition Using Spectral Envelope and Modulation Frequency Features", ICASSP, Taiwan, April 2009.
- S. Ganapathy**, S. Thomas and H. Hermansky, "Front-end for Far-field Speech Recognition based on Frequency Domain Linear Prediction", Proc. of INTERSPEECH, Brisbane, Australia, Sep 2008.
- S. Thomas, **S. Ganapathy** and H. Hermansky, "Hilbert Envelope Based Spectro-Temporal Features for Phoneme Recognition in Telephone Speech", Proc. of INTERSPEECH, Brisbane, Australia, Sep 2008.

S. Ganapathy, P. Motlicek, H. Hermansky and H. Garudadri, "Spectral Noise Shaping: Improvements in Speech/Audio Codec Based on Linear Prediction in Spectral Domain", Proc. of INTERSPEECH, Brisbane, Australia, Sep 2008.

P. Motlicek, **S. Ganapathy**, H. Hermansky, H. Garudadri and Marios Athineos, "Perceptually motivated Sub-band Decomposition for FDLP Audio Coding", in Lecture Notes In Artificial Intelligence, Springer-Verlag Berlin, Heidelberg, 2008.

S. Thomas, **S. Ganapathy** and H. Hermansky, "Spectro-Temporal Features for Automatic Speech Recognition using Linear Prediction in Spectral Domain", Proc. of EUSIPCO, Lausanne, Switzerland, Aug 2008.

S. Ganapathy, P. Motlicek, H. Hermansky and H. Garudadri, "Autoregressive Modelling of Hilbert Envelopes for Wide-band Audio Coding", AES 124th Convention, Audio Engineering Society, May 2008.

S. Ganapathy, P. Motlicek, H. Hermansky and H. Garudadri, ""Temporal Masking for Bit-rate Reduction in Audio Codec Based on Frequency Domain Linear Prediction", Proc. of ICASSP, April 2008.

S. Thomas, **S. Ganapathy** and H. Hermansky, "Hilbert Envelope Based Features for Far-Field Speech Recognition", Lecture Notes in Computer Science, Springer Berlin, Heidelberg 2008.

P. Motlicek, H. Hermansky, **S. Ganapathy** and H. Garudadri, "Frequency Domain Linear Prediction for QMF Sub-bands and Applications to Audio Coding", Lecture Notes in Computer Science, Springer Berlin, Heidelberg 2007.

P. Motlicek, H. Hermansky, **S. Ganapathy** and H. Garudadri, "Non- Uniform Speech/Audio Coding Exploiting Predictability of Temporal Evolution of Spectral Envelopes", Lecture Notes in Computer Science, Springer Berlin, Heidelberg 2007.