

- RESEARCH INTERESTS** My research interests are mainly in the application of machine learning and statistical modeling to speech and audio signal analysis. I am currently working on emotional speech generation. Our goal is to develop data-efficient models by combining Bayesian techniques (prior knowledge) with modern deep learning machinery in un/semi-supervised settings.
- EDUCATION**
- Johns Hopkins University, Baltimore** (2017 - present)
Ph.D. candidate, Department of Electrical and Computer Engineering
Advisor: Dr. Archana Venkataraman
- Johns Hopkins University, Baltimore** (2022 - 2023)
M.S.E. in Applied Mathematics and Statistics (Statistics major)
Advisor: Prof. Amitabh Basu
- Indian Institute of Technology, Guwahati** (2011 - 2015)
Bachelors in Technology in Electronics and Electrical Engineering
Advisors: Prof. S.R.M Prasanna (Dean, RnD) and Prof. S. Sundaram
- HONOURS & AWARDS**
- MINDS Data Science Research Fellowship (2019-20 and 2020-21)**
Received for 'Diffeomorphic Time Warping for Duration Modification'. Awarded annually for mathematical contribution in advancing machine learning and data science.
- ISCA 2020 Travel Award**
Recognized for our technical contributions in the chained Encoder-Decoder-Predictor model based on reviewer's comments.
- NVIDIA Research Fellowship**
Our proposal titled 'AI for Mental Health and Speech Disorder' featured among the top 5% proposals in a pool of >350 applicants.
- Graduate Research Fellowship, JHU, 2017-18**
JHU award for PhD students to recognize their research contribution in the domain of Electrical Engineering.
- UofA Research Fellowship, 2015**
Awarded by University of Alberta for doing research in Computer Science (**Declined**).
- Institute Merit Scholarship, 2012-13**
Awarded to a single student annually for the best academic performance.
- DAAD-WISE Fellowship, 2014**
Fellowship for doing a summer research internship in Germany (selection based on academic performance and prior research experience).
- Merit-Cum-Means Scholarship, 2012-13, 2013-14 and, 2014-15**
This award recognizes students from lower income group and unprivileged households for strong academic performance.
- Cepstrum Graduation Award, IIT Guwahati, 2015**
Awarded to 3 students every year from EEE graduating batch for student services.
- Summer Research Support, IIT Hyderabad, 2013**
Summer research internship program at IIT Hyderabad under Dr. K.S.R Murthy.

TALKS & POSTERS

Improving Speech Enhancement via Phonetic Embeddings (SSL)
MLCV Seminar, Meta Reality Labs (August 2022)

Generative Modeling of Prosody for Expressive Speech Synthesis
Weill Cornell Medicine, New York (July 2023)
Children’s National Hospital, Washington DC (April 2023)
ECE Seminar, JHU (May 2022)
MINDS Symposium, JHU (March 2022)
Ohio State University, CS Seminar (November 2021)
Meta Reality Labs, Redmond, Washington (November 2021)
Microsoft Research, Redmond, Washington (October 2021)
AAII, India (October 2021)

Variational Cycle-GAN for Emotion Morphing
MINDS-CIS Seminar, JHU (May 2020)

Emotion Morphing in Speech
2020 MINDS Symposium, Baltimore (January 2020)
School of Medicine, JHU (February 2020)

An Overview of Generative Models
Machine Learning Journal Club, JHU (June 2020)

Lightning Presentation: MFCCs
Information Extraction, JHU (March 2019)

SKILLS
Statistical Modeling, Python, TensorFlow, PyTorch

RESEARCH ARTICLES

A closer look at Wav2Vec2 Embeddings for Single-channel Speech Enhancement
Ravi Shankar, Ke Tan, Buye Xu, Anurag Kumar
Work done at Facebook (Under Submission).

A Diffeomorphic Flow-based Variational Model for Emotion Conversion
Ravi Shankar, Hsi-Wei Hsieh, Nicholas Charon, Archana Venkataraman
Accepted in IEEE/ACM Transactions for Audio, Speech and Language Processing

Adaptive Duration Modification of Speech using Masked Convolutional Networks and Open-Loop Time Warping
Ravi Shankar, Archana Venkataraman
ISCA Speech Synthesis Workshop 2023

Comparative Study of Data Augmentation for Deep Learning Based Emotion Recognition
Ravi Shankar, Abdouh Harouna Kenfack, Arjun Somayazulu, Archana Venkataraman
arXiv Preprint: <https://arxiv.org/abs/2211.05047>

Non-parallel Emotion Conversion using a Deep-Generative Hybrid Network and an Adversarial Pair Discriminator
Ravi Shankar, Jacob Sager, Archana Venkataraman
Published in Interspeech 2020. (Held Virtually)

Multi-speaker Emotion Conversion via Latent Variable Regularization and A Chained Encoder-Decoder-Predictor Network (ISCA Award)
Ravi Shankar, Hsi-Wei Hsieh, Nicolas Charon, Archana Venkataraman
Published in Interspeech 2020. (Held Virtually)

A Multi-Speaker Emotion Morphing Model Using Highway Networks and Maximum Likelihood Objective

Ravi Shankar, Jacob Sager, Archana Venkataraman

Published in Interspeech 2019. (**Oral**)

VESUS: A Crowd-Annotated Database to Study Emotion Production and Perception in Spoken English

Jacob Sager, **Ravi Shankar**, Archana Venkataraman

Published in Interspeech 2019. (**Oral**)

Weakly Supervised Syllable Segmentation by Vowel-Consonant Peak Classification

Ravi Shankar, Archana Venkataraman

Published in Interspeech 2019. (Poster)

Automated Emotion Morphing in Speech Based on Diffeomorphic Curve Registration and Highway Networks

Ravi Shankar, Hsi-Wei Hsieh, Nicolas Charon, Archana Venkataraman

Published in Interspeech 2019. (Poster)

Spoken Keyword Detection Using Joint DTW-CNN

Ravi Shankar, Vikram C.M., S.R.M Prasanna

Published in Interspeech 2018. (**Oral**)

Spoken Term Detection using DTW and Morphological Operations

Ravi Shankar, Arpit Jain, Deepak K.T., Vikram C.M., S.R.M Prasanna

Published in National Conference on Communications 2016. (Poster)

WORK EXPERIENCE	Research Scientist Intern, Meta Reality Labs, Redmond	(May'22 - Aug'22)
	Analyze the usage of SSL embeddings for speech enhancement.	
	Research Assistant, IDIAP Institute, Martigny	(Jan'17 - Jun'17)
	Study the effect of continuity in acoustic features in HMM-DNN models.	
	Research Assistant, IIT Guwahati	(Sep'16 - Dec'16)
	Proposed joint DTW-CNN framework for keyword spotting in speech.	
	Rails Developer, CaRPM, Gurgaon	(Jan'16 - Aug'16)
Developed module for analysis of used cars to gauge their resale value.		
Research Assistant, AICML, UofA	(Sep'15 - Jan'16)	
Worked on patient specific survival prediction using machine learning.		
iOS Developer, Housing.com, Mumbai	(Jun'15 - Sep'15)	
Developed new features for property rental in the native iOS app.		
MENTORING	Abdouh Harouna Kenfack , MSE in Dept. of Applied Math, JHU	
	Yi-Te Hsu , MSE in Dept. of Computer Science, JHU	
	Arjun Somayazulu , BS in Dept. of Computer Science, JHU	
	Jacob Sager , BS in Dept. of Electrical and Computer Engineering, JHU	

SERVICES

TA, **Probabilistic Machine Learning** (EN.520.651) (Fall'21, Fall'22)

Reviewer, **NeuRips** 2022, 2023

Reviewer, **UAI** 2023

Reviewer, **ICLR** 2022

Reviewer, **Interspeech** 2021, 2022, 2023

Reviewer, **CISS** 2021

REFERENCES

Dr. Archana Venkataraman, **Associate Professor, ECE**, BU

Dr. Nicolas Charon, **Assistant Professor, AMS**, JHU

Dr. Amitabh Basu, **Associate Professor, AMS**, JHU

Dr. Anurag Kumar, **Senior Research Scientist**, Meta Reality Labs

Dr. Mounya Elhilali, **Professor, ECE**, JHU

Dr. Sanjeev Khudanpur, **Associate Professor, ECE**, JHU