BIOGRAPHICAL SKETCH

NAME: Bhiksha Raj Ramakrishnan

eRA COMMONS USER NAME (credential, e.g., agency login): N/A

POSITION TITLE: Professor (Tenured), Fellow IEEE, Language Technologies Institute, Carnegie Mellon University

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
Carnegie Mellon University, USA	Ph.D	2000	Electrical and Computer Engineering
Indian Institute of Technology, Madras, India	M.Tech.	1990	Electrical Engineering
Osmania University, India	B.E.	1988	Electrical Engineering

A. Professional Appointments and Accomplishments

Positions and Employment

2016–	Professor: Language Technologies Institute, School of Computer Science, CMU Professor (by courtesy): Electrical and Computer Engineering Department, Carnegie Institute of Technology, CMU Affiliate faculty: Machine Learning Department, School of Computer Science, CMU
2009–2016	Associate Professor: Language Technologies Institute, School of Computer Science, CMU
2001–2008	Principal Research Scientist and head of speech research, Mitsubishi Electric Research Labs, Cambridge, MA, USA
2000–2001	Research Scientist, Compaq Computer Corp., Cambridge Research Lab (CRL), Cambridge, MA, USA
1994	Visiting Researcher as a United Nations Development Program fellow, Carnegie Mellon University, USA
1991–1994	Research Scholar, Tata Institute of Fundamental Research, Bombay (now Mumbai), India
1990–1991	Senior System Scientist, Indian Institute of Technology, Madras, India

Honors

2022	Invited Speaker/Panelist, Digital India Dialogues Capacity Building Workshop for Government Leaders, March 2022. Personal invitation by the Ministry of Electronics and Information Technology, Government of India.
2020	Invited Speaker/Panelist, RAISE 2020. Personal invitation by the Ministry of Electronics and Information Technology, Government of India.
2018	IEEE Distinguished lecturer for Japan.
2017	Elected Fellow of the IEEE.
2015	Distinguished visiting scientist, Govt. of Kerala, India.

B. Teaching:Courses

1. Introduction to Deep Learning (11-785, 11-685, 11-485, 18-786), CMU Pittsburgh, CMU Silicon Valley, CMU Doha, CMU Adelaide, and CMU Africa, Every semester, since Fall 2016, Spring 2013-2015.
2. Machine Learning for Signal Processing (11-755, 18797), CMU Pittsburgh, CMU Silicon Valley, CMU Africa, Every fall semester since 2009.
3. Language and Statistics (11-661, 11-761), CMU Pittsburgh, Fall 2018, Fall 2019.

4. Structured Prediction for Language and Other Discrete Data (10-710, 11-763), Carnegie Mellon University, Spring 2018.
5. Machine Learning (10-601), Carnegie Mellon University, Qatar, Spring 2016, Spring 2017.
6. Mathematical Foundations for Data Science (11-691), Carnegie Mellon University, Fall 2015.
7. Algorithms for Security and Privacy (11-795), Carnegie Mellon University, Spring 2010, 2012.
8. Design and Implementation of Speech Recognition Systems (11-756, 18-799D), Carnegie Mellon University, Spring 2010-2015.
9. Digital Signal Processing for Computer Scientists (11-465, 15-423), Carnegie Mellon University, Spring 2013-2015.
10. Computer Music Systems and Information Processing (15-623), Carnegie Mellon University, Spring 2014, Spring 2015.
11. Data Mining. Harvard University Extension School, Fall 2003, Fall 2005, Spring 2007.
12. Statistical Audio and Video Processing. Harvard University Extension School, Fall 2005.
13. I have also taught several mini courses to the defence agencies, companies such as Yahoo, Samsung, and LG, and at various universities in India, Chile and Doha.

C. Selected Publications

1. Olivier, R. and **Raj, B.**, 2021, November. Sequential Randomized Smoothing for Adversarially Robust Speech Recognition. In Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing (pp. 6372-6386).
2. Liu, W., Wen, Y., **Raj, B.**, Singh, R. and Weller, A., 2021. SphereFace Revived: Unifying Hyperspherical Face Recognition. arXiv preprint arXiv:2109.05565.
3. Wen, Y., Liu, W., Weller, A., **Raj, B.** and Singh, R., 2021. SphereFace2: Binary Classification is All You Need for Deep Face Recognition. arXiv preprint arXiv:2108.01513.
4. Deshmukh, S., **Raj, B.** and Singh, R., 2021. Improving weakly supervised sound event detection with self-supervised auxiliary tasks. arXiv preprint arXiv:2106.06858. In 22nd Annual Conference of the International Speech Communication Association (INTERSPEECH 2021), Brno, Czech Republic. pp. 596–600.
5. Olivier, R., **Raj, B.** and Shah, M., 2021, June. High-Frequency Adversarial Defense for Speech and Audio. In ICASSP 2021-2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (pp. 2995-2999). IEEE.
6. Shah, M.A., Olivier, R. and **Raj, B.**, 2021, June. Towards Adversarial Robustness Via Compact Feature Representations. In ICASSP 2021-2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (pp. 3845-3849). IEEE.

A List of my Published Work is available on Google Scholar: Bhiksha Raj

D. Research Funding: (Last three years (2018-2021))

Note: My research has been supported in the past by the Walt Disney Imagineering, US Air Force, IARPA, DARPA, NSF, Cisco, Bosch, Apple, NEC, Sony, Mitsubishi Electric Research Labs, Google Inc. Amazon Inc, Adobe and multiple other companies. The following list includes details of my grants in the past three years.

1. Facebook Research. Speech denoising with indirect supervision. Award amount: $254,000. Dec 2021 to Nov 2022.

2. Portuguese Science and Technology Foundation. Privacy in speaker diarization (PrivaDia): Detecting “who spoke when” privately. Award amount: $55,000. Jan 2021 to Dec 2021.
3. DARPA GARD. Guaranteeing AI Robustness against Deception (GARD) .Award amount: $664,360. Jan 2020 to Jul 2021.
4. Sony Research. DNN-based low-latency speech enhancement. Award amount: $100,000. Aug 2019 to Jun 2020.
5. Bosch Research. Identifying actions for sound event classification. Award amount: $150,000. Aug 2018 to Jun 2020.
6. Apple Research. Privacy-preserving voice processing. Award amount: $50,000. Aug 2019 to Jun 2020.
7. Portuguese Early Bird Discretionary Fund. Diarization of video recordings. Award amount: $23,000. Aug 2018 to Jun 2021.

   Other funding: In addition to the amounts listed above, between 2010 and 2018 I received over 3.5 million dollars in research funding. I have also received over 2 million dollars in discretionary funds from teaching large courses, to be used as research funding.

E. Ph.D Students Supervised

1. Manas Pathak, Ph.D. 2012. LTI, Carnegie Mellon University. Thesis title: Privacy-Preserving Machine Learning for Speech Processing.
2. Sourish Chaudhuri. Ph.D. 2013. LTI, Carnegie Mellon University. Thesis title: Structured Modelsfor Audio Content Analysis. (won Draper IR&D award for thesis work)
3. Sohail Bahmani, Ph.D. 2013. ECE, Carnegie Mellon University. Thesis title: Sparse Solutions for Nonlinear Optimization (won Bertucci fellowship, 2011)
4. Antonio Juarez, PhD Thesis. Machine Learning Department, CMU (incomplete). Thesis title: Semantic entity discovery in multimedia data.
5. Jose Portelo, Ph.D 2014. Thesis title: INESC, Portugal. Thesis title: Privacy-Perserving Voice Biometrics. (Cosupervised with Isabel Trancoso and Alberto Abad)
6. Nia Bradley. Ph.D 2017. ECE, Carnegie Mellon University. Thesis title: Collaborative Communication Interruption Management System (C-CIMS): Modeling Interruption Timings via Pprosodic and Topic Modeling for Human-Machine Teams.
7. Anurag Kumar. Ph.D 2018. LTI, Carnegie Mellon University. Thesis title: Acoustic Intelligence in Machines.
8. Abelino Jimenez. Ph.D 2019. ECE, Carnegie Mellon University. Thesis title: An Information Theoretic Approach for Privacy Preservation in Distance-based Machine Learning.
9. George Philipp. Ph.D 2020 (co-supervised with Jaime Carbonell). CSD, Carnegie Mellon University. Thesis title: The Nonlinearity Coefficient - A Practical Guide to Neural Architecture Design.
10. Joanna Correia. Ph.D 2021 (co-supervised with Isabel Trancoso). INESC, Portugal. Thesis title: In-the-wild detection of speech-affecting diseases.
11. Anders Oland. Ph.D expected in Spring 2022 (co-supervised with Roger Dannenberg). CSD, Carnegie Mellon University. Thesis title: Efficient deep learning.
12. Wenbo Liu. Ph.D expected in Spring 2022 (co-supervised with Ming Li). ECE Department, Carnegie Mellon University. Thesis title: Identifying Autism Spectrum Disorder with Multimodal Behavior Analysis.
13. Francisco Teixeira. Ph.D expected in 2023 (co-supervised with Isabel Trancoso). INESC, Portugal. Thesis title: Privacy-preserving Machine Learning for Speech.