

Soumitro Chakrabarty

Curriculum Vitae

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Education

- 2013–present **PhD.** *International Audio Laboratories, Erlangen, part of Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany.*
Topic: Robust Direction-of-Arrival Estimation and Spatial Filtering in Noisy and Reverberant Environments.
Advisor: Prof. Dr. ir. Emanuel A. P. Habets
- 2010–2013 **MSc. in Computer Science** *Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland, GPA – 4.89/6.*
- 2006–2010 **B.E. in Electronics and Communication Engineering** *Manipal Institute of Technology Manipal, Karnataka, India, GPA – 9.14/10.*
- 1994–2006 **School Education** *DAV Public School NTS Barkakana, Hazaribagh, Jharkhand, India.*
Primary, middle and high school education

Work Experience

- Jan.2019–present **Research Employee** INTERNATIONAL AUDIO LABORATORIES/FRAUNHOFER IIS Erlangen.
Working on machinelearning for microphone array processing.
- Oct.2013–Dec.2018 **Research Assistant** INTERNATIONAL AUDIO LABORATORIES Erlangen.
Working on probabilistic directional filtering approaches for multi-microphone speech enhancement, and localization and tracking of acoustic sources in adverse acoustic environments.
- Apr.–Oct. 2013 **Research Intern** FRAUNHOFER IIS Erlangen.
Developed novel Kalman filter based approach for tracking of multiple non-concurrent sound sources in reverberant environments.
- Feb.–Aug. 2012 **Intern** TECHNICOLOR SA Hannover.
An existing Matlab/C++ toolbox for Higher order ambisonics(HOA) processing was connected to a user interface specifically built for the Eigenmike, a spherical microphone array. Also developed an efficient room impulse response simulation technique for the Eigenmike.
- Jul.–Aug. 2011 **Summer Intern** EPFL Lausanne.
Explored a novel approach of solving the issue of echo planar imaging (EPI) distortions in MRI reconstruction by performing the reconstruction in the image space and utilize the structure of the matrices involved, in the model based approach to reconstruction.

Research Interests

- Speech Enhancement
- Microphone Array Processing
- Machine Learning
- Acoustic Source Localization

Invited Talks

- 2017 **Speaker Localization using Convolutional Neural Networks Trained with Noise** *Ohio State University*, December 2017.

Journal Publications

- 2019 **S. Chakrabarty** and E. A. P. Habets, "Time-Frequency Masking Based Online Multi-Channel Speech Enhancement with Convolutional Recurrent Neural Networks".
IEEE Journal on Selected Topics in Signal Processing, 2019.
- 2019 **S. Chakrabarty** and E. A. P. Habets, "Multi-Speaker DOA Estimation Using Deep Convolutional Networks Trained with Noise Signals".
IEEE Journal of Selected Topics in Signal Processing, vol. 13, no. 1, pp. 8-21, March 2019.
- 2019 F.R. Stoeter, **S. Chakrabarty**, B. Edler and E. A. P. Habets, "CountNet: Estimating the Number of Concurrent Speakers Using Supervised Learning".
IEEE/ACM Transactions on Audio, Speech, and Language Processing, vol. 27, no. 2, pp. 268-282, Feb. 2019.
- 2018 **S. Chakrabarty** and E. A. P. Habets, "A Bayesian Approach to Informed Spatial Filtering with Robustness Against DOA Estimation Errors".
IEEE/ACM Transactions on Audio, Speech, and Language Processing, Volume: 26, Issue: 1, Jan. 2018.
- 2016 **S. Chakrabarty** and E. A. P. Habets, "On the Numerical Instability of an LCMV Beamformer for a Uniform Linear Array".
IEEE Signal Processing Letters, Vol. 23(2); Pg. 272-276, 2016.

Conference Publications

- 2020 W. Mack, Ullas Bharadwaj, **S. Chakrabarty** and E. A. P. Habets, "Signal-Aware Broadband DOA Estimation Using Attention Mechanisms".
IEEE Intl. Conf. on Acoustics, Speech and Signal Processing (ICASSP), Calgary, Canada, 2020.
- 2019 **S. Chakrabarty** and E. A. P. Habets, "Multi-Scale Aggregation of Phase Information for Reducing Computational Cost of CNN Based DOA Estimation".
European Signal Processing Conference (EUSIPCO) 2019.
- 2018 **S. Chakrabarty** and E. A. P. Habets, "Time-frequency masking based online speech enhancement with multi-channel data using convolutional neural networks".
Intl. Workshop on Acoustic Echo Noise Control (IWAENC), Tokyo, Japan, 2018.
- 2018 W. Mack, **S. Chakrabarty**, F.R. Stoeter, S. Barun, B. Edler and E. A. P. Habets, "Single-Channel Dereverberation Using Direct MMSE Optimization and Bidirectional LSTM Networks".
Interspeech, Hyderabad, India, 2018.

- 2018 F.R. Stoeter, **S. Chakrabarty**, B. Edler and E. A. P. Habets, "Classification vs. Regression in supervised learning for single channel speaker count estimation".
IEEE Intl. Conf. on Acoustics, Speech and Signal Processing (ICASSP), Calgary, Canada, 2018.
- 2017 **S. Chakrabarty** and E. A. P. Habets, "Multi-Speaker localization using convolutional neural network trained with noise".
Machine Learning for Audio Processing (ML4Audio) Workshop at NIPS, USA, 2017.
- 2017 **S. Chakrabarty** and E. A. P. Habets, "Broadband DOA estimation using convolutional neural networks trained with noise signals".
IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA), New Paltz, New York, USA, 2017.
- 2016 **S. Chakrabarty** D. Pilakeezhu and E. A. P. Habets, "Head-orientation Compensation with Video-informed Single Channel Speech Enhancement".
Intl. Workshop on Acoustic Echo Noise Control (IWAENC), Xian, China, 2016.
- 2016 **S. Chakrabarty** O. Thiergart and E. A. P. Habets, "A Method to Analyze the Spatial Response of Informed Spatial Filters".
12. ITG Fachtagung Sprachkommunikation, Paderborn, Germany, 2016.
- 2015 **S. Chakrabarty** O. Thiergart and E. A. P. Habets, "A Bayesian approach to spatial filtering and diffuse power estimation for joint dereverberation and noise reduction".
IEEE Intl. Conf. on Acoustics, Speech and Signal Processing (ICASSP), Brisbane, Australia, 2015.
- 2014 **S. Chakrabarty** K. Kowalczyk, M. Taseska and E. A. P. Habets, "Extended Kalman filter with probabilistic data association for multiple non-concurrent speaker localization in reverberant environments".
IEEE Intl. Conf. on Acoustics, Speech and Signal Processing (ICASSP), Florence, Italy, 2014.

Awards

- 2017 **Best Student Paper Award**, *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*.
- 2017 **Student Travel Grant**, *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*.
- 2016 **Best Student Paper Award - Finalist** *IEEE Workshop on Acoustic Signal Enhancement (IWAENC)*.

Teaching

- 2014–2018 **Tutor** AudioLabs Lab Course.
Graduate level lab course
- 2016–2018 **Teaching Assistant** Speech Enhancement.
Graduate level course

Academic Service

Reviewer **Journals** IEEE/ACM Transactions on Audio, Speech and Language Processing, IEEE Transactions on Aerospace and Electronic Systems, IEEE Signal Processing Letters, Journal of Acoustic Society of America, IEEE Journal of Selected Topics in Signal Processing.

Conferences IWAENC (2016,2018), EUSIPCO (2019).

Computer skills

Basic OmniGraffle, Adobe InDesign, C/C++

Intermediate Python, \LaTeX

Advanced MATLAB

Languages

English **Proficient**

Hindi **Proficient**

Bengali **Mother Tongue**

German **Basic**