

## ARINDAM JATI

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CONTACT INFORMATION	3740 McClintock Avenue, Room EEB 100 University of Southern California Los Angeles, CA 90089-2560, USA	Cell: +1 (213) 716-1074 E-mail: jati@usc.edu Web-page: <a href="http://arindamjati.com/">http://arindamjati.com/</a>
RESEARCH INTERESTS	<b>Machine learning, Deep learning, Speech and Audio Processing, NLP, Multimodal Signal Processing</b> <ul style="list-style-type: none"><li>• Speech recognition, Speaker recognition, Speaker diarization,</li><li>• Natural language processing</li><li>• Audio event detection, Acoustic scene characterization</li><li>• Human behavioral signal processing, Multi-modal affective computing</li><li>• Adversarial attacks on deep neural nets and defenses</li></ul>	
EDUCATION	<b>University of Southern California (USC), Los Angeles, CA, USA</b> PhD candidate in <i>Ming Hsieh Department of Electrical and Computer Engineering</i> Current GPA: 3.91/4.0 Lab: <a href="#">SAIL</a> , Advisor: Prof. Shrikanth Narayanan Past lab: SCUBA, Advisor: Prof. Panayiotis Georgiou	2015 - present
	<b>University of Southern California (USC), Los Angeles, CA, USA</b> Master of Science (MS) in Electrical Engineering GPA: 3.91/4.0	2015 - 2017
	<b>Jadavpur University, Kolkata, India</b> Bachelor of Engineering (BE) in Electronics and Telecommunication Engineering GPA: 9.43/10.0	2009 - 2013
WORK EXPERIENCE	<b>Microsoft Research, Redmond, WA, USA</b> Research Intern in <i>Audio and Acoustics Research Group</i> Manager: Dr. Ivan Tashev, Mentor: Dr. Dimitra Emmanouilidou	May, 2019 to July, 2019
	<b>Sony Interactive Entertainment America LLC, San Mateo, CA, USA</b> AI Intern Manager: Dr. Ruxin Chen, Mentor: Dr. Naveen Kumar	June, 2018 to Aug, 2018
	<b>Polaris Networks, Kolkata, India</b> Software Engineer - II Software Engineer - I	July, 2014 to June, 2015 July, 2013 to June, 2014
	<b>School of Medical Science and Technology, IIT Kharagpur, India</b> Intern at <i>Biostatistics and Medical Informatics Laboratory</i> Advisor: Prof. Chandan Chakraborty	Dec, 2011 to Jan, 2012
	<b>Department of Electronics and Telecommunication Engineering</b> Jadavpur University, India Advisor: Prof. Amit Konar	2009 to 2013

TEACHING  
EXPERIENCE

**Teaching Assistant (TA)**

USC EE 599: Deep Learning

Spring 2019

**Teaching Assistant (TA)**

USC EE 599: Deep Learning Lab for Speech Processing

Fall 2018

**Teaching Assistant (TA)**

USC EE 559: Mathematical Pattern Recognition

Spring 2018

**Teaching Assistant (TA)**

USC EE 483: Digital Signal Processing

Fall 2017

MAJOR PROJECTS

- **[Ongoing] Adversarial attacks on deep neural nets and defense strategies:** With a focus on speaker recognition systems.  
*Program:* [DARPA GARD](#) *Relevant publications:* [Adversarial Speaker ID](#)
- **[Ongoing] Acoustic scene characterization:** Detecting dynamically varying background acoustic scenes from wearable audio badges in workplace setting.  
*Program:* [IARPA MOSAIC](#)
- **[Ongoing] Robust speaker recognition:** Speaker recognition in noisy and far-field environment, disentanglement of nuisance factors from speaker embeddings.  
*Relevant publications:* [Multi-task DNN-TVM](#), [UAI](#)
- **[Past] Audio event identification and quantization:** Machine learning to identify audio events in the environments, and finding suitable quantized representations for efficient retrieval.  
*Relevant publications:* [Hierarchical audio events](#), [Deep audio hashing](#)
- **[Past] Unsupervised learning of speaker characteristics:** Training deep neural networks that can learn speaker-specific characteristics from unlabeled multi-speaker audio streams, and its application on speaker recognition and diarization.  
*Relevant publications:* [Speaker2Vec](#), [NPC](#), [NPC-RNN](#)
- **[Past] Behavioral signal processing:** Exploration of multi-modal cues from speech and physiology for characterizing affective states and traits of humans.  
*Relevant publications:* [Stressful conversations](#), [Depression detection](#)

PUBLICATIONS

([GOOGLE SCHOLAR](#))

1. **Arindam Jati**, Chin-Cheng Hsu, Monisankha Pal, Raghuveer Peri, Wael AbdAlmageed, Shrikanth Narayanan, “*Adversarial Attack and Defense Strategies for Deep Speaker Recognition Systems*”, Under review in Elsevier Computer Speech and Language. [arXiv preprint](#)
2. **Arindam Jati**, Amrutha Nadarajan, Raghuveer Peri, Karel Mundnich, Tiantian Feng, Benjamin Girault, and Shrikanth Narayanan, “*Temporal Dynamics of Workplace Acoustic Scenes: Egocentric Analysis and Prediction*”, Under review in IEEE/ACM Transactions on Audio, Speech, and Language Processing.
3. **Arindam Jati**, and Dimitra Emmanouilidou, “*Supervised Deep Hashing for Efficient Audio Event Retrieval*”, In ICASSP 2020. [PDF](#)
4. Raghuveer Peri, Haoqi Li, Krishna Somandepalli, **Arindam Jati**, and Shrikanth Narayanan, “*An empirical analysis of information encoded in disentangled neural speaker representation*”, in Odyssey: The Speaker and Language Recognition Workshop, 2020. [PDF](#)
5. **Arindam Jati**, Amrutha Nadarajan, Karel Mundnich, and Shrikanth Narayanan, “*Characterizing dynamically varying acoustic scenes from egocentric audio recordings in workplace setting*”. [arXiv preprint](#)

6. Raghuveer Peri, Monisankha Pal, **Arindam Jati**, Krishna Somandepalli, and Shrikanth Narayanan, “*Robust speaker recognition using unsupervised adversarial invariance*”, In ICASSP 2020. [PDF](#)
7. **Arindam Jati**, Raghuveer Peri, Monisankha Pal, Tae Jin Park, Naveen Kumar, Ruchir Travadi, Panayiotis Georgiou, and Shrikanth Narayanan, “*Multi-task Discriminative Training of Hybrid DNN-TVM Model for Speaker Verification with Noisy and Far-Field Speech*”, In Interspeech 2019. [PDF](#)
8. Krishna Somandepalli, Naveen Kumar, **Arindam Jati**, Panayiotis Georgiou and Shrikanth Narayanan, “*Multiview Shared Subspace Learning across Speakers and Speech Commands*”, In Interspeech 2019. [PDF](#)
9. **Arindam Jati**, Naveen Kumar, Ruxin Chen, and Panayiotis Georgiou, “*Hierarchy-Aware Loss Function on a Tree Structured Label Space for Audio Event Detection*”, In ICASSP 2019. [PDF](#)
10. **Arindam Jati** and Panayiotis Georgiou, “*An unsupervised neural prediction framework for learning speaker embeddings using recurrent neural networks*”, In Interspeech, 2018. [PDF](#)
11. **Arindam Jati** and Panayiotis Georgiou, “*Neural Predictive Coding using Convolutional Neural Networks towards Unsupervised Learning of Speaker Characteristics*”, in IEEE/ACM Transactions on Audio, Speech, and Language Processing, vol. 27, no. 10, pp. 1577-1589, Oct. 2019. doi: 10.1109/TASLP.2019.2921890, 2018. [arXiv](#) [PDF](#)
12. **Arindam Jati**, Paula G. Williams, Brian Baucom and Panayiotis Georgiou, “*Towards Predicting Physiology from Speech During Stressful Conversations: Heart Rate and Respiratory Sinus Arrhythmia*”, In ICASSP, 2018. [PDF](#)
13. **Arindam Jati** and Panayiotis Georgiou, “*Speaker2Vec: Unsupervised Learning and Adaptation of a Speaker Manifold using Deep Neural Networks with an Evaluation on Speaker Segmentation*”, Proceedings of Interspeech, 2017. [PDF](#)
14. Md Nasir, **Arindam Jati**, Prashanth Gurunath Shivakumar, Sandeep Nallan Chakravarthula, and Panayiotis Georgiou, “*Multimodal and Multiresolution Depression Detection from Speech and Facial Landmark Features*”, Proceedings of the 6th ACM International Workshop on Audio/Visual Emotion Challenge (AVEC). ACM, 2016. [PDF](#)

#### TALKS

1. “*Supervised Deep Hashing for Efficient Audio Retrieval*”, at Microsoft Research, Redmond, WA, USA. ([YouTube link](#))

#### CODES

1. Adversarial attack and defense strategies for deep speaker recognition systems: <https://github.com/usc-sail/gard-adversarial-speaker-id>

#### PATENTS FILED

1. **Arindam Jati**, Naveen Kumar, Ruxin Chen, “*Sound Categorization System*”, US Patent filed, 2018. [US20200104319A1](#)
2. Justice Adams, **Arindam Jati**, Sudha Krishnamurthy, Masanori Omote, Jian Zheng, Naveen Kumar, Min-Heng Chen, Ashish Singh, “*Action description for on-demand accessibility*”, US Patent filed, 2018. [US20200129860A1](#)
3. Sudha Krishnamurthy, Justice Adams, **Arindam Jati**, Masanori Omote, Jian Zheng, “*Scene annotation using machine learning*”, US Patent filed, 2018. [US20200134316A1](#)
4. Ashish Singh, Justice Adams, **Arindam Jati**, Masanori Omote, “*Color accommodation for on-demand accessibility*”, US Patent filed, 2018. [US20200135052A1](#)
5. Naveen Kumar, Justice Adams, **Arindam Jati**, Masanori Omote, “*Textual annotation of acoustic effects*”, US Patent filed, 2018. [US20200137463A1](#)

6. Sudha Krishnamurthy, Ashish Singh, Naveen Kumar, Justice Adams, **Arindam Jati**, Masanori Omote, “*Graphical style modification for video games using machine learning*”, US Patent filed, 2018. [US20200134929A1](#)

RELEVANT GRADUATE COURSES	<div>Digital signal Processing</div> <div>Probability</div> <div>Random processes</div>	<div>Pattern recognition</div> <div>Machine learning</div> <div>Natural language processing</div>	<div>Algorithms</div> <div>Affective computing</div> <div>Wavelets and graph signal processing</div>
COURSE PROJECTS	<ul style="list-style-type: none"> <li>• Wavelets and graph signal processing: Sparse Representation of Deep Neural Network Embeddings for Speaker Identification</li> <li>• Affective Computing: End-To-End Speech Negotiations with Affective Speech Rollout</li> <li>• Pattern Recognition: Predicting Readmission of Diabetic Patients from Medical Records</li> <li>• Machine Learning: Santander Customer Satisfaction Classification</li> <li>• Natural language processing: Automatic Solver for Mad Gab - A Language Game</li> </ul>		
SKILLS	<p><b>Programming:</b> Python, C/C++, Bash, MATLAB</p> <p><b>Machine learning tools:</b> Pytorch, Keras, Tensorflow, Scikit-learn</p> <p><b>Machine learning on clusters:</b> Amazon AWS, Microsoft Azure, <a href="#">USC HPCC</a></p> <p><b>Speech and NLP tools:</b> <a href="#">KALDI Speech recognition toolkit</a>, <a href="#">OpenSMILE</a>, <a href="#">OpenFST</a></p> <p><b>Other tools:</b> SPSS, Git, LaTeX</p> <p><b>OS:</b> Unix, Windows</p>		
JOURNAL/ CONFERENCE REVIEWER	<ul style="list-style-type: none"> <li>• IEEE/ACM Transactions on Audio, Speech, and Language Processing</li> <li>• IEEE Signal Processing Letters</li> <li>• IEEE Access</li> <li>• 20th ACM International Conference on Multimodal Interaction (ICMI 2018)</li> <li>• EURASIP Journal on Audio, Speech, and Music Processing</li> <li>• Springer Signal, Image and Video Processing</li> </ul>		
MAJOR AWARDS	<ul style="list-style-type: none"> <li>• Honorable mention for Best Teaching Assistant (TA) award, 2019 at USC.</li> <li>• Honorable mention (3<sup>rd</sup> place) in Summer 2018 Hackathon at Sony Interactive Entertainment America LLC.</li> <li>• Received ISCA travel grant award for students and young scientists for Interspeech 2017 conference.</li> <li>• Received Annenberg PhD Fellowship at USC.</li> </ul>		

1. **Arindam Jati**, Garima Singh, Subhranil Koley, Amit Konar, A. K. Ray, Chandan Chakraborty, "*A novel segmentation approach for noisy medical images using Intuitionistic fuzzy divergence with neighbourhood-based membership function*", Journal of Microscopy, Wiley, 2014.
2. Anwesha Khasnobish, **Arindam Jati**, Garima Singh, Amit Konar and D. N. Tibarewala, "*Object-shape recognition by tactile image analysis using support vector machine*", International Journal of Pattern Recognition and Artificial Intelligence, World Scientific, 2014.
3. **Arindam Jati**, Garima Singh, Rashmi Mukherjee, Madhumala Ghosh, Amit Konar, Chandan Chakraborty, Atulya K. Nagar, "*Automatic leukocyte nucleus segmentation by intuitionistic fuzzy divergence based thresholding*", Micron, Elsevier, 2014.
4. Anwesha Khasnobish, Garima Singh, **Arindam Jati**, Amit Konar & D. N. Tibarewala, "*Object-shape recognition and 3D reconstruction from tactile sensor images*", Medical & Biological Engineering & Computing, Springer, 2014.
5. Anwesha Khasnobish, **Arindam Jati**, Garima Singh, Saugat Bhattacharyya, Amit Konar, D. N. Tibarewala, Eunjin Kim, Atulya K. Nagar, "*Object-shape recognition from tactile images using a feed-forward neural network*", The International Joint Conference on Neural Networks (IJCNN), IEEE, 2012.
6. **Arindam Jati**, Garima Singh, Pratyusha Rakshit, Amit Konar, Eunjin Kim, Atulya K. Nagar, "*A hybridisation of Improved Harmony Search and Bacterial Foraging for multirobot motion planning*", IEEE Congress on Evolutionary Computation 2012: 1-8.
7. Anwesha Khasnobish, Saugat Bhattacharyya, Garima Singh, **Arindam Jati**, Amit Konar, D. N. Tibarewala, R. Janarthanan, "*The Role of Empirical Mode Decomposition on Emotion Classification Using Stimulated EEG Signals*", International Conference on Advances in Computing and Information Technology (ACITY), 2012.
8. Garima Singh, **Arindam Jati**, Anwesha Khasnobish, Saugat Bhattacharyya, Amit Konar, D. N. Tibarewala and Atulya Nagar, "*Object Shape Recognition from Tactile Images Using Regional Descriptors*", Fourth World Congress on Nature and Biologically Inspired Computing (NaBIC), IEEE, 2012.
9. Garima Singh, **Arindam Jati**, Anwesha Khasnobish, Saugat Bhattacharyya, Amit Konar, D. N. Tibarewala and R. Janarthanan, "*Negative emotion recognition from stimulated EEG signals*", International Conference on Computing Communication & Networking Technologies (ICCCNT), IEEE, 2012.
10. Garima Singh, **Arindam Jati**, Anwesha Khasnobish, Saugat Bhattacharyya, Amit Konar, D. N. Tibarewala, R. Janarthanan, "*A Comparative Analysis of Emotion Recognition from Stimulated EEG Signals*", Second International Conference on Soft Computing for Problem Solving (SocProS), December, 2012.
11. Garima Singh, Anwesha Khasnobish, **Arindam Jati**, Saugat Bhattacharyya, Amit Konar, D. N. Tibarewala and R. Janarthanan, "*Object-shape classification and reconstruction from tactile images using image gradient*", International Conference on Emerging Applications of Information Technology (EAIT), 2012.
12. Anisha Halder, **Arindam Jati**, Garima Singh, Amit Konar, Aruna Chakraborty, Ramadoss Janarthanan. "*Facial Action Point Based Emotion Recognition by Principal Component Analysis*", The International Conference on Soft Computing for Problem Solving (SocProS), 2011.