

ARINDAM JATI

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, arindamjati@gmail.com Web-page: http://arindamjati.com/
RESEARCH INTERESTS	Machine Learning & Deep Learning: Deep Representation Learning, Unsupervised and Self-supervised Learning, Hierarchical Representations, Multi-task Learning Adversarial Attacks: Adversarial Attack on Deep Neural Nets, Defense Strategies Speech & Audio Processing: Speech Recognition, Speaker Recognition, Speaker Diarization, Audio Event Detection, Acoustic Scene Classification Multimodal Signal Processing: Human Behavioral Signal Processing, Affective Computing Search & Retrieval: Hashing, Quantization, Deep Hashing Natural Language Processing, Computer Vision	
EDUCATION	University of Southern California (USC), Los Angeles, CA, USA PhD candidate in <i>Department of Electrical and Computer Engineering</i> Current GPA: 3.91/4.0	2015 - present
	University of Southern California (USC), Los Angeles, CA, USA Master of Science (MS) in <i>Electrical Engineering</i> GPA: 3.91/4.0	2015 - 2017
	Jadavpur University, Kolkata, India Bachelor of Engineering (BE) in <i>Electronics and Telecommunication Engineering</i> GPA: 9.43/10.0	2009 - 2013
WORK EXPERIENCE	University of Southern California (USC), Los Angeles, CA, USA Graduate Research Assistant Lab: <i>SAIL</i> , Advisor: Prof. Shrikanth Narayanan Past Lab: <i>SCUBA</i> , Advisor: Prof. Panayiotis Georgiou Topics: Investigating Sources of Variability in Audio, Learning Robust Representation	Aug 2015 - present
	Microsoft Research, Redmond, WA, USA Research Intern in <i>Audio and Acoustics Research Group</i> Manager: Dr. Ivan Tashev, Mentor: Dr. Dimitra Emmanouilidou Topic: Deep Hashing for Efficient Audio Event Retrieval	May - July, 2019
	Sony Interactive Entertainment, San Mateo, CA, USA AI Intern Manager: Dr. Ruxin Chen, Mentor: Dr. Naveen Kumar Topic: Deep Neural Networks for Hierarchical Audio Event Classification	June - Aug, 2018
	Polaris Networks, Kolkata, India Software Engineer - II Software Engineer - I Topics: 4G LTE Communication Networks, Node Emulators, Test Tools	July, 2014 to June, 2015 July, 2013 to June, 2014
	School of Medical Science and Technology, IIT Kharagpur, India Undergrad Intern at <i>Biostatistics and Medical Informatics Laboratory</i> Advisor: Prof. Chandan Chakraborty	Dec, 2011 to Jan, 2012

Topic: Medical Image Segmentation

Department of Electronics and Telecommunication Engineering

Undergrad Researcher at Jadavpur University, India

2009 to 2013

Advisor: Prof. Amit Konar

Topics: Pattern Recognition Applications with EEG & Tactile Signals

MAJOR PROJECTS
DURING PHD

- **[Ongoing] Adversarial attacks & defenses:** Attacking Deep Neural Networks with adversarial perturbations, and corresponding defense strategies. 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](#)

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](#)

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](#)

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

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