

Aparna Balagopalan

Website: <https://aparna-b.github.io/researcher/>
Google Scholar: [Link](#)

Email : aparnab@mit.edu
Github: <https://github.com/Aparna-B>

PERSONAL STATEMENT

My research interests are in developing trustworthy machine learning techniques for healthcare applications by re-evaluating and surfacing assumptions in machine learning-based measurements. Machine learning models are often not transparent, and the opacity hides a variety of malicious phenomenon, such as encoding human biases. The fields of model robustness and fairness focus on *measuring* and developing techniques to circumvent these. My work aims to introspect the core definitions of these socially-relevant measurements, particularly in the scope where users are interacting with models to make actionable decisions, and studying these through an HCI+AI lens.

EDUCATION

- **Massachusetts Institute of Technology** Cambridge, USA
Ph.D. in EECS; Advisor: Prof. Marzyeh Ghassemi Jan 2022 -
- **University of Toronto (transferred)** Toronto, Canada
Ph.D. in Computer Science; Advisor: Prof. Marzyeh Ghassemi Sep 2020 - 2021
- **University of Toronto** Toronto, Canada
MSc. in Applied Computing Sep 2017 - Jan 2019
- **Indian Institute of Technology, Guwahati** Guwahati, India
Bachelor of Technology Jul 2013 - May 2017

EXPERIENCE

- **Max Planck Institute for Security and Privacy** Bochum, Germany
Visiting Scholar May 2021 – July 2021
 - **Responsible Computing Group:** Project involved understanding the core constructs and measurements in machine learning-based ranking systems.
- **Winterlight Labs** Toronto, Canada
Research Engineer, Machine Learning Jan 2019 - Aug 2020
 - **Machine Learning Research Team:** Worked in the machine learning research team on the detection and monitoring of cognitive impairment and mental health conditions from speech.
- **Philips Innovation Campus** Bengaluru, India
Research Intern May 2017 - July 2017
 - **Research and Development Division:** Worked in the research division on the application of signal processing and machine learning to healthcare.
- **Technische Universitat Dresden** Dresden, Germany
Visiting Scholar May 2016 – July 2016
 - **Computer Vision Lab & Computer Graphics Lab:** Project involved visualization of Convolutional Neural Networks (CNNs) at a layer level in 3D by particle rendering. Developed gradient-based importance measure for each filter with respect to output classification in a CNN (using Caffe)
- **Indian Institute of Science** Bengaluru, India
Research Intern May 2015 – July 2015
 - **Department of Electrical & Communication Engineering:** Project involved implementation of various machine learning algorithms in Theano. Analyzed how information is captured in Convolutional Neural Networks using entropy calculations.

PEER-REVIEWED PUBLICATIONS

- **Balagopalan, A.**, Madras, D., Yang, D., Hadfield-Menell, D., Hadfield, G., and Ghassemi, M. “Judging Facts, Judging Norms: Training Machine Learning Models to Judge Humans Requires a Modified Approach to Labeling Data.”. *Sci. Adv.* 9, (2023)
- **Balagopalan, A.**, Jacobs, A. Z., and Biega, A. “The Role of Relevance in Fair Ranking”, SIGIR 2023
- Robin, J., Xu, M., **Balagopalan, A.**, Novikova, J., Kahn, L., Oday, A., Hejrati, M., Hashemifar, S., Negahdar, M., Simpson, W. and Teng, E., 2023. Automated detection of progressive speech changes in early Alzheimer’s disease. *Alzheimer’s & Dementia: Diagnosis, Assessment & Disease Monitoring*, 15, (2023)
- Adam, H., **Balagopalan, A.**, Alsentzer, E., Christia, F., and Ghassemi, M., “Mitigating the impact of biased artificial intelligence in emergency decision-making”, *Nature Communications Medicine*, October 2022

- **Balagopalan, A.**, Zhang, H., Hamidieh, K., Hartvigsen, T., Rudzicz, F., and Ghassemi, M., “The Road to Explainability is Paved with Bias: Measuring the Fairness of Explanations”, FAccT 2022
- **Balagopalan, A.**, Eyre, B., Rudzicz, F., and Novikova, J., “Comparing Acoustic-based Approaches for Alzheimer’s Disease Detection”, 22nd Annual Conference of the International Speech Communication Association, INTERSPEECH, 2021
- **Balagopalan, A.**, Eyre, B., Rudzicz, F., and Novikova, J., “To BERT or Not To BERT: Comparing Speech and Language-based Approaches for Alzheimer’s Disease Detection”, 21st Annual Conference of the International Speech Communication Association, INTERSPEECH, 2020
- **Balagopalan, A.**, Novikova, N., McDermott, M. B., Nestor, B., Naumann, T. J., and Ghassemi, M., “Cross-Language Aphasia Detection using Optimal Transport Domain Adaptation”, To appear in Machine Learning for Health (ML4H) at NeurIPS 2019, In Machine Learning for Health Workshop (pp. 202-219). PMLR
- Seifert, C., Aamir, A., **Balagopalan, A.**, Jain, D., Sharma, A., Grottel, S., Gumhold, S., “Visualizations of deep neural networks in computer vision: A survey”, In Transparent Data Mining for Big and Small Data (pp. 123-144). Springer, Cham., 2017

PEER-REVIEWED WORKSHOP PAPERS

- **Balagopalan, A.**, Shkaruta, K., and Novikova, J., “Impact of ASR on Alzheimer’s Disease Detection: All Errors are Equal, but Deletions are More Equal than Others”, 6th Workshop on Noisy User Generated Text, EMNLP 2020 (Oral Spotlight)
- Novikova, J., **Balagopalan, A.**, Shkaruta, K., Rudzicz, F., “Lexical Features Are More Vulnerable, Syntactic Features Have More Predictive Power”, 5th Workshop on Noisy User Generated Text, EMNLP 2019
- **Balagopalan, A.**, Novikova, J., Rudzicz, F., Ghassemi, M., “The Effect of Heterogeneous Data for Alzheimer’s Disease Detection from Speech.”, Machine Learning for Health (ML4H) at NeurIPS 2018

PREPRINTS

- Zhu, Z., **Balagopalan, A.**, Ghassemi, M., Rudzicz, F. (2021). Quantifying the Task-Specific Information in Text-Based Classifications. arXiv preprint arXiv:2110.08931.

HONORS AND AWARDS

- Amazon/MIT Schwarzman College of Computing Science Hub PhD Fellowship, MIT Jun 2022-Dec 2022
- DeepMind PhD Fellowship, University of Toronto 2020-21.
- ISCA Student Grant, University of Toronto 2020.
- MITACS Accelerate Scholarship, University of Toronto from May 2018-Dec 2018.
- Institute Silver Medal, Indian Institute of Technology Guwahati in 2017.
- DAAD Working Internships in Science and Engineering (WISE) Scholarship for a research internship under the guidance of Dr. Carsten Rother, Dr. Stefan Gumhold and Dr. Christin Seifert at TU Dresden
- Kishore Vaigyanik Protsahan Yojana (KVPY) scholarship for higher studies in Basic Sciences, 2013

INVITED TALKS

- Impact of ASR on Alzheimer’s Disease Detection, 6th Workshop on Noisy User Generated Text, EMNLP 2020

SKILLS SUMMARY

- **Programming Languages:** Python, C++, CUDA, MATLAB, Java
- **Deep Learning Frameworks:** PyTorch, Caffe

TEACHING EXPERIENCE

- CSC 458: Computer Networks, Fall 2017, University of Toronto
- CSC 358: Introduction to Computer Networks, Winter 2018, University of Toronto
- IDS.012 / 6.3730 / IDS.131 / 6.3732: Statistics, Computation, and Applications, Winter 2023, MIT

EXTRA CURRICULAR

- **EECS Thriving Stars Mentoring 2022:** Conversing with female-identifying undergraduate students at MIT about PhD and research.
- **DCS Women Mentoring 2021:** Duties included conversing with female-identifying undergraduate students at the University of Toronto about PhD and graduate programs.
- **DAAD Young Ambassador India 2016-17:** Duties included helping students learn more about research opportunities in Germany
- **Editorial Team Member, InPhase Magazine, 2016:** Was on the editorial team of the departmental magazine, InPhase, in 2016 at IIT Guwahati.
- **Volunteer:** Served as a member in National Service Scheme, 2014.