

# AISHWARYA H. BALWANI

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## RESEARCH INTERESTS

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### Machine Learning, Digital Signal Processing, Applied Math & Computational Neuroscience

- Sparse & Low-Dimensional Representations of Data
- Analysis & Explainability of Biological Systems and Neural Networks
- Transferability, Interpretability & Generalizability of Features in Deep Neural Networks
- Generative Modelling

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## EDUCATION

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### Georgia Institute of Technology

- PhD, Electrical & Computer Engineering (Minor: Mathematics), 2018-Present
- MS, Electrical & Computer Engineering, 2016-2018.

### University of Mumbai

- BE, Electronics and Telecommunication, 2012-2016.

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## PUBLICATIONS, PREPRINTS & PEER REVIEWED ABSTRACTS

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### Publications

- Liu, R., Subakan, C., **Balwani, A. H.**, Whitesell, J. D., Harris, J. A., Koyejo, S., & Dyer, E. "A generative modeling approach for interpreting population-level variability in brain structure." to appear in *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, 2020.
- **Balwani, Aishwarya H.**, and Eva L. Dyer. "Modeling variability in brain architecture with deep feature learning." *2019 53rd Asilomar Conference on Signals, Systems, and Computers. IEEE*, 2019.
- Kyle Milligan, **Aishwarya Balwani**, Eva Dyer. "Brain Mapping at High Resolutions: Challenges, Opportunities." *Current Opinion in Biomedical Engineering*, 2019.
- T.J. Lee, A. Kumar, **A.H. Balwani**, D. Brittain, S. Kinn, C.A. Tovey, E.L. Dyer, N.M. da Costa, R.C. Reid, C.R. Forest, D.J. Bumbarger. "Large-scale neuroanatomy using LASSO: Loop based Automated Serial Sectioning Operation." *PloS one*, 13. 10, 2018.

### Preprints

- **Aishwarya H. Balwani**, Eva L. Dyer. "A Deep Feature Learning Approach for Mapping the Brain's Microarchitecture and Organization." *bioRxiv*, 2020.
- Prasad, J. A., **Balwani, A. H.**, Johnson, E. C., Miano, J. D., Sampathkumar, V., De Andrade, V., ... & Dyer, E. L. "A three-dimensional thalamocortical dataset for characterizing brain heterogeneity." *bioRxiv*, 2020.

### Peer Reviewed Abstracts

- **Aishwarya H. Balwani**, Eva L. Dyer. "Modeling Brain Microarchitecture with Deep Representation Learning" (Video+Poster), *ML Interpretability for Scientific Discovery, ICML*, 2020.
- **Aishwarya Balwani**, Joseph Miano, Judy Prasad, Eva Dyer. "Learning to Segment at Multiple Scales." (Poster), *BioImage Informatics*, 2019.

- K. Milligan, **A. Balwani**, A. Maguire, S. Margulies, E. Dyer. "Deep Learning for Characterization of Neuroinflammation in Traumatic Brain Injury." (Poster), *BioImage Informatics*, 2019.

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## RESEARCH & WORK EXPERIENCE

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- Graduate Research Assistant, Georgia Institute of Technology (Summer 2018-Present)
  - Areas of Research: Unsupervised/Self/Semi-supervised representation learning, Transfer/Meta and Multi-task learning, Sparse and low-rank representations of data.
- Graduate Student, Georgia Institute of Technology (Fall 2017-Spring 2018)
  - Neural event recovery from noisy data via sparse deconvolution (Advisor: Dr. Eva Dyer)
  - Deep learning in autonomous driving (Advisor: Dr. Vijay Madisetti)
- R&D Intern (Algorithms Team), Intellifusion, China (Summer 2017)
  - Areas of Research: Image Processing, Digital Signal Processing, Machine Learning, Data Compression and Encryption.

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## TEACHING & MENTORING EXPERIENCE

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### Teaching Assistant

- Hands-On Tech Day Camp, Georgia Institute of Technology (June 2019)
- Deep Learning for Microscopy Image Analysis, Marine Biological Laboratory (May 2019)
- Data Analytics for Engineers, Georgia Institute of Technology (Fall 2019, 2018)
- Mathematical Foundations for Data Science, Georgia Institute of Technology (Spring 2018)

### Junior Instructor

- Embedded Systems & IoT, Eduvance (Summer 2016)

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## HONOURS & AWARDS

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### Academic Awards & Fellowships

- ECE Coulter MS Fellowship, 2016-2017

### Competitions & Hackathons

- Winner (Technical Track) – Hacklytics, Data Science at Georgia Tech, 2019
- Winner (Best Project) – AI/ML for Social Good Hackathon at Georgia Tech, 2018
- Gold Award - IEEE UBTech-Education Robotics Design Challenge, 2017

### Registration & Travel Awards

- ICML Diversity and Inclusion Fellowship, 2020

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## PROFESSIONAL SERVICE

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### Reviewing

- Journals: Distill
- Workshops: Lifelong Learning Workshop (ICML 2020), Workshop on Continual Learning in Computer Vision (CVPR 2020)

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- Other: Neuromatch Academy 2020, President's Undergraduate Research Awards – Georgia Tech (Spring 2020, Fall 2021)

**Professional & Student Organizations**

- Senator (ECE), Graduate Student Association, Georgia Institute of Technology, 2017-2018

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**WORKSHOPS & SEMINARS**

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**Attendee**

- Banach Center – Oberwolfach Graduate Seminar: Mathematics of Deep Learning, Institute of Mathematics, Polish Academy of Sciences (November 2019)
- Foundation of Data Science Summer School, Georgia Institute of Technology (August 2019)
- Spinning Up in RL Workshop, OpenAI (February 2019)