

# Mohit Agarwal

## PhD Student at Georgia Tech

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## Research Interests

[Brain-Computer Interfaces](#)  
[Reinforcement Learning](#)  
[Human-In-The-Loop ML](#)  
[Ubiquitous Computing](#)  
[Machine/Deep Learning](#)

## Selected Coursework

### Computer Science

Machine Learning  
 Deep Learning  
 Artificial Intelligence  
 Computation and Brain  
 Information Visualization  
 Applied Cryptography  
 Mobile Computing  
 Data Structure & Algorithms

### Mathematics

Probability & Statistics  
 Linear Algebra  
 Convex Optimization

## Technical Skills

Programming Languages  
 • Python • MATLAB • C/C++  
 • Java • R Web: • HTML •  
 CSS • d3 • JS  
 Deep Learning Frameworks  
 • Tensorflow • Torch

## Selected Awards

• **2nd Position Worldwide** in ISBI Melanoma Detection Challenge  
 • **Semi-Finalist** Qualcomm Innovation Fellowship'18

## Responsibilities

### PC Member

• ICWSM'20

### Session Chair

• Allerton'19

### Reviewer

• CHI, CogSci, IMWUT, ICWSM, IEEE TMC, MobileHCI, AutomotiveUI

## Education

### Georgia Institute of Technology

MS and PhD in Electrical and Computer Engineering | **GPA: 4.0/4.0**  
 Minor: Computer Science | Expected Graduation: Fall 2020

*Fall'14 - Present (USA)*

### Indian Institute of Technology Kanpur

Bachelors in Electrical Engineering | **GPA: 8.7/10.0**

*Fall'10 - Spring'14 (India)*

## Internships

### Apple | Wireless Technologies

*Summer'18 (USA)*

**RAT Simulator:** Developed a system-level discrete event simulator in C++ to characterize and optimize the parameters of a radio-access technology (undisclosed, and developed in-house)

### Lawrence Livermore National Labs | Machine Learning

*Summer'17 (USA)*

**High Dimensional Spectral Sampling Methods:** Automated pair-correlation function estimation for arbitrary point clouds (traditionally requires manual tuning or multiple days of MD simulation)

### Cisco | Deep Learning

*Summer'16 (USA)*

**Video Action Classification:** Designed DNNs using LSTMs in Tensorflow, for action recognition in video clips using UCF-101 dataset | Proposed stateful model performed with > 25% accuracy improvement

### Syracuse University | Wireless Communication

*Summer'13 (USA)*

**Automatic Modulation Classification in WSNs:** Developed algorithm for automatic identification of digital modulation in wireless communication in the presence of noisy environment using Bayesian model | Proposed *Collapsed Gibbs sampling* based approach, with > 90% accuracy for higher-order QAMs

## Selected Research Projects

### Multi-Human Assisted Learning for Machine Agents using EEG

*Fall'18 - Present*

[Brain-Computer Interfaces \(BCIs\) and Reinforcement Learning](#) [Doctoral Research Work]

- Research, design and develop an interesting solution paradigm allowing humans to assist RL algorithms without burdening human-in-the-loop through EEG-based brain waves
- Demonstration of the impact of our approach in improving state-of-the-art RL algorithms (e.g., DQN) by developing multiple Atari-like discrete-grid based games in OpenAI Gym
- Experimentally showed that error-potentials can be learned in a zero-shot manner (with **AUC > 0.8**), and achieves **2.25x acceleration** in training while making **75.56%** fewer queries

### Low-Power Command Detection for BCI Wearables

*Fall'16 - Spring'18*

[BCIs, Ubiquitous Computing and Statistical Learning](#) [Doctoral Research Work]

- Proposed a wakeup command design and detection strategy enabling always-on BCI wearables to run on low-power mode achieving **2.7x** improvement in battery life
- Proposed algorithm to self-learn and detect eye-blinks in user brainwaves with **98% accuracy**

### Skin Lesion Analysis towards Melanoma Detection

*Spring'16*

[Deep Learning](#)

- Automated skin cancer detection by proposing CNN based deep architectures for skin lesion classification | **81.3%** accuracy, 2nd position worldwide in ISBI Melanoma Detection Challenge

## Selected Publications

**Mohit Agarwal** and Raghupathy Sivakumar, "Charge for a whole day: Extending Battery Life for BCI Wearables using a Lightweight Wake-Up Command", **ACM CHI 2020**

**Mohit Agarwal** and Raghupathy Sivakumar, "BLINK: A Fully Automated Unsupervised Algorithm for Eye-Blink Detection in EEG Signals", **IEEE Allerton 2019**

**Mohit Agarwal**, Duo Xu, F. Fekri and Raghupathy Sivakumar, "Playing Games with Implicit Human Feedback", Workshop on Reinforcement Learning for Games at AAAI, 2020

**Mohit Agarwal**, Duo Xu, Faramarz Fekri and Raghupathy Sivakumar, "Accelerating Reinforcement Learning Agent with EEG-based Implicit Human Feedback", IEEE Transactions on Systems, Man, and Cybernetics: Systems (under submission)