

# Sriram Balasubramanian

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[LinkedIn Profile](#)

## WORK EXPERIENCE

**Research Fellow** – Microsoft Research, India  
AUGUST 2020 – AUGUST 2021

- **Predicting e-mail arrivals and reads:** Built machine learning models to predict e-mail arrivals and reads from user type and history of arrivals/reads to improve cache hit rates.
- **Simulating network paths using ML:** Built machine learning models to simulate internet paths using static network traces

**Intern** – Tower Research Capital, India  
MAY 2019 – JULY 2019

- Developed tools to analyse trading and market logs and compute fill ratios (number of order fulfilled / number of orders sent) for various securities

**Research Intern** – IST, Austria  
MAY 2018 – JULY 2018

- Implemented fast algorithms for finding algebraic path properties (like distance queries) in graphs with small treewidth, and used it for dataflow analysis on control flow graphs with distributive dataflow functions.

## RESEARCH AND PUBLICATIONS

### Increasing robustness in Natural Language Processing

2020 – *IIT Bombay* [[Link to paper](#)]

- Explored training algorithms robust to synonym and named entity replacement attacks on tasks including text classification, grammar correction, co-reference resolution and question answering.
- Demonstrated the presence of non-robustness in state-of-the-art BERT based models on the above tasks

### Simulating Network Paths with Recurrent Buffering Units

2021 – *MSR India* [[Link to paper](#)]

- Introduced a novel grey-box approach to network simulation that embeds the semantics of physical network path in a new RNN-style architecture called Recurrent Buffering Unit (RBU)
- RBUs combine the interpretability of standard network simulator tools with the power of neural models, the efficiency of SGD-based techniques for learning, and yield promising results on synthetic and real-world network traces.

## PROJECTS

- **CLIP robustness (Ongoing):** Discovered that pre-trained models like CLIP can be excessively sensitive to text probes and image style; currently investigating the underlying reasons behind this phenomenon.
- **Excessive invariance in neural networks (Ongoing):** Discovered that many state-of-the-art neural networks can be highly insensitive to significant changes in input; currently investigating applications of confidence calibrated models to solve this problem
- **Cartoonification of Images (2019):** Implemented a flow-based technique to extract lines and smooth regions for non-realistic rendering of coloured photos
- **A blockchain currency simulation in Racket (2018):** Built a simulation of cryptocurrency transactions including digital signatures, maintaining and cutting blockchain forks, etc.

## EDUCATION

**Master's in Computer Science** –  
University of Maryland, College Park  
AUG 2021 – PRESENT  
• **GPA: 4.0/4.0**

**Bachelor's in Computer Science with Honors** – IIT Bombay, India  
AUG 2016 – MAY 2020  
• **GPA: 9.56/10.0**

## COURSEWORK

Advanced Machine Learning  
Foundations of Deep Learning  
Artificial Intelligence  
Optimization  
Information Retrieval & Web Mining  
Linear Algebra

## TECHNICAL SKILLS

**Languages:** Python • Matlab •  $\text{\LaTeX}$  • C/C++ • SQL • Java

**ML Frameworks:** PyTorch • Tensorflow • Keras • MXNet

## AWARDS AND ACHIEVEMENTS

- Awarded Institute Academic Prize for exceptional academic performance in IIT Bombay [2017]
- Ranked **2nd** in the institute out of about 900 students in the first year at IIT Bombay [2017]
- Ranked **4th** in JEE Mains out of 1.2 million candidates all over India [2017]
- Awarded KVPY Fellowship by the Government of India [2015]
- Awarded NTSE scholarship by N.C.E.R.T [2014]

## RESPONSIBILITIES

**Teaching Assistant: Programming Hand-held systems** •2022 •UMD College Park

**Teaching Assistant: Probability and Statistics** •2021 •UMD College Park

**Teaching Assistant: Data Interpretation and Analysis** •2019 •IIT Bombay

**Teaching Assistant: Electricity and Magnetism** •2018 •IIT Bombay