

# Vivek Ramanujan

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🎓 Google Scholar

🔄 vkramanuj

🌐 vkramanuj.github.io

Bill & Melinda Gates Center For Computer Science & Engineering

University of Washington,

3800 E Stevens Way NE,

Seattle, WA 98195

## Research Interests

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Machine Learning, Computer Vision, Dynamics, Optimization, Reinforcement Learning

## Education

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**University of Washington**, Seattle, WA

2020 to Present

PhD Student in Computer Science

Advisor: Prof. Ali Farhadi

**Brown University**, Providence, RI

2015 to 2018

B.S. Mathematics and Computer Science *with Honors*, May 2018

Major GPA: 3.96, Cumulative: 3.92

Thesis title: *Latent Space Augmentations for Generative Adversarial Networks*

## Publications

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See my **Google Scholar** for an always up-to-date list

\* means equal contribution

9. Matryoshka Representation Learning

A. Kusupati\*, G. Bhatt\*, A. Rege\*, M. Wallingford\*, A. Sinha, **V. Ramanujan**, W. Howard-Snyder, K. Chen, S. Kakade, P. Jain, A. Farhadi

At *Neural Information Processing Systems 2022*

8. On the Connection between Pre-training Data Diversity and Fine-tuning Robustness

**V. Ramanujan\***, T. Nguyen\*, S. Oh, L. Schmidt, Ali Farhadi

Appeared at *ICML 2022 Pre-training: Perspectives, Pitfalls, and Paths Forward* workshop

Full paper *in submission*

7. Forward Compatible Training for Representation Learning

**V. Ramanujan**, PKA. Vasu, A. Farhadi, O. Tuzel, H. Pouransari

At *Computer Vision and Pattern Recognition 2022*

6. Effects of Parameter Norm Growth During Transformer Training: Inductive Bias from Gradient Descent

W. Merrill, **V. Ramanujan**, Y. Artzi, R. Schwartz, N. Smith

(oral) *Empirical Methods in Natural Language Processing 2021*

5. LLC: Accurate, multi-purpose learnt low-dimensional binary codes

A. Kusupati, M. Wallingford, **V. Ramanujan**, R. Somani, J. S. Park, K. Pillutla, P. Jain, S. Kakade, A. Farhadi

At *Neural Information Processing Systems 2021*

4. Supermasks in Superposition for Continual Learning

M. Wortsman\*, **V. Ramanujan\***, R. Liu, A. Kembhavi, M. Rastegari, J. Yosinski, A. Farhadi.

At *Neural Information Processing Systems 2020*  
(**spotlight**) *International Conference for Machine Learning Continual Learning Workshop 2020*.

3. **Soft Threshold Weight Reparameterization for Learnable Sparsity**  
A. Kusupati, **V. Ramanujan\***, R. Somani\*, M. Wortsman\*, P. Jain, A. Farhadi, S. Kakade, A. Farhadi.  
(**virtual talk**) *International Conference for Machine Learning 2020*.
2. **What's Hidden in a Randomly Weighted Neural Network?**  
**V. Ramanujan\***, M. Wortsman\*, A. Kembhavi, A. Farhadi, M. Rastegari.  
At *Computer Vision and Pattern Recognition 2020*.
1. **Improving Shape Deformation in Unsupervised Image-to-Image Translation**  
A. Gokaslan, **V. Ramanujan**, D. Ritchie, K. Kim, J. Tompkin  
At *European Conference for Computer Vision 2018*.

## Research + Work Experience

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### University of Washington - Seattle

Sep 2020 to Present

*PhD Research Assistant (Post-Quals)*

Advisor. Ali Farhadi

Working on robustness and transfer learning with Ali Farhadi and Ludwig Schmidt. Currently working on effects of simulated data in pretraining generated using differentiable renderers and diffusion models. In the past I have worked on extending neural tangent kernels (NTKs) to close the gap in generalization performance to standard finite architectures and empirical explorations of various pretraining strategies to understand transfer learning.

### Apple

Jun 2021 - Sep 2021

*PhD Research Intern*

Advisors. Oncel Tuzel and Hadi Pouransari

Worked on practical implications of transfer learning to develop forward compatible feature representations. Resulted in publication 7 at **CVPR 2022**.

### Allen Institute for Artificial Intelligence

Dec 2018 to Sep 2020

*Research Resident*

Advisors. Prof Ali Farhadi, Mohammad Rastegari, Aniruddha Kembhavi

Worked on a wide array of topics including but not limited to: self-supervised learning, sparse network optimization, continual and transfer learning. Resulted in publications [2, 3, 4], in **NeurIPS 2020**, **CVPR 2020** and **ICML 2020**.

### Brown University Visual Computing Group

Dec 2016 to May 2018

*Undergraduate Researcher*

Advisor. Prof James Tompkin

Created generative models to produce images from other images or text. Utilized neural networks and graphical models. Worked on formalism and extension of Generative Adversarial Networks for high variance productions and segmentation (funded by UTRA). Collaborated on CycleGAN extension (Publication 1) published in **ECCV 2018**.

### Google

June 2016 to Aug 2016

*Software Engineering Intern*

Supervisor: Luis Carlos Cobo (Sr. Research Engineer)

Used neural networks (among other techniques) with Torch and Tensorflow, ran experiments. Wrote backend code to handle large amounts of data. Also included front end work and data visualization.

## Programming Skills

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Python • Golang • (Py)Torch • Jax (autograd framework)

## Awards

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Student Awards — Brown University Computer Science

- Andy Van Dam Named TA
  - Undergraduate Teaching and Research Assistantship Award Sept 2017, June 2017
  - Publication (1) received second at Brown Undergraduate Research Symposium Spring 2018
- EPFL Summer Research Assistantship Summer 2017  
Sigma Xi (Nominated, Declined) Spring 2018

## Teaching Experience

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<b>BROWN UNIVERSITY - COMPUTER SCIENCE DEPARTMENT</b>	2016 to 2018
• <b>Teaching Assistant</b> , CS 2951K (grad) - Deep Learning, Prof Eugene Charniak	Fall 2016
• <b>Teaching Assistant</b> , CS 1410 - Applied Artificial Intelligence, Prof George Konidaris	Spring 2017
• <b>Teaching Assistant</b> , CS 1430 - Computer Vision, Prof James Tompkin	Fall 2017
• <b>Teaching Assistant</b> , CS 1420 - Machine Learning, Prof Michael Littman	Spring 2018

*General Responsibilities:* Worked with other TAs to design new assignments. Held office hours to help students with homework and course concepts. Graded homeworks.

## Service

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- Peer Reviewing** 2021 - Present
- Neural Information Processing Systems (NeurIPS) 2021
  - International Conference for Learning Representations (ICLR) 2022

**Volunteer Education** Sept 2017 - May 2018  
Supervised and taught a Computer Science club, with other Brown students, at a middle school near Providence. Helped arrange curriculum.