# Siddharth Karamcheti

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## Research Interests

**Focus**: Building agents that can collaborate with humans and act safely in different environments
**Areas:** Natural Language Processing, Reinforcement Learning, and Machine Learning

## Education

**Stanford University** - Stanford, CA                                                                 Starting: Fall 2019

PhD in Computer Science
Deferred admission for one-year residency at Facebook AI Research (2018 - 2019)

**Brown University** - Providence, RI                                                                 Aug 2015 - May 2018

Sc.B. with Honors in Computer Science, A.B. in Literary Arts - *Magna Cum Laude*  [Technical GPA: 4.0]
Thesis: Grounding Natural Language to Goals for Abstraction, Generalization, and Interpretability
CS research advised by Professor Eugene Charniak and Professor Stefanie Tellex

**University of California, Berkeley** - Berkeley, CA                                     Aug 2014 - Aug 2015

Major in Electrical Engineering and Computer Science - *Regents Scholarship*  [Technical GPA: 3.92]
Transferred to Brown University to pursue a multidisciplinary course of study in CS & Literature

## Research Experience

**Facebook AI Research,** Facebook NYC                                                         Aug 2018 - Present

*Position*: AI Resident (one-year) as part of inaugural residency program at Facebook Research.
*Advisors*: Rob Fergus, Arthur Szlam, Douwe Kiela, and Jason Weston
Research at the intersection of natural language processing and reinforcement learning, question-answering

**CTO Research Group**, Bloomberg NYC                                                         May 2017 - Aug 2018

*Position*: Research Intern (Summer '17, '18) with part-time status during academic year ('17 - '18)
*Advisors*: Gideon Mann, David Rosenberg
Research in automated bug detection via machine learning, active learning for program testing

**H2R (Human to Robots Lab)**, Brown Computer Science                             Jan 2016 - May 2018

*Position*: Undergraduate Research Assistant  |  *Advisor*: Stefanie Tellex
Research in language grounding for robotics (allowing robots to follow language instructions)

**BLLIP (Natural Language Processing)**, Brown Computer Science             Jan 2016 - May 2018

*Position*: Undergraduate Research Assistant  |  *Advisor*: Eugene Charniak
Research in semantic parsing, question-answering via learned knowledge bases

## Peer-Reviewed Publications

**Adaptive Grey-Box Fuzz Testing with Thompson Sampling**

Siddharth Karamcheti, D. Rosenberg, G. Mann
*Workshop in AI and Security (AISec) at CCS 2018*. arXiv: https://arxiv.org/abs/1808.08256

**Grounding Language to Goal Representations for Abstraction and Generalization**

Dilip Arumugam*, Siddharth Karamcheti*, N. Gopalan, E. Williams, M. Rhee, L. Wong, and S. Tellex
*Journal for Autonomous Robots (Springer) - August 2018:* https://doi.org/10.1007/s10514-018-9792-8

**A Tale of Two DRAGGNs: Interpreting Action and Goal-Oriented Instructions**

Siddharth Karamcheti, E. Williams, D. Arumugam, M. Rhee, N. Gopalan, L. Wong, and S. Tellex
*Workshop in Language Grounding for Robotics (RoboNLP) at ACL* 2017.
***Winner of the RoboNLP Best Paper Award***. arXiv: https://arxiv.org/abs/1707.08668

**Accurately and Efficiently Interpreting Robot Instructions of Varying Granularities**

Dilip Arumugam***,** Siddharth Karamcheti**\***, N. Gopalan, L. Wong, and S. Tellex.
*Conference for Robotics: Science and Systems (RSS) 2017*. arXiV: https://arxiv.org/abs/1704.06616

## Preprints and Technical Reports

**Improving Grey-Box Fuzzing by Modeling Program Behavior**
Siddharth Karamcheti, D. Rosenberg, G. Mann
*In Progress*

**Grounding Language to Goals for Abstraction, Generalization, and Interpretability**
Siddharth Karamcheti (Undergraduate Honors Thesis) - Nominated for University Honors
*Brown CS Link*: https://cs.brown.edu/research/pubs/theses/ugrad/2018/karamcheti.siddharth.pdf

**Modeling Latent Attention within Neural Networks**
Christopher Grimm, D. Arumugam, S. Karamcheti, D. Abel, L. Wong, M. Littman
*arXiv preprint:* https://arxiv.org/abs/1706.00536

## Awards & Honors

**Selected for Inaugural Facebook Residency Program**, 2018
One of 11 AI Residents selected from a class of 2000+ applicants

**University Distinguished Thesis Nominee, Brown Computer Science**, 2018
Nominated for University Distinguished Thesis prize by CS Department (sole nominee)

**Honorable Mention - CRA Outstanding Undergraduate Researcher Prize**, 2018
One of 45 students recognized by CRA in nationwide competition

**Senior Prize - Brown CS**, 2018
Recognized by CS Department for outstanding record in teaching, research, and service

**Best Paper - RoboNLP Workshop**, 2017
Won Best Paper for *A Tale of Two DRAGGNs: Interpreting Action and Goal-Oriented Instructions*.

**Regents and Chancellors Scholarship - UC Berkeley**, 2014
One of 200 incoming undergraduates recognized with scholarship as determined by Academic Senate.

## Work Experience

**Software Engineering Intern : *Wealthfront*** - Redwood City, CA          May 2016 - Aug 2016
Worked primarily on the backend, building out significant parts of production systems.

**Natural Language Processing Intern : *WriteLab* -** Berkeley, *CA*          May 2015 - Nov 2015
Created a system to track topics, entities, and topic dependencies across an essay or larger text.

**Software Dev/Research Intern : *AutoGrid Systems*** - Redwood City, CA          Jun 2013 – Nov 2013
Ran data through a predictive machine learning algorithm to predict demand spikes.

## Teaching Experience

**Head Teaching Assistant**          Oct 2017 - May 2018
***CS 1380: Distributed Systems*** - Brown, Spring 2018

**-** Revised course assignments (written in Golang), adding projects on block-chains & cryptocurrencies.
**-** Course taught by Professor Theo Benson: http://cs.brown.edu/courses/cs138/

**Head Teaching Assistant**          Jun 2016 - Jan 2018
***CS 2950K/1470: Deep Learning*** - Brown, Fall 2016, Fall 2017

**-** Designed course assignments, pulling from topics in NLP, Vision, and Reinforcement Learning.
**-** Course taught by Professor Eugene Charniak: http://cs.brown.edu/courses/cs1470/

**Head Teaching Assistant**          Jan 2017 - Jun 2017
***CS 1460: Computational Linguistics*** - Brown, Spring 2017

**-** Wrote assignments in language modeling, translation, parsing, topic modeling, and deep learning
**-** Course taught by Professor Eugene Charniak: http://cs.brown.edu/courses/csci1460/