

# Fabrice Harel-Canada

SOFTWARE ENGINEER · COMPUTER SCIENCE RESEARCHER

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## Biography

I am a computer science PhD student at UCLA where I am part of the Software Evolution and Analysis Lab and advised by Miryung Kim. I also work with Violet Peng in the PLUS Lab and Quanquan Gu in the Statistical Machine Learning Lab. My research aims at developing new techniques for training, testing, and evaluating ML systems. Previously, this has entailed devising novel adversarial attacks, investigating test metrics like neuron coverage for deep learning models, and creating *sibylvariant transformations* to improve model generalization and robustness. My current projects span three distinct areas: a) developing fine-grained data lineage to support the creation of automated data augmentation policies and data exploration; b) producing reference-free evaluation metrics to quantify the diversity of natural language; c) analyzing android apps containing ML models to generate tests that expand post-inference coverage.

## Education

### University of California, Los Angeles (UCLA)

PHD | COMPUTER SCIENCE

- 3.92 / 4.00 GPA
- Majors: Software Engineering + Artificial Intelligence
- Minor: Data Science Computing

Advisor: Miryung Kim

Jan 2020 - Jun 2024

### University of California, Los Angeles (UCLA)

MS | COMPUTER SCIENCE

- Major: Artificial Intelligence
- Thesis: *Is Neuron Coverage a Meaningful Measure for Testing Deep Neural Networks?*

Advisor: Miryung Kim

Sept 2018 - Dec 2019

### University of Florida (UF)

BS | BUSINESS ADMINISTRATION

- Majors: Management + Information Systems and Operations Management
- Minors: Entrepreneurship + Finance
- Thesis: *The Viability of the Student-Run Housing Cooperative: A Case Study of the Cooperative Living Organization*

Aug 2008 - May 2012

## Publications

### ENDEX: EVALUATION OF DIALOGUE ENGAGINGNESS AT SCALE

Guangxuan Xu, Ruiho Liu, **Fabrice Harel-Canada**, Nischal Reddy Chandra and Nanyun Peng, in *Findings of EMNLP 2022, Abu Dhabi, United Arab Emirates. Empirical Methods in Natural Language Processing*.

Findings of EMNLP 2022

Acceptance Rate: 29 %

### SIBYLARIANT TRANSFORMATIONS FOR ROBUST TEXT CLASSIFICATION

**Fabrice Harel-Canada**, Muhammad Ali Gulzar, Nanyun Peng and Miryung Kim, in *Findings of the Association for Computational Linguistics: ACL 2022, pages 1771–1788, Dublin, Ireland. Association for Computational Linguistics*.

Findings of ACL 2022

Acceptance Rate: 37 %

### IS NEURON COVERAGE A MEANINGFUL MEASURE FOR TESTING DEEP NEURAL NETWORKS?

**Fabrice Harel-Canada**, Lingxiao Wang, Muhammad Ali Gulzar, Quanquan Gu and Miryung Kim, in *Proc of ACM SIGSOFT International Symposium on the Foundations of Software Engineering (ESEC/FSE)*, Sacramento, California, USA, 2020.

ESEC/FSE 2020

Acceptance Rate: 28 %

## Research Experience

### University of California, Los Angeles

GRADUATE STUDENT RESEARCHER

- Developing automated evaluation metrics for natural language generation systems - e.g. diversity, engagement
- Designed a new class of sibylvariant data transformations, releasing an open source tool for the community [Sibyl]
- Evaluated the reliability of testing metrics for deep learning
- Developed diversity-promoting extensions to adversarial attack algorithms

Supervisor: Miryung Kim

June 2019 - present

## University of California, Los Angeles

RESEARCH ASSISTANT

Supervisor: Judson Caskey

July 2020 - Oct 2020

- Conducted LDA topic modeling and phrase-level sentiment analysis using BERT transformers on millions of Amazon and Glassdoor product / employer reviews

## Professional Experience

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### University of California, Los Angeles

TEACHING ASSISTANT, CS 31 : INTRO TO COMPUTER SCIENCE

Supervisor: David Smallberg

Sept 2023 - Dec 2023

- Facilitated a robust understanding of C++ fundamentals for introductory computer science students, providing guidance on programming concepts, debugging techniques, and hands-on problem-solving support.

### University of California, Los Angeles

TEACHING ASSISTANT, CS 130 : SOFTWARE ENGINEERING

Supervisor: Michael Burns

Mar 2023 - June 2023

- Collaborated with a team of Google instructors to facilitate cutting-edge learning experiences and contributing to the development of students' technical skills.

### University of California, Los Angeles

TEACHING ASSISTANT, CS 130 : SOFTWARE ENGINEERING

Supervisor: Miryung Kim

Sept 2020 - Dec 2020

- Facilitated hands-on learning in software engineering by guiding 50+ undergraduates through coding exercises and debugging, enhancing their grasp of complex algorithms and object-oriented programming.
- Guided teams in designing and executing bespoke capstone projects, including a plant identification app, equipping them with practical experience in full-stack development and collaborative design.

### University of California, Los Angeles

READER, CS 143 : DATABASE SYSTEMS

Supervisor: Carlo Zaniolo

Jan 2019 - Mar 2019

- Developed test cases for a Spark project in Scala, actively addressed student questions, and assisted students with project work

### Verox Tech

PROJECT MANAGER + DEVELOPER TEAM LEAD

Supervisor: Michael Simhai

July 2015 - Sept 2018

- Designed and successfully launched a smarter insurance app by building, motivating, and guiding a team of 23
- Contributed 100s of check-ins, primarily consisting of C# Web APIs and database tables, triggers, sprocs, and T-SQL scripts
- Designed and implemented a 3-system legacy data migration
- Responsible for producing, coordinating and reviewing nearly every aspect of the SDLC:
  - code reviews and code optimization
  - requirements and spec generation
  - database design + SSIS + SSRS
  - technical documentation
  - UI design standards + product design
  - build and deployment scripts

### People's Trust Insurance

BUSINESS + DATA ANALYST

Supervisor: Scott Thompson

Dec 2012 - Sept 2018

- Go-to data expert for executives to produce hundreds of reports and analyses for pivotal decision making at the executive level
- Developed numerous front-end / back-end application features that were successfully deployed into production to automate tedious and time-intensive workflows
- Performed continuous requirements gathering & demos with business stakeholders to support 60+ sprints of development for both applications and business intelligence teams, including the transition to a new policy and claim management system

### Cooperative Living Organization

PRESIDENT

Dec 2010 - May 2012

- Appointed and oversaw the performance of 17 managers who were responsible for executing the policies and procedures I developed
- Increased house occupancy from 60 residents to full capacity (80) and increased net income 57% while expanding services & activities for residents

## Skills

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**Programming** sql, python, java, c#, linq, html, css, js, scala, prolog,  $\LaTeX$   
**Frameworks** pytorch, tensorflow, keras, spark, numpy, pandas, scipy, sklearn, opencv, matplotlib, seaborn  
**Tools** ssms, ssis, ssrs, tfs, azure devops, visual studio, excel, aws, gcp, exchange server, moqups

## Selected Coursework

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2022	<b>Natural Language Generation</b> , CS 269	<i>UCLA</i>
2022	<b>Automated Testing 4 Data Systems</b> , CS 239	<i>UCLA</i>
2021	<b>Large-Scale Social and Complex Networks</b> , EC 232E	<i>UCLA</i>
2020	<b>Machine Learning Algorithms</b> , CS 260	<i>UCLA</i>
2020	<b>Probabilistic Programming</b> , CS 267A	<i>UCLA</i>
2019	<b>Neural Networks and Deep Learning</b> , EC 239AS	<i>UCLA</i>
2019	<b>Natural Language Processing</b> , CS 269	<i>UCLA</i>
2019	<b>ML Testing and Debugging</b> , CS 239	<i>UCLA</i>
2018	<b>Advanced Data + Knowledge Bases</b> , CS 240B	<i>UCLA</i>

## Honors & Awards

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2019	<b>Magna Cum Laude</b> , 3.90 / 4.00 GPA	<i>UCLA</i>
2012	<b>Magna Cum Laude</b> , 3.85 / 4.00 GPA	<i>University of Florida</i>
2008 - 2012	<b>Recipient</b> , Bright Futures Academic Scholarship	<i>University of Florida</i>
2011 - 2012	<b>Recipient</b> , Anderson Scholar with Distinction	<i>University of Florida</i>

## Extracurricular Activity

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2020-2021	<b>Mentor</b> , Queers in STEM	<i>Los Angeles, CA</i>
2019	<b>Volunteer</b> , TreePeople	<i>Los Angeles, CA</i>
2018	<b>Volunteer</b> , Gay for Good (G4G)	<i>Los Angeles, CA</i>
2017	<b>Volunteer</b> , Los Angeles LGBT Center	<i>Los Angeles, CA</i>
2014	<b>Volunteer</b> , Stonewall Pride	<i>Wilton Manors, FL</i>
2009	<b>Volunteer Counselor</b> , CDS Interfaith Youth Shelter	<i>Gainesville, FL</i>
2009	<b>Co-founder, Editor, Contributor</b> , Florida Inquiry Journal	<i>Gainesville, FL</i>
2009 - 2010	<b>Volunteer</b> , Habitat for Humanity	<i>Fort Lauderdale, FL</i>
2008 - 2012	<b>Member</b> , UF Entrepreneurship Club	<i>Gainesville, FL</i>