

# Haekyu Park

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My research focuses on **democratizing artificial intelligence (AI)** — helping people more easily access, learn, and understand AI technologies. Specifically, I design and build **interactive visual tools** to help people easily **interpret, explore, and apply AI** to many important domain problems. My long-term goal is to cultivate an AI ecosystem where people of diverse backgrounds, skill sets, and domains would work harmoniously to invent the next AI-powered innovations.

Education	<b>Ph.D., Computer Science</b> Georgia Institute of Technology, Atlanta, GA Advisor: Dr. Polo Chau	Aug 2018 - Present
	<b>B.S., Computer Science and Engineering</b> Seoul National University, Seoul, Republic of Korea Graduated with honors (Cum Laude)	Mar 2012 - Aug 2017
Research Experience	<b>Data Science Intern</b> NVIDIA, Austin, TX Mentor: Bartley Richardson, Brad Rees, Joe Eaton Internship results are integrated into NVIDIA RAPIDS team's <a href="#">cybersecurity use case notebook</a> , presented at <a href="#">KDD 2019 NVIDIA RAPIDS tutorial</a> .	May 2019 - Aug 2019
	<b>Graduate Research Assistant</b> Georgia Institute of Technology, Atlanta, GA	Aug 2018 - Present
	<b>Undergraduate Research Assistant</b> Seoul National University, Seoul, Republic of Korea	June 2016 - Aug 2017
Honors and Awards	<b>"Thank a Teacher" Award</b> Center for Teaching & Learning (CTL), Georgia Institute of Technology	2019
	<b>WiML Travel Funding</b> \$550 Travel Funding for Women in Machine Learning Workshop, co-located with NeurIPS	2019
	<b>Amazon AWS Research Grant</b> Co-PIs: Nilaksh Das, Scott Freitas, Duen Horng Chau Funded \$5,000 in AWS cloud credits	2018
	<b>National Scholarship For Science and Engineering</b> Merit-based	2015
Publications	<b>Massif: Interactive Interpretation of Adversarial Attacks on Deep Learning</b> Nilaksh Das*, <a href="#">Haekyu Park*</a> , Zijie J. Wang, Fred Hohman, Robert Firstman, Emily Rogers, Duen Horng Chau Extended Abstracts; ACM Human Factors in Computing Systems (CHI). Honolulu, HI, USA, 2020. *Authors contributed equally. <a href="#">[PDF]</a>	
	<b>CNN 101: Interactive Visual Learning for Convolutional Neural Networks</b> Zijie J. Wang, Robert Turko, Omar Shaikh, <a href="#">Haekyu Park</a> , Nilaksh Das, Fred Hohman, Minsuk Kahng, Duen Horng Chau Extended Abstracts; ACM Human Factors in Computing Systems (CHI). Honolulu, HI, USA, 2020. <a href="#">[PDF]</a>	

**Summit: Scaling Deep Learning Interpretability by Visualizing Activation and Attribution Summarizations**

Fred Hohman, [Haekyu Park](#), Caleb Robinson, Duen Horng Chau

IEEE Transactions on Visualization and Computer Graphics (TVCG). 2020.

[\[PDF\]](#) [\[Demo\]](#)

**Visual Analytics for Interpretability on Deep Neural Networks**

[Haekyu Park](#), Fred Hohman, Nilaksh Das, Caleb Robinson, Duen Horng Chau

Women in Machine Learning Workshop (WiML), 2019.

[\[PDF\]](#) [\[Poster\]](#)

**MLsploit: A Framework for Interactive Experimentation with Adversarial Machine Learning Research**

Nilaksh Das, Siwei Li, Chanil Jeon, Jinho Jung, Shang-Tse Chen, Carter Yagemann,

Evan Downing, [Haekyu Park](#), Evan Yang, Li Chen, Michael Kounavis, Ravi Sahita,

David Durham, Scott Buck, Duen Horng Chau, Taesoo Kim, Wenke Lee

Knowledge Discovery and Data Mining (KDD) Workshop - Project Showcase, 2019.

[\[PDF\]](#)

**NeuralDivergence: Exploring and Understanding Neural Networks by Comparing Activation Distributions**

[Haekyu Park](#), Fred Hohman, Duen Horng Chau

Poster, IEEE Pacific Visualization Symposium (PacificVis), 2019.

[\[PDF\]](#) [\[Demo\]](#)

**SIDE: Representation Learning in Signed Directed Networks**

Junghwan Kim, [Haekyu Park](#), Ji-Eun Lee, and U Kang

The Web Conference (WWW), 2018.

[\[PDF\]](#) [\[Website\]](#)

**A Comparative Study of Matrix Factorization and Random Walk with Restart in Recommender Systems**

[Haekyu Park](#), Jinhong Jung, and U Kang

IEEE Big Data, 2017.

[\[PDF\]](#) [\[Website\]](#)

Talks and  
Presentations

**Accelerated Data Science in the Classroom: Teaching Analytics and Machine Learning with RAPIDS**

Polo Chau and [Haekyu Park](#)

Mar 2020, Talk, NVIDIA's GPU Technology Conference (GTC)

**NeuralDivergence: Exploring and Understanding Neural Networks by Comparing Activation Distributions**

Apr 2019, Poster Presentation, PacificVis

**A Comparative Study of Matrix Factorization and Random Walk with Restart in Recommender Systems**

Dec 2017, Oral Presentation, IEEE Big Data

Tutorial

**RAPIDS and Cybersecurity: A Network Use Case**

2019

Keywords: RAPIDS, NVIDIA, GPU-acceleration, Graph, Personalized Page Rank

Presented at [KDD 2019 NVIDIA RAPIDS tutorial](#) with the [cybersecurity use case notebook](#).

Teaching

**Graduate Teaching Assistant**

Fall 2019

Georgia Institute of Technology, Atlanta, GA

Data and Visual Analytics (CSE 6242)

Designed homeworks, held weekly office hours, and mentored student team projects for 264 students.

Instructor: Polo Chau

Mentoring	<b>Rob Firstman</b>	Fall 2019 - Present
	B.S. in Computer Science, Georgia Institute of Technology Visualization for deep learning interpretability	
	<b>Robert Turko</b>	Fall 2019 - Present
	B.S. in Computer Science, Georgia Institute of Technology Visualization for machine learning education	
	<b>Omar Shaikh</b>	Fall 2019 - Present
	B.S. in Computer Science, Georgia Institute of Technology Visualization for natural language processing	
Open-source Research Projects	<b>Summit: Scaling Deep Learning Interpretability by Visualizing Activation and Attribution Summarizations</b> Interactive visualization that scalably summarizes what features a deep learning model has learned and how those features interact to make predictions. It was published at IEEE VIS (VAST), 2019. Fred Hohman, <a href="#">Haekyu Park</a> , Caleb Robinson, Duen Horng Chau <a href="#">[Demo]</a>	
	<b>MLsploit: A Framework for Interactive Experimentation with Adversarial Machine Learning Research</b> User-friendly, cloud-based system that enables researchers and practitioners to rapidly evaluate and compare state-of-the-art adversarial attacks and defenses for machine learning (ML) models. It was published at a KDD 2019 Project Showcase.	
	<b>SIDE: Representation Learning in Signed Directed Networks</b> General network embedding method that represents both sign and direction of edges in the embedding space. It was published at the Web Conference (WWW), 2018.	
	<b>A Comparative Study of Matrix Factorization and Random Walk with Restart in Recommender Systems</b> We provide a comparative study of matrix factorization and RWR, which are the most representative recommender systems. It was published at IEEE Big Data, 2017.	
Professional Service	<b>Reviewer</b>	
	WiML 2019	
	KDD 2019	
	ICML 2019	
	<b>Professional Membership</b>	
	The Institute of Electrical and Electronics Engineers (IEEE). Since 2019.	
Projects	<b>RAPIDS and Cybersecurity: A Network Use Case</b>	2019
	Keywords: RAPIDS, NVIDIA, GPU-acceleration, Graph, Personalized Page Rank Presented at <a href="#">KDD 2019 NVIDIA RAPIDS tutorial</a> with the <a href="#">cybersecurity use case notebook</a> .	
	<b>Recommender System for Videos on Oksusu Application</b>	2017
	Keywords: Deep Learning, Sequence/Word Embedding, Approx. k-NN, Heterogeneous Features SK Telecom, Seoul, Republic of Korea	
	<b>A Fast Data Compression with Shared Virtual Memory in Heterogeneous System Architecture</b>	2017
	Keywords: OpenCL, GPGPU, SVM, HSA Undergraduate thesis	
	<b>Personalized Recommendation for Credit Card Rewards</b>	2016
	Keywords: Coupled Matrix Factorization, Time Series Data Hyundai Card, Seoul, Republic of Korea	

## Skills

### **Programming Languages**

Python, JavaScript, HTML, R, Matlab, Java, C, C++, Ocaml, Scheme

### **Machine Learning / Deep Learning / Data Science**

TensorFlow, PyTorch, Keras, scikit-learn, OpenCV, Numpy, Pandas, SciPy, NetworkX

### **GPU-accelerated Data Science**

cuGraph, cuDF, cuML, BlazingSQL, OpenCL

### **Data Visualization**

D3.js, HoloViews, Matplotlib, WebGL, ggplot