

# Seongmin Lee

PH.D. STUDENT IN COMPUTER SCIENCE AT GEORGIA INSTITUTE OF TECHNOLOGY

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## Summary

I'm a Ph.D. student in Computer Science at Georgia Tech, advised by Professor Polo Chau. My research aims to provide explanations and interpretations for various machine learning techniques based on visualization. I received my B.S. in Electrical and Computer Engineering from Seoul National University in February 2021. I have collaborated with researchers and developers of Cisco Systems, Inc. and AVAST Software.

## Education

### Georgia Institute of Technology

PH.D. IN COMPUTER SCIENCE

Advisor: Prof. Duen Horng (Polo) Chau

Georgia, USA

Aug. 2021 - Present

### Seoul National University

B.S. IN ELECTRICAL AND COMPUTER ENGINEERING

Graduated with Summa Cum Laude. Overall GPA: 3.91/4.0, Major GPA: 3.94/4.0

Seoul, South Korea

Mar. 2016 - Feb. 2021

### Korea Science Academy of KAIST

MATH AND SCIENCE SPECIALIZED HIGH SCHOOL

One year early entrance, Graduated with distinction in GPA

Busan, South Korea

Feb. 2013 - Feb. 2016

## Research Experience

### Cisco Systems, Inc.

PHD INTERN

Mentor: Ali Payani

- Added machine learning explanation and visualization features to RAI, a (to be) open-sourced project for responsible AI.
- Improved disentangled representation learning algorithms and visualized the results for better interpretability.
- Investigated CNNs by visualizing how the concepts in the input images affect the feature representations from the neural networks using synthetic data.

California, USA (Remote)

May. 2022 - Jul. 2022

### Polo Club of Data Science, Georgia Institute of Technology

GRADUATE RESEARCH ASSISTANT

Advisor: Duen Horng (Polo) Chau

- Led a project to help people assess website reliability by providing visual explanations of how each website engages in spreading false information.
- Developed an interactive visualization tool to detect biases in CNN classifiers.
- Participating in a project to investigate how a concept evolves while training neural networks.

Georgia, USA

Aug. 2021 - Present

### Data Mining Lab, Seoul National University

UNDERGRADUATE RESEARCH INTERNSHIP

Advisor: Prof. U Kang

- Investigated multi-source domain adaptation under various constraints and settings.
- Resolved the limitation of BERT that the tasks with few training data are hard to fine-tune by pruning proper attention heads based on reinforcement learning.

Seoul, South Korea

Jan. 2020 - Feb. 2021

### Communication and Machine Learning Laboratory, Seoul National University

UNDERGRADUATE RESEARCH INTERNSHIP AND BACHELOR'S THESIS

Advisor: Prof. Jungwoo Lee

- Studied the problem of class imbalance and uncertainty in semantic segmentation.

Seoul, South Korea

Sep. 2019 - Apr. 2020

### Biomedical Precision Laboratory, The University of Tokyo

UNDERGRADUATE RESEARCH INTERNSHIP

Advisor: Dr. Keiichi Nakagawa, Dr. Ayumu Ishijima

- Collaborated with 3 students majoring in biology and physics to observe interaction between human cells and acoustic waves.
- Constructed a microscopic motion-picture camera with sub-nano spatial/temporal resolution using optical equipments and laser.
- Processed the microscopic images using Matlab for better analysis.

Tokyo, Japan

Jul. 2018 - Aug. 2018

## Publications

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### Explaining Website Reliability by Visualizing Hyperlink Connectivity

Seongmin Lee, Sadia Afroz, Haekyu Park, Zijie J. Wang, Omar Shaikh, Vibhor Sehgal, Ankit Peshin, and Duen Horng (Polo) Chau  
IEEE Visualization and Visual Analytics (VIS), 2022

### NOVA: A Practical Method for Creating Notebook-Ready Visual Analytics

Zijie J. Wang, David Munechika, Seongmin Lee, and Duen Horng (Polo) Chau  
IEEE Visualization and Visual Analytics (VIS) Poster, 2022

### VisCUIT: Visual Auditor for Bias in CNN Image Classifier

Seongmin Lee, Zijie J. Wang, Judy Hoffman, and Duen Horng Chau  
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Demo Track, 2022

### MisVis: Explaining Web Misinformation Connections via Visual Summary

Seongmin Lee, Sadia Afroz, Haekyu Park, Zijie J. Wang, Omar Shaikh, Vibhor Sehgal, Ankit Peshin, and Duen Horng Chau  
CHI Conference on Human Factors in Computing Systems Extended Abstracts, 2022

### Multi-EPL: Accurate Multi-Source Domain Adaptation

Seongmin Lee, Hyunsik Jeon, and U Kang  
PLOS ONE, 2021

### AUBER: Automated BERT Regularization

Hyun Dong Lee\*, Seongmin Lee\*, and U Kang (\* These authors contributed equally to this work)  
PLOS ONE, 2021

### Unsupervised Multi-Source Domain Adaptation with No Observable Source Data

Hyunsik Jeon, Seongmin Lee, and U Kang  
PLOS ONE, 2021

## Patent

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### Pruning Method for Attention Head in Transformer Neural Networks for Regularization and Apparatus Thereof

Seongmin Lee, Hyun Dong Lee, and U Kang  
10-2020-0162397, 2020

## Honors & Awards

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### The Presidential Science Scholarship

KOREA SCIENCE AID FOUNDATION

Mar. 2016 - Dec. 2019

### SNU Engineering Honor Society (STEM)

COLLEGE OF ENGINEERING, SNU

Mar. 2018 - Dec. 2019

### Voluntary Service Award

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING, SNU

Dec. 2018, Dec. 2017

## Talks

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“MisVis: Explaining Web Misinformation Connections via Visual Summary”, Georgia Tech, School of CSE Recruiting Event

Nov. 2022

“Explaining Website Reliability by Visualizing Hyperlink Connectivity”, AVAST Software, Fake News Monthly Sync Up

Spring 2022

“Multi-Source Domain Adaptation with Pseudo-labels”, Seoul National University, AIIS Retreat

Jun. 2020

## Teaching

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Data and Visual Analytics (CSE 6242), Graduate Teaching Assistant

Fall 2022

Deep Learning Course for LG Chem, Lab session lecturer

Jan. 2021

Deep Learning Course for SK Hynix, Lab session lecturer

Nov. 2020

Introduction to Algorithm, SNU, Undergraduate student tutor

Fall 2020, Fall 2019

Introduction to Physics I, SNU, Undergraduate student tutor

Spring 2017

## Grants and Funding

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### Meta Research Funding (\$50k)

2022

PIs: Polo Chau

Co-authored proposal on developing novel visualization to curb and quantify misinformation consumption.

### Cisco Research Funding (\$150k)

2022

PIs: Polo Chau

Co-authored proposal.

## Skills

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**Programming** C/C++, Python, Java, Verilog, HTML/CSS/Javascript

**Frameworks** Tensorflow, PyTorch

**Languages** Korean (Native), English (iBT: 109 (R28/L28/S26/W27), GRE: Verbal 163, Writing 4.5)

## Extracurricular Activity

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### GTKSA (Georgia Tech Korean Student Association)

Aug. 2021 - Present

Serving as a secretary and web administrator.

### SNU Buddy

Sep. 2020 - Dec. 2020

Buddy program for the international exchange students. Used to be a group leader.

### SNU Engineering Honor Society (STEM)

Mar. 2018 - Dec. 2019

Organized academic seminars, international round table, and mentoring programs as a vice president.

### Vision Mentoring, Seoul National University

Jul. 2019

Lectured high school students on engineering (More than 700 students attended)

### Dream Camp Mentoring, Seoul National University

Feb. 2019, Feb. 2018

Educated high school students in the countryside by designing a mentoring program

### Student Vice President

Nov. 2017 - Oct. 2018

Elected as a vice president of the Department of Electrical and Computer Engineering, SNU

### Student Reporter

Sep. 2017 - Feb. 2021

Published brochures about the Department of Electrical and Computer Engineering every semester

### Talent Sharing Volunteer Camp, KOSAF

Jan. 2017, Aug. 2016

Conducted self-planned mentoring for elementary school students in underprivileged areas in Korea