

# Zijie Jay Wang

<https://zijie.wang> [jayw@gatech.edu](mailto:jayw@gatech.edu)

## Education

### Georgia Institute of Technology

Ph.D. in Machine Learning

Advisor: Duen Horng (Polo) Chau

Atlanta, GA

Aug. 2019 – Present

### University of Wisconsin–Madison

Bachelor of Science (B.S.), GPA: 3.95/4.00

Majors: Computer Sciences (Honor), Statistics (Honor), Mathematics

Thesis: *Classifying T Cell Activity with Convolutional Neural Networks*

Advisors: Anthony Gitter, Michael Gleicher, Yu Hen Hu

Madison, WI

Sept. 2015 – May 2019

## Academic Research Experience

### Georgia Institute of Technology

Ph.D. Researcher, School of Computational Science and Engineering

Mentor: Duen Horng (Polo) Chau

Member of the Polo Club of Data Science where we innovate scalable, interactive, and interpretable tools that amplify human's ability to understand and interact with billion-scale data and machine learning models.

Atlanta, GA

Aug. 2019 – Present

### Morgridge Institute for Research

Undergraduate Researcher, John W. and Jeanne M. Rowe Center for Research in Virology

Mentor: Anthony Gitter

Classify T-cell and breast cancer cell types using fluorescent images with machine learning classifiers with a gradient of complexity.

Interprete feature representations of each classifiers. Analyze about 1 million 5-channel cell-painting images of bone tumor cells. Explore latent space between image space and chemical molecule space.

Madison, WI

Dec. 2017 – Aug. 2019

### University of Wisconsin–Madison

Undergraduate Researcher, Department of Computer Sciences

Mentor: Michael Gleicher

Design and develop a visual analytics tool for recommender system researchers. Interactively visualized user-item rating matrix with statistics-conditioned sub-sampling to spot abnormal ratings and predictions.

Madison, WI

Dec. 2018 – June 2019

### University of Wisconsin–Madison

Research Assistant, Electrical & Computer Engineering

Mentor: Yu Hen Hu

Study how to track car driver's head position and orientation from low-quality traffic video. Develop semi-automatic video annotation

software with Viola-Jones frontal facedetector for training object tracking algorithms. Implement real-time face tracking algorithms on iOS devices. Train a facial reenactment model using GANs and port it to iOS device.

Madison, WI

Feb. 2017 – Dec. 2017

## Industry Research Experience

### Bosch Research

Research Intern, Human–Machine Interaction

Mentor: Liang Gou

Research and develop explainable machine learning models and visual analytics solutions to help autonomous driving domain experts understand and control adversarial case generation for object recognition.

Sunnyvale, CA

June 2020 – Aug. 2020

## Publications

### CNN Explainer: Learning Convolutional Neural Networks with Interactive Visualization

Zijie J. Wang, Robert Turko, Omar Shaikh, Haekyu Park, Nilaksh Das, Fred Hohman, Minsuk Kahng, Duen Horng (Polo) Chau  
*IEEE Transactions on Visualization and Computer Graphics (TVCG)*. Salt Lake City, UT, USA, 2021.

 Project  Demo  Video  PDF  Code (★ 4984)  BibTeX  Top of GitHub Trending

### Bluff: Interactively Deciphering Adversarial Attacks on Deep Neural Networks

Nilaksh Das\*, Haekyu Park\*, Zijie J. Wang, Fred Hohman, Robert Firstman, Emily Rogers, Duen Horng (Polo) Chau

*IEEE Visualization Conference (VIS)*. Salt Lake City, UT, USA, 2020.

 Project  Demo  PDF  Code  BibTeX (\* Authors contributed equally)

## A Comparative Analysis of Industry Human-AI Interaction Guidelines

Austin P. Wright, **Zijie J. Wang**, Haekyu Park, Grace Guo, Fabian Sperrle, Mennatallah El-Assady, Alex Endert, Daniel Keim, Duen Horng (Polo) Chau







IEEE Visualization Conference, Workshop on Trust and Expertise in Visual Analytics (TRES). Salt Lake City, UT, USA, 2020.

 Project  Demo  PDF  Code  BibTeX

## Mapping Researchers with PeopleMap

Jon Saad-Falcon, Omar Shaikh, **Zijie J. Wang**, Austin P. Wright, Sasha Richardson, Duen Horng (Polo) Chau

Poster, IEEE Visualization Conference (VIS). Salt Lake City, UT, USA, 2020.

 Project  Demo  PDF  Code (★ 32)  BibTeX  Best Poster Research Award, Honorable Mention

## Argo Lite: Open-Source Interactive Graph Exploration and Visualization in Browsers

Siwei Li, Zhiyan Zhou, Anish Upadhayay, Omar Shaikh, Scott Freitas, Haekyu Park, **Zijie J. Wang**, Susanta Routray, Matthew Hull, Duen Horng (Polo) Chau

The Conference on Information and Knowledge Management (CIKM). Galway, Ireland, 2020.

 Project  Demo  PDF  Code (★ 29)  BibTeX

## UnMask: Adversarial Detection and Defense Through Robust Feature Alignment

Scott Freitas, Shang-Tse Chen, **Zijie J. Wang**, Duen Horng (Polo) Chau

IEEE International Conference on Big Data (BigData). Los Angeles, CA, USA, 2020.

 Project  PDF  Code  BibTeX

## Massif: Interactive Interpretation of Adversarial Attacks on Deep Learning

Nilaksh Das\*, Haekyu Park\*, **Zijie J. Wang**, Fred Hohman, Robert Firstman, Emily Rogers, Duen Horng (Polo) Chau

Extended Abstracts on ACM Human Factors in Computing Systems (CHI). Honolulu, HI, USA, 2020.

 Project  PDF  BibTeX (\* Authors contributed equally)

## CNN 101: Interactive Visual Learning for Convolutional Neural Networks

**Zijie J. Wang**, Robert Turko, Omar Shaikh, Haekyu Park, Nilaksh Das, Fred Hohman, Minsuk Kahng, Duen Horng (Polo) Chau

Extended Abstracts on ACM Human Factors in Computing Systems (CHI). Honolulu, HI, USA, 2020.

 Project  Video  PDF  BibTeX

## Classifying T cell activity in autofluorescence intensity images with convolutional neural networks

**Zijie J. Wang**, Alex J. Walsh, Melissa C. Skala, Anthony Gitter

Journal of Biophotonics (J. Biophotonics). 2019.

 Project  PDF  Slides  Code  Data  BibTeX

## Classifying T cell activity with convolutional neural networks

**Zijie J. Wang**, Alex J. Walsh, Melissa C. Skala, Anthony Gitter

International Society for Computational Biology Great Lakes Bioinformatics Conference (ISCB GLBIO). Madison, WI, USA, 2019.

 Project  PDF  BibTeX

## Using Transfer Learning to Classify Breast Cancer Cells with Fluorescence Imaging

**Zijie J. Wang**, Tiffany M. Heaster, Quan Yin, Alex J. Walsh, Melissa C. Skala, Anthony Gitter

University of Wisconsin–Madison Undergraduate Symposium. 2018.

 Project  PDF  BibTeX

## Invited Talks

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### CNN Explainer: Learning Convolutional Neural Networks with Interactive Visualization

IEEE Visualization Conference

Oct. 2020

Deepkapha LiveAI 

Aug. 2020

### Classifying T cell activity with convolutional neural networks

Out in Science, Technology, Engineering, and Mathematics (oSTEM) Conference

Nov. 2019

UW–Madison Senior Honors Thesis Symposium

April 2019

## Grants and Awards

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### Dean's List

Aug. 2015 – May 2019

Achieved at least a 3.60 GPA as freshmen and sophomores, a 3.85 GPA as juniors and seniors.

### University Book Store Academic Excellence Award (\$1000)

May 2019

An award recognizing undergraduate students who have completed an outstanding independent project, such as a senior thesis.

## Honors Senior Thesis Summer Research Grant (\$3000)

June 2018

A research grant funding students to undertake more demanding and extensive senior thesis research projects.

## Welton Summer Sophomore Apprenticeship (\$2500)

June 2017

A research grant awarded to talented students to participate in actual, cutting-edge research.

## Teaching

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### Graduate Teaching Assistant

Atlanta, GA

Georgia Institute of Technology

Aug. 2020 – Dec. 2020

Data & Visual Analytics (CSE 6242) , Instructor: Duen Horng (Polo) Chau

Lead homework designs for data visualizations, hold weekly office hours, and answer student questions on Piazza. The course had 1277 graduate students enrolled.

### Undergraduate Teaching Assistant

Madison, WI

University of Wisconsin–Madison

Dec. 2018 – May 2019

Computer Graphics (CS 559) , Instructor: Michael Gleicher

Create course notes and weekly assignments, hold weekly office hours, and answer student questions on Piazza. The course had 180 undergraduates enrolled.

### Notetaker

Madison, WI

University of Wisconsin–Madison

Sep. 2016 – May 2019

McBurney Disability Resource Center

Provide clearly-written math and statistics notes to students with disability, answer course-related questions.

### Academic Coach

Madison, WI

University of Wisconsin–Madison

Nov. 2016 – May 2017

Division of Diversity, Equity and Educational Achievement

Mentor undergraduate students in DDEEA programs for Data Structure course, design two worksheets and provided detailed solutions every week.

### Tutor

Madison, WI

University of Wisconsin–Madison

Jan. 2016 – Jan. 2017

Greater University Tutoring Service

Instruct peers one-on-one in programming and math problems for three hours weekly, lead review sections to help students study for calculus exams.

## Mentoring

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### Jon Saad-Falcon

May 2020 – Present

B.S. in Computer Science, Georgia Institute of Technology

### Robert Turko

Aug. 2019 – Present

B.S. in Computer Science, Georgia Institute of Technology

🏆 PURA Travel Award (2020)

### Omar Shaikh

Aug. 2019 – Present

B.S. in Computer Science, Georgia Institute of Technology

🏆 Outstanding Freshman Award (2020)

## Service

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### Reviewer

IEEE Visual Analytics Science and Technology (VAST) 2020

ACM Conference on Information and Knowledge Management (CIKM) 2020

Journal of Open Source Software (JOSS) 2020

### Member

Institute of Electrical and Electronics Engineers (IEEE)

July 2019 – Present

Association for Computing Machinery (ACM)

Dec. 2019 – Present

## Skills

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### Programming

Python, JavaScript, Swift, R, Julia, PyTorch, TensorFlow, Keras, HTML, CSS, LaTeX, SQL, C++, Git

## Design

Affinity Designer, Affinity Photo, Final Cut Pro, Sketch, Keynote, Illustrator, Photoshop

## HCI

Think-aloud protocol, User Personas, Rapid Paper Prototyping, Affinity Diagraming

## References

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**Polo Chau**, Associate Professor

School of Computational Science and Engineering

*Georgia Institute of Technology*

<https://cc.gatech.edu/~dchau/>

**Liang Gou**, Principal Research Scientist

Human–Machine Interaction

*Bosch Research*

<https://www.linkedin.com/in/lianggou/>

**Anghony Gitter**, Assistant Professor

Department of Biostatistics and Medical Informatics

*University of Wisconsin–Madison*

<https://www.biostat.wisc.edu/~gitter/>

**Michael Gleicher**, Professor

Department of Computer Sciences

*University of Wisconsin–Madison*

<http://pages.cs.wisc.edu/~gleicher/>