Ángel Alexander Cabrera

I am a PhD student in the Human Computer Interaction Institute (HCII) at Carnegie Mellon University, advised by Adam Perer and Jason Hong. My research focus is broadly human-centered data science, specifically in applying techniques from HCI and visualization to help people better understand and improve their machine learning models. I am supported by a NSF Graduate Research Fellowship.

Before CMU, I graduated with a B.S. in Computer Science from Georgia Tech where I worked with Polo Chau and Jamie Morgenstern. I've spent time at Apple AI/ML, Microsoft Research, and a few summers as a software engineering intern at Google working on Google Maps, Cloud Dataflow, and Android Auto.

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- ✉ cabrera@cmu.edu
- 🐙 GitHub
- 🎓 Google Scholar

Education

August 2019 - Present	**PhD in Human-Computer Interaction (HCI)** Carnegie Mellon University Advised by Adam Perer and Jason Hong. 🌐 Data Interaction Group
August 2015 - May 2019	**B.S. in Computer Science** Georgia Institute of Technology Concentration in intelligence and modeling/simulation. Minor in economics.
Fall 2017	Sciences Po - Paris, France Exchange program with a focus on economics and political science.

Work Experience

May 2021 - Present	**Apple** Research Intern Design + Visualization Group. 🌐 Apple AI/ML
May 2020 - August 2020	**Microsoft Research** Research Intern Worked on behavioral model understanding with Steven Drucker and Marco Tulio Ribeiro. 🌐 VIDA Group

May 2018 - August 2018	**Google**
	Software Engineering Intern
	Researched and prototyped improvements for automated driver assistance systems and hyperlocal weather prediction for the next generation of Android Auto.
	📰 WSJ Article

May 2017 - August 2017	**Google**
	Software Engineering Intern
	Created an anomaly detection and trend analysis system for Google's data processing pipelines.

May 2016 - August 2016	**Google**
	Engineering Practicum Intern
	Built an analytics platform for monitoring and catching erroneous edits to Google Maps.

Awards

May 2019	**National Science Foundation Graduate Research Fellowship (NSF GRFP)**
	Three-year graduate fellowship for independent research. Full tuition with an annual stipend of $34,000.
	🌐 Website

May 2019	**Love Family Foundation Scholarship**
	Co-awarded the $10,000 scholarship for the undergraduate with the most outstanding scholastic record.
	🌐 Announcement

August 2015 - May 2019	**Stamps President's Scholar**
	Georgia Tech and the Stamps Family Charitable Foundation
	Full ride scholarship with $15,000 in extracurricular funding awarded to 10 incoming students.
	🌐 Website

February 3, 2018	**The Data Open Datathon**
	Correlation One and Citadel Securities
	Placed third and won $2,500 for creating a ML system to predict dangerous road areas.
	📰 Press Release

Refereed Publications

October 2021	**Discovering and Validating AI Errors With Crowdsourced Failure Reports**
	Ángel Alexander Cabrera, Abraham Druck, Jason Hong, Adam Perer
	ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW). Virtual, 2021.
	📄 PDF 🌐 Website

December 2020	**Regularizing Black-box Models for Improved Interpretability**

Gregory Plumb, Maruan Al-Shedivat, Ángel Alexander Cabrera, Adam Perer, Eric Xing, Ameet Talwalkar

Conference on Neural Information Processing Systems (NeurIPS). Vancouver, 2020.

📄 PDF   🌐 Website

October 2020   Designing Alternative Representations of Confusion Matrices to Support Non-Expert Public Understanding of Algorithm Performance

Hong Shen, Haojian Jin, Ángel Alexander Cabrera, Adam Perer, Haiyi Zhu, Jason Hong

ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW). Virtual, 2020.

📄 PDF   🌐 Website

October 2019   FairVis: Visual Analytics for Discovering Intersectional Bias in Machine Learning

Ángel Alexander Cabrera, Will Epperson, Fred Hohman, Minsuk Kahng, Jamie Morgenstern, Duen Horng (Polo) Chau

IEEE Conference on Visual Analytics Science and Technology (VAST). Vancouver, Canada, 2019.

📄 PDF   Ⓜ Blog   ▶ Video   🌐 Demo   ○ Code   🌐 Website

Workshops, Demos, Posters, and Preprints

May 2020   "Public(s)-in-the-Loop": Facilitating Deliberation of Algorithmic Decisions in Contentious Public Policy Domains

Hong Shen, Ángel Alexander Cabrera, Adam Perer, Jason Hong

Fair & Responsible AI Workshop at CHI. Hawaii, USA, 2020.

📄 PDF   🌐 Workshop   🌐 Website

May 2019   Discovery of Intersectional Bias in Machine Learning Using Automatic Subgroup Generation

Ángel Alexander Cabrera, Minsuk Kahng, Fred Hohman, Jamie Morgenstern, Duen Horng (Polo) Chau

Debugging Machine Learning Models Workshop (Debug ML) at ICLR. New Orleans, Louisiana, USA, 2019.

📄 PDF   🌐 Workshop   🌐 Website

June 2018   Interactive Classification for Deep Learning Interpretation

Ángel Alexander Cabrera, Fred Hohman, Jason Lin, Duen Horng (Polo) Chau

Demo at IEEE Computer Vision and Pattern Recognition (CVPR). Salt Lake City, Utah, USA, 2018.

📄 PDF   ▶ Video   🌐 Demo   ○ Code   🌐 Website

Teaching

Fall 2021	**05499:C - Data Visualization** Graduate Teaching Assistant @ Carnegie Mellon
Fall 2016 Spring 2017 Spring 2018	**CS1332 - Data Structures and Algorithms** Undergraduate Teaching Assistant @ Georgia Tech Taught a 1 1/2 hour weekly recitation, graded tests and homework, and helped create assignments.
Fall 2016	**GT 1000 - First-Year Seminar** Team Leader @ Georgia Tech Designed a class curriculum for incoming first years and helped lead a weekly seminar class.

Mentoring

Spring 2021 - Present	**Kazi Jawad** B.S. in Statistics and Machine Learning, Carnegie Mellon Interactive tagging of images for AI error validation.
Spring 2020 - Present	**Abraham Druck** B.S. in Mathematical Sciences, Carnegie Mellon Crowdsourced discovery of ML blind spots for image captioning.
Fall 2020 Spring 2020	**CMU AI Mentoring Program**

Service

	Student Volunteer
October 2019	IEEE Visualization (VIS)
January 2019	ACM Fairness, Accountability, and Transparency (FAT*)
	Reviewer
2019 - 2021	IEEE Transactions on Visualization and Computer Graphics (TVCG)
2020 - 2021	IEEE Visualization (VIS)
2021	ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW)
2021	ACM Conference on Human Factors in Computing Systems (CHI)
2019	ACM Transactions on Interactive Intelligent Systems (TiiS)

Press & Talks

2021	"Data Science Widgets with Svelte and Jupyter" - *Svelte Summit 2021*
2020	"New forecasting data could help public health officials prepare for what's next in the coronavirus pandemic" - *CNN*
2020	"Facebook and Google Survey Data May Help Map Covid-19's Spread" - *Wired*
2020	"Carnegie Mellon Unveils Five Interactive COVID-19 Maps" - *Carnegie Mellon*

2020	"Visualizing Fairness in Machine Learning" - *Data Stories Podcast*
2019	"Alex Cabrera Wins Love Family Foundation Scholarship" - *GT SCS*
2019	"Georgia Tech Satellite Successfully Launched Into Space " - *Georgia Tech*
2018	"Datathon Challenges Students to Create Solutions to Real-World Problems" - *GT SCS*

Projects and Open Source

Spring 2021   **Svelte + Vega**
A Svelte component for reactively rendering Vega and Vega-Lite visualizations.
 GitHub   Demo

Spring 2021   **Svelte + Jupyter Widgets**
A framework for creating reactive data science widgets using Svelte JS.
M Blog   GitHub   Video

Spring 2020   **COVIDCast Visualization of COVID-19 Indicators**
Interactive visualization system of COVID-19 indicators gathered through >20,000,000 surveys on Facebook and Google by CMU Delphi.
 Website   GitHub

September 2015 - May 2017   **PROX-1 Satellite**
Flight Software Lead and Researcher
Led a team of engineers in developing the software for a fully undergraduate-led satellite mission.
 In space!   Press release

Spring 2014   **CTF Resources**
Guide and resources for capture the flag (CTF) competitions with over 1.4k stars on GitHub.
 Website   GitHub

Selected Classes

PhD   Causality and Machine Learning
Human Judgement and Decision Making
Applied Research Methods

B.S.   Deep Learning
Data and Visual Analytics
Machine Learning
Computer Simulation
Honors Algorithms