

Alexa F. Siu

afsiu@stanford.edu || www.alexasiu.com

keywords: human-computer interaction, haptics, accessibility

Education

- PhD in Mechanical Engineering - Design and HCI** 2017-2021 (Expected)
Stanford University (Stanford, CA)
▶ Thesis Committee: Sean Follmer (advisor), James Landay, Allison Okamura
- MS in Mechanical Engineering** 2015-2017
Stanford University (Stanford, CA)
▶ Focus: Design, Mechatronics, Dynamics
- BS in Biomedical Engineering** 2011-2015
Georgia Institute of Technology (Atlanta, GA)
▶ Minor in Computer Science - Artificial Intelligence
▶ Highest Honors

Professional Experience

- Graduate Research Assistant** 2015-Present
Stanford University SHAPE Lab (Stanford, CA)
Advised by Sean Follmer
▶ Investigating multimodal perception and interaction to support people who are blind in accessing spatial information (e.g., 3D designs, STEM diagrams, data visualization).
▶ Engaging in participatory design to work closely with community stakeholders and develop new tools and workflows rooted in users' needs and practices.
- Research Intern** Summer 2019
Microsoft Research Ability Team (Redmond, WA)
Advised by Ed Cuttrell
Collaborators: Mike Sinclair, Rob Kovacs, Eyal Ofek, Christian Holz
▶ Explored the design of immersive virtual reality (VR) experiences accessible to people who are blind.
▶ Led the system architecture, hardware development, and user evaluation of a VR controller that employs a novel three-axis brake mechanism to render kinesthetic and tactile feedback.
▶ Collaborated across teams and managed tight deadlines for publication; resulting in two co-authored manuscripts published at top-tier HCI conferences. Received a Best Paper Honorable Mention.
- Research Intern** Summer 2018
HP Inc - Immersive Experiences Lab
Manager: Alexander Thayer
Collaborators: Jiwon Jun, Eric Faggin, Tico Ballagas
▶ Investigated how we might leverage 3D printed auxetic properties to design parts with embedded sensing and interactivity using HP Inc's novel multi jet fusion 3D printer.
▶ Research and technical development to realize 3D printed auxetic parts. Working with product teams to expand and showcase the capabilities of HP's 3D printing technology to potential customers.

- ▶ Presented at the quarterly HP Labs all-hands meetings and contributed to demos for the HP customer welcome center.

Undergraduate Research Assistant (Amgen Scholar)

Summer 2014

Stanford University CHARM Lab (Stanford, CA)

Advised by Allison Okamura

Collaborators: Nicholas Colonnese, Caroline M. Abbott

- ▶ Conducted a controlled user study to characterize the effect of time delay and low-pass filtering on human perception of stiffness and damping in haptic displays.
- ▶ Designed a physical variable stiffness and damping environment to interact with the Phantom Premium haptic device to analyze the performance of a bilateral teleoperator.

Undergraduate Research Assistant

2011-2015

Georgia Institute of Technology Lam Lab (Atlanta, Georgia)

Undergraduate Research Assistant advised by Wilbur Lam

Collaborators: Byungwook Ahn, Yumiko Sakurai, Erika Tyburski

- ▶ Investigated the interaction of neutrophil extracellular traps (NETs) and whole blood in thrombosis.
- ▶ Developed a children's educational outreach program (BME HealthReach) to implement at hospitals.
- ▶ Assisted in validation through clinical trials and prototyping of an anemia diagnostic device (AnemoCheck) at Children's Healthcare of Atlanta.

Academic Publications

Google Scholar: <https://scholar.google.com/citations?user=1bEAnsEAAAAJ>

Refereed Conference & Journal Articles [stringently peer-reviewed]

1. **Alexa F. Siu**, Danyang Fan, Gene S-H Kim, Hrishikesh V. Rao, Xavier Vazquez, Sile O'Modhrain, Sean Follmer. 2021. COVID-19 Highlights the Issues Facing Blind and Visually Impaired People in Accessing Data on the Web. In Proceedings of the 18th International Web for All Conference (W4A' 21).
2. Robert Kovacs, Eyal Ofek, Mar Gonzalez Franco, **Alexa F. Siu**, Sebastian Marwecki, Christian Holz, Mike Sinclair. 2020. Haptic PIVOT: On-Demand Handhelds in VR. In Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology (UIST '20), pp. 321-330. [Acceptance Rate: 20.6%]
3. **Alexa F. Siu**, Mike Sinclair, Rob Kovacs, Christian Holz, Eyal Ofek, and Edward Cutrell. 2020. Virtual Reality Without Vision: A Haptic and Auditory White Cane to Navigate Complex Virtual Worlds. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20). Association for Computing Machinery, New York, NY, USA. DOI: <https://doi.org/10.1145/3313831.3376353>. [Acceptance Rate: 24.3%] **Best Paper Honorable Mention (Top 5%)**
4. **Alexa F. Siu**, Son Kim, Joshua A. Miele and Sean Follmer. 2019. shapeCAD: An Accessible 3D Modelling Workflow for the Blind and Visually Impaired Via 2.5D Shape Displays. In The 21st International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '19). Association for Computing Machinery, New York, NY, USA (pp. 342-354). DOI: <https://doi.org/10.1145/3308561.3353782>. [Acceptance Rate: 25%] **Best Paper Nominee**
5. Cynthia L. Bennett, Abigale Stangl, **Alexa F. Siu** and Joshua A. Miele. 2019. Making Nonvisually: Lessons from the Field. In The 21st International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '19). Association for Computing Machinery, New York, NY, USA, 279-285. DOI: <https://doi.org/10.1145/3308561.3355619>. [Acceptance Rate: 25%]

6. Michael A. Lin, **Alexa F. Siu**, Jung Hwa Bae, Mark R. Cutkosky and B. L. Daniel (2018). HoloNeedle: Augmented-reality Guidance System for Needle Placement Investigating the Advantages of 3D Needle Shape Reconstruction. IEEE Robotics and Automation Letters (RA-L). [Acceptance Rate: 40.6%]
7. **Alexa F. Siu**, Eric J. Gonzalez, Shenli Yuan, Jason B. Ginsberg, and Sean Follmer. 2018. shapeShift: 2D Spatial Manipulation and Self-Actuation of Tabletop Shape Displays for Tangible and Haptic Interaction. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18). ACM, New York, NY, USA. DOI: http://dx.doi.org/10.475/123_4. [Acceptance Rate: 25%]
8. Nicholas Colonnese, **Alexa F. Siu**, Caroline M. Abbott and Allison M. Okamura (2015) Rendered and Characterized Closed-loop Accuracy of Impedance-type Haptic Displays. IEEE Transactions on Haptics, 8(4):434-446.
9. Erika A. Tyburski, Scott E. Gillespie, William A. Stoy, Robert G. Mannino, Alexander J. Weiss, **Alexa F. Siu**, Rayford H. Bulloch et al. "Disposable platform provides visual and color-based point-of-care anemia self-testing." The Journal of clinical investigation 124, no. 10 (2014): 4387-4394.

Refereed Posters, Demonstrations & Extended Abstracts [peer-reviewed]

1. Danyang Fan, **Alexa F. Siu**, Sile O'Modhrain and Sean Follmer. (2020, October). Constructive Visualization to Inform the Design and Exploration of Tactile Data Representations. In The 22nd International ACM SIGACCESS Conference on Computers and Accessibility. [Acceptance Rate: 61.5%]
2. Lawrence H Kim, Abena Boadi-Agyemang, **Alexa F. Siu** and John Tang. (2020, October). Constructive Visualization to Inform the Design and Exploration of Tactile Data Representations. In The 22nd International ACM SIGACCESS Conference on Computers and Accessibility. [Acceptance Rate: 61.5%]
3. Elyse D. Z. Chase*, **Alexa F. Siu***, Abena Boadi-Agyemang, Gene S-H Kim, Eric J. Gonzales and Sean Follmer. (2020, October). PantoGuide: A Haptic and Audio Guidance System To Support Tactile Graphics Exploration. In The 22nd International ACM SIGACCESS Conference on Computers and Accessibility. [Acceptance Rate: 61.5%] *authors contributed equally
4. Olutayo Falase, **Alexa F. Siu** and Sean Follmer. (2019, October). Tactile Code Skimmer: A Tool to Help Blind Programmers Feel the Structure of Code. In The 21st International ACM SIGACCESS Conference on Computers and Accessibility (pp. 536-538). [Acceptance Rate: 58%]
5. Jiwon W. Jun and **Alexa F. Siu**. 2019. An Exploration of 3D-Printed Metamaterial Structures. In Symposium On Computational Fabrication (SCF '19). ACM, Pittsburgh, PA.
6. **Alexa F. Siu**, Joshua A. Miele and Sean Follmer. 2018. An Accessible CAD Workflow Using Programming of 3D Models and Preview Rendering in A 2.5D Shape Display. In Proceedings of the 20th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '18). ACM, Galway, Ireland. DOI: <https://doi.org/10.1145/3234695.3240996>.
7. **Alexa F. Siu**, Eric J. Gonzalez, Shenli Yuan, Jason B. Ginsberg, Allen R. Zhao and Sean Follmer. 2018. shapeShift: A Mobile Tabletop Shape Display for Tangible and Haptic Interaction. In IEEE Haptics Symposium (HS '18), San Francisco, CA.
8. **Alexa F. Siu**, Eric J. Gonzalez, Shenli Yuan, Jason B. Ginsberg, Allen R. Zhao and Sean Follmer. 2017. shapeShift: A Mobile Tabletop Shape Display for Tangible and Haptic Interaction. In Adjunct Publication of the 30th Annual ACM Symposium on User Interface Software and Technology (UIST '17). ACM, New York, NY, USA, 77-79. DOI: <https://doi.org/10.1145/3131785.3131792>.

Best Demo Honorable Mention

Refereed Symposia & Consortia [peer-reviewed]

1. **Alexa F. Siu**. 2019. Advancing Accessible 3D Design for the Blind and Visually Impaired via Tactile Shape Displays. In The Adjunct Publication of the 32nd Annual ACM Symposium on User Interface

Software and Technology (UIST '19). Association for Computing Machinery, New York, NY, USA, 146–149. DOI:<https://doi.org/10.1145/3332167.3356875>

2. **Alexa F. Siu**. 2019. Advancing Accessible 3D Design for the Blind and Visually Impaired via Tactile Shape Displays. In The Adjunct Publication of the 21st International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '19). Association for Computing Machinery, New York, NY, USA.

Book Chapters

1. **Alexa F. Siu**, Elyse D. Z. Chase, Gene S-H Kim, Abena Boadi-Agyemang, Eric J. Gonzalez and Sean Follmer (2021). Haptic Guidance to Support Design Education and Collaboration for Blind and Visually Impaired People. In: Plattner H., Meinel C., Leifer L. (eds) Design Thinking Research. Understanding Innovation. Springer, Cham
2. **Alexa F. Siu**, Shenli Yuan, Hieu Pham, Eric J. Gonzalez, Lawrence H. Kim, Mathieu Le Goc, Sean Follmer (2018). Investigating Tangible Collaboration for Design Towards Augmented Physical Telepresence. In: Plattner H., Meinel C., Leifer L. (eds) Design Thinking Research. Understanding Innovation. Springer, Cham

Teaching Experience

Designing for Accessibility (CS 377Q) - Upper Undergraduate Level Stanford University (Stanford, CA) Course Assistant with instructor John Tang	Spring 2020
Design Impact Master's Project I (ME 316A) - Graduate Level Stanford University (Stanford, CA) Course Assistant with instructors Sean Follmer & David Kelley	Fall 2019
Introduction to the Design of Smart Products (ME 216M) - Graduate Level Stanford University (Stanford, CA) Course Assistant with instructor Sean Follmer	Spring 2018 & 2019
Introduction to Artificial Intelligence (CS 3600) - Undergraduate Level Georgia Institute of Technology (Atlanta, GA) Course Assistant with instructor Jim Rehg	Spring 2015
Introduction to Bioengineering Statistics (BMED 2400) - Undergraduate Level Georgia Institute of Technology (Atlanta, GA) Course Assistant with instructor Brani Vidakovic	Fall 2014

Funding Grants, Awards & Honors

Learning by Touch: Preparing Blind Students to Participate in the Data Science Revolution (\$328,000) . National Science Foundation Collaborative Grant (Cyber Learning at the Human Technology Frontier).	2020
Best Paper Honorable Mention . CHI' 20.	2020
Haptic Guidance to Support Design Education and Collaboration for Blind and Visually Impaired People (\$150,000) . Hasso-Plattner Design Thinking Research Grant.	2020

Best Paper Nominee. ASSETS' 19.	2019
Doctoral Consortium Travel Grant. UIST'19.	2019
Doctoral Consortium Travel Grant. ASSETS'19.	2019
Microsoft Research Dissertation Grant (\$25,000).	2019
Bill Moggridge Design Award (\$10,000).	2018
Honorable Mention Fastco Innovation by Design Awards. Student Category.	2018
Best Demo Honorable Mention. UIST' 17.	2017
NSF GRFP (\$102,000).	2015
Stanford School of Engineering Fellowship.	2015
Amgen Scholar at Stanford University	2014
The Coca-Cola Foundation: "100,000 Strong Initiative" Scholarship (\$10,000).	2012
Women in Engineering Corporate Award Sponsored by Kimberly-Clark (\$2,000).	2012
Panama Science, Technology, and Innovation National Undergraduate Scholarship, full ride college scholarship	2012

Academic Service

Information Director	2020 –
<ul style="list-style-type: none"> ▶ ACM Transactions on Accessible Computing (TACCESS). Tasked with initiating the journal's online presence and increase its reach and visibility within the HCI community 	
Stanford HCI Website Manager	2020 –
Reviewer	
<ul style="list-style-type: none"> ▶ IEEE World Haptics Conference (WHC) ▶ ACM Transactions on Accessible Computing (TACCESS) ▶ ACM Symposium on User Interface Software and Technology (UIST) ▶ ACM Conference on Human Factors in Computing Systems (CHI) ▶ ACM International Conference on Tangible, Embedded and Embodied Interaction (TEI) ▶ ACM Designing Interactive Systems (DIS) ▶ ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) 	<p>2021 –</p> <p>2020 –</p> <p>2019 –</p> <p>2018 –</p> <p>2019</p> <p>2019</p> <p>2020</p>

▶ Graphics Interface (GI) 2020

Invited Talks, Workshops & Demonstrations

Panelist 2020

State of the Science - Smith-Kettlewell Eye Research Institute (San Francisco, CA)

- ▶ *STEM and Technical Training* co-panelist with Sile O'Modhrain (lead), Joshua Miele, Steve Landau, Chancey Fleet, and Charity Pitcher-Cooper

Speaker 2020

Google ATAP (Mountain View, CA)

- ▶ *Multimodal Interfaces to Support Understanding of Spatial Representations for People Who Are Blind*

Speaker 2020

HPI-Stanford Design Thinking Research Program (Stanford, CA)

- ▶ *Haptic Guidance to Support Design Collaboration with People Who Are Blind*

Speaker 2020

American Council for the Blind Community Presentations (ACB Radio)

- ▶ *Access to Spatial Concepts and Information*

Workshop Facilitator 2020

HPI-Stanford Design Thinking Research Program (Stanford, CA)

- ▶ *Inclusive Design Thinking*

Workshop Facilitator 2020

Lighthouse for the Blind and Visually Impaired (San Francisco, CA)

- ▶ *Design Thinking for Inclusion* (Workshop) co-led with Marie Trudelle

Speaker & Demonstration 2020

Smith-Kettlewell Eye Research Institute Colloquium Series (San Francisco, CA)

- ▶ *Tactile Design Tools*

Demonstration 2020

Exploratorium - After Dark: Tactile (San Francisco, CA)

- ▶ *Interactive Shape-Changing Displays to Support Accessibility in Design*

Speaker 2019

Learning Differences & The Future of Special Education Initiative (Stanford, CA)

- ▶ *Advancing Accessible Design & Making for the Blind*

Demonstration 2019

Web4All Hackathon (San Francisco, CA)

- ▶ *An Accessible 3D Modelling Workflow for the Blind*

Speaker 2018

HP Labs (Palo Alto, CA)

- ▶ *Exploring the Design Space of Interactive 3D Printed Auxetics*

Speaker & Demonstration 2018

The Smith-Kettlewell Haptics Symposium (San Francisco, CA)

- ▶ *shapeShift: A Mobile Tabletop Shape Display for Tangible Interaction*

- Poster Presenter** 2016
 Adobe Creative Lab Retreat (Stanford, CA)
 ▶ *Supporting Remote Design Collaboration Through Shape-Changing Displays and AR*
- Poster Presenter** 2016
 Stanford Mechanical Engineering Conference (Stanford, CA)
 ▶ *Design of a Dynamic Shape Display for Remote Collaboration*

Research Supervised

Masters Students

- ▶ Olutayo Falasse, Masters in Design, Stanford University 2018-2019
- ▶ Julea Chin, Mechanical Engineering, Stanford University 2018
- ▶ Allen R. Zhao, Symbolic Systems, Stanford University 2017

Undergraduate Students

- ▶ Gene S-H Kim, Symbolic Systems, Stanford University 2020 –
- ▶ Abena Boadi-Agyemang, Mechanical Engineering, Stanford University 2019 –
- ▶ Robert Alan Brantley, Product Design, Stanford University 2020
- ▶ Xavier Vazquez, Product Design, Stanford University 2020
- ▶ Leticia Pereira de Souza, Product Design, Stanford University 2018
- ▶ Jason B. Ginsberg, Electrical Engineering, Stanford University 2017
- ▶ Hieu Minh Pham, Art & Art History, Stanford University 2016

Volunteer Service & Outreach

- Elections Phone Banks For New Spanish-Speaking Voters.** Native spanish-speaking volunteer with the Immigration Institute of the Bay Area (IIBA). 2020
- Stanford Splash Instructor.** Developed and facilitated a class with the goal of teaching students in grades 8-12 concepts in design, rapid prototyping, and storytelling. 2019
- seeME Instructor.** Developed and facilitated a class that introduced middle school students to rapid prototyping techniques through the creation of automata. 2019
- ScienceBus Tutor.** After-school science program at East Palo Alto Charter School. 2017-2019

- BME HealthReach Tutor.** Helped launch and develop initial teaching modules for a K-12 program for hospitalized children. 2013-2015
- GoSTEM Pathways into College Program in Gwinnett Tutor.** Lead after-school programs for undeserved Hispanic students at Radloff & Lilburn Middle Schools. 2012-2013

Selected Media Coverage

- Gizmodo.** [These Wrist-Worn Hammers Swing Into Your Hands So You Feel Virtual Objects.](#) Andrew Liszewski. October 2020
- UploadVR.** [Microsoft's 'PIVOT' Haptics Research Could Make Throwing A Ball In VR More Believable.](#) Ian Hamilton. October 2020
- Microsoft Research Blog.** [Physics matters: Haptic PIVOT, an on-demand controller, simulates physical forces such as momentum and gravity.](#) Mar Gonzalez Franco, Eyal Ofek, Mike Sinclair. October 2020
- Tech News.** [Microsoft Research shows off their novel VR cane controller again.](#) March 2020
- Microsoft Research Blog.** [Bringing virtual reality to people who are blind with an immersive sensory-based system.](#) Ed Cutrell and Eyal Ofek. April 2020
- Core77.** [Stanford Researchers Develop Tactile Display to Make 3D Modeling More Accessible for Visually Impaired Users.](#) Alexandra Alexa. December 2019
- NSF YouTube Series.** [4 Awesome Discoveries You Probably Didn't Hear About - Episode 87.](#) November 2019
- TechCrunch.** [This Tactile Display Lets Visually Impaired Users Feel On Screen 3D Shapes.](#) David Coldewey. October 2019
- Hackster.** [Stanford University Unveils Pin Art-Like Tactile 3D Display for Visually Impaired 3D Modelers.](#) Gareth Halfacree. October 2019
- Futurity.** [Touch-Based Display Boosts 3D Modelling Accessibility.](#) Taylor Kubota. October 2019
- ScienceDaily.** [Stanford increasing access to 3D modeling through touch-based display.](#) October 2019
- TechXplore.** [Researchers increasing access to 3-D modeling through touch-based display.](#) October 2019
- Stanford News.** [Stanford increasing access to 3D modeling through touch-based display.](#) Taylor Kobuta. October 2019
- HP Labs Blog.** [HP Labs Summer 2018 Intern Spotlight: Alexa Siu.](#) Simon Firth. July 2018
- Fast Company.** [A Computer Mouse for the Year 3000.](#) Mark Wilson. April 2018
- Gizmodo.** [This Shape-Shifting, Pin-Headed Robot Lets You Feel Virtual Objects With Your Bare Hands.](#) Andrew Liszewski. April 2018

Wall Street Journal. Volkswagen Brings Sense of Touch to Virtual Reality. Sara Castellanos.

April 2018

Fast Company. 2018 Fastco Innovation by Design Awards.

2018

Skills

- ▶ Mechatronics (circuits and embedded systems)
- ▶ Programming (Python, C#, C++, R, HTML, CSS)
- ▶ Experience & interaction prototyping (Unity, Adobe, Figma)
- ▶ Rapid prototyping (fabrication, mechanical design, 3D CAD)
- ▶ Human-centered design methods (user analysis, co-design, WoZ, interviews, contextual inquiry)
- ▶ Spoken languages (Spanish - native, French - proficient)