

Alexa F. Siu

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Education

- Stanford University** (*Stanford, CA*) **June 2017-June 2021 (Expected)**
- ▶ PhD Candidate in Mechanical Engineering - Design and HCI
 - ▶ Advisor: Sean Follmer
 - ▶ Thesis Committee: James Landay, Allison Okamura
- Stanford University** (*Stanford, CA*) **September 2015-June 2017**
- ▶ M.S. in Mechanical Engineering
 - ▶ Focus: Mechatronics, Dynamics, Design
- Georgia Institute of Technology** (*Atlanta, GA*) **August 2011-May 2015**
- ▶ B.S. in Biomedical Engineering
 - ▶ Minor in Computer Science - Artificial Intelligence
 - ▶ Highest Honors

Professional Experience

- Stanford University SHAPE Lab** (*Stanford, CA*) **2015-Present**
Graduate Research Assistant advised by Sean Follmer, PhD
- ▶ Developing tools and workflows to support people with visual impairments in designing 3D models and electronics prototyping through a combination of iterative prototyping and human centered design.
 - ▶ Designing controlled studies to understand haptic perception and inform these designs.
 - ▶ Designed and developed hardware and software for a novel open-source mobile tabletop shape display. Involved in PCB design, mechanical design, firmware development, communication protocols, coordination with vendors and manufacturers, and integration to virtual reality applications.
 - ▶ User evaluation on interaction methods for exploring spatial data using a mobile tabletop shape display.
 - ▶ User evaluation of egocentric exploration of spatial data using a mobile tabletop shape display.
 - ▶ Investigated the use of tangibles for remote design collaboration. Carried out a formative user study to inform the design of a tangible UI.
- Microsoft Research Ability Team** (*Redmond, WA*) **June-September 2019**
Research Intern advised by Ed Cuttrel, PhD
Collaborators: Mike Sinclair, Rob Kovacs, Eyal Ofek, Christian Holz
- ▶ Exploring the design of immersive virtual reality (VR) experiences accessible to people who are blind. Best paper honorable mention at CHI 2020.
 - ▶ Designed and fabricated a white cane VR controller that employs a novel three-axis brake mechanism to render kinesthetic and tactile feedback.
 - ▶ Implemented a scavenger hunt game to interface with the VR controller that rendered spatial audio determined based on the progression of sound through the geometry around the user.
 - ▶ Conducted a user study that demonstrated how the VR controller enabled blind users to understand and navigate a complex virtual environment.

- ▶ Developed software applications for a novel wrist-worn on-demand haptic VR controller. Presented at UIST 2020.

HP Inc. Immersive Experiences Lab (Palo Alto, CA)

June-September 2018

Research Intern with Alexander Thayer, PhD

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.

Stanford University CHARM Lab (Stanford, CA)

June-September 2014

Amgen Scholar advised by Allison Okamura, PhD

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.

Georgia Tech Lam Lab (Atlanta, GA)

October 2012-May 2015

Undergraduate Research Assistant advised by Wilbur Lam, MD, PhD

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.

Publications

REFEREED CONFERENCE ARTICLES

1. 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%]
2. **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%)**
3. **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**
4. 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%]

5. **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%]

REFEREED JOURNAL ARTICLES

1. 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%]
2. 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.
3. 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.

POSTERS, DEMOS & EXTENDED ABSTRACTS

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

DOCTORAL CONSORTIA PAPERS

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,** 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

SPRING 2020

- **CS377Q: Designing for Accessibility** - Upper Undergraduate Level
Course Assistant with Prof. John Tang
Stanford University

AUTUMN 2019

- **ME316A: Design Impact Master's Project I** - Graduate Level
Course Assistant with Professors Sean Follmer and David Kelley
Stanford University

SPRING 2018 & 2019

- **ME216M: Introduction to the Design of Smart Products** - Graduate Level
Course Assistant with Prof. Sean Follmer
Stanford University

SPRING 2015

- **CS3600: Introduction to Artificial Intelligence** - Undergraduate Level
Course Assistant with Prof. Jim Rehg
Georgia Institute of Technology

AUTUMN 2014

- **BMED2400: Introduction to Bioengineering Statistics** - Undergraduate Level
Course Assistant with Prof. Brani Vidakovic
Georgia Institute of Technology

Invited Talks, Workshops & Demonstrations

2020

- ▶ **Google ATAP** (*Mountain View, CA*)
Multimodal Interfaces to Support Understanding of Spatial Representations for People Who Are Blind
- ▶ **HPI-Stanford Design Thinking Research Program** (*Stanford, CA*)
Haptic Guidance to Support Design Collaboration with People Who Are Blind
- ▶ **American Council for the Blind Community Presentations** (*ACB Radio*)
Access to Spatial Concepts and Information
- ▶ **HPI-Stanford Design Thinking Research Program** (*Stanford, CA*)
Inclusive Design Thinking Workshop
- ▶ **Lighthouse for the Blind and Visually Impaired** (*San Francisco, CA*)
An Inclusive Design Thinking Workshop co-led with Marie Trudelle
- ▶ **Smith-Kettlewell Eye Research Institute Colloquium Series** (*San Francisco, CA*)
Tactile Design Tools
- ▶ **Exploratorium - After Dark: Tactile** (*San Francisco, CA*)
Interactive Shape-Changing Displays to Support Accessibility in Design (Demo)

2019

- ▶ **Learning Differences & The Future of Special Education Initiative** (*Stanford, CA*)
Advancing Accessible Design & Making for the Blind
- ▶ **Microsoft Research** (*Redmond, WA*)
Virtual Navigation Through Multimodal Haptics & Spatial Audio
- ▶ **Web4All Hackathon** (*San Francisco, CA*)
An Accessible 3D Modelling Workflow for the Blind (Demo)

2018

- ▶ **HP Labs** (*Palo Alto, CA*)
Exploring the Design Space of Interactive 3D Printed Auxetics
- ▶ **The Smith-Kettlewell Haptics Symposium** (*San Francisco, CA*)
shapeShift: A Mobile Tabletop Shape Display for Tangible Interaction (Talk & Demo)

2016

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

Mentoring

MASTERS STUDENTS

2018-2019

- ▶ **Olutayo Falasse**
Masters in Design, Stanford University

2018

- **Julea Chin**
Mechanical Engineering, Stanford University

2017

- **Allen R. Zhao**
Symbolic Systems, Stanford University

UNDERGRADUATE STUDENTS

2020-Present

- **Robert Alan Brantley**
Product Design Stanford University
- **Gene S-H Kim**
Symbolic Systems Stanford University

2019-Present

- **Abena Boadi-Agyemang**
Mechanical Engineering, Stanford University

2020

- **Xavier Vazquez**
Product Design Stanford University

2018

- **Leticia Pereira de Souza**
Product Design Stanford University

2017

- **Jason B. Ginsberg**
Electrical Engineering Stanford University

2016

- **Hieu Minh Pham**
Art & Art History, Stanford University

Funding Awards & Honors

2020

- National Science Foundation Collaborative Grant (Cyber Learning at the Human Technology Frontier): “Learning by Touch: Preparing Blind Students to Participate in the Data Science Revolution”
- CHI 2020 Best Paper Honorable Mention

2019

- ASSETS 2019 Best Paper Nominee
- UIST and ASSETS 2019 Doctoral Consortium Travel Grants
- Microsoft Research Dissertation Grant

2018

- Bill Moggridge Design Award
- Fastco Innovation by Design Awards Honorable Mention in the Student Category

2017

- UIST 2017 Best Demo Honorable Mention

2015

- National Science Foundation Graduate Research Fellowship (NSF GRFP)
- Stanford School of Engineering Fellowship

2014

- Amgen Scholar at Stanford University

2013

- Georgia Tech Up With The White & Gold Nominee - International Leadership Award

2012

- The Coca-Cola Foundation: "100,000 Strong Initiative" Scholarship
- Women in Engineering Corporate Award Sponsored by Kimberly-Clark
- Panama Science, Technology, and Innovation National Undergraduate Scholarship, full ride college scholarship

Academic Service

2020-Present

- **ACM TACCESS Information Co-Director**
Tasked with initiating the journal's online presence and increase its reach and visibility within the HCI community
- **Stanford HCI Group Website Manager**

2018-Present

- **Journal Reviewer**
ACM TACCESS
- **Conference Reviewer**
CHI 2021, UIST 2020, IMWUT 2020, GI 2020, DIS 2019, TEI 2019, UIST 2019, CHI 2018-20

Volunteer Service & Outreach

2020

- **Elections Phone Banks For New Voters**
Native spanish-speaking volunteer with the Immigration Institute of the Bay Area (IIBA).

2019

- **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.
- **seeME Instructor**

Developed and facilitated a class that introduced middle school students to rapid prototyping techniques through the creation of automata.

2017-2019

▸ **ScienceBus Tutor**

After-school science program at East Palo Alto Charter School.

2013-2015

▸ **BME HealthReach Tutor**

Helped launch and develop initial teaching modules for a K-12 program for hospitalized children.

2012-2013

▸ **GoSTEM Pathways into College Program in Gwinnett Tutor**

Lead after-school programs for underserved Hispanic students at Radloff & Lilburn Middle Schools.

Selected Media Coverage

2020

- [Microsoft Research shows off their novel VR cane controller again](#). Tech News. March 28, 2020.
- [Bringing virtual reality to people who are blind with an immersive sensory-based system](#). Microsoft Research Blog. Ed Cutrell and Eyal Ofek. April 7, 2020.

2019

- [Stanford Researchers Develop Tactile Display to Make 3D Modeling More Accessible for Visually Impaired Users](#). Core 77. Alexandra Alexa. December 3, 2019.
- [4 Awesome Discoveries You Probably Didn't Hear About - Episode 87](#). National Science Foundation. November 8, 2019.
- [This Tactile Display Lets Visually Impaired Users Feel On Screen 3D Shapes](#). TechCrunch. David Coldewey. October 31, 2019.
- [Stanford University Unveils Pin Art-Like Tactile 3D Display for Visually Impaired 3D Modelers](#). Hackster. Gareth Halfacree. October 30, 2019.
- [Touch-Based Display Boosts 3D Modelling Accessibility](#). Futurity. Taylor Kubota. October 30, 2019.
- [Stanford increasing access to 3D modeling through touch-based display](#). Science Daily. October 29, 2019.
- [Researchers increasing access to 3-D modeling through touch-based display](#). TechXplore. October 29, 2019.
- [Stanford increasing access to 3D modeling through touch-based display](#). Stanford News. Taylor Kobuta. October 29, 2019.

2018

- [HP Labs Summer 2018 Intern Spotlight: Alexa Siu](#). HP Labs. Simon Firth. July 20, 2018.
- [A Computer Mouse for the Year 3000](#). Fast Company. Mark Wilson. April 30, 2018.
- [This Shape-Shifting, Pin-Headed Robot Lets You Feel Virtual Objects With Your Bare Hands](#). Gizmodo. Andrew Liszewski. April 27, 2018.
- [Volkswagen Brings Sense of Touch to Virtual Reality](#). Wall Street Journal. Sara Castellanos. April 25, 2018.
- [2018 Fastco Innovation by Design Awards](#). Fast Company. 2018.