Sai Ganesh Swaminathan

Assistant Professor
Min H. Kao Department of Electrical Engineering and Computer Science (EECS)
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RESEARCH INTERESTS

Human-Computer Interaction, Ubiquitous Computing, Computational Material Devices, Cyber-Physical Systems, Cyber-Manufacturing, Advanced Manufacturing

EDUCATION

Carnegie Mellon University, Pittsburgh, PA USA
Ph.D. in Human-Computer Interaction
School of Computer Science August 2022

Dissertation: *Interactive Computational Materials for the Networked Built Environment*
Advisor: Scott Hudson
Committee: Lining Yao (CMU HCII), Mayank Goel (CMU HCII), Gregory Abowd (Northeastern, ECE), Haeyoung Noh (Stanford, CEE)

Technische Universität Berlin, BB, Germany

Université Paris-Sud Xi, Paris, France
Dual Degree, Masters major in Human-Computer Interaction and Design Dec 2014

Thesis: *LineSpace: Repurposing 3D printers as output devices for blind and visually impaired users*
Advisor: Stefanie Mueller and Patrick Baudisch

SASTRA University, TN, India
B.Tech., Computer Science & Engineering July 2012

ETH Zürich, Zurich, Switzerland
Visiting Student at Department of Computer Science 2011

EMPLOYMENT

Fall 2022 to date	**University of Tennessee, Knoxville, US** Assistant Professor, Department of Electrical Engineering and Computer Science
Summer 2019	**Research Intern, Oakridge National Lab**, Oak Ridge, US
2016-2022	**Graduate Research Assistant, Carnegie Mellon University**, Pittsburgh, US
2015-2016	**Research Fellow, Microsoft Research**, Bangalore, India
Summer 2015	**Research Intern, Hasso Plattner Institute**, Berlin, Germany
Summer 2014	**Research Intern, Xerox Research Europe**, Grenoble, France
Summer 2013	**Research Intern, INRIA**, Paris, France

AWARDS AND FELLOWSHIP

- Selected for the CMU NSF I-Corps entrepreneurship program, 2020 ($2,500).
- Best Paper Honorable Mention Award, CSCW (2019), Awarded to top 5% of the paper submitted.
- W4A 2017 Best Paper Nomination Apr 2017
- Scholarship from Hasso Plattner Institut for completing masters thesis, 2015 ($6000)
- Numerous travel support awards from research organizations – INRIA, HPI, etc. to attend conferences and present research.
- European Institute of Technology (EIT) Excellence Nominee includes a stipend, tuition fee waiver, and travel support for graduate school, 2012-2014 ($30,000).
- Desh-Videsh scholarship and travel far for study abroad awarded ($1700).
- Scholarship awarded by Global information systems group, for research at ETH Zürich ($6,000)

PUBLICATIONS

Peer-reviewed Journal and Conference Publications

[18] Dingtian Zhang, Canek Fuentes-Hernandez, Raaghesh Vijayan, Yang Zhang, Yunzhi Li, Jung Wook Park, Yiyang Wang, Yuhui Zhao, Youngwook Do, Tingyu Cheng, Nivedita Arora, Ali Mirzazadeh, **Saiganesh Swaminathan**, Trisha Andrew, Thad Starner, Gregory D Abowd. Flexible Computational Photodetectors for Self-Powered Activity Sensing. *npj Flexible Electronics*

[17] Tingyu Cheng, Bu Li, Yang Zhang, Yunzhi Li, Charles Ramey, Eui Min Jung, Yepu Cui, Youngwook Do, **Saiganesh Swaminathan**, Manos Tentzeris, Gregory D. Abowd, HyunJoo Oh Duco: Autonomous Large-Scale Direct-Circuit-Writing (DCW) on Vertical Everyday Surfaces Using A Scalable Hanging Plotter. *In Proceedings of ACM Conference on Interactive, Mobile, Wearable and Ubiquitous Technologies (UbiComp 2021).*

[16] **Saiganesh Swaminathan**, Yellina Yim, Scott E. Hudson, Cynthia L. Bennett, Patrick Carrington. From Tactile to NavTile: Opportunities and Challenges with Multi-Modal Feedback for Guiding Surfaces during Non-Visual Navigation.*In Proceedings of the 34th Annual ACM Conference on Human Factors in Computing Systems (CHI 2021), Tokyo, Japan*

[15] **Saiganesh Swaminathan**, Jonathon Fagert, Michael L. Rivera, Andrew Cao, Gierad Laput, Hae Young Noh, Scott E. Hudson: OptiStructures: Fabrication of Room-Scale Interactive Structures with Embedded Fiber Bragg Grating Optical Sensors and Displays. *In Proceedings of the ACM Conference on Interactive, Mobile, Wearable and Ubiquitous Technologies (UbiComp 2020). Cancun, Mexico*

[14] **Saiganesh Swaminathan**, Kadri Bugra Ozutemiz, Carmel Majidi, Scott E. Hudson. FiberPrint: 3D Printing Mechanically Strong, Lightweight Carbon-Fiber Composite Devices with Embedded Electronic Function. *In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI 2019), Glasgow, United Kingdom*

[13] **Saiganesh Swaminathan**, Mike Rivera, Runchang Kang, Zheng Luo, Kadri Bugra Ozutemiz, Scott E Hudson. Input, Output and Construction Methods for Custom Fabrication of Room-Scale Deployable Pneumatic Structures. *In Proceedings of the ACM Conference on Interactive, Mobile, Wearable and Ubiquitous Technologies (UbiComp 2019). London, United Kingdom*

[12] **Saiganesh Swaminathan**, Indrani Medhi Thies, Devansh Mehta, Ed Cutrell, Amit Sharma, and Bill Thies. Learn2Earn: Using Mobile Airtime Incentives to Bolster Public Awareness Campaigns *In Proceedings of the ACM Human-Computer Interaction (CSCW 2019), Austin, United States.*
Best Paper Honorable Mention Award, Top 5%

[11] **Saiganesh Swaminathan**, Raymond Fok, Fanglin Chen, Ting-Hao Kenneth Huang, Irene Lin, Rohan Jadvani, Walter S. Lasecki, and Jeffrey P. Bigham. WearMail: On-the-Go Access to Information in Your Email with a Privacy-Preserving Human Computation Workflow. *In Proceedings of the 30th Annual ACM Conference on User Interface Software and Technology (UIST 2017), Montreal, Canada.*:

[10] **Saiganesh Swaminathan**, Kotaro Hara, and Jeffrey P. Bigham. The Crowd Work Accessibility Problem *In Proceedings of the 14th Annual ACM International Web for All Conference (W4A '17), Perth, Australia.*
Best Paper Nomination

[9] **Saiganesh Swaminathan**, Thijs Roumen, Robert Kovacs, David Stangl, Stefanie Mueller, and Patrick Baudisch. Linespace: A Sensemaking Platform for the Blind. *In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI 2016), San Jose, United States.*

[8] Benjamin V. Hanrahan, Jutta K. Willamowski, **Saiganesh Swaminathan**, David B. Martin. TurkBench: Rendering the Market for Turkers *In Proceedings of the 32nd Annual ACM Conference on Human Factors in Computing Systems (CHI 2015), Seoul, South Korea.*

[7] **Saiganesh Swaminathan**, Conglei Shi, Yvonne Jansen, Pierre Dragicevic, Lora Oehlberg, Jean-Daniel Fekete. Supporting The Design and Fabrication of Physical Visualizations. *In Proceedings of the 31st Annual ACM Conference on Human Factors in Computing Systems (CHI 2014), Toronto, Canada.*

Posters, Demos, Extended Abstracts (Peer Reviewed)

[6] **Saiganesh Swaminathan**, Bill Thies, Amit Sharma, Devansh Mehta, Alok Sharma. Learn2Earn: Enabling Mass Awareness through Financial Incentives. In adjunct Proceedings of 10th International Conference of Information and Communication Technologies on Development 2019, Jan 2019
.

[5] Ting-Hao Kenneth Huang and Joseph Chee Chang and **Saiganesh Swaminathan** and Jeffrey P. Bigham. Evorus: A Crowd-powered Conversational Assistant That Automates Itself Over Time. *In Adjunct Proceedings of the 30th Annual ACM Conference on User Interface Software and Technology (UIST 2017), Montreal, Canada.*

[4] **Saiganesh Swaminathan**, Conglei Shi, Yvonne Jansen, Pierre Dragicevic, Lora Oehlberg, Jean-Daniel Fekete. Creating Physical Visualizations With MakerVis. Interactivity Demo at CHI'14. *In Proc. of CHI'14 EA*: ACM, pages 543-546, April 2014.

Workshop Proceedings (Lightly Peer Reviewed)

[3] **Saiganesh Swaminathan**, Scott Hudson and Steve Hodges Using Surface Acoustic Wave Devices for Self-powered Sensing & Interaction. In the Workshop on self-powered sustainable interfaces and interactions at the 34th ACM CHI, 2020.

[2] **Saiganesh Swaminathan**, Stephanie Valencia, Patrick Carrington. An Approach to Last Meter Problem: Designing and Deploying Low-Cost, Custom Fabricated Interactive Tactile Tiles for Navigation and Spatial Awareness. In the Hacking Blind Navigation Workshop at the 33rd ACM CHI, 2019.

[1] **Saiganesh Swaminathan**, Ting-Hao K. Huang, Irene Lin, Anhong Guo, Gierad Laput, and Jeffrey P. Bigham. (2017) Epistemo: A Crowd-Powered Conversational Search Interface. In the Talking with Conversational Agents in Collaborative Action Workshop at the 20th ACM CSCW, Feb 2017.

PATENTS

- **Saiganesh Swaminathan**, Jonathan Fagert, Scott Hudson, Haeyoung Noh, Michael Rivera, Gierad Laput, Andrew Cao. System and Method for OptiStructures: Fabrication of Room-Scale Interactive Structures with Embedded Fiber Bragg Grating Optical Sensors and Displays. U.S. Patent Application. Filed November 14, 2020.
- **Saiganaesh Swaminathan**, Scott Hudson, Carmel Majidi and Kadri B. Ozutemiz. System and Method for 3D printed Continuous Carbon Fiber Composite Objects with Embedded Circuitry and Sensors. Filed January 29, 2020.

SELECTED INVITED TALKS

[13] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Information Science Department, Princeton University, Host: Prof. Andrés Monroy-Hernández

[12] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Information Science Department, Indiana University at Bloomington, Host: Prof. Martin Swany

[11] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Information Science Department, Cornell University , Host: Prof. Qian Yang

[10] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Information Science Department, Cornell Tech, Host: Prof. Rajalakshmi Nandakumar

[9] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Computer Science Department, University of Rochester, Host: Zhen Bai

[8] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Computer Science Department, University of Wisconsin-Madison, Host: Prof. Yuhang Zhao

[7] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Electrical Engineering and Computer Science Department, University of Utah, Host: Prof. Jason Wiese

[6] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Electrical Engineering and Computer Science Department, University of Tennessee, Host: Prof. Scott Ruoti

[5] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Electrical and Computer Engineering , University of Minnesota, Host: Prof. Changhyun Choi

[4] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Computer Science Department, George Mason University, Host: Prof. Yotam Gingold

[3] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Computer Science Department, Lehigh Universty, Host: Prof. Eric Baumer

[2] "Computational Infrastructure Materials for the Networked Interactive Built Environment ", Industrial Systems Engineering Department, North Carolina State University, Host: Prof. Binil Starly

[1] "Computational Infrastructure Materials for the Networked & Interactive Built Environment ", Industrial Systems Engineering Department, North Carolina State University, Host: Prof. Binil Starly

TEACHING EXPERIENCE

Instructor, University of Tennessee

- **COSC 522: Machine Learning** **Fall 2022**
  Electrical Engineering and Computer Science, University of Tennessee
- **COSC 494/594: Prototyping Smart Devices** **Spring 2023**
  Electrical Engineering and Computer Science, University of Tennessee
- **COSC 559: Human-Computer Interaction** **Fall 2023**
  Electrical Engineering and Computer Science, University of Tennessee

Head Teaching Assistant, Carnegie Mellon University

- **HCII 05391: Designing Human-Centered Systems** **Spring 2021**
  School of Computer Science, Carnegie Mellon University
  - Managed and mentored other Teaching Assistants.
  - Facilitated proctoring and grading of exams.

Teaching Assistant, Carnegie Mellon University

- **HCII (05-431 / 05-631) Programming User Interfaces** **Fall 2019**
  School of Computer Science, Carnegie Mellon University
  - Co-Instructor – weekly Recitation of course where I was responsible for giving weekly lectures, designing assignments, and providing direct feedback to 20-30 students.

Guest Lecturer

- "Interfaces for Blind and Visually Impaired Users" Future Interactive Technologies, Hasso Plattner Institut Fall 2015

Teaching Development

- **Future Faculty Program, Eberly Center Teaching Excellence and Education Innovation, Carnegie Mellon University** **Summer 2021**
  - Attended Workshop on Teaching Inclusively: Centering DEI in Course Design
    Focused on addressing DEI issues through teaching and exploring the role of teaching.
  - Attended Workshop Designing Effective Assessments: Multiple-Choice Questions, Explored best design assessments for capturing student's understanding.

Student Mentoring

Primary Doctoral Advisor (University of Tennessee)
- Azizul Zahid - PhD in Computer Engineering
- Imran Fahad - PhD in Computer Engineering
- Dan Scott - PhD in Computer Engineering

PhD Committee Member (University of Tennessee)
- Fabian Fallas - PhD in Computer Science
- Yi Wu - PhD in Computer Engineering

Masters thesis (University of Tennessee)

- Gaddiel Morales - MS in Computer Science
- Jason Houbre - MS in Computer Engineering

Direct Student Mentoring (Carnegie Mellon University)
* Denotes co-authors on research papers

- Tim Neumann - B.S Computer Science, Hasso Plattner Institut, Germany
- David Stangl* - B.S Computer Science, Hasso Plattner Institut, Germany
- Raymond Fok* - B.S. Computer Science, University of Michigan, Currently PhD student at UW
- Rohan Jadvani* - B.S. Computer Science, Currently Software Engineer at Iron Fish
- Sanjana Pruthi - B.S Computer Science, Currently Senior at Carnegie Mellon University
- Yu Jiang - B.S Computer Science, currently at MS in HCI at Georgia tech.
- Nali Hyunh - B.S Computer Science, Carnegie Mellon University, currently rising Junior.
- Shreya Bahl - B.S Computer Science, Carnegie Mellon University, currently rising Junior.
- Shiva Peri - B.S. Computer Science and Art, Carnegie Mellon University, currently a sophomore.
- Andrew Cao* - B.S Civil and Environmental Engineering, Currently at Amtrak
- Emily Wu - B.S. Mechanical Engineering at Carnegie Mellon University, currently UX designer at Exxon.
- Elena Deng - B.S Design, currently UX designer at Amazon
- Yellina Yim* - B.S Psychology, Currently at Delloite
- Irene Lin* - B.S Electrical and Computer Engineering, Carnegie Mellon University
- Amal Jafrani - B.S in Architecture, Carnegie Mellon University
- Simran Jobaputra, M.S. in HCI, Carnegie Mellon University, currently senior Product Designer at Sight Machine
- Runchang Kang* - M.S Architecture, Currently at Apple as a hardware engineer
- Zheng Luo* - M.S. in Computational Design in School of Architecture, Currently at Amazon as a software engineer
- Wei Wei Chi - M.S. in Computational Design in School of Architecture, Currently PhD student at the University of Maryland.

ACADEMIC SERVICE & MENTORING

Program Committee

- ACM ENSsys 2023
- ACM MUM 2021
- Associate Chair Late-Breaking Work ACM CHI 2021
- Associate Chair Late-Breaking Work ACM CHI 2020

Organizing Committee

- Registration Chair, UIST 2021
- Registration Chair, UIST 2020

Session Chair

- Tracking Touch and Pose, ACM UIST 2021
- Designing the Things in IoT, ACM CHI 2019

Conference & Journal Reviewing

- Special Recognition for Outstanding Review, ACM CHI 2021
- IMWUT/UbiComp 2021
- CHI 2015, 2016, 2019, 2020, 2021
- UIST 2018,2019, 2020, 2021
- CSCW 2020
- ISS 2018, 2019.
- SCF 2018

- TEI 2019, 2021

Department Service

- Computer Engineering Faculty Search Committee, Electrical Engineering and Computer Science, Member, August 2023 - April 2024,
- Department Head Search Committee, Electrical Engineering and Computer Science, Committee Member, August 2023 - March 2024
- Undergraduate Ad-Hoc Curriculum Committee, University of Tennessee, member, November 2022 - December 2023 (ongoing)
- PhD Admissions Committee, Human-Computer Interaction Institute, Spring 2021
- Faculty Hiring Committee, Human-Computer Interaction Institute, Carnegie Mellon University, Spring 2020
- Elected PhD student Department Ombudsman, HCII, Carnegie Mellon University, 2019-2021
- Dean's Social Connectedness working group, School of Computer Science, Carnegie Mellon University, Fall 2020
- Crowdsourcing Lunch Co-organizer, 2016

Additional Conference Service

- Program Committee Meeting, Student Volunteer UIST 2017
- Conference Student Volunteer, UIST 2017

SELECTED PRESS COVERAGE

- HacksterIO *Staring at the Wall for Fun* (2020)
- New Scientist, *3D-printed display lets blind people explore images by touch* (2016)
- Makezine *This Robot Prints Tactile Maps for the Blind* (2016)
- Tech. Times *3D-Printed Display Could Help Blind People Explore Maps And Images* (2016)
- 3Ders *3D printed 'Linespace' display lets blind people explore images & maps by touch* (2016)
- 3D printing from Scratch *Visually Impaired People Interact with Diagrams Through 3D Printed Linespace* (2016)

REFERENCES

Scott Hudson
Professor
Human-Computer Interaction Institute
School of Computer Science
Carnegie Mellon University

Gregory Abowd
Dean of the College of Engineering, Office of the Dean
Professor, Electrical and Computer Engineering
Northeastern University

Patrick Carrington
Assistant Professor
Human-Computer Interaction Institute
School of Computer Science
Carnegie Mellon University

Carmel Majidi
Clarence H. Adamson Professor
Mechanical Engineering
Carnegie Mellon University

Haeyoung Noh
Associate Professor
School of Civil and Environmental Engineering
Stanford University

Thad Starner
Professor and Staff research scientist at Google
College of Computing
Georgia Institute of Technology