

# Ryo Suzuki Curriculum Vitae

University of Calgary iLab  
MS 680, 2500 University Drive NW  
Calgary, Alberta, Canada T2N1N4

<http://ryosuzuki.org>  
[ryo.suzuki@ucalgary.ca](mailto:ryo.suzuki@ucalgary.ca)  
+1 (403) 220-6015

## Research Interest

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I am an Assistant Professor in the Department of Computer Science at the University of Calgary. My research focus lies in the intersection of **human-computer interaction** and **robotics**. I have developed a novel tangible user interface made of swarm and soft robots, leveraging techniques from both robotics and HCI. The goal of my research is to *seamlessly blend the virtual and physical worlds*, enabled by augmented/virtual reality, robotics, and shape-changing technologies.

keyword: tangible interface, swarm robots, soft robots, AR/VR, shape-changing UI

## Employment

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- 01/2021 – **University of Calgary**  
Assistant Professor, Department of Computer Science  
Human-Computer Interaction Group (Interactions Lab)  
Director of Programmable Reality Lab
- 05/2020 – **Microsoft Research, Redmond**  
08/2020 Research Intern in EPIC Group  
with Mar Gonzalez-Franco, Eyal Ofek, Mike Sinclair
- 08/2015 – **University of Colorado Boulder**  
05/2020 Research Assistant in Department of Computer Science and ATLAS Institute  
with Daniel Leithinger, Mark D. Gross, Tom Yeh
- 05/2019 – **Adobe Research, Seattle**  
08/2019 Research Intern in Creative Intelligence Lab  
with Rubaiat Habib, Li-Yi Wei, Stephen DiVerdi, Wilmot Li
- 12/2017 – **University of Tokyo**  
10/2018 Research Intern in JST ERATO  
with Yasuaki Kakehi, Yoshihiro Kawahara, Ryuma Niiyama
- 05/2016 – **UC Berkeley**  
08/2016 Research Intern in BiD Group  
with Bjoern Hartmann, Gustavo Soares, Elena Glassman
- 05/2015 – **Stanford University**  
08/2015 Research Intern in HCI Group  
with Michael Bernstein

09/2014 – **University of Tokyo**  
05/2015 Research Assistant in IIS Lab  
with Koji Yatani  
  
01/2015 – **AIST, Tsukuba**  
03/2015 Research Intern in Media Interaction Group  
with Jun Kato, Masataka Goto

## Education

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08/2015 – **University of Colorado Boulder**  
12/2020 Ph.D. candidate in Human-Computer Interaction, Department of Computer Science  
PhD Dissertation: Dynamic Shape Construction and Transformation with Collective Elements  
Committee: Daniel Leithinger, Mark D. Gross, Hiroshi Ishii, Takeo Igarashi, Tom Yeh  
  
04/2011 – **University of Tokyo**  
03/2013 M.A. in Computational Game Theory, Department of Economics  
Thesis: Diffusion Process and Take-off Conditions of Online Platforms  
Advisor: Michihiro Kandori  
  
04/2007 – **Tokyo Institute of Technology**  
03/2011 B.Eng in Information and Social Science, School of Engineering

## Peer-Reviewed Conference Publications

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Quick summary since 2016: First Author (13), Awarded Paper (2), CHI (5), UIST (7), IROS (2), ICRA (1), ICSE (1), ASSETS (1), and other venues (5). 800 citations and 16 h-index and 19 i10-index since 2016, based on Google Scholar as of 5/2022. <sup>a</sup>

<sup>a</sup><https://scholar.google.com/citations?user=klWjaQIAAAAJ>

- [J1] Hooman Hedayati, **Ryo Suzuki**, Wyatt Rees, Daniel Leithinger, Daniel Szafir. Designing Expandable-Structure Robots for Human-Robot Interaction *Frontiers in Robotics and AI*. 2022. (in press)
- [C22] Hiroki Kaimoto, Kyzyl Monteiro, Mehrad Faridan, Jiatong Li, Samin Farajian, Yasuaki Kakehi, Ken Nakagaki, **Ryo Suzuki**. Sketched Reality: Exploring Bi-Directional Interactions Between Virtual Sketches and Actuated Tangible Interfaces Based on AR Sketching and Tabletop Mobile Robots. *In Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2022. (UIST '22, acceptance rate: 26%)
- [C21] Jian Liao, Adnan Karim, Shivesh Jadon, Rubaiat Habib, **Ryo Suzuki**. RealityTalk: Real-time Speech-driven Augmented Presentation for AR Live Storytelling. *In Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2022. (UIST '22, acceptance rate: 26%)

- [C20] Martin Nisser, Yashaswini Makaram, Lucian Covarrubias, Amadou Yaye Bah, Faraz Faruqi, **Ryo Suzuki**, Stefanie Mueller. Mixels: Fabricating Interfaces using Programmable Magnetic Pixels. In *Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2022. (UIST '22, acceptance rate: 26%)
- [C19] Martin Nisser, Yashaswini Makaram, Faraz Faruqi, **Ryo Suzuki**, Stefanie Mueller. Selective Self-Assembly using Re-Programmable Magnetic Pixels. In *Proceedings of 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems*. IEEE, 2022 (IROS '22, acceptance rate: 48%)
- [C18] Martin Nisser, Leon Cheng, Yashaswini Makaram, **Ryo Suzuki**, Stefanie Mueller. ElectroVoxel: Electromagnetically Actuated Pivoting for Scalable Modular Self-Reconfigurable Robots. In *Proceedings of the IEEE International Conference on Robotics and Automation*. ACM, 2022. (ICRA '22, acceptance rate: 43%)
- [C17] **Ryo Suzuki**, Adnan Karim, Tian Xia, Hooman Hedayati, Nicolai Marquardt. Augmented Reality and Robotics: A Survey and Taxonomy for AR-enhanced Human-Robot Interaction and Robotic Interfaces. In *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems*. ACM, 2022. (CHI '22, acceptance rate: 26%)
- [C16] **Ryo Suzuki**, Eyal Ofek, Mike Sinclair, Daniel Leithinger, Mar Gonzalez-Franco. HapticBots: Distributed Encountered-type Haptics for VR with Multiple Shape-changing Mobile Robots. In *Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2021. (UIST '21, acceptance rate: 25%)
- [C15] **Ryo Suzuki**, Rubaiat Habib, Li-Yi Wei, Stephen Diverdi, Wilmot Li, Daniel Leithinger. RealitySketch: Embedding Responsive Graphics and Visualizations in AR through Dynamic Sketching. In *Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2020. (UIST '20, acceptance rate: 21%)  
**Honorable Mention Paper Award (top 5%)**
- [C14] Hooman Hedayati, **Ryo Suzuki**, Daniel Leithinger, Daniel Szafir. PufferBot: Actuated Expandable Structures for Aerial Robots. In *Proceedings of 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems*. IEEE, 2020 (IROS '20, acceptance rate: 47%)
- [C13] **Ryo Suzuki**, Hooman Hedayati, Clement Zheng, James Bohn, Daniel Szafir, Ellen Yi-Luen Do, Mark D. Gross, Daniel Leithinger. RoomShift: Room-scale Dynamic Haptics for VR with Furniture-moving Swarm Robots. In *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems*. ACM, 2020. (CHI '20, acceptance rate: 24%)
- [C12] **Ryo Suzuki**, Ryosuke Nakayama, Dan Liu, Yasuaki Kakehi, Mark D. Gross, Daniel Leithinger. LiftTiles: Constructive Building Blocks for Prototyping Room-scale Shape-changing Interfaces. In *Proceedings of the ACM International Conference on Tangible, Embedded and Embodied Interaction*. ACM, 2020. (TEI '20, acceptance rate: 28%)
- [C11] **Ryo Suzuki**, Clement Zheng, Yasuaki Kakehi, Tom Yeh, Ellen Do, Mark D. Gross, Daniel Leithinger. ShapeBots: Shape-changing Swarm Robots. In *Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2019. (UIST '19, acceptance rate: 24%)

- [C10] Ryosuke Nakayama\*, **Ryo Suzuki**\*, Satoshi Nakamaru, Ryuma Niiyama, Yoshihiro Kawahara, Yasuaki Kakehi. (\* equally contributed) MorphIO: Entirely Soft Sensing and Actuation Modules for Programming Shape Changes through Tangible Interaction. *In Proceedings of the ACM Conference on Designing Interactive Systems*. ACM, 2019. (**DIS '19**, acceptance rate: 25%)  
**Best Paper Award (top 1%)**
- [C9] **Ryo Suzuki**, Junichi Yamaoka, Daniel Leithinger, Tom Yeh, Mark D. Gross, Yoshihiro Kawahara, Yasuaki Kakehi. Dynablock: Dynamic 3D Printing for Instant and Reconstructable Shape Formation. *In Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2018. (**UIST '18**, acceptance rate: 20%)
- [C8] **Ryo Suzuki**, Koji Yatani, Mark D. Gross, Tom Yeh. Tabby: Explorable Design for 3D Printing Textures. *In Proceedings of the Pacific Conference on Computer Graphics and Applications*. Eurographics Association, 2018 (**PG '19**, acceptance rate: 26%)
- [C7] **Ryo Suzuki**, Jun Kato, Mark D. Gross, Tom Yeh. Reactile: Programming Swarm User Interfaces through Direct Physical Manipulation. *In Proceedings of the CHI Conference on Human Factors in Computing Systems*. ACM, 2018. (**CHI '18**, acceptance rate: 25%)
- [C6] Hyunjoo Oh, Tung D. Ta, **Ryo Suzuki**, Mark D. Gross, Yoshihiro Kawahara, Lining Yao. PEP (3D Printed Electronic Papercrafts): An Integrated Approach for 3D Sculpting Paper-based Electronic Devices. *In Proceedings of the CHI Conference on Human Factors in Computing Systems*. ACM, 2018. (**CHI '18**, acceptance rate: 25%)
- [C5] **Ryo Suzuki**, Abigale Stangl, Mark D Gross, Tom Yeh. FluxMarker: Enhancing Tactile Graphics with Dynamic Tactile Markers. *In Proceedings of the International ACM SIGACCESS Conference on Computers and Accessibility*. ACM, 2017. (**ASSETS '17**, acceptance rate: 26%)
- [C4] **Ryo Suzuki**, Gustavo Soares, Andrew Head, Elena Glassman, Ruan Reis, Melina Mongiovi, Loris D'Antoni, Bjoern Hartmann. TraceDiff: Debugging Unexpected Code Behavior Using Trace Divergences. *In Proceedings of the IEEE Symposium on Visual Languages and Human-Centric Computing*. IEEE, 2017. (**VL/HCC '17**, acceptance rate: 29%)
- [C3] Andrew Head, Elena Glassman, Gustavo Soares, **Ryo Suzuki**, Lucas Figueredo, Loris D'Antoni, Bjoern Hartmann. Writing Reusable Code Feedback at Scale with Mixed-Initiative Program Synthesis. *In Proceedings of the ACM Conference on Learning at Scale*. ACM, 2017. (**L@S '17**, acceptance rate: 22%)
- [C2] Reudismam Rolim, Gustavo Soares, Loris D'Antoni, Oleksandr Polozov, Sumit Gulwani, Rohit Gheyi, **Ryo Suzuki**, Bjoern Hartmann. Learning Syntactic Program Transformations from Examples. *In Proceedings of the International Conference on Software Engineering*. IEEE, 2017. (**ICSE '17**, acceptance rate: 19%)
- [C1] **Ryo Suzuki**, Niloufar Salehi, Michelle S. Lam, Juan C. Marroquin, Michael S. Bernstein. Atelier: Repurposing Expert Crowdsourcing Tasks as Micro-internships. *In Proceedings of the CHI Conference on Human Factors in Computing Systems*. ACM, 2016. (**CHI '16**, acceptance rate: 23%)

## Peer-Reviewed Demo and Poster Publications

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- [D14] **Ryo Suzuki**, Rubaiat Habib, Li-Yi Wei, Stephen Diverdi, Wilmot Li, Daniel Leithinger. RealitySketch: Augmented Reality Sketching for Real-time Embedded and Responsive Visualizations. *SIGGRAPH Asia 2021 Real-Time Live!*. ACM, 2021. (**SIGGRAPH Asia '21 Real-Time Live!**)
- [D13] Hiroki Kaimoto, Samin Farajian, **Ryo Suzuki**. Swarm Fabrication: Reconfigurable 3D Printers and Drawing Plotters Made of Swarm Robots. In *Adjunct Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2021. (**UIST '21 Student Innovation Contest**)
- [D12] Martin Nisser, Leon Cheng, Yashaswini Makaram, **Ryo Suzuki**, Stefanie Mueller. Programmable Polarities: Actuating Interactive Prototypes with Programmable Electromagnets. In *Adjunct Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2021. (**UIST '21 Demo**)
- [D11] **Ryo Suzuki**, Eyal Ofek, Mike Sinclair, Daniel Leithinger, Mar Gonzalez-Franco. Demonstrating HapticBots: Distributed Encountered-type Haptics for VR with Multiple Shape-changing Mobile Robots. In *Adjunct Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2021. (**UIST '21 Demo**)
- [D10] **Ryo Suzuki**, Rubaiat Habib, Li-Yi Wei, Stephen Diverdi, Wilmot Li, Daniel Leithinger. Demonstrating RealitySketch: Embedding Responsive Graphics and Visualizations in AR through Dynamic Sketching. In *Adjunct Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2020. (**UIST '20 Demo**)  
**Honorable Mention Best Demo Award (top two demos)**
- [D9] **Ryo Suzuki**. Collective Shape-changing Interfaces. In *Adjunct Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2019. (**UIST '19 Doctoral Consortium**)
- [D8] **Ryo Suzuki**, Ryosuke Nakayama, Dan Liu, Yasuaki Kakehi, Mark D. Gross, Daniel Leithinger. LiftTiles: Modular and Reconfigurable Room-scale Shape Displays through Retractable Inflatable Actuators. In *Adjunct Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2019. (**UIST '19 Poster**)
- [D7] **Ryo Suzuki**, Clement Zheng, Yasuaki Kakehi, Tom Yeh, Ellen Do, Mark D. Gross, Daniel Leithinger. Demonstrating ShapeBots: Shape-changing Swarm Robots. In *Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2019. (**UIST '19 Demo**)
- [D6] **Ryo Suzuki**, Junichi Yamaoka, Daniel Leithinger, Tom Yeh, Mark D. Gross, Yoshihiro Kawahara, Yasuaki Kakehi. Demonstrating Dynablock: Dynamic 3D Printing for Instant and Reconstructable Shape Formation. In *Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2018. (**UIST '18 Demo**)
- [D5] **Ryo Suzuki**, Gustavo Soares, Elena Glassman, Andrew Head, Loris D'Antoni, Bjoern Hartmann. Exploring the Design Space of Automatically Synthesized Hints for Introductory Programming Assignments. In *Proceedings of the CHI Conference Extended Abstracts on Human Factors in Computing Systems*. ACM, 2017. (**CHI '17 Late-Breaking Work**)

- [D4] Stanford Crowd Research Collective (For the full author list, please see the publication), Daemo: A Self-Governed Crowdsourcing Marketplace. *In Adjunct Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2015. (UIST '15 Poster)
- [D3] **Ryo Suzuki**. Toward a Community Enhanced Programming Education. *In Proceedings of the CHI Conference Extended Abstracts on Human Factors in Computing Systems*. ACM, 2015. (CHI '15 Workshop Paper)
- [D2] **Ryo Suzuki**, Interactive and Collaborative Source Code Annotation. *In Proceedings of the International Conference on Software Engineering*. IEEE, 2015. (ICSE '15 Poster)
- [D1] **Ryo Suzuki**, Network Thresholds and Multiple Equilibria in the Diffusion of Content-based Platforms. *In Proceedings of the International Conference on Web and Internet Economics*. Springer, 2014. (WINE '14 Poster)

## Patents

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- P.3 Mar Gonzalez-Franco, **Ryo Suzuki**, Eyal Ofek, Mike Sinclair. "Mobile Haptic Robots". U.S. Patent Application, filed August 2021.
- P.2 Kazi Rubaiat Habib, Stephen Joseph DiVerdi, **Ryo Suzuki**, Li-Yi Wei, Wilmot Wei-Mau Li. "Systems for Augmented Reality Sketching." U.S. Patent 11,158,130, 2021, issued October 26, 2021.
- P.1 Yasuaki Kakehi, **Ryo Suzuki**, Junichi Yamaoka, Yoshihiro Kawahara. "Reconstructable 3D Block Assembly" Japan Patent Application, filed October, 2018.

## Awards and Scholarships

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### Awards

- 2021 **UIST 2021 Best Student Innovation Contest Award**  
(for Samin Farajian and Hiroki Kaimoto)
- 2021 **Snap Creative Challenge Award for The Future of Co-located Social AR**
- 2020 **UIST 2020 Honorable Mention Best Demo Award**
- 2020 **UIST 2020 Honorable Mention Best Paper Award**
- 2020 **University of Colorado Boulder Outstanding Research Award in CS**
- 2019 **DIS 2019 Best Paper Award**
- 2018 **Google PhD Fellowship Finalist**
- 2013 **Tech Crunch Disrupt in Tokyo 2013 Finalist**
- 2012 **University of Tokyo Startup Competition 1st Prize Winner**

## Scholarship

- 2015-2020 **CU Boulder Travel Grant** (\$500-\$1,200 for each conference travel)
- 2015-2020 **Nakajima Foundation Scholarship** (\$120,000 stipend for 5 years and 2 years tuition coverage)
- 2013-2015 **JSPS Research Fellow DC1** (\$72,000 stipend for 2 years)
- 2011-2013 **JASSO Fellow (Total Exemption for Outstanding Students)** (\$20,000 stipend for 2 years)
- 2010 **Tohso Foundation Scholarship** (\$3,600)

## Funding

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- 2022 **Ryo Suzuki**. Adobe Collaborative Research Gift Funding (with Rubaiat Habib), \$25,000 USD
- 2021 **Ryo Suzuki** (for Hiroki Kaimoto). *Mitacs*, Mitacs Globalink Research Award, \$6,000  
<https://www.mitacs.ca/en/programs/globalink/globalink-research-award>
- 2021 **Ryo Suzuki** (for Kyzyl Monteiro and Ritik Vatsal). Augmented Reality based Real-time Visualization to Seamlessly Integrate Virtual and Physical Worlds. *Mitacs*, Mitacs Globalink Research Internship Funding  
<https://www.mitacs.ca/en/programs/globalink/globalink-research-internship>
- 2021 **Ryo Suzuki**. Augmenting In-person Verbal Communication by Adding Interactivity to Transcribed Spoken Words in AR. *Snap, Inc*, Snap Creative Challenge Funding, \$15,000 USD  
<https://www.snapcreativechallenge.com/>
- 2021 **Ryo Suzuki** (for Harrison Chen). Investigating Human-Drone Interaction with VR Simulation. *NSERC*, NSERC USRA, \$6,000 CAD
- 2021 **Ryo Suzuki** (for Colin Au Yeoung). Situated Guidance and Visualization to Support Personal Fabrication Activities. *NSERC*, NSERC USRA, \$6,000 CAD
- 2021 **Ryo Suzuki**. Mixed Reality for IoT and Robotics: Opportunities and Challenges for Immersive Human-Robot Interaction. *Tohoku University*, Tohoku University Research Institute of Electrical Communication, Cooperative Research Projects, \$18,000 CAD  
<https://www.riec.tohoku.ac.jp/en/nation-wide/koubo/r3/>
- 2021 **Ryo Suzuki**. *NSERC*, NSERC Discovery Grant Funding, \$145,000 CAD
- 2021 **Ryo Suzuki**. *University of Calgary*, Startup Funding, \$100,000 CAD
- 2019 **Ryo Suzuki**. Adaptive Physical Environments with Distributed Swarm Robots. *Ministry of Internal Affairs and Communications in Japan*, Innovation Research Funding, \$30,000  
<https://www.inno.go.jp/en/>
- 2019 **Ryo Suzuki**. Adobe Gift Funding, \$5,000

- 2018 **Ryo Suzuki**. Dynamic Physical Interfaces. *JST in Japan*, ACT-I Funding for Young Scholars, \$30,000 and Mentorship Opportunity (my mentor was Takeo Igarashi)  
<https://www.jst.go.jp/kisoken/act-i/en/index.html>
- 2018 **Ryo Suzuki**. Programmable Architecture with Soft Inflatable Actuator. *Leave a Nest Foundation in Japan*, Emerging Research Funding for AI and Interdisciplinary Research \$5,000
- 2013-2015 **Ryo Suzuki**. Network-based Diffusion Analysis for Online Community, *JSPS*, KAKENHI Grants-in-Aid for Scientific Research, \$40,000

## Student Funding

- 2022 **Marcus Friedel**. Departmental Research Award, *University of Calgary*, \$11,000 CAD

## Teaching

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### Courses

- Winter 2023 **CPSC 599: Design of Mixed Reality Apps (Undergraduate)**  
Department of Computer Science, University of Calgary
- Winter 2023 **CPSC 584: Human-Robot Interaction (Undergraduate)**  
Department of Computer Science, University of Calgary
- Fall 2022 **CPSC 581: Human-Computer Interaction II (Undergraduate)**  
Department of Computer Science, University of Calgary
- Winter 2022 **CPSC 601: AR/VR and Robotics (Graduate)**  
Department of Computer Science, University of Calgary
- Fall 2021 **CPSC 581: Human-Computer Interaction II (Undergraduate)**  
Department of Computer Science, University of Calgary
- Winter 2021 **CPSC 599: Design of Mixed Reality Apps (Undergraduate)**  
Department of Computer Science, University of Calgary

### Teaching Assistant

- Fall 2019 **CSCI 3002: Fundamentals of Human Computer Interaction (Undergraduate)**  
Instructor: Prof. Shaun Kane  
Department of Computer Science, University of Colorado Boulder
- Spring 2017 **ATLS 6000: Soft Robotics (Graduate)**  
Instructor: Prof. Mark D. Gross  
ATLAS Institute, University of Colorado Boulder
- Fall 2012 **Game and Network Theory (Graduate)**  
Instructor: Prof. Michihiro Kandori  
Department of Economics, University of Tokyo



*Fall 2012* **Dynamic Programming and Optimization (Graduate)**

Instructor: Prof. Kazuya Kamiya

Department of Economics, University of Tokyo

## Students

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### Supervision

*01/2021* – **Neil Chulpongsatorn**

*present* MSc student and Undergraduate research student (CPSC 502 Course)  
Cross-Device Interaction / Mixed Reality / Data Visualization

*05/2021* – **Adnan Karim**

*present* MSc student  
AR/VR and Robotics / AR Sketching Tools

*09/2021* – **Shivesh Jadon**

*present* MSc student (co-supervised by Wesley Willet)  
Social AR / Data Visualization

*09/2021* – **Marcus Friedel**

*present* MSc student (co-supervised by Ehud Sharlin)  
Wearable VR Haptics

*09/2021* – **Samin Farajian**

*present* MSc student  
Swarm User Interfaces / Augmented Reality

*01/2021* – **Christopher Smith**

*present* MSc student (co-supervised by Ehud Sharlin and Sowmya Somanath)  
In-situ Immersive Haptic Authoring

### Undergraduate Students

*12/2021* – **Jian Liao**

*present* Undergraduate research student (CPSC 503 Course)  
Augmented Presentation

*12/2021* – **Mehrad Faridan**

*present* Undergraduate research student (CPSC 503 Course)  
Augmented Conversation

*04/2022* – **Kevin Van**

*present* Undergraduate research student  
Augmented Reality Authoring Tool

*04/2022* – **Zhijie Xia**

*present* Undergraduate research student  
Augmented Reality Authoring Tool

- 04/2022 – **Muhammad Mahian**  
*present* Undergraduate research student (UCalgary PURE)  
 Augmented Reality Authoring Tool
- 12/2021 – **Mehrad Faridan**  
*present* Undergraduate research student (CPSC 503 Course)  
 Augmented Conversation
- 05/2021 – **Tian Xia**  
*present* Undergraduate research student (CPSC 502 Course, co-supervised by Ehud Sharlin)  
 Cross-scale Interactions with AR/VR
- 05/2021 – **Colin Au Yeung**  
 04/2022 Undergraduate research student (NSERC USRA, co-supervised by Wesley Willet)  
 Augmented Makrespace
- 09/2021 – **Kaynen Mitchell**  
 03/2022 Undergraduate research student (CPSC 502 Course)  
 Reconfigurable Swarm Robotic Displays
- 09/2021 – **Manjot Khangura**  
 03/2022 Undergraduate research student (CPSC 502 Course)  
 Survey, Taxonomy, and Evaluation of Embedded Data Visualization
- 09/2021 – **Manuel Rodriguez,**  
 03/2022 Undergraduate research student (CPSC 502 Course)  
 Live Video Annotation and Augmentation for Real-Time Sports Analysis
- 09/2021 – **Christopher Rodriguez**  
 03/2022 Undergraduate research student (CPSC 503 Course)  
 Robot Teleoperation with AR/VR
- 12/2021 – **Tiffany Tang**  
 03/2022 Undergraduate research student (CPSC 503 Course)  
 Swarm User Interfaces
- 12/2021 – **Edward Mah**  
 03/2022 Undergraduate research student (CPSC 503 Course)  
 Augmented Conversation
- 05/2021 – **Harrison Chen**  
 09/2021 Undergraduate research student (NSERC USRA)  
 Human-Drone Interaction

### Visiting Students

- 07/2021 – **Hiroki Kaimoto**  
*present* Mitacs Globalink student intern (University of Tokyo)
- 05/2022 – **Kyzyl Monteiro**  
*present* Mitacs Globalink summer student intern (IIT Delhi)

- 05/2022 – **Ritik Vatsal**  
*present* Mitacs Globalink summer student intern (IIT Delhi)
- 05/2022 – **Shrivatsa Mishra**  
*present* Mitacs Globalink summer student intern (IIT Delhi)
- 06/2022 – **Johann Wentzel**  
*present* Visiting PhD student (University of Waterloo)
- 09/2021 – **Vaishvi Shah**  
*present* High-school research student (Henry Wise Wood High School)
- 05/2021 – **Curtis Engerdahl**  
 09/2021 Summer undergraduate research student (University of Alberta)
- 05/2021 – **Gurnoor Auja**  
 09/2021 Summer undergraduate research student (University of Alberta)
- 05/2021 – **Carrie Rong**  
 08/2021 Summer undergraduate research student (McGill University)

### Student Collaborators

- 01/2021 – **Martin Nisser**  
*present* PhD student at MIT CSAIL (Stefanie Mueller's Student)

### Thesis Committee

- 2021 **Brennan Jones**  
 PhD Thesis Committee (supervisor: Tony Tang)  
 Title: Designing Remote Collaboration Technologies for Wilderness Search and Rescue
- 2020 **Kendra Wannamaker**  
 MSc Thesis Committee (supervisor: Wesley Willett)  
 Title: Situated Self-Tracking: Ideating, Designing, and Deploying Dedicated User-driven Personal Informatics Systems

### Mentoring (During PhD)

- 2019 **Chrystalina Pharr**  
 Undergraduate student in Mechanical Engineering  
 University of Colorado Boulder  
 Project: ceiling-based swarm robots
- 2019 **James Bohn**  
 Undergraduate student in Computer Science  
 University of Colorado Boulder  
 Project: furniture-moving swarm robots

- 2018 **Ryosuke Nakayama**  
Master student in Media Design  
Keio University (now Sony)  
Project: interactive soft robots and shape-changing inflatable structure
- 2018 **Takayuki Hirai**  
Undergraduate student in Media Design  
Keio University (now Nintendo)  
Project: shape-changing swarm robots
- 2018 **Takumi Murayama**  
Undergraduate student in Media Design  
Keio University  
Project: reprogrammable inflatable architectural structure
- 2017 **Kevin Kuwata**  
Master student in Electrical and Computer Engineering  
University of Colorado Boulder (now Apple)  
Project: mm-scale swarm robots with electromagnetic actuation
- 2017 **Zhixian Jin**  
Undergraduate student in Electrical and Computer Engineering  
University of Colorado Boulder  
Project: tactile feedback with actuated magnetic marker
- 2016 **Ruan Reis**  
Master student in Computer Science  
Federal University of Campina Grande  
Project: automated hint generation for programming assignment
- 2015 **Michelle Lam**  
Undergraduate student in Computer Science  
Stanford University (now PhD at Stanford University)  
Project: micro-internship with repurposed crowdsourcing tasks
- 2015 **Juan Marroquin**  
Undergraduate student in Computer Science  
Stanford University (now Microsoft)  
Project: micro-internship with repurposed crowdsourcing tasks
- 2015 **Adam Ginzberg**  
Undergraduate student in Computer Science  
Stanford University (now Coda.io)  
Project: crowd research

## Selected Press Coverage

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02/2022 Engadget. *Scientists create cube robots that can shapeshift in space*

02/2022 TechXplore. *Robotic cubes: Self-reconfiguring ElectroVoxels use embedded electromagnets to test applications for space exploration*

02/2022 TechEBlog. *MIT Researchers Develop Shape-Shifting ElectroVoxel Robots for Space Exploration*

02/2022 TechEBlog. *MIT Researchers Develop Shape-Shifting ElectroVoxel Robots for Space Exploration*

02/2022 IEEE Spectrum. *Video Friday: Your weekly selection of awesome robot videos*

02/2022 Arduino Blog. *ElectroVoxel robots reconfigure themselves using magnets*

02/2022 Hackster.io. *These Magnetic Robots Assemble Like Voltron*

02/2022 Robotic Gizmos. *ElectroVoxel Cube Based Reconfigurable Robot*

01/2022 CGWorld. *RealitySketch: Augmented Reality Sketching in SIGGRAPH Asia*

11/2021 UCalgary News. *"Touchable spoken words" bring the fantastic to life*

07/2021 IEEE Computer Graphics and Applications. *Cover Story of "Real Virtual Reality" (vol. 41)*

03/2021 IT Media News. *Evolution of "AR Drawing"? RealitySketch, a sketching technology that works with objects in reality*

12/2020 TechXplore. *RealitySketch: An AR interface to create responsive sketches*

10/2020 ACM TechNews. *Pufferfish-inspired robot could improve drone safety*

10/2020 Interesting Engineering. *Pufferfish Mimicking Drones to Improve Aerial Safety*

10/2020 New Atlas. *Drone draws on the pufferfish to protect itself and others*

10/2020 Techable. *University of Colorado researchers unveil 'RoomShift' to move props in VR space in real life*

10/2020 Hackster.io. *Putting the Reality in Virtual Reality*

09/2020 Hackster.io. *PufferBot Is an Aerial Robot That Can Change Shape In-Flight*

09/2020 TechXplore. *RoomShift: A room-scale haptic and dynamic environment for VR applications*

09/2020 Engineering 360. *Team builds drone inspired by the pufferfish*

09/2020 TechXplore. *PufferBot: A flying robot with an expandable body*

09/2020 Yahoo News. *The University of Colorado Announced "RoomShift" where Robot Rearranges Furniture to Create Virtual Spaces in a Realistic Way*

09/2020 IT Media News. *RoomShift: Reconfigurable Environments for Virtual Reality*

02/2020 IT Media News. *Giant whistle module expands the room with the University of Colorado and other "LiftTiles" developments*

01/2020 Arduino Blog. *Prototype room-scale, shape-changing interfaces with LiftTiles*

01/2020 TechXplore. *LiftTiles: Actuator-based Building Blocks for Shape-changing Interfaces*

01/2020 ITMedia News. *A Swarm of Self-transforming Robots to Assist People*

11/2019 Hackster.io. *LiftTiles Turn Walls and Floors Into Reconfigurable Structures on Demand*

11/2019 Element 14. *Engineers Develop LiftTiles, a Scale Shape-changing Interface*

11/2019 Bouncy. *Swarm Robots that can Change Shape to Visualize Data*

10/2019 Hackster.io. *Swarming Robots Can Change Their Configuration to Handle Different Tasks*

09/2019 TechXplore. *ShapeBots: A Swarm of Shape-shifting Robots that Visually Display Data*

09/2019 Hackaday. *Tiny Robots that Grow Taller and Wider*

09/2019 Robotic Gizmo. *ShapeBots: Shape Changing Swarm Robots*

09/2019 Gadgetify. *ShapeBots: Shape Changing Swarm Robots*

10/2018 3DPrint.com. *Dynablock: 3D Prints That Assemble and Disassemble in Seconds*

10/2018 Hackster.io. *The Dynamic 3D Printing That Assembles and Disassembles Objects in Seconds*

10/2018 Arduino Blog. *Create Shapes Over and Over with the Dynablock 3D Printer*

10/2018 3DRuck.com. *Dynablock: Dynamischer 3D-Drucker erstellt Objekte in Sekunden*

10/2018 World Business Satellite (Japanese TV). *Repeatable 3D Printer*

10/2018 Nikkei Newspaper, *Modeling 3D Objects with Magnet-Embedded Blocks*

06/2016 Wired. *It's Not Just Robots: Skilled Jobs Are Going to Meatware*

## Invited Talks

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07/2022 **Programmable Reality: Making the World a Dynamic Medium through Visually and Physically Programmable Environments**  
KAIST, Daejeon (hosted by Andrea Bianchi and Juho Kim)

05/2022 **Programmable Reality: Making the World a Dynamic Medium through Visually and Physically Programmable Environments**  
Calgary Public Library, Calgary

04/2022 **Dynamic Media for Immersive Natives**  
Microsoft Research, Redmond (hosted by Andy Wilson and Ken Hinckley)

03/2022 **Programmable Reality: Making the World a Dynamic Medium through Visually and Physically Programmable Environments**  
CU Boulder, Boulder (hosted by Ellen Yi Luen Do)

- 03/2021 **From Augmented Reality to Reconfigurable Reality: Towards Seamless Interactions through Both Visually and Physically Programmable Environments**  
MIT CSAIL, Boston (hosted by Arvind Satyanarayan)
- 02/2021 **From Augmented Reality to Reconfigurable Reality: Towards Seamless Interactions through Both Visually and Physically Programmable Environments**  
Tsinghua University, Beijing, China (hosted by Zhicong Lu)
- 12/2020 **Programmable Environments with Distributed Swarm Robots**  
Tohoku University, Tohoku, Japan (hosted by Yoshifumi Kitamura)
- 05/2020 **Programmable Environments with Distributed Swarm Robots**  
University of Calgary, Calgary (hosted by Ehud Sharlin)
- 03/2020 **Programmable Environments with Distributed Swarm Robots**  
Virginia Tech, Blacksburg (hosted by Doug Bowman)
- 03/2020 **Programmable Environments with Distributed Swarm Robots**  
UCSB, Santa Barbara (hosted by Misha Sra)
- 02/2020 **Programmable Environments with Distributed Swarm Robots**  
University of Washington, Seattle (hosted by Shyam Gollakota and Jon Froehlich)
- 02/2020 **Programmable Environments with Distributed Swarm Robots**  
Boston University, Boston (hosted by Emily Whiting)
- 12/2019 **Adaptive Physical Environment with Distributed Swarm Robots**  
CU Boulder ATLAS Seminar, Boulder (hosted by Ellen Do)
- 11/2019 **Adaptive Physical Environment with Distributed Swarm Robots**  
MIT CSAIL, Boston (hosted by Stefanie Mueller)
- 11/2019 **Adaptive Physical Environment with Distributed Swarm Robots**  
MIT Media Lab, Boston (hosted by Hiroshi Ishii)
- 10/2019 **Distributed and Collective Robots as Ubiquitous Interfaces**  
University of Tokyo, Tokyo, Japan (hosted by Takeo Igarashi)
- 10/2019 **Distributed and Collective Robots as Ubiquitous Interfaces**  
University of Tokyo, Tokyo, Japan (hosted by Jun Rekimoto)
- 10/2019 **Distributed and Collective Robots as Ubiquitous Interfaces**  
JST ERATO, Tokyo, Japan (hosted by Yoshihiro Kawahara)
- 10/2019 **Distributed and Collective Robots as Ubiquitous Interfaces**  
Takram, Tokyo, Japan (hosted by Hisato Ogata)
- 10/2019 **Distributed and Collective Robots as Ubiquitous Interfaces**  
ZOZO Research, Tokyo, Japan (hosted by Satoshi Nakamaru)
- 10/2019 **Distributed and Collective Robots as Ubiquitous Interfaces**  
Preferred Networks, Tokyo, Japan (hosted by Hironori Yoshida)

- 10/2019 **Distributed and Collective Robots as Ubiquitous Interfaces**  
Omron ScinicX Research Lab, Tokyo, Japan (hosted by Yoshitaka Ushiku)
- 06/2019 **Real-time Binding between Physical and Digital Worlds**  
Adobe Research, Seattle (hosted by Wilmot Li)
- 10/2018 **Dynamic Physical Media**  
CU Boulder ATLAS Seminar, Boulder (hosted by Mark Gross)
- 06/2016 **Programming Environment for Physical Computing and Mixed Reality Era**  
UC Berkeley BiD Seminar, Berkeley (hosted by Bjoern Hartmann)

## Service

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- 2020 – present **Program Committee**  
CHI 2022, 2023  
UIST 2021, 2022  
ISMAR 2021, 2022  
VRST 2021, 2022  
TEI 2021, 2022, 2023  
GI 2020
- 2021 – present **Journal Editorial Board**  
ACM Transactions of Human-Robot Interaction  
Frontiers in Virtual Reality Haptics
- 2016 – present **Organizing Committee**  
UIST '22 Student Innovation Contest Chair  
UIST '21 Student Innovation Contest Chair  
CHI '21 Social Media Chair  
CHI '21 Student Research Competition Jury  
UIST '16 Web and Social Media Chair



*2016 – present* **Reviewer**

CHI 2016 - 2022  
UIST 2016 - 2022  
IMWUT 2020 - 2021  
CHI LBW 2018 - 2022  
ISS 2021  
ISMAR 2020 - 2022  
VRST 2020 - 2022  
CSCW 2021  
TOCHI 2020  
PACM 2021  
DIS 2021 - 2022  
C&C 2021  
IEEE VR 2020  
VL/HCC 2020  
GI 2020  
SCF 2019  
SIGGRAPH ETech 2018 - 2021

Total about 100 reviews.  
6 Outstanding Reviews at CHI/UIST

*2016 – 2017* **Student Volunteer**

CHI 2017  
UIST 2016

Academic Services within the University

*2022* **Faculty Hiring External Committee**

University of Calgary, Department of Mechanical Engineering

*2021* **Safety Committee**

University of Calgary, Department of Computer Science

*2021* **Committee Member**

University of Calgary, Professional Master's Game Production & Immersive Tech Program

*2021* **Faculty Hiring External Committee**

University of Calgary, Department of Electrical Software Engineering

## References

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- **Daniel Leithinger**

Assistant Professor  
University of Colorado Boulder, ATLAS Institute  
daniel.leithinger@colorado.edu

- **Mark D. Gross**  
Director  
University of Colorado Boulder, ATLAS Institute  
mdgross@colorado.edu
- **Hiroshi Ishii**  
Jerome B. Wiesner Professor and Associate Director  
MIT Media Lab  
ishii@media.mit.edu
- **Takeo Igarashi**  
Professor  
University of Tokyo, Department of Computer Science  
takeo@acm.org
- **Tom Yeh**  
Associate Professor  
University of Colorado Boulder, Department of Computer Science  
tom.yeh@colorado.edu
- **Bjoern Hartmann**  
Associate Professor  
UC Berkeley, Department of Electrical Engineering and Computer Science  
bjoern@eecs.berkeley.edu
- **Rubaiat Habib**  
Senior Research Scientist  
Adobe Research  
rhabib@adobe.com