Ryo Suzuki Curricumlum Vitae

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Research Interest

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

01/2021 – **University of Calgary**
Assistant Professor, Department of Computer Science
Human-Computer Interaction Group (Interactions Lab)
Director of Programmable Reality Lab

05/2020 – 08/2020 **Microsoft Research, Redmond**
Research Intern in EPIC Group
with Mar Gonzalez-Franco, Eyal Ofek, Mike Sinclair

08/2015 – 05/2020 **University of Colorado Boulder**
Research Assistant in Department of Computer Science and ATLAS Institute
with Daniel Leithinger, Mark D. Gross, Tom Yeh

05/2019 – 08/2019 **Adobe Research, Seattle**
Research Intern in Creative Intelligence Lab
with Rubaiat Habib, Li-Yi Wei, Stephen DiVerdi, Wilmot Li

12/2017 – 10/2018 **University of Tokyo**
Research Intern in JST ERATO
with Yasuaki Kakehi, Yoshihiro Kawahara, Ryuma Niiyama

05/2016 – 08/2016 **UC Berkeley**
Research Intern in BiD Group
with Bjoern Hartmann, Gustavo Soares, Elena Glassman

05/2015 – 08/2015 **Stanford University**
Research Intern in HCI Group
with Michael Bernstein

09/2014 – 05/2015 **University of Tokyo**
Research Assistant in IIS Lab
with Koji Yatani

01/2015 – 03/2015 **AIST, Tsukuba**
Research Intern in Media Interaction Group
with Jun Kato, Masataka Goto

Education

08/2015 – 12/2020 **University of Colorado Boulder**
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 – 03/2013 **University of Tokyo**
M.A. in Computational Game Theory, Department of Economics

Thesis: Diffusion Process and Take-off Conditions of Online Platforms
Advisor: Michihiro Kandori

04/2007 – 03/2011 **Tokyo Institute of Technology**
B.Eng in Information and Social Science, School of Engineering

Peer-Reviewed Conference Publications

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. [a]

[a] 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 Sinclar, 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

[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 withProgrammable 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 Sinclar, 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

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

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 Scholorship** ($3,600)

Funding

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

Courses

Winter 2023 **CPSC 599: Design of Mixed Reality Apps (Undergradate)**
Department of Computer Science, University of Calgary

Winter 2023 **CPSC 584: Human-Robot Interaction (Undergradate)**
Department of Computer Science, University of Calgary

Fall 2022 **CPSC 581: Human-Computer Interaction II (Undergradate)**
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 (Undergradate)**
Department of Computer Science, University of Calgary

Winter 2021 **CPSC 599: Design of Mixed Reality Apps (Undergradate)**
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

Supervision

01/2021 – present **Neil Chulpongsatorn**
MSc student and Undergraduate research student (CPSC 502 Course)
Cross-Device Interaction / Mixed Reality / Data Visualization

05/2021 – present **Adnan Karim**
MSc student
AR/VR and Robotics / AR Sketching Tools

09/2021 – present **Shivesh Jadon**
MSc student (co-supervised by Wesley Willet)
Social AR / Data Visualization

09/2021 – present **Marcus Friedel**
MSc student (co-supervised by Ehud Sharlin)
Wearable VR Haptics

09/2021 – present **Samin Farajian**
MSc student
Swarm User Interfaces / Augmented Reality

01/2021 – present **Christopher Smith**
MSc student (co-supervised by Ehud Sharlin and Sowmya Somanath)
In-situ Immersive Haptic Authoring

Undergraduate Students

12/2021 – present **Jian Liao**
Undergraduate research student (CPSC 503 Course)
Augmented Presentation

12/2021 – present **Mehrad Faridan**
Undergraduate research student (CPSC 503 Course)
Augmented Conversation

04/2022 – present **Kevin Van**
Undergraduate research student
Augmented Reality Authoring Tool

04/2022 – present **Zhijie Xia**
Undergraduate research student
Augmented Reality Authoring Tool

04/2022 – present **Muhammad Mahian**
Undergraduate research student (UCalgary PURE)
Augmented Reality Authoring Tool

12/2021 – present **Mehrad Faridan**
Undergraduate research student (CPSC 503 Course)
Augmented Conversation

05/2021 – present **Tian Xia**
Undergraduate research student (CPSC 502 Course, co-supervised by Ehud Sharlin)
Cross-scale Interactions with AR/VR

05/2021 – 04/2022 **Colin Au Yeung**
Undergraduate research student (NSERC USRA, co-supervised by Wesley Willet)
Augmented Makrespace

09/2021 – 03/2022 **Kaynen Mitchell**
Undergraduate research student (CPSC 502 Course)
Reconfigurable Swarm Robotic Displays

09/2021 – 03/2022 **Manjot Khangura**
Undergraduate research student (CPSC 502 Course)
Survey, Taxonomy, and Evaluation of Embedded Data Visualization

09/2021 – 03/2022 **Manuel Rodriguez,**
Undergraduate research student (CPSC 502 Course)
Live Video Annotation and Augmentation for Real-Time Sports Analysis

09/2021 – 03/2022 **Christopher Rodriguez**
Undergraduate research student (CPSC 503 Course)
Robot Teleoperation with AR/VR

12/2021 – 03/2022 **Tiffany Tang**
Undergraduate research student (CPSC 503 Course)
Swarm User Interfaces

12/2021 – 03/2022 **Edward Mah**
Undergraduate research student (CPSC 503 Course)
Augmented Conversation

05/2021 – 09/2021 **Harrison Chen**
Undergraduate research student (NSERC USRA)
Human-Drone Interaction

Visiting Students

07/2021 – present **Hiroki Kaimoto**
Mitacs Globalink student intern (University of Tokyo)

05/2022 – present **Kyzyl Monteiro**
Mitacs Globalink summer student intern (IIT Delhi)

05/2022 – present **Ritik Vatsal**
Mitacs Globalink summer student intern (IIT Delhi)

05/2022 – present **Shrivatsa Mishra**
Mitacs Globalink summer student intern (IIT Delhi)

06/2022 – present **Johann Wentzel**
Visiting PhD student (University of Waterloo)

09/2021 – present **Vaishvi Shah**
High-school research student (Henry Wise Wood High School)

05/2021 – 09/2021 **Curtis Engerdahl**
Summer undergraduate research student (University of Alberta)

05/2021 – 09/2021 **Gurnoor Aujla**
Summer undergraduate research student (University of Alberta)

05/2021 – 08/2021 **Carrie Rong**
Summer undergraduate research student (McGill University)

Student Collaborators

01/2021 – present **Martin Nisser**
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

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

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 Willson)

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, Beijin, 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

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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