## 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 primarily focuses on the intersection of **human-computer interaction** and **robotics**. My research aims to *seamlessly blend the virtual and physical worlds*, by leveraging augmented reality, tangible user interfaces, robotics, and shape-changing technologies.

Keywords: AR x AI, tangible interfaces, human-robot interaction, augmented environment

## **Employment**

	University of Calgary Assistant Professor, Department of Computer Science Human-Computer Interaction Group (Interactions Lab) Director of Programmable Reality Lab		
07/2023 – current	Google Visiting Researcher Blended Interaction Research and Devices Lab (BIRD Lab)		
_	The University of Tokyo Visiting Professor Research Center for Advanced Science and Technology		
-	Microsoft Research, Redmond Research Intern in EPIC Group with Mar Gonzalez-Franco, Eyal Ofek, Mike Sinclair		
	University of Colorado Boulder Research Assistant in Department of Computer Science and ATLAS Institute with Daniel Leithinger, Mark D. Gross, Tom Yeh		
-	Adobe Research, Seattle Research Intern in Creative Intelligence Lab with Rubaiat Habib, Li-Yi Wei, Stephen DiVerdi, Wilmot Li		
•	University of Tokyo Research Intern in JST ERATO with Yasuaki Kakehi, Yoshihiro Kawahara, Ryuma Niiyama		
-	UC Berkeley Research Intern in BiD Group with Bioern 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**

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**

Quick summary since 2016: First Author (13), Last Author (7), Awarded Paper (2), CHI (7), UIST (10), IROS (2), ICRA (1), ICSE (1), ASSETS (1), and other venues (5). About 1,200 citations and 19 h-index and 22 i10-index since 2016, based on Google Scholar as of 7/2023. <sup>a</sup>

- [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.
- [C28] Neil Chulpongsatorn\*, Mille Skovhus Lunding\*, Nishan Soni, **Ryo Suzuki**. (\* equally contributed) Augmented Math: ML-Based Approach to Authoring AR Explorable Explanations by Augmenting Static Math Textbooks. *In Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2022. (**UIST '23**, acceptance rate: 25%)
- [C27] Keiichi Ihara, Mehrad Faridan, Ayumi Ichikawa, Ikkaku Kawaguchi, Ryo Suzuki. HoloBots: Augmenting Holographic Telepresence with Mobile Robots for Tangible Remote Collaboration in Mixed Reality. In Proceedings of the Annual ACM Symposium on User Interface Software and Technology. ACM, 2022. (UIST '23, acceptance rate: 25%)

 $<sup>{\</sup>it a} {\it https://scholar.google.com/citations?user=klWjaQIAAAAJ}$ 

- [C26] Zhijie Xia\*, Kyzyl Monteiro\*, Kevin Van, **Ryo Suzuki**. (\* equally contributed) RealityCanvas: Augmented Reality Sketching for Embedded and Responsive Scribble Animation Effects. *In Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2022. (UIST '23, acceptance rate: 25%)
- [C25] Jiatong Li, Ryo Suzuki, Ken Nakagaki. Physica: Interactive Tangible Physics Simulation based on Tabletop Mobile Robots towards Explorable Physics Education. In Proceedings of the ACM Conference on Designing Interactive Systems. ACM, 2023. (DIS '23, acceptance rate: 24%)
- [C24] Mehrad Faridan, Bheesha Kumari, Ryo Suzuki. ChameleonControl: Teleoperating Real Human Surrogates through Mixed Reality Gestural Guidance for Remote Hands-on Classrooms In Proceedings of the ACM CHI Conference on Human Factors in Computing Systems. ACM, 2022. (CHI '23, acceptance rate: 28%)
- [C23] Kyzyl Monteiro, Ritik Vatsal, Neil Chulpongsatorn, Aman Parnami, **Ryo Suzuki**. Teachable Reality: Prototyping Tangible Augmented Reality with Everyday Objects by Leveraging Interactive Machine Teaching. In Proceedings of the ACM CHI Conference on Human Factors in Computing Systems. ACM, 2022. (CHI '23, acceptance rate: 28%)
- [C22] Hiroki Kaimoto, Kyzyl Monteiro, Mehrad Faridan, Jiatong Li, Samin Farajian, Yasuaki Kakehi, Ken Nakagaki, Ryo Suzuki. Sketched Reality: Sketching Bi-Directional Interactions Between Virtual and Physical Worlds with AR and Actuated Tangible UI. 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%)

## Workshop Organizers

[W1] **Ryo Suzuki**, Mar Gonzalez-Franco, Misha Sra, David Lindlbauer, Hrvoje Benko. XR and AI: AI-enabled Virtual, Augmented, and Mixed Reality. *In Adjunct Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2023. (UIST '23 Workshop)

## **Peer-Reviewed Demo and Poster Publications**

- [D18] Neil Chulpongsatorn, Wesley Willett, Ryo Suzuki. HoloTouch: Interacting with Mixed Reality Visualizations through Smartphone Proxies. In Proceedings of the CHI Conference Extended Abstracts on Human Factors in Computing Systems. ACM, 2023. (CHI '23 Late-Breaking Work, acceptance rate: 34%)
- [D17] Cathy Fang, **Ryo Suzuki**, Daniel Leithinger. VR Haptics at Home: Repurposing Everyday Objects and Environments for Room-Scale VR Haptic Interaction. In Proceedings of the CHI Conference Extended Abstracts on Human Factors in Computing Systems. ACM, 2023. (CHI '23 Late-Breaking Work, acceptance rate: 34%)

[D16] Mehrad Faridan, Marcus Friedel, **Ryo Suzuki**. UltraBots: Large-Area Mid-Air Haptics for VR with Robotically Actuated Ultrasound Transducers. *In Adjunct Proceedings of the Annual ACM Symposium on User Interface Software and Technology*. ACM, 2022. (**UIST '22** Student Innovation Contest)

### Honorable Mention Best Student Innovation Contest Award (top three)

- [D15] Marcus Friedel, Ehud Sharlin, **Ryo Suzuki**. HapticLever: Kinematic Force Feedback using a 3D Pantograph. In Adjunct Proceedings of the Annual ACM Symposium on User Interface Software and Technology. ACM, 2022. (**UIST '22** Poster)
- [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)

### Best Student Innovation Contest Award (top one)

- [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, acceptance rate: 37%)
- [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)
- [D<sub>3</sub>] **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*<sub>3</sub>] Mar Gonzalez-Franco, Eyal Ofek, Mike Sinclair, **Ryo Suzuki**. "Mobile Haptic Robots". U.S. Patent 17/356,513, 2022.
- [P2] Rubaiat Habib Kazi, 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.
- [P1] Yasuaki Kakehi, **Ryo Suzuki**, Junichi Yamaoka, Yoshihiro Kawahara. "Reconstructable 3D Block Assembly" Japan Patent Application, filed October, 2018.

## Awards and Scholarships

**Awards** 

- 2022 UIST 2022 Honorable Mention Best Student Innovation Contest Award (for Mehrad Faridan and Marcus Friedel)
- 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**

- 2023 **Ryo Suzuki**. Google Collaborative Research Gift Funding (with Mar Gonzalez-Franco), \$30,000 USD
- 2023 Ryo Suzuki (Co-PI: Ehud Sharlin, Lora Oehlberg, Wesley Willett, Aditya Shekhar Nittala).
  NSERC, NSERC RTI, \$150,000 CAD
- 2022 Ryo Suzuki. Adobe Collaborative Research Gift Funding (with Rubaiat Habib), \$25,000 USD
- **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/
- **Ryo Suzuki** (for Harrison Chen). Investigating Human-Drone Interaction with VR Simulation. *NSERC*, NSERC USRA, \$6,000 CAD

- **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

- 2023 Mehrad Faridan. Gary Marsden Travel Awards, ACM SIGCHI, \$3,000 CAD
- 2023 **Kyzyl Monteiro**. Gary Marsden Travel Awards, ACM SIGCHI, \$3,000 CAD
- 2023 Shivesh Jadon. Graduate Student Scholarship, Alberta Innovates, \$18,600 CAD
- 2023 Marcus Friedel. Graduate Student Scholarship, Alberta Innovates, \$18,600 CAD
- 2022 **Neil Chulpongsatorn**. Alberta Graduate Excellence Scholarship (AGES), *Alberta Government*, \$11,000 CAD
- 2022 **Adnan Karim**. Alberta Graduate Excellence Scholarship (AGES), *Alberta Government*, \$11,000 CAD
- 2022 **Shivesh Jadon**. Alberta Graduate Excellence Scholarship (AGES), *Alberta Government*, \$11,000 CAD
- 2022 Shivesh Jadon. Rizvi Family Graduate Scholarship, University of Calgary, \$2,000 CAD
- 2022 Shivesh Jadon. Departmental Research Award, University of Calgary, \$11,000 CAD
- 2022 Marcus Friedel. Canada Graduate Scholarships Master's Program (CGS-M), NSERC, \$17,500 CAD

## **Teaching**

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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

# 01/2023 - Aditya Gunturu present MSc student Mixed Reality 01/2021 - Neil Chulpongsatorn present MSc student and Undergraduate research student (CPSC 502 Course) Cross-Device Interaction / Mixed Reality / Data Visualization (CHI'23, CHI'23 LBW) 05/2021 - Adnan Karim present MSc student

AR/VR and Robotics (CHI'22)

09/2021 - Shivesh Jadon

present MSc student (co-supervised by Wesley Willet)

Social AR / Data Visualization (**UIST'22**)

09/2021 - Marcus Friedel

present MSc student (co-supervised by Ehud Sharlin) Wearable VR Haptics (UIST'22 SIC, UIST'22 Poster)

09/2021 - Samin Farajian

present MSc student

Swarm User Interfaces / Augmented Reality (UIST'22, UIST'21 SIC)

01/2021 - Christopher Smith

present MSc student (co-supervised by Ehud Sharlin and Sowmya Somanath)

In-situ Immersive Haptic Authoring

**Undergraduate Students** 

12/2021 - Mehrad Faridan

present Undergraduate research student (CPSC 503 Course)

Augmented Conversation / Remote Telepresence (UIST'22, UIST'22 SIC, CHI'23)

04/2022 - Kevin Van

present Undergraduate research student

Augmented Reality Authoring Tool (CHI'23 LBW)

04/2022 - Zhijie Xia

present Undergraduate research student

Augmented Reality Authoring Tool (CHI'23 LBW)

01/2023 - Jarin Thundathil

present Undergraduate research student (CPSC 503 Course / NSERC USRA)

Augmented Reality with Natural Language

01/2023 - Melissa Hoang

present Undergraduate research student (CPSC 503 Course)

Augmented Reality with Natural Language

## 01/2023 - Bheesha Kumari present Undergraduate research student (CPSC 503 Course) Remote Telepresence (CHI'23) 01/2023 - **Nishan Soni** present Undergraduate research student (UCalgary PURE) Augmented Reality Authoring Tool 01/2023 - Abhinav Pillai present Undergraduate research student Augmented Reality for Medical Applications 01/2023 - Saja Abufarha present Undergraduate research student Augmented Reality with Natural Language 12/2021 - **Jian Liao** present Undergraduate research student (CPSC 503 Course) Augmented Presentation (UIST'22, CHI'23 LBW) 05/2021 - Tian Xia present Undergraduate research student (CPSC 502 Course, co-supervised by Ehud Sharlin) AR for Robotics / Cross-scale Interactions with AR/VR (CHI'22) 09/2022 - Faiz Marsad 04/2023 Undergraduate research student (CPSC 502 Student) Augmented Reality and AI 04/2022 - Muhammad Mahian 09/2022 Undergraduate research student (UCalgary PURE) Augmented Reality Authoring Tool 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 12/2022 - Keiichi Ihara present Visiting MS student intern (University of Tsukuba) 10/2022 - **Ryota Gomi** present Visiting MS student intern (University of Tohoku) 02/2023 - Mille Lunding present Visiting PhD student (Aarhus University) 02/2023 - Rasmus Lunding present Visiting PhD student (Aarhus University) 07/2021 - Hiroki Kaimoto present Mitacs Globalink student intern (University of Tokyo) UIST'22 05/2022 - Kyzyl Monteiro present Mitacs Globalink summer student intern (IIIT Delhi) UIST'22, CHI'23 05/2022 - Ritik Vatsal 01/2023 Mitacs Globalink summer student intern (IIIT Delhi) CHI'23 05/2022 - Shrivatsa Mishra 01/2023 Mitacs Globalink summer student intern (IIIT Delhi) 06/2022 - Johann Wentzel 01/2023 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 Aujla 09/2021 Summer undergraduate research student (University of Alberta)

## 05/2021 - Carrie Rong

08/2021 Summer undergraduate research student (McGill University)

## **Student Collaborators**

### 01/2023 - Justin Moon

present PhD student at KAIST (Andrea Bianchi's Student)

#### 01/2021 - Martin Nisser

11/2022 PhD student at MIT CSAIL (Stefanie Mueller's Student)

## Thesis Committee

## 2023 Yuki Onishi

PhD Thesis Committee (supervisor: Yoshifumi Kitamura)

Title: Actuated Walls as Media Connecting and Dividing Physical/Virtual Spaces

#### 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 Per-

sonal 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**

- 04/2023 TechXplore. A System that Augments Mixed Reality Visualizations using Smartphones or Tablets
- 05/2022 UCalgary News. New Shape Shifting Robot Design Offers Solutions for Long-Distance Space Missions
- 02/2022 Forbes. Programmable Matter: MIT Building Self-Assembling Robots for Space
- 03/2022 IEEE Spectrum. Programmable Blocks Tease Self-Assembling Space Structures Self-reconfiguring Robot Cubes Use Electromagnets to Shift Shapes in Zero-G
- 02/2022 Popular Science. These shape-shifting robots could make for great furniture in pace
- 02/2022 MIT News. Robotic cubes shapeshift in outer space Self-reconfiguring ElectroVoxels use embedded electromagnets to test applications for space exploration

- 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**

- o7/2022 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)

ically 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)

03/2022 Programmable Reality: Making the World a Dynamic Medium through Visually and Phys-

## 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

2023 – present Subcommittee Chair

**UIST 2023** 

2020 – present Program Committee

CHI 2022, 2023, 2024

(Blending Interaction Subcommittee)

UIST 2021, 2022, 2023

ISMAR 2021, 2022, 2023

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

2023 – present Workshop Organizers

UIST 2023 - XR and AI Workshop

2016 – present Organizing Committee

UIST 2023 Program Committee Assistant Co-Chair

CHI 2023 Student Research Competition Jury

UIST 2022 Student Innovation Contest Chair

UIST 2021 Student Innovation Contest Chair

CHI 2021 Social Media Chair

CHI 2021 Student Research Competition Jury

UIST 2016 Web and Social Media Chair

### 2016 – present Reviewer

CHI 2016 - 2023

UIST 2016 - 2023

IMWUT 2020 - 2022

CHI LBW 2018 - 2022

TEI 2018 - 2023

ISS 2021

ISMAR 2020 - 2022

VRST 2020 - 2022

CSCW 2021

**TOCHI 2020** 

PACM 2021

DIS 2021 - 2022

C&C 2021

SUI 2022

ISS 2022

IEEE VR 2020, 2022 - 2023

HRI 2023

**VL/HCC 2020** 

GI 2020

SCF 2019

SIGGRAPH ETech 2018 - 2021

Total about 100-150 reviews.

6 Outstanding Reviews at CHI/UIST

## 2021 – present Session Chairs

CHI 2022 - 2023

UIST 2021 - 2022

## 2016 – 2017 Student Volunteer

CHI 2017

**UIST 2016** 

Academic Services within the University

#### 2023 Graduate Studies Scholarship Committee Reviewer

University of Calgary, Department of Computer Science

## 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

## 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

## Mar Gonzalez-Franco

Research Scientist Manager Google margon@google.com

#### 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