

Ryo Suzuki Curriculum Vitae

ATLAS Institute
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Research Interest

My research focus lies in the **intersection between robotics and human-computer interaction**. During my PhD, I have developed a novel physical interface made of swarm and soft robots, by leveraging the technique from both robotics and HCI. The goal of my research is to *make the physical environment more adaptive with the distributed swarm robots at all scales* (i.e., from mm- to m-scale).

keyword: tangible interface, swarm robots, soft robots, augmented reality

Education

08/2015 – **University of Colorado Boulder**

present Ph.D. candidate in Human-Computer Interaction
Department of Computer Science

Dissertation: Adaptive Physical Environment with Distributed Swarm Robots

Advisors: Daniel Leithinger and Mark D. Gross;

Committee: Hiroshi Ishii, Takeo Igarashi, Tom Yeh

04/2011 – **University of Tokyo**

03/2013 M.A. in Economics and Game Theory
Department of Economics

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

Advisor: Michihiro Kandori, Koji Yatani

04/2007 – **Tokyo Institute of Technology**

03/2011 B.Eng in Social Engineering
Department of Engineering

Professional Experience

08/2015 – **University of Colorado Boulder**

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, Danny Kaufman

- 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

Peer-Reviewed Conference Publications

Quick summary since 2016: First Author (9 + 2 in submission), Best Paper (1), CHI (3), UIST (2), ICSE (1), ASSETS (1), and other venues (5). 280 citations and 8 h-index based on Google Scholar (as of 11/2019) ^a

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

- [–] **Ryo Suzuki**, Rubaiat Habib, Li-Yi Wei, Stephen Diverdi, Daniel Leithinger. RealitySketch: Sketching Interactive Concept Visualizations in Augmented Reality. (**CHI '20** under review)
- [–] **Ryo Suzuki**, Hooman Hedayati, James Bohn, Clement Zheng, Daniel Szafir, Ellen Yi-Luen Do, Mark D. Gross, Daniel Leithinger. RoomShift: Room-scale Dynamic Haptics for VR with Furniture-moving Swarm Robots. (**CHI '20** under review)
- [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

- [D7] **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)

- [D6] **Ryo Suzuki**, Ryosuke Nakayama, Dan Liu, Yasuaki Takehi, 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)
- [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), Daemon: 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)

Awards and Scholarships

Awards

- 2019 **DIS 2019 Best Paper Award**
- 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

- 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

Selected Press Coverage

- 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

- 12/2019 **Adaptive Physical Environment with Distributed Swarm Robots**
ATLAS Institute, University of Colorado Boulder, Boulder, U.S.A. (ATLAS Seminar)
- 11/2019 **Adaptive Physical Environment with Distributed Swarm Robots**
MIT CSAIL, Boston, U.S.A. (hosted by Stefanie Mueller)
- 11/2019 **Adaptive Physical Environment with Distributed Swarm Robots**
MIT Media Lab, Boston, U.S.A. (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, U.S.A. (hosted by Wilmot Li)
- 10/2018 **Dynamic Physical Media**
CU Boulder ATLAS Seminar, Boulder, U.S.A. (hosted by Mark Gross)
- 06/2016 **Programming Environment for Physical Computing and Mixed Reality Era**
UC Berkeley BiD Seminar, Berkeley, U.S.A. (hosted by Bjoern Hartmann)

Teaching and Mentoring

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

Mentoring

- 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
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 Sparkfun X)
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
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

Service

- 2016 – present **Organizing Committee**
CHI '21 Social Media Chair
UIST '16 Web and Social Media Chair
- 2016 – present **Reviewer**
CHI 2016 - 2020
UIST 2017 - 2019
SCF 2019
SIGGRAPH ETech 2019
- 2016 – 2017 **Student Volunteer**
CHI 2017
UIST 2016

References

- **Daniel Leithinger**
Assistant Professor
ATLAS Institute, University of Colorado Boulder
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- **Mark D. Gross**
Director
ATLAS Institute, University of Colorado Boulder
mdgross@colorado.edu
- **Hiroshi Ishii**
Professor and Associate Director
Media Lab, MIT
ishii@media.mit.edu

- **Takeo Igarashi**
Professor
Department of Computer Science, University of Tokyo
takeo@acm.org
- **Tom Yeh**
Assistant Professor
Department of Computer Science, University of Colorado Boulder
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- **Bjoern Hartmann**
Associate Professor
Department of Electrical Engineering and Computer Science, UC Berkeley
bjoern@eecs.berkeley.edu
- **Rubaiat Habib**
Senior Research Scientist
Adobe Research
rhabib@adobe.com