

Inrak Choi

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Education

Stanford University

Ph.D. candidate in Mechanical Engineering, GPA: 3.98/4.0

Advisor: Sean Follmer, Ph.D. & Co-advisor: Mark R. Cutkosky, Ph.D.

Stanford, CA, USA

2016 – present

Stanford University

M.S. in Mechanical Engineering, GPA: 3.98/4.0

Quals: Dynamics, Robotics, & Research (Haptics)

Stanford, CA, USA

2013 – 2016

Korea University

B.S. in Mechanical Engineering, GPA: 3.88/4.0

Seoul, Korea

2009 – 2013

Research Experience

Stanford SHAPE Lab

Research Assistant, Advisor: Sean Follmer, Ph.D.

Stanford, CA

June 2015 – present

- Developing handheld haptic devices using voice coil actuators to create variable perceived stiffness and pseudo force for VR interaction.
- Developing wearable haptic interfaces for grasping, named Wolverine and Grabity, to enable users to get kinesthetic feedback from virtual objects, such as rigid stiffness or weight, in VR/AR environments.
- Investigating passive & energy-dissipative mechanisms, such as jamming, braking, and clutching, for light weight, power-efficient wearable haptic interfaces.
- Collaborated with researchers at MIT Media Lab, Oculus Research, and Google.

Microsoft Research

Intern for a haptic project

Redmond, WA

June 2017 – September 2017

- Mentor: Mike Sinclair, Ph.D., Hrvoje Benko, Ph.D., Eyal Ofek, Ph.D., Christian Holz, Ph.D.
- Submitted a VR haptic controller paper to CHI 2018 and filed a patent. Details are confidential at this time.

Hansen Medical, Inc,

Intern in Robotics Group, Supervisor: June Park, Ph.D.

Mountain View, CA

June 2015 – September 2015

- Proposed new active guidewire manipulation mechanisms.
- Wrote two invention disclosures in three months then applied to a patent.

Stanford Artificial Intelligence Laboratory

Research Assistant, Advisor: Oussama Khatib, Ph.D.

Stanford, CA

January 2014 – May 2015

- Human-friendly robotic arm project. Designed and assembled a wrist and a gripper.
- Implemented a hybrid actuation system with pneumatic artificial muscles and electrical dc motors.

Honors and Awards

Best Paper Award, UIST 2017

Author, "Grabity: A Wearable Haptic Interface for Simulating Weight and Grasping in Virtual Reality"

2017

Honorable Mention, Fast Company Innovation by Design 2017

"Wolverine: A Wearable Haptic Interface for Grasping in VR"

2017

Best Paper Award, UIST 2016

Co-author, "Rovables: Miniature On-Body Robots as Mobile Wearables"

2016

Best Demo Award, UIST 2016 <i>Author, "Wolverine: A Wearable Haptic Interface for Grasping in VR"</i>	2016
Young Engineers Honor Society (YEHS) <i>The National Academy of Engineering of Korea (NAEK)</i>	2011 – present
Presidential Science Scholarship <i>Awarded by the Korean President</i>	2009 – 2013
Great Honor Student for Academic Achievement <i>Korea University</i>	2009 – 2013

Publications

Journal Papers.....

1. **I. Choi**, N. Corson, L. Peiros, E. W. Hawkes, S. Keller, and S. Follmer. A Soft, Comrollable, High Force Density Linear Brake Utilizing Layer Jamming. IEEE Robotics and Automation Letters, 2016. (RA-L)

Conference Papers.....

1. **I. Choi**, E. Ofek, H. Benko, M. Sinclair, and C. Holz. CLAW: A Multifunctional Handheld Haptic Controller for Grasping, Touching, and Triggering in Virtual Reality. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems, Montreal, QC, Canada (CHI 2018)(Accepted)
2. **I. Choi**, H. Culbertson, M. R. Miller, A. Olwal, and S. Follmer. Gravity: A Wearable Haptic Interface for Simulating Weight and Grasping in Virtual Reality. In Proceedings of the 30th Annual ACM Symposium on User Interface Software & Technology (UIST 2017) **Best Paper Award**
3. H.-L. C. Kao, D. Ajilo, O. Anilonyte, A. Dementyev, **I. Choi**, S. Follmer, and C. Schmandt. Exploring interactions and perceptions of kinetic wearables. In Proceedings of the 2017 Conference on Designing Interactive Systems (DIS 2017)
4. A. Dementyev, H.-L. C. Kao, **I. Choi**, D. Ajilo, M. Xu, J. A. Paradiso, C. Schmandt, and S. Follmer. Rovables: Miniature On-Body Robots as Mobile Wearables. In Proceedings of the 29th Annual ACM Symposium on User Interface Software & Technology (UIST 2016) **Best Paper Award**
5. **I. Choi**, E. W. Hawkes, D. L. Christensen, C. J. Ploch, and S. Follmer. Wolverine: A Wearable Haptic Interface for Grasping in Virtual Reality. In Proceedings of the 2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2016)

Demos & Posters.....

1. **I. Choi**, E. Ofek, H. Benko, M. Sinclair, and C. Holz. Demonstration of CLAW: A Multifunctional Handheld VR Haptic Controller. In Adjunct proceedings of the 2018 CHI Conference on Human Factors in Computing Systems, Montreal, QC, Canada (CHI 2018)(Accepted)
2. M. Sinclair, E. Ofek, C. Holz, **I. Choi**, E. Whitmire, E. Strasnick, H. Benko. Three Haptic Shape-Feedback Controllers for Virtual Reality. IEEE Virtual Reality 2018 (Accepted)
3. A. Dementyev, J. Hernandez, S. Follmer, **I. Choi**, and J. Paradiso. SkinBot: A Wearable Skin Climbing Robot. In Adjunct proceedings of the 30th Annual ACM Symposium on User Interface Software & Technology (UIST 2017)
4. **I. Choi** and S. Follmer. Wolverine: A Wearable Haptic Interface for Grasping in Virtual Reality. In Adjunct proceedings of the 29th Annual ACM Symposium on User Interface Software & Technology (UIST 2016) **Best Demo Award**

5. **I. Choi** and S. Follmer. "Wolverine", ACM Interactions, Demo Hour, Jan/Feb 2017. In press.

Patents

1. **I. Choi**, H. Culbertson, and S. Follmer, "Grability: A Wearable Haptic Interface for Simulating Weight and Grasping in Virtual Reality," 2017. (Stanford disclosure S17/113)
2. E. W. Hawkes, **I. Choi**, and S. Follmer, "Wolverine: A Wearable Haptic Interface for Grasping in Virtual Reality," 2017. (U.S. Appl. No.: 15/588507)
3. **I. Choi**, J. Park, and A. Kokish, "Active Drive for Guidewire Manipulation," 2016. (U.S. Appl. No.: 15/250232).
4. **I. Choi**, "A Device for Removing the Snow of Vinyl House," 2008. (Korea Utility Model Appl. No. 20-2008-0000167)

Teaching Experience

ME 161 / 261: Dynamic Systems, Vibrations and Control <i>Course Assistant, Instructor: Paul Mitiguy, Ph.D.</i>	Stanford 2014, 2015, and 2016
ME 331 A: Advanced Dynamics & Computation <i>Course Assistant, Instructor: Paul Mitiguy, Ph.D.</i>	Stanford 2014 and 2015
ME 331 B: Advanced Dynamics, Simulation & Control <i>Course Assistant, Instructor: Paul Mitiguy, Ph.D.</i>	Stanford 2014 and 2015
CS 225A: Experimental Robotics <i>Course Assistant, Instructor: Oussama Khatib, Ph.D.</i>	Stanford 2015
CS 223A: Introduction to Robotics <i>Course Assistant, Instructor: Oussama Khatib, Ph.D.</i>	Stanford 2015

Professional Activities

Reviewer.....
Transactions on Haptics, Soft Robotics, IEEE VR

References

Available upon request

Updated on March 8, 2018