

## CURRICULUM VITAE

# Hrvoje Benko

Research Science Manager  
Facebook Reality Labs

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## RESEARCH INTERESTS

My research is in the field of Human Computer Interaction. My research interests include augmented and virtual reality, haptics, interactive projection mapping, new input form factors and devices, as well as touch and freehand gestural input. I am passionate about creating highly interactive real-time demonstration systems that highlight the core innovations while at the same time surprising and delighting the user. In my work, I try to strike a balance between long horizon research and solutions that are directly applicable to products in the near term.

## EDUCATION

### **Columbia University**

*Ph.D. in Computer Science*

June 2003 – June 2007

Advisor: Prof. Steven Feiner

Thesis: "User Interaction in Hybrid Multi-Display Environments"

### **Columbia University**

*Masters of Science (M.S.) in Computer Science*

September 2001 – June 2003

### **Lehigh University**

*Bachelors of Science (B.S.) in Computer Engineering*

September 1997 – June 2001

## EMPLOYMENT

### **Facebook**

November 2017 –

Research Science Manager – Redmond, WA

Responsible for setting the vision and research direction of the HCI research team at Facebook Reality Labs. Recruited 5 team members within a year. Started and led several large-scale multi-disciplinary projects that resulted in novel input devices and sensing techniques for VR/AR.

### **Microsoft Corporation**

July 2007 – October 2017

Senior Researcher – Redmond, WA

I worked first in the Adaptive Systems and Interaction group (manager Eric Horvitz), and then in the Natural Interaction Research group (manager Andy Wilson). My projects focused on haptics, augmented and virtual reality, projector-camera interactive systems, and non-planar multi-touch sensing devices. I also worked with Microsoft Hardware to turn one of my research projects into a product. We created Microsoft Touch Mouse which enables the user to use touch gestures on top of the mouse to control their Windows experience.

### **Microsoft Corporation**

Summer 2005

Summer Research Internship – Redmond, WA

I worked with Andy Wilson and Patrick Baudisch on a set of interaction techniques for increasing the precision of multi-touch interactions on a tabletop display. My work resulted in several working demonstrations, an ACM CHI paper, and a granted patent (8077153).

### **Unisys Corporation**

Summer 2000

Summer Internship – Malvern, PA

Worked on interfaces for the design of spoken dialogue call systems. My work resulted in a working prototype, demonstrated to senior management, and was integrated into the product.

**Merrill Lynch**

Summer 1999

Summer Internship – New York, NY

Worked in IT operations department supporting the Foreign Exchange trading desk. Responsible for Windows clients and server maintenance and software deployment scripting.

## PUBLICATIONS<sup>1</sup>

### Books and Book Chapters

- B1. Pandžić, I. S., Pejša, T., Matković, K., Benko, H., Čereković, A., Matijašević, M. (2011). "Virtualna Okruženja: Interaktivna 3D grafika i njene primjene". (In Croatian, translated title: Virtual Environments: Interactive 3D graphics and applications). ISBN: 978-953-197-606-0. Element d.o.o., Zagreb, September 2010.
- B2. Benko, H. and Wigdor, D. "Imprecision, Inaccuracy, and Frustration: The Tale of Touch Input". In "Tabletops - Horizontal Interactive Displays". Christian Mueller-Tomfelde (ed.). ISBN: 978-1-84996-112-7. Springer HCI Series, Springer-Verlag London Ltd., April 2010.

### Journal Articles

- J1. Holman, D., Girouard, A., Benko, H., and Vertegaal, R. (2013). "The Design of Organic User Interfaces: Shape, Sketching and Hypercontext". *Interacting with Computers, Oxford Journals*. 25(2): 133-142.
- J2. Steinicke, F., Benko, H., Daiber, F., Keefe, D.F., and de la Rivière, J.-B. (2013) "Foreword to the special section on touching the 3rd dimension". *Computers & Graphics*. 37(3).
- J3. Thorisson, K., Benko, H., Abramov, D., Arnold, A., Maskey, S., and Vaseekaran, A. (2004). "Constructionist Design Methodology for Interactive Intelligences". *AI Magazine*. Vol. 25, No. 4. p. 77-90.
- J4. Benko, H. (2001). "e-Ireland: Europe's New Internet Hub". *Perspectives on Business and Economics, Volume 19*. Martindale Center for the Study of Private Enterprise, Lehigh University, Bethlehem, PA, USA. p. 39-48.

### Peer Reviewed Conference Papers and Technotes

- C1. Strasnick, E., Holz, C., Ofek, E., Sinclair, M. and Benko, H. (2018). Haptic Links: Bimanual Haptics for Virtual Reality Using Variable Stiffness Actuation. In *Proc. of ACM CHI '18*.

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<sup>1</sup> A note on publication venues: in my primary area of research, Human Computer Interaction, the ACM Conference on Human Factors in Computing Systems (CHI) and the ACM Symposium on User Interface Software and Technology (UIST) are considered the best forums for dissemination of research results and covers the broad spectrum of research in Human Computer Interaction. Papers in these conferences are rigorously refereed by 4-5 experts, and have an acceptance rate of around 15-25% each year.

- C2. Whitmire, E., Benko, H., Holz, C., Ofek, E. and Sinclair, M. (2018). Haptic Revolver: Touch, Shear, Texture, and Shape Rendering on a Reconfigurable Virtual Reality Controller. In Proc. of ACM CHI '18.  
**ACM CHI 2018 Best Paper Honorable Mention**
- C3. Zhao, Y., Bennett, C., Benko, H., Cutrell, E., Holz, C., Morris, M. and Sinclair, M. (2018). Enabling People with Visual Impairments to Navigate Virtual Reality with a Haptic and Auditory Cane Simulation. In Proc. of ACM CHI '18.
- C4. Choi, I., Ofek, E., Benko, H., Sinclair, M. and Holz, C. (2018). CLAW: A Multifunctional Handheld Haptic Controller for Grasping, Touching, and Triggering in Virtual Reality. In Proc. of ACM CHI '18.
- C5. Xiao, R., Schwartz, J., Wilson, A., and Benko, H. (2018). MRTouch: Adding Touch Input to Head-Mounted Mixed Reality. IEEE Transactions on Visualization and Computer Graphics (TVCG), Special Issue (presented at IEEE VR 2018 Conference).
- C6. Fender, A. R., Benko, H. and Wilson, A.D. (2017). MeetAlive: Room-Scale Omni-Directional Display System for Multi-User Content and Control Sharing. In Proc. of ACM Interactive Surfaces and Spaces (ISS) 2017.  
**ACM ISS 2017 Best Paper Award**
- C7. Lu, J., Benko, H., and Wilson, A. (2017) Hybrid HFR Depth: Fusing Commodity Depth and Color Cameras to Achieve High Frame Rate, Low Latency Depth Camera Interactions. In Proc. of ACM CHI 2017.  
**ACM CHI 2017 Best Paper Honorable Mention**
- C8. Cheng, L.-P., Ofek, E., Holz, C., Benko, H., and Wilson, A. (2017) Sparse Haptic Proxy: Touch Feedback in Virtual Environments Using a General Passive Prop. In Proc. of ACM CHI 2017.
- C9. Benko, H., Holz, C., Sinclair, M. and Ofek, E. (2016). NormalTouch and TextureTouch: High-fidelity 3D Haptic Shape Rendering on Handheld Virtual Reality Controllers. In Proc. of ACM UIST 2016.  
**ACM UIST 2016 Best Paper Honorable Mention**  
**Reprise Presentation at ACM SIGGRAPH 2017**
- C10. Xiao, R. and Benko, H. (2016). Augmenting the Field-of-View of Head-Mounted Displays with Sparse Peripheral Displays. In Proc. of ACM CHI 2016.  
**ACM CHI 2016 Best Paper Honorable Mention**
- C11. Azmandian, M., Hancock, M., Benko, H., Ofek, E., and Wilson, A. (2016). Haptic Retargeting: Dynamic Repurposing of Passive Haptics for Enhanced Virtual Reality Experiences. In Proc. of ACM CHI 2016.  
**ACM CHI 2016 Golden Mouse Award (Best Video)**
- C12. Nuernberger, B., Ofek, E., Benko, H., and Wilson, A. (2016). SnapToReality: Aligning Augmented Reality to the Real World. In Proc. of ACM CHI 2016.
- C13. Hinckley, K., Heo, S., Pahud, M., Holz, C., Benko, H., Sellen, A., Banks, R., O'Hara, K., Smyth, G., and Buxton, W. (2016). Pre-Touch Sensing for Mobile Interaction. In Proc. of ACM CHI 2016.

- C14. Pejsa, T., Kantor, J., Benko, H., Ofek, E., and Wilson, A. (2016). Room2Room: Enabling Life-Size Telepresence in a Projected Augmented Reality Environment. In Proc. of ACM Conference on Computer Supported Cooperative Work (CSCW 2016).  
**ACM CSCW 2016 Best Paper Award**
- C15. Benko, H., Ofek, E., Zheng, F., and Wilson, A. D. (2015). FoveAR: Combining an Optically See-Through Near-Eye Display with Spatial Augmented Reality Projections. In Proc. of ACM UIST 2015.
- C16. Yoon, D., Hinckley, K., Benko, H., Guimbretiere, F., Irani, P., Pahud, M., and Gavriliu, M. (2015). Sensing Tablet Grasp + Micro-mobility for Active Reading. In Proc. of ACM UIST 2015.
- C17. Wilson, A. D. and Benko, H. (2014). "CrossMotion: Fusing Device and Image Motion for User Identification, Tracking and Device Association". In Proc. of ACM International Conference on Multimodal Interaction (ICMI 2014).
- C18. Benko, H., Wilson, A. D., Zannier, F. (2014). "Dyadic Projected Spatial Augmented Reality". In Proc. of ACM UIST 2014.
- C19. Jones, B., Sodhi, R., Murdock, M., Mehra, R., Benko, H., Wilson, A., Ofek, E., MacIntryre, B., Raghuvanshi, N., Shapira, L. (2014). "RoomAlive: Magical Experiences Enabled by Scalable, Adaptive Projector-Camera Units". In Proc. of ACM UIST 2014.
- C20. Hinckley, K., Pahud, M., Benko, H., Irani, P., Gavriliu, M., Guimbretiere, F., Chen, X., Matulic, F., Buxton, W., Wilson, A. D. (2014). "Sensing Techniques for Tablet+Stylus Interaction". In Proc. of ACM UIST 2014.  
**ACM UIST 2014 Best Paper Award**  
**Invited for Reprise Presentation at ACM SIGGRAPH 2015**
- C21. Sinclair, M., Pahud, M. and Benko, H. (2014). "TouchMover 2.0 - 3D Touchscreen with Haptic Feedback and Haptic Texture". In Proc. of IEEE Haptics Symposium (HAPTICS '14).
- C22. Sinclair, M., Pahud, M. and Benko, H. (2013). "TouchMover: Actuated 3D Touchscreen with Haptic Feedback". In Proc. of ACM Interactive Tabletops and Surfaces (ITS 2013).  
**ACM ITS 2013 Best Paper Award**
- C23. Hinckley, K., Chen, X., and Benko, H. (2013). "Motion and Context Sensing Techniques for Pen Computing". In Proc. of Graphics Interface 2013.
- C24. Bacim, F., Sinclair, M., and Benko, H. (2013). "Understanding Touch Selection Accuracy on Flat and Hemispherical Deformable Surfaces". In Proc. of Graphics Interface 2013.
- C25. Jones, B., Benko, H., Ofek, E., and Wilson, A. D. (2013). "IllumiRoom: Peripheral Projected Illusions for Interactive Experiences". In Proc. of ACM CHI 2013.  
**ACM CHI 2013 Best Paper Award**  
**ACM CHI 2013 Golden Mouse Award (best video)**
- C26. Wilson, A. D., Benko, H., Izadi, S., and Hilliges, O. (2012). "Steerable Augmented Reality with the Beamatron". In Proc. of ACM UIST 2012. p. 413-422.
- C27. Benko, H., Jota, R. and Wilson, A. D. (2012). "MirageTable: Freehand Interaction on a Projected Augmented Reality Tabletop". In Proc. of ACM CHI 2012. p. 199-208.

C28. Sodhi, R., Benko, H., and Wilson, A. D. (2012). "LightGuide: Projected Visualizations for Hand Movement Guidance". In Proc. of ACM CHI 2012. p. 179-188.

**ACM CHI 2012 Best Paper Honorable Mention**

- C29. Sun, M., Cao, X., Song, H., Izadi, S., Benko, H., Guimbretiere, F., Ren, X., and Hinckley, K. (2011). "Enhancing Naturalness of Pen-and-Tablet Drawing through Context Sensing". In Proceedings of ACM Interactive Tabletops and Surfaces (ITS '11). p. 83-86.
- C30. Harrison, C., Benko, H., Wilson, A. D. (2011). "OmniTouch: Wearable Multitouch Interaction Everywhere". In Proceedings of ACM UIST 2011. p. 441-450.
- C31. Saponas, T.S., Harrison, C., Benko, H. (2011) "PocketTouch: Through-Fabric Capacitive Touch Input". In Proceedings of ACM UIST 2011. p. 303-308.
- C32. Song, H., Benko, H., Guimbretiere, F., Izadi, S., Cao, X., and Hinckley, K. (2011). "Grips and Gestures on a Multi-Touch Pen". In Proceedings of ACM CHI 2011. p. 1323-1332.
- C33. Wigdor, D., Benko, H., Pella, J., Lombardo, J., and Williams, S. (2011). "Rock & Rails: Extending Multi-touch Interactions with Shape Gestures to Enable Precise Spatial Manipulations". In Proceedings of ACM CHI 2011. p. 1581-1590.
- C34. Benko, H. and Wilson, A. D. (2010). "Multi-Point Interactions with Immersive Omnidirectional Visualizations in a Dome". In Proceedings of ACM Interactive Tabletops and Surfaces (ITS '10). p. 19-28.
- C35. Hinckley, K., Yatani, K., Pahud, M., Coddington, N., Rodenhouse, J., Wilson, A., Benko, H., and Buxton, B. (2010). "Pen + Touch = New Tools". In Proceedings of ACM UIST '10. pp. 27-36.
- C36. Wilson, A. and Benko, H. (2010). "Combining Multiple Depth Cameras and Projectors for Interactions On, Above, and Between Surfaces". In Proceedings of ACM UIST '10. pp. 273-282.
- C37. Benko, H., Izadi, S., Wilson, A. D., Cao, X., Rosenfeld, D., and Hinckley, K. (2010). "Design and Evaluation of Interaction Models for Multi-touch Mice". In Proceedings of Graphics Interface 2010. p. 253-260.
- C38. Hinckley, K., Yatani, K., Pahud, M., Coddington, N., Rodenhouse, J., Wilson, A., Benko, H., and Buxton, B. (2010). "Manual Deskterity: An Exploration of Simultaneous Pen + Touch Direct Input". ACM CHI 2010 Extended Abstracts (alt.chi).
- C39. Hartmann, B., Morris, M., Benko, H., and Wilson, A. D. (2010). "Pictionaire: Supporting Collaborative Design Work by Integrating Physical and Digital Artifacts". In Proceedings of ACM CSCW '10. p. 421-424.
- C40. Tang, A., Pahud, M., Inkpen, K., Benko, H., Tang, J., and Buxton, B. (2010). "Three's Company: Understanding Communication Channels in Three-way Distributed Collaboration". In Proceedings of ACM CSCW '10. p. 271-280.
- C41. EMG + Surface Benko, H. Saponas, T.S., Morris, D., and Tan, D. (2009). "Enhancing Input On and Above the Interactive Surface with Muscle Sensing". In Proceedings of ACM Interactive Tabletops and Surfaces (ITS '09). p. 93-100.

- C42. Freeman, D., Benko, H., Morris, M. R., and Wigdor, D. (2009). "ShadowGuides: Visualizations for In-Situ Learning of Multi-Touch and Whole-Hand Gestures". In Proceedings of ACM Interactive Tabletops and Surfaces (ITS '09). p. 165-172.
- C43. Benko, H. (2009). "Beyond Flat Surface Computing: Challenges of Depth-Aware and Curved Interfaces". In Proceedings of ACM MultiMedia '09.
- C44. Villar, N., Izadi, S., Rosenfeld, D., Benko, H., Helmes, J., Westhues, J., Hodges, S., Butler, A., Ofek, E., Cao, X., and Chen, B. (2009). "Mouse 2.0: Multi-touch Meets the Mouse". In Proceedings of ACM User Interface Software and Technology (UIST '09). p. 33-42.
- ACM UIST 2009 Best Paper Award**
- C45. Hartmann, B., Morris, M. R., Benko, H., and Wilson, A. D. (2009). "Augmenting Interactive Tables with Mice & Keyboards". In Proceedings of ACM User Interface Software and Technology (UIST '09). p. 149-152.
- C46. Wigdor, D., Williams, S., Cronin, M., White, K., Levy, R., Mazeev, M., and Benko, H. (2009). "Ripples: Utilizing Per-Contact Visualizations to Improve User Interaction with Touch Displays". In Proceedings of ACM User Interface Software and Technology (UIST '09). p. 3-12.
- C47. Nacenta, M., Baudisch, P., Benko, H., and Wilson, A. D. (2009). "Separability of Spatial Manipulations in Multi-touch Interfaces". In Proceedings of Graphics Interface '09. Kelowna, BC, Canada, May 2009. p. 175-182.
- C48. Benko, H., Wilson, A. D., and Balakrishnan, R. (2008). "Sphere: Multi-Touch Interactions on a Spherical Display". In Proceedings of ACM User Interface Software and Technology (UIST '08). Monterey, CA. p. 77-86.
- C49. Benko, H. and Feiner, S. (2007). "Pointer Warping in Heterogeneous Multi-Monitor Environments". In Proceedings of Graphics Interface '07. Montreal, Canada. May 28-30. p. 111-117.
- C50. Benko, H. and Feiner, S. (2007). "Balloon Selection: A Multi-Finger Technique for Accurate Low-Fatigue 3D Selections." In Proceedings of IEEE Symposium on 3D User Interfaces. Charlotte, North Carolina, USA. March 10-11. p. 79-86.
- C51. Benko, H., Wilson, A. D., and Baudisch, P. (2006). "Precise Selection Techniques for Multi-Touch Screens." In Proceedings of ACM CHI 2006 (CHI'06: Human Factors in Computing Systems). Montreal, Canada. April 24-27. p. 1263-1272.
- C52. Benko, H., Feiner, S. (2005). "Multi-Monitor Mouse." ACM CHI 2005 (CHI'05: Human Factors in Computing Systems) Extended Abstracts. Portland, Oregon, USA. April 2-7. p. 1208-1211.
- C53. Benko, H., Ishak, E.W., Feiner, S. (2005). "Cross-Dimensional Gestural Interaction Techniques for Hybrid Immersive Environments." In Proceedings of IEEE Virtual Reality (VR '05). Bonn, Germany. March 10-12. p. 209-116.
- C54. Benko, H., Ishak, E.W., Feiner, S. (2004). "Collaborative Mixed Reality Visualization of an Archaeological Excavation." In Proceedings of The International Symposium on Mixed and Augmented Reality (ISMAR '04). November 2-5. p. 132-140.

- C55. Allen, P., Feiner, S. Troccoli, A., Benko, H., Ishak, E., Smith, B. (2004). "Seeing into the Past: Creating a 3D Modeling Pipeline for Archaeological Visualization." In Proceedings of International Symposium on 3D Data Processing Visualization and Transmission (3DPVT '04). p. 751-758.
- C56. Kaiser, E., Olwal, A., McGee, D., Benko, H., Corradini, A., Li, X., Cohen, P., Feiner, S. (2003). "Mutual Disambiguation of 3D Multimodal Interaction in Augmented and Virtual Reality." In Proceedings of The Fifth International Conference on Multimodal Interfaces (ICMI '03). Vancouver, BC. Canada. November 5-7. p. 12-19.
- C57. Olwal, A., Benko, H., Feiner, S. (2003). "SenseShapes: Using Statistical Geometry for Object Selection in a Multimodal Augmented Reality System". In Proceedings of The Second International Symposium on Mixed and Augmented Reality (ISMAR '03). Tokyo, Japan. October 7-10. p. 300-301.

## Technical Reports

- TR1. Aigner, R., Wigdor, D., Benko, H., Haller, M., Lindbauer, D., Ion, A., Zhao, S., and Koh, J.T.K.V. (2012). "Understanding Mid-Air Hand Gestures: A Study of Human Preferences in Usage of Gesture Types for HCI". Microsoft Research Technical Report MSR-TR-2012-111. November, 2012.
- TR2. Benko, H., Wilson, A. (2009). "DepthTouch: Using Depth-Sensing Camera to Enable Freehand Interactions On and Above the Interactive Surface". Microsoft Research Technical Report MSR-TR-2009-23. March, 2009.
- TR3. Benko, H., Morris, M. R., Brush, A.J.B., Wilson, A.D. (2009). "Insights on Interactive Tabletops: A Survey of Researchers and Developers". Microsoft Research Technical Report MSR-TR-2009-22. March, 2009.
- TR4. Benko, H., Ishak, E.W., Feiner, S. (2004). "Cross-Dimensional Gestural Interaction Techniques for Hybrid Immersive Environments". Columbia University, New York. Technical Report. CUCS-029-04, August 2004.

## Peer-Reviewed Demos & Posters

- D1. Azmandian, M., Hancock, M., Benko, H., Ofek, E., and Wilson, A. (2016). A Demonstration of Haptic Retargeting: Dynamic Repurposing of Passive Haptics for Enhanced Virtual Reality Experiences. ACM ISS 2016.
- D2. Azmandian, M., Hancock, M., Benko, H., Ofek, E., and Wilson, A. (2016). A Demonstration of Haptic Retargeting: Dynamic Repurposing of Passive Haptics for Enhanced Virtual Reality Experiences. ACM CHI 2016.
- D3. Jones, B., Benko, H., Ofek, E., and Wilson, A. D. (2013). "IllumiRoom: Peripheral Projected Illusions for Interactive Experiences". SIGGRAPH 2013 Emerging Technologies. Anaheim, CA. **Best Demo & Invitation to Laval Virtual 2014.**
- D4. Holman, D. and Benko, H. (2011). "SketchSpace: Designing Interactive Behaviors with Passive Materials". CHI 2011 Extended Abstracts, May, 2011.



- D5. Jota, R. and Benko, H. (2011). "Constructing Virtual 3D Models with Physical Building Blocks". CHI 2011 Extended Abstracts, May, 2011.
- D6. Benko, H., Wilson, A. (2010). "Pinch-the-Sky Dome: Freehand Multi-Point Interactions with Immersive Omni-Directional Data". CHI 2010 Extended Abstracts, April, 2010.
- D7. Benko, H., Wilson, A. (2008). "DepthTouch: Using Depth-Sensing Camera to Enable Freehand Interactions On and Above the Interactive Surface". IEEE Workshop on Tabletops and Interactive Surfaces '08. Amsterdam, the Netherlands, October 1-3, 2008.
- D8. Benko, H., Ishak, E.W., Feiner, S. (2004). "VITA: Visual Interaction Tool for Archaeology". The International Symposium on Mixed and Augmented Reality (ISMAR 2004). November 2-5, 2004.
- D9. Benko, H., Ishak, E.W., Feiner, S. (2004). "VITA: Visual Interaction Tool for Archaeology (Demo)". In Proc. The ACM SIGMM Effective Telepresence Workshop (ACM SIGMM ETP 2004), October 15, 2004. p. 48-49.
- D10. Allen, P., Feiner, S., Meskell, L., Ross, K., Troccoli, A., Smith, B., Benko, H., Ishak, E., and Conlon, J. (2004). "Digitally Modeling, Visualizing and Preserving Archaeological Sites". In Proc. Joint Conference on Digital Libraries 2004 (JCDL 2004). Tuscon, AZ. June 7-11. pp. 389.
- D11. Feiner, S. Bell, B., Benko, H., Blasko, G., Güven, S., Hallaway, D., Höllerer, T., and Lok, S. (2002). "Mobile Augmented Reality Systems." Living with the Genie: Governing Scientific and Technological Transformation in the 21st Century. New York, NY. March 5-7.

## Workshops

- W1. Wilson, A., and Benko, H. (2017) Projected Augmented Reality with the RoomAlive Toolkit. Tutorial at ACM ISS 2016.
- W2. Steimle, J., Benko, H., Cassinelli, A., Ishii, H., Leithinger, D., Maes, P., and Poupyrev, I. (2013) "Displays take new shape: an agenda for future interactive surfaces". (workshop) CHI Extended Abstracts 2013. p. 3283-3286.
- W3. Bacim, F., Sinclair, M., and Benko, H. (2012) "Challenges of Multitouch Interaction on Deformable Surfaces". Beyond Flat Displays Workshop at ACM ITS 2012.
- W4. Steinicke, F., Benko, H., Krüger, A., Keefe, D.F., de la Rivière, J.-B., Anderson, K., Häkkinä, J., Arhippainen, L., and Pakanen, M. (2012) "The 3rd dimension of CHI (3DCHI): touching and designing 3D user interfaces". CHI Extended Abstracts 2012: p. 2695-2698.
- W5. Steinicke, F., Benko, H., Daiber, F., Keefe, D.F., and de la Rivière, J.-B. (2011) "Touching the 3rd dimension (T3D workshop)". CHI Extended Abstracts 2011. p. 161-164.
- W6. Benko, H. and Wilson, A. (2009). "Design Challenges of Interactive Spherical User Interfaces". Programming Reality Workshop at CHI'09. April, 2009.
- W7. Ishak, E., Benko, H., and Feiner, S. (2005). "Development and Evaluation of Mixed Reality Interaction Techniques". Workshop on 3D User Interfaces (3DUI at IEEE VR'05). Bonn, Germany. March 10-12, 2005.

- W8. Benko, H., Ishak, E., and Feiner, S. (2003). "Collaborative Visualization of an Archaeological Excavation". Workshop on Collaborative Virtual Reality and Visualization (CVRV 2003). Lake Tahoe, CA. October 26-28, 2003.

## Thesis

- T1. Benko, H. (2007). "User Interaction in Hybrid Multi-Display Environments". Ph.D. Dissertation. Department of Computer Science, Columbia University, New York, NY. May 2007.

## INVITED TALKS

- IT1. Benko, H. (2018). "The ABC of MR Interactions". Keynote presentation at IEEE International Symposium on Mixed and Augmented Reality 2018. Munich, Germany.
- IT2. Benko, H. (2018). "VR Haptic Controllers: Multi-Purpose Handheld Haptics Beyond Vibrotactors". Keynote presentation at IEEE Haptics Symposium 2018, San Francisco, CA.
- IT3. Benko, H. (2017). "Perception Equals Reality". Invited lecture. Virtual Reality World Congress 2017. Bristol, UK.
- IT4. Benko, H. (2017). "Perception Equals Reality". Lecture series. Simon Fraser University, BC, Canada.
- IT5. Benko, H. (2017). "Perception Equals Reality". Lecture series. University of British Columbia, BC, Canada.
- IT6. Benko, H. (2015). "Interacting with Photons: Creating Interactive Projected Augmented Reality Experiences". TUX Sander's Distinguished Speaker Series in Toronto, ON. October 13, 2015.
- IT7. Benko, H. (2015). "Interacting with Photons: Creating Interactive Projected Augmented Reality Experiences". Columbia University. October 14, 2015.
- IT8. Benko, H. (2015). "Interacting with Photons: Creating Interactive Projected Augmented Reality Experiences". New York University. October 15, 2015.
- IT9. Benko, H. (2013). "Beyond Flat Displays: Interactivity on Any Surface". Stanford University. HCI Seminar. October 17, 2013.
- IT10. Benko, H. (2013). "Beyond Flat Displays: Interactivity on Any Surface". University of California Berkeley. SWARM Lab Seminar. October 16, 2013.
- IT11. Benko, H. (2013). "Istraživanja iz Microsoft Research-a na području proširene stvarnosti". (in Croatian). WinDays Conference. Umag, Croatia, April 24, 2013.
- IT12. Benko, H. (2013). "Beyond Flat Displays". ACM CHI '13 Workshop on Displays Take New Shape. April 28, 2013.
- IT13. Benko, H. (2012). "Rich Augmented Reality Interactions without Goggles, Gloves or 3D Trackers". DUB Research Talk. University of Washington. January 4, 2012.
- IT14. Benko, H. (2011). "High-fidelity Augmented Reality Interactions". Microsoft Research Latin American Faculty Summit. May 19, 2011.

- IT15. Benko, H. (2011). "Multi-touch Interactions on Small Input Devices". DUB Research Talk. University of Washington. February 2, 2011.
- IT16. Benko, H. (2009). "Alternative Form Factors of Surface Computing". Microsoft Research Faculty Summit. July 15, 2009.
- IT17. Wilson, A. D. and Benko, H. (2009). "Riffing on Surface". Department of Computer Science, University of California Santa Barbara. March 6, 2009.
- IT18. Benko, H. (2008). "Non-Flat Surface Computing". Microsoft Research Cambridge Lab. September 15, 2008.
- IT19. Benko, H. (2005). "Collaborative Mixed Reality Visualization of an Archaeological Excavation". MIT Media Lab. January 12, 2005.
- IT20. Benko, H., Troccoli, A. (2004). "Creating Telepresence: 3D Modeling and Visualization of an Archaeological Excavation". Ph.D. Seminar, Computer Science, Columbia University. November 23, 2004.

## PATENTS

- P1. LATENCY REDUCTION IN CAMERA-PROJECTION SYSTEMS. Hrvoje Benko, Jarrod Knibbe, Andrew D. Wilson. (pending)
- P2. FUSING DEVICE AND IMAGE MOTION FOR USER IDENTIFICATION, TRACKING AND DEVICE ASSOCIATION. Andrew D. Wilson, Hrvoje Benko. (pending)
- P3. STEERABLE DISPLAY SYSTEM. Andrew D. Wilson, Hrvoje Benko, Shahram Izadi. (pending)
- P4. MOTION AND CONTEXT SHARING FOR PEN-BASED COMPUTING INPUTS. Ken P. Hinckley, Hrvoje Benko, Xiang Chen. US-2013-0257777-A1. (pending)
- P5. TOUCH DISCRIMINATION. Ian M. Sands, Ken P. Hinckley, Ben Kunz, Steve E Hodges, Shahram Izadi, Hrvoje Benko, Alex A Butler. US-2013-0234992-A1. (pending)
- P6. SURFACE PUCK. Shawn R. LeProwse, Steven N. Bathiche, Ben Kunz, Steve E Hodges, Shahram Izadi, Hrvoje Benko, Alex A Butler. US-2013-0241806-A. (pending)
- P7. GRIP-BASED DEVICE ADAPTATIONS. Steven N. Bathiche, Ken P. Hinckley, Luis Eduardo Cabrera-Cordon, Hrvoje Benko, Paul H Dietz, Cati N Boulanger, Anatoly Churikov. (pending)
- P8. USING PHYSICAL OBJECTS IN CONJUNCTION WITH AN INTERACTIVE SURFACE. Andy D. Wilson, Meredith Ringel J. Morris, Hrvoje Benko, Bjoern Hartmann. US-2013-0229353-A1. (pending)
- P9. IMMERSIVE DISPLAY WITH PERIPHERAL ILLUSIONS. Brett R. Jones, Hrvoje Benko, Andy D. Wilson, Eyal Ofek. (pending)
- P10. PROVIDING MULTI-DIMENSIONAL HAPTIC TOUCH SCREEN INTERACTION. Mike J. Sinclair, Michel Pahud, Hrvoje Benko. (pending)
- P11. PROVIDING A TELE-IMMERSIVE EXPERIENCE USING A MIRROR METAPHOR. Zhengyou Zhang, Don M. Gillett, Neil S. Fishman, Philip A. A. Chou, Andy D. Wilson, Hrvoje Benko. (pending)

- P12. REDUCING LATENCY IN INK RENDERING. Steven N. Bathiche, Hrvoje Benko, Paul H. Dietz, Andreas G. Nowatzky. (pending)
- P13. MULTI-TOUCH INTERACTIONS ON EYEWEAR. Hrvoje Benko, Scott S. Saponas. (pending)
- P14. MOBILE VIDEO CONFERENCING WITH DIGITAL ANNOTATION. Gavin Jancke, Anoop Gupta, Gina D. Venolia, Aaron C. Hoff, Sasa Junuzovic, Hrvoje Benko, Kori Inkpen M. Quinn, John C. Tang, Andreas G. Nowatzky. (pending)
- P15. WIDE ANGLE DEPTH DETECTION. Jay P. Kapur, Andy D. Wilson, Steve E Hodges, Hrvoje Benko. (pending)
- P16. CONTROLLING AUTOMOTIVE FUNCTIONALITY USING INTERNAL- AND EXTERNAL-FACING SENSORS. Jay P. Kapur, Andy D. Wilson, Ken A. Lobb, Hrvoje Benko, Dan S. Morris. (pending)
- P17. FOCUS GUIDANCE WITHIN A THREE-DIMENSIONAL INTERFACE. Daniel C. Robbins, Hrvoje Benko. (pending)
- P18. TOUCH AND STYLUS DISCRIMINATION AND REJECTION FOR CONTACT SENSITIVE COMPUTING DEVICES. Steven N. Bathiche, Ken P. Hinckley, Anoop Gupta, Hrvoje Benko, Paul H Dietz. US-2012-0262407-A1. (pending)
- P19. AUTOMATICALLY MORPHING AND MODIFYING HANDWRITTEN TEXT. Benoit Barabe, Hrvoje Benko. (pending)
- P20. ENHANCING CAPTURED DATA. Steven N. Bathiche, Kevin A. Geisner, Hrvoje Benko, Paul H Dietz, Steve G Latta. (pending)
- P21. PROJECTED VISUAL CUES FOR GUIDING PHYSICAL MOVEMENT. Andy D. Wilson, Hrvoje Benko, Rajinder Sodhi. (pending)
- P22. PROXIMITY AND CONNECTION BASED PHOTO SHARING. Steven N. Bathiche, Ken P. Hinckley, Kevin A. Geisner, Hrvoje Benko, Steve G Latta, Vivek Pradeep. US-2013-0286223-A1. (pending)
- P23. THREE-DIMENSIONAL PRINTING. Steven N. Bathiche, Ken P. Hinckley, Desney S Tan, Kevin A. Geisner, Hrvoje Benko, Steve G Latta. US-2013-0215454-A1. Granted 3/4/2014.  
**Patent #: 8665479.**
- P24. PRESENTATION TECHNIQUES. A.J. B Brush, Ken P. Hinckley, Hrvoje Benko, Paul H Dietz, Steve G Latta, Vivek Pradeep. US-2013-0201095-A1. (pending)
- P25. SKINNABLE TOUCH DEVICE GRIP PATTERNS. Steven N. Bathiche, Ken P. Hinckley, Desney S Tan, Hrvoje Benko, Paul H Dietz. US-2013-0181902-A1. (pending)
- P26. GESTURE IDENTIFICATION USING AN AD-HOC MULTIDEVICE NETWORK. Eric J. Horvitz, Ken P. Hinckley, Hrvoje Benko. US-2013-0182892-A1. Granted 7/18/2013.
- P27. OMNI-SPATIAL GESTURE INPUT. Eric J. Horvitz, Ken P. Hinckley, Desney S. Tan, Hrvoje Benko. US-2013-0082978-A1. (pending)
- P28. CORRELATING MOVEMENT INFORMATION RECEIVED FROM DIFFERENT SOURCES. Andy D. Wilson, Hrvoje Benko. US-2013-0069931-A1. (pending)
- P29. DEVICE INTERACTION THROUGH BARRIER. Hrvoje Benko, Scott S. Saponas, Chris Harrison. US-2012-0319959-A1. (pending)

- P30. PREDICTION-BASED TOUCH CONTACT TRACKING. John L. Miller, Dave A. Stevens, Weidong Zhao, Hrvoje Benko, Aleksandar Uzelac. US-2012-0206380-A1. (pending)
- P31. IDENTIFYING CONTACTS AND CONTACT ATTRIBUTES IN TOUCH SENSOR DATA USING SPATIAL AND TEMPORAL FEATURES. John L. Miller, Andy D. Wilson, Steve E Hodges, Shahram Izadi, Hrvoje Benko, Pete John Ansell. US-2012-0299837-A1. (pending)
- P32. DISAMBIGUATING INTENTIONAL AND INCIDENTAL CONTACT AND MOTION IN MULTI-TOUCH POINTING DEVICES. John L. Miller, Rob D. Young, Hrvoje Benko, David R Perek, Pete John Ansell, Chris H Stoumbos, Oyvind Haehre. US-2012-0293420-A1. (pending)
- P33. PROVIDING AN INTERACTIVE EXPERIENCE USING A 3D DEPTH CAMERA AND A 3D PROJECTOR. Hrvoje Benko, Ricardo J Costa, Andy D. Wilson. US-2012-0212509-A1. (pending)
- P34. MONITORING INTERACTIONS BETWEEN TWO OR MORE OBJECTS WITHIN AN ENVIRONMENT. Hrvoje Benko, Chris Harrison, Andy D. Wilson. US-2012-0293402-A1. Granted: 12/31/2013. **Patent #: 8619049.**
- P35. MULTI-TOUCH INPUT DEVICE WITH ORIENTATION SENSING. Ken P. Hinckley, Shahram Izadi, Hrvoje Benko, Xiang Cao, Minghui Sun. US-2012-0206330-A1. (pending)
- P36. RESOLVING MERGED TOUCH CONTACTS. Hrvoje Benko, Andy D. Wilson. US-2012-0113017-A1. (pending)
- P37. SYNTHETIC GESTURE TRACE GENERATOR. Alisson A.S. Sol, Hrvoje Benko, Chris J O'Prey. US-2012-0092286-A1. (pending)
- P38. PROJECTORS AND DEPTH CAMERAS FOR DEVICELESS AUGMENTED REALITY AND INTERACTION. Andy D. Wilson, Hrvoje Benko. US-2011-0205341-A1. Granted: 5/20/2014. **Patent #: 8730309.**
- P39. INTERFACING WITH A COMPUTING APPLICATION USING A MULTI-DIGIT SENSOR. Hrvoje Benko, Daniel J Wigdor. US-2011-0260962-A1. Granted.
- P40. TRANSLATING TEXT ON A SURFACE COMPUTING DEVICE. Anand M. Chakravarty, Takako Aikawa, Michel Pahud, Andy D. Wilson, Sauleh Eetemadi, Hrvoje Benko. US-2011-0252316-A1. (pending)
- P41. MULTI-TOUCH USER INTERFACE INTERACTION. Ken Hinckley, Andy D. Wilson, Dan A Rosenfeld, Steve E Hodges, Shahram Izadi, Hrvoje Benko, Xiang Cao, Nicolas Villar. US-2011-0227947-A1. (pending)
- P42. INTERACTING WITH AN OMNI-DIRECTIONALLY PROJECTED DISPLAY. Hrvoje Benko, Andy D. Wilson. US-2011-0205147-A1. (pending)
- P43. MULTI-TOUCH MOUSE IN GAMING APPLICATIONS. Dan A Rosenfeld, Eyal Ofek, Hrvoje Benko, Bill P. Chen. US-2011-0195781-A1. (pending)
- P44. HAND POSTURE MODE CONSTRAINTS ON TOUCH INPUT. Maxim B. Oustiougov, Paul Hoover, Hrvoje Benko, Daniel J Wigdor, Jarrod Lombardo. US-2011-0157025-A1. Granted: 8/20/2013. **Patent #: 8514188.**
- P45. TEACHING GESTURE INITIATION WITH REGISTRATION POSTURE GUIDES. Hrvoje Benko, Daniel J Wigdor. US-2011-0117526-A1. (pending)

- P46. TEACHING GESTURES WITH OFFSET CONTACT SILHOUETTES. Hrvoje Benko, Daniel J Wigdor, Dustin Freeman. US-2011-0117535-A1. Granted: 1/7/2014. **Patent #: 8622742.**
- P47. INDIRECT MULTI-TOUCH INTERACTION. Richard M. Banks, Dan A Rosenfeld, Steve E Hodges, Shahram Izadi, Hrvoje Benko, Alex A Butler, Xiang Cao, Nicolas Villar, John F. M. Helmes. US-2011-0080341-A1. (pending)
- P48. POINTING DEVICE WITH INDEPENDENTLY MOVABLE PORTIONS. Richard M. Banks, Dan A Rosenfeld, Steve E Hodges, Shahram Izadi, Hrvoje Benko, Alex A Butler, Ben D. Eidelson, Xiang Cao, Otmar Hilliges, Nicolas Villar, John F. M. Helmes. US-2010-0315335-A1. (pending)
- P49. POINTING DEVICE USING PROXIMITY SENSING. Dan A Rosenfeld, Steve E Hodges, Shahram Izadi, Hrvoje Benko, Alex A Butler, Nicolas Villar, John F. M. Helmes. US-2010-0315336-A1. (pending)
- P50. DETECTING TOUCH ON A CURVED SURFACE. Dan A Rosenfeld, Shahram Izadi, Hrvoje Benko, Kurt A. Jenkins, Jonathan Westhues, Nicolas Villar, John F. M. Helmes. US-2010-0245246-A1. (pending)
- P51. DETECTING TOUCH ON A CURVED SURFACE. Dan A Rosenfeld, Shahram Izadi, Hrvoje Benko, Kurt A. Jenkins, Jonathan Westhues, Nicolas Villar, John F. M. Helmes. US-2010-0242274-A1. (pending)
- P52. TOUCH SENSITIVE DISPLAY APPARATUS USING SENSOR INPUT. Desney S Tan, Hrvoje Benko, Dan S Morris, Scott S Saponas. US-2010-0302137-A1. Granted: 11/12/2013. **Patent #: 8581856.**
- P53. CAMERA-BASED MULTI-TOUCH MOUSE. Dan A Rosenfeld, Eyal Ofek, Shahram Izadi, Hrvoje Benko, Bill P. Chen, Nicolas Villar, John F. M. Helmes. US-2010-0265178-A1. Granted: 5/21/2013. **Patent #: 8446367.**
- P54. TOUCH DISCRIMINATION. Ian M. Sands, Ken P. Hinckley, Ben Kunz, Steve E Hodges, Shahram Izadi, Hrvoje Benko, Alex A Butler. US-2010-0225595-A1. Granted: 4/30/2013. **Patent #: 8432366.**
- P55. AUTHENTICATION VIA A DEVICE. Jeff J. Westerinen, Shawn R. LeProwse, Steven N. Bathiche, Ian M. Sands, Andy D. Wilson, Meredith Ringel J. Morris, Ben Kunz, Matthew MacLaurin, Art T Whitten, Paul Hoover, Steve E Hodges, Shahram Izadi, Hrvoje Benko, Alex A Butler, Pete B. Thompson. US-2010-0218249-A1. (pending)
- P56. SURFACE PUCK. Shawn R. LeProwse, Steven N. Bathiche, Ben Kunz, Steve E Hodges, Shahram Izadi, Hrvoje Benko, Alex A Butler, Adrian Travis. US-2010-0182220-A1. Granted: 5/7/2013 **Patent #: 8436789.**
- P57. GESTURES, INTERACTIONS, AND COMMON GROUND IN A SURFACE COMPUTING ENVIRONMENT. Shawn R. LeProwse, David David Jones, Eric J. Horvitz, Ian M. Sands, Ken P. Hinckley, Andy Wilson, Kevin Russ, Meredith Ringel J. Morris, Ben Kunz, Steve E Hodges, Shahram Izadi, Hrvoje Benko, Alex A Butler. US-2010-0149090-A1. (pending)
- P58. TOUCH INTERACTION WITH A CURVED DISPLAY. Hrvoje Benko, Andy D. Wilson, Patrick M Baudisch, Bill P. Chen, Ravin Balakrishnan. US-2010-0023895-A1. (pending)

- P59. TOUCH INTERACTION WITH A CURVED DISPLAY. Hrvoje Benko, Andy D. Wilson, Patrick M Baudisch, Bill P. Chen, Ravin Balakrishnan. US-2010-0020026-A1. (pending)
- P60. USING PHYSICAL OBJECTS IN CONJUNCTION WITH AN INTERACTIVE SURFACE. Andy D. Wilson, Meredith Ringel J. Morris, Hrvoje Benko, Bjoern Hartmann. US-2010-0079369-A1. Granted: 4/23/2013. **Patent #: 8427424.**
- P61. PROJECTION OF GRAPHICAL OBJECTS ON INTERACTIVE IRREGULAR DISPLAYS. Andy D. Wilson, Hrvoje Benko. US-2009-0189917-A1. (pending)
- P62. TOUCH SENSING FOR CURVED DISPLAYS. Andy D. Wilson, Hrvoje Benko, Ravin Balakrishnan. US-2009-0189857-A1. (pending)
- P63. PRECISE SELECTION TECHNIQUES FOR MULTI-TOUCH SCREENS. Andy D. Wilson, Hrvoje Benko US-2007-0247435-A1. Granted: 12/13/2011. **Patent #: 8077153.**

## PHD GRADUATES MENTORING

- PHD1. *Robert Xiao* – On-World Computing: Enabling Interaction on Everyday Surfaces. Carnegie Mellon University. Primary advisor: Chris Harrison. Expected graduation date: 2018.
- PHD2. *Dr. Tomislav Pejsa* – Effective Directed Gaze for Character Animation. University of Wisconsin-Madison. Primary advisor: Michael Gleicher. Graduation date: 2016.
- PHD3. *Dr. Brett Jones* – Content Creation for Seamless Augmented Experiences with Projection Mapping. University of Illinois at Urbana-Champaign. Primary advisors: David Forsyth and Brian Bailey. Graduation date: 2014.

## INTERN SUPERVISION<sup>2</sup>

- M1. *Christoph Gebhardt*, ETH Zurich (Intern Summer 2018) – Reinforcement learning agent for adaptive label presentation in AR.
- M2. *Peter Hamilton*, University of Toronto (Summer 2018) – Occlusion management techniques for AR/VR/MR
- M3. *Eric Whitmire*, University of Washington (Intern Spring 2018) – Touch sensing on un-instrumented surfaces.
- M4. *Eric Whitmire*, University of Washington (Intern Summer 2017) – Novel Haptic VR controller.
- M5. *Inrak Choi*, Stanford University (Intern Summer 2017) – Novel Haptic VR controller.
- M6. *Evan Strasnick*, Stanford University (Intern Summer 2017) – Novel Haptic VR controller.

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<sup>2</sup> I have frequently co-advised interns with my colleagues.

- M7. *Yuhang Zhao*, Cornell Tech (Intern Summer 2017) – Haptic solutions for blind people to experience VR.
- M8. *Jan Gugenheimer*, University of Ulm, Germany (Intern Summer 2017) – Large-scale VR solutions.
- M9. *Robert Xiao* (Contractor Spring 2017) – Interactions with Hololens
- M10. *Jiajun Lu* (Intern Summer 2016) – Hybrid high speed depth camera from fusion of RGB and depth images
- M11. *Andreas Fender* (Intern Summer 2016) – Room-scale omnidirectional projection system for meetings
- M12. *Robert Xiao* (Intern Summer 2016) – Interactions with Hololens
- M13. *Benjamin Nuernberger* (Intern Summer 2015) – Snapping to real world constraints
- M14. *Mahdi Azmandian* (Intern Summer 2015) – Haptic retargeting of passive haptic sensations for virtual reality experiences
- M15. *Robert Xiao* (Intern Summer 2015) – Sparse peripheral displays for augmented and virtual reality HMDs
- M16. *Tomislav Pejisa* (Intern Summer 2014) – Life-sized projection mapped augmented reality teleconferencing
- M17. *Feng Zhang* (Intern Summer 2014) – Combination of head-mounted displays with projection-based augmented reality
- M18. *Julian Kantor* (Intern Summer 2014) – Experiences for room-sized augmented reality
- M19. *Jarrod Knibbe* (Intern Summer 2013) – Software techniques for addressing projector camera latency
- M20. *Ravish Mehra* (Intern Summer 2013) – Spatial audio propagation techniques for Augmented reality scenarios
- M21. *Brett Jones* (Intern Summer 2013) – Multi camera & projector calibration
- M22. *Rajinder Sodhi* (Intern Summer 2013) – Interactivity for room-sized augmented reality experiences
- M23. *Michael Murdock* (Intern Summer 2013) – Special effects for augmented reality scenarios
- M24. *Felipe Bacim de Araujo e Silva* (Intern Summer 2012) – Deformable Haptics
- M25. *Brett Jones* (Intern Summer 2012) – IllumiRoom project
- M26. *Rajinder Sodhi* (Intern Summer 2011) – Projected visual guides for movement guidance
- M27. *Chris Harrison* (Intern Spring 2011) – Touch interactions on any surface
- M28. *Roland Aigner* (Intern Fall 2010) co-advised with Daniel Wigdor – Freehand selection and manipulations
- M29. *Ricardo Costa Jota* (Intern Summer 2010) – Fluid 3D capture of tabletop interactions
- M30. *David Holman* (Intern Summer 2010) – Mockup design of physical user interfaces
- M31. *Dustin Freeman* (Intern Spring 2009) – On-screen tools for multitouch gesture learning
- M32. *Miguel Nacenta* (Intern Summer 2008) – Tabletop interactions



- M33. *Bjoern Hartmann* (Intern Summer 2008) – Large tabletop prototyping and interactions
- M34. *Bhashinee Garg* (Spring 2007) - Exploration of dual-sided multi-touch interactions on a handheld device
- M35. *Ivor Baksa* (Spring 2006) - Development of AR conversational agent
- M36. *Shezan Baig* (Spring 2004) - Tablet AR system for archeological visualization
- M37. *Erik Peterson* (Spring 2004) - Interface development for situated AR multimedia
- M38. *Shezan Baig* (Fall 2003) - Adaptive meshing algorithm for large meshes
- M39. *Sajid Sadi* (Spring 2003) - P5 Glove gesture recognizer
- M40. *Zachariah Munoz* (Fall 2002, Spring 2003) – 3D modeling of the Cathedral of St. John the Divine
- M41. *Sajid Sadi* (Fall 2002) – Design of control interfaces

## PRODUCT TRANSFER<sup>3</sup>

- 2016-17 RoomAlive Toolkit <https://github.com/Microsoft/RoomAliveToolkit>
- 2010 Mouse 2.0 project shipped as *Microsoft Touch Mouse*
- 2009 Ripples project shipped in Microsoft Surface SDK and ultimately incorporating in Windows OS (starting with Windows 7).

## CONFERENCE & JOURNAL ORGANIZATION

- CO1. Program Committee member for IEEE Virtual Reality Conference 2018
- CO2. Program Committee member for ACM CHI 2018
- CO3. Program Committee member for World Haptics Conference 2017
- CO4. Program Committee member for ACM CHI 2017
- CO5. **Information Director and Associate Editor for *Transactions of Human-Computer Interaction (TOCHI) Journal 2016-2018***
- CO6. Program Committee member for ACM ISS 2016
- CO7. Program Committee member for ACM UIST 2016
- CO8. Program Committee member for *ACM SIGGRAPH 2015*
- CO9. Program Committee member for *ACM CHI 2015*
- CO10. **Steering Committee member for ACM UIST 2015 – ongoing**
- CO11. **General Chair of *ACM UIST 2014***
- CO12. **Associate Editor of the *IEEE Computer Graphics and Applications***

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<sup>3</sup> My research projects that shipped as (part of) a commercial product or was open sourced.

- CO13. Guest Co-Editor of the Special Issue of *IEEE Computer Graphics and Applications* (May/June 2014): Interacting Beyond the Screen
- CO14. Program Committee member for *ACM CHI 2014*
- CO15. Program Committee member for *ACM ISMAR 2013*
- CO16. **Program Committee Co-Chair for *ACM UIST 2012***
- CO17. Guest Co-Editor of the Special Issue of *Computers and Graphics* on Touching the 3rd Dimension. Published by Elsevier in Dec. 2012.
- CO18. Program Committee member for *ACM ISMAR 2012*
- CO19. Program Committee member for *ACM CHI 2012*
- CO20. Program Committee member for *ACM ITS 2011*
- CO21. Program Committee member for Video Showcase at *ACM CHI 2011*
- CO22. Program Committee member for *ACM UIST 2010*
- CO23. Program Committee member and Doctoral Symposium Co-Chair for *ACM ITS 2010*
- CO24. Program Committee member for *ACM ICMI/MLMI 2010*
- CO25. Program Committee member for *IEEE 3DUI 2010*
- CO26. Webmaster for *ACM UIST 2009*
- CO27. Program Committee Member for *IEEE 3DUI 2009*
- CO28. Demo Co-Chair for *ACM UIST 2008*
- CO29. Program Committee member and Publicity Chair for 2nd International Conference on Intelligent Technologies for Interactive Entertainment (*INTETAIN '08*)
- CO30. Publicity Co-Chair for *IEEE ISMAR 2007*, Nara, Japan.
- CO31. Co-Chair for the First Annual Columbia Computer Science Student Research Symposium, December 8th 2006, Davis Auditorium, Columbia University, NY.
- CO32. Student Volunteer Organizing Committee, *IEEE and ACM ISAR 2001* (International Symposium on Augmented Reality).

## REVIEWING

ACM CHI: 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018

ACM User Interface Software and Technology (UIST): 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018

ACM SIGGRAPH: 2003, 2008, 2009, 2010, 2011, 2012, 2013, 2015, 2016, 2017, 2018

ACM SIGGRAPH ASIA: 2012, 2013

ACM Interactive Tabletops and Surfaces (ITS): 2009, 2010, 2011, 2012, 2013, 2016, 2017

IEEE/ACM International Symposium on Mixed and Augmented Reality (ISMAR): 2003, 2004, 2005, 2010, 2012, 2013

ACM ToCHI Journal: 2009, 2012, 2015, 2016, 2017, 2018

IEEE Transactions on Visualization and Computer Graphics (TVGC): 2008, 2009, 2011, 2018  
International Conference on Multimodal Interfaces (ICMI): 2010  
IEEE Virtual Reality (VR): 2004, 2005, 2007, 2016, 2018  
IEEE Symposium on 3D User Interfaces: 2007, 2008, 2009, 2010, 2011  
IEEE International Symposium on Wearable Computing (ISWC): 2007  
IEEE Visualization: 2003, 2006  
IEEE Haptic Symposium: 2018  
World Haptics Conferences: 2017  
Pervasive: 2005  
SmartGraphics: 2004

## PROFESSIONAL MEMBERSHIP

ACM (Association for Computing Machinery) <http://www.acm.org>  
ACM SIGCHI (ACM Special Interest Group on Human Computer Interaction)  
<http://www.sigchi.org>  
IEEE (Institute of Electrical and Electronics Engineers) <http://www.ieee.org>

## SELECTED POPULAR PRESS

### Mainstream Press & Magazines Featuring My Research

- PP1. New York Times – “Here’s Looking at You (but I’m Still Texting)” – Anne Eisenberg (Feb. 11, 2012) – Sunday Times press edition
- PP2. MIT Technology Review – “Stealth Texting”(December 20, 2011)
- PP3. Forbes – “Turn Any Surface Into a Touch Screen” (October 19, 2011)
- PP4. MIT Technology Review – “Kinect Turns Any Surface Into a TouchScreen” – Duncan Graham-Rowe (October, 18, 2011)
- PP5. Seattle Times – “Microsoft shows first multitouch touch mouse” - Sharon Chan (January 6, 2011)
- PP6. Seattle Post-Intelligencer – “Microsoft finally shows off its own multi-touch mouse” - Nick Eaton (January 7, 2011)
- PP7. Seattle Post-Intelligencer – “LightSpace: Microsoft Research’s room-size computer environment” (October 5, 2010)
- PP8. Seattle Times – “Wild mice of the future in Microsoft labs” – Brier Dudley (October 5, 2009)
- PP9. New York Times – “Microsoft Mapping Course to a Jetsons-Style Future” - Ashlee Vance (March, 1, 2009) – business page cover story

- PP10. Seattle Times – “Microsoft TechFest: A pinch of your fingers and images, videos move” - Brier Dudley (February 25, 2009)
- PP11. Seattle Times – “Microsoft shows off search product, but Sphere gets the attention” – Benjamin Romano (July 30, 2008) – business page cover story

### Technology Blogs

My work has also appeared numerous times on Gizmodo, Engadget, cNet, Ars Technica, Slash Gear, PC World, TechFlash, ComputerWorld, ZD Net, VentureBeat, and Guardian Tech Blog.