

# Otmar Hilliges | Curriculum Vitae

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## Personal

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Born in Munich, Germany on July 3<sup>rd</sup>, 1979. Nationality: German.

## Research Interests

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My research interests include all aspects of Human-Computer Interaction. In particular, post-desktop user interfaces, mobile interaction, augmented and virtual reality, human-robot interaction, input sensing technologies and algorithms, gesture recognition and human activity recognition.

## Education

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| 2005–2009 | <b>PhD in Computer Science, LMU Munich, Germany.</b> Grade: 1.0/1.0 – “ <i>summa cum laude</i> ”.<br>Committee: A. Butz (Advisor), S. Izadi, A. Wilson, S. Carpendale.          |
| 1999–2004 | <b>MSc in Computer Science, TU Munich, Germany.</b> Grade: 1.0/1.0 – “ <i>summa cum laude</i> ”.<br>Thesis Advisor: G. Klinker. Finalist “Werner von Siemens Excellence Award”. |
| 1998      | <b>Abitur.</b> Erasmus-Grasser-Gymnasium, Munich, Germany.  |

## Academic Positions

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| 2013–present | <b>Assistant Professor in Computer Science (Tenure Track)</b><br>ETH Zurich, Department of Computer Science. I lead the AIT Lab ( <a href="http://ait.ethz.ch">http://ait.ethz.ch</a> ). |
| 2012–2013    | <b>Researcher</b> , Microsoft Research, Cambridge, UK. <i>Interactive 3D Technologies Group</i> .  |
| 2010–2011    | <b>Postdoc Researcher</b> , Microsoft Research, Cambridge, UK. <i>Sensors and Devices Group</i> .  |

## Grants and Other Funding

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| 2017–2021 | “OPTINT: Optimization-based Design of Interactive Technologies”.<br>Funding: € 1.5M. <b>ERC Starting Grant</b> .  |
| 2017–2019 | “Human-Centric-Flight II: End-user Design of High-level Robotic Behavior”.<br>Funding: CHF 180K. <b>Microsoft Research Grant</b> .  |
| 2015–2018 | “Deformation and Motion Modeling using Modular, Sensor-based Input Devices”.<br>Funding share: CHF 250K. <b>Swiss National Science Foundation (SNF)</b> .   |
| 2015–2018 | “UFO: Semi-Autonomous Aerial Vehicles for Augmented Reality, Human-Computer Interaction and Remote Collaboration”.<br>Funding: CHF 375K. <b>Swiss National Science Foundation (SNF)</b> .           |
| 2014–2017 | “Human-centric flight: Micro Aerial Vehicles for Interaction, Videography and 3D Reconstruction”.<br>Funding share: CHF 255K. <b>Microsoft Research Grant</b> .                                     |
| 2014–2016 | “Gesture Recognition Algorithms Using High-Speed, Wide Field-of-View, Short Range Radar for Mobile and Wearable Computing”.<br>Funding: CHF 220K. <b>Google Inc. Sponsored Research Agreement</b> . |
| 2014–2016 | “MAV In Context: Exploring Immersive Virtual Environments Through Micro Aerial Vehicles”.<br>Funding: CHF 200K. <b>ETH post-doctoral fellowship (Fabrizio Pece)</b> .                               |

## Awards

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2014	<b>Best paper award - IEEE IROS'14.</b> "Environment-independent Formation Flight for Micro Aerial Vehicles"
2014	<b>Best paper award - ACM SIGCHI '14</b> "Type-Hover-Swipe in 96 Bytes: A Motion Sensing Mechanical Keyboard"
2012	<b>Honorable mention best technote - ACM SIGCHI '12</b> "Shake'n'Sense: Reducing Structured Light Interference when Multiple Depth Cameras Overlap"
2012	<b>Best demo award runner-up - ACM UIST '12</b> "Digits: Freehand 3D Interactions Anywhere Using a Wrist-worn Gloveless Sensor"
2012	<b>Best paper award - Pervasive '12</b> "Interactive Environment-Aware Handheld Projectors for Pervasive Computing Spaces"
2011	<b>Best paper award - IEEE ISMAR '11</b> "KinectFusion: Real-Time Dense Surface Mapping and Tracking"
2010	<b>Best paper award - ACM CSCW '10</b> "Opening up the Family Archive"
2008	<b>Best paper award - ACM UIST '08</b> "Bringing Physics to the Surface"

## Research Group

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### Current PhD students

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2015–present	Emre Aksan. " <i>Machine Learning for interactive technologies</i> ".
2015–present	Stefan Stesvic. " <i>End-user design of robotic behavior</i> ".
2015–present	Christoph Gebhardt. " <i>Computational design of interactive technologies</i> ".
2015–present	Benjamin Hepp. " <i>Trajectory planning for resource efficient 3D reconstruction</i> ".
2014–present	Jie Song. " <i>Human activity and input recognition</i> ". Winner Swisscom ICT thesis award (CHF 10K).
2014–present	Tobias Nägeli. " <i>Human robot interaction</i> ". Winner Qualcomm Innovation Fellowship (CHF 10K).

### Current postdoctoral researchers

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2014–present	Fabrizio Pece, PhD from UCL, London. ETH / Marie Curie COFUND Fellow.
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### PhD committee member

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Nicolai Ranieri (ETHZ), Petri Tanskanen (ETHZ), Gabor Sörös (ETHZ).

### Past PhD students

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David Kim, Newcastle University (2010–2013), with Prof. Patrick Olivier. Now researcher at Microsoft Research.

## Professional Activities

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### Program committee member

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- o ACM SIGCHI 2013, 2014, 2015, 2016, 2017
- o ACM UIST 2013, 2014, 2016
- o ACM NordiCHI 2016
- o ACM TEI 2009, 2014
- o ACM MUM 2013
- o ACM UbiComp 2013
- o IEEE ISMAR 2013
- o IEEE 3DV 2012, 2013
- o ACM ITS 2010

### Conference organizing committee member

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- o Keynote chair ACM UIST 2013,104
- o Video co-chair ACM UbiComp 2013
- o Demo co-chair ACM UIST 2010,2011
- o SV co-chair ACM ITS 2010

## Reviewer.....

I routinely review papers for ACM CHI, UIST, SIGGRAPH, ITS, TEI, Ubicomp, IEEE ISMAR, 3DV, IEEE IROS and ICRA as well as for many journal publications, including ACM ToG, ACM ToCHI, IJHCS, IEEE ToSMC, IEEE JVR.

## Organized courses and tutorials.....

- o Co-organizer of annual "Summer School on Computational Interaction" (2015 Glasgow, UK, 2016 Aalto, Fi, 2017 Zurich, CH).
- o Organizer Dagstuhl seminar "Computational Interactivity" 2017.

## Invited talks, conference presentations and seminars.....

I regularly give invited talks at many internationally renowned academic institutions. Since joining ETH (2013) these included NYU, NY, USA, University of Tokyo and Nara Institute of Technology, Japan, TU Graz, Austria, TU Munich, Germany, FH Hagenberg, Austria, Microsoft Research and Google Research. I am an invited panelist at ACM SUI'16.

## Memberships

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I am a member of ACM SIGCHI, ACM UIST, ACM SIGGRAPH and the IEEE Computer Society.

## Teaching

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### ETH Zurich, Switzerland.....

<b>Fall 2016</b>	<b>Human Computer Interaction</b> 4 ECTS, 50% teaching, 80-90 students <b>Visual Computing</b> 8 ECTS, 50% teaching, 80-90 students <b>Seminar: ML for Interactive Systems and Advanced Programming Tools</b> 2 ECTS, 50% teaching, 11 students
<b>Spring 2016</b>	<b>Parallel Programming</b> 7 ECTS, 50% teaching, 392 students <b>User Interface Engineering</b> 4 ECTS, 100% teaching, 45 students
<b>Fall 2015</b>	<b>Human Computer Interaction</b> 4 ECTS, 50% teaching, 88 students
<b>Spring 2015</b>	<b>Seminar: Distributed Systems Seminar ("Smart Environments")</b> 2 ECTS, 50% teaching, 13 students <b>Parallel Programming</b> 7 ECTS, 50% teaching, 315 students <b>User Interface Engineering</b> 4 ECTS, 100% teaching, 30 students
<b>Fall 2014</b>	<b>Human Computer Interaction</b> 4 ECTS, 33% teaching, 64 students
<b>Spring 2014</b>	<b>Seminar: Distributed Systems Seminar ("Smart Environments")</b> 2 ECTS, 50% teaching, 13 students <b>Parallel Programming</b> 7 ECTS, 50% teaching, 262 students
<b>Fall 2013</b>	<b>User Interface Engineering</b> 4 ECTS, 100% teaching, 17 students
<b>Spring 2013</b>	<b>Seminar: Distributed Systems ("Interaction in Intelligent Environments")</b> 2 ECTS, 50% teaching, 11 students

## Master's and Bachelor's thesis.....

I have supervised 16 Master's and 8 Bachelor's theses since 2013.

## Previous teaching experience (LMU Munich).....

**Teaching assistant:** Computer Graphics, Information Visualization, HCI, Image Processing

**Seminars:** Interactive Tabletops

**Courses taught:** 3D Graphics, Information Visualization

**Theses:** Supervision of multiple Master's theses and Bachelor's theses. Sometimes in collaboration with industry partners (BMW, MAN, Siemens).

## Publications

In my area peer-reviewed conference publications are the primary outlet for current research. ACM SIGCHI and ACM UIST are the premiere venues for Human Computer Interaction research with an average acceptance rate of 20%. An up-to-date list of publications can be found at: <http://ait.ethz.ch/publications>.

**Most important publications:** This is a purely subjective list of my three most important papers. These were selected because they illustrate the two main goals of my work: First, I attempt to push the state-of-the art in terms of input recognition algorithmically. Second, I aim to alter accepted limitations on user experiences, by demonstrating entirely novel forms of user interaction through algorithmic design of interactive technologies. Other papers may have received more citations or have had impact in other ways.

- o **In-Air-Gestures** [CF11] – Highly efficient algorithms for gesture recognition on mobile devices, currently achieving best in class accuracy and enabling novel forms of interaction.
- o **DefSense** [CF2] – Computational design of functional flexible, 3D printed input devices.
- o **HoloDesk** [CF14] – Mixed reality system allowing users to manipulate 3D content using uninstrumented freehand interactions.

### Journal publications

- [J1] Oliver Glauser, Alex Ma, Daniele Panozzo, Alec Jacobson, Otmar Hilliges, and Olga Sorkine-Hornung. "Rig Animation with a Tangible and Modular Input Device". In: *ACM Transactions on Graphics* (July 2016).
- [J2] Vittorio Megaro, Bernhard Thomaszewski, Maurizio Nitti, Otmar Hilliges, Markus Gross, and Stelian Coros. "Interactive Design of 3D-printable Robotic Creatures". In: *ACM Transactions on Graphics* 34.6 (Oct. 2015), 216:1–216:9.
- [J3] Alec Jacobson, Daniele Panozzo, Oliver Glauser, Cédric Pradalier, Otmar Hilliges, and Olga Sorkine-Hornung. "Tangible and modular input device for character articulation". In: *ACM Transactions on Graphics* 33.4 (July 2014), pp. 1–12.
- [J4] Johannes Schöning, Jonathan Hook, Nima Motamedi, Patrick Olivier, Florian Echtler, Peter Brandl, Laurence Muller, Florian Daiber, Otmar Hilliges, Markus Loechtfeld, et al. "Building interactive multi-touch surfaces". In: *Journal of Graphics, GPU, and Game tools* 14.3 (2009), pp. 35–55.
- [J5] Lucia Terrenghi, Otmar Hilliges, and Andreas Butz. "Kitchen Stories: Sharing Recipes with the Living Cookbook". In: *Personal Ubiquitous Computing* 11.5 (June 2007), pp. 409–414.

### Peer-reviewed full-length conference publications

- [CF1] Christoph Gebhardt, Benjamin Hepp, Tobias Naegeli, Stefan Stevsic, and Otmar Hilliges. "Airways: Optimization-based Interactive Design of High-Level Quadrotor Behavior". In: *SIGCHI Conference on Human Factors in Computing Systems*. CHI '16. San Jose, CA: ACM, Apr. 2016.
- [CF2] Benjamin Hepp, Moritz Baecher, Fabrizio Pece, Bernhard Thomszewski, Paul Kry, Bernd Bickel, and Otmar Hilliges. "DefSense: Computational Design of Customized Deformable Input Devices". In: *SIGCHI Conference on Human Factors in Computing Systems*. CHI '16. San Jose, CA: ACM, Apr. 2016.
- [CF3] Benjamin Hepp, Tobias Naegeli, and Otmar Hilliges. "Omni-directional Person Tracking on a Flying Robot using Occlusion-robust Ultra-Wideband Signals". In: *IEEE/RSJ International Conference on Intelligent Robots and System (IEEE IROS)*. IEEE. Oct. 2016.
- [CF4] Nicolas de Palézieux, Tobias Naegeli, and Otmar Hilliges. "Duo-VIO: Fast, Light-weight, Stereo Inertial Odometry". In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IEEE IROS)*. IEEE. Oct. 2016.
- [CF5] Jie Song, Saiwen Wang, Jamie Lien, Ivan Poupyrev, and Otmar Hilliges. "Interacting with Soli: Exploring Fine-Grained Dynamic Gesture Recognition in the Radio-Frequency Spectrum". In: *ACM Symposium on User Interface Software and Technology (ACM UIST)*. ACM. Oct. 2016.
- [CF6] Wang Yifan, Jie Song, Limin Wang, and Otmar Hilliges. "Two-Stream SR-CNNs for Action Recognition in Videos". In: *British Machine Vision Conference*. BMVC '16. ACM. Sept. 2016.
- [CF7] Jibin Ou, Martin Vechev, and Otmar Hilliges. "An Interactive System for Data Structure Development". In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '15. Seoul, South Korea: ACM, Apr. 2015.

- [CF8] Gábor Sörös, Stephan Semmler, Luc Humair, and Otmar Hilliges. "Fast Blur Removal for Wearable QR Code Scanners". In: *Proceedings of International Symposium on Wearable Computers (ACM ISWC)*. ACM. Sept. 2015.
- [CF9] Petri Tanskanen, Tobias Naegeli, Marc Pollefeys, and Otmar Hilliges. "Semi-Direct EKF-based Monocular Visual-Inertial Odometry". In: *Proceedings of Intelligent Robots and Systems (IEEE IROS)*. IEEE. Sept. 2015.
- [CF10] Tobias Nägeli, Christian Conte, Alexander Domahidi, Manfred Morari, and Otmar Hilliges. "Environment-independent Formation Flight for Micro Aerial Vehicles". In: *Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2014)*. Chicago, IL, USA: IEEE Press, 2014.
- [CF11] Jie Song, Gábor Sörös, Fabrizio Pece, Sean Ryan Fanello, Shahram Izadi, Cem Keskin, and Otmar Hilliges. "In-air Gestures Around Unmodified Mobile Devices". In: *Proceedings of the 27th Annual ACM Symposium on User Interface Software and Technology*. UIST '14. Honolulu, Hawaii, USA: ACM, 2014, pp. 319–329.
- [CF12] Stuart Taylor, Cem Keskin, Otmar Hilliges, Shahram Izadi, and John Helmes. "Type-hover-swipe in 96 Bytes: A Motion Sensing Mechanical Keyboard". In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '14. Toronto, Ontario, Canada: ACM, 2014, pp. 1695–1704.
- [CF13] Dustin Freeman, Otmar Hilliges, Abigail Sellen, Kenton O'Hara, Shahram Izadi, and Kenneth Wood. "The Role of Physical Controllers in Motion Video Gaming". In: *Proceedings of the Designing Interactive Systems Conference*. DIS '12. Newcastle Upon Tyne, United Kingdom: ACM, 2012, pp. 701–710.
- [CF14] Otmar Hilliges, David Kim, Shahram Izadi, Malte Weiss, and Andrew Wilson. "HoloDesk: Direct 3D Interactions with a Situated See-through Display". In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '12. Austin, Texas, USA: ACM, 2012, pp. 2421–2430.
- [CF15] David Kim, Otmar Hilliges, Shahram Izadi, Alex D. Butler, Jiawen Chen, Iason Oikonomidis, and Patrick Olivier. "Digits: Freehand 3D Interactions Anywhere Using a Wrist-worn Gloveless Sensor". In: *Proceedings of the 25th Annual ACM Symposium on User Interface Software and Technology*. UIST '12. Cambridge, Massachusetts, USA: ACM, 2012, pp. 167–176.
- [CF16] David Kirk, Shahram Izadi, Otmar Hilliges, Richard Banks, Stuart Taylor, and Abigail Sellen. "At Home with Surface Computing?" In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '12. Austin, Texas, USA: ACM, 2012, pp. 159–168.
- [CF17] David Molyneaux, Shahram Izadi, David Kim, Otmar Hilliges, Steve Hodges, Xiang Cao, Alex Butler, and Hans Gellersen. "Interactive Environment-aware Handheld Projectors for Pervasive Computing Spaces". In: *Proceedings of the 10th International Conference on Pervasive Computing*. Pervasive'12. Newcastle, UK: Springer-Verlag, 2012, pp. 197–215.
- [CF18] Andrew Wilson, Hrvoje Benko, Shahram Izadi, and Otmar Hilliges. "Steerable Augmented Reality with the Beamatron". In: *Proceedings of the 25th Annual ACM Symposium on User Interface Software and Technology*. UIST '12. Cambridge, Massachusetts, USA: ACM, 2012, pp. 413–422.
- [CF19] Alex Butler, Otmar Hilliges, Shahram Izadi, Steve Hodges, David Molyneaux, David Kim, and Danny Kong. "Vermeer: Direct Interaction with a 360° Viewable 3D Display". In: *Proceedings of the 24th Annual ACM Symposium on User Interface Software and Technology*. UIST '11. Santa Barbara, California, USA: ACM, 2011, pp. 569–576.
- [CF20] Shahram Izadi, David Kim, Otmar Hilliges, David Molyneaux, Richard Newcombe, Pushmeet Kohli, Jamie Shotton, Steve Hodges, Dustin Freeman, Andrew Davison, and Andrew Fitzgibbon. "KinectFusion: Real-time 3D Reconstruction and Interaction Using a Moving Depth Camera". In: *Proceedings of the 24th Annual ACM Symposium on User Interface Software and Technology*. UIST '11. Santa Barbara, California, USA: ACM, 2011, pp. 559–568.
- [CF21] Richard A. Newcombe, Shahram Izadi, Otmar Hilliges, David Molyneaux, David Kim, Andrew J. Davison, Pushmeet Kohli, Jamie Shotton, Steve Hodges, and Andrew Fitzgibbon. "KinectFusion: Real-time Dense Surface Mapping and Tracking". In: *Proceedings of the 2011 10th IEEE International Symposium on Mixed and Augmented Reality*. ISMAR '11. Washington, DC, USA: IEEE Computer Society, 2011, pp. 127–136.
- [CF22] David S. Kirk, Shahram Izadi, Abigail Sellen, Stuart Taylor, Richard Banks, and Otmar Hilliges. "Opening Up the Family Archive". In: *Proceedings of the 2010 ACM Conference on Computer Supported Cooperative Work*. CSCW '10. Savannah, Georgia, USA: ACM, 2010, pp. 261–270.
- [CF23] Mark Hancock, Otmar Hilliges, Christopher Collins, Dominikus Baur, and Sheelagh Cpendale. "Exploring Tangible and Direct Touch Interfaces for Manipulating 2D and 3D Information on a Digital Table". In: *Proceedings of the ACM International Conference on Interactive Tabletops and Surfaces*. ITS '09. Banff, Alberta, Canada: ACM, 2009, pp. 77–84.

- [CF24] Otmar Hilliges, Shahram Izadi, Andrew D. Wilson, Steve Hodges, Armando Garcia-Mendoza, and Andreas Butz. "Interactions in the Air: Adding Further Depth to Interactive Tabletops". In: *Proceedings of the 22Nd Annual ACM Symposium on User Interface Software and Technology*. UIST '09. Victoria, BC, Canada: ACM, 2009, pp. 139–148.
- [CF25] Dominikus Baur, Otmar Hilliges, and Andreas Butz. "Flux: Enhancing photo organization through interaction and automation". In: *SG 08 Proceedings of the 9th international symposium on Smart Graphics*. Springer, 2008, pp. 216–223.
- [CF26] Lucia Terrenghi, David Kirk, Hendrik Richter, Sebastian Krämer, Otmar Hilliges, and Andreas Butz. "Physical Handles at the Interactive Surface: Exploring Tangibility and Its Benefits". In: *Proceedings of the Working Conference on Advanced Visual Interfaces*. AVI '08. Napoli, Italy: ACM, 2008, pp. 138–145.
- [CF27] Andrew D. Wilson, Shahram Izadi, Otmar Hilliges, Armando Garcia-Mendoza, and David Kirk. "Bringing Physics to the Surface". In: *Proceedings of the 21st Annual ACM Symposium on User Interface Software and Technology*. UIST '08. Monterey, CA, USA: ACM, 2008, pp. 67–76.
- [CF28] Sebastian Boring, Manuela Altendorfer, Gregor Broll, Otmar Hilliges, and Andreas Butz. "Shoot & copy: phonecam-based information transfer from public displays onto mobile phones". In: *Proceedings of the 4th international conference on mobile technology, applications, and systems (Mobility' 07)*. ACM. 2007, pp. 24–31.
- [CF29] Sebastian Boring, Otmar Hilliges, and Andreas Butz. "A Wall-Sized Focus Plus Context Display". In: *Annual IEEE International Conference on Pervasive Computing and Communications (PerCom '07)*. November 2005. IEEE, 2007, pp. 161–170.
- [CF30] Otmar Hilliges, Dominikus Baur, and Andreas Butz. "Photohelix: Browsing, Sorting and Sharing Digital Photo Collection". In: *Proceedings of the 2nd IEEE International Workshop on Horizontal Interactive HumanComputer Systems TABLETOP 2007*. 2007.
- [CF31] Otmar Hilliges, Peter Kunath, Alexey Pryakhin, Andreas Butz, and Hans-Peter Kriegel. "Browsing and Sorting Digital Pictures using Automatic Image Classification and Quality Analysis ." In: *Human-Computer Interaction*. LNCS. Springer, 2007, pp. 882–891.
- [CF32] Otmar Hilliges, Lucia Terrenghi, Sebastian Boring, David Kim, Hendrik Richter, and Andreas Butz. "Designing for Collaborative Creative Problem Solving". In: *Proceedings of the 6th ACM SIGCHI Conference on Creativity & Cognition*. C&C '07. Washington, DC, USA: ACM, 2007, pp. 137–146.
- [CF33] Otmar Hilliges, Phillipp Holzer, Rene Klüber, and Andreas Butz. "AudioRadar: A metaphorical visualization for the navigation of large music collections". In: *Smart Graphics*. Springer, 2006, pp. 82–92.

### Refereed short papers.....

- [CS1] D. Asenov, O. Hilliges, and P. Müller. "The Effect of Richer Visualizations on Code Comprehension". In: *SIGCHI Conference on Human Factors in Computing Systems*. CHI '16. San Jose, CA: ACM, Apr. 2016.
- [CS2] Jie Song, Fabrizio Pece, Marion Koelle, and Otmar Hilliges. "Joint Estimation of 3D Hand Position and Gestures from Monocular Video for Mobile Interaction". In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '15. Seoul, South Korea: ACM, Apr. 2015.
- [CS3] D. Alex Butler, Shahram Izadi, Otmar Hilliges, David Molyneaux, Steve Hodges, and David Kim. "Shake'N'Sense: Reducing Interference for Overlapping Structured Light Depth Cameras". In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '12. Austin, Texas, USA: ACM, 2012, pp. 1933–1936.
- [CS4] Otmar Hilliges and David Stanley Kirk. "Getting Sidetracked: Display Design and Occasioning Photo-talk with the Photohelix". In: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '09. Boston, MA, USA: ACM, 2009, pp. 1733–1736.
- [CS5] Otmar Hilliges, David Kim, and S. Izadi. "Creating malleable interactive surfaces using liquid displacement sensing". In: *3rd IEEE International Workshop on Horizontal Interactive Human Computer Systems, ITS*. Oct. 2008, pp. 157–160.
- [CS6] Otmar Hilliges, Christian Sandor, and Gudrun Klinker. "Interactive Prototyping for Ubiquitous Augmented Reality User Interfaces". In: *Proceedings of the 11th international conference on Intelligent user interfaces*. Vol. 65. 0065-1419 LA - eng. ACM Press, 2006, pp. 285–287.

### Book contributions.....

- [BC1] Otmar Hilliges, Andreas Butz, Shahram Izadi, and Andrew D Wilson. "Interaction on the Tabletop: Bringing the Physical to the Digital". In: *Tabletops-Horizontal Interactive Displays*. Ed. by Christian Müller-Thomfelde. Springer, 2010, pp. 189–221.

## Workshop papers and abstracts.....

- [A1] Oliver Glauser, Alex Ma, Daniele Panozzo, Alec Jacobson, Otmar Hilliges, and Olga Sorkine-Hornung. "Rig Animation with a Tangible and Modular Input Device". In: ACM, Oct. 2016.
- [A2] Alec Jacobson, Daniele Panozzo, Oliver Glauser, Cedric Pradalier, Otmar Hilliges, and Olga Sorkine-Hornung. "Tangible and modular input device for character articulation". In: *Proceedings of the adjunct publication of the 27th annual ACM symposium on User interface software and technology - UIST'14 Adjunct*. New York, New York, USA: ACM Press, Oct. 2014, pp. 45–46.
- [A3] Alec Jacobson, Daniele Panozzo, Oliver Glauser, Cédric Pradalier, Otmar Hilliges, and Olga Sorkine-Hornung. "Tangible and modular input device for character articulation". In: *ACM SIGGRAPH 2014 Emerging Technologies*. New York, New York, USA: ACM Press, July 2014, pp. 1–1.
- [A4] Shahram Izadi, Richard A Newcombe, David Kim, Otmar Hilliges, et al. "KinectFusion: real-time dynamic 3D surface reconstruction and interaction". In: *SIGGRAPH '11: ACM SIGGRAPH 2011 Talks*. New York, NY, USA: ACM, 2011, p. 1.
- [A5] Andreas Butz, Otmar Hilliges, Lucia Terrenghi, and Dominikus Baur. "Hybrid Widgets on an Interactive Tabletop". In: *Ubicomp '07: Adjunct Proceedings*. In Ubicomp '07: Adjunct Proceedings, 2007.
- [A6] Otmar Hilliges. "Informed Browsing: Scaling Up Co-Experienced Access to Digital Media". In: *Doctoral symposium of 20th ACM UIST, Newport, RI, USA*. 2007.
- [A7] Otmar Hilliges and Lucia Terrenghi. "Overcoming mode-changes on multi-user large displays with bimanual interaction". In: *MU3I Workshop on Multi-User and Ubiquitous User Interfaces (IUI Workshops)*. ACM, 2006, pp. 23–31.
- [A8] Martin Bauer, Otmar Hilliges, Asa MacWilliams, Christian Sandor, et al. "Integrating studierstube and dwarf". In: *Int. Workshop on Software Technology for Augmented Reality Systems (STARS 2003)*. 2003.

## Invited publications.....

- [IN1] Richard A. Newcombe, Shahram Izadi, Otmar Hilliges, David Molyneaux, David Kim, Andrew J. Davison, Pushmeet Kohli, Jamie Shotton, Steve Hodges, and Andrew Fitzgibbon. "KinectFusion: Real-time Dense Surface Mapping and Tracking". In: *Commun. ACM (to appear)* (2016).

## Tech reports.....

- [TR1] Johannes Schöning, Peter Brandl, Florian Daiber, Florian Echtler, Otmar Hilliges, et al. *Multi-Touch Surfaces: A Technical Guide*. Tech. rep. Institute for Geoinformatics University of Münster, 2008.

## Theses.....

- [T1] Otmar Hilliges. "Bringing the Physical to the Digital: A New Model for Tabletop Interaction". PhD thesis. Ludwig-Maximilians-Universität München, 2009.
- [T2] Otmar Hilliges. "Interaction Management for Ubiquitous Augmented Reality User Interfaces". Masters thesis. Technische Universität München (TUM), Munich, Germany, 2004.

## Patents granted.....

- [P1] *Detection of body and props*. US Patent 8,660,303. 2014.
- [P2] *Gesture recognition techniques*. US Patent 8,760,395. 2014.
- [P3] *Human body pose estimation*. US Patent 8,638,985. 2014.
- [P4] *Mobile camera localization using depth maps*. US Patent 8,711,206. 2014.
- [P5] *Learning image processing tasks from scene reconstructions*. US Patent US8971612B2. 2013.
- [P6] *Moving object segmentation using depth images*. US Patent 8,401,225. 2013.
- [P7] *Physics simulation-based interaction for surface computing*. US Patent 8,502,795. 2013.
- [P8] *Real-time camera tracking using depth maps*. US Patent 8,401,242. 2013.
- [P9] *Tabletop display providing multiple views to users*. US Patent 8,502,816. 2013.
- [P10] *Three-dimensional environment reconstruction*. US Patent 8,587,583. 2013.
- [P11] *Using a three-dimensional environment model in gameplay*. US Patent 8,570,320. 2013.
- [P12] *Generating computer models of 3d objects*. US Patent US9053571B2. 2012.

## Patents pending.....

- [PA1] *Grasping virtual objects in augmented reality*. US Patent App. 13/653,968. 2014.

- [PA2] *In-air gestures around unmodified mobile devices*. EP Patent App. 14/184134.6. 2014.
- [PA3] *Using photometric stereo for 3D environment modeling*. US Patent App. 13/729,324. 2014.
- [PA4] *Wearable sensor for tracking articulated body-parts*. US Patent App. 13/644,701. 2014.
- [PA5] *Distributed asynchronous localization and mapping for augmented reality*. US Patent App. 13/152,220. 2012.
- [PA6] *Reducing interference between multiple infrared depth cameras*. US Patent App. 13/017,518. 2012.
- [PA7] *Three-dimensional user interaction*. US Patent App. 12/939,891. 2012.
- [PA8] *User interaction in augmented reality*. US Patent App. 12/940,383. 2012.
- [PA9] *Pointing device with independently movable portions*. US Patent App. 12/485,543. 2010.
- [PA10] *Surface Computer User Interaction*. US Patent App. 12/485,499. 2010.
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