

Sven Kratz

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U.S. Permanent Resident

Research Interests

Human-Computer Interaction	Machine Learning
Human-Robot Interaction	Spatial UI
Usable Security	Ubiquitous Computing

Education

- 2011–2012 **Ph.D. (Dr. Rer. Nat.), Computer Science, Faculty of Mathematics, Computer Science and Statistics, University of Munich, Munich, Germany, Final Grade “Magna Cum Laude”.**
Ph.D. Student at the Chair for Media Informatics of the University of Munich.
- 2008–2011 **Graduate school, TU Berlin, Berlin, Germany.**
Ph.D. Student in Computer Science at the Quality & Usability Group, Deutsche Telekom Laboratories.
- 2000–2007 **Diplom (M.Sc. equiv.) degree in Computer Science, RWTH Aachen University, Aachen, Germany, Final Grade 1.0/1.0 – “Very Good”, Business Administration as minor subject.**
- 1992–2000 **Abitur (German higher education entrance exam), German International School of Brussels, Brussels, Belgium, Final grade 1.8/1.0 – “Good”, advanced courses in Mathematics and English.**
- 1987–1992 **British preparatory school, Maseru English Medium Preparatory School, Maseru, Lesotho.**

Work Experience

- 10/2012–present **Research Scientist, FX Palo Alto Laboratory, Palo Alto, CA, USA.**
Formed a robotics research group that applies a human-centered approach to the research and design of technologies for mobile robotic telepresence and robotic delivery. Conducted research into gesture and sensor-based user interfaces for mobile devices and collaborative smart work environments. Developed novel finger pose estimation technique using depth sensor and gesture-based authentication system using depth sensor. *FXPAL Significant Achievement Award received in 2014.*
- 02/2011–09/2012 **Research Assistant, University of Munich, Munich, Germany.**
Research assistant (full-time staff position) at the *Chair for Media Informatics*, member of the Mobile Interaction Lab. Teaching duties in lectures on image processing and human-computer interaction. Developed research prototypes for around-phone spatial interaction and wearable input system for mobile devices using depth sensor.
- 04/2008–01/2011 **Junior Researcher, Telekom Innovation Laboratories and TU Berlin, Berlin, Germany.**
Junior researcher (full-time staff position) in the *Quality and Usability Group*, where I started work on my Ph.d. in Computer Science under the guidance of Prof. Dr. Michael Rohs and Prof. Dr. Sebastian Möller. Developed research hardware and software prototypes and IP for novel mobile user interfaces using motion, pressure, distance and RGBD sensors.
- 08/2011–10/2011 **Research Intern, Microsoft Inc., Redmond, WA, USA.**
12 week internship at the *Microsoft Applied Sciences Group*. Developed home automation, microcontroller and computer vision modules for public release of *Mayhem* end user programming environment. Evaluated depth imaging technologies for 3D scanning and finger-based gestural input.

- 08/2010–10/2011 **Research Intern**, *Microsoft Inc.*, Redmond, WA, USA.
16 week internship mentored by Dr. Paul Dietz. Implemented Kinect-based obstacle avoidance system for mobile robots; implemented robotic arm control application for evaluation of a multi-touch trackpad; designed and implemented the first version of the *Mayhem*, an open-source end-user programming environment for Windows.
- 10/2007–03/2008 **Student Assistant**, *User Interface Engineering Group, B-IT*, Bonn, Germany.
Tutorials and homework grading for “Designing Interactive Systems I” lecture.
- 07/2005–06/2007 **Student Assistant**, *Media Computing Group, RWTH Aachen*, Aachen, Germany.
Performed HCI Research. Mac OS X (Cocoa) application developer. Mobile app developer for location-based tourist game.

Teaching

- 2011–2012 **University of Munich**, *Chair for Media Informatics*.
Held tutorials for Master’s-level lectures on image processing and mobile interaction, together with Prof. Dr. Michael Rohs. Supervised Bachelor’s and Master’s theses.
- 2008–2010 **TU Berlin**, *Quality & Usability Group*.
Supervision of tutorials for Master’s-level lecture Mobile Interaction. Assisted in Seminar Current Topics in HCI, together with Prof. Dr. Michael Rohs and Prof. Dr. Georg Essl. Supervised Master’s theses.
- 2007–2008 **Bonn-Aachen International Center for Information Technology (B-IT)**, *Bonn, Germany, User Interface Engineering Group*.
Supervision of tutorials for Master’s-level lecture Designing Interactive Systems I.

Academic Service

- 2017 **Associate Chair of the Program Committee**, *CHI 2017*.
- 2016 **Associate Chair of the Program Committee**, *MobileHCI 2016 Conference*.
- 2015/16 **Associate Chair of the Program Committee**, *CHI 2016 Conference*.
- 2014 **Poster and Demos Co-Chair**, *IUI 2015 Conference*.
- 2014 **Workshop Chair**, *MobileHCI 2015 Conference*.
- 2013 **Publicity Co-Chair**, *MobileHCI 2013 Conference*.
- 2013 **Associate Chair of the Program Committee**, *MobileHCI 2013 Conference*.
- 08/2011 **Organizer**, *Workshop Body Movement Gestures & Tactility in Interaction with Mobile Devices at Mobile HCI 2011, Stockholm, Sweden, August 2011*.
- 2008–now **Reviewer**, Reviewed publications for the following academic conferences and journals:
CHI, CSCW, MobileHCI, IUI, UIST, DIS, Pervasive, UbiComp, IJHCI, IEE Pervasive Computing, IEEE Transactions on Multimedia, NordCHI, Pervasive and Mobile Computing, TEI

Languages

German	Mother Tongue	
English	Fluent	<i>spoken and written</i>
French	Fluent	<i>spoken and written</i>

Development Skills

Programming Languages	C, C++, Objective-C, C#, Java, Python, NumPy	Platforms and Operating Systems	Android, Arduino, Atmel-AVR, Arduino, Eclipse, Electric Imp, HTML/JavaScript, IOS, Linux, Mac OS X, Microsoft Visual Studio, ROS, Windows, XCode
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Miscellaneous CAD (Eagle, OpenSCAD, SolidWorks basics), Databases (SQLite, MongoDB), OpenCV, Point Cloud Library, SPSS

Hardware 3D printing, CNC milling, basic metal lathe and manual milling machine use, basic electronic circuit design and construction

Invited Talks

- 11/2015 **Technicolor Research Bay Area, Palo Alto, CA, USA**, The Perceptive Mobile Device: Using Sensors to Improve User Input Capabilities with and Around the Device.
- 06/2012 **SICSA Summer School, University of Glasgow, Scotland**, Sensor-Based User Interface Concepts for Interaction on Mobile Devices.
- 04/2012 **Dagstuhl Seminar *Touching the 3rd Dimension*, Dagstuhl, Germany**, A New Perspective on Hand Gestures and Wearable Applications.
- 03/2012 **Nokia Research Center, Palo Alto, CA, USA**, Sensor-Based User Interface Concepts for Interaction on Mobile Devices.
- 08/2011 **Doctoral Consortium, ACM MobileHCI 2011, Stockholm, Sweden**, Sensor-Based Interface Technologies for Gestural and Continuous Interaction on Mobile Devices.

Publications

Peer-Reviewed Conferences and Journals

- [1] Don Kimber, Jim Vaughan, and Sven Kratz. Look Where You're Going: Visual Interfaces for Robot Teleoperation. In *To appear: IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*. IEEE, August 2016.
- [2] Sven Kratz and Fred Ferreira. Immersed Remotely: Evaluating the Use of Head Mounted Devices for Remote Collaboration in Robotic Telepresence. In *To appear: IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*. IEEE, August 2016.
- [3] Sven Kratz and Jason Wiese. GestureSeg: Developing a Gesture Segmentation System using Gesture Execution Phase Labeling by Crowd Workers. In *The 8th ACM SIGCHI Symposium on Engineering Interactive Computing Systems (EICS 2016)*. ACM, June 2016.
- [4] Matthew Cooper, Jacob Biehl, Gerry Filby, and Sven Kratz. LoCo: boosting for indoor location classification combining Wi-Fi and BLE. *Personal and Ubiquitous Computing*, pages 1–14, 2016.
- [5] Sven Kratz, Daniel Avrahami, Don Kimber, Jim Vaughan, Patrick Proppe, and Don Severns. Polly wanna show you: Examining viewpoint-conveyance techniques for a shoulder-worn telepresence system. In *Proceedings of the 17th International Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI 2015), Industrial Case Studies*. ACM, august 2015.
- [6] Barry Kollee, Sven Kratz, and Tony Dunnigan. Exploring gestural interaction in smart spaces using head mounted devices with ego-centric sensing. In *Proceedings of the 2nd ACM Symposium on Spatial User Interaction*. ACM, October 2014.
- [7] Tanvir Aumi and Sven Kratz. Airauth: Evaluating in-air hand gestures for authentication. In *Proceedings of the 16th International Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI 2014)*. ACM, September 2014.
- [8] Jacob Biehl, Matthew Cooper, Gerry Filby, and Sven Kratz. Loco: A ready-to-deploy framework for efficient room localization using wi-fi. In *Proceedings of the 2014 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp 2014)*. ACM, September 2014.
- [9] Sven Kratz, Don Kimber, Weiqing Su, Gwen Gordon, and Don Severns. Polly: "being there" through the parrot and a guide. In *Proceedings of the 16th International Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI 2014), Industrial Case Studies*. ACM, September 2014.

- [10] Sven Kratz, Michael Rohs, and Georg Essl. Combining acceleration and gyroscope data for motion gesture recognition using classifiers with dimensionality constraints. *IUI '13*. ACM, March 2013.
- [11] Katrin Wolf, Robert Schleicher, Sven Kratz, and Michael Rohs. Tickle: A surface-independent interaction technique for grasp interfaces. *TEI '13*. ACM, February 2013.
- [12] Gilles Bailly, Jörg Müller, Michael Rohs, Daniel Wigdor, and Sven Kratz. Shoesense: A new perspective on gestural interaction and wearable applications. In *Proceedings of CHI 2012*. ACM Press, May 2012.
- [13] Sven Kratz, Dennis Guse, Michael Rohs, Jörg Müller, Gilles Bailly, and Michael Nischt. PalmSpace: Continuous around-device gestures vs. multitouch for 3d rotation tasks on mobile devices. *AVI '12*, New York, NY, USA, May 2012. ACM.
- [14] Alireza Sahami Shirazi, Michael Rohs, Robert Schleicher, Sven Kratz, Alexander Müller, and Albrecht Schmidt. Real-time nonverbal opinion sharing through mobile phones during sports events. In *Proceedings of CHI 2011, Vancouver, Canada, May 7-12, 2011. Note*, May 2011.
- [15] Sven Kratz and Michael Rohs. Protractor3d: A closed-form solution to rotation-invariant 3d gestures. In *Proceedings of the International Conference on Intelligent User Interfaces (IUI 2011), Palo Alto, CA, USA, February 13-16, 2011. Short paper*, IUI '11, New York, NY, USA, February 2011. ACM.
- [16] Christine Kühnel, Tilo Westermann, Fabian Hemmert, Sven Kratz, Alexander Müller, and Sebastian Möller. I'm home: Defining and evaluating a gesture set for smart-home control. *International Journal of Human-Computer Studies*, 69(v1):693 – 704, 2011.
- [17] Georg Essl, Michael Rohs, and Sven Kratz. Use the force (or something) - pressure and pressure-like input for mobile music performance. In *Proceedings of the International Conference on New Interfaces for Musical Expression (NIME 2010)*, June 2010.
- [18] Sven Kratz and Michael Rohs. Extending the virtual trackball metaphor to rear touch input. In *Proceedings of the 2010 IEEE Symposium on 3D User Interfaces (3DUI 2010)*, pages 111–114. IEEE, mar 2010.
- [19] Sven Kratz, Ivo Brodien, and Michael Rohs. Semi-automatic zooming for mobile map navigation. In *Proceedings of the 12th international conference on Human computer interaction with mobile devices and services, MobileHCI '10*, pages 63–72, New York, NY, USA, 2010. ACM.
- [20] Sven Kratz and Michael Rohs. A \$3 gesture recognizer: simple gesture recognition for devices equipped with 3d acceleration sensors. In *Proceeding of the 14th international conference on Intelligent user interfaces, IUI '10*, pages 341–344, New York, NY, USA, 2010. ACM.
- [21] Craig Stewart, Michael Rohs, Sven Kratz, and Georg Essl. Characteristics of pressure-based input for mobile devices. In *Proceedings of the 28th international conference on Human factors in computing systems, CHI '10*, pages 801–810, New York, NY, USA, 2010. ACM.
- [22] Christian Kray, Michael Rohs, Jonathan Hook, and Sven Kratz. Bridging the gap between the kodak and the flickr generations: A novel interaction technique for collocated photo sharing. *International Journal of Human-Computer Studies*, 67:1060–1072, December 2009.
- [23] Sven Kratz and Michael Rohs. Hoverflow: Expanding the design space of around-device interaction. In *Proceedings of the 11th International Conference on Human-Computer Interaction with Mobile Devices and Services, MobileHCI '09*, pages 31–38, New York, NY, USA, 2009. ACM.

Extended Abstracts, Workshops, Demos and Posters

- [24] Sven Kratz and Tony Dunnigan. ThermoTouch: Design of a High Dynamic (Temperature) Range Thermal Haptic Display. In *CHI 2016 Late Breaking Results*, May 2016.
- [25] Sven Kratz and Maribeth Back. Towards accurate automatic segmentation of imu-tracked motion gestures. In *CHI 2015 Extended Abstracts*, April 2015.
- [26] Jennifer Marlow, Daniel Avrahami, Jacob Biehl, Scott Carter, Cooper Matthew, Don Kimber, and Sven Kratz. 'good enough' is not good enough: Challenges of social interaction in video-mediated telepresence. In *Presented at "Everyday Telepresence" workshop at CHI 2015*, April 2015.
- [27] Sven Kratz, Jim Vaughan, Ryota Mizutani, and Don Kimber. Evaluating stereoscopic video with head tracking for immersive teleoperation of mobile telepresence robots. In *10th ACM/IEEE International Conference on Human-Robot Interaction*, March 2015.
- [28] Don Kimber, Patrick Proppe, Jim Vaughan, Sven Kratz, and Don Severns. Telepresence from a guide's shoulder. In *Second Workshop on Assistive Computer Vision and Robotics at ECCV2014*, September 2014.
- [29] Tanvir Aumi and Sven Kratz. Airauth: Towards attack-resilient biometric authentication using in-air gestures. In *CHI 2014 Extended Abstracts, Toronto, CA*. ACM, April 2014.
- [30] Sven Kratz, Patrick Chiu, and Maribeth Back. Pointpose demo: using a depth camera for finger pose estimation on touch-based mobile devices. In *Proceedings of the 2013 ACM international conference on Interactive tabletops and surfaces*, pages 321–324. ACM, october 2013.
- [31] Sven Kratz, Jim Vaughan, and Maribeth Back. Voropoint: Improving gesture-based target selection on large displays. In *Adjunct Proceedings of the International Symposium on Pervasive Displays 2013*, June 2013.
- [32] Sven Kratz, Tilo Westermann, Michael Rohs, and Georg Essl. Capwidgets: Tangible widgets versus multi-touch controls on mobile devices. In *Work in Progress, CHI 2011, Vancouver, Canada, May 7-12, 2011*, May 2011.
- [33] Dennis Guse, Niklas Kirschnick, Sven Kratz, and Sebastian Möller. Gesture-based user authentication for mobile devices. In *Proc. MobileHCI 2011, Workshop on Body, Movement, Gesture & Tactility in Interaction with Mobile Devices*, 30. Aug. - 2. Sept. 2011.
- [34] Qian Qin, Michael Rohs, and Sven Kratz. Dynamic ambient lighting for mobile devices. In *Proceedings of the 24th annual ACM symposium adjunct on User interface software and technology, UIST '11 Adjunct*, pages 51–52, New York, NY, USA, 2011. ACM.
- [35] Benjamin Bähr, Michael Rohs, and Sven Kratz. A tabletop system for supporting paper prototyping of mobile interfaces. In *PaperComp 2010: 1st International Workshop on Paper Computing. Workshop at Ubicomp 2010*, September 2010.
- [36] Michael Rohs, Sven Kratz, Robert Schleicher, Alireza Sahami, and Albrecht Schmidt. Worldcupinion: Experiences with an android app for real-time opinion sharing during world cup soccer games. In *Research in the Large: Using App Stores, Markets and other wide distribution channels in UbiComp research. Workshop at Ubicomp 2010*, September 2010.
- [37] Sven Kratz, Fabian Hemmert, and Michael Rohs. Natural user interfaces in mobile phone interaction. In *Workshop on Natural User Interfaces at CHI 2010*, 2010.
- [38] Georg Essl, Michael Rohs, and Sven Kratz. Squeezing the sandwich: A mobile pressure-sensitive two-sided multi-touch prototype. In *Demonstration at the 22nd Annual ACM Symposium on User Interface Software and Technology (UIST), Victoria, BC, Canada*, October 2009.

- [39] Sven Kratz and Michael Rohs. Unobtrusive tabletops: Linking personal devices with regular tables. In *Workshop Multitouch and Surface Computing at CHI'09*, April 2009.
- [40] Johannes Schöning, Michael Rohs, Sven Kratz, Markus Löchtefeld, and Antonio Krüger. Map torchlight: A mobile augmented reality camera projector unit. In *Proceedings of the 27th international conference extended abstracts on Human factors in computing systems*, CHI '09, pages 3841–3846, New York, NY, USA, 2009. ACM.
- [41] Christian Kray, Michael Rohs, Jonathan Hook, and Sven Kratz. Group coordination and negotiation through spatial proximity regions around mobile devices on augmented tabletops. In *3rd IEEE Workshop on Tabletops and Interactive Surfaces (IEEE Tabletop 2008)*, October 2008.
- [42] Sven Kratz and Michael Rohs. Navigating dynamically-generated high quality maps on tilt-sensing mobile devices. In *Workshop on Mobile and Embedded Interactive Systems (MEIS at Informatik 2008)*, Munich, Germany, September 11, 2008, 2008.

Patents and Invention Disclosures

- [43] Patrick Chiu, Sven Kratz, Jun Shingu, and Laurent Denué. Methods for rendering hands over documents with depth camera for telepresence, filing nr. us 15/133,608, April 2016.
- [44] Qiong Liu, Shang Ma, and Sven Kratz. Using coded light to dock drones and ground robots, Filing Nr. US 15/064,595, December 2015.
- [45] Ryota Mizutani, Don Kimber, Sven Kratz, and Jim Vaughan. Focus+Context views for telepresence and robotic teleoperation, Filing Nr. US 14/966,428, October 2015.
- [46] Sven Kratz and Jim Vaughan. System and Method for Mobile Robot Teleoperation, Filing Nr. US 14/852,246, September 2015.
- [47] Jun Shingu, Akira Ichiboshi, Patrick Chiu, and Sven Kratz. Systems and Methods for Interacting with Large Displays Using Shadows, Filing Nr. US 14/642,719, November 2014.
- [48] Sven Kratz and Jun Shingu. Personalized Meeting Event Capture Using Egocentric Tracking in Smart Spaces, Filing Nr. 14/667,504, October 2014.
- [49] Don Kimber, Sven Kratz, Patrick Proppe, Maribeth Back, Bee-Yian Liew, and Tony Dunnigan. Methods and Systems for Sharing Views. Filing Nr. US 14/476,605, September 2014.
- [50] Patrick Chiu, Henry Tang, Qiong Liu, and Sven Kratz. Systems and Methods for Enabling Fine-Grained User Interactions for Projector-Camera or Display-Camera Systems, Filing Nr. US 14/288,370, May 2014.
- [51] Sven Kratz and Tanvir Aumi. System and Method for Biometric User Authentication using In-Air Hand Gestures, Filing Nr. US 14/244,839, March 2014.
- [52] Ville Makela, Scott Carter, Matthew Cooper, Vikash Rogoobur, Laurent Denué, and Sven Kratz. System and methods for notifying users of mismatches between intended and actual captured content during heads-up recording of expository video, Filing Nr. US 14/218,495, March 2014.
- [53] Patrick Chiu and Sven Kratz. System and Methods for Gesture Based GUI Widgets, Filing Nr. US20140313136 A1, April 2013.
- [54] Sven Kratz and Patrick Chiu. System and Method for Finger Pose Estimation on Touch Screen Devices, US9069415 B2, April 2013.
- [55] Georg Essl, Sven Kratz, and Michael Rohs. Electronic Device and Method for Controlling an Electronic Device, EP000002282256, February 2011.

Hobbies and Continuing Education

Aviation	Holder of FAA Private Pilot Certificate Airplane Single-Engine Land (PPL-ASEL)	Mountain Sports	hiking, snowboarding
Continuing Education	<i>BUS 205—Managing Innovation</i> , Stanford Continuing Studies (Marv Patterson, 2014), <i>Online Stanford Machine Learning Class</i> (Andrew Ng, 2011).		