Katherine J. Kuchenbecker, Ph.D.

Haptic Intelligence Department, Max Planck Institute for Intelligent Systems
Heisenbergstraße 3, 70569 Stuttgart, Germany
Phone: +49 711 689-3510 Email: kjk@is.mpg.de
Date of Birth: June 13, 1978
Citizenship: United States of America

Curriculum vitae last updated on March 9, 2024

Education

2006 Ph.D. in Mechanical Engineering, Stanford University, Stanford, California, USA
Dissertation: Characterizing and Controlling the High-Frequency Dynamics of Haptic Interfaces
Advisor: Günter Niemeyer, Ph.D.

2002 M.S. in Mechanical Engineering, Stanford University, Stanford, California, USA
Specialization: Mechatronics and Robotics

2000 B.S. in Mechanical Engineering, Stanford University, Stanford, California, USA
With Distinction

Positions Held

Jan. 2017 – present	**Director**, Max Planck Institute for Intelligent Systems (MPI-IS), Stuttgart, Germany, and **Scientific Member**, Max Planck Society (MPG)
Nov. 2022 – present	**Honorary Professor**, University of Stuttgart, Stuttgart, Germany
Jan. 2017 – present	**Spokesperson**, International Max Planck Research School for Intelligent Systems (IMPRS-IS), joint Ph.D. program between MPI-IS, Uni. Stuttgart, and Uni. Tübingen
Jul. 2019 – Dec. 2020	Overall Managing Director, MPI-IS, Stuttgart and Tübingen
Jan. 2018 – Dec. 2020	Managing Director of the Stuttgart Site, MPI-IS
Jul. 2013 – Dec. 2016	Associate Professor, Department of Mechanical Engineering and Applied Mechanics (MEAM), University of Pennsylvania Class of 1940 Bicentennial Endowed Term Chair, Jul. 2015 – Dec. 2016 Secondary Appointment, Dept. of Computer and Information Science, from 2013 Member, Electrical and Systems Engineering Graduate Group, from 2015 Member, Bioengineering Graduate Group, from 2010 On leave Jan. 2017 – Dec. 2018. Adjunct Professor Jan. 2019 – Jun. 2022.
Jul. 2013 – Jun. 2016	Undergraduate Curriculum Chair, MEAM Dept., University of Pennsylvania
Jul. 2007 – Jun. 2013	Skirkanich Assistant Professor of Innovation, MEAM Dept., Univ. of Pennsylvania
Aug. 2006 – May 2007	Postdoctoral Research Fellow, Department of Mechanical Engineering, Johns Hopkins University, Baltimore, USA. Advisor: Allison M. Okamura, Ph.D.

Research Interests

Our scientific understanding of haptic interaction is still evolving, both because what you feel greatly depends on how you move, and because engineered sensors, actuators, and algorithms typically struggle to match human capabilities. Consequently, few computer and machine interfaces provide the human operator with high-fidelity touch feedback or carefully analyze the physical signals generated during haptic interactions, limiting their usability. The crucial role of the sense of touch is also gaining appreciation from people trying to create autonomous robots that can competently manipulate everyday objects and safely interact with humans in unstructured environments. My team works in all of these related areas, aiming to sharpen our understanding of haptic interaction while simultaneously inventing helpful human-computer, human-machine, human-robot, robotic, and sensing systems that take advantage of the unique capabilities of the sense of touch.

Selected Awards and Honors

2023 Outstanding Reviewer, ACM/IEEE Int. Conf. on Human-Robot Interaction (HRI)
2022 Honoree, 35 Women in Robotics Engineering and Science (WiRES), announced at IROS
2022 Participant, Berlin Summit on Robotics
2022 Advisor of Dr. Alexis E. Block, winner of the Otto Hahn Medal (MPG doctoral thesis prize)
2022 Best Demo (with co-authors), EuroHaptics Conference
2022 Honorable Mention for Best ToH Short Paper (with co-author), IEEE Haptics Symposium
2021 Hon. Mention for Best ToH Short Paper (with co-author), IEEE World Haptics Conference
2021 IEEE Fellow, for contributions to interactive haptic systems and robotic touch perception
2020 Best Poster (with co-author), EuroHaptics Conference
2019 Best Poster (with co-authors), IROS RoboTac Workshop
2017 Finalist for Best Poster (with co-author), IEEE World Haptics Conference
2015 TCPW Award for Excellence in Undergraduate Advising, University of Pennsylvania
2014 Best Poster (with co-author), IROS Workshop on Sensorimotor Control in Surgical Robotics
2014 Lindback Award for Distinguished Teaching, University of Pennsylvania
2014 Finalist for Best Paper (with co-author), IEEE Haptics Symposium
2014 Finalist for Best Poster (with co-authors), IEEE Haptics Symposium
2013 Best Demonstration Award (by committee vote, with co-authors), SIGGRAPH Asia
2013 Best Paper Silver Award (with co-authors), Advances in Computer Entertainment (ACE)
2013 Best Cognitive Robotics Paper Award (with co-authors), IEEE ICRA
2013 Best Demonstration (by audience vote, with co-authors), IEEE World Haptics Conference
2013 Finalist for Best Paper (with co-authors), IEEE World Haptics Conference
2012 IEEE Robotics and Automation Society Academic Early Career Award
2012 Best Demonstration (three-way tie, with co-authors), IEEE Haptics Symposium
2012 Finalist for Best Poster (with co-authors), IEEE Haptics Symposium
2011 Citation for Meritorious Service as a Reviewer, IEEE Transactions on Haptics
2011 PopTech Science and Public Leadership Fellow
2011 Best Poster in Session (with co-authors), American Urological Association Annual Meeting
2011 Best Associate Editor, IEEE International Conference on Robotics and Automation
2010 Popular Science Brilliant 10
2010 Ford Motor Company Award for Faculty Advising, SEAS, University of Pennsylvania
2009 National Science Foundation CAREER Award
2009 Early Career Spotlight Talk (keynote speaker), Robotics: Science and Systems Conference
2009 Best Demonstration (with co-author), IEEE World Haptics Conference
2008 Citation for Meritorious Service as a Reviewer, IEEE Transactions on Haptics
2007 Best Haptic Technology Paper (with co-author), IEEE World Haptics Conference
2004-2005 Achievement Rewards for College Scientists (ARCS) Fellowship
2004 Best Student Paper (with co-author), Dynamic Systems and Controls Div., ASME IMECE
2004 Best Poster (with co-authors), Medicine Meets Virtual Reality Conference
2000-2003 National Science Foundation Graduate Research Fellowship
2000-2001 Tau Beta Pi Fellowship
2000 Mayfield Fellow, entrepreneurship program, Stanford University
2000 Henry Ford II Scholar, #1 Graduating Student in Engineering, Stanford University
2000 Henry O. Fuchs Memorial Award for Excellence in Mechanical Design, Stanford University
2000 Best of Program (with co-authors), Senior Design Competition, Lincoln Foundation
1999 ASME Kenneth Andrew Roe Scholarship
1999 Phi Beta Kappa Honor Society, elected Junior Year
1999 Tau Beta Pi Engineering Honor Society, elected Junior Year
1998 Cap and Gown, the Stanford Women's Honor Society, elected Junior Year
1996-1999 Scholar Athlete Award, Varsity Volleyball, Stanford University

Publications

Journal Articles

[J1] Nataliya Rokhmanova, Owen Pearl, Katherine J. Kuchenbecker, and Eni Halilaj. IMU-based kinematics estimation accuracy affects gait retraining using vibrotactile cues. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 2024. Accepted. doi:10.1109/TNSRE.2024.3365204.

[J2] Naomi T. Fitter, Mayumi Mohan, Rhian C. Preston, Michelle J. Johnson, and Katherine J. Kuchenbecker. How should robots exercise with people? Robot-mediated exergames win with music, social analogues, and gameplay clarity. *Frontiers in Robotics and AI*, 10(1155837):1–18, January 2024. doi:10.3389/frobt.2023.1155837.

[J3] Behnam Khojasteh, Yitian Shao, and Katherine J. Kuchenbecker. Robust surface recognition with the maximum mean discrepancy: Degrading haptic-auditory signals through bandwidth and noise. *IEEE Transactions on Haptics*, pages 1–8, January 2024. doi:10.1109/TOH.2024.3356609.

[J4] Rachael L'Orsa, Sanju Lama, David Westwick, Garnette Sutherland, and Katherine J. Kuchenbecker. Towards semi-automated pleural cavity access for pneumothorax in austere environments. *Acta Astronautica*, 212:48–53, November 2023. doi:10.1016/j.actaastro.2023.07.029.

[J5] Behnam Khojasteh, Friedrich Solowjow, Sebastian Trimpe, , and Katherine J. Kuchenbecker. Multimodal multi-user surface recognition with the kernel two-sample test. *IEEE Transactions on Automation Science and Engineering*, pages 1–16, August 2023. doi:10.1109/TASE.2023.3296569.

[J6] Iris Andrussow, Huanbo Sun, Katherine J. Kuchenbecker, and Georg Martius. Minsight: A fingertip-sized vision-based tactile sensor for robotic manipulation. *Advanced Intelligent Systems*, 5(8):2300042, August 2023. Inside back cover. doi:10.1002/aisy.202300042.

[J7] Young-Eun Lee, Haliza Mat Husin, Maria-Paola Forte, Seong-Whan Lee, and Katherine J. Kuchenbecker. Learning to estimate palpation forces in robotic surgery from visual-inertial data. *IEEE Transactions on Medical Robotics and Bionics*, 5(3):496–506, August 2023. doi:10.1109/TMRB.2023.3295008.

[J8] Alexis E. Block, Hasti Seifi, Otmar Hilliges, Roger Gassert, and Katherine J. Kuchenbecker. In the arms of a robot: Designing autonomous hugging robots with intra-hug gestures. *ACM Transactions on Human-Robot Interaction*, 12(2):1–49, June 2023. Special Issue on Designing the Robot Body: Critical Perspectives on Affective Embodied Interaction. doi:10.1145/3526110.

[J9] Ifat Gertler, Gokhan Serhat, and Katherine J. Kuchenbecker. Generating clear vibrotactile cues with a magnet embedded in a soft finger sheath. *Soft Robotics*, 10(3):624–635, June 2023. doi:10.1089/soro.2021.0184.

[J10] Farimah Fazlollahi and Katherine J. Kuchenbecker. Haptify: A measurement-based benchmarking system for grounded force-feedback devices. *IEEE Transactions on Robotics*, 39(2):1622–1636, April 2023. doi:10.1109/TRO.2022.3226110.

[J11] Jeremy D. Brown and Katherine J. Kuchenbecker. Effects of automated skill assessment on robotic surgery training. *The International Journal of Medical Robotics and Computer Assisted Surgery*, 19(2):e2492, April 2023. doi:10.1002/rcs.2492.

[J12] Adam J. Spiers, Eric Young, and Katherine J. Kuchenbecker. The S-BAN: Insights into the perception of shape-changing haptic interfaces via virtual pedestrian navigation. *ACM Transactions on Computer-Human Interaction*, 30(1):1–31, March 2023. doi:10.1145/3555046.

[J13] Neha Thomas, Farimah Fazlollahi, Katherine J. Kuchenbecker, and Jeremy D. Brown. The utility of synthetic reflexes and haptic feedback for upper-limb prostheses in a dexterous task without direct vision. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 31:169–179, January 2023. doi:10.1109/TNSRE.2022.3217452.

[J14] Hyosang Lee, Huanbo Sun, Hyunkyu Park, Gokhan Serhat, Bernard Javot, Georg Martius, and Katherine J. Kuchenbecker. Predicting the force map of an ERT-based tactile sensor using simulation and deep networks. *IEEE Transactions on Automation Science and Engineering*, 20(1):425–439, January 2023. doi:10.1109/TASE.2022.3156184.

[J15] Benjamin A. Richardson, Yasemin Vardar, Christian Wallraven, and Katherine J. Kuchenbecker. Learning to feel textures: Predicting perceptual similarities from unconstrained finger-surface interactions. *IEEE Transactions on Haptics*, 15(4):705–717, October 2022. Benjamin A. Richardson and Yasemin Vardar contributed equally to this publication. doi:10.1109/TOH.2022.3212701.

[J16] Gokhan Serhat, Yasemin Vardar, and Katherine J. Kuchenbecker. Contact evolution of dry and hydrated fingertips at initial touch. *PLOS ONE*, 17(7):e0269722, July 2022. Gokhan Serhat and Yasemin Vardar contributed equally to this publication. doi:10.1371/journal.pone.0269722.

[J17] Hojin Lee, Güney Tombak, Gunhyuk Park, and Katherine J. Kuchenbecker. Perceptual space of algorithms for three-to-one dimensional reduction of realistic vibrations. *IEEE Transactions on Haptics*, 15(3):521–534, July 2022. doi:10.1109/TOH.2022.3174229.

[J18] David Gueorguiev, Julien Lambert, Jean-Louis Thonnard, and Katherine J. Kuchenbecker. Normal and tangential forces combine to convey contact pressure during dynamic tactile stimulation. *Scientific Reports*, 12(8215):1–11, May 2022. doi:10.1038/s41598-022-12010-0.

[J19] Nataliya Rokhmanova, Katherine J. Kuchenbecker, Peter B. Shull, Reed Ferber, and Eni Halilaj. Predicting knee adduction moment response to gait retraining with minimal clinical data. *PLOS Computational Biology*, 18(5):e1009500, May 2022. doi:10.1371/journal.pcbi.1009500.

[J20] Rachael Bevill Burns, Hyosang Lee, Hasti Seifi, Robert Faulkner, and Katherine J. Kuchenbecker. Endowing a NAO robot with practical social-touch perception. *Frontiers in Robotics and AI*, 9(840335):1–17, April 2022. doi:10.3389/frobt.2022.840335.

[J21] Maria-Paola Forte, Ravali Gourishetti, Bernard Javot, Tobias Engler, Ernest D. Gomez, and Katherine J. Kuchenbecker. Design of interactive augmented reality functions for robotic surgery and evaluation in dry-lab lymphadenectomy. *The International Journal of Medical Robotics and Computer Assisted Surgery*, 18(2):e2351, April 2022. doi:10.1002/rcs.2351.

[J22] Kyungseo Park, Hyosang Lee, Katherine J. Kuchenbecker, and Jung Kim. Adaptive optimal measurement algorithm for ERT-based large-area tactile sensors. *IEEE/ASME Transactions on Mechatronics*, 27(1):304–314, February 2022. doi:10.1109/TMECH.2021.3063414.

[J23] Huanbo Sun, Katherine J. Kuchenbecker, and Georg Martius. A soft thumb-sized vision-based sensor with accurate all-round force perception. *Nature Machine Intelligence*, 4(2):135–145, February 2022. doi:10.1038/s42256-021-00439-3.

[J24] Ravali Gourishetti and Katherine J. Kuchenbecker. Evaluation of vibrotactile output from a rotating motor actuator. *IEEE Transactions on Haptics*, 15(1):39–44, January 2022. Presented at the IEEE Haptics Symposium. Honorable Mention for Best ToH Short Paper. doi:10.1109/TOH.2021.3138867.

[J25] Siyao Hu, Krista Fjeld, Erin V. Vasudevan, and Katherine J. Kuchenbecker. A brake-based overground gait rehabilitation device for altering propulsion impulse symmetry. *Sensors*, 21(19):6617, October 2021. doi:10.3390/s21196617.

[J26] Elisabetta Ambron, Laurel J. Buxbaum, Alexander Miller, Harrison Stoll, Katherine J. Kuchenbecker, and H. Branch Coslett. Virtual reality treatment displaying the missing leg improves phantom limb pain: A small clinical trial. *Neurorehabilitation and Neural Repair*, 35(12):1100–1111, October 2021. doi:10.1177/15459683211054164.

[J27] Siyao Hu, Rochelle Mendonca, Michelle J. Johnson, and Katherine J. Kuchenbecker. Robotics for occupational therapy: Learning upper-limb exercises from demonstrations. *IEEE Robotics and Automation Letters*, 6(4):7781–7788, October 2021. doi:10.1109/LRA.2021.3098945.

[J28] Hyosang Lee, Kyungseo Park, Jung Kim, and Katherine J. Kuchenbecker. Piezoresistive textile layer and distributed electrode structure for soft whole-body tactile skin. *Smart Materials and Structures*, 30(8):085036, July 2021. Hyosang Lee and Kyungseo Park contributed equally to this publication. doi:10.1088/1361-665X/ac0c2e.

[J29] Gokhan Serhat and Katherine J. Kuchenbecker. Free and forced vibration modes of the human fingertip. *Applied Sciences*, 11(12):5709, June 2021. doi:10.3390/app11125709.

[J30] Saekwang Nam and Katherine J. Kuchenbecker. Optimizing a viscoelastic finite element model to represent the dry, natural, and moist human finger pressing on glass. *IEEE Transactions on Haptics*, 14(2):303–309, May 2021. Presented at the IEEE World Haptics Conference (WHC). Honorable Mention for Best ToH Short Paper. doi:10.1109/TOH.2021.3077549.

[J31] Yasemin Vardar and Katherine J. Kuchenbecker. Finger motion and contact by a second finger influence the tactile perception of electrovibration. *Journal of the Royal Society Interface*, 18(176):20200783, March 2021. doi:10.1098/rsif.2020.0783.

[J32] Rachael Bevill Burns, Hasti Seifi, Hyosang Lee, and Katherine J. Kuchenbecker. Getting in touch with children with autism: Specialist guidelines for a touch-perceiving robot. *Paladyn. Journal of Behavioral Robotics*, 12(1):115–135, January 2021. doi:10.1515/pjbr-2021-0010.

[J33] Saekwang Nam, Yasemin Vardar, David Gueorguiev, and Katherine J. Kuchenbecker. Physical variables underlying tactile stickiness during fingerpad detachment. *Frontiers in Neuroscience*, 14:235, April 2020. doi:10.3389/fnins.2020.00235.

[J34] Benjamin A. Richardson and Katherine J. Kuchenbecker. Learning to predict perceptual distributions of haptic adjectives. *Frontiers in Neurorobotics*, 13:1–16, February 2020. doi:10.3389/fnbot.2019.00116.

[J35] Naomi T. Fitter, Mayumi Mohan, Katherine J. Kuchenbecker, and Michelle J. Johnson. Exercising with Baxter: Preliminary support for assistive social-physical human-robot interaction. *Journal of NeuroEngineering and Rehabilitation*, 17:1–22, February 2020. doi:10.1186/s12984-020-0642-5.

[J36] Eric M. Young, David Gueorguiev, Katherine J. Kuchenbecker, and Claudio Pacchierotti. Compensating for fingertip size to render tactile cues more accurately. *IEEE Transactions on Haptics*, 13(1):144–151, January 2020. Katherine J. Kuchenbecker and Claudio Pacchierotti contributed equally to this publication. Presented at the IEEE World Haptics Conference (WHC). doi:10.1109/TOH.2020.2966993.

[J37] Siyao Hu and Katherine J. Kuchenbecker. Hierarchical task-parameterized learning from demonstration for collaborative object movement. *Applied Bionics and Biomechanics*, (9765383), December 2019. doi:10.1155/2019/9765383.

[J38] Eric M. Young and Katherine J. Kuchenbecker. Implementation of a 6-DOF parallel continuum manipulator for delivering fingertip tactile cues. *IEEE Transactions on Haptics*, 12(3):295–306, June 2019. doi:10.1109/TOH.2019.2920928.

[J39] Naomi T. Fitter and Katherine J. Kuchenbecker. How does it feel to clap hands with a robot? *International Journal of Social Robotics*, 12(1):113–127, April 2019. doi:10.1007/s12369-019-00542-x.

[J40] Alexis E. Block and Katherine J. Kuchenbecker. Softness, warmth, and responsiveness improve robot hugs. *International Journal of Social Robotics*, 11(1):49–64, October 2018. URL: https://rdcu.be/baa1k.

[J41] Naomi T. Fitter and Katherine J. Kuchenbecker. Teaching a robot bimanual hand-clapping games via wrist-worn IMUs. *Frontiers in Robotics and Artificial Intelligence*, 5(85), July 2018. doi:10.3389/frobt.2018.00085.

[J42] Claudio Pacchierotti, Eric M. Young, and Katherine J. Kuchenbecker. Task-driven PCA-based design optimization of wearable cutaneous devices. *IEEE Robotics and Automation Letters*, 3(3):2214–2221, July 2018. Presented at ICRA 2018. URL: https://ieeexplore.ieee.org/document/8304773.

[J43] Yousi A. Oquendo, Elijah W. Riddle, Dennis Hiller, Thane A. Blinman, and Katherine J. Kuchenbecker. Automatically rating trainee skill at a pediatric laparoscopic suturing task. *Surgical Endoscopy*, 32(4):1840–1857, April 2018. doi:10.1007/s00464-017-5873-6.

[J44] Elisabetta Ambron, Alexander Miller, Katherine J. Kuchenbecker, Laurel J. Buxbaum, and H. Branch Coslett. Immersive low-cost virtual reality treatment for phantom limb pain: Evidence from two cases. *Frontiers in Neurology*, 9(67):1–7, February 2018. doi:10.3389/fneur.2018.00067.

[J45] Andrés M. Bur, Ernest D. Gomez, Jason G. Newman, Gregory S. Weinstein, Jr. Bert W. O'Malley, Christopher H. Rassekh, and Katherine J. Kuchenbecker. Evaluation of high-fidelity simulation as a training tool in transoral robotic surgery. *Laryngoscope*, 127(12):2790–2795, December 2017. doi:10.1002/lary.26733.

[J46] Jeremy D. Brown, Conor E. O'Brien, Sarah C. Leung, Kristoffel R. Dumon, David I. Lee, and Katherine J. Kuchenbecker. Using contact forces and robot arm accelerations to automatically rate surgeon skill at peg transfer. *IEEE Transactions on Biomedical Engineering*, 64(9):2263–2275, September 2017. doi:10.1109/TBME.2016.2634861.

[J47] Heather Culbertson and Katherine J. Kuchenbecker. Ungrounded haptic augmented reality system for displaying texture and friction. *IEEE/ASME Transactions on Mechatronics*, 22(4):1839–1849, August 2017. doi:10.1109/TMECH.2017.2700467.

[J48] Netta Gurari, Allison M. Okamura, and Katherine J. Kuchenbecker. Perception of force and stiffness in the presence of low-frequency haptic noise. *PLoS ONE*, 12(6):e0178605, June 2017. URL: https://doi.org/10.1371/journal.pone.0178605.

[J49] Katherine J. Kuchenbecker, Robert Parajon, and Margrit P. Maggio. Evaluation of a vibrotactile simulator for dental caries detection. *Simulation in Healthcare*, 12(3):148–156, June 2017. doi:10.1097/SIH.0000000000000201.

[J50] Heather Culbertson and Katherine J. Kuchenbecker. Importance of matching physical friction, hardness, and texture in creating realistic haptic virtual surfaces. *IEEE Transactions on Haptics*, 10(1):63–74, January 2017. doi:10.1109/TOH.2016.2598751.

[J51] Rebecca P. Khurshid, Naomi T. Fitter, Elizabeth A. Fedalei, and Katherine J. Kuchenbecker. Effects of grip-force, contact, and acceleration feedback on a teleoperated pick-and-place task. *IEEE Transactions on Haptics*, 10(1):40–53, January 2017. doi:10.1109/TOH.2016.2573301.

[J52] Ernest D. Gomez, Rajesh Aggarwal, William McMahan, Karlin Bark, and Katherine J. Kuchenbecker. Objective assessment of robotic surgical skill using instrument contact vibrations. *Surgical Endoscopy*, 30(4):1419–1431, 2016.

[J53] Claudio Pacchierotti, Domenico Prattichizzo, and Katherine J. Kuchenbecker. Cutaneous feedback of fingertip deformation and vibration for palpation in robotic surgery. *IEEE Transactions on Biomedical Engineering*, 63(2):278–287, February 2016.

[J54] Claudio Pacchierotti, Domenico Prattichizzo, and Katherine J. Kuchenbecker. Displaying sensed tactile cues with a fingertip haptic device. *IEEE Transactions on Haptics*, 8(4):384–396, October 2015.

[J55] Jacqueline K. Koehn and Katherine J. Kuchenbecker. Surgeons and non-surgeons prefer haptic feedback of instrument vibrations during robotic surgery. *Surgical Endoscopy*, 29(10):2970–2983, October 2015.

[J56] Rebecca P. Khurshid and Katherine J. Kuchenbecker. Data-driven motion mappings improve transparency in teleoperation. *Presence: Teleoperators and Virtual Environments*, 24(2):132–154, May 2015.

[J57] Karlin Bark, Emily Hyman, Frank Tan, Elizabeth Cha, Steven A. Jax, Laurel J. Buxbaum, and Katherine J. Kuchenbecker. Effects of vibrotactile feedback on human motor learning of arbitrary arm motions. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 23(1):51–63, January 2015.

[J58] Vivian Chu, Ian McMahon, Lorenzo Riano, Craig G. McDonald, Qin He, Jorge Martinez Perez-Tejada, Michael Arrigo, Trevor Darrell, and Katherine J. Kuchenbecker. Robotic learning of haptic adjectives through physical interaction. *Robotics and Autonomous Systems*, 63(3):279–292, 2015. Vivian Chu, Ian MacMahon, and Lorenzo Riano contributed equally to this publication. Corrigendum published in June 2016.

[J59] Yosuke Kurihara, Seiya Takei, Yuriko Nakai, Taku Hachisu, Katherine J. Kuchenbecker, and Hiroyuki Kajimoto. Haptic robotization of human body via data-driven vibrotactile feedback. *Entertainment Computing*, 5(4):485–494, December 2014.

[J60] Heather Culbertson, Juliette Unwin, and Katherine J. Kuchenbecker. Modeling and rendering realistic textures from unconstrained tool-surface interactions. *IEEE Transactions on Haptics*, 7(3):381–292, July 2014.

[J61] William McMahan, Ernest D. Gomez, Liting Chen, Karlin Bark, John C. Nappo, Eza I. Koch, David I. Lee, Kristoffel Dumon, Noel Williams, and Katherine J. Kuchenbecker. A practical system for recording instrument interactions during live robotic surgery. *Journal of Robotic Surgery*, 7(4):351–358, 2013.

[J62] Seungmoon Choi and Katherine J. Kuchenbecker. Vibrotactile display: Perception, technology, and applications. *Proceedings of the IEEE*, 101(9):2093–2104, September 2013.

[J63] Joseph M. Romano, Jordan P. Brindza, and Katherine J. Kuchenbecker. ROS open-source audio recognizer: ROAR environmental sound detection tools for robot programming. *Autonomous Robots*, 34(3):207–215, April 2013.

[J64] Karlin Bark, William McMahan, Austin Remington, Jamie Gewirtz, Alexei Wedmid, David I. Lee, and Katherine J. Kuchenbecker. In vivo validation of a system for haptic feedback of tool vibrations in robotic surgery. *Surgical Endoscopy*, 27(2):656–664, February 2013. dynamic article (paper plus video), available at http://www.springerlink.com/content/417j532708417342/.

[J65] Netta Gurari, Katherine J. Kuchenbecker, and Allison M. Okamura. Perception of springs with visual and proprioceptive motion cues: Implications for prosthetics. *IEEE Transactions on Human-Machine Systems*, 43:102–114, January 2013. Video.

[J66] Andrew A. Stanley and Katherine J. Kuchenbecker. Evaluation of tactile feedback methods for wrist rotation guidance. *IEEE Transactions on Haptics*, 5(3):240–251, July 2012.

[J67] Joseph M. Romano and Katherine J. Kuchenbecker. Creating realistic virtual textures from contact acceleration data. *IEEE Transactions on Haptics*, 5(2):109–119, April 2012. Cover article.

[J68] Joseph M. Romano, Kaijen Hsiao, Günter Niemeyer, Sachin Chitta, and Katherine J. Kuchenbecker. Human-inspired robotic grasp control with tactile sensing. *IEEE Transactions on Robotics*, 27(6):1067–1079, 2011.

[J69] William McMahan, Jamie Gewirtz, Dorsey Standish, Paul Martin, Jacquelyn Kunkel, Magalie Lilavois, Alexei Wedmid, David I. Lee, and Katherine J. Kuchenbecker. Tool contact acceleration feedback for telerobotic surgery. *IEEE Transactions on Haptics*, 4(3):210–220, July 2011.

[J70] Amy Blank, Allison M. Okamura, and Katherine J. Kuchenbecker. Identifying the role of proprioception in upper-limb prosthesis control: Studies on targeted motion. *ACM Transactions on Applied Perception*, 7(3):1–23, June 2010.

[J71] Stephen Kim, Geoffrey Spencer, George Makar, Nuzhat Ahmad, David Jaffe, Gregory Ginsberg, Katherine J. Kuchenbecker, and Michael Kochman. Lack of discriminatory function for endoscopy skills on a computer-based simulator. *Surgical Endoscopy*, 24(12):3008–3015, December 2010.

[J72] Katherine J. Kuchenbecker and Günter Niemeyer. Induced master motion in force-reflecting teleoperation. *ASME Journal of Dynamic Systems, Measurement, and Control*, 128(4):800–810, December 2006.

[J73] Katherine J. Kuchenbecker, Jonathan P. Fiene, and Günter Niemeyer. Improving contact realism through event-based haptic feedback. *IEEE Transactions on Visualization and Computer Graphics*, 12(2):219–230, March 2006.

[J74] William R. Provancher, Mark R. Cutkosky, Katherine J. Kuchenbecker, and Günter Niemeyer. Contact location display for haptic perception of curvature and object motion. *International Journal of Robotics Research*, 24(9):691–702, September 2005.

Book Chapters/Collections

[B1] Katherine J. Kuchenbecker. Haptics and haptic interfaces. In *Encyclopedia of Robotics*. Springer, May 2018. doi:10.1007/978-3-642-41610-1_19-1.

[B2] Allison M. Okamura, Katherine J. Kuchenbecker, and Mohsen Mahvash. Measurement-based modeling for haptic rendering. In *Haptic Rendering: Algorithms and Applications*, chapter 21, pages 443–467. A. K. Peters, May 2008.

Peer-Reviewed Conference Papers

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[C88] William R. Provancher, Katherine J. Kuchenbecker, Günter Niemeyer, and Mark R. Cutkosky. Perception of curvature and object motion via contact location feedback. In *Proceedings of the International Symposium on Robotics Research (ISRR)*, volume 15 of *Springer Tracts in Advanced Robotics*, pages 456–465, Siena, Italy, 2005. Springer. Oral presentation given by Provancher in October of 2003.

Short Peer-Reviewed Conference Papers and Abstracts

[S1] Mayumi Mohan, Haliza Mat Husin, and Katherine J. Kuchenbecker. Expert perception of teleoperated social exercise robots. In *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, pages 1–5, Boulder, USA, March 2024. Late-Breaking Report (LBR) (5 pages) presented at HRI. doi:10.1145/3610978.3640620.

[S2] Andrew Schulz, Gokhan Serhat, and Katherine J. Kuchenbecker. Adapting a high-fidelity simulation of human skin for comparative touch sensing in the elephant trunk. Abstract presented at the Society for Integrative and Comparative BIology Annual Meeting (SICB), January 2024.

[S3] Andrew Schulz, Lena Kaufmann, Michael Brecht, Gunther Richter, and Katherine J. Kuchenbecker. Whiskers that don't whisk: Unique structure from the absence of actuation in elephant whiskers. Abstract presented at the Society for Integrative and Comparative BIology Annual Meeting (SICB), January 2024.

[S4] Guillem Garrofé, Christian Schoeffmann, Hubert Zangl, Katherine J. Kuchenbecker, and Hyosang Lee. NearContact: Accurate human detection using tomographic proximity and contact sensing with cross-modal attention. Extended abstract (4 pages) presented at the International Workshop on Human-Friendly Robotics (HFR), September 2023.

[S5] Behnam Khojasteh, Yitian Shao, and Katherine J. Kuchenbecker. Seeking causal, invariant, structures with kernel mean embeddings in haptic-auditory data from tool-surface interaction. Workshop paper (4 pages) presented at the IROS Workshop on Causality for Robotics: Answering the Question of Why, October 2023.

[S6] Nataliya Rokhmanova, Owen Pearl, Katherine J. Kuchenbecker, and Eni Halilaj. The role of kinematics estimation accuracy in learning with wearable haptics. Abstract presented at the American Society of Biomechanics (ASB), August 2023.

[S7] Giulia Ballardini and Katherine J. Kuchenbecker. Toward a device for reliable evaluation of vibrotactile perception. Work-in-progress paper (1 page) presented at the IEEE World Haptics Conference (WHC), July 2023.

[S8] Farimah Fazlollahi, Zahra Taghizadeh, , and Katherine J. Kuchenbecker. Improving haptic rendering quality by measuring and compensating for undesired forces. Work-in-progress paper (1 page) presented at the IEEE World Haptics Conference (WHC), July 2023.

[S9] Ravali Gourishetti, Bernard Javot, and Katherine J. Kuchenbecker. Can recording expert demonstrations with tool vibrations facilitate teaching of manual skills? Work-in-progress paper (1 page) presented at the IEEE World Haptics Conference (WHC), July 2023.

[S10] David Gueorguiev, Baptiste Rohou-Claquin, and Katherine J. Kuchenbecker. The influence of amplitude and sharpness on the perceived intensity of isoenergetic ultrasonic signals. Work-in-progress paper (1 page) presented at the IEEE World Haptics Conference (WHC), July 2023.

[S11] Behnam Khojasteh, Yitian Shao, and Katherine J. Kuchenbecker. Capturing rich auditory-haptic contact data for surface recognition. Work-in-progress paper (1 page) presented at the IEEE World Haptics Conference (WHC), July 2023.

[S12] Nataliya Rokhmanova, Robert Faulkner, Julian Martus, Jonathan Fiene, and Katherine J. Kuchenbecker. Strap tightness and tissue composition both affect the vibration created by a wearable device. Work-in-progress paper (1 page) presented at the IEEE World Haptics Conference (WHC), July 2023.

[S13] Guido Caccianiga, Julian Nubert, Marco Hutter, and Katherine J. Kuchenbecker. 3D reconstruction for minimally invasive surgery: Lidar versus learning-based stereo matching. Workshop paper (2 pages) presented at the ICRA Workshop on Robot-Assisted Medical Imaging, May 2023.

[S14] Yijie Gong, Bernard Javot, Anja P. R. Lauer, Oliver Sawodny, and Katherine J. Kuchenbecker. Naturalistic vibrotactile feedback could facilitate telerobotic assembly on construction sites. Poster presented at the ICRA Workshop on Future of Construction: Robot Perception, Mapping, Navigation, Control in Unstructured and Cluttered Environments, May 2023.

[S15] Yijie Gong, Naomi Tashiro, Bernard Javot, Anja P. R. Lauer, Oliver Sawodny, and Katherine J. Kuchenbecker. AiroTouch: Naturalistic vibrotactile feedback for telerobotic construction-related tasks. Extended abstract (1 page) presented at the ICRA Workshop on Communicating Robot Learning across Human-Robot Interaction, May 2023.

[S16] Behnam Khojasteh, Yitian Shao, and Katherine J. Kuchenbecker. Surface perception through haptic-auditory contact data. Workshop paper (4 pages) presented at the ICRA Workshop on Embracing Contacts, May 2023. URL: `https://openreview.net/forum?id=aNFtngbn6A`.

[S17] Mayumi Mohan and Katherine J. Kuchenbecker. OCRA: An optimization-based customizable retargeting algorithm for teleoperation. Workshop paper (3 pages) presented at the ICRA Workshop Toward Robot Avatars, May 2023. URL: `https://www.ais.uni-bonn.de/ICRA2023AvatarWS/contributions/ICRA_2023_Avatar_WS_Mohan.pdf`.

[S18] Rachael Bevill Burns and Katherine J. Kuchenbecker. A lasting impact: Using second-order dynamics to customize the continuous emotional expression of a social robot. Workshop paper (5 pages) presented at the HRI Workshop on Lifelong Learning and Personalization in Long-Term Human-Robot Interaction (LEAP-HRI), March 2023. URL: `https://leap-hri.github.io/2023/papers/LEAP-HRI_2023_paper_6433.pdf`.

[S19] Benjamin A. Richardson, Katherine J. Kuchenbecker, and Georg Martius. A sequential group VAE for robot learning of haptic representations. Workshop paper (8 pages) presented at the CoRL Workshop on Aligning Robot Representations with Humans, December 2022. URL: `https://aligning-robot-human-representations.github.io/docs/camready_11.pdf`.

[S20] Rachael L'Orsa, Madeleine de Lotbiniere-Bassett, Kourosh Zareinia, Sanju Lama, David Westwick, Garnette Sutherland, and Katherine J. Kuchenbecker. Semi-automated robotic pleural cavity access in space. Poster presented at the Canadian Space Health Research Symposium (CSHRS), November 2022.

[S21] Rachael Bevill Burns, Ruby Rosenthal, Keshav Garg, and Katherine J. Kuchenbecker. Do-it-yourself whole-body social-touch perception for a NAO robot. Workshop paper (1 page) presented at the IROS Workshop on Large-Scale Robotic Skin: Perception, Interaction and Control, October 2022. URL: `https://sites.google.com/view/iros2022ws-lsrobskin/list-of-contributors?authuser=0`.

[S22] Iris Andrussow, Huanbo Sun, Katherine J. Kuchenbecker, and Georg Martius. A soft vision-based tactile sensor for robotic fingertip manipulation. Workshop paper (1 page) presented at the IROS Workshop on Large-Scale Robotic Skin: Perception, Interaction and Control, October 2022. URL: `https://sites.google.com/view/iros2022ws-lsrobskin/list-of-contributors?authuser=0`.

[S23] Nataliya Rokhmanova, Katherine J. Kuchenbecker, Peter B. Shull, Reed Ferber, and Eni Halilaj. Predicting knee adduction moment response to gait retraining. Extended abstract presented at North American Congress of Biomechanics (NACOB), August 2022.

[S24] Rachael L'Orsa, Kourosh Zareinia, David Westwick, Garnette Sutherland, and Katherine J. Kuchenbecker. A sensorized needle-insertion device for characterizing percutaneous thoracic tool-tissue interactions. Short paper (2 pages) presented at the Hamlyn Symposium on Medical Robotics (HSMR), June 2022.

[S25] Guido Caccianiga and Katherine J. Kuchenbecker. Dense 3d reconstruction through lidar: A new perspective on computer-integrated surgery. Short paper (2 pages) presented at the Hamlyn Symposium on Medical Robotics (HSMR), June 2022.

[S26] Saekwang Nam, David Gueorguiev, and Katherine J. Kuchenbecker. Finger contact during pressing and sliding on a glass plate. Poster presented at the EuroHaptics Workshop on Skin Mechanics and its Role in Manipulation and Perception, May 2022.

[S27] Farimah Fazlollahi, Hasti Seifi, Karon MacLean, and Katherine J. Kuchenbecker. How do expert hapticians evaluate grounded force-feedback devices? Work-in-progress paper (1 page) presented at the IEEE World Haptics Conference (WHC), July 2021. doi:10.1109/WHC49131.2021.9517240.

[S28] Rachael Bevill Burns, Hasti Seifi, Hyosang Lee, and Katherine J. Kuchenbecker. A haptic empathetic robot animal for children with autism. Workshop paper (3 pages) presented at the HRI Pioneers Workshop, March 2021. doi:10.1145/3434074.3446352.

[S29] Alexis E. Block, Shari Young Kuchenbecker, Olivier Lambercy, Roger Gassert, and Katherine J. Kuchenbecker. Love, actually? robot hugs, oxytocin, and cortisol. Workshop paper (5 pages) presented at the HRI Workshop on Workshop YOUR study design! Participatory critique and refinement of participants' studies, March 2021.

[S30] Rachael Bevill Burns, Hasti Seifi, and Katherine J. Kuchenbecker. Evaluation of a touch-perceiving, responsive robot koala for children with autism. Workshop paper (4 pages) presented at the HRI Workshop on Workshop YOUR study design! Participatory critique and refinement of participants' studies, March 2021.

[S31] Mayumi Mohan, Haliza Mat Husin, and Katherine J. Kuchenbecker. Evaluation of a teleoperated robotic exercise coach. Workshop paper (4 pages) presented at the HRI Workshop on Workshop YOUR study design! Participatory critique and refinement of participants' studies, March 2021.

[S32] Eric Cao, Sergio Machaca, Timothy Bernard, Amy Chi, Brett Wolfinger, Zachary Patterson, Gina L. Adrales, and Katherine J. Kuchenbecker. Bimanual wrist-squeezing haptic feedback changes speed-force tradeoff in robotic surgery training. Short paper presented at the ACS Surgeons and Engineers: A Dialogue on Surgical Simulation meeting, March 2021.

[S33] Rachael Bevill Burns, Hasti Seifi, Hyosang Lee, and Katherine J. Kuchenbecker. Utilizing interviews and thematic analysis to uncover specifications for a companion robot. Workshop paper (2 pages) presented at the ICSR Workshop on Enriching HRI Research with Qualitative Methods, November 2020. URL: https://www.youtube.com/watch?v=CtlOtb55Uas.

[S34] Hojin Lee, Güney Işık Tombak, Gunhyuk Park, and Katherine J. Kuchenbecker. Characterization of a magnetic levitation haptic interface for realistic tool-based interactions. Work-in-progress poster presented at EuroHaptics, September 2020. URL: http://eurohaptics2020.org/program/posters-demos-1/.

[S35] Maria-Paola Forte, Eric M. Young, and Katherine J. Kuchenbecker. Estimating human handshape by feeling the wrist. Work-in-progress poster presented at EuroHaptics, September 2020.

[S36] Saekwang Nam and Katherine J. Kuchenbecker. Sweat softens the outermost layer of the human finger pad: Evidence from simulations and experiments. Work-in-progress poster presented at EuroHaptics, September 2020. Best Poster Award.

[S37] Gokhan Serhat and Katherine J. Kuchenbecker. Intermediate ridges amplify mechanoreceptor strains in static and dynamic touch. Work-in-progress poster presented at EuroHaptics, September 2020.

[S38] Neha Thomas and Katherine J. Kuchenbecker. Seeing through touch: Contact-location sensing and tactile feedback for prosthetic hands. Work-in-progress poster presented at EuroHaptics, September 2020.

[S39] Behnam Khojasteh and Katherine J. Kuchenbecker. A framework for analyzing both finger-surface and tool-surface interactions. Work-in-progress poster presented at EuroHaptics, September 2020.

[S40] Ravali Gourishetti, Gokhan Serhat, and Katherine J. Kuchenbecker. Optimal sensor placement for recording the contact vibrations of a medical tool. Work-in-progress poster presented at EuroHaptics, September 2020.

[S41] Cara M. Nunez, Yasemin Vardar, and Katherine J. Kuchenbecker. Insights into human perception of asymmetric vibrations via dynamic modeling. Work-in-progress poster presented at Eurohaptics, September 2020.

[S42] Farimah Fazlollahi and Katherine J. Kuchenbecker. Haptify: A comprehensive benchmarking system for grounded force-feedback haptic devices. Work-in-progress poster presented at EuroHaptics, September 2020.

[S43] Mayumi Mohan, Cara M. Nunez, and Katherine J. Kuchenbecker. How does real-time feedback affect communicative actions in social-physical human-robot interaction? Workshop paper (2 pages) presented at the ROMAN Workshop on Quality of Interaction in Socially Assistive Robots (QISAR), August 2020.

[S44] Young-Eun Lee, Haliza Mat Husin, Maria-Paola Forte, Seong-Whan Lee, and Katherine J. Kuchenbecker. Vision-based force estimation for a da vinci instrument using deep neural networks. Extended abstract presented as an Emerging Technology ePoster at the Annual Meeting of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), August 2020.

[S45] Ernest D. Gomez, Haliza Mat Husin, Kristoffel R. Dumon, Noel N. Williams, and Katherine J. Kuchenbecker. Sleep, stress, and experience supersede vibrotactile haptic feedback as contributors to workload during robotic surgical skill acquisition. Extended abstract presented as an ePoster at the Annual Meeting of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), August 2020.

[S46] Nataliya Rokhmanova, Peter B. Shull, Katherine J. Kuchenbecker, and Eni Halilaj. Subject-specific biofeedback for gait retraining outside of the lab. Extended abstract (1 page) presented at the Dynamic Walking Conference, May 2020. URL: `https://www.seas.upenn.edu/~posa/DynamicWalking2020/603-877-1-RV.pdf`.

[S47] Gokhan Serhat and Katherine J. Kuchenbecker. Intermediate ridges amplify mechanoreceptor strains in static and dynamic touch. Work-in-progress paper (2 pages) presented at the IEEE Haptics Symposium, March 2020.

[S48] Rachael Bevill Burns, Hyosang Lee, Hasti Seifi, and Katherine J. Kuchenbecker. A fabric-based sensing system for recognizing social touch. Work-in-progress paper (3 pages) presented at the IEEE Haptics Symposium, March 2020.

[S49] Maria-Paola Forte and Katherine J. Kuchenbecker. Interactive augmented reality for robot-assisted surgery. Workshop extended abstract presented as a podium presentation at the IROS Workshop on Legacy Disruptors in Applied Telerobotics, November 2019.

[S50] Alexis E. Block and Katherine J. Kuchenbecker. Huggiechest: An inflatable haptic sensing chest for a hugging robot. Workshop paper (4 pages) presented at the IROS RoboTac Workshop on New Advances in Tactile Sensation, Perception, and Learning in Robotics: Emerging Materials and Technologies for Manipulation, November 2019.

[S51] Hyosang Lee, Kyungseo Park, Jung Kim, and Katherine J. Kuchenbecker. A fabric-based scalable robotic skin mimicking biological tactile hyperacuity. Workshop paper (3 pages) presented at the IROS RoboTac Workshop on New Advances in Tactile Sensation, Perception, and Learning in Robotics: Emerging Materials and Technologies for Manipulation, November 2019. Co-Winner of the Award for Best Poster.

[S52] Gokhan Serhat and Katherine J. Kuchenbecker. High-fidelity multiphysics finite element modeling of finger-surface interactions with tactile feedback. Work-in-progress paper (2 pages) presented at the IEEE World Haptics Conference (WHC), July 2019.

[S53] David Gueorguiev, Julien Lambert, Jean-Louis Thonnard, and Katherine J. Kuchenbecker. Fingertip friction enhances perception of normal force changes. Work-in-progress paper (2 pages) presented at the IEEE World Haptics Conference (WHC), July 2019.

[S54] Alexis E. Block and Katherine J. Kuchenbecker. Inflatable haptic sensor for the torso of a hugging robot. Work-in-progress paper (2 pages) presented at the IEEE World Haptics Conference (WHC), July 2019.

[S55] Saekwang Nam and Katherine J. Kuchenbecker. Understanding the pull-off force of the human fingerpad. Work-in-progress paper (2 pages) presented at the IEEE World Haptics Conference (WHC), July 2019.

[S56] Adam Spiers and Katherine J. Kuchenbecker. Explorations of shape-changing haptic interfaces for blind and sighted pedestrian navigation. Workshop paper (6 pages) presented at the CHI Workshop on Hacking Blind Navigation, May 2019.

[S57] Hasti Seifi, Jessica Ip, Ashutosh Agrawal, Katherine J. Kuchenbecker, and Karon E. MacLean. Toward expert-sourcing of a haptic device repository. Workshop paper (5 pages) published at the CHI Workshop on Designing Crowd-powered Creativity Support Systems, May 2019. URL: https://dc2s2.github.io/2019/papers/dc2s2-seifi.pdf.

[S58] Eric Cao, Sergio Machaca, Timothy Bernard, Brett Wolfinger, Zachary Patterson, Amy Chi, Gina L. Adrales, Katherine J. Kuchenbecker, and Jeremy D. Brown. Bimanual wrist-squeezing haptic feedback changes speed-force tradeoff in robotic surgery training. Extended abstract presented as an ePoster at the Annual Meeting of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), April 2019.

[S59] Maria-Paola Forte and Katherine J. Kuchenbecker. Interactive augmented reality for robot-assisted surgery. Extended abstract presented as an Emerging Technology ePoster at the Annual Meeting of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), April 2019.

[S60] Mayumi Mohan and Katherine J. Kuchenbecker. A design tool for therapeutic social-physical human-robot interactions. Workshop paper (3 pages) presented at the HRI Pioneers Workshop, March 2019.

[S61] David Gueorguiev, Dimitrios Tzionas, Claudio Pacchierotti, Michael J. Black, and Katherine J. Kuchenbecker. Statistical modelling of fingertip deformations and contact forces during tactile interaction. Extended abstract presented at the Hand, Brain and Technology conference (HBT), August 2018.

[S62] Rachael Burns and Katherine J. Kuchenbecker. Designing a haptic empathetic robot animal for children with autism. Workshop paper (4 pages) presented at the Robotics: Science and Systems Workshop on Robot-Mediated Autism Intervention: Hardware, Software and Curriculum, June 2018. URL: https://www.researchgate.net/publication/327843951_Designing_a_Haptic_Empathetic_Robot_Animal_for_Children_with_Autism.

[S63] Hyosang Lee, Jung Kim, and Katherine J. Kuchenbecker. Soft multi-axis boundary-electrode tactile sensors for whole-body robotic skin. Workshop paper (2 pages) presented at the RSS Pioneers Workshop, June 2018.

[S64] Eric Young and Katherine J. Kuchenbecker. Delivering 6-DOF fingertip tactile cues. Work-in-progress paper (5 pages) presented at EuroHaptics, June 2018.

[S65] Alex Burka and Katherine J. Kuchenbecker. Can humans infer haptic surface properties from images? Work-in-progress paper (3 pages) presented at the IEEE Haptics Symposium, March 2018.

[S66] David Gueorguiev, Dimitrios Tzionas, Claudio Pacchierotti, Michael J. Black, and Katherine J. Kuchenbecker. Towards a statistical model of fingertip contact deformations from 4D data. Work-in-progress paper (3 pages) presented at the IEEE Haptics Symposium, March 2018. URL: https://2018proc.hapticssymposium.org/hapticscomp18/hapticscomp18wip-p1022-p.pdf.

[S67] Hasti Seifi, Karon E. MacLean, Katherine J. Kuchenbecker, and Gunhyuk Park. Haptipedia: An expert-sourced interactive device visualization for haptic designers. Work-in-progress paper (3 pages) presented at the IEEE Haptics Symposium, March 2018.

[S68] Katherine J. Kuchenbecker. Arm-worn tactile displays. Cross-Cutting Challenge Interactive Discussion presented at the IEEE Haptics Symposium, March 2018.

[S69] Naomi T. Fitter, Mayumi Mohan, Katherine J. Kuchenbecker, and Michelle J. Johnson. Exercising with Baxter: Design and evaluation of assistive social-physical human-robot interaction. Workshop paper (6 pages) presented at the HRI Workshop on Personal Robots for Exercising and Coaching, March 2018. URL: https://aiweb.techfak.uni-bielefeld.de/hri2018_workshop_robot_coach/paper/PREC2018_paper_3.pdf.

[S70] Alexis E. Block and Katherine J. Kuchenbecker. Emotionally supporting humans through robot hugs. Workshop paper (2 pages) presented at the HRI Pioneers Workshop, March 2018. URL: `https://dl.acm.org/citation.cfm?doid=3173386.3176905`.

[S71] Alexis E. Block and Katherine J. Kuchenbecker. Physical and behavioral factors improve robot hug quality. Workshop Paper (2 pages) presented at the RO-MAN Workshop on Social Interaction and Multimodal Expression for Socially Intelligent Robots, August 2017.

[S72] Alexis E. Block and Katherine J. Kuchenbecker. How should robots hug? Work-in-progress paper (2 pages) presented at the IEEE World Haptics Conference (WHC), June 2017.

[S73] Siyao Hu and Katherine J. Kuchenbecker. Teaching a robot to collaborate with a human via haptic teleoperation. Work-in-progress paper (2 pages) presented at the IEEE World Haptics Conference (WHC), June 2017.

[S74] Jaimie Carlson and Katherine J. Kuchenbecker. An interactive augmented-reality video training platform for the da Vinci surgical system. Workshop paper (3 pages) presented at the ICRA Workshop on C4 Surgical Robots, May 2017.

[S75] Yousi A. Oquendo, Elijah W. Riddle, Dennis Hiller, Thane A. Blinman, and Katherine J. Kuchenbecker. Automatic OSATS rating of trainee skill at a pediatric laparoscopic suturing task. Extended abstract presented as a podium presentation at the Annual Meeting of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), March 2017.

[S76] Naomi T. Fitter, Dylan T. Hawkes, Michelle J. Johnson, and Katherine J. Kuchenbecker. Designing human-robot exercise games for Baxter, 2016. Late-breaking results report presented at the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

[S77] Naomi T. Fitter, Yi-Lin E. Huang, Jamie P. Mayer, and Katherine J. Kuchenbecker. IMU-mediated real-time human-Baxter hand-clapping interaction, 2016. Late-breaking results report presented at the *IEEE/RSJ International Conference on Intelligent Robots and Systems.*

[S78] Krista Fjeld, Siyao Hu, Katherine J. Kuchenbecker, and Erin V. Vasudevan. Design and evaluation of a novel mechanical device to improve hemiparetic gait: a case report. Extended abstract presented at the Biomechanics and Neural Control of Movement Conference (BANCOM), 2016. Poster presentation given by Fjeld.

[S79] Alex Burka, Siyao Hu, Stuart Helgeson, Shweta Krishnan, Yang Gao, Lisa Anne Hendricks, Trevor Darrell, and Katherine J. Kuchenbecker. Design and implementation of a visuo-haptic data acquisition system for robotic learning of surface properties. In *Proceedings of the IEEE Haptics Symposium*, pages 350–352, April 2016. Work-in-progress paper. Poster presentation given by Burka.

[S80] Naomi T. Fitter and Katherine J. Kuchenbecker. Using IMU data to teach a robot hand-clapping games. In *Proc. IEEE Haptics Symposium*, pages 353–355, April 2015. Work-in-progress paper. Poster presentation given by Fitter.

[S81] Alex Burka, Siyao Hu, Shweta Krishnan, Katherine J. Kuchenbecker, Lisa Anne Hendricks, Yang Gao, and Trevor Darrell. Toward a large-scale visuo-haptic dataset for robotic learning. In *Proc. CVPR Workshop on the Future of Datasets in Vision*, 2015.

[S82] Jeremy D. Brown, Conor O'Brien, Kiyoyuki Miyasaka, Kristoffel R. Dumon, and Katherine J. Kuchenbecker. Analysis of the instrument vibrations and contact forces caused by an expert robotic surgeon doing FRS tasks. In *Proc. Hamlyn Symposium on Medical Robotics*, pages 75–76, London, England, June 2015. Poster presentation given by Brown.

[S83] Naomi T. Fitter, Michelle Neuburger, and Katherine J. Kuchenbecker. Enabling the Baxter robot to play hand-clapping games. In *Proc. IEEE World Haptics Conference*, June 2015. Work-in-progress paper. Poster presentation given by Fitter.

[S84] Jennifer Hui, Alexis Block, and Katherine J. Kuchenbecker. Detecting lumps in simulated tissue via palpation with a BioTac. In *Proc. IEEE World Haptics Conference*, 2015. Work-in-progress paper. Poster presentation given by Hui.

[S85] Andrés M. Bur, Ernest D. Gomez, Christopher H. Rassekh, Jason G. Newman, Gregory S. Weinstein, and Katherine J. Kuchenbecker. Haptic feedback in transoral robotic surgery: A feasibility study. In *Proc. Annual Meeting of the Triological Society at COSM*, April 2015. Poster presentation given by Bur.

[S86] Andrés M. Bur, Ernest D. Gomez, Ara A. Chalian, Jason G. Newman, Gregory S. Weinstein, and Katherine J. Kuchenbecker. Design and validation of a practical simulator for transoral robotic surgery. In *Proc. Society for Robotic Surgery Annual Meeting: Transoral Program*, number T8, February 2015. Oral presentation given by Bur.

[S87] Sarah Leung and Katherine J. Kuchenbecker. Automatic skill evaluation for a needle passing task in robotic surgery. In *Proc. IROS Workshop on the Role of Human Sensorimotor Control in Robotic Surgery*, Chicago, Illinois, September 2014. Poster presentation given by Kuchenbecker. Best Poster Award.

[S88] Claudio Pacchierotti, Priyanka Shirsat, Jacqueline K. Koehn, Domenico Prattichizzo, and Katherine J. Kuchenbecker. Cutaneous feedback of planar fingertip deformation and vibration on a da Vinci surgical robot. In *Proc. IROS Workshop on the Role of Human Sensorimotor Control in Robotic Surgery*, Chicago, Illinois, 2014. Poster presentation given by Koehn.

[S89] Denise Wong, Philip Dames, and Katherine J. Kuchenbecker. Teaching forward and inverse kinematics of robotic manipulators via MATLAB. Extended abstract presented at *ICRA Workshop on MATLAB/Simulink for Robotics Education and Research*. Oral presentation given by Dames and Wong, June 2014.

[S90] Naomi T. Fitter and Katherine J. Kuchenbecker. Analyzing human high-fives to create an effective high-fiving robot. In *Proc. ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, pages 156–157, Bielefeld, Germany, March 2014. Poster presentation given by Fitter.

[S91] Ernest D. Gomez, Gregory S. Weinstein, Bert W. O'Malley, Jr., William McMahan, Liting Chen, and Katherine J. Kuchenbecker. A practical system for recording instrument contacts and collisions during transoral robotic surgery. In *Proc. Annual Meeting of the Triological Society*, Orlando, Florida, USA, April 2013. Poster presentation given by Gomez.

[S92] Ernest D. Gomez, Rajesh Aggarwal, William McMahan, Eza Koch, Daniel A. Hashimoto, Ara Darzi, Kenric M. Murayama, Kristoffel R. Dumon, Noel N. Williams, and Katherine J. Kuchenbecker. Instrument contact vibrations are a construct-valid measure of technical skill in Fundamentals of Laparoscopic Surgery training tasks. In *Proc. Annual Meeting of the Association for Surgical Education*, Orlando, Florida, USA, 2013. Oral presentation given by Gomez.

[S93] William McMahan, Ernest D. Gomez, Liting Chen, Karlin Bark, John C. Nappo, Eza I. Koch, David I. Lee, Kristoffel Dumon, Noel Williams, and Katherine J. Kuchenbecker. A practical system for recording instrument interactions during live robotic surgery. In *Proc. Medicine Meets Virtual Reality*, 2013. Poster presentation given by McMahan.

[S94] Ian McMahon, Vivian Chu, Lorenzo Riano, Craig G. McDonald, Qin (Karen) He, Jorge Martinez Perez-Tejada, Michael Arrigo, Naomi Fitter, John Nappo, Trevor Darrell, and Katherine J. Kuchenbecker. Robotic learning of haptic adjectives through physical interaction. In *Proc. IROS Workshop on Advances in Tactile Sensing and Touch-based Human-robot Interaction*, Vilamoura, Algarve, Portugal, 2012. Oral presentation given by McMahon.

[S95] Ernest D. Gomez, Karlin Bark, Charlotte Rivera, William McMahan, Austin Remington, David I. Lee, Noel Williams, Kenric Murayama, Kristoffel Dumon, and Katherine J. Kuchenbecker. Construct validity of instrument vibrations as a measure of robotic surgical skill. *Journal of the American College of Surgeons*, 215(3):S119–120, 2012. Oral presentation given by Gomez at the *American College of Surgeons (ACS) Clinical Congress*.

[S96] Karlin Bark, Ernest D. Gomez, Charlotte Rivera, William McMahan, Austin Remington, Kenric Murayama, David I. Lee, Kristoffel Dumon, Noel Williams, and Katherine J. Kuchenbecker. Surgical instrument vibrations are a construct-valid measure of technical skill in robotic peg transfer and suturing tasks. In *Proc. Hamlyn Symposium on Medical Robotics*, pages 50–51, London, England, July 2012. Oral presentation given by Bark.

[S97] Margrit P. Maggio, Robert Parajon, and Katherine J. Kuchenbecker. VerroTeach: Visuo-audio-haptic training for dental caries detection. In *Proc. Annual American Dental Educator's Association (ADEA) Conference*, Orlando, Florida, 2012. Oral presentation given by Maggio.

[S98] Ernest D. Gomez, Karlin Bark, William McMahan, Charlotte Rivera, Austin Remington, David I. Lee, and Katherine J. Kuchenbecker. VerroTouch: Detection of instrument vibrations for haptic feedback and skill assessment in robotic surgery. In *Proc. Annual Meeting of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES)*, San Diego, California, USA, March 2012. Emerging Technology Poster presentation given by Gomez. Poster available at http://thesagesmeeting.org/.

[S99] William McMahan, Joseph M. Romano, and Katherine J. Kuchenbecker. Using accelerometers to localize tactile contact events on a robot arm. In *Proc. Workshop on Advances in Tactile Sensing and Touch-Based Human-Robot Interaction, ACM/IEEE International Conference on Human-Robot Interaction*, Boston, Massachusetts, March 2012. Oral presentation given by McMahan.

[S100] William McMahan, Karlin Bark, Jamie Gewirtz, Dorsey Standish, Paul D. Martin, Jacquelyn A. Kunkel, Magalie Lilavois, Alexei Wedmid, David I. Lee, and Katherine J. Kuchenbecker. Tool vibration feedback may help expert robotic surgeons apply less force during manipulation tasks. In *Proc. Hamlyn Symposium on Medical Robotics*, pages 37–38, London, England, June 2011. Oral Presentation given by Kuchenbecker.

[S101] William McMahan, Jamie Gewirtz, Dorsey Standish, Paul Martin, Jacquelyn Kunkel, Magalie Lilavois, Alexei Wedmid, David I. Lee, and Katherine J. Kuchenbecker. VerroTouch: Vibrotactile feedback for robotic minimally invasive surgery. *Journal of Urology*, 185(4, Supplement):e373, May 2011. Poster presentation given by McMahan at the Annual Meeting of the American Urological Association in Washington, D.C., USA.

[S102] Katherine J. Kuchenbecker, Jamie Gewirtz, William McMahan, Dorsey Standish, Jonathan Bohren, Paul Martin, Alexei Wedmid, Pierre J. Mendoza, and David I. Lee. VerroTouch: A vibrotactile feedback system for minimally invasive robotic surgery. In *Proc. 28th World Congress of Endourology*, 2010. PS8-14. Poster presentation given by Wedmid.

[S103] Joseph M. Romano, Alla Safonova, and Katherine J. Kuchenbecker. Real-time graphic and haptic simulation of deformable tissue puncture. In *Proc. Medicine Meets Virtual Reality*, Long Beach, California, USA, January 2009. Poster presentation given by Romano.

[S104] Meng Yang, Jingwan Lu, Zehua Zhou, Alla Safonova, and Katherine J. Kuchenbecker. A GPU-based approach for real-time haptic rendering of 3D fluids. In *Proc. SIGGRAPH Asia Conference*, Singapore, December 2008. Oral presentation given by Yang.

[S105] Amy Blank, Allison M. Okamura, and Katherine J. Kuchenbecker. Effects of proprioceptive motion feedback on sighted and unsighted control of a virtual hand prosthesis. In *Proc. IEEE Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems*, pages 141–142, Reno, Nevada, USA, March 2008. Poster presentation given by Blank.

[S106] Katherine J. Kuchenbecker. Haptography: Capturing the feel of real objects to enable authentic haptic rendering. In *Proc. Haptic in Ambient Systems (HAS) Workshop, in conjunction with the First International Conference on Ambient Media and Systems*, Montreal, Canada, February 2008.

[S107] Katherine J. Kuchenbecker, Netta Gurari, and Allison M. Okamura. Quantifying the value of visual and haptic position feedback in force-based motion control. In *Proc. IEEE World Haptics Conference*, pages 561–562, Tsukuba, Japan, March 2007. Poster presentation given by Kuchenbecker.

[S108] Günter Niemeyer, Katherine J. Kuchenbecker, Raymond Bonneau, Probal Mitra, Andrew Reid, Jonathan Fiene, and Grant Weldon. THUMP: An immersive haptic console for surgical simulation and training. In *Proc. Medicine Meets Virtual Reality*, pages 272–274, Newport Beach, California, USA, January 2004. Poster presentation given by Niemeyer. Best Poster Award.

Hands-On Demonstrations

[D1] Yijie Gong, Bernard Javot, Anja Patricia Regina Lauer, Oliver Sawodny, and Katherine J. Kuchenbecker. AiroTouch: Naturalistic vibrotactile feedback for telerobotic construction. Hands-on demonstration presented at the IEEE World Haptics Conference, July 2023.

[D2] Ravali Gourishetti, Autumn G. Hughes, Bernard Javot, and Katherine J. Kuchenbecker. Vibrotactile playback for teaching manual skills from expert recordings. Hands-on demonstration presented at the IEEE World Haptics Conference, July 2023.

[D3] Bernard Javot, Vu H. Nguyen, Giulia Ballardini, and Katherine J. Kuchenbecker. CAPT Motor: A strong direct-drive haptic interface. Hands-on demonstration presented at the IEEE World Haptics Conference, July 2023.

[D4] Farimah Fazlollahi and Katherine J. Kuchenbecker. Comparing two grounded force-feedback haptic devices. Hands-on demonstration presented at EuroHaptics, May 2022.

[D5] Alexis E. Block, Hasti Seifi, Sammy Christen, Bernard Javot, and Katherine J. Kuchenbecker. HuggieBot: A human-sized haptic interface. Hands-on demonstration presented at EuroHaptics, May 2022. Award for best hands-on demonstration.

[D6] Ravali Gourishetti and Katherine J. Kuchenbecker. Vibrotactile playback for teaching sensorimotor skills in medical procedures. Hands-on demonstration presented at the IEEE World Haptics Conference (WHC), July 2021.

[D7] Rachael Bevill Burns, Neha Thomas, Hyosang Lee, Robert Faulkner, and Katherine J. Kuchenbecker. Tactile textiles: An assortment of fabric-based tactile sensors for contact force and contact location. Hands-on demonstration presented at EuroHaptics, September 2020. Rachael Bevill Burns, Neha Thomas, and Hyosang Lee contributed equally to this publication.

[D8] Yasemin Vardar, Bernard Javot, and Katherine J. Kuchenbecker. Do touch gestures affect how electrovibration feels? Hands-on demonstration presented at EuroHaptics, September 2020.

[D9] Yasemin Vardar and Katherine J. Kuchenbecker. Do touch gestures affect how electrovibration feels? Hands-on demonstration (1 page) planned to be presented at the IEEE Haptics Symposium, but the demo could not take place due to the COVID-19 pandemic, March 2020.

[D10] Maria-Paola Forte, Rachael L'Orsa, Mayumi Mohan, Saekwang Nam, and Katherine J. Kuchenbecker. The Haptician and the Alphamonsters. Student Innovation Challenge on Implementing Haptics in Virtual Reality Environment presented at the IEEE World Haptics Conference, July 2019. Maria-Paola Forte, Rachael L'Orsa, Mayumi Mohan, and Saekwang Nam contributed equally to this publication.

[D11] Hyosang Lee, Kyungseo Park, Jung Kim, and Katherine J. Kuchenbecker. A large-scale fabric-based tactile sensor using electrical resistance tomography. Hands-on demonstration (3 pages) presented at AsiaHaptics, November 2018.

[D12] Gunhyuk Park and Katherine J. Kuchenbecker. Reducing 3D vibrations to 1D in real time. Hands-on demonstration (4 pages) presented at AsiaHaptics, November 2018.

[D13] Gunhyuk Park and Katherine J. Kuchenbecker. Reducing 3D vibrations to 1D in real time. Hands-on demonstration presented at EuroHaptics, June 2018.

[D14] Hasti Seifi, Farimah Fazlollahi, Gunhyuk Park, Katherine J. Kuchenbecker, and Karon E. MacLean. Haptipedia: Exploring haptic device design through interactive visualizations. Hands-on demonstration presented at EuroHaptics, June 2018.

[D15] Alex Burka and Katherine J. Kuchenbecker. Proton Pack: Visuo-haptic surface data recording. Hands-on demonstration presented at the IEEE World Haptics Conference (WHC), June 2017.

[D16] Naomi T. Fitter and Katherine J. Kuchenbecker. Physically interactive exercise games with a Baxter robot. Hands-on demonstration presented at the IEEE World Haptics Conference (WHC), June 2017.

[D17] Naomi T. Fitter and Katherine J. Kuchenbecker. Hand-clapping games with a Baxter robot. Hands-on demonstration presented at ACM/IEEE International Conference on Human-Robot Interaction (HRI), March 2017.

[D18] Jeremy D. Brown, Mary Ibrahim, Elyse D. Z. Chase, Claudio Pacchierotti, and Katherine J. Kuchenbecker. One sensor, three displays: A comparison of tactile rendering from a BioTac sensor. Hands-on demonstration presented at IEEE Haptics Symposium, Philadelphia, Pennsylvania, USA, April 2016.

[D19] Heather Culbertson and Katherine J. Kuchenbecker. Haptic textures for online shopping. Interactive demonstrations in The Retail Collective exhibit, presented at the Dx3 Conference in Toronto, Canada, March 2015.

[D20] Heather Culbertson, Juan José López Delgado, and Katherine J. Kuchenbecker. The Penn Haptic Texture Toolkit. Hands-on demonstration presented at IEEE Haptics Symposium, Houston, Texas, USA, February 2014.

[D21] Katherine J. Kuchenbecker, Alexandre Miranda Anon, Tyler Barkin, Kent deVillafranca, and Michael Lo. A modular tactile motion guidance system. Hands-on demonstration presented at IEEE Haptics Symposium, Houston, Texas, USA, February 2014.

[D22] Rebecca M. Pierce, Elizabeth A. Fedalei, and Katherine J. Kuchenbecker. Control of a virtual robot with fingertip contact, pressure, vibrotactile, and grip force feedback. Hands-on demonstration presented at IEEE Haptics Symposium, Houston, Texas, USA, February 2014.

[D23] Yosuke Kurihara, Taku Hachisu, Katherine J. Kuchenbecker, and Hiroyuki Kajimoto. Jointonation: Robotization of the human body by vibrotactile feedback. Emerging Technologies Demonstration with Talk at ACM SIGGRAPH Asia, November 2013. Hands-on demonstration given by Kurihara, Takei, and Nakai. Best Demonstration Award as voted by the Program Committee.

[D24] Katherine J. Kuchenbecker, Anna Brzezinski, Ernest D. Gomez, Michael Gosselin, Jennifer Hui, Eza Koch, Jackie Koehn, William McMahan, Kunal Mahajan, John Nappo, and Neel Shah. Adding haptics to robotic surgery. Learning Center Station at SAGES (Society of American Gastrointestinal and Endoscopic Surgeons) Annual Meeting, Baltimore, Maryland, USA, 2013.

[D25] Heather Culbertson, Craig G. McDonald, Benjamin E. Goodman, and Katherine J. Kuchenbecker. Data-driven modeling and rendering of isotropic textures. Hands-on demonstration presented at IEEE World Haptics Conference, Daejeon, South Korea, April 2013. Best Demonstration Award (by audience vote).

[D26] Karlin Bark, Elizabeth Cha, Frank Tan, Steven A. Jax, Laurel J. Buxbaum, and Katherine J. Kuchenbecker. StrokeSleeve: Real-time vibrotactile feedback for motion guidance. Hands-on demonstration presented at IEEE Haptics Symposium, Vancouver, Canada, March 2012.

[D27] Pablo Castillo, Joseph M. Romano, and Katherine J. Kuchenbecker. Simon game with data-driven visuo-audio-haptic buttons. Hands-on demonstration presented at IEEE Haptics Symposium, Vancouver, Canada, March 2012.

[D28] Pablo Castillo, Joseph M. Romano, Heather Culbertson, Max Mintz, and Katherine J. Kuchenbecker. Pen tablet drawing program with haptic textures. Hands-on demonstration presented at IEEE Haptics Symposium, Vancouver, Canada, March 2012.

[D29] Simon K. Healey, William McMahan, and Katherine J. Kuchenbecker. Haptic vibration feedback for a teleoperated ground vehicle. Hands-on demonstration presented at IEEE Haptics Symposium, Vancouver, Canada, March 2012.

[D30] Margrit P. Maggio, Robert Parajon, and Katherine J. Kuchenbecker. VerroTeach: Visuo-audio-haptic training for dental caries detection. Hands-on demonstration presented at IEEE Haptics Symposium, Vancouver, Canada, March 2012. Best Demonstration Award (three-way tie).

[D31] Andrew A. Stanley, Simon K. Healey, Matthew R. Maltese, and Katherine J. Kuchenbecker. A biofidelic CPR manikin with programmable pneumatic damping. Hands-on demonstration presented at IEEE Haptics Symposium, Vancouver, Canada, March 2012. Finalist for Best Hands-on Demonstration Award.

[D32] Diane Tam, Katherine J. Kuchenbecker, Karon MacLean, and Joanna McGrenere. Exploring presentation timing through haptic reminders. Hands-on demonstration presented at IEEE Haptics Symposium, Vancouver, Canada, March 2012.

[D33] Yunqing Wang, Eza Koch, and Katherine J. Kuchenbecker. HALO: Haptic alerts for low-hanging obstacles in white cane navigation. Hands-on demonstration presented at IEEE Haptics Symposium, Vancouver, Canada, March 2012. Finalist for Best Hands-on Demonstration Award.

[D34] Joseph M. Romano and Katherine J. Kuchenbecker. Please touch the robot. Hands-on demonstration presented at IEEE/RSJ Conference on Intelligent Robots and Systems (IROS), San Francisco, California, September 2011.

[D35] Andrew A. Stanley and Katherine J. Kuchenbecker. Body-grounded tactile actuators for playback of human physical contact. Hands-on demonstration presented at IEEE World Haptics Conference, Istanbul, Turkey, June 2011.

[D36] Joseph M. Romano, Nils Landin, William McMahan, and Katherine J. Kuchenbecker. TexturePad: Realistic rendering of haptic textures. Hands-on demonstration presented at EuroHaptics, Amsterdam, Netherlands, July 2010.

[D37] Katherine J. Kuchenbecker, Jamie Gewirtz, William McMahan, Dorsey Standish, Paul Martin, Jonathan Bohren, Pierre J. Mendoza, and David I. Lee. VerroTouch: High-frequency acceleration feedback for telerobotic surgery. Hands-on demonstration presented at EuroHaptics, Amsterdam, Netherlands, July 2010.

[D38] Joseph M. Romano and Katherine J. Kuchenbecker. Realistic haptic contacts and textures for tablet computing. Hands-on demonstration presented at the Stanford Medical Innovation Conference on Medical Robotics, Stanford, California, April 2010.

[D39] Dorsey Standish, Jamie Gewirtz, William McMahan, Paul Martin, and Katherine J. Kuchenbecker. High-frequency tactile feedback for the da Vinci surgical system. Hands-on demonstration presented at the Stanford Medical Innovation Conference on Medical Robotics, April 2010.

[D40] Zhihao Jiang, Mohit Bhoite, and Katherine J. Kuchenbecker. The haptic board. Hands-on demonstration presented at IEEE Haptics Symposium, Waltham, Massachusetts, USA, March 2010.

[D41] Saurabh Palan, Ruoyao Wang, Nathaniel Naukam, Edward Li, and Katherine J. Kuchenbecker. Tactile gaming vest (TGV). Hands-on demonstration presented at IEEE Haptics Symposium, Waltham, Massachusetts, March 2010.

[D42] Joseph M. Romano and Katherine J. Kuchenbecker. Realistic haptic contacts and textures for tablet computing. Hands-on demonstration presented at IEEE Haptics Symposium, Waltham, Massachusetts, March 2010. Best Teaser Award.

[D43] Dorsey Standish, Jamie Gewirtz, William McMahan, Paul Martin, and Katherine J. Kuchenbecker. High-frequency tactile feedback for the da Vinci surgical system. Hands-on demonstration presented at IEEE Haptics Symposium, Waltham, Massachusetts, March 2010.

[D44] Meng Yang, Jingwan Lu, Alla Safonova, and Katherine J. Kuchenbecker. GPU-based haptic rendering of 3D smoke. Hands-on demonstration presented at IEEE Haptics Symposium, Waltham, Massachusetts, March 2010.

[D45] Joseph M. Romano, Steven R. Gray, Nathan T. Jacobs, and Katherine J. Kuchenbecker. The SlipGlove. Hands-on demonstration presented at IEEE World Haptics Conference, Salt Lake City, Utah, March 2009.

[D46] William McMahan and Katherine J. Kuchenbecker. Displaying realistic contact accelerations via a dedicated vibration actuator. Hands-on demonstration presented at IEEE World Haptics Conference, Salt Lake City, Utah, Proc. IEEE World Haptics Conference, pp. 613–614, March 2009. Best Demonstration Award.

[D47] Pulkit Kapur, Sunthar Premakumar, Steven A. Jax, Laurel J. Buxbaum, Amanda M. Dawson, and Katherine J. Kuchenbecker. Vibrotactile feedback system for intuitive upper-limb rehabilitation. Hands-on demonstration presented at IEEE World Haptics Conference, Salt Lake City, Utah, USA, Proc. IEEE World Haptics Conference, pp. 621–622, March 2009.

[D48] Kyle N. Winfree, Jamie Gewirtz, Thomas Mather, Jonathan Fiene, and Katherine J. Kuchenbecker. The iTorqU 1.0 and 2.0. Hands-on demonstration presented at IEEE World Haptics Conference, Salt Lake City, Utah, March 2009.

[D49] Joseph M. Romano, Alla Safonova, and Katherine J. Kuchenbecker. Real-time graphic and haptic simulation of deformable tissue puncture. Hands-on demonstration presented at Medicine Meets Virtual Reality, Long Beach, California, USA, January 2009.

[D50] Katherine J. Kuchenbecker, David Ferguson, Michael Kutzer, Matthew Moses, and Allison M. Okamura. The Touch Thimble. Hands-on demonstration presented at IEEE Haptics Symposium, Reno, Nevada, USA, March 2008.

[D51] Katherine J. Kuchenbecker, Netta Gurari, and Allison M. Okamura. Comparing visual and haptic position feedback. Hands-on demonstration at IEEE World Haptics Conference, Tsukuba, Japan, March 2007.

[D52] Katherine J. Kuchenbecker, Jonathan P. Fiene, and Günter Niemeyer. Event-based haptic feedback. Hands-on demonstration at IEEE World Haptics Conference, Pisa, Italy, March 2005.

Patents

1. V. Nguyen, B. Javot, and K. J. Kuchenbecker. ***An electric machine with two-phase planar Lorentz coils and a ring-shaped Halbach array for high torque density and high-precision applications***. Provisional European patent pending under application #EP21170679.1, filed April 2021.

2. H. Sun, G. Martius, and K. J. Kuchenbecker. ***Sensor arrangement for sensing forces and methods for fabricating a sensor arrangement and parts thereof***. Provisional European patent pending under application #PCT/EP2021/050230, filed January 2021.

3. H. Sun, G. Martius, and K. J. Kuchenbecker. ***Method for force inference, method for training a feed-forward neural network, force inference module, and sensor arrangement***. Provisional European patent pending under application #PCT/EP2021/050231, filed January 2021.

4. H. Lee and K. J. Kuchenbecker. ***System and method for simultaneously sensing contact force and lateral strain***. Provisional European patent pending under application #EP20000480.2, filed December 2020.

5. K. J. Kuchenbecker, Steven D. Domenikos, Jean-Samuel Chenard, and Ilann Derche. ***Systems and methods for providing fingertip tactile feedback from virtual objects***. United States provisional patent pending under application #62/287,506, filed January 27, 2016.

6. K. J. Kuchenbecker, Vivienne Clayton, Siyao Hu, Ilana Teicher, and Erin Vasudevan. ***Gait Rehabilitation systems, methods, and apparatuses thereof***. United States provisional patent pending under application #62/201,799, filed August 6, 2015.

7. K. J. Kuchenbecker and Siyao Hu. ***Reproducing a laser pointer dot on multiple projected screens***. United States provisional patent pending under application #62/186,640, filed June 30, 2015.

8. A. Brzezinski, K. J. Kuchenbecker, E. D. Gomez, N. Blumenfeld, B. H. Horwich, Z. E. Shurden. ***Electrocautery tactile feedback systems and methods***. International patent application PCT/US2014/034443, filed April 17, 2014. United States provisional patent pending under application #61/813,670, filed April 19, 2013.

9. K. J. Kuchenbecker, D. Standish, W. McMahan, and J. Gewirtz. ***Systems and methods for providing vibration feedback in robotic systems***. International patent application PCT/US2011/023995, filed February 8, 2011. United States national phase patent pending under application #13/577,581, filed August 7, 2012. European and Korean national phase patent applications filed in September, 2012. United States patent 9,333,039 issued on May 10, 2016.
10. K. J. Kuchenbecker, J. Romano, W. McMahan, and N. Landin. ***Systems and methods for capturing and recreating the feel of surfaces***. United States patent #8,988,445, issued on March 24, 2015.
11. B. G. MacGregor, J. C. B. Novoa, L. Cheng, E. Cruse, T. B. Eich, J. A. Fourt, D. M. Gresham, A. T. Grishaver, J. L. Hei, M. D. Inouye, K. J. Kuchenbecker, J. N. Ludwig, S. D. Newman, T. A. Pelman, A. Salamini, F. N. Schultz, B. J. V. Tarbell, S. A. Whitman, and D. M. Webster. ***Partition panel with modular appliance mounting arrangement***. United States Patent #6,851,226, issued February 8, 2005. International patents also issued.
12. A. Calder, L. Bayer, K. Kuchenbecker, and E. Froelich. ***Self-service terminal***. European Patent #1,258,842, issued November 20, 2002. United States patent pending under application #10/101,582.

Media Highlights

November 2023 The German science magazine bild der Wissenschaft published an article about Christoph Keplinger and other soft robotics research at MPI-IS, including photographs of Insight and HuggieBot from Dr. Kuchenbecker's work.

October 2023 Regio TV published a short article and video (both in German) about the visit of Petra Olschowski (Minister of Science in Baden-Württemberg) to MPI-IS to learn about AI and robotics for health; Dr. Kuchenbecker's department's research on touch feedback for robotic surcery was highlighted. Olschowski besucht Cyber Valley

May 2023 Dr. Kuchenbecker's team hosted media visits by two influencers creating short TikTok videos about our AI and robotics research.

February 2023 Computer Vision News & Medical Imaging News published an extensive profile of Dr. Kuchenbecker, including many images and quotes, by Ralph Anzarouth: Women in Computer Vision

December 2022 The radio station SWR3 highlighted HuggieBot research by Dr. Kuchenbecker's team.

December 2022 The Max Planck Society highlighted Insight, the vision-based tactile sensor invented by Huanbo Sun, Dr. Kuchenbecker, and Georg Martius, as one of the year's twelve scientific highlights: Scientific highlights 2022

November 2022 Heise online highlighed HuggieBot and quoted Dr. Alexis Block and Dr. Kuchenbecker in an article (in English and German) by Eva Wolfangel: Robotics: "HuggieBot is like a friendly stranger"

June 2022 Two Stuttgart newspapers and one local television station mentioned our presentation of HuggieBot at the opening of the Stuttgart Science Festival.

May 2022 Nature Outlook carefully presented both Insight and HuggieBot, including quotes from Dr. Kuchenbecker, in an article by Marcus Woo: Teaching robots to touch

April 2022 HuggieBot was honored as one of the eight most curious robots in a Vodafone article by Roman Maas (in German): Von genial bis schräg: Die 8 kuriosesten Roboter-Kreationen

April 2022 Dr. Kuchenbecker was interviewed for the BBC radio show "Digital World."

March 2022 IEEE Spectrum explained the new capabilities of HuggieBot 2.0 and 3.0 with many quotes by Dr. Alexis Block in an article by Evan Ackerman: The 11 Commandments of Hugging Robots: How to build a humanoid that gives perfect hugs

March 2022 Stuttgarter Zeitung released an online feature by Regine Warth about Dr. Kuchenbecker for International Women's Day, also showing her in a printed visual spread on local women leaders (in German): Katherine Kuchenbecker: Robotersysteme, die wirklich helfen können

March 2022 The University of Stuttgart and IntCDC produced a video feature about Yijie Gong, a doctoral student of Dr. Kuchenbecker, as a female role model in IntCDC: Yijie Gong: Haptic Intelligence

February 2022 Max Planck Forschung presented Dr. Kuchenbecker and her department's research in a long focus article by Andreas Knebl (in print in German and online in both German and English): Roboter mit sanfter Hand

October 2021 Dr. Kuchenbecker recorded a "Direktdurchwahl" podcast for Cyber Valley with Rebecca Beiter: Feel the robot - haptic intelligence

June 2021 ETH Globe highlighted Alexis Block and her doctoral research on HuggieBot in an article by Samuel Schlaefli (in German and English): Robots for comfort and counsel

June 2021 Dr. Kuchenbecker was on episode 491 of the TWIML AI Podcast with Sam Charrington: Haptic Intelligence with Katherine J. Kuchenbecker

April 2021 Handelsblatt quoted Dr. Kuchenbecker in an article (in German) by Ina Karabasz: *Wie haptisches Feedback die digitale und reale Welt miteinander verschmelzen soll*

June 2018 IEEE Spectrum published an article by Evan Ackerman featuring research by Dr. Kuchenbecker and her Ph.D. student Alexis Block: *The Importance of Teaching Robots to Hug.* Many other media outlets then ran related stories, as documented in the following press release by Linda Behringer: *Alexis Block is Teaching Robots to Give Good Hugs*

July 2017 Ira Flatow did a Science Friday interview with Dr. Kuchenbecker that was broadcast on NPR in the USA: *Can You Feel Me Now? The Science Of Digitizing Touch*

July 2017 German magazine GEO published a long article about the sense of touch that included an interview of Dr. Kuchenbecker, a headshot of her, and a photograph of her da Vinci robot.

September 2016 Rolling Stone published an article by John Gaudiosi about Tactai, one of Prof. Kuchenbecker's start-up companies: *Virtual Touch: Inside Technology That Makes VR Feel Real*

September 2016 Philadelphia Magazine published a long article by Sandy Hingston featuring Prof. Kuchenbecker, Naomi Fitter, and other local roboticists: *Welcome to Philly's Robot Revolution*

May 2016 The New Yorker published a long article by Adam Gopnik featuring Prof. Kuchenbecker and her lab's research: *Feel Me: What the New Science of Touch Says about Ourselves*

April 2016 The PennCurrent published an online article and video about the Penn Haptics Group: *Penn Researchers Get Hands-on Experience at Haptics Symposium*

April 2016 Philly.com published an article about the 2016 IEEE Haptics Symposium, which Prof. Kuchenbecker co-chaired: *The Technology of Touch: Mini-motors Enhance Tactile World*

March 2016 Polygon's Christopher Grant published an article about Professor Kuchenbecker's Tactai demo: *On Eve of VR Launches, Hands-on With a New Haptic Ideal*

November 2015 The University of Pennsylvania Almanac published a one-page article Professor Kuchenbecker wrote about her teaching philosophy: *Reducing Student Anonymity and Increasing Engagement*

March 2015 Circuit Cellar magazine published a six-page profile on Professor Kuchenbecker and her lab: *Advances in Haptics Research*

October 2014 ECRI Institute's Health Technology Trends publication highlighted the Kuchenbecker lab's research: *More Than a Feeling? Can Haptics Improve Robot-Assisted Surgery?*

May 2014 Penn created a four-part multimedia feature on current research in the GRASP Lab, highlighting several projects in the Kuchenbecker lab: *Robotics at the University of Pennsylvania*

January 2014 Along with Professors Vijay Kumar and Dan Lee, Professor Kuchenbecker was a guest on Radio Times with Marty Moss-Coane, which broadcasts live on WHYY: *Robotic Roundup*

January 2014 The international magazine Future by Semcon published a three-page Q&A interview about haptics with Professor Kuchenbecker: *Introducing Touch to the Computer World*

May 2013 IEEE Spectrum highlighted the Kuchenbecker lab's ICRA paper, which won the Best Cognitive Robotics Paper award: *Finally: Robots Learn What 'Squishy' Really Means*

May 2013 Alok Jha and a BBC film crew recorded demonstrations of robotics research project in the Kuchenbecker lab for an episode of Dara O Briain's Science Club.

March 2013 Professor Kuchenbecker's TEDYouth talk was featured on TED.com on March 29, 2013, and was highlighted as the TED talk of the week: *Katherine Kuchenbecker's talk on TED.com*

December 2012 Professor Kuchenbecker's TEDYouth talk was the lead item in Penn News Today on December 14, 2012: *Katherine Kuchenbecker Presents at TEDYouth 2012*

November 2012 PBS NOVA featured the Kuchenbecker lab's research on touch feedback for robotic surgery in a video hosted by David Pogue: *Augmented Reality With a Sense of Touch*

November 2012 Time For Kids highlighted Professor Kuchenbecker's presentation and hands-on demonstrations at TEDYouth: *TEDYouth challenges New York City students to think outside the box*

April 2012 The Philadelphia City Paper featured Professor Kuchenbecker and her lab's research as the cover story in their Science and Technology Issue: *Are You Ready For A New Sensation?*

April 2012 The National Science Foundation worked with Penn Publicity to create an NSF Innovators video about the Kuchenbecker Lab's Haptography research project. This video was also featured as a multimedia news item on the Penn homepage for several weeks.

March 2012 The Electric Playground produced a video on the 2012 IEEE Haptics Symposium. The Kuchenbecker Lab's TexturePad, StrokeSleeve, and VerroTeach projects are all visible in the video.

October 2011 Willow Garage prominently featured the Kuchenbecker Lab's demo of the PR2 giving hugs, handing out business cards, and giving high-fives in their video montage of IROS 2011.

October 2011 The Urology Times published an article summarizing the Kuchenbecker Lab's VerroTouch project: *Vibrotactile feedback enhances robotic urologic surgery, according to study.*

August 2011 SmartPlanet blogger Reena Jana wrote about Professor Kuchenbecker: *Why design is key in haptics innovation*

January 2011 The Philadelphia Inquirer ran an article about the projects presented at the open house for Professor Kuchenbecker's haptics class: *Haptics offer the sensation of touch without touching*

December 2010 MentorNet ran an article about Professor Kuchenbecker's career path: *MentorNet Alumna: Being a Woman in Engineering is "Fun"*

November 2010 Many news outlets featured Professor Kuchenbecker's selection to the Popular Science Brilliant Ten, including the Daily Pennsylvanian, Stanford Women's Volleyball, and the Penn Current.

August 2010 The Kuchenbecker Lab's research was featured in the cover article for the July/August issue of the Pennsylvania Gazette, Penn's alumni magazine: *Touching the Virtual Frontier*

April 2010 Many online news outlets mentioned the Tactile Gaming Vest demo shown by the Kuchenbecker Lab at the IEEE Haptics Symposium, including IEEE Spectrum, Wired, Make, Gizmodo, Slash Gear, Slashdot, and Ubergizmo

March 2009 Professor Kuchenbecker and the iTorqU 2.0 were featured on the back cover of the Pennsylvania Gazette, Penn's alumni magazine.

Grants and Contracts

Current

1. DFG Cluster of Excellence – EXC 2120/1 – 390831618
   Integrative Computational Design and Construction for Architecture (IntCDC)
   Role: One of 25 principal investigators at the University of Stuttgart and MPI-IS
   PI: Achim Menges (University of Stuttgart)
   Sponsor: German Research Foundation (DFG)
   Funding to Kuchenbecker Lab: ∼270,000 EUR
   Dates: July 1, 2019, – June 30, 2025

Completed

1. BMBF Competence Center – FKZ: 01IS18039B
   Tübingen AI Center
   Role: One of 25 project leaders at Uni. Tübingen and MPI-IS
   PI: Matthias Bethge (University of Tübingen), Co-PI: Bernhard Schölkopf (MPI-IS)
   Sponsor: German Federal Ministry of Education and Research (BMBF)
   Funding to Kuchenbecker Lab: ∼135,000 EUR
   Dates: January 1, 2020, – December 31, 2022

2. NIH Grant #R03HD092822
   Improving paretic leg walking propulsion post-stroke with a mechanical device
   Role: Co-Principal Investigator
   Co-PI: Erin Vasudevan (Stony Brook U.)
   Sponsor: Eunice Kennedy Shriver National Institute Of Child Health & Human Development
   Funding to Kuchenbecker Lab: $0
   Funding to Vasudevan Lab: $154,306
   Dates: August 16, 2017, – July 31, 2019

3. NIH Grant #R21NS099645
   Virtual Reality Treatment of Phantom Leg Pain
   Role: Senior Personnel
   PI: H. Branch Coslett (U. of Pennsylvania)
   Sponsor: National Institute of Neurological Disorders and Stroke
   Funding to Kuchenbecker Lab: $0
   Funding to Collaborating Labs: $415,456
   Dates: July 1, 2017, – June 30, 2019

4. NSF National Robotics Initiative #IIS-1426787
   "Shall I Touch This?": Navigating the Look and Feel of Complex Surfaces
   Role: Principal Investigator at Penn | Co-PI: Trevor Darrell (U.C. Berkeley)
   Sponsor: National Science Foundation | Funding to Penn: $400,000
   Dates: October 1, 2014, – September 30, 2018 | Plus $8,000 in REU Supplements

5. Intuitive Surgical 2015 Technology Research Award
   Comparison of Cutaneous Feedback Methods for Pinching Palpation in Robotic Surgery
   Role: Principal Investigator | Co-PI: Domenico Prattichizzo (U. Siena)
   Sponsor: Intuitive Surgical, Inc. | Funding to Penn: $35,600
   Dates: January 1, 2015, – June 30, 2016 | Indirect costs limited to $5,933

6. IERION Research Contract
   Prototype of a Fingertip Tactile Feedback System for Virtual Reality
   Role: Principal Investigator | Co-PIs: None
   Sponsor: IERION, Inc. | Funding: $14,815
   Dates: March 1, 2016, – March 31, 2016

7. Subcontract from NSF #IIP-1519938
   SBIR Phase I: Enabling Natural Tactile Interaction Across the Internet
   Role: PI of Penn Subcontract | PI at IERION: Steven Domenikos
   Sponsor: National Science Foundation | Funding: $50,000
   Dates: July 1, 2015, – December 31, 2015

8. Rolls-Royce Research Contract
   Force, Displacement and Degrees of Freedom (DoF) Assessment of Boreblending
   Role: Principal Investigator | Co-PIs: None
   Sponsor: Rolls-Royce, Inc. | Funding: $23,239
   Dates: March 1, 2015, – June 1, 2015

9. IERION Research Contract
   Prototype of a Tactile Transmission System for Project Touch^{TM}
   Role: Principal Investigator | Co-PIs: None
   Sponsor: IERION, Inc. | Funding: $24,000
   Dates: February 2, 2015, – May 1, 2015

10. NSF REU Site #CNS-1156366
    Perception, Planning, Mobility, and Interaction for Next Generation Robotics
    Role: Co-PI | PI: Max Mintz (Penn)
    Sponsor: National Science Foundation | Funding: $349,200
    Dates: April 1, 2012, – March 31, 2015

11. Intuitive Surgical 2014 Technology Research Award
    Objective Assessment of Robotic Surgical Skill Using Instrument Contact Vibrations
    Role: Principal Investigator | Co-PIs: None
    Sponsor: Intuitive Surgical, Inc. | Funding: $40,000
    Dates: January 1, 2014, – March 31, 2015 | Indirect costs limited to $6,666

12. Coulter Translational Research Award
    Vibrotactile and Auditory Feedback for Robotic Minimally Invasive Surgery
    Role: Principal Investigator | Clinical Co-PI: David I. Lee (Penn Presbyterian)
    Sponsor: Wallace H. Coulter Foundation | Funding: $180,000
    Dates: September 1, 2011, – August 30, 2014 | Indirect costs limited to $30,000

13. NSF #IIS-0845670
    CAREER: Haptography: Capturing and Recreating the Rich Feel of Real Surfaces
    Role: Principal Investigator | Co-PIs: None
    Sponsor: National Science Foundation | Funding: $499,495
    Dates: July 15, 2009, – June 30, 2014 | Funded via the American Recovery and Reinvestment Act (ARRA)

14. NSF #IIS-0915560
HCC: Small: Modular Tactile Feedback for Whole-Body Motion Guidance
Role: Principal Investigator | Co-PIs: None
Sponsor: National Science Foundation | Funding: $500,000
Dates: July 1, 2009, – June 30, 2014 | Plus $32,000 in REU supplements

15. DARPA BOLT Activity E Subcontract
Perceptual Grounding of Language using Probabilistic Models
Role: Co-PI | PI: Trevor Darrell (U.C. Berkeley)
Other Co-PIs: P. Abbeel, T. Griffiths, and D. Klein (U.C. Berkeley) and G. Friedland (ICSI)
Sponsor: Defense Advanced Research Projects Agency, via U.C. Berkeley | Funding to Kuchenbecker Lab: $150,000
Dates: October 1, 2011, – December 31, 2012

16. ARL RCTA
Robotics Collaborative Technology Alliance
Role: Co-PI, ∼40 Co-PIs | Consortium Manager: Bill Borgia (GDRS)
Sponsor: Army Research Laboratory | Funding to Kuchenbecker Lab: ∼$400,000
Dates: July 1, 2010 – June 30, 2013

17. Willow Garage PR2 Beta Program
PR2GRASP: From Perception to Reasoning to Grasping
Role: Co-PI | PI: Maxim Likhachev (Penn)
Other Co-PIs: K. Daniilidis, V. Kumar, D. D. Lee, J. Shi, C. J. Taylor, and M. Yim (Penn)
Sponsor: Willow Garage | Funding: One PR2 two-handed mobile robot
Dates: July 1, 2010, – June 30, 2012 | Equipment only, worth ∼$400,000

18. DARPA ARM-S
DHARMA: Dexterous Hand-Arm Robotic Manipulation Autonomy
Role: Co-PI | PI: Wes Huang (iRobot)
Other Co-PIs: V. Kumar, K. Daniilidis, M. Likhachev, and D. D. Lee (Penn), R. Grupen (UMass-Amherst), and C. Geyer (iRobot)
Sponsor: Defense Advanced Research Projects Agency | Funding to Kuchenbecker Lab: ∼$60,000
Dates: July 1, 2010, – September 30, 2011

19. PDH Health Research Formula Funds
Vibrotactile and Auditory Feedback for Robotic Minimally Invasive Surgery
Role: Principal Investigator | Clinical Co-PI: David I. Lee (Penn Presbyterian)
Sponsor: Pennsylvania Department of Health | Funding: $75,000
Dates: July 1, 2010, – December 31, 2010

20. NSF CRI #CNS-0855210
II-EN: Mobile Manipulation
Role: Co-PI | PI: Maxim Likhachev (Penn)
Other Co-PIs: D. D. Lee, J. Shi, and K. Daniilidis (Penn)
Sponsor: National Science Foundation | Funding: $298,050 (for shared equipment)
Dates: September 1, 2009, – August 31, 2010

21. Subcontract from PDH Health Research Formula Fund
Development of a Low Cost Haptic Virtual Environment for Upper Limb Rehabilitation
Role: Co-PI | PI: Steven A. Jax (Moss Rehab)
Other Co-PI: L. Buxbaum (Moss Rehab)
Sponsor: Pennsylvania Department of Health, via Moss Rehab | Funding: $10,041
Dates: January 1, 2009, – December 31, 2009

22. Subcontract from NSF #EEC-9731748
Haptic Effects of Nonideal Slave Dynamics in Robotic Surgery

Role: Principal Investigator on Subcontract PI: Russ Taylor (JHU)
Sponsor: National Science Foundation, via Johns Hopkins University Funding: $19,976
Dates: September 1, 2007, – June 30, 2008

Entrepreneurship

Completed

- ***Tactai, Inc.*** **– Co-Founder and Chief Science Advisor**
  Co-founded in stealth mode in September 2014 with CEO Steven Domenikos.
  Tactai pioneered haptic interaction technology that enabled users to touch and feel virtual objects with life-like realism. Based on IP from the Kuchenbecker lab at the University of Pennsylvania, our hardware and software products helped create compelling immersive experiences on tablets, on phones, in augmented reality, and in virtual reality, providing benefits for for gaming, e-commerce, social media, training, film, architecture, and education.
  Phase I NSF SBIR grant of $150,000 from July to December 2015.
  Phase II NSF SBIR grant of $750,000 awarded in September 2016.
  Additional funding from other government entities and angel investors.
  Tactai closed in 2021 due to the long timeline of commercializing hardware.

- ***VerroTouch Medical, Inc.*** **– Co-Founder and Chief Science Advisor**
  Co-founded in March 2016 with CEO Steve Davis.
  VerroTouch Medical was developing a revolutionary device to add touch feedback to robotic surgery. Based on IP from the Kuchenbecker lab at the University of Pennsylvania, our technology measured the vibrations caused by surgical tool contact during robotically assisted minimally invasive surgery and relays them to a haptic feedback system at the control console. The surgeon controlling the robot gained important information through the sense of touch.
  VerroTouch Medical closed in 2019 to allow both co-founders to focus on other ventures.

Invited Research Presentations

Keynote Talks at Academic Conferences

1. "Robotic Surgery and Intelligent Systems." Keynote talk, Annual Meeting of the Southwest German Society for Urology (Südwestdeutsche Gesellschaft für Urologie, SWDGU), Freiburg, Germany. June 20, 2024.

2. "Research in Robotics." Keynote talk, 12th Symposium of the German Society for Robot-Assisted Urology (Symposium der Deutschen Gesellschaft für Roboter assistierte Urologie e. V., DRUS), Stuttgart, Germany. October 14, 2022.

3. "Haptic Intelligence for Human-Robot Interaction." Plenary talk, International Conference on Embodied Intelligence (EI), virtual. March 23, 2022.

4. "Haptics and Physical Human-Robot Interaction." Semi-plenary talk, IEEE Conference on Decision and Control (CDC), virtual. December 14, 2021.

5. "Creating Interactive Haptic Robots." Tutorial (plenary talk focused on teaching technical content), Conference on Robot Learning (CoRL), virtual. November 16, 2020.

6. "Haptic Intelligence." Plenary talk, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Macau, China. November 7, 2019.

7. "Haptic Interactions Matter." Keynote, IEEE International Conference on Rehabilitation Robotics (ICORR), as part of RehabWeek (combined IFESS, ICORR, IISART, ACRM, RESNA, and ISPO Canada), Toronto, Canada. June 27, 2019.

8. "Telerobotic Touch." Keynote, AsiaHaptics, Songdo, South Korea. November 15, 2018.

9. "Tactile Reality." Keynote, Hand, Brain and Technology: the Somatosensory System, Monte Verità, Switzerland. August 29, 2018.

10. "Telerobotic Touch." Keynote, Robotics: Science and Systems (RSS), Pittsburgh, Pennsylvania, USA. June 28, 2018.
11. "Tactile Reality." Keynote, IEEE Virtual Reality (VR), Reutlingen, Germany. March 21, 2018.
12. "Haptography: Capturing and Displaying Touch." Keynote, Annual Meeting of the Vision Sciences Society (VSS), St. Pete Beach, Florida, USA. May 20, 2017.
13. "Haptics: The Technology of Touch." Presidential Invited Lecture, Annual Meeting of the American Society of Hand Therapists, Boston, Massachusetts, USA. September 20, 2014.
14. "Robotics, Haptics, and Beyond." Chevalier Jackson Lecture, Annual Meeting of the American Broncho-Esophagological Association (ABEA), Las Vegas, Nevada, USA. May 14, 2014.
15. "Innovation and Breakthrough Technologies of the Future." Keynote, 7th International NOTES (Natural Orifice Translumenal Endoscopic Surgery) Summit, Chicago, Illinois, USA. July 13, 2012.
16. "Haptography: Creating Authentic Haptic Feedback from Recordings of Real Interactions." Early Career Spotlight Talk, Robotics: Science and Systems Conference, Seattle, Washington, USA. July 1, 2009.

Seminars at Universities, Institutes, and Industry

1. "Haptic Intelligence." Invited talk, Informatics Section, Leopoldina, Tübingen, Germany. January 29, 2024.
2. "Haptic Intelligence." Invited inspiration talk, Inauguration Event, Max Planck and Amazon Science Hub, Tübingen, Germany. December 12, 2022.
3. "Robotics." Invited talk, Cyber Valley Bosch Visit, Tübingen, Germany. November 21, 2022.
4. "My Journey." Inaugural address, Meeting of the Chemistry, Physics, and Technology Section (CPTS), Max Planck Society, Berlin, Germany. October 21, 2022.
5. "Haptics and Haptic Interfaces." Invited presentation, Conversations with Research Pioneers Webinar Series, Unity Technologies, virtual. September 21, 2022.
6. "Tactile Sensing for Robots with Haptic Intelligence." Invited talk, SFB 1410: Hybrid Societies: Humans Interacting with Embodied Technologies, TU Chemnitz, Germany, virtual. July 20, 2022.
7. "Haptics and Physical Human-Robot Interaction." GRASP Seminar, University of Pennsylvania, Philadelphia, USA. April 22, 2022.
8. "Tactile Sensing for Robots with Haptic Intelligence." Robotics Seminar, Massachusetts Institute of Technology (MIT), Cambridge, USA. April 15, 2022. Online video
9. "Haptic Intelligence." Invited talk, Faculty 7: Engineering Design, Production Engineering and Automotive Engineering, University of Stuttgart, Stuttgart, Germany, virtual. May 12, 2021.
10. "Haptic Intelligence." Keynote talk, Centre for Tactile Internet with Human-in-the-Loop (CETI), Cluster of Excellence, TU Dresden, Germany, virtual. November 25, 2020.
11. "Haptic Intelligence." Invited talk, Max Planck Institute for Biological Cybernetics, Tübingen, Germany. December 13, 2019.
12. "Haptic Intelligence." Invited talk, 40th Anniversary Celebration, GRASP Laboratory, University of Pennsylvania, Philadelphia, USA. September 27, 2019.
13. "Haptic Intelligence." Invited talk, Special Workshop on Haptics and Smart Interactive Systems, Department of Mechanical Engineering and School of Computing, KAIST, Daejeon, Korea. November 12, 2018.
14. "Tactile Reality." Invited talk, Robotics Research Jam Sessions, University of Pisa, Pisa, Italy. June 12, 2018.

15. "Telerobotic Touch." Invited seminar, Institute of Robotics and Intelligent Systems (IRIS), ETH Zurich, Switzerland. Simultaneously broadcast to NCCR Robotics researchers at EPFL. June 1, 2018.

16. "Haptic Intelligence." Invited seminar, Department of Neuroscience, University of Tübingen, Germany. January 15, 2018.

17. "Tactile Reality." Invited seminar, Department of Cognitive Science, University of Ulm, Germany. November 16, 2017.

18. "Haptics: The Technology of Touch." Invited seminar on Human and Artificial Intelligence, University of Tübingen, Germany. November 13, 2017.

19. "Haptography: Capturing and Displaying Touch." Invited seminar, Institute for Systems Theory and Automatic Control, University of Stuttgart, Germany. November 7, 2017.

20. "Haptography: Capturing and Displaying Touch." Invited talk, Intelligent Systems Colloquium, Max Planck Institute for Intelligent Systems. July 7, 2017.

21. "Haptic Intelligence in Robotic Surgery." Grand rounds, Department of Women's Health, University Clinic of Tübingen, Germany. June 12, 2017.

22. "Haptography: Capturing and Displaying Touch." Invited seminar, Department of Computer Science, University of Tübingen, Germany. May 8, 2017.

23. "Haptics: The Technology of Touch." Invited seminar, Department of Biomedical Engineering, George Washington University, Washington, DC. November 28, 2016.

24. "Haptics: The Technology of Touch." Invited seminar, Department of Mechanical and Aerospace Engineering, Princeton University, Princeton, New Jersey. November 18, 2016.

25. "Haptics: The Technology of Touch." Invited seminar, Maryland Robotics Center, University of Maryland, College Park, Maryland. September 23, 2016.

26. "Haptics: The Technology of Touch." Distinguished seminar for the 125th Anniversary of the Department of Mechanical Engineering, University of Delaware, Newark, Delaware. September 16, 2016.

27. "Haptic Texture Rendering." Invited seminar, Apple, Inc., Cupertino, California, May 17, 2016.

28. "Comparison of Cutaneous Feedback Methods for Pinching Palpation in Robotic Surgery." Grant summary presentation, Principal Investigator Meeting, Intuitive Surgical, Inc., Sunnyvale, California, USA. Jointly presented with Jeremy Brown, Domenico Prattichizzo, and Claudio Pacchierotti. January 8, 2016.

29. "Objective Assessment of Robotic Surgical Skill Using Instrument Contact Vibrations." Grant summary presentation, Principal Investigator Meeting, Intuitive Surgical, Inc., Sunnyvale, California, USA. Jointly presented with Jeremy Brown. January 8, 2016.

30. "Adding a Sense of Touch to Robotics in Medicine." Invited seminar, FOCUS Lunchtime Seminar Series, Perelman School of Medicine, Philadelphia, Pennsylvania. November 16, 2015.

31. "Tactile Feedback for Telerobotic Surgery." Invited seminar, Distinguished Lecture Series (DLS), University of Tennessee, Knoxville, Tennessee. September 21, 2015.

32. "Tactile Feedback and Skill Analysis in Robotic Surgery." Guest lecture, ME/CS 571: Surgical Robotics Seminar, Stanford University, Stanford, California. May 1, 2015.

33. "Haptic Feedback and Skill Evaluation in Robotic Surgery." Grand rounds, Department of Otorhinolaryngology: Head and Neck Surgery, University of Pennsylvania, Philadelphia, Pennsylvania. February 26, 2015.

34. "Haptics: The Technology of Touch." Invited seminar, Max Planck Institute for Intelligent Systems, Stuttgart, Germany, simultaneously broadcast to the MPI-IS site in Tübingen, Germany. January 26, 2015.

35. "Human-Centered Control Interfaces for Teleoperation." Invited seminar, Prattichizzo Research Group, University of Siena, Siena, Italy. December 18, 2014.

36. "The Value of Tactile Sensations in Haptics and Robotics." Invited seminar, Control Theory Seminar Series, Department of Electrical Engineering and Computer Science, University of California, Berkeley, California. April 7, 2014.

37. "The Value of Tactile Sensations in Haptics and Robotics." Invited seminar, Department of Mechanical Engineering, Rice University, Houston, Texas. March 12, 2014.

38. "The Value of Tactile Sensations in Haptics and Robotics." Invited seminar, Perceptual Science Talk Series, Rutgers University, Piscataway, New Jersey. October 7, 2013.

39. "Haptic Feedback and Analysis of Tool Vibrations in Robotic Surgery." Surgical Grand Rounds, Drexel University College of Medicine, Philadelphia, Pennsylvania. August 20, 2013.

40. "The Value of Tactile Sensations in Haptics and Robotics." Invited seminar, Robotics Colloquium, Department of Computer Science and Engineering, University of Washington, Seattle, Washington. May 24, 2013.

41. "Overview of Penn Haptics Research: The Value of Tactile Sensations in Haptics and Robotics." Invited seminar, Robotics Research Group, Johns Hopkins University Applied Physics Laboratory (JHUAPL), Baltimore, Maryland. May 21, 2013.

42. "Haptic Feedback and Analysis of Tool Vibrations in Robotic Surgery." Grand Rounds, Department of Obstetrics and Gynecology, Pennsylvania Hospital, Philadelphia, Pennsylvania. April 24, 2013.

43. "Using Robotic Exploratory Procedures to Learn the Meaning of Haptic Adjectives." Invited seminar, Department of Mechanical Engineering, Villanova University, Philadelphia, Pennsylvania. November 9, 2012.

44. "Tactile Acceleration Cues for Haptic and Robotic Systems." Invited seminar, Department of Mechanical and Civil Engineering, California Institute of Technology, Pasadena, California. May 24, 2012.

45. "Tactile Acceleration Cues for Haptic and Robotic Systems." Invited seminar, Department of Mechanical and Aerospace Engineering, University of California at Los Angeles, Los Angeles, California. March 16, 2012.

46. "Tactile Acceleration Cues for Biomedical Robotics." Invited seminar, Biomed Seminar Series, Drexel University, Philadelphia, Pennsylvania. February 3, 2012.

47. "Three Good Reasons to Buy an Accelerometer." Invited seminar, Laboratory for Computational Sensing and Robotics, Johns Hopkins University, Baltimore, Maryland. April 27, 2011.

48. "Haptics: Touch Feedback for Robotic Surgery, Tablet Computers, and More." Invited seminar, Women in Human-Computer Interaction Lecture Series, Iowa State University, Ames, Iowa. April 14, 2011. Online video

49. "Haptics: Touch Feedback for Robotic Surgery, Tablet Computers, and More." Distinguished lecture, Drexel IEEE Graduate Forum's Annual Research Symposium, Drexel University, Philadelphia, Pennsylvania, USA. March 3, 2011.

50. "High-Fidelity Haptic Interfaces: Haptography, VerroTouch, StrokeSleeve, and Tactile Grasping." Invited seminar, Center for Injury Research and Prevention at The Children's Hospital of Philadelphia (CHOP). February 15, 2011.

51. "High-Fidelity Haptic Interfaces: Haptography, VerroTouch, StrokeSleeve, and Tactile Grasping." Invited seminar, Institute for Research on Cognitive Science, University of Pennsylvania. January 21, 2011.

52. "High-Fidelity Haptic Interfaces: Haptography, VerroTouch, StrokeSleeve, and Tactile Grasping." Invited seminar, Center for Robotics and Intelligent Machines, Georgia Institute of Technology, Atlanta, Georgia. November 23, 2010.

53. "Robotics in the 21st Century: From the Lab to the OR and Back." Invited seminar, Anesthesiology Grand Rounds, Main Line Health Anesthesia Departments (Lankenau, Bryn Mawr, and Paoli Hospitals), Philadelphia, Pennsylvania. November 16, 2010.

54. "Creating Realistic Virtual Textures from Contact Acceleration Data." Invited seminar, Mechanical Engineering Department, University of Maine, Orono, Maine. October 1, 2010.

55. "Creating Realistic Virtual Textures from Contact Acceleration Data." Invited seminar, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania. September 23, 2010.

56. "High-Fidelity Haptic Interfaces for Surgical Applications." Invited seminar, Neurosurgery Grand Rounds, Hospital of the University of Pennsylvania. August 12, 2010.

57. "High-Fidelity Haptic Interfaces for Medical Applications." Invited seminar, Center for Simulation, Advanced Education, and Innovation, Children's Hospital of Philadelphia. July 21, 2010.

58. "High-Fidelity Haptic Feedback: Haptography, VerroTouch, and Stroke Sleeve." Invited seminar, Robotics Lab, Stanford University, Stanford, California. April 9, 2010.

59. "High-Fidelity Haptic Feedback for Robotic Surgery: Haptography and VerroTouch." Invited seminar, Intuitive Surgical, Inc., Sunnyvale, California. April 9, 2010.

60. "New Trends in Medical Robotics and Haptic Feedback." Invited seminar, Lankenau Hospital, Philadelphia, Pennsylvania. February 23, 2010.

61. "High-Fidelity Haptic Interfaces for Real, Remote, and Virtual Environments." Invited seminar, QinetiQ North America (QNA) / Foster-Miller, Waltham, Massachusetts. November 20, 2009.

62. "High-Fidelity Haptic Feedback for Surgical Teleoperation." Invited seminar (delivered twice), Electrical Engineering Department, University of Calgary, and Neurosurgery Department, Foothills Hospital, Calgary, Alberta, Canada. May 1, 2009.

63. "Overview of Current Research: High-Fidelity Haptic Interfaces for Real, Remote, and Virtual Environments." Invited seminar, Robotics Program, Engineering and Systems Division, SRI International, Menlo Park, California. February 10, 2009.

64. "Realistic Haptic Feedback for Virtual Environments and Teleoperation." Invited seminar, City College of New York, New York, New York. February 7, 2008.

65. "High-Frequency Acceleration Matching for Realistic Haptic Interaction." Invited seminar, Somatosensory Group, Krieger Mind/Brain Institute, Johns Hopkins University, Baltimore, Maryland. November 29, 2006.

66. "Characterizing and Controlling the High-Frequency Dynamics of Haptic Interfaces." Invited seminar, ERC-CISST Seminar Series, Johns Hopkins University, Baltimore, Maryland. October 11, 2006.

67. "Characterizing and Controlling the High-Frequency Dynamics of Haptic Interfaces." Invited seminar, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia, Pennsylvania. April 13, 2006.

68. "Realistic Haptic Feedback for Virtual Environments and Teleoperation." Invited seminar, University of British Columbia, Vancouver, Canada, January 30; University of California, Riverside, February 6; University of California, Santa Cruz, February 8; University of Pennsylvania, February 14; Johns Hopkins University, February 16; Northwestern University, February 20; Cal Poly San Luis Obispo, February 27; Tufts University, March 2; University of Maryland, College Park, March 9; University of Michigan, Ann Arbor, March 21; Carnegie Mellon University, March 23; Massachusetts Institute of Technology, April 5; Columbia University, April 12; Duke University, April 17; Georgia Tech, April 18, 2006.

Talks at Academic Conferences and Workshops (omitting keynotes and conference paper presentations)

1. "Haptic Intelligence." Invited talk, Workshop on Touch Processing: a New Sensing Modality for AI, NeurIPs, New Orleans, USA. December 15, 2023.

2. "Robotics and Haptic Intelligence – the Potential for Timber Construction." Invited talk, IntCDC session, Süddeutscher Holzbau Kongress (SHK), Fellbach, Germany. July 26, 2023.
3. "Naturalistic Vibrotactile Cues Enrich Haptic Interactions." Invited talk, Workshop on Applications of Vibrotactile Technology, IEEE World Haptics Conference (WHC), Delft, the Netherlands. July 10, 2023.
4. "Minsight: A Fingertip-Sized Vision-Based Tactile Sensor for Robotic Manipulation." Invited talk, ViTac Workshop on Blending Virtual and Real Visuo-Tactile Perception, IEEE International Conference on Robotics and Automation (ICRA), London, United Kingdom. June 2, 2023.
5. "Sensing Tactile Contact Over Large, Soft Surfaces." Invited talk, Workshop on Large-Scale Robotic Skin: Perception, Interaction, and Control, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), virtual. October 23, 2022.
6. "Cyber-Physical Construction of Co-Design: Human-Machine Interaction." Short keynote talk and panel discussion, Stuttgart Week of Advancing Architecture, Engineering & Construction (SWAA). October 13, 2022.
7. "Action-Perception Coupling." Session co-organizer and co-presenter with Prof. Martin Rolfs, Berlin Summit on Robotics, Berlin, Germany. July 25, 2022.
8. "Robot Learning." Presentation, Kick-off Event, Stuttgart ELLIS Unit, University of Stuttgart, Stuttgart, Germany. July 21, 2022.
9. "Sensing Tactile Contact Over Large, Soft Surfaces." Keynote talk, Workshop on Shaping the Future of Robotics Through Materials Innovation, Ringberg Castle, Kreuth, Germany. June 17, 2022.
10. "Sensing Tactile Contact Over Large, Soft Surfaces." Invited talk, Workshop on New Advances in Tactile Sensation, Interactive Perception, Control, and Learning: A Soft Robotic Perspective on Grasp, Manipulation, & HRI (RoboTac), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), virtual. September 27, 2021.
11. "Touch Perception for Telerobotic and Robotic Systems." Invited talk, Closing Conference on Enabling Flexible Behavior: From Frameworks to Mechanisms and Complete Systems, Center for Interdisciplinary Research (ZiF), University of Bielefeld, Bielefeld, Germany. August 31, 2021.
12. "Broad Sensing of Tactile Events Supports Social-Physical HRI." Invited talk, Workshop on Increasing Safety for Human-Robot Interaction using Tactile and Proximity Perception, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), virtual. August 26, 2021.
13. "Touch Perception for Telerobotic and Robotic Systems." Invited talk, ETH Robotics Symposium, Zürich, Switzerland. July 2, 2021.
14. "Tactile Perception for Physical Human-Robot Interaction." Invited talk, Workshop on Robotics in Dynamic Environments, IEEE International Conference on Robotics and Automation (ICRA), virtual. June 4, 2021.
15. Moderator handling the debate on "Individual success metrics prevalent in robotics create perverse incentives that harm the long-term needs of the field." Workshop on Robotics Debates, IEEE International Conference on Robotics and Automation (ICRA), virtual. June 4, 2021.
16. "Haptic Intelligence." Invited talk, Workshop on Embodied Multimodal Learning, International Conference on Learning Representations (ICLR), virtual. May 7, 2021.
17. "Robotic Training: An Engineer's Perspective." Invited talk, Clinical Robotic Surgery Association (CRSA) Webinar on Robotic Training: Are We Doing Enough?, virtual. October 28, 2020.
18. Debater arguing in favor of "The costs of large, global, in-person conferences (like ICRA) outweigh the benefits." Workshop on Robotics Debates, IEEE International Conference on Robotics and Automation (ICRA), virtual. June 5, 2020.
19. "Haptic Feedback of Teleoperated Tool Vibrations." Invited talk, Workshop on Legacy Disruptors in Applied Telerobotics, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). November 4, 2019.

20. "Design and Calibration of a Biologically Inspired Scalable Tactile Skin." Invited talk, Workshop of the Intel Network on Intelligent Systems (NIS), Munich, Germany. September 9, 2019.

21. "The Proton Visuo-Haptic Surface Interaction Dataset." Presentation, Workshop on Data-Driven Haptic Rendering with Multimodal Improvements for Highly Realistic Virtual Experiences, Asia-Haptics, Songdo, Korea. November 14, 2018.

22. "Haptic Intelligence." Invited talk, Retreat for the Max Planck ETH Center for Learning Systems (CLS), Stoos, Switzerland. October 4, 2017.

23. "Haptic Intelligence for Robots." Invited talk, Workshop of the Intel Network on Intelligent Systems (NIS), Munich, Germany. August 31, 2017.

24. "Cognitive: Physical Instrument Interactions Strongly Relate to Robotic Surgical Skill." Invited presentation, Workshop on C4 Surgical Robots: Compliant, Continuum, Cognitive, and Collaborative, IEEE International Conference on Robotics and Automation (ICRA), Singapore, Singapore. June 2, 2017.

25. "Haptic Intelligence for Robots." Invited presentation, Workshop on the Robotic Sense of Touch: From Sensing to Understanding, International Conference on Robotics and Automation (ICRA), Singapore, Singapore. May 29, 2017.

26. "Workshop on Interactive Multisensory Object Perception for Embodied Agents." Plenary session (chosen by organizers to summarize our workshop to all attendees), AAAI Spring Symposia, Stanford, California, USA. March 29, 2017.

27. "Haptic Intelligence in Robotics." Invited talk, Workshop on Interactive Multisensory Object Perception for Embodied Agents, AAAI Spring Symposia, Stanford, California, USA. March 29, 2017.

28. "Haptic Intelligence in Robotics." Invited talk, Conference on Robotics and Autonomous Systems – Vision, Challenges, and Actions, organized by the Royal Society, London, England. November 13, 2015. Online video.

29. "Tactile Feedback of Tool Vibrations in Robotic Surgery." Presentation, Workshop on Cutaneous Feedback for Teleoperation in Medical Robotics, IEEE World Haptics Conference, Chicago, Illinois. June 22, 2015.

30. "Key Barriers to Haptic Intelligence in Robotics." Invited presentation, NSF Workshop on Locomotion and Manipulation: Why the Great Divide?, Arlington, Virginia. April 2, 2015.

31. "The Future of Haptics in Robotic Surgery." Invited presentation, Transoral Program, Society of Robotic Surgery Annual Meeting, Orlando, Florida. February 21, 2015.

32. "Robotic Learning of Haptic Adjectives Through Physical Interaction." Invited presentation, Workshop on Active Touch Sensing in Animals and Robots, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Chicago, Illinois. September 18, 2014.

33. "Haptic Feedback and Analysis of Tool Vibrations in Robotic Surgery." Invited presentation and panel discussion, Workshop on the Role of Human Sensorimotor Control in Surgical Robotics, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Chicago, Illinois. September 18, 2014.

34. "Where Are We and Where Are We Going With Haptics in Robotic Surgery?" Invited presentation, Johns Hopkins Symposium on Head and Neck Robotic Surgery, Adjuvant Therapy and Emerging Technologies, Baltimore, Maryland. July 25, 2014.

35. "Haptic Feedback and Skill Assessment in Robotic Surgery." Invited presentation, CHOP Airway Endoscopy Course, Philadelphia, Pennsylvania. March 22, 2014.

36. "Haptic Rendering of Textures." Half-day tutorial presented jointly with Heather Culbertson, IEEE Haptics Symposium, Houston, Texas, USA. February 23, 2014.

37. "Adding Haptics to Robotic Surgery." Invited presentation and panel discussion on robotic surgery, 5th Research Summit, American Association of Oral and Maxillofacial Surgeons (AAOMS), Chicago, Illinois. May 2, 2013.

38. "The Future of Surgical Robotics: Haptic Feedback." Invited presentation and panel discussion on robotic surgery, Annual Meeting, Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), Baltimore, Maryland. April 19, 2013.

39. "Effects of Vibrotactile Feedback on Human Learning of Arm Motions." Invited presentation, Piper Health Solutions Workshop on Rehabilitation Robotics, Arizona State University, Tempe, Arizona. February 22, 2013.

40. "Haptic Systems in Surgical Robotics." Invited presentation, IDEAS (Innovation, Design, and Emerging Alliances in Surgery) Symposium: Opportunities and Challenges in Surgical Robotics, Beth Israel Deaconess Medical Center, Boston, Massachusetts. April 21, 2012. Talk begins 47 minutes into the online video.

41. "Sensors and Sensor Interfaces." Invited presentation, Workshop on Tools and Techniques for Prototyping Haptic Interfaces, IEEE Haptics Symposium. March 4, 2012.

42. "Collaborating with Engineers." Invited presentation, Surgical Innovation and Entrepreneurship Conference, University of Pennsylvania. September 24, 2011.

43. "VerroTouch: Tool Contact Acceleration Feedback for Telerobotic Surgery." Invited presentation, Workshop on Haptics in Surgical Robotics, IEEE World Haptics Conference, Istanbul, Turkey. June 21, 2011.

44. "Human-Inspired Robotic Grasp Control with Tactile Sensing." Invited presentation, Workshop on Mobile Manipulation, IEEE International Conference on Robotics and Automation, Shanghai, China. May 13, 2011.

45. "High-Fidelity Haptic Feedback for Robotic Surgery." Invited presentation, Medical Robotics Innovation Forum, Stanford Medical Innovation Conference on Medical Robotics, Stanford University, Stanford, California. April 10, 2010.

46. "Application: Haptics." Invited presentation, Workshop on Contact Models for Manipulation and Locomotion, IEEE International Conference on Robotics and Automation, Pasadena, California. May 19, 2008.

47. "Rendering Realistic Contact with Virtual Surfaces Via Event-Based Haptic Feedback." Invited presentation, Workshop on Integration of Haptics in Virtual Environments: from Perception to Rendering. IEEE Virtual Reality Conference, Reno, Nevada. March 8, 2008.

Talks at Conferences for Broader Audiences

1. "Is there anything robots can't do?" Panel presentation, and& summit and festival, virtual. April 21, 2021.

2. "3D Printing: Enabling Innovation in Tactile Technology." Invited presentation, Philadelphia Magazine's ThinkFest U. November 14, 2014.

3. "Adding Touch Feedback to Robotic Surgery." Invited presentation, Pennovation Event, University of Pennsylvania. October 31, 2014.

4. Invited presentation, State of University City, Philadelphia, Pennsylvania. October 15, 2014.

5. "Haptic Feedback for Robotic Surgery." Invited presentation with hands-on demonstrations, TEDxYouth @ Bridge Street, Phoenixville, Pennsylvania. June 6, 2014.

6. "When AR Meets the OR: Robotics and AR in Surgery." Panel presentation, IEEE Technology for Humanity Series at South By Southwest (SXSW) Interactive, Austin, Texas. March 10, 2014.

7. "Haptics: Touch Technology." Invited presentation, TEDYouth, New York City, New York. November 17, 2012. http://www.ted.com/talks/katherine_kuchenbecker_the_technology_of_touch.html

8. "Haptics." PopTech Science and Public Leadership Fellow talk, PopTech Conference, Camden, Maine. October 20, 2011. http://poptech.org/popcasts/katherine_j_kuchenbecker_haptic_interfaces

9. "Touching Reality: Haptic Feedback for Robotic Surgery, Tablet Computers, and More." Invited presentation, TEDxPenn, University of Pennsylvania. October 7, 2011.

Educational Presentations and Workshops

Technical Lectures for Students, Alumni, Parents, and Other Groups

1. "Understanding Robot Motion." Two lectures, Cornell, Maryland, and Max Planck Pre-Doctoral Research School (CMMRS), virtual. August 4 and 5, 2021.
2. "Touching Technology." Forum am Mittag, Central Administration, Max Planck Society, Munich, Germany. November 14, 2020.
3. "Haptic Interactions Matter." Lecture, Boot Camp, International Max Planck Research School for Intelligent Systems (IMPRS-IS). October 8, 2019.
4. "Debugging." Lecture, co-presented with Georg Martius, Boot Camp, International Max Planck Research School for Intelligent Systems (IMPRS-IS). October 13, 2017.
5. "Tactile Feedback for Telerobotic Surgery." Invited lecture, dinner discussion series, Kings Court English College House, University of Pennsylvania. March 16, 2016.
6. "Innovation through Touch Feedback." Lecture with hands-on demonstrations, Wharton Executive Education, University of Pennsylvania. February 25, 2016.
7. "Haptics: The Technology of Touch." Invited lecture for the Philomathean Society, University of Pennsylvania. April 13, 2015.
8. "The AddLab: 3-D Printing in Teaching and Research." Invited presentation, co-presented with Nick Parrotta, Penn IT Staff Conference, University of Pennsylvania. November 17, 2014.
9. "Current Trends in Robotic Surgery." Expert call for technology investors, ISI Group LLC. October 9, 2014.
10. "The AddLab: 3-D Printing in Teaching and Research." Invited presentation, co-presented with Nick Parrotta and Jonathan Fiene, Penn Science Café, University of Pennsylvania. September 23, 2014.
11. "Haptics: Innovation through Touch Feedback." Lecture, English Language Program, University of Pennsylvania. September 22, 2014.
12. "Haptic Feedback for Natural User Interfaces." Invited presentation with hands-on demonstrations, co-presented with Heather Culbertson, meeting of NUI Central, New York, New York. July 21, 2014.
13. "Haptics: Innovation through Touch Feedback." Lecture, Summer English Intensive Program, University of Pennsylvania. July 15, 2014.
14. "Haptics: Innovation through Touch Feedback." Lecture with hands-on demonstrations, Wharton Executive Education, University of Pennsylvania. June 25, 2014.
15. "Haptics: Enhancing Computer Interfaces and Robotic Systems with Touch Feedback." Invited presentation, meeting of the Philadelphia Chapter of the Association for Women in Science (AWIS). November 21, 2013.
16. "Haptics: Touch Technology." Invited presentation with hands-on demonstrations, Penn Academy, West Palm Beach, Florida. February 9, 2013.
17. "Haptics: Touch Technology." Invited presentation, Graduate Society of Women Engineers Tech Talks, University of Pennsylvania. December 5, 2012.
18. "Haptics: Touch Feedback for Robotic Surgery, Tablet Computers, and More." Invited presentation, Ivy+ STEM Symposium for Diversity Scholars, University of Pennsylvania. October 5, 2012.
19. "Tactile Acceleration Cues for Haptic and Robotic Systems." Invited presentation, Summer Science Research Program, Bryn Mawr College. July 18, 2012.
20. "Haptics: Touch-Based Interaction." Lecture and lab tour, IRCS Undergraduate Summer Workshop on Cognitive Science, University of Pennsylvania. June 7, 2012.

21. "Haptics: Touch Technology." Lecture for alumni, Homecoming Weekend, University of Pennsylvania. November 5, 2011.

22. "Penn Haptics Research." Guest Lecture, IPD 561: Integrated Product Design Theories and Methods I, University of Pennsylvania. November 1, 2011.

23. "Three Good Reasons to Buy an Accelerometer." Master lecture for high-school-age participants in the Summer Academy in Applied Science and Technology (SAAST), University of Pennsylvania. July 22, 2011.

24. "Haptics: Touch-Based Interaction." Lecture and lab tour, IRCS Undergraduate Summer Workshop on Cognitive Science, University of Pennsylvania. June 6, 2011.

25. "Penn Haptics Research: Touch Feedback for Robotic Surgery, Tablet Computers, and More." Lecture and hands-on demonstrations for high-school-age participants in the Robotics Leadership Academy at GRASP, University of Pennsylvania. February 17, 2011.

26. "Haptics: Touch-Based Interaction with Real, Remote, and Virtual Environments." Guest lecture, EMTM 695: Robotics, Executive Masters in Technology and Management program, University of Pennsylvania. February 4, 2011.

27. "Haptics: Touch Feedback for Robotic Surgery, Tablet Computers, and More" Online lecture (webinar) for the Penn Alumni Association. November 9, 2010.

28. "Haptics: Touch-Based Interaction." Lecture and lab tour, IRCS Undergraduate Summer Workshop on Cognitive Science, University of Pennsylvania. June 16, 2010.

29. "Introduction to Haptics: Touch-Based Interaction with Real, Remote, and Virtual Environments." Guest lecture, CIS 563: Physically Based Animation, University of Pennsylvania. March 29, 2010.

30. "Haptics: Touch Feedback for Robotic Surgery and More." Invited presentation, Society of Women Engineers (SWE) Region E Conference, University of Pennsylvania. March 20, 2010.

31. "Haptics: Touch-Based Interaction with Real, Remote, and Virtual Environments." Guest lecture, EMTM 695: Robotics, Executive Masters in Technology and Management program, University of Pennsylvania. October 30, 2009.

32. "Haptography: Capturing and Recreating the Rich Feel of Real Surfaces." Master lecture for high-school-age participants in the Summer Academy in Applied Science and Technology (SAAST), University of Pennsylvania. July 24, 2009.

33. "Please Touch! Haptic Technology for Games, Surgery, and More." Keynote speech, RobotGames Competition, University of Calgary, Calgary, Alberta. May 2, 2009.

34. "Introduction to Haptics: Touch-Based Interaction with Real, Remote, and Virtual Environments." Guest lecture, CIS 563: Physically Based Animation, University of Pennsylvania. March 2, 2009.

35. "Haptics: Touch-Based Interaction with Real, Remote, and Virtual Environments." Lecture for participant parents, Science and Technology Series, Center for Talented Youth Robotics Program, University of Pennsylvania. November 15, 2008.

36. "Haptics: Touch-Based Interaction with Real, Remote, and Virtual Environments." Guest lecture, EMTM 695: Robotics, Executive Masters in Technology and Management program, University of Pennsylvania. October 31, 2008.

37. "Haptics: Touch-Based Interaction with Real, Remote, and Virtual Environments." Master lecture for high-school-age participants in the Summer Academy in Applied Science and Technology (SAAST), University of Pennsylvania. July 25, 2008.

38. "Haptics: Touch-Based Interaction with Real, Remote, and Virtual Environments." Guest lecture, EMTM 695: Robotics, Executive Masters in Technology and Management program, University of Pennsylvania. October 26, 2007.

Educational Lectures and Outreach Activities

1. "Becoming a Keynote Speaker in an International Robotics Conference." Presenter and panelist, IEEE Robotics and Automation Society (RAS) Women in Engineering (WIE), virtual. May 13, 2022.
2. Senior mentor in the "System Design and Applications" Mentoring Forum at the 2022 IEEE Haptics Symposium, virtual. March 24, 2022, with a follow-up session on September 27, 2022.
3. "Good Scientific Practice for Doctoral Students." Panelist, workshop for doctoral students, organized by the Max Planck Institute for Intelligent Systems, virtual. November 22, 2021.
4. Presenter, Girls' Day, Max Planck Institute for Intelligent Systems, Stuttgart, Germany. April 27, 2017, and April 26, 2018.
5. "Research Ethics." Lecture, Boot Camp, International Max Planck Research School for Intelligent Systems (IMPRS-IS). October 11, 2017.
6. "Creating Meaningful Assignments." Leader, workshop for graduate students and postdocs, sponsored by the MEAM Department and the Center for Teaching and Learning, University of Pennsylvania. October 14, 2015.
7. "Effective Lecturing." Co-presenter (with Sanjeev Khanna), workshop for SEAS faculty, Center for Teaching and Learning, University of Pennsylvania. February 24, 2015.
8. Invited guest, "Women@Work" radio show on Business Radio Powered by the Wharton School, SiriusXM channel 111. September 10, 2014.
9. "The Joy of Being a Faculty Member." Panelist, School of Engineering and Applied Science, University of Pennsylvania. February 7, 2014.
10. "Effective Lecturing." Leader, workshop for graduate students and postdocs, sponsored by the MEAM Department and the Center for Teaching and Learning, University of Pennsylvania. November 15, 2013.
11. "Women in STEM 2013." Panel moderator, Annenberg Center for the Performing Arts, University of Pennsylvania. October 3, 2013.
12. "Research Ethics." Presenter or Co-Presenter (with Max Mintz), workshop for undergraduate researchers in various programs such as Rachleff Scholars and SUNFEST REU Site. Given five times: October 27, 2016, July 12, 2016, October 15, 2015, June 26, 2014, June 27, 2013.
13. "Earning an NSF Graduate Research Fellowship." Co-Presenter (with Jason Burdick), School of Engineering and Applied Science, University of Pennsylvania. Given seven times: October 6, 2015, October 7, 2014, October 8, 2013, October 9, 2012, October 14, 2011, October 16, 2009, and October 10, 2008.
14. "Mechanical Engineering in Action!" Hands-on design activities for PennGEMS: Girls in Engineering Math and Science Camp, University of Pennsylvania. Given nine pairs of times: July 25 and 29, 2016, July 30 and 31, 2015, July 30 and August 1, 2014, July 30, 2013, July 30 and August 2, 2012, August 2 and 3, 2011, August 3 and 4, 2010, August 6 and 7, 2009, and August 7, 2008.

Advising

Visiting Faculty

Hannah Stuart, Ph.D., Assistant Professor of Mechanical Engineering, University of California, Berkeley, USA.
Visiting Professor at the MPI for Intelligent Systems, March 2024 through May 2024.
Supported by funding from IntCDC (nominated by Kuchenbecker).

Caroline Cao, Ph.D., Professor of Biomedical, Industrial & Human Factors Engineering, Wright State University, Dayton, USA.
Visiting Professor at the Max Planck Institute for Intelligent Systems, May 2019 through July 2019.

Brent Gillespie, Ph.D., Professor of Mechanical Engineering at the University of Michigan, Ann Arbor, USA.
Visiting Professor at the Max Planck Institute for Intelligent Systems, September 2017 through early 2019.
Supported by a 2018 Humboldt Research Award (nominated by Kuchenbecker).

Seungmoon Choi, Ph.D., Associate Professor of Computer Science and Engineering at Pohang University of Science and Technology (POSTECH), South Korea.
Visiting Associate Professor in Mechanical Engineering and Applied Mechanics at the University of Pennsylvania, July 2011 through July 2012.

Postdoctoral Researchers and Research Scientists

Yarden Sharon, Ph.D., Postdoctoral Researcher, October 2023 through present.

Zhaoyang Li, Ph.D., Research Scientist, March 2023 through present.

Andrew Schulz, Ph.D., Postdoctoral Researcher, March 2023 through present.
Humboldt postdoctoral fellowship, March 2024 through August 2025.

Giulia Ballardini, Ph.D., Postdoctoral Researcher, January 2023 through present.
Selected for SignUp! a career-building program for excellent female postdocs in MPG, 2024.

Ravali Gourishetti, Ph.D., Research Scientist, August 2022 through present.
Previous job title: Postdoctoral Researcher, July 2019 through July 2022.
Honorable Mention for Best IEEE Transactions on Haptics Short Paper, Haptics Symposium, 2022.

Bernard Javot, Ph.D., Senior Research Engineer, September 2022 through present.
Previous job title: Research Engineer, September 2017 through August 2022.
Permanent position starting October 2019.
Best Hands-On Demonstration (fourth author), EuroHaptics 2022.

Gökhan Serhat, Ph.D., Part-time Research Scientist (20%), October 2022 through present.
Previous job titles: Postdoctoral Researcher, March 2019 through March 2021, and Research Scientist, March 2021 through September 2022.
Now an Assistant Professor of Mechanical Engineering, KU Leuven, Bruges, Belgium.

David Gueorguiev, Ph.D., Part-time Research Scientist (15%) at MPI-IS from June 2020 through present.
Previous job title: Postdoctoral Researcher, October 2017 through December 2019.
Now a CNRS Researcher at the Institute for Intelligent Systems and Robotics (ISIR) in Paris, France.
ERC Starting Grant, 2024.

Haliza Mat Husin, Ph.D., Research Scientist, May 2022 through November 2023. Previous job title: Postdoctoral Researcher: March 2018 through April 2022.

Hyosang Lee, Ph.D., Postdoctoral Researcher, October 2017 through September 2019.
Research Scientist, October 2019 through October 2021.
Part-time Research Scientist at MPI-IS, October 2021 through December 2022.
Participant, RSS Pioneers, 2018.
Best Poster (first author), IROS RoboTac Workshop 2019.
Postdoctoral Fellowship from the National Research Foundation of South Korea, 2019–2020.
Now an independent Cyber Valley Research Group Leader at the University of Stuttgart in Stuttgart, Germany.

Yitian Shao, Ph.D., Postdoctoral Researcher, January 2021 through June 2022.
EuroHaptics Society Award for Best Ph.D. Thesis in 2020.
Humboldt postdoctoral fellowship, January 2022 through June 2022.
Part-time Postdoctoral Researcher at MPI-IS from July 2022 through November 2022.
Was a Junior Professor for Intelligent Materials and Human-Computer Interaction, Center for Tactile Internet with Human-in-the-Loop (CeTI), Faculty of Electrical and Computer Engineering, TU Dresden, Dresden, Germany.
Now faculty in the School of Computer Science and Technology at Harbin Institute of Technology in Shenzhen, China.

Hojin Lee, Ph.D., Postdoctoral Researcher, July 2019 through January 2022.
Now a Senior Researcher at the Electronics and Telecommunications Research Institute (ETRI) in Seoul, South Korea.

Valerio Ortenzi, Ph.D., Research Scientist, July 2020 through July 2021.
Was a Senior Research Manager at Unity Technologies in Copenhagen, Denmark.
Now at Novo Nordisk.

Ad Spiers, Ph.D., Senior Research Scientist, June 2018 through June 2020.
Part-time Research Scientist at MPI-IS from July 2020 through June 2021.
Now a Lecturer (Assistant Professor) in Robotics and Machine Learning at Imperial College London, London, UK.

Yasemin Vardar, Ph.D., Postdoctoral Researcher, February 2018 through August 2020.
EuroHaptics Society Award for Best Ph.D. Thesis in 2018.
Selected for SignUp! a career-building program for excellent female postdocs in MPG, 2019.
Now an Assistant Professor in Cognitive Robotics at Delft University of Technology (TU Delft) in Delft, the Netherlands.

Hasti Seifi, Ph.D., Postdoctoral Researcher, July 2017 through September 2020.
EuroHaptics Society Award for Best Ph.D. Thesis in 2017.
Postdoctoral Fellowship from the National Sciences and Engineering Research Council (NSERC) of Canada, 2018–2020.
Best Hands-On Demonstration (second author), EuroHaptics 2022.
Was an Assistant Professor in Computer Science at the University of Copenhagen in Copenhagen, Denmark.
Now an Assistant Professor in Computer Science at Arizona State University (ASU) in Phoenix, USA.

Gunhyuk Park, Ph.D., Postdoctoral Researcher, April 2017 through January 2019.
Now an Assistant Professor at Gwangju Institute of Science and Technology (GIST) in Gwangju, South Korea.

Jeremy D. Brown, Ph.D., Postdoctoral Researcher, July 2014 through December 2016.
Penn Postdoctoral Fellowship for Academic Diversity, 2014–2017.
Now an Assistant Professor in Mechanical Engineering at the Johns Hopkins University in Baltimore, USA.
IEEE Technical Committee on Haptics (TCH) Early Career Award, 2023.

Karlin Bark, Ph.D., Postdoctoral Researcher, September 2010 through August 2012.
L'Oréal Postdoctoral "For Women in Science" Fellowship ($54,000 research grant) 2011–2012.
Now at Apple in Sunnyvale, USA.

Doctoral Students

Jan Ulrich "Uli" Bartels, September 2023 through present.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Co-advised by Michael Sedlmair, University of Stuttgart.

Naomi Tashiro, May 2022 through present.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Registered in the Graduate School of Advanced Research in Integrative Computational Design and Construction (IntCDC).

Arnaud Allemang--Trivalle, November 2021 through present.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Co-advised by Caroline Cao, University of Illinois, Urbana Champaign, and Mathieu Chollet, University of Glasgow (both formerly at IMT Atlantique).
Registered for a dual degree in Computer Science at the University of Stuttgart and IMT Atlantique.

Rachael L'Orsa, August 2021 through present.
Doctoral student in Electrical Engineering at the University of Calgary.
Co-advised by David Westwick and Garnette Sutherland, University of Calgary.

Iris Andrussow, April 2021 through present.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Co-advised by Georg Martius, Max Planck Institute for Intelligent Systems and University of Tübingen.
Registered in Computer Science at the University of Tübingen.

Natalia Sanchez-Tamayo, October 2020 through present.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Co-advised by Christoph Keplinger, Max Planck Institute for Intelligent Systems.

Guido Caccianiga, October 2020 through present.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Registered in Computer Science at the University of Tübingen.

Julian Nubert, July 2020 through present.
Doctoral student in the Max Planck ETH Center for Learning Systems (CLS).
Co-advised by Marco Hutter, ETH Zürich.
Registered in Mechanical Engineering at ETH Zürich.

Ifat Gertler, November 2019 through present.
Doctoral student in the International Max Planck Research School for Intelligent Systems.

Maria-Paola Forte, November 2019 through present.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Co-advised by Michael Black, Max Planck Institute for Intelligent Systems.
Registered in Computer Science at the University of Tübingen.

Nataliya Rokhmanova, September 2019 through present.
Doctoral student in the CMU ME/MPI-IS Collaborative Ph.D. Program.
Co-advised by Eni Halilaj, Carnegie Mellon University.
NSF Graduate Research Fellowship 2019–2022.
Participant, CHI Doctoral Consortium, 2023.
Registered in Mechanical Engineering at Carnegie Mellon University.

Behnam Khojasteh, August 2019 through present.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Registered in Mechanical Engineering at the University of Stuttgart.

Yijie Gong, August 2019 through present.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Registered in the Graduate School of Advanced Research in Integrative Computational Design and Construction (IntCDC).

Farimah Fazlollahi, April 2019 through present.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Registered in Computer Science at the University of Tübingen.

Rachael Bevill Burns, April 2018 through February 2024.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Initial stay at MPI-IS supported by a Whitaker Award.
Participant, HRI Pioneers, 2021.
First place, HRI 2021 Student Elevator Pitch Competition.
Participant, RSS Pioneers, 2023.
Dissertation: "Creating a Haptic Empathetic Robot Animal That Feels Touch and Emotion"
Registered in Computer Science at the University of Tübingen.

Mayumi Mohan, October 2017 through October 2023.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Dissertation: "Gesture-Based Nonverbal Interaction for Exercise Robots"
Dr. rer. nat. in Computer Science at the University of Tübingen, Tübingen, Germany.
Participant, HRI Pioneers, 2019.
Now a postdoctoral researcher (wrap-up contract) at MPI-IS, Stuttgart, Germany.

Ben Richardson, October 2017 through December 2022.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Dissertation: "Multi-Timescale Representation Learning of Human and Robot Haptic Interactions"
Dr. rer. nat. in Computer Science at the University of Stuttgart, Stuttgart, Germany.
Now a postdoctoral researcher (wrap-up contract) at MPI-IS, Stuttgart, Germany.

Saekwang Nam, September 2017 through October 2022.
Doctoral student in the International Max Planck Research School for Intelligent Systems.
Best Work-in-progress Poster, EuroHaptics 2020.
Honorable Mention, Best IEEE Transactions on Haptics Short Paper, IEEE World Haptics Conference 2021.
Dissertation: "Understanding the Influence of Moisture on Fingerpad-Surface Interactions"
Dr. rer. nat. in Computer Science at the University of Tübingen, Tübingen, Germany.
Now a Postdoctoral Researcher with Nathan Lepora at the University of Bristol, Bristol, UK.

Alexis E. Block, July 2017 through August 2021.
Doctoral student in the Max Planck ETH Center for Learning Systems (CLS).
Co-advised by Otmar Hilliges and Roger Gassert, ETH Zürich.
Participant, HRI Pioneers, 2018.
Co-General Chair, HRI Pioneers, 2019.
Winner of an NSF Computing Innovation Fellowship (CIFellows) in 2021.
Best Hands-On Demonstration (first author), EuroHaptics 2022.
Otto Hahn Medal, Max Planck Society, 2022.
Dissertation: "HuggieBot: an Interactive Hugging Robot with Visual and Haptic Perception"
Dr.Sc. in Computer Science at ETH Zürich, Zürich, Switzerland.
Was a Postdoctoral Researcher with Veronica Santos at the University of California, Los Angeles (UCLA), USA.
Now an Assistant Professor at Case Western Reserve University in Cleveland, Ohio, USA.

Eric Young, September 2015 through October 2020.
Doctoral student in Mechanical Engineering and Applied Mechanics at Penn.
NSF Graduate Research Fellowship 2015–2020 (two years deferred).
Intern at Oculus Research in Fall of 2018.
Dissertation: "Delivering Expressive and Personalized Fingertip Cues"
Was at Bright Machines, Seattle, Washington, USA.
Now a consultant with Meta, Kirkland, Washington, USA.

Siyao "Nick" Hu, September 2015 through May 2020.
Doctoral student in Mechanical Engineering and Applied Mechanics at Penn.
MEAM Masters Merit Scholarship (when pursuing a MEAM Masters at Penn).
Intern at Schlumberger-Doll Research in Fall of 2018.
Dissertation: "Modulating Physical Interactions in Human-Assistive Technologies"
Now at Amazon Robotics, Westborough, Massachusetts, USA.

Alex Burka, July 2014 through October 2018.
Doctoral student in Electrical and Systems Engineering at Penn.
NSF IGERT Traineeship in Complex Scene Perception 2013–2015.
Participated in the Machine Learning Summer School in Tübingen, Germany, 2015.
Dissertation: "Instrumentation, Data, and Algorithms for Visually Understanding Haptic Surface Properties"
Now at Exyn Technologies in Philadelphia, Pennsylvania, USA.

Naomi Fitter, August 2012 through August 2017.
Ph.D. in Mechanical Engineering and Applied Mechanics at Penn.
NSF IGERT Traineeship in Complex Scene Perception 2012–2014.
NSF Graduate Research Fellowship 2013–2017 (one year deferred).
Participated in the Human-Robot Interaction (HRI) Pioneers Workshop, 2014.
MEAM Department John A. Goff Prize 2016.
Dissertation: "Design and Evaluation of Interactive Hand-Clapping Robots"
Was a postdoctoral researcher with Maja Mataric at the University of Southern California in Los

Angeles, California, USA.
Now an Assistant Professor at Oregon State University in Corvalis, Oregon, USA.

Rebecca Pierce Khurshid, September 2010 through October 2015.
Ph.D. in Mechanical Engineering and Applied Mechanics at Penn.
NSF Graduate Research Fellowship 2011–2015 (one year deferred).
Best Teaching Assistant, Mechanical Engineering and Applied Mechanics, Spring 2013.
CTL Fellow Graduate Fellow for Teaching Excellence, 2013–2014.
Dissertation: "Increasing Transparency and Presence in Teleoperation Through Human-Centered Design"
Was a postdoctoral researcher with Julie Shah at MIT, Cambridge, USA.
Was an Assistant Professor at Boston University in Boston, USA.
Now at Boston Dynamics, Waltham, Massachusetts, USA.

Heather Culbertson, September 2010 through August 2015.
Ph.D. in Mechanical Engineering and Applied Mechanics at Penn.
NSF Graduate Research Fellowship 2011–2015 (one year deferred).
Best Demonstration, IEEE World Haptics Conference 2013.
Finalist for Best Paper, IEEE World Haptics Conference 2013.
Dissertation: "Data-Driven Haptic Modeling and Rendering of Realistic Virtual Textured Surfaces"
Was a postdoctoral researcher with Allison Okamura at Stanford University, Stanford, USA.
Now an Assistant Professor at the University of Southern California (USC) in Los Angeles, USA
IEEE Technical Committee on Haptics (TCH) Early Career Award, 2021.

William McMahan, September 2008 through May 2013.
Ph.D. in Mechanical Engineering and Applied Mechanics at Penn.
Best Poster in Session (of 17 posters), American Urological Association Annual Meeting 2011.
Best Demonstration, IEEE World Haptics Conference 2009.
Dissertation: "Providing Haptic Perception to Telerobotic Systems via Tactile Acceleration Signals"
Was at Neocis (medical robotics start-up) in Miami, Florida, USA.
Now at Berkshire Grey, Boston, USA.

Joseph M. Romano, September 2007 through May 2012.
Ph.D. in Mechanical Engineering and Applied Mechanics at Penn.
Best Teaching Assistant, Mechanical Engineering and Applied Mechanics, Fall 2008.
Best Teaser Presentation, IEEE Haptics Symposium 2010.
Intern at Willow Garage in Summer 2010.
Intern at Rethink Robotics in Winter 2012.
Dissertation: "Combining Tactile and Kinesthetic Information in Human and Machine Haptic Systems"
Now at Berkshire Grey, Boston, USA.

Masters Thesis Students

Arekh Tiwari, thesis to be submitted in March 2024.
M.Sc. in Embedded Systems at Saarland University, to be examined by Prof. Jürgen Steimle.
Thesis: "Estimating Contact Forces across Soft Capacitive Tactile Sensors using Machine Learning"

Fabian Raphael Krauthausen, thesis submitted in May 2021.
M.Sc. in Software Engineering at the University of Stuttgart, examined by Prof. Michael Sedlmair.
Thesis: "Robotic Surgery Training in AR: Multimodal Record and Replay"

Robert Faulkner, Samantha Melnyk, Tamara Rosales, and Naomi Tashiro, graduated in October 2019.
M.Sc. in Integrative Technologies and Architectural Design Research (ITECH) at the University of Stuttgart, examined by Prof. Achim Menges.
Thesis: "Haptic Reality: Novel Interfacing for Informed Assembly Systems"
Naomi Tashiro is now a doctoral student with me in IMPRS-IS at MPI-IS.

Maria-Paola Forte, graduated in July 2018.
M.S. in Biomedical Engineering at Politecnico di Milano, examined by Prof. Elena De Momi.
Thesis: "Robust Visual Augmented Reality for Robot-Assisted Surgery"
Now a doctoral student with me in IMPRS-IS at MPI-IS.

Alexis E. Block, graduated in May 2017.
M.S.E. in Robotics at Penn.
Thesis: "How Should Robots Hug?"
Completed her doctorate with me in the Center for Learning Systems at MPI-IS / ETH-Zurich.

Ernest "Ted" Gomez, graduated in May 2013.
M.D./M.T.R. (Masters in Translational Research) at Penn.
Thesis: "The Role of Haptic Tool Vibrations in Skill Acquisition and Assessment in Minimally Invasive Robotic Surgery"
Now at Beth Israel Deaconess Medical Center, Department of Otolaryngology, Harvard Medical School.

Diane Tam, graduated in September 2012.
M.S. Student with HCI Sub-Specialization at the University of British Columbia.
Co-advised by Karon MacLean and Joanna McGrenere.
Thesis: "The Design and Field Observation of a Haptic Notification System for Timing Awareness During Oral Presentations"

Yunqing "David" Wang, graduated in December 2011.
M.S.E. in Bioengineering at Penn.
Thesis: "HALO: Haptic Alerts for Low-hanging Obstacles in White Cane Navigation"
Now at the U.S. Patent Office in Alexandria, Virginia, USA.

Pulkit Kapur, graduated in May 2010.
M.S.E. in Mechanical Engineering and Applied Mechanics at Penn.
Thesis: "StrokeSleeve: Spatially Distributed Tactile Feedback for Kinesthetic Motion Guidance"

Kyle N. Winfree, graduated in August 2009.
M.S.E. in Robotics at Penn.
Thesis: "An Ungrounded Haptic Torque Feedback Device: The iTorqU"
Was a Postdoc at the University of Delaware, USA.
Now an Assistant Professor at Northern Arizona University in Flagstaff, Arizona, USA.

Undergraduate Thesis Students

Austin Remington, graduated May 2014.
B.S. in Biological Basis of Behavior (BBB) at Penn, with honors.
Honors Thesis: "The Effect of Audio Tool Vibrations on Performance in Laparoscopic Surgery"
Now a Medical Student at Stanford University, California, USA.

Visiting and Rotating Graduate Students

Autumn Hughes, September 2022 – November 2023.
Initial research stay funded by a Fulbright Fellowship.

Yoojin Oh, July 2022 – March 2023.
Doctoral student in Computer Science at the University of Stuttgart, Stuttgart, Germany, advised by Jim Mainprice and Marc Toussaint.

Christian Schöffmann, September 2021 – May 2022.
Doctoral student in Electrical Engineering at Alpen-Adria Universität, Klagenfurt, Austria, advised by Hubert Zangl.

Neha Thomas, August 2019 – June 2021.
Doctoral student in Biomedical Engineering at the Johns Hopkins University, Baltimore, USA, advised by Jeremy Brown.
First ten months of stay funded by a Fulbright Fellowship.

Cara Nunez, September 2019 – September 2020.
Doctoral student in Bioengineering at Stanford University, Stanford, USA, advised by Allison Okamura.
First part of exchange funded by a Deutscher Akademischer Austauschdienst (DAAD) scholarship.

Jeong-Hyun Cho, August 2019 – January 2020.
Doctoral student in Brain and Cognitive Engineering at Korea University, Seoul, South Korea, advised by Seong-Whan Lee.
Exchange funded by an AI graduate student fellowship from the Korean government.

Young-Eun Lee, August 2019 – January 2020.
Doctoral student in Brain and Cognitive Engineering at Korea University, Seoul, South Korea, advised by Seong-Whan Lee.
Exchange funded by an AI graduate student fellowship from the Korean government.

Hyunkyu Park, July 2019 – October 2019.
Doctoral student in Mechanical Engineering at KAIST, Daejeon, South Korea, advised by Jung Kim.

Preeti Vyas, January 2019 – April 2019.
Masters student in Electrical and Computer Engineering at McGill University, Montreal, Canada, advised by Jeremy Cooperstock.
Exchange funded by a Mitacs Globalink Research Award.

Kyungseo Park, June 2018 – November 2018.
Doctoral student in Mechanical Engineering at KAIST, Daejeon, South Korea, advised by Jung Kim.
Best Poster (second author), IROS RoboTac Workshop 2019.

Rachael L'Orsa, May 2018 – August 2018.
Doctoral student in Electrical Engineering at the University of Calgary, Canada, advised by Chris Macnab.
Exchange funded by a Deutscher Akademischer Austauschdienst (DAAD) scholarship.

Canaan Ng, September 2016 – December 2016.
Masters student in Mechanical Engineering at the University of Calgary, Canada, advised by Kourosh Zareinia.
Exchange funded by a Canada Graduate Scholarship Michael Smith Foreign Study Supplement.

Andrés Bur, M.D., July 2014 – December 2014.
Resident in Otorhinolaryngology (ENT) at the University of Pennsylvania.

Claudio Pacchierotti, January 2014 – July 2014.
Doctoral student in Advanced Robotics at the Italian Institute of Technology, Italy, and in Information Engineering and Mathematical Sciences at the University of Siena, Italy, advised by Domenico Prattichizzo.
EuroHaptics Society Best Ph.D. Thesis Award 2015.
Was a postdoctoral researcher at IIT, Genoa, Italy.
Now a CNRS scientist at IRISA and Inria, Rennes, France.

Yosuke Kurihara, September 2012 – December 2012.
Masters student in Informatics at The University of Electro-Communications (UEC), Japan, advised by Hiroyuki Kajimoto.
Now an R&D engineer at Sony Computer Entertainment, Tokyo, Japan.

Gabjong Han, October 2011 – January 2012.
Doctoral student in Computer Science and Engineering at Pohang University of Science and Technology (POSTECH), Korea, advised by Seungmoon Choi.

Rahul Chaudhari, September 2011 – November 2011.
Doctoral student in Media Technology at Technische Universität München (TUM), Germany, advised by Eckehard Steinbach.
Supported by a $2,000 student exchange award from the IEEE Technical Committee on Haptics.

Research Engineers, Technicians, and Administrative Staff

Natalia Egana Rosa, October 2020 – present.
Technical assistant at the Max Planck Institute for Intelligent Systems.

Lijuan Wang, Ph.D., October 2020 – present.
Post-masters research engineer at the Max Planck Institute for Intelligent Systems.

Maria-Paola Forte, March 2018 – October 2019.
Post-masters research engineer at the Max Planck Institute for Intelligent Systems.

Farimah Fazlollahi, March 2018 – March 2019.
Post-masters research engineer at the Max Planck Institute for Intelligent Systems.

Joey Burns, November 2017 – present.
IT administrator at the Max Planck Institute for Intelligent Systems.

Ildikó Papp-Wiedmann, October 2017 – December 2020.
Administrative assistant (50%-75% position) for my Managing Director duties at the Max Planck Institute for Intelligent Systems.

Gemma Ciabattoni, September 2017 – August 2018.
Post-bachelors research engineer at the Max Planck Institute for Intelligent Systems.

Ilona Jacobi, January 2017 – present.
Administrative assistant for my department at the Max Planck Institute for Intelligent Systems.

Paul Kress, October 2016 – present.
Post-masters research engineer at the Max Planck Institute for Intelligent Systems.

Michaela Wieland, October 2016 – February 2020.
Technical assistant at the Max Planck Institute for Intelligent Systems.

Craig McDonald, June 2012 – July 2013.
Post-bachelors research engineer at the University of Pennsylvania.

Jamie Gewirtz, June 2010 – August 2010.
Post-masters research engineer at the University of Pennsylvania.

Non-thesis Graduate Students

Many additional graduate students work with me and my team members without writing a thesis. Research is typically performed for hourly pay or an intern salary; occasionally it has been for independent study course credit or on a volunteer basis. 36 such students worked with me at the University of Pennsylvania between 2007 and 2017. As of January 2023, approximately 14 such students have worked with me at MPI-IS.

Non-Thesis Undergraduate Students

I have also recruited and mentored a large number of undergraduate researchers. Research is typically performed for hourly pay or an intern salary; occasionally it has been for independent study course credit or on a volunteer basis. Over 60 undergraduate researchers worked with me at the University of Pennsylvania between 2007 and 2016. Several of these students went on to Ph.D. research with competitive national fellowships. As of January 2023, approximately 20 such students have worked with me at MPI-IS.

High-School Students

My team has also hosted about 28 high-school students as volunteer research interns. At Penn, they would typically work with us for between one and four weeks, often in the summer before starting university. At MPI-IS, such students usually join us for one week during the school year as a BOGY intern.

Selected Senior Design Projects at the University of Pennsylvania

2015–2016: "PoDSaR: A Portable and Distributed Search and Report Robotic Platform" by Alexis E. Block, Daniel Krupka, Jordan Martin, and Aravind Rao. Interdisciplinary senior design project hosted by MEAM. Finalists for the 2016 Penn President's Innovation Prize (Block and Krupka).

2014–2015: "BionUX: Bionic Upper Extremity: A Transhumeral Prosthesis with Sensory Feedback" by Freddy Hernandez, Adrian Lievano, Matt Lisle, Aadu Prakash, and Steven Xing. Interdisciplinary senior design project hosted by MEAM. Winners of PennVention 2015. Finalists and first place (seven such awards given) in the Intel/Cornell Cup USA. Couloucoundis prize for best presentation of a senior design project in MEAM.

2014–2015: "AutoBCD: Automatic Buoyancy Compensation Device for SCUBA Diving" by Pete Furlong, Matt Gus, Nick Pirri, and James Sui. MEAM senior design project.

2014–2015: "ForceField" by David Baker, Tyler Caron, Colin Feo, and Preston Morris. Interdisciplinary senior design project hosted by ESE and co-advised by Heather Culbertson. Ketterer prize for best design in ESE. First honorable mention in SEAS Senior Design Competition.

2013–2014: "VITAL: Continuous Noninvasive Data Acquisition System to Monitor Cardiovascular Health" by Monica Cho, Eza Koch, Michael Lautman, and Nicole Xu. Interdisciplinary senior design project hosted by BE. Participated in the Intel/Cornell Cup USA (only twenty teams from across the country).

2012–2013: "Tactile Feedback for Monopolar Electrocautery in Minimally Invasive Surgery" by Nicki Blumenfeld, Anna Brzeszinski, Brian Horwich, and Zach Shurden. BE senior design project co-advised by Ernest D. Gomez. One of the best three projects in BE. First place overall in SEAS senior design competition.

2012–2013: "KneeCAP: Catching ACL Tears Before They Happen" by Josh Black, Pablo Castillo, Kun He Lee, and Dan Zhou. Interdisciplinary senior design project hosted by BE and co-advised by Dr. Erin Vasudevan.

2011–2012: "D1GIT: Automated, Temperature-Calibrated Measurement of Capillary Refill Time" by Annett Bordoley, Rikki Irwin, Viraj Kalyani, Craig McDonald, and Dorsey Standish. MEAM senior design project sponsored by Dr. Vinay Nadkarni. Tatnall Prize for most outstanding project. Fifth place overall in SEAS senior design competition. Second honorable mention in the Diagnostic Devices Category of the 2012 DEBUT (Design by Biomedical Undergraduate Teams) Competition.

2011–2012: "Weight-Bearing Casting System for Transfemoral Prostheses" by Melissa Cedarholm, Duyun Chen, Gregory Lee, and Zameer Merchant. BE senior design project. One of the best three projects in BE. Advanced to SEAS senior design competition.

2010–2011: "High-Fidelity Mannequin Chest for CPR Training" by Michael Boyle, Nihar Dharamsey, Simon Healey, Nihar Naik, and Andrew Stanley. MEAM senior design project co-advised by Matt Maltese. Couloucoundis prize for best presentation of a senior design project in MEAM. Tied for fourth place overall in SEAS senior design competition. Gold Award in James F. Lincoln Arc Welding Foundation Division IV Design Competition.

2009–2010: "Robotic Self-Feeder for Children with Cerebral Palsy" by Cynthia Ericksen, Mallory Jensen, Monica Sachs, and Monica Thomas. MEAM senior design project.

2008–2009: "ROGER: Rapidly Orienting Green-Eyed Robot" by Kate Chovanetz, Matthew MacMillan, and Travis Van Schoyck. MEAM senior design project co-advised by Mark Yim. Couloucoundis prize for best presentation of a senior design project in MEAM. Advanced to SEAS senior design competition.

Thesis and Exam Committees (omitting my own students)

2024: Dr. rer. nat. examiner for Yoojin Oh (student of Jim Mainprice and Marc Toussaint, University of Stuttgart)

2023: Dr. rer. nat. examiner for Alexander Achberger (student of Michael Sedlmair, University of Stuttgart)
Ph.D. proposal committee for Anika Kao (student of Greg Gerling, University of Virginia)

2021: Dr.Sc. examiner for Carmelo Sferrazza (student of Raffaelo D'Andrea, ETH Zürich)
Ph.D. examiner for Victor Rodrigo Mercado Garcia (student of Anatole Lecuyer, INSA Rennes)
Ph.D. examiner for Bushra Sadia, (student of Cagatay Basdogan, Koc University)

2020: Ph.D. examiner for Xi Lin (student of Michaël Wiertlewski, Aix-Marseille Université)

2019: Ph.D. dissertation committee for Jenifer Miehlbradt (student of Silvestro Micera, EPFL)
Ph.D. dissertation committee for Nadia Barbara Figueroa Fernandez (student of Aude Billard, EPFL)

2018: Ph.D. dissertation committee for Matteo Rossi (student of Antonio Bicchi, University of Pisa)
Ph.D. dissertation committee for Wenzhen Yuan (student of Edward Adelson and Mandayam Srinivasan, MIT)
Ph.D. dissertation committee for Mabel Zhang (student of Kostas Daniilidis, CIS, Penn)
Ph.D. dissertation committee for Firas Abi-Farraj (student of Paolo Robuffo Giordano and Claudio Pacchierotti, CNRS/Irisa/Inria)

2017: Ph.D. dissertation committee for Marco Janko (student of Yon Visell and Moshe Kam, ECE, Drexel)

2016: Ph.D. WPE II committee for Mabel Zhang (student of Kostas Daniilidis, CIS, Penn)
BE Department Ph.D. qualifying exam for one student.

2015: Ph.D. dissertation committee for Pengfei Huang (student of Norm Badler, CIS, Penn)
Ph.D. qualifying exam committee for Yitian Shao (student of Yon Visell, ECE, Drexel)
Ph.D. proposal committee for Marco Janko (student of Yon Visell, ECE, Drexel)
MEAM Department Ph.D. qualifying exam for one student.

2014: Ph.D. dissertation committee for Francesco Chinello (student of Domenico Prattichizzo, University of Siena)
Ph.D. dissertation committee for Claudio Pacchierotti (student of Domenico Prattichizzo, University of Siena)
Ph.D. dissertation committee for Adrian Ramos Peon (student of Domenico Prattichizzo, University of Siena)
Ph.D. qualifying exam committee for Jeff Gregorio (student of Youngmoo Kim, ECE, Drexel)
MEAM Department Ph.D. qualifying exams for two students.

2013: Ph.D. qualifying exam committee for Matthew Prockup (student of Youngmoo Kim, ECE, Drexel)
Ph.D. qualifying exam committee for Bin Li (student of Adam Fontecchio, ECE, Drexel)
M.T.R. thesis committee for Daniel Hashimoto (student of Noel Williams, Surgery, Penn)
MEAM Department Ph.D. qualifying exams for six students

2012: Ph.D. dissertation committee for Amy Blank (student of Louis Whitcomb and Allison Okamura, ME, Johns Hopkins University)
Ph.D. proposal committee for Pengfei Huang (student of Norm Badler, CIS, Penn)
MEAM Department Ph.D. qualifying exam for one student

2011: Ph.D. proposal and dissertation committee for Paul White (student of Mark Yim, MEAM, Penn)
Ph.D. proposal and dissertation committee for Chris Thorne (student of Mark Yim, MEAM, Penn)
MEAM Department Ph.D. qualifying exams for three students

2010: Ph.D. dissertation committee for Netta Gurari (student of Allison Okamura, ME, Johns Hopkins University)
MEAM Department Ph.D. qualifying exam for one student

2009: MEAM Department Ph.D. qualifying exams for two students

2008: MEAM Department Ph.D. qualifying exams for three students

Instruction and Course Development

Undergraduate Courses

Engineering Mechanics: Dynamics This sophomore-level lecture course investigates the motion of bodies and the forces involved in their motion, focusing on particle and rigid body models. Students attend lectures and recitation, complete weekly problem sets, do individual and pair-programming dynamic simulation problems using Matlab, and take three examinations. *MEAM 211 at the University of Pennsylvania: 68 students in Spring 2010, 58 in Spring 2011, 72 in Spring 2012, 75 in Spring 2013, 81 in Spring 2014, 93 in Spring 2015, and 85 in Spring 2016.*

Introduction to Mechanics Lab (new course) This freshman-level laboratory class investigates the concepts of classical mechanics through weekly hands-on experiments, many of which use Matlab and a custom camera-based motion-capture system. Each week, students read the lab workbook, take an in-class pre-lab quiz, work through the lab's activities in teams of three, and complete a follow-on post-lab assignment. *MEAM 147 at the University of Pennsylvania: 38 students in Fall 2007, 71 in Fall 2008, 70 in Fall 2009, and 78 in Fall 2010.*

I also taught a three-week version of this class in a summer program that helps prepare incoming undergraduate students for college-level engineering classes. *PFP at the University of Pennsylvania: 15 students in Summer 2008, 14 in Summer 2009, and 13 in Summer 2010.*

Assorted Other Topics (as a teaching assistant) I worked as a teaching assistant for eight quarters as a graduate student at Stanford University. Five quarters were spent as a TA in the Product Realization Laboratory, teaching mechanical design and manufacturing in affiliation with the ME 203 course. The other courses I helped teach were Computer-Aided Design and Prototyping (ME 213), Control System Design and Simulation (E 206), Statics (E 14), and Dynamics (E 15).

Graduate Courses

Introduction to Robotics This course presents the fundamental kinematic, dynamic, and computational principles underlying most modern robotic systems. The main topics include coordinate transformations, forward kinematics of manipulators, inverse kinematics of manipulators, trajectory planning, motion planning, velocity kinematics and jacobians, sensing and actuation, joint dynamics, feedback control, and haptic interfaces. The material is reinforced with hands-on lab exercises including robot arm control and haptic rendering. *MEAM 520 at the University of Pennsylvania: 103 students in Fall 2012, 94 students in Fall 2013, 99 students in Fall 2014, 117 in Fall 2015, and 150 in Fall 2016.*

Haptic Interfaces (new course) This course provides an introduction to research in the field of haptics, which involves human interaction with real, remote, and virtual objects through the sense of touch. The course includes lectures, written and hands-on homework assignments, research paper discussion and presentation, and semester-long team projects. Many of these student projects lead to further research and conference publications. *MEAM 625 at the University of Pennsylvania: 19 students in Spring 2008, 14 in Spring 2009, and 28 in Fall 2010.*

Professional Service

Conference Chairing and Editing

2025 Editor-in-Chief, Conference Editorial Board (CEB), IEEE World Haptics Conference (WHC).

2023 Associate Editor-in-Chief, CEB, IEEE World Haptics Conference (WHC). This is the top international conference in haptics, and it took place in Delft, the Netherlands, from July 10 to July 13, 2023. In this role, I worked closely with the other three members of the CEB (Fernando Bello, Seungmoon Choi, and Karon MacLean) to manage the review of the 146 technical papers submitted directly to this conference, along with the many short papers rejected from the *IEEE Transactions on Haptics*. I ran the "Technology and Systems" subcommittee of the CEB. Among many other changes, we introduced double-blind review for the first time in an IEEE RAS haptics or robotics conference.

2018 Co-Chair, IEEE Haptics Symposium, which took place in San Francisco, California, USA, from March 25 to March 28, 2018. In this role, I worked closely with Co-Chair Gregory Gerling (University of Virginia, USA) to oversee all aspects of this independent conference. The duties were similar to those of 2016, as described below.

2016 Co-Chair, IEEE Haptics Symposium, which took place in Philadelphia, Pennsylvania, USA. In this role, I worked closely with Co-Chair Seungmoon Choi (POSTECH, South Korea) to oversee all aspects of this independent conference, including the following items:

- Recruited and managed the 22-member Organizing Committee, the 20-member Program Committee, and the 13-member WIP Editorial Board.
- Managed the scientific review process and made final acceptance/rejection decisions on 107 technical paper submissions and 44 work-in-progress paper submissions.

- Helped arrange the program of oral presentations, poster presentations, hands-on demonstrations, student innovation challenge entries, and exhibits.
- Recruited plenary speakers Ken Salisbury and Bobby Klatzky.
- Led all local arrangements work, including selecting conference venue, selecting banquet venue, scheduling room use, planning food and entertainment, handling on-site supplies and logistics, and organizing technical tours.
- Planned and hosted the VIP dinner at my house.
- Worked with others to secure $27,000 in sponsorship from industry and academia.
- Oversaw publicity and email communication with authors and attendees.
- Created and edited content for the conference website.
- Curated and posted galleries of about 2500 photographs from the conference.
- Conducted a post-conference survey of the 233 attendees. Of the 87 respondents, 57% rated the conference as Excellent, 41% rated it Good, and 1% rated it Neutral. None rated it Poor or Terrible.

Program Committees, Conference Organization, and Other Research Leadership Roles

2021 Member, Best Paper Award Committee, IEEE International Conference on Robotics and Automation (ICRA).
2021 Associate Editor, IEEE International Conference on Robot and Human Interactive Communication (RO-MAN).
2021 Program Committee, IEEE World Haptics Conference.
2020 Awards Chair, IEEE Haptics Symposium.
2018–2021 Member, World Haptics Steering Committee.
2018 Co-Organizer (with Hasti Seifi, Karon MacLean, Farimah Fazlollahi, Gunhyuk Park, and Michael Opperman), half-day workshop on "Haptipedia: An interactive database for selecting, ideating, and learning about grounded force-feedback devices," AsiaHaptics.
2018 Member, Best Paper Awards Committee, Robotics Science and Systems (RSS) Conference.
2017 Judge, Best Hands-on Demonstration Award, IEEE World Haptics Conference.
2017 Program Committee, IEEE World Haptics Conference.
2016–2021 Member, Management Committee, IEEE Transactions on Haptics.
2016–2017 Member, Advisory Board, ExCITe Center, Drexel University.
2016 Associate Editor, IEEE International Conference on Robot and Human Interactive Communication (RO-MAN).
2015 Judge, Best Hands-on Demonstration Award, IEEE World Haptics Conference.
2015 Co-Organizer (with Claudio Pacchierotti and Domenico Prattichizzo), half-day workshop on "Cutaneous Feedback for Teleoperation in Medical Robotics," IEEE World Haptics Conference.
2015 Work-in-Progress Editor, IEEE World Haptics Conference.
2015–2017 Co-Chair, IEEE Technical Committee on Haptics.
2014 Program Committee, EuroHaptics.
2014 Co-Organizer (with Heather Culbertson), half-day tutorial on "Haptic Rendering of Textures," IEEE Haptics Symposium.
2014 Publications Chair, IEEE Haptics Symposium.
2014 Associate Editor, IEEE Haptics Symposium.
2013 Associate Editor, IEEE World Haptics Conference.
2012 Participant, Second Roadmapping Workshop on US Medical and Healthcare Robotics.
2012 Area Chair, Robotics: Science and Systems (RSS) Conference.
2012 Associate Editor, IEEE International Conference on Robotics and Automation (ICRA).
2012 Program Committee, IEEE Haptics Symposium.
2012 Website Advisor and Organizing Committee Member, IEEE Haptics Symposium.
2011 Co-chair (with Marcia O'Malley and Yasu Yokokohji), special sessions on haptic interfaces, IEEE/RSJ Conference on Intelligent Robots and Systems (IROS).
2011 Associate Editor, IEEE World Haptics Conference.
2011 Associate Editor, IEEE International Conference on Robotics and Automation (ICRA).
2010 Publicity Chair, Robotics: Science and Systems (RSS) Conference.
2010 Co-Chair of Posters, Demonstrations and Exhibits, IEEE Haptics Symposium.
2010 Program Committee, IEEE Haptics Symposium.
2008 Program Committee, IEEE Haptics Symposium.

Reviews

Site reviewer: National Centre of Competence in Research (NCCR) Robotics at ETH Zurich and EPFL in Switzerland, 2016 – 2022. Review of annual report and on-site evaluation in most years.

Journal paper reviews: IEEE Transactions on Haptics, IEEE Transactions on Robotics, IEEE Robotics and Automation Letters (RA-L), IEEE Transactions on Visualization and Computer Graphics (TVCG), IEEE/ASME Transactions on Mechatronics, IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE), IEEE Transactions on Biomedical Engineering (TBME), IEEE Transactions on Medical Robotics and Bionics (TMRB), IEEE Transactions on Systems, Man, and Cybernetics (TSMC), IEEE Transactions on Human-Machine Systems (THMS), IEEE Transactions on Control Systems Technology (TCST), IEEE Transactions on Instrumentation and Measurement (TIM), IEEE Transactions on Industrial Informatics (TII), Proceedings of the IEEE, International Journal of Robotics Research (IJRR), International Journal of Social Robotics (IJSR), Autonomous Robots, Presence: Teleoperators and Virtual Environments, ACM Transactions on Computer-Human Interaction (TOCHI), Human-Computer Interaction, International Journal of Human-Computer Interaction, Simulation in Healthcare, ASME Journal of Computing and Information Science in Engineering, Applied Science, ACM Transactions on Applied Perception (TAP), Advanced Intelligent Systems (AIS), PLoS ONE, Journal of the Royal Society Interface, Nature Machine Intelligence, Science Robotics, Science, Nature.

Conference paper reviews: In addition to the conference program committees listed earlier, occasional reviews are provided for numerous annual and biannual conferences, including IEEE World Haptics Conference (WHC), IEEE International Conference on Robotics and Automation (ICRA), ACM/IEEE Human-Robot Interaction (HRI), HRI Pioneers, Robotics: Science and Systems (RSS), IEEE International Conference on Soft Robotics (RoboSoft), IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN), IEEE Virtual Reality (VR), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob), EuroHaptics, MobileHCI, ACM Conference on Human Factors in Computing Systems (CHI), ACM International Conference on Interactive Tabletops and Surfaces (ITS), Virtual Reality Software and Technology (VRST), ASME Dynamic Systems and Controls Conference (DSC), IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI), International Symposium on Robotics Research (ISRR), International Symposium on Experimental Robotics (ISER), International Conference on Social Robotics (ICSR).

Grant proposal reviews: four review panels for the U.S. National Science Foundation; member of the Cyber Valley Research Board; ad hoc proposal reviews for the U.S. National Science Foundation, the U.S. National Institutes of Health, the Canadian Natural Sciences and Engineering Research Council, the Israel Science Foundation, the Dutch Research Council (NWO), the European Commission, the German Research Foundation (DFG), the Alexander von Humboldt Foundation, and the MPG Diversity Fund.

University/Institute Service

Max Planck Institute for Intelligent Systems

Spokesperson (2017–present) for the International Max Planck Research School (IMPRS-IS):

- Selecting and hiring the IMPRS-IS Coordinator, Dr. Leila Masri, as well as other key IMPRS-IS staff.
- Leading the nine-member IMPRS-IS Executive Board.
- Supervising the creation and refinement of the IMPRS-IS website, application portal, data management system, and other online tools.
- Managing annual rounds of doctoral student recruitment.
- Co-planning yearly on-site interviews for between 30 and 200 candidates.
- Co-planning yearly boot camp for IMPRS-IS students and faculty.
- Representing the school both internally and externally.
- Led the application to prolong the grant from the Max Planck Society that funds this school; secured six additional years of funding at a higher level than provided in the first six-year funding phase, with additional support from the State of Baden-Württemberg for the University of Stuttgart and the University of Tübingen.

Mentor, Glass Workshop (October. 2023 – present).

Mentor, Fine Mechanical Workshop (Mar. 2021 – present).

Leader, Gender Equality Plan (GEP) Committee (Mar. 2020 – present):

- Organized creation of the first MPI-IS GEP: it was submitted in both English and German in March 2021 and was rated gold.
- Organized creation of the second MPI-IS GEP: it was submitted in both English and German in January 2024.
- Leading implementation of both MPI-IS GEP's by heading the GEP Committee, including collection and regular reporting of detailed statistics related to gender across MPI-IS.

Mentor, Stuttgart IT Team (Jan. 2018 – present).

Overall Managing Director (Jul. 2019 – Dec. 2020):

- Leading the organization of the institute's multi-day off-site retreat in July of 2019.
- Planning and leading several meetings of the Overall Board of Directors per year.
- Formed new dedicated administration for MPI-IS.
- Worked closely with Scientific Coordinator (Matthias Tröndle), Head of Administration (Aline Dietrich), and other key staff to manage all aspects of the institute.

Managing Director (Jan. 2018 – Dec. 2020) for the Stuttgart site:

- Planning and leading several meetings of the Stuttgart Board of Directors per year.
- Representing MPI-IS in the Joint Commission with the MPI for Solid State Research.
- Managing the allocation and reallocation of space in institute buildings.
- Planning local personnel assignments and budgetary decisions.
- Planning, running, and presenting at internal and external institute events.
- Successfully nominated Prof. Marc Toussaint as a Max Planck Fellow.
- Helped hire Head of Administration Aline Dietrich.
- Working closely with other leaders to manage crises that arise.
- Co-leading the Stuttgart Max Planck Campus Crisis Unit's response to the COVID-19 pandemic, including dozens of meetings, dozens of email announcements, and four online town hall meetings.
- Representing our institute in meetings with visiting politicians, faculty, and other leaders.

University of Stuttgart

Member (2019–present) of the IntCDC Equal Opportunities Commission:

- Taking part in regular meetings about gender equality within the IntCDC Excellence Cluster.
- Helping plan and execute events and initiatives to advance equal opportunities.

Member (2018–present) of the Cooperation Council (Kooperationsrat):

- Taking part in strategic planning meetings.
- Reviewing internal grant proposals.

Department of Mechanical Engineering and Applied Mechanics at the University of Pennsylvania

Undergraduate Curriculum Chair (2013–2016):

- Served as the public face of the MEAM undergrad program, giving many presentations and meeting with many prospective students and their parents.
- Instantiated and organized a wide range of events for students, including the MEAM Summer Showcase and the MEAM Women's Dinner.
- Created and edited a weekly email newsletter for the 330 students in our program.
- Composed and sent course selection advice to each class of students (freshmen through seniors) at the start of each semester and during advance registration.
- Advised hundreds of students on academic and professional topics through one-on-one meetings and periodic drop-in advising sessions.
- Reinvigorated and managed MEAM Study Hall, evening sessions where MEAM Mentors help younger students with their homework.
- Handled all petitions submitted by MEAM students.
- Guided many students in crisis to receive support and manage their academic obligations.
- Created and organized the MEAM Student Teaching Award, which goes to the undergraduate or masters student who has contributed most to the educational mission of the MEAM undergraduate program each semester.

- Handled nominations and selection of all existing SEAS-wide and MEAM Department awards for undergraduate students.
- Ran an anonymous online survey of all MEAM undergraduates every summer, repeatedly earning an average overall grade of A- (on a scale from F to A+).

Faculty Hiring Committee (2014–2016)

Machine Shop Committee (2013–2016)

Senior Design Committee (2008–2010, 2012–2016)

Faculty Advisor for the American Society of Mechanical Engineers (ASME) Student Chapter (2013–2016)

Search Committee, Coordinator for Instructional Labs (2015)

Chair, Curriculum Subcommittee on Mechanical Systems and Design (2012–2013)

Search Committee, Part-time Lecturer for Senior Design (2012)

Search Committee, Department Chair for Mechanical Engineering and Applied Mechanics (2011)

Search Committee, Associate Director for Integrated Product Design masters program (2010–2011)

Graduate Admissions Committee (2007–2008, 2010, 2012, 2015)

Website Redesign Committee (2008–2010)

School of Engineering and Applied Science at the University of Pennsylvania

Consultative Search Committee, Dean of the School of Engineering and Applied Science (2014)

Co-Director of the NSF-Funded GRASP REU Site on Robotics (2012–2014)

Faculty Advisor for the Society of Women Engineers (SWE) Student Chapter (2009–2014)

Faculty Advisory Board, Advancing Women in Engineering (2007–2014)

Library Redesign Committee (2008–2009)

University of Pennsylvania

Faculty Advisor for the Trustees' Council on Penn Women (2009–2016)

Executive Committee, Institute for Research on Cognitive Science (2011–2013)

Numerous presentations to alumni, industrial partners, and prospective donors, plus interviews and lab tours for internal and external audiences

Personal

Born on June 13, 1978, in Los Angeles, California, USA.
Married to Jonathan Fiene since 2006.
Mother of two step-daughters born in 1999 and 2003.
English – native speaker.
German – intermediate, passed B2 exam in August 2021.
SCUBA diving – PADI Rescue Diver, completed more than 325 dives.