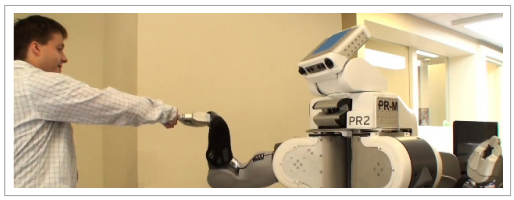

Joseph Romano

Education

2007–2012 **Ph.D. in Mechanical Engineering**, *University of Pennsylvania*, Philadelphia, PA.

2007–2010 **M.S. in Mechanical Engineering**, *University of Pennsylvania*, Philadelphia, PA.

2002–2007 **B.S. in Computer Science with Honors**, *Johns Hopkins University*, Baltimore, MD.

2002–2007 **B.S. in Mechanical Eng. with Honors**, *Johns Hopkins University*, Baltimore, MD.

Ph.D. Thesis

Title *Combining Tactile and Kinesthetic Information for Improvements in Human and Machine Haptic Systems*

Committee Dr. Katherine J. Kuchenbecker (advisor), Dr. Vijay Kumar, Dr. Mark Yim, and Dr. Seungmoon Choi

Description Tactile cues provide a wealth of information and have the potential to revolutionize both haptic display technology and the performance of autonomous robotics. However, this information only becomes meaningful when correlated with the motion that generated it. In my thesis I show that by tightly coupling sensing and acting, it is possible to engineer systems with unique and sophisticated capabilities.

Professional Experience

09/01/2013 - Present **Research Scientist**, *Kiva Systems*, North Reading, MA.
Project lead for various next-generation robotic developments within the Amazon.com fulfillment centers.

01/10/2012 - 09/01/2013 **Senior Robotics Engineer**, *Rethink Robotics*, Boston, MA.
Research and development for Rethink Robotics first flagship product, Baxter, an interactive human-safe sensor-based robot for manufacturing environments. Lead development for a variety of technical innovations including: interactive haptic feedback during robot task training, reactive motion control, robot tactile perception, force sensing and control, and dynamic modeling and calibration.[D2, D1]

Summer 2010 **Research Intern**, *Willow Garage*, Menlo Park, CA.
Researched and developed robot manipulation capabilities that are now core components of the ROS and PR2 robot framework.[A3]

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2006–2007 **Research Engineer**, *Johns Hopkins University Haptics Group*, Baltimore, MD.
Designed controllers for minimally invasive surgical systems, including steerable needles and snake-like robots.[A4]

Summer 2005 **Engineering Intern**, *Department of Defense EOD*, Picatinny Arsenal, NJ.
Reverse-engineered foreign munitions for the development of training simulations. Developed add-on components to allow the QinetiQ Talon and iRobot Packbot to better perform improvised explosive device (IED) detection and disarmament missions in the field.

Technical Skills

Programming and Computer-related

Highly Experienced: C/C++, Python, OpenGL, ROS, LaTeX, Linux, Octave/MATLAB

Moderately Experienced: RTAI/Xenomai, Java, network administration

Mechanical Design

Highly Experienced: Pro/E, Solidworks, rapid prototyping (3D and 2D)

Moderately Experienced: AutoCAD, CNC & manual mill/lathe

Electrical

Highly Experienced: SPI communication, surface-mount prototyping, microcontroller programming (AVR, STAMP, PIC), motor drive circuitry

Moderately Experienced: PCB design & fabrication, sensor integration, analog circuitry

Honors, Awards, and Professional Affiliations

Honors and Awards

Ashton Graduate Research Fellowship Award, 2007-2011

IEEE Haptics Symposium, Best Short Oral Presentation, 2010

Robotics and Automation Society Travel Grant, ICRA, 2010

National Science Foundation Travel Grant, ICRA, 2009

UPenn Outstanding Teaching Assistant Award in Mechanical Engineering, 2008

NSF Graduate Research Fellowship, Honorable Mention, 2006, 2007, 2008

ASME Maryland Regional Design Competition, 1^{st} Place Award, 2007

American College Hockey Association (ACHA) Academic All-American, 2006-2007

Affiliations

Upsilon Pi Epsilon (UPE), Computer Science Honor Society

Institute of Electrical and Electronics Eng. (IEEE), Robotics and Automation Society

Association for Computing Machinery (ACM)

American Society of Mechanical Engineers (ASME)

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Publications

Journal Publications

[A1] Joseph M. Romano, Jordan P. Brindza, and Katherine J. Kuchenbecker. Ros open-source audio recognizer: Roar environmental sound detection tools for robot programming. *Autonomous Robotics*, 34(3):207–215, 2013.

[A2] Joseph M. Romano and Katherine J. Kuchenbecker. Creating realistic virtual textures from contact acceleration data. *IEEE Transactions on Haptics*, 5(2):109–119, 2012.

[A3] 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.

[A4] Robert J. Webster, Joseph M. Romano, and Noah J. Cowan. Mechanics of precurved-tube continuum robots. *IEEE Transactions on Robotics*, 25(1):67–78, 2009.

Book Chapters

[B1] Katherine J. Kuchenbecker, Joseph M. Romano, and William McMahan. Haptography: Capturing and recreating the rich feel of real surfaces. In Cedric Pradalier, Roland Siegwart, and Gerhard Hirzinger, editors, *Robotics Research: The 14th International Symposium ISRR*, volume 70 of *Springer Tracts in Adanced Robotics*, pages 245–260. Springer Berling/Heidelberg, 2010.

[B2] Robert J. Webster III, John P. Swensen, Joseph M. Romano, and Noah J. Cowan. Closed-form differential kinematics for concentric-tube continuum robots with application to visual servoing. In Oussama Khatib, Vijay Kumar, and George Pappas, editors, *Experimental Robotics*, volume 54 of *Springer Tracts in Adanced Robotics*, pages 485–494. Springer Berling/Heidelberg, 2009.

Conference Publications

[C1] Stephen R. Gray, Joseph M. Romano, Jordan Brindza, Soonkyum Kim, Katherine J. Kuchenbecker, and Vijay Kumar. Planning manipulation and grasping tasks with a redundant arm. In *Proc. ASME 2011 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, August 2011.

[C2] Nils Landin, Joseph M. Romano, William McMahan, and Katherine J. Kuchenbecker. Dimensional reduction of high-frequency accelerations for haptic rendering. In *Haptics: Generating and Perceiving Tangible Sensations, Proc. EuroHaptics, Part II*, volume 6192 of *Lecture Notes in Computer Science*, pages 79–86. Springer, July 2010.

[C3] Jordan M. Croom, Daniel C. Rucker, Joseph M. Romano, and Robert J. Webster III. Visual sensing of continuum robot shape using self-organizing maps. In *Proc. IEEE International Conference on Robotics and Automation*, pages 4591–4596, May 2010.

[C4] Joseph M. Romano, Takashi Yoshioka, and Katherine J. Kuchenbecker. Automatic filter design for synthesis of haptic textures from recorded acceleration data. In *Proc. IEEE International Conference on Robotics and Automation*, pages 1812–1821, May 2010.

[C5] Kyle N. Winfree, Joseph M. Romano, Jamie Gewirtz, and Katherine J. Kuchenbecker. Control of a high fidelity ungrounded torque feedback device: The itorqu 2.1. In *Proc. IEEE International Conference on Robotics and Automation*, pages 1347–1352, May 2010.

[C6] William McMahan, Joseph M. Romano, Amal M. Abdul Rahuman, and Katherine J. Kuchenbecker. High frequency acceleration feedback significantly increases the realism of haptically rendered textured surfaces. In *Proc. IEEE Haptics Symposium*, pages 141–148, March 2010.

[C7] Joseph M. Romano, Stephen R. Gray, Nathan T. Jacobs, and Katherine J. Kuchenbecker. Toward tactilely transparent gloves: Collocated slip sensing and vibrotactile actuation. In *Proc. IEEE World Haptics Conference*, pages 279–284, March 2009.

[C8] 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 (MMVR17)*, January 2009.

[C9] Robert J. Webster III, Joseph M. Romano, and Noah J. Cowan. Kinematics and calibration of active cannulas. In *Proc. IEEE International Conference on Robotics and Automation*, pages 3888–3895, May 2008.

[C10] Joseph M. Romano, Robert J. Webster III, and Allison M. Okamura. Teleoperation of steerable needles. In *Proc. IEEE International Conference on Robotics and Automation*, pages 934–939, May 2007.

Patents

[D1] Elaine Chen, Rodney Brooks, Chris Buehler, Matthew Williamson, Bruce Blumberg, Noelle Dye, Joseph Romano, and W. Goodwin. User interface for robot. United States patent application #13/621,561, September 17 2012.

[D2] Matthew Williamson, Matthew DiCicco, and Joseph Romano. Constraining robotics manipulation with redundant degrees of freedom. United States patent application #61/701,900, September 17 2012.

[D3] Katherine J. Kuchenbecker, Joseph M. Romano, William McMahan, and Nils Landin. Systems and methods for capturing and recreating the feel of surfaces. Provisional United States patent application #61/369,254, July 30 2010.

Posters and Demonstrations

[E1] Joseph M. Romano, Nils Landin, William McMahan, and Katherine J. Kuchenbecker. Texturepad: Realistic rendering of haptic textures. Hands-on demonstration presented at EuroHaptics, Amsterdam, the Netherlands, July 2010.

[E2] 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.

[E3] Joseph M. Romano and Katherine J. Kuchenbecker. Realistic haptic contacts and textures for tablet computing. Hands-on demonstration presented at IEEE Haptics Symposium, Boston, Massachusetts, March 2010. Award: Best Short Oral Presentation.

[E4] Joseph M. Romano, Nathan Jacobs, and Stephen Gray. The haptic slip glove. Hands-on demonstration presented at IEEE World Haptics Conference, March 2009.

[E5] Joseph M. Romano, Robert J. Webster III, Noah J. Cowan, and Allison M. Okamura. Teleoperation of steerable needles. Poster. Johns Hopkins University Engineering Research Center, National Science Foundation (NSF) Engineering Research Center (ERC) Symposium, 2007.

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