

Kyle B. Reed

kylereed@eng.usf.edu

• <http://reedlab.eng.usf.edu>

• (813) 974-2385

last updated January 2, 2017

RESEARCH INTERESTS

My primary research interests are in designing devices that interact with humans, particularly doctors and physical therapists, haptics, rehabilitation, and engineering education. I strive to develop robots that follow implicit human interactions instead of requiring users to adapt to the apparatus and am also researching how the perception of a robot and surrounding environment affects the performance of an individual.

EDUCATION

Northwestern University, Evanston, Illinois

Ph.D. in Mechanical Engineering

June, 2007

- Thesis: *Understanding the Haptic Interactions of Working Together* (Advisor: Michael A. Peshkin)

Northwestern University, Evanston, Illinois

M.S. in Mechanical Engineering

December, 2004

- Thesis: *Specialization in Dyadic Shared Manual Tasks*

University of Tennessee, Knoxville, Tennessee

B.S. in Mechanical Engineering

May, 2001

- Minors in Material Science and Engineering Communications

RESEARCH EXPERIENCE

University of South Florida

- Associate Professor, Department of Mechanical Engineering
- Assistant Professor, Department of Mechanical Engineering

Aug, 2016 – present

Aug, 2009 – Aug, 2016

Johns Hopkins University, Post-Doctoral Fellow

Sep, 2007 – July, 2009

- Mentored by Allison M. Okamura and Noah J. Cowan
- Contributed to the design of a steerable needle with image based feedback for medical interventions.
- Formulated control algorithms to compensate for torsional friction in the steerable needle.
- Integrated stochastic models of the steerable needle with planning and control algorithms.
- Conceived and designed a portable mechanism to correct irregular walking patterns in patients with cerebellar damage.

Northwestern University, Graduate Research Assistant

2002 – 2007

- Designed and built an experimental testbed for studying human-human and human-robot physical interaction. Conceived and performed psychophysical experiments.
- Discovered an unsuspected latent capacity for haptic communication between partners. Dyads developed a new emergent strategy to divide the task while improving task performance.
- Modeled and implemented the human interaction in a robotic partner that surreptitiously took the place of one participant.
- Programmed the graphics, control algorithms, data acquisition, and servo control in C on QNX.

Los Alamos National Lab – Mechanical Engineer Intern

Summers of 2000 & 2001

- Used finite element and probabilistic analysis to determine the strength of explosion confinement vessels. Identified critical stress point that would categorically change the strength of the vessel.

Los Alamos National Lab – Computer Programmer Intern

Summers of 1998 & 1999

- Designed and wrote data analysis software for a missile explosion simulation.

CITATION COUNTS

H-index: 19 (i.e., nineteen papers cited at least nineteen times)
 i10-index: 31 (i.e., thirty one papers cited at least ten times)
 Total citations: 1259 (<http://scholar.google.com/citations?user=UtmQJt8AAAAAJ>)

REFEREED JOURNAL PUBLICATIONS

- [J1] A. Manasrah, N. Crane, R. Guldiken, and K. B. Reed, “Perceived constant cooling using asymmetrically-applied hot and cold stimuli,” *IEEE Trans. on Haptics*, preprint, DOI: 10.1109/TOH.2016.2578334.
- [J2] I. Handžić, H. Muratagic, and K. B. Reed, “Two-dimensional kinetic shape dynamics: Verification and application,” *Journal of Nonlinear Dynamics*, 2016. Article ID 8124015, DOI: 10.1155/2016/8124015.
- [J3] I. Handžić, H. Muratagic, and K. B. Reed, “Passive kinematic synchronization of dissimilar and uncoupled rotating systems,” *Nonlinear Dynamics*, vol. 15, no. 4, 2015.
- [J4] G. Yuen and K. B. Reed, “Engineering student self-assessment through a confidence-based scoring method,” *Advances in Engineering Education*, vol. 4, no. 4, pp. 1–23, 2015.
- [J5] I. Handžić and K. B. Reed, “Perception of gait patterns that deviate from normal and symmetric biped locomotion,” *Frontiers in Psychology*, vol. 6, 2015.
- [J6] I. Handžić and K. B. Reed, “Kinetic shapes: Analysis, verification, and application,” *Journal of Mechanical Design*, vol. 136, no. 6, 2014.
- [J7] I. Handžić and K. B. Reed, “The musical kinetic shape: A variable tension string instrument,” *Elsevier Applied Acoustics*, vol. 85, pp. 143–149, 2014.
- [J8] N. Valles and K. B. Reed, “To know your own strength: Overriding natural force attenuation,” *IEEE Trans. on Haptics*, vol. 7, no. 2, pp. 264–269, 2014.
- [J9] S. McAmis and K. B. Reed, “Effects of compliant coupling on cooperative and bimanual task performance,” *Journal of Rehabilitation Robotics*, vol. 1, no. 2, pp. 99–108, 2013.
- [J10] S. McAmis and K. B. Reed, “Simultaneous perception of forces and motions using bimanual interactions,” *IEEE Trans. on Haptics*, vol. 5, no. 3, pp. 220–230, 2012.
- [J11] I. Handžić, E. Barno, E. V. Vasudevan, and K. B. Reed, “Design and pilot study of a gait enhancing mobile shoe,” *Journal of Behavioral Robotics, Special Issue on Assistive Robotics*, vol. 2, no. 4, pp. 193–201, 2011.
- [J12] K. B. Reed, A. Majewicz, V. Kallem, R. Alterovitz, K. Goldberg, N. J. Cowan, and A. M. Okamura, “Robot-assisted needle steering: Technology to improve medical interventions,” *IEEE Robotics & Automation Magazine*, vol. 18, no. 4, pp. 35–46, 2011.
- [J13] S. Misra, K. B. Reed, B. W. Schafer, K. T. Ramesh, and A. M. Okamura, “Mechanics of flexible needles robotically steered through soft tissues,” *Int. J. Robot. Res.*, vol. 29, no. 13, pp. 1640–1660, 2010.
- [J14] K. B. Reed, A. M. Okamura, and N. J. Cowan, “Modeling and control of needles with torsional friction,” *IEEE Trans. Biomed. Eng.*, vol. 56, no. 12, pp. 2905–2916, 2009.
- [J15] K. B. Reed and M. A. Peshkin, “Physical collaboration of human-human and human-robot teams,” *IEEE Trans. on Haptics*, vol. 1, no. 2, pp. 108–120, 2008.
- [J16] K. B. Reed, M. A. Peshkin, M. J. Hartmann, M. Grabowecy, J. Patton, and P. M. Vishton, “Haptically linked dyads: Are two motor-control systems better than one?,” *Psychological Science*, vol. 17, no. 5, pp. 365 – 366, 2006.

BOOK CHAPTERS

- [B1] L. J. Elliott, S. B. Hottman, W. L. Christian, K. B. Reed. “Effects of Feedback Mapping on Human Control of Robotic Systems in Individual and Cooperative Tasks”. In *Human-Robot Interactions: Principles, Technologies and Challenges*, 2015, ISBN: 978-1-63463-774-9.
- [B2] K. B. Reed, I. Handzic and S. McAmis. “Home-based rehabilitation: enabling frequent and effective training”. In Artemiadis, Ed., *Neuro-Robotics: From Brain Machine Interfaces to Rehabilitation Robotics, Trends in Augmentation of Human Performance*, Vol. 2, 2014, ISBN: 978-9-4017-8931-8.
- [B3] K. B. Reed. “Cooperative Physical Human-Human and Human-Robot Interaction”. In A. Peer and C. Giachritsis, Eds., *Immersive Multimodal Interactive Presence*, Springer Series on Touch and Haptic Systems, 2012, ISBN: 978-1-4471-2754-3.
- [B4] N. J. Cowan, K. Goldberg, G. S. Chirikjian, G. Fichtinger, R. Alterovitz, K. B. Reed, V. Kallem, W. Park, S. Misra, and A. M. Okamura. “Robotic Needle Steering: Design, Modeling, Planning, and Image Guidance”. In J. Rosen, B. Hannaford, and R. Satava, Eds., *Surgical Robotics - Systems, Applications, and Visions*, Springer, December, 2011, ISBN: 978-1-4419-1125-4.

REFEREED CONFERENCE PUBLICATIONS

- [C1] S. Carey, K. B. Reed, A. Martori, T. Ramakrishnan, and R. Dubey, “Evaluating the gait of lower limb prosthesis users,” in *The International Symposium on Wearable Robotics (WeRob)*, 2016.
- [C2] D. Menychtas, T. Sullins, B. Rigsby, S. Carey, and K. B. Reed, “Assessing the role of preknowledge in force compensation during a tracking task,” in *Conf. Proc. IEEE Eng. Med. Biol. Soc. (EMBC)*, 2016.
- [C3] T. Ramakrishnan, H. Muratagic, and K. B. Reed, “Combined gait asymmetry metric,” in *Conf. Proc. IEEE Eng. Med. Biol. Soc. (EMBC)*, 2016.
- [C4] C. Lahiff, T. Ramakrishnan, S. H. Kim, and K. B. Reed, “Knee orthosis with variable stiffness and damping that simulates hemiparetic gait,” in *Conf. Proc. IEEE Eng. Med. Biol. Soc. (EMBC)*, 2016.
- [C5] A. Manasrah, R. Guldiken, and K. B. Reed, “Thermal comfort and perception inside air-conditioned areas,” in *ASHRAE Annual Conference*, 2016.
- [C6] T. Ramakrishnan and K. B. Reed, “Position and weight activated passive prosthetic knee mechanism,” in *Proc. Int. Mechanical Engineering Congress and Exposition (IMECE)*, 2015.
- [C7] D. Capecci, S. H. Kim, K. B. Reed, and I. Handzic, “Crutch tip for swing-through crutch walking control based on a kinetic shape,” in *Proc. IEEE Int. Conf. Rehabilitation Robotics (ICORR)*, 2015.
- [C8] I. Handzic and K. B. Reed, “Recognition of gait impairment evaluated using an artificial gait stimuli,” in *Proc. IEEE Int. Conf. Rehabilitation Robotics (ICORR)*, 2015.
- [C9] I. Handzic and K. B. Reed, “Analysis of human stepping dynamics using a Wii balance board with a webcam: A comparison study,” in *Proceedings of the 7th International Conference on Pervasive Technologies Related to Assistive Environments (PETRA)*, ACM, 2015.
- [C10] I. Handzic and K. B. Reed, “The ‘chopstick’ illusion: A simply demonstrated tactile illusion,” in *Haptics Symposium*, pp. 551–555, 2014.
- [C11] I. Handžić and K. B. Reed, “Validation of a passive dynamic walker model for human gait analysis,” in *Conf. Proc. IEEE Eng. Med. Biol. Soc. (EMBC)*, pp. 6945–6948, 2013.
- [C12] I. Handžić and K. B. Reed, “Comparison of the passive dynamics of walking on ground, tied-belt and split-belt treadmills, and via the gait enhancing mobile shoe (GEMS),” in *Proc. IEEE Int. Conf. Rehabilitation Robotics (ICORR)*, 2013.

- [C13] S. Kim and K. B. Reed, “Robot-assisted balance training for gait modification,” in *Proc. IEEE Int. Conf. Rehabilitation Robotics (ICORR)*, 2013.
- [C14] S. McAmis and K. B. Reed, “Design and analysis of a compliant bimanual rehabilitation device,” in *Proc. IEEE Int. Conf. Rehabilitation Robotics (ICORR)*, 2013.
- [C15] J. Sushko, C. Honeycutt, and K. B. Reed, “Prosthesis design based on an asymmetric passive dynamic walker,” in *Proc. IEEE EMBC Int. Conf. Biomedical Robotics and Biomechanics (BioRob)*, pp. 1116–1121, June 2012.
- [C16] K. B. Reed, “Assessment of student’s confidence of learned knowledge,” in *American Society for Engineering Education (ASEE) Annual Conference*, 2012.
- [C17] I. Handžić, E. Vasudevan, and K. B. Reed, “Developing a gait enhancing mobile shoe to alter over-ground walking coordination,” in *Proc. IEEE Int. Conf. Robot. Autom. (ICRA)*, pp. 4142–4129, May 2012.
- [C18] S. McAmis and K. B. Reed, “Application of haptic feedback to a combot,” in *Haptics Symposium*, pp. 553–557, March 2012.
- [C19] J. R. Cooper, M. M. Wernke, and K. B. Reed, “The effects of incongruent feedback on bimanual task performance,” in *Haptics Symposium*, pp. 301–305, March 2012.
- [C20] K. Khokar, R. Alqasemi, K. B. Reed, and R. Dubey, “Laser assisted combined teleoperation and autonomous control,” in *13th Robotics & Remote Systems for Hazardous Environments*, 2011.
- [C21] S. McAmis and K. B. Reed, “Symmetry modes and stiffnesses for bimanual rehabilitation,” in *Proc. IEEE Int. Conf. Rehabilitation Robotics (ICORR)*, pp. 1106–1111, June 2011.
- [C22] C. Honeycutt, J. Sushko, and K. B. Reed, “Asymmetric passive dynamic walker,” in *Proc. IEEE Int. Conf. Rehabilitation Robotics (ICORR)*, pp. 852–857, June 2011.
- [C23] I. Handžić and K. B. Reed, “Motion controlled gait enhancing mobile shoe for rehabilitation,” in *Proc. IEEE Int. Conf. Rehabilitation Robotics (ICORR)*, pp. 583–588, June 2011.
- [C24] H. G. Malabet, R. A. Robles, and K. B. Reed, “Symmetric motions for bimanual rehabilitation,” in *Proc. IEEE/RSJ Int Intelligent Robots and Systems (IROS) Conf*, pp. 5133–5138, 2010.
- [C25] K. Khokar, K. Reed, R. Alqasemi, and R. Dubey, “Laser-assisted telerobotic control for enhancing manipulation capabilities of persons with disabilities,” in *Proc. IEEE/RSJ Int. Conf. Intell. Robots Syst. (IROS)*, pp. 5139–5144, IEEE.
- [C26] A. Majewicz, T. Wedlick, K. B. Reed, and A. M. Okamura, “Evaluation of needle steering in ex vivo tissue,” in *Proc. IEEE Int. Conf. Robot. Autom. (ICRA)*, pp. 2068–2073, May 2010.
- [C27] W. Park, K. B. Reed, A. M. Okamura, and G. S. Chirikjian, “Estimation of model parameters for flexible needles,” in *Proc. IEEE Int. Conf. Robot. Autom. (ICRA)*, pp. 3703–3708, May 2010.
- [C28] S. Misra, K. B. Reed, K. T. Ramesh, and A. M. Okamura, “Observations of needle-tissue interactions,” in *Conf. Proc. IEEE Eng. Med. Biol. Soc. (EMBC)*, pp. 262–265, September 2009.
- [C29] K. B. Reed, A. M. Okamura, and N. J. Cowan, “Controlling a robotically steered needle in the presence of torsional friction,” in *Proc. IEEE Int. Conf. Robot. Autom. (ICRA)*, pp. 3476–3481, May 2009.
- [C30] S. Misra, K. B. Reed, B. W. Schafer, K. T. Ramesh, and A. M. Okamura, “Observations and models for needle-tissue interactions,” in *Proc. IEEE Int. Conf. Robot. Autom. (ICRA)*, pp. 2687–2692, May 12–17, 2009.

- [C31] A. de Groot, R. Decker, and K. B. Reed, “Gait enhancing mobile shoe (GEMS) for rehabilitation,” in *Proc. Joint Eurohaptics Conf. and Symp. on Haptic Interfaces for Virtual Environment and Teleoperator Systems (WHC)*, pp. 190–195, March 2009.
- [C32] K. B. Reed, “Compensating for torsion windup in steerable needles,” in *Proc. IEEE EMBC Int. Conf. Biomedical Robotics and Biomechanics (BioRob)*, (Scottsdale, AR, USA), pp. 936–941, October 2008.
- [C33] K. B. Reed, V. Kallem, R. Alterovitz, K. Goldberg, A. M. Okamura, and N. J. Cowan, “Integrated planning and image-guided control for planar needle-steering,” in *Proc. IEEE EMBC Int. Conf. Biomedical Robotics and Biomechanics (BioRob)*, (Scottsdale, AR, USA), pp. 819–824, October 2008.
- [C34] S. Misra, K. B. Reed, A. S. Douglas, K. T. Ramesh, and A. M. Okamura, “Needle-tissue interaction forces for bevel-tip steerable needles,” in *Proc. IEEE EMBC Int. Conf. Biomedical Robotics and Biomechanics (BioRob)*, pp. 224–231, October 2008.
- [C35] K. B. Reed, J. Patton, and M. Peshkin, “Replicating human-human physical interaction,” in *Proc. IEEE Int. Conf. Robot. Autom. (ICRA)*, pp. 3615–3620, April 2007.
- [C36] K. B. Reed, M. Peshkin, M. J. Hartmann, J. Patton, P. M. Vishton, and M. Grabowecky, “Haptic cooperation between people, and between people and machines,” in *Proc. IEEE/RSJ Int. Conf. Intell. Robots Syst. (IROS)*, pp. 2109–2114, October 2006.
- [C37] K. B. Reed, M. Peshkin, M. J. Hartmann, J. E. Colgate, and J. Patton, “Kinesthetic interaction,” in *Proc. IEEE Int. Conf. Rehabilitation Robotics (ICORR)*, pp. 569–574, June 2005.
- [C38] K. B. Reed, M. Peshkin, J. E. Colgate, and J. Patton, “Initial studies in human-robot-human interaction: Fitts’ law for two people,” in *Proc. IEEE Int. Conf. Robot. Autom. (ICRA)*, pp. 2333–2338, April 2004.

ABSTRACTS, POSTERS, AND NON-REFEREED CONFERENCE ARTICLES

- [A1] T. Ramakrishnan and K. B. Reed, “Anatomically Scalable Transfemoral Knee Design”, IAJC/ISAM International Conference, November 2016.
- [A2] M. Schlafly, T. Ramakrishnan, and K. B. Reed, “Effect of Knee Height on Gait Symmetry”, USFs College of Engineering Research Day, Tampa, October, 2016, awarded the *Research Day Winner*.
- [A3] J. Kahle, K. B. Reed, T. Ramakrishnan, T. Klenow, and J. Highsmith, “The Effect of Transfemoral Prosthetic Interface Design on Gait Biomechanics Using a CAREN System: IRC Compared to Brimless”, 99th AOPA National Assembly, September 2016.
- [A4] T. Ramakrishnan, J. Kahle, J. Highsmith, T. Klenow, and K. B. Reed, “Combined Gait Asymmetry Metric based on Biomechanics: Comparison of IRC, Brimless, and Able-body”, 99th AOPA National Assembly, September 2016.
- [A5] B. Rigsby and K. B. Reed, “Effect of Weight and Number of Fingers on Bimanual Force Recreation”, IEEE Eng. Med. Biol. Soc. (EMBC), 2016.
- [A6] S. H. Kim, I. Handzic, D. Huizenga, R. Edgeworth, M. Lazinski, T. Ramakrishnan, and K. B. Reed, “Initial Results of the Gait Enhancing Mobile Shoe on Individuals with Stroke”, IEEE Eng. Med. Biol. Soc. (EMBC), 2016.
- [A7] B. Rigsby and K. B. Reed, “Assessing the Effect of Experience on Bimanual Force Recreation”, IEEE Eng. Med. Biol. Soc. (EMBC), 2016.
- [A8] K. A. Hart, J. Chapin, and K. B. Reed, “Haptics Morse Code Communication for Deaf and Blind Individuals”, IEEE Eng. Med. Biol. Soc. (EMBC), 2016.

- [A9] S. Carey, K. B. Reed, and R. Dubey, “Evaluating and Optimizing Gait Enhancing Technologies Using a Virtual Reality Environment”, Workshop on Cognitive Mobility Assistance Robots at the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2015.
- [A10] B. Matlack and K. B. Reed, “Gait Efficiency Enhancing Shoe (GEES)”, USFs Annual Undergraduate Research Symposium, Tampa, April, 2013, awarded the *Excellence in Undergraduate Research Award*.
- [A11] K. B. Reed and S. H. Kim, “Gait modification in healthy individuals following robot-assisted balance training”, Neuroscience, 2012.
- [A12] D. Perez, P. Logan, and K. B. Reed, “Vibro-Vest: Directional Information in Three Dimensions”, Society of Hispanic Professional Engineers National Conference, 2012.
- [A13] J. Gaskell and K. B. Reed, “Development of Haptic Force-Feedback Controller”, USFs Annual Undergraduate Research Symposium, Tampa, April, 2011, awarded an *Honorable Mention*.
- [A14] C. Honeycutt, J. Sushko, and K. B. Reed, “Passive Dynamic Walkers and Their Effect on Gait Rehabilitation”, USFs Annual Undergraduate Research Symposium, Tampa, April, 2010.
- [A15] K. B. Reed, “Haptic Collaboration of Human-Human and Human-Robot Teams,” IEEE/RSJ International Conference on Intelligent Robotic Systems, Workshop on Haptic Human-Robot Interaction, St. Louis, USA, October, 2009.
- [A16] A. de Groot, R. Decker, and K. B. Reed. “Design of the Gait Enhancing Motion Shoe (GEMS) for the Improvement of Gait Irregularity Due to Stroke,” Colonial Academic Alliance Undergraduate Research Conference, Baltimore, USA, April, 2009.
- [A17] K. B. Reed, N. Cowan, and A. Okamura. “Torsion Windup in Steerable Needles,” Needle Steering Workshop during Medical Image Computing and Computer-Assisted Intervention (MICCAI), New York, USA, September, 2008.

GRANTS AND CONTRACTS

Current (sorted by start date, newest to oldest)

1. National Science Foundation award #1602020: “PFI: AIR-TT: Enhancing the Balance and Control of Crutch Walking Using a Novel Crutch Tip”, PI: K. B. Reed, co-PIs: Seok Hun Kim, David Huizenga, Ismet Handzic. \$209,858; 5/1/2016–10/31/2017.
2. National Science Foundation award #1526475: “CHS: Small: Investigation of Dynamic Thermal Perception over Large Skin Areas”, PI: K. B. Reed, co-PIs: Nathan Crane, Rasim Guldiken, and Kristen Salomon. \$497,683; 9/1/2015–8/31/2018.
3. Moterum, LLC: “Gait Enhancing Mobile Shoe for Stroke Rehabilitation”, PI: K. B. Reed, co-PI: S. H. Kim. \$134,606 (\$60,313 from Moterum; \$74,293 from the Florida High Tech Corridor); 6/15/2014–6/14/2017.
4. National Science Foundation award #1319802: “HCC: Small: Perception of Accurate Interactions through Bimanual Integrated Forces and Motions”, PI: K. B. Reed. \$380,773; 8/1/2013–7/31/2017.
5. National Science Foundation award #1229561: “MRI: CAREN: Virtual Reality System for Collaborative Research in Assistive and Rehabilitation Technologies”, PI: R. Dubey, co-PI: K. B. Reed and others. \$537,245; 9/1/2012–8/31/2017.
(Video description of the CAREN: <http://youtu.be/3UHstIEV4DI>)

Completed (sorted by end date, most recently ended first)

1. Orthotic and Prosthetic Education and Research Foundation (OPERF): “Gait adaptation in transfemoral amputees using split-belt treadmill training”, PI: S. H. Kim, co-PI: K. B. Reed. \$24,895; 12/2/2014–12/1/2016.

2. American Orthotic & Prosthetic Association: “Transfemoral interfaces with vacuum assisted suspension comparison of biomechanics using the CAREn: Ischial containment versus brimless,” PI: J. Kahle, co-PI: K. B. Reed and others. \$15,000; 8/1/2015–7/31/2016.
3. National Science Foundation award #1449772: “I-Corps: Walking Crutch/Cane for Enhanced Assistance, Balance, and Control of Walking Dynamics”, PI: K. B. Reed. \$50,000; 7/1/2014–6/30/2015.
4. Subcontract from Moss Rehabilitation Research Institute: Development of a Curved-Bottom Shoe for Gait Rehabilitation, PI: E. Vasudevan; total \$30,000; subcontract to K. B. Reed at USF \$1,082; 7/1/2012–8/31/2012.
5. National Institutes of Health 1R21HD066200-01: “Gait Enhancing Mobile Shoe for Rehabilitation” PI: K. B. Reed, co-PIs: A. Bastian and E. Vasudevan. \$102,876; 9/13/2010–8/31/2012.
6. New Florida Clustering Award Program (New Florida Initiative) in cooperation with UF and UCF, PI: T. Weller, co-PI: K. B. Reed and others, awarded \$200,000 to USF, 2011.
7. National Science Foundation Graduate Fellowship, K. B. Reed. For approximately \$110,000 over three years (9/1/2002–8/31/2005).

PATENTS

1. “Biomimetic Transfemoral Knee with Gear Mesh Locking Mechanism”, K. B. Reed and T. Ramakrishnan, provisional patent submitted, 2016.
2. “A Knee Orthosis with Variable Stiffness and Damping”, K. B. Reed, S. H. Kim, C. Lahiff and T. Ramakrishnan, patent pending, 2015.
3. “Position/Weight Activated Knee Locking Mechanism”, K. B. Reed and T. Ramakrishnan, patent pending, 2015.
4. “Assisting, Resisting, or Adjustable Dynamics Walking Crutch”, K. B. Reed and I. Handžić, patent pending, 2014, *licensed to Moterum LLC*, currently sold as the MTip (www.moterumtip.com).
5. “String Vibration Frequency Altering Shape”, K. B. Reed and I. Handžić, U.S. Patent 9,520,110, issued December 13, 2016, priority date July 23, 2014.
6. “Systems and Methods for Synchronizing Uncoupled Rotating Systems”, K. B. Reed and I. Handžić, patent pending, 2014.
7. “Compliant Bimanual Rehabilitation Device and Method of Use Thereof”, K. B. Reed and S. McAmis, U.S. Patent 9,265,685, issued February 23, 2016, priority date May 1, 2014.
8. “Systems and Methods for Designing Kinetic Shapes”, K. B. Reed and I. Handžić, patent pending, 2014.
9. “Transfemoral Prosthesis Having Altered Knee Locations,” K. B. Reed, J. Sushko, and C. Honeycutt, U.S. Patent 9,050,199, issued June 9, 2015, priority date April 17, 2012.
10. “Gait-Altering Shoe,” K. B. Reed and I. Handžić, U.S. Patent 9,295,302, issued March 29, 2016, priority date February 17, 2012, *licensed to Moterum LLC*.
11. “Systems and Methods for Reliable Motion Control of Virtual Tour Applications”, K. B. Reed, B. D. Foshee, and C. R. Armstrong, U.S. Patent US20130191067, issued July 25, 2013, priority date January 6, 2012.

INSTRUCTION AND COURSE DEVELOPMENT

- Advanced Engineering Mathematics II**, University of South Florida 2011, 2013, 2016
- Taught the class with the following topics: Matrices, System of linear differential equations, Vector calculus, Functions of a complex variable, and Integration in a complex plane.
- Haptics**, University of South Florida 2010, 2011, 2012, 2013, 2014, 2015, 2017
- Developed and introduced this course on Haptics that includes concepts of human-robot interaction that incorporates programming (C++), projects, journal readings, presentations, research methods, human subject experimentation, and ethics.
 - Five publications (one journal) have resulted from the student projects in this class.
- Mechanical Controls**, University of South Florida 2009, 2010, 2011, 2012, 2014, 2015, 2016
- Taught the class with the following topics: transfer functions, block diagrams, characteristic equation, modeling of dynamic systems, Laplace transforms, time response of first and second order systems, stability, frequency response, Bode plots, and an introduction to state space models.
 - Implemented a new grading method incorporating confidence into the scoring.
- Electronics and Instrumentation**, Johns Hopkins University 2009
- Co-taught the class introducing circuits and electrical analysis to mechanical engineering students.
- Engineering Analysis III, Guest Lecturer**, Northwestern University 2006, 2007
- Taught five of the lectures related to dynamics to Freshmen engineering students.
- Strain Gauge Workshop**, Northwestern University 2004
- Formulated and taught a workshop on installing and instrumenting devices with strain gauges. Instructed graduate students and faculty in the Mechanical and Biomedical Engineering departments.
- English Teacher**, Shenzhen, China 2001 – 2002
- Designed and taught a two month course on engineering English to workers at Foxconn, an electronics manufacturing company.
 - Created and taught English as a second language classes to high school and middle school students.
- Teaching Assistant for Freshman Engineering**, University of Tennessee 1999 – 2001
- Managed design teams, taught labs, and conducted help sessions for the integrated Freshman Engineering curriculum. Helped create a video of the program for advertising.

MEDIA ATTENTION

- WEDU Quest, June 16, 2016, episode 209, “Gait Enhancing Mobile Shoe”.
(<http://video.wedu.org/video/2365785979/>)
- American Medicine Today, March 5, 2016 radio episode.
- audio: http://www.iheart.com/show/139-American-Medicine-Today/?episode_id=27466555 (start at minute 21)
- video: https://www.youtube.com/watch?v=2Z_8o6UrmbY (start at minute 27)
- florida.HIGH.TECH, 2016, page 28, “A Giant Step for Stroke Patients”
(<http://www.floridahightech.com/wp-content/uploads/2016/02/FHT-2016-compressed.pdf>)
- Science News Cover Story, October 2014
(<https://www.sciencenews.org/article/spirals-inspire-walking-aids-people-disabilities>)
- 83 Degrees Media, August 2014
(<http://www.83degreesmedia.com/features/caren081914.aspx>)
- The Tampa Tribune, September 2014
(<http://www.tbo.com/health/medical-news/new-usf-center-mixes-rehab-research-481469>)
- Association for Psychological Science News Release, May 2006
(<http://www.psychologicalscience.org/media/releases/2006/pr060515.cfm>)

HONORS AND AWARDS

Outstanding Junior Research Achievement Award , University of South Florida	2015
Excellence in Innovation Award , University of South Florida	2015
Invited attendee to the 7th Annual Frontiers of Engineering Education Symposium Hosted by the National Academy of Engineering	2015
Invited member of the National Academy of Inventors , University of South Florida chapter	2015
Meritorious Service , awarded by IEEE Transactions on Haptics	2012
da Vinci award for NÜberwalker, by National Multiple Sclerosis Society	2006
Graduate Research Fellowship awarded the National Science Foundation (NSF)	2001
Tau Beta Pi Engineering Honor Society induction	1999
Pi Tau Sigma Mechanical Engineering Society induction	1999
Finner Family Scholarship awarded twice.	1998 and 1999

INVITED PRESENTATIONS

- “Attainable Symmetries in Asymmetrically-Impaired Individuals” at the Engineering in Medicine and Biology Society Minisymposium on “Restoring Human Performance through Physical and Robotic Augmentation”, Orlando, FL, 2016.
- “A Haptic Touch of Rehabilitation” at the Tau Beta Pi District 5 Conference in Tampa, FL, 2016.
- “Using Symmetric Abilities for Rehabilitation and Training” at the University of Hong Kong in August, 2015.
- “Symmetry in Asymmetrically Impaired Individuals” at the Hong Kong Polytechnic University in August, 2015.
- “A Haptic Touch of Rehabilitation” at Pint of Science, Tampa in May, 2015.
- “Optimizing gait in an asymmetrically impaired person” at the University of Texas, Austin in October, 2014.
- Guest lecturer in Movement Science 2 (PHT 6178) at USF School of Physical Therapy & Rehabilitation Sciences on “Haptics for Physical Therapists”, March, 2012 & March, 2013 & September 2013.
- “Interacting with human-centered rehabilitation devices at Florida Institute for Human and Machine Cognition (IHMC), 2011.
- “Home-based Rehabilitation” at the Emergency Management & Robotics for Hazardous Environments conference, 2011.
- Workshop on Haptic Human-Robot Interaction at Int. Conf. on Intelligent Robots and Systems (IROS), to occur in October, 2009.
- Computational Neuroscience Laboratory, Advanced Telecommunications Research (ATR) Institute International, Kyoto, Japan, May, 2009.
- Workshop on Innovation of Medical Robotics at IEEE Int. Conf. on Robotics and Automation (ICRA), May, 2009.
- School of Engineering and Textiles, Philadelphia University, Philadelphia University, PA, March, 2009.
- Winter School Mini-Symposium on Medical Robotics and Computer-Integrated Interventional Medicine, Johns Hopkins University, Baltimore, Maryland, January, 2009.
- Mechanical Engineering Department, University of South Florida, Tampa, FL, January, 2009.
- Institute of Automatic Control Engineering, Technical University of Munich, Germany, December, 2008.

- Mechanical and Aerospace Department, Nanyang Technological University, Singapore, April, 2008.
- Laboratory for Computational Sensing and Robotics, Johns Hopkins University, Baltimore, MD, February, 2007.
- Mechanical Engineering Department, Union College, Schenectady, NY, February, 2007.

PROFESSIONAL ACTIVITIES

Associate Editor for IEEE Transactions on Haptics, 2017-present.

Organizing Committee member for Haptics Symposium, 2018.

Organizer for the 2016 Engineering in Medicine and Biology Society (EMBC) Minisymposium: “Restoring Human Performance through Physical and Robotic Augmentation”.

Executive Committee member for the USF Chapter of the National Academy of Inventors, 2016-present.

Program Committee member for the Haptics Symposium, 2016.

Organizing Committee member (in charge of Student Volunteers) for World Haptics, 2015.

Advisor for the USF Graduate Certificate in Robotics program, 2013-present.

Associate Editor for IROS (IEEE/RSJ International Conference on Intelligent Robots and Systems), 2013.

Session Chair of Medical, Rehabilitative, and Assistive Robotics session at the Emergency Management & Robotics for Hazardous Environments conference (EPRRS), 2011.

Advisor for the USF Robotics Interest Group, 2010-present.

Associated Editor for IROS (International Conference on Intelligent Robots and Systems) Invited Session: “Human-Robot-Human Interaction for Rehabilitation”, 2010.

Session co-Chair at International Conference on Robotics and Automation (ICRA), 2010.

Member of the American Society of Mechanical Engineers (ASME).

Member of the Institute of Electrical and Electronics Engineers (IEEE).

Member of the American Society of Engineering Education (ASEE).

Reviewer for (more details on reviewing activity at <https://publons.com/author/1173479/kyle-reed#profile>):

- National Science Foundation (NSF) Panels, several programs
- Journal of Neurophysiology*
- IEEE Transactions on Haptics*
- IEEE Transactions on Robotics*
- IEEE Transactions on Biomedical Engineering*
- IEEE Transactions on Automation Science and Engineering*
- IEEE Transactions on Systems, Man, and Cybernetics–Part A: Systems and Humans Presence*
- ASME Journal of Mechanical Design*
- IEEE/ASME International Conference on Advanced Intelligent Mechatronics*
- Workshop on the Algorithmic Foundations of Robotics (WAFR)*
- IEEE International Conference on Robotics and Automation (ICRA)*
- World Haptics Conference (WHC)*
- Haptics Symposium*
- International Conference on Rehabilitation Robotics (ICORR)*
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*
- International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*
- American Society of Engineering Education (ASEE)*
- IEEE International Conference on Biomedical Robotics and Biomechatronics (BioRob)*

COMMUNITY SERVICE

Demos to high school students in the pre-college Biomedical Engineering Program, 2014 & 2015.

Lab tour to 30 Girl Scouts in the Minds for Design camp, 2011, 2013, 2014, & 2015.

Judge for the Research Experience for Undergraduates (REU) Symposium, 2010, 2011, 2015.

Lab tour to 7-13 year-olds participating in the Allen Temple Neighborhood Development Corporation summer camp for economically disadvantaged children, July 2014.

Lab tour to Chiles Elementary School, May 8, 2012.

Help setup and give a lab tour to 60 5th graders from Robles Elementary School, April 2011.

Haptics demonstrations to two classes of 5th graders at Robles Elementary School, April 2011.

Lab tour to high school students from Plant High School, July 2010.

Judge for the College of Engineering Research Day Poster Competition, October 2009.

Volunteered at Asian Youth Services serving underprivileged children in Chicago, 2003-2007.

- Mentored and tutored kids (grades 7-12) weekly in all subjects.
- Setup and maintained 10 Linux computers for daily use by the kids and the director.
- Coauthored a proposal to the Hewitt Associates Foundation for funding. The \$15,000 grant was awarded to Asian Youth Services in December 2006.

Organized lab tours of the Laboratory for Intelligent Mechanical Systems (LIMS).

- Robot operating buddies of Schaumburg, 2006; Bring you daughters to work day, 2005, 2006, & 2007; Cubscouts, 2005; Middle school students from surrounding schools, 2005.

Judge for the Tennessee State Science Olympiad competition in 2000 and 2001.

PUBLISHED MOBILE APPS

1. Pat & Rub: app related to research on bimanual motions
(<https://itunes.apple.com/us/app/pat-and-rub/id934555994>)
2. Alphabetical: (<https://itunes.apple.com/us/app/alphabetical/id659643113>)
3. Baby Count: (<https://itunes.apple.com/us/app/baby-count/id591138391>)

PUBLISHED PHOTOGRAPHS

1. Spektrum der Wissenschaft (German version of Scientific American), October, 2010, p. 92. Picture taken by K. B. Reed in Chicago in 2004.
2. Frankfurter Allgemeine (German newspaper), July 31, 2005, p. 16. Picture taken by K. B. Reed in Germany in 2002.
3. Niko Roorda, Basisboek duurzame ontwikkeling, Wolters-Noordhoff, 2006, ISBN: 9789001267094, p. 67. Picture taken by K. B. Reed in Shenzhen, China in 2001.

ADVISING (LAST SECTION)

Doctoral Students

- Fatemeh Rasouli Dynamic and Biomechanics of Walking on Crutches Ph.D. expected in 2020
- Mehdi Hojat Madani Dynamic Thermal Actuators Ph.D. expected in 2020
- Benjamin Rigsby - Bimanual Perception for Training and Rehabilitation Ph.D. expected in 2019
- Tyagi Ramakrisnan - Simulation and Passive Correction of Gait Dynamics Ph.D. expected in 2017
- Ahmad Manasrah, Ph.D. in Mechanical Engineering, 2016. "Application and Analysis of Asymmetrical Hot and Cold Stimuli", co-advised with R. Guildiken.

- Ismet Handžić, Ph.D. in Mechanical Engineering, 2014. “Analysis and Application of Passive Gait Rehabilitation Methods”.

Masters Thesis Students

- Matthew Hardy - Modeling Thermal Haptic Interactions 2016 – present
- Christina-Anne Lahiff - Imposed Asymmetric Gait Dynamics 2016 – present
- Michael Walker, M.S. in Mechanical Engineering, 2016. “Designing the Haptic Interface for Morse Code”.
- Haris Muratagic, M.S. in Mechanical Engineering, 2015. “Passive Symmetry in Dynamic Systems and Walking”.
- Philip Hatzitheodoru, M.S. in Mechanical Engineering, 2015. “An Experimental Study on Passive Dynamic Walking”.
- Ahmad Manasrah, M.S. in Mechanical Engineering, 2012. “Human Motion Tracking for Assisting Balance Training and Control of a Humanoid Robot”.
- John Sushko, M.S. in Mechanical Engineering, 2011. “Asymmetric Passive Dynamic Walker Used to Examine Gait Rehabilitation Methods”.
- Craig Honeycutt, M.S. in Mechanical Engineering, 2011. “Utilizing a Computational Model for the Design of a Passive Dynamic Walker”.
- Ismet Handžić, M.S. in Mechanical Engineering, 2011. “Design and Testing of a Motion Controlled Gait Enhancing Mobile Shoe (GEMS) for Rehabilitation.
- William Christian, M.S. in Mechanical Engineering, 2010. “Exploring the Human Interactivity with a Robot to Obtain the Fundamental Properties of Materials”.

Undergraduate Students

- Milli Schlafly - Gait Rehabilitation 2016 – present
- Katie Hart - Passive Dynamic Walkers 2014 – 2016
- Daniel Capecci - Bimanual Synchronized Motions and the Kinetic Crutch 2014 – 2016
- Christina-Anne Lahiff - Stroke Simulator 2014 – 2015
- Kaleb Marroquin - Gait analysis 2014 – 2015
- Haris Muratagic - Dynamics Matching 2013 – 2014
- Joseph Gaskell - Force Feedback Glove Summer, 2012
- Wuthipat Brink - Human Gait Simulator 2011/2012
- Ben Matlack - Gait Efficiency Enhancing Shoe 2011/2012
- Nicole Valles - Overriding Natural Force Attenuation Summer, 2011
- Sarah Salgado - Bimanual Motion Symmetries Summer, 2011
- Tahiem Williams - Evaluation of Vibration Properties of Boney and Soft Tissues 2011
- Laura Carpp - Gait Enhancing Mobile Shoe for Rehabilitation 2009/2010
- Hernando Gonzalez Malabet - Symmetric Bimanual Trainer for Stroke 2009/2010
- Rafael Alvarez Robles - Robot-Assisted Balance Trainer 2009/2010
- Ryan Decker - Gait Enhancing Mobile Shoe for Rehabilitation 2008
- Allison de Groot - Gait Enhancing Mobile Shoe for Rehabilitation Summer, 2008

High School Students

- Sarah Salgado - Overriding Natural Force Attenuation Summer, 2011
- Ethan Huber - Robot-Assisted Balance Trainer Summer, 2010

- Kyle Dunn - Robot-Assisted Balance Trainer Summer, 2010

Thesis/Dissertation Committees

- Michael Walker, M.S. in Mechanical Engineering, 2016. “Designing the Haptic Interface For Morse Code.” Major Professor K. B. Reed.
- Ahmad Manasrah, Ph.D. in Mechanical Engineering, 2016. “Application and Analysis of Asymmetrical Hot and Cold Stimuli”, Co-Major Professors K. B. Reed and R. Guildiken.
- Andrew Katz, Ph.D. in Mechanical Engineering, 2016. “Waterproofing Shape-Changing Mechanisms Using Origami Engineering,” Major Professor C. Lusk.
- Haris Muratagic, M.S. in Mechanical Engineering, 2015. “Passive Symmetry in Dynamic Systems and Walking, Major Professor K. B. Reed.
- Ahmad Alqasimi, Ph.D. in Mechanical Engineering, 2015. “Design of Shape Morphing Structures Using Bistable Elements,” Major Professor C. Lusk.
- Caitrin Eaton, Ph.D. in Computer Science and Engineering, 2015. “Reducing the Control Burden of Legged Robotic Locomotion through Biomimetic Consonance in Mechanical Design and Control,” Major Professor L. Palmer.
- Philip Logan, Ph.D. in Mechanical Engineering, 2015. “A Planar Pseudo-Rigid-Body Model for Cantilevers Experiencing Combined Endpoint Forces and Uniformly Distributed Loads Acting in Parallel,” Major Professors C. Lusk & A. Volinsky.
- Yu-Cheng, M.S. in Mechanical Engineering, 2015. “Dual 7-Degree-of-Freedom Robotic Arm Remote Teleoperation Using Haptic Devices,” Major Professor R. Alqasemi.
- Philip Hatzitheodoru, M.S. in Mechanical Engineering, 2015. “An Experimental Study on Passive Dynamic Walking,” Major Professor K. B. Reed.
- Ismet Handzic, Ph.D. in Mechanical Engineering, 2014. “Analysis and Application of Passive Gait Rehabilitation Methods,” Major Professor K. B. Reed.
- Yun Lin, Ph.D. in Computer Science and Engineering, 2014. “Task-based Robotic Grasp Planning,” Major Professor Y. Sun.
- Tyagi Ramakrishnan, M.S. in Mechanical Engineering, 2014. “Asymmetric Unilateral Transfemoral Prosthetic Simulator,” Major Professor K. B. Reed.
- Karan Khokar, Ph.D. in Mechanical Engineering, 2013. “Human Intention Recognition based Assisted Telerobotic Grasping of Modeled Objects in Unstructured Environments,” Major Professor R. Dubey.
- Mayur Palankar, Ph.D. in Computer Science, 2013. “A Distributed Local-Leg Feedback Algorithm for Robust Walking on Uneven Terrain,” Major Professor L. Palmer.
- Daniel Standish, M.S. in Computer Science, 2013. “Robotic Swarming Without Inter-Agent Communication,” Major Professor L. Palmer.
- Sriharsha Garapati, M.S. in Mechanical Engineering, 2012. “Analytical and Numerical Modeling of Assembly Procedures of Steel Fulcra of Bascule Bridges,” Major Professor A. Kaw.
- Adam Zimandy, M.S. in Mechanical Engineering, 2012. “Prevailing Torque Locking Feature Wear Out,” Major Professor D. Hess.
- Joseph Pishnery, M.S. in Mechanical Engineering, 2012. “A Statically Balanced Shape-Shifting Surface,” Major Professor C. Lusk.
- Ryan Hunter, M.S. in Mechanical Engineering, 2012. “Direct Verification of the Locking of Liquid Locking Compounds in Threaded Fasteners,” Major Professor D. Hess.
- Ahmad Manasrah, M.S. in Mechanical Engineering, 2012. “Human Motion Tracking for Assisting Balance Training and Control of a Humanoid Robot,” Major Professor K. B. Reed.
- Derek Lura, Ph.D. in Mechanical Engineering, 2012. “The Creation of a Robotics Based Human Upper Body Model for Predictive Simulation of Prostheses Performance,” Major Professor R. Dubey.

- John Sushko, M.S. in Mechanical Engineering, 2011. "Asymmetric Passive Dynamic Walker Used to Examine Gait Rehabilitation Methods," Major Professor K. B. Reed.
- Craig Honeycutt, M.S. in Mechanical Engineering, 2011. "Utilizing a Computational Model for the Design of a Passive Dynamic Walker," Major Professor K. B. Reed.
- William Christian, M.S. in Mechanical Engineering, 2010. "Exploring the Human Interactivity with a Robot to Obtain the Fundamental Properties of Materials," Major Professor K. B. Reed.
- Ismet Handžić, M.S. in Mechanical Engineering, 2011. "Design and Testing of a Motion Controlled Gait Enhancing Mobile Shoe (GEMS) for Rehabilitation," Major Professor K. B. Reed.
- Chester Smith, M.S. in Mechanical Engineering, 2011. "Modeling and Parameter Study of Bistable Spherical Compliant Mechanisms," Major Professor C. Lusk.
- Patrick McKnight, M.S. in Mechanical Engineering, 2010. "Finite Element Analysis of Thermoelectric Systems with Applications in Self Assembly and Haptics," Major Professor N. Crane.
- Jon Freeberg, M.S. in Mechanical Engineering, 2010. "A Study of Omnidirectional Quad-Screw-Drive Configurations for All-Terrain Locomotion," Major Professor S. Wilkinson.
- James Tuckerman, M.S. in Mechanical Engineering, 2010. "Capillary Self-Assembly and its Application to Thermoelectric Coolers," Major Professor N. Crane.
- Punya A. Basnayaka, M.S. in Mechanical Engineering, 2010. "Low-Level Programming of a 9-Degree-of-Freedom Wheelchair-Mounted Robotic Arm with the Application of Different User Interfaces," Major Professor R. Dubey.
- Fabian Farelo, M.S. in Biomedical Engineering, 2009. "Task Oriented Simulation and Control of a Wheelchair Mounted Robotic Arm," Major Professor R. Dubey.