**Curriculum Vitae**

Devin R. Berg

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**EDUCATION**

Ph.D., University of Minnesota – Twin Cities, 2013

* Major: Mechanical Engineering
* Dissertation Title: Design of a Dexterous Hydraulic Manipulator for Minimally Invasive Surgery
* Dissertation Advisors: Dr. Perry Y. Li and Dr. Arthur G. Erdman
* Honors: 3M Science and Technology Fellowship

M.S., University of Minnesota – Twin Cities, 2011

* Major: Mechanical Engineering
* Thesis Title: The Application of Fluid Power as an Enabling Technology for Surgical Robotics

B.S., University of Wisconsin – Madison, 2008

* Major: Mechanical Engineering
* Graduated with Honors

**TEACHING EXPERIENCE**

* 2012 – present, Assistant Professor, University of Wisconsin - Stout
* 2012, Adjunct Faculty, University of St. Thomas
* 2011 – 2012, Lab Supervisor, Medical Devices Center
* 2010 – 2012, Teaching Assistant, University of Minnesota - Twin Cities

**HIGHLIGHTS OF WORK EXPERIENCE**

Graduate Research Assistant, University of Minnesota, 2008 – 2013

* Researched and designed a novel robotic multi-articulated surgical platform for use with various forms of surgical procedures.
* Designed a novel hydraulic valve capable of low-flow rate, high-pressure operation within restrictive size constraints.
* Planned and fabricated prototypes for various components of the proposed surgical platform for validation and testing design effectiveness.
* Developed analytical and numerical models to describe system kinematics and test operation.

Lab Supervisor, Medical Devices Center, July 2011 – August 2012

* Co-founded an undergraduate internship program.
* Mentored various undergraduate and graduate engineering design groups in the medical device. development process and general engineering design.
* Designed, maintained, and enforced safety protocols for a multi-function laboratory space.
* Trained students in the use of advanced prototyping and development equipment.
* Developed and maintained an up-to-date design environment through equipment acquisition, skills training, and needs analysis.

Adjunct Faculty, University of St. Thomas, January 2012 – May 2012

* Led a laboratory class covering the topics of statics and dynamics.
* Helped students to make the connection between classical theory and the real-world applications through the use of hands-on projects.
* Introduced students to the basics of manufacturing by teaching wood and metal machining skills.

Teaching Assistant, University of Minnesota, January 2010 – May 2012

* Senior Design Projects
  + Provided project support for 47 industry sponsored student senior design groups.
  + Assisted students through the design experience and provided feedback through project reviews.
  + Located on campus resources and equipment to meet various project needs.
* Design and Manufacturing I
  + Instructed students in both a small group lecture format and laboratory format.
  + Covered topics such as statics, stress analysis, machine component design, mechanics, fatigue, manufacturing processes, and computer aided design/analysis.
  + Supervised laboratory sessions on basic machining, numerically controlled machining, injection molding, rolling, and welding.
* Design and Manufacturing II
  + Led a discussion section of approximately 50 students weekly.
  + Lectured on topics including graphical and analytical synthesis of mechanisms, mechanism analysis, machine component selection, and kinematics.
  + Mentored student groups in the design and analysis of mechanism based projects.

Bone and Joint Biomechanics Lab Assistant, University of Wisconsin-Madison, May 2008 – August 2008

* Conducted an experimental study evaluating the accuracy, precision, and repeatability of an Optotrak motion capture camera system.
* Prepared computer models of human bones and joint implants using image processing software, Mimics.
* Performed data analysis, interpreted results, and summarized findings in preparation for submission to a peer-reviewed journal for publication.

Thermal and Fluid Sciences Co-op, Cummins Emission Solutions, January 2007 – May 2008

* Worked under the Director of Research.
* Collected and analyzed speciation data from diesel engine emissions.
* Interpreted experimental results and prepared manuscripts for both internal report and external publication.

**RESEARCH INTERESTS**

* Bio-inspired engineering and design.
* Design and fabrication of medical devices.
* Experiential learning in engineering education.

**RESEARCH UNDER REVIEW**

* “Expanding an Online Engineering Learning Environment to a Diverse Population of Learners”, NSF-TUES Proposal. PI: Marc Veletzos, Co-PI: Franco Capaldi and Devin R. Berg, Budget: $600,000.

**SERVICE**

* 2012 – 2013, Reviewer: ASME Dynamic Systems and Control Conference
* 2012 – present, Manufacturing Engineering Advisory Board, member
* 2012 – 2013, Bylaws Revision Committee, member

**PUBLICATIONS**

**Peer-Reviewed Journal Articles**

* Z. G. Liu, D. R. Berg, V. N. Vasys, M. E. Dettmann, B. Zielinska, and J. J. Schauer. Analysis of C1, C2, and C10 through C33 particle-phase and semi-volatile organic compound emissions from heavy-duty diesel engines. Atmospheric Environment, 44(8):1108-1115, 2010
* Z. G. Liu, D. R. Berg, T. A. Swor, J. J. Schauer, and B. Zielinska. A study on the emissions of chemical species from heavy-duty diesel engines and the effects of modern aftertreatment technology. SAE Technical Paper Series 2009-01-1084, 2009
* J. Schmidt, D. R. Berg, L. Ploeg, and H. L. Ploeg. Precision, repeatability and accuracy of optotrak optical motion tracking systems. International Journal of Experimental and Computational Biomechanics, 1(1):114-127, 2009
* Z. G. Liu, D. R. Berg, and J. J. Schauer. Effects of a zeolite-selective catalytic reduction system on comprehensive emissions from a heavy-duty diesel engine. Journal of the Air & Waste Management Association, 58(10), 2008
* Z. G. Liu, D. R. Berg, T. A. Swor, and J. J. Schauer. Comparative analysis on the effects of diesel particulate filter and selective catalytic reduction systems on a wide spectrum of chemical species emissions. Environmental Science and Technology, 42(16):6080-6085, 2008
* Z. G. Liu, D. R. Berg, and J. J. Schauer. An analysis of methods for measuring particulate matter mass emissions. SAE Technical Paper Series 2008-01-1748, 2008
* Z. G. Liu, D. R. Berg, and J. J. Schauer. Detailed effects of a diesel particulate filter on the reduction of chemical species emissions. SAE Technical Paper Series 2008-01-0333, 2008

**Invited Talks**

* D. R. Berg. Surgical robots under fluid power. In Proceedings of the 2013 Design of Medical Devices Conference, Minneapolis, MN, 2013. ASME
* D. R. Berg, P. Y. Li, and A. G. Erdman. Achieving dexterous manipulation for minimally invasive surgical robots through the use of hydraulics. In Proceedings of the 2012 ASME Dynamic Systems and Control Conference, Fort Lauderdale, FL, 2012. ASME. (Best Paper in Session)

**Peer-Reviewed Conference Proceedings**

* F. Capaldi and D. R. Berg. Outcomes of using an infinitely explorable online learning system. In Proceedings of the 2013 ASEE Annual Conference, Atlanta, GA, 2013. ASEE. Accepted
* D. R. Berg, L. A. Harder, and A. G. Erdman. Generating interest in technology and medical devices through an interactive educational game. In Proceedings of the 2012 ASEE Annual Conference, San Antonio, TX, 2012. ASEE
* D. R. Berg, T. P. Kinney, P. Y. Li, and A. G. Erdman. Determination of surgical robot tool force requirements through tissue manipulation and suture force measurement. In Proceedings of the 2011 Design of Medical Devices Conference, Minneapolis, MN, 2011. ASME
* D. R. Berg, A. Carlson, W. K. Durfee, R. M. Sweet, and T. Reihsen. Low-cost, take-home, beating heart simulator for health-care education. In Proceedings of Medicine Meets Virtual Reality 18, Newport Beach, CA, 2011

**PROFESSIONAL MEMBERSHIPS**

* American Society for Engineering Education
* American Society of Mechanical Engineers
* Product Development and Management Association
* Pi Tau Sigma (Honorary Mechanical Engineering Society)
* Tau Beta Pi (Honorary Engineering Society)