CM 4032, 5500 Wabash Ave. Phone: (812) 877-8505
Terre Haute, IN 47803 rogge@rose-hulman.edu

Renee D. Rogge

Education

1996 – 2000 University of Iowa Iowa City, Iowa

College of Engineering

- Ph.D. in Biomedical Engineering – Biomechanics of Distal Radius Fractures: Factors Influencing Stability (July 2000)
  Advisors: Brian D. Adams, M.D. and Vijay K. Goel, Ph.D.

Aging Studies Program

- Certificate in Aging Studies (July 2000)

1992 – 1996 Tulane University New Orleans, Louisiana

College of Engineering

- B.S. in Biomedical Engineering
- Minor in Mechanical Engineering

Experience

July 2011 – June 2012 Joint Replacement Surgeons of Indiana Research Foundation

- Development and validation of computational models of the hip and knee

July 2004 - Present Rose-Hulman Institute of Technology Terre Haute, IN

Associate Professor in Applied Biology & Biomedical Engineering (2010 -)

Assistant Professor in Applied Biology & Biomedical Engineering (2004 - 10)

- Teaching Senior Design, Graphical Communications, Biomechanics, Orthopaedic Biomechanics, Bone Biomechanics; advising undergraduate students in Biomedical Engineering

July 2000 - July 2004 Mercer University Macon, GA

Assistant Professor in Biomedical Engineering

- Teaching Statics & Mechanics of Materials, Biomechanics (senior-level biomedical engineering course), Calculus I laboratory, Dynamics of Biological Fluids, Biomaterials, and Advanced Biomechanics

Summer 2002 & 2003 Johnson Space Center Houston, TX

Summer Faculty Fellow, Anthropometry & Biomechanics Facility

- Developed a three-dimensional kinematic model using data acquired from 3-D body surface scans to assess shoulder impingement during extravehicular activities.

1996 – 2000 University of Iowa Iowa City, Iowa

Research Assistant

- Developed mathematical models, conducted cadaveric experiments, analyzed theoretical and experimental data, and assisted undergraduate students in design projects.

Fall 1998, Spring 2000 University of Iowa Iowa City, Iowa

Teaching Assistant

- Conducted discussion sections for Mechanics of Deformable Bodies/ Dynamics to assist students in working problems, formulated examinations/quizzes, and graded exams/quizzes.

Publications

Tokunaga S*, Rogge RD#, Small SR, Berend ME, Ritter MA. Metal Backing and Resection Depth as Factors in Tibial Loading Following TKA: A Finite Element Study. *Medical Engineering & Physics* (Submitted - Under Revision)

Berend ME, Small SR, Howard L+, Rogge RD#. Buckley CA#, Ritter MA. High Initial Stability in Porous Titanium Acetabular Cups: A Biomechanical Study - *Journal of Arthroplasty* (Submitted - Under Revision)

Howe, S., Caves, K., Kleiner, C., Livesay, G., Norback, J.S., **Rogge, R.**, Turner, C., and T. Utschig. Nifty Ideas and Surprising Flops in Capstone Design Education. International Journal of Engineering Education 27(6): 1-12, 2011.

Small, S.R., Berend, M.E., Ritter, M.A., Buckley, C.A., and **R.D. Rogge**. Metal Backing Significantly Decreases Tibial Strains in Unicompartmental Knee Arthroplasty. Journal of Arthroplasty 26(5):777-82, 2011.

Livesay,G., **Rogge, R**., and KC Dee. Development of a Supplemental Evaluation for Engineering Design Courses. Advances in Engineering Education 2(1):1-14, 2010.

*Harrigan, K., *Logan, R., *Sluti, A., and **R. Rogge**. "Instrumented Sparring Vest to Aid in Martial Arts Scoring," Biomedical Sciences Instrumentation 42:211-16, 2006. *Student authors.

Rogge, R. "Development of a Digital Human Model using Whole Body Scanning Technology," NASA Tech Briefs, 2008.

Grosland, N.M., **Rogge, R.D.,** and B.D. Adams. Influence of Articular Geometry on Prosthetic Wrist Stability. Clinical Orthopedics 421:134-42, 2004.

Rogge, R.D., Adams, B.D., & V.K. Goel. An analysis of bone stresses and fixation stability using a finite element model of simulated distal radius fractures. J Hand Surgery 27A:86-92, 2002.

Abstracts, Technical Papers, & Conference Proceedings

Rogge RD#, Tokunaga S*, Small SR, Berend ME, Ritter MA. The Influence of Bone Resection Depth on Tibial Loading. *2012 Orthopaedic Research Society Annual Meeting*

Archer DB+, Kingman AL+, Hughes KR+, Small SR, Rogge RD#, Berend ME, Ritter MA. Biomechanical Assessment of Tibial Component Slope in Unicompartmental Knee Arthroplasty. 2011 *Biomedical Engineering Society Annual Fall Meeting*

Berend ME, Small SR, *Howard LA, **Rogge RD**, Buckley CA, Ritter MA. "High Initial Stability in Porous Titanium Acetabular Cup Designs: A Biomechanical Study", Accepted for the 2010 Annual Biomedical Engineering Society Meeting.

*Tokunaga S, Small SR, Berend ME, **Rogge RD**, Ritter MA. "Factors Influencing Tibial Loading Following Total Knee Arthroplasty: A Finite Element Study", *Biomedical Engineering Society Meeting,* Austin, Oct 2010.

Small SR, Berend ME, Ritter MA, Buckley CA, and **Rogge RD**. Metal Backing Significantly Decreases Tibial Strains in Unicompartmental Knee Arthroplasty. *American Association of Hip and Knee Surgeons,* Dallas, Oct 2009.

Rogge, R., Livesay, G., and Dee, K. "Development of an Evaluation Tool for Assessing Student Practices, Independence, and Responsibility in Design Courses," Proceedings of the 2009 Annual ASEE Conference. (Best Paper Award in the Design in Education Division)

*Volitich M, *Younger SM, Small SR, Buckley CA, **Rogge RD**, and Berend ME. Strain in the Medial Tibia with Fixed All-Polyethylene Bearings in Unicompartmental Knee Arthroplasty. *Poster Presentation to the Biomedical Engineering Annual Fall Meeting*; Pittsburg, Oct 2009.

*Volitich M, Small SR, Buckley CA, **Rogge RD**, Berend ME. Comparison of Photoelastic and Strain Gage Evaluation Techniques in an Orthopaedic Model. *Poster Presentation to the Biomedical Engineering Society Annual Fall Meeting*; Pittsburg, Oct 2009.

*Santoso, A., *Steward, A., and **R. Rogge**. "A Fall Simulator to Investigate the Efficacy of Personal Protective Equipment," Proceedings of the 2009 Injury Biomechanics Symposium at Ohio State.

*Baker, R., *Horton, K., *Varatharaj, A., *Wagner, Z. and **R. Rogge.** "Design and Construction of a Device to Investigate Head Trauma," Proceedings of the 2009 ASEE IL/IN Conference. (*Student author, 1st Place - Student Poster Competition)

*Gregory, E., *Sheets, S., *Witten, B. and **R. Rogge**. "Comparison of Elbow Joint Angles for Male and Female Bat Swings," Proceedings of the ASME 2008 Summer Bioengineering Conference (SBC2008) (*Student author, independent research project.)

*Dick, S., *Maynard, S, and **R. Rogge**. "Repetitive Stress Injuries Research Device," Proceedings of the 2008 ASEE IL/IN Section Conference (*Student author, 1st Place - Student Poster Competition)

*Sheridan, D., **Rogge, R.D.**, and Livesay, G.A.: Testing of the impact characteristics of personal protective devices, Submitted for presentation at the ASME Summer Bioengineering Conference, Keystone, CO, June 20-24, 2007. (*Student author)

J. Williams, A. Chidanandan, P. Coppinger, D. Fisher, M. Hirotani, **R. Rogge**, S. Sexton, M. Simoni, K. Sutterer, and D. Walter, "Measuring The Impact Of Tablet Pcs And Dyknow Vision Software On Students' Note-Taking Strategies: A Cross-Disciplinary Case Study," in *The Impact of Tablet PCs and Pen-based Technology on Education 2008*, ed. J. Prey, R. Reed, and D. Berque, Purdue University Press, 2008.

Dee, K.C., Livesay, G.A., and **Rogge, R.D.:** Development of a supplemental course evaluation for capstone design, National Capstone Design Course Conference,

Boulder, CO, June 13-15, 2007. (*Won best paper honors)

Livesay, G.A. and **R.D. Rogge**. "A Practical Approach to 'Closing the Loop' in Biomedical Engineering Design". Proceedings of the BMES 2006 Meeting.

Rogge, R.D. and G.A. Livesay. "Design Bootcamp: Getting in Shape for a Capstone Experience," Proceedings of the ASEE Annual Conference (2006).

Livesay, G.A. & **R.D. Rogge**. "Vertical Mentoring: Closing the Loop in Design," Proceedings of the ASEE Annual Conference (2006).

Rogge, R., *****Chappell, A., & S. Rajulu. "Development and Validation of a Digital Human Model for Space Hardware Design and Evaluation," SAE Digital Human Modeling Conference: 2005, Iowa City, IA. (*Student co-author)

Sumner, L.B. & **R.D. Rogge**. "Teaching with Technology: A Strategy for Pedagogy and Practicality using CAE Software," ASEE Conference: 2005, Portland, OR.

Rogge, R.D., Sumner, L.B., & J. Burtner. "Formative Assessment of a Computer-Aided Analysis Center: Plan Development and Preliminary Results," FIE: 2004, Savannah, GA.

Rogge, R.D. "A Student-led Approach to Teaching Advanced Biomechanics," Proceedings of the ASEE-Southeastern Section Meeting, April 2004.

Grosland, N.M., **Rogge, R.D.,** & B.D. Adams. "Influence of articular geometry on prosthetic wrist stability," in American Society of Biomechanics Conference Proceedings. ASB: 2003, Toledo, OH.

Grosland, N.M., **Rogge, R.D.,** Adams, B.D., & T.D. Brown. "Rotational dislocation resistance of a dual-curvature-radius total wrist implant," in Transactions of the Orthopaedic Research Society (Vol. 28). ORS: 2003, New Orleans, LA.

Burtner, J.M. and **R.D. Rogge**. "Faculty advisors' management style and the development of students' leadership capabilities," in the Annual ASEE National Conference Proceedings. ASEE-National: 2003, Nashville, TN.

Rogge, R.D. and J.M. Burtner. "Case study in management style and leadership roles of faculty advisors to students organizations," in the Annual ASEE-Southeastern Conference Proceedings. ASEE-SE: 2003, Macon, GA.

Rogge, R.D., Adams, B.D., Grosland, N.M., & V.K. Goel. "A finite element model to assess distal radius fracture stability," in the Annual International Conference of the IEEE Engineering in Medicine and Biology Proceedings (Vol. 3). EMBS: 2002, Houston, TX.

O'Brien, E.M. & **R.D. Rogge**. "LabView usage as part of the biomedical engineering senior design experience," in the Annual International Conference of the IEEE Engineering in Medicine and Biology Proceedings (Vol. 3). EMBS: 2002, Houston, TX.

Rogge, R.D., Grosland, N.M., Goel, V.K. & B.D. Adams. "Influence of site and

severity of comminution on extra-articular distal radius fracture stability," in American Society of Biomechanics/World Congress of Biomechanics Joint Meeting Conference Proceedings. 2002, ASB: Calgary, Canada.

Barnett, S.K. & **R.D. Rogge.** "Journal article critiques: a complement to upper-level engineering courses," in the ASEE-Southeastern Section Conference Proceedings. 2002, ASEE-SE: Gainesville, FL.

R.D. Rogge. "Integrating finite element analysis into an undergraduate biomechanics course," in the ASEE-National Conference Proceedings. 2002, ASEE-National: Montreal, Canada.

Grosland, N.M.**, Rogge, R.D.**, Brown, T.D. and B.D. Adams. "Rotational dislocation propensity of an unconstrained total wrist implant," in the American Society of Biomechanics Proceedings. ASB: 2001, San Diego, CA.

Grosland, N.M., **Rogge, R.D**, & B.D. Adams. " Influence of articular geometry on prosthetic wrist stability," in Transactions of the Orthopaedic Research Society (Vol. 26). ORS: 2001, San Francisco, CA.

Listed under Renee D. Heatherly:

Heatherly, R.D., Grosland, N.M., Goel, V.K., & B.D. Adams. "A finite element analysis of distal radius fracture instability," in the Computational Methods in Orthopaedic Biomechanics Proceedings. Pre-ORS: 2000, Orlando, FL.

Heatherly, R.D., Adams, B.D., & V.K. Goel. (June 1999) An evaluation of distal radius fracture pinning techniques using an experimentally validated FE model. ASME 1999 Summer Bioengineering Conference, Big Sky, MT.

Heatherly, R.D., Adams, B.D., & V.K. Goel. (February 1999) Development and validation of a three-dimensional finite element model of the distal radius. Orthopaedic Research Society, Anaheim, CA.

Heatherly, R.D., Adams, B.D., & V.K. Goel. (February 1998) Stress distribution in various pinning techniques using a finite element model. American Academy of Orthopaedic Surgeons, New Orleans, LA.

Adams, B.D., **Heatherly, R.D.**, & V.K. Goel. (September 1998) Development and validation of a three-dimensional finite element of the distal radius. Third Triennial International Hand and Wrist Biomechanics Symposium, Minneapolis, MN.

Contract or Grant Activities

"MRI: Acquisition of a Biomechanics Biaxial Materials Testing and Measurement System" funded by the NSF. Co-PI: Dr. Christine Buckley. $335,309 (2010-2013)

"Biomedical Engineering Senior Design Projects: Design & Implementation of Assistive Technology for People with Disabilities" funded by the NSF (Research to Aid Persons with Disabilities). Co-PIs: Dr. Glen Livesay & Dr. Fred Berry. $127,000 (2008-2013)

Summer Faculty Development Grant ($5000) for "Development of an Upper

Extremity Model for Investigating Fall and Fracture Mechanics"

Weaver Research Award ($2500) for Michael Volitich ("Comparison of Photoelastic and Strain Gage Measurement Techniques in a Total Joint Replacement Biomechanics Model")

HP Tablet PC/DyKnow Project Proposal - Award to develop classroom teaching techniques in Biomechanics using the Tablet PC and DyKnow.

W.M. Keck Foundation ($340,000) - Award to develop computational engineering analysis facility at Mercer University School of Engineering (2002-2005). (Co-PI: Loren Sumner)

NASA-Johnson Space Center ($16,993) - Award to develop a 3-D representation of suited and unsuited astronauts for use in design and development of space hardware (2003-2004).

Ford Motor Company & Society of Women Engineers ($3400) -- Award to conduct three workshops illustrating the various applications of engineering to high school girls (2001-2002). (Co-PI: Joan Burtner)

Awards

$335,309 grant from the National Science Foundation to expand biomechanical instrumentation for undergraduate research projects in orthopedics that could lead to the development of improved, cost effective design alternatives for knee and hip implants.

ASEE Design in Engineering Education Division Best Paper Award, 2009 Meeting

2009 NASA Tech Brief Award for publication on Digital Human Modeling

Recipient of the Edward T. Edwards Award from the Knox County ARC. This award is presented to an individual or organization which has made a contribution that resulted in improved opportunities for people with disabilities. Awarded 5 times in the last 27 years.

2006 National Scholar Award for Workplace Innovation and Design – worked with students in senior design who won a $10,000 award for their individual efforts. Rose-Hulman was awarded a $10,000 matching award to be used in BE senior design projects.

Organizational Involvement

I am an active member of the American Society for Engineering Education. I was the 2010 Program Chair for the Design in Engineering Education Division (DEED). I am serving as the Treasurer/Secretary for the 2010-2011 year. As an active participant in this division, I played an integral role in the development of a "Financial Assistance Program" that provides seed money for student design teams that are developing innovation solutions to assistive technology challenges. This program is supported by DEED and NISH, an organization that works to employ people with disabilities in the workplace. I have been the chair for this program for 3

years and have awarded seed grants totaling over $20,000 to ~ 45 teams.

Research Interests

I am actively involved in the Orthopaedic Biomechanics Laboratory (OBL) at Rose-Hulman. The OBL is a collaboration between the Joint Replacement Surgeons of Indiana (JRSI) Research Foundation, based at the Center for Hip & Knee Surgery in Mooresville, IN and Rose-Hulman Institute of Technology. The program was established to provide undergraduate and graduate engineering students at Rose-Hulman with valuable research opportunities in the field of orthopaedics.

Teaching Experience

I have been a professional educator for 10 years and thoroughly enjoy the experience. As a faculty member at an undergraduate-focused institution, I typically teach three courses each quarter. I have developed and taught courses in biomechanics, bone biomechanics, orthopaedic biomechanics, biomedical engineering laboratory, and research methods in biomechanics. Most of my classes include a laboratory component because I firmly believe that students need as much hands-on experience as possible.