Kevin M. Labus, Ph.D.

Curriculum Vitae

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EDUCATION

Doctor of Philosophy *(Ph.D.)*, Bioengineering August, 2016
School of Biomedical Engineering
Colorado State University, Fort Collins, Colorado, USA
Dissertation: "Constitutive Modeling of the Biaxial Mechanics of Brain White Matter"
Advisor: Dr. Christian Puttlitz.

Bachelor of Science *(B.S.)*, Mechanical Engineering May, 2011
Department of Mechanical Engineering
University of Notre Dame, Notre Dame, Indiana, USA

RESEARCH EXPERIENCE

Postdoctoral Research Fellow August, 2016 - Present
Orthopaedic Bioengineering Research Laboratory
Department of Mechanical Engineering
Colorado State University, Fort Collins, Colorado, USA

- Developing a wireless sensing system for monitoring bone healing in orthopedic implants
- Innovated a way to simplify our sensing technology with the potential to minimize regulatory hurdles
- Liaising with surgeons to plan clinical trials and guide device design and methodology
- Performing mechanical testing for client-driven evaluations of orthopaedic devices

Graduate Research Assistant July, 2011 – August, 2016
Orthopaedic Bioengineering Research Laboratory
Colorado State University, Fort Collins, Colorado, USA

- Designed novel techniques for mechanically testing and modeling brain tissue
- Performed histology and transmission electron microscopy analyses to study the structure of the brain.
- Created and validated a microstructurally-scaled finite element model of an intervertebral disc, and designed experiments to define material models
- Performed finite element analysis of a lumbar spine model for comparison with global research groups

Undergraduate Research Assistant May, 2010 - May, 2011
Department of Mechanical Engineering
University of Notre Dame, Notre Dame, Indiana, USA

- Evaluated the wear of knee articular cartilage to test implants for tissue replacement
- Studied the effects of age-related changes to articular cartilage wear

TEACHING EXPERIENCE

Graduate Teaching Assistant August, 2013 – May, 2016
Department of Mechanical Engineering, Course: *MECH 231 - Engineering Experimentation*
Colorado State University, Fort Collins, Colorado, USA

- Lead multiple lab sections teaching LabVIEW, experimentation techniques, data analysis, and technical writing
- Initiated and implemented improvements to several laboratory experiments
- Developed excellent communication skills through lectures in labs and as a guest lecturer in the classroom
- Strong time management to balance simultaneous teaching and research responsibilities

PEER-REVIEWED PUBLICATIONS

1. **Labus KM** and Puttlitz CM. "Viscoelasticity of Brain Corpus Callosum in Biaxial Tension." *J. Mech. Phys. Solids.* 2016 Nov. 96:591-604.

2. **Labus KM** and Puttlitz CM. "An Anisotropic Hyperelastic Constitutive Model of Brain White Matter in Biaxial Tension and Structural-Mechanical Relationships." *J. Mech. Behav. Biomed. Mater.* 2016 Sep. 62:195-208.

3. Han SK, Chen CW, **Labus KM**, Puttlitz CM, Chen Y, Hsieh AH. "Optical Coherence Tomographic Elastography Reveals Mesoscale Shear Strain Inhomogeneities in the Annulus Fibrosus." *Spine*. 2016 Jul. 1;41(13):E770-7.

4. Dreischarf M, Zander T, Shirazi-Adl A, Puttlitz CM, Adam CJ, Chen CS, Goel VK, Kiapour A, Kim YH, **Labus KM**, Little JP, Park WM, Wang YH, Wilke HJ, Rohlmann A, Schmidt H. "Comparison of Eight Published Static Finite Element Models of the Intact Lumbar Spine: Predictive Power of Models Improves When Combined Together." *J. Biomechanics*. 2014 Jun. 47(8), 1757-1766.

5. **Labus KM**, Han SK, Hsieh AH, Puttlitz CM. "A Computational Model to Describe the Regional Interlamellar Shear of the Annulus Fibrosus." *J Biomech Eng*. 2014 Apr. 136(5), 051009.

ABSTRACTS & CONFERENCE PROCEEDINGS

1. **Labus KM**, McGilvray KC, Demir HV, Kieser D, Puttlitz CM. "An Experimental Model of Femoral Stem Loosening and Detection via Strain Sensing." Orthopaedic Research Society. Mar 19-22, 2017.

2. **Labus KM**, García JJ, Puttlitz CM. "Modeling the Biaxial Mechanics of Brain White Matter." Summer Biomechanics, Bioengineering and Biotransport Conference. June 17-20, 2015.

3. **Labus KM**, Orozco GA, García JJ, Puttlitz CM. "An Anisotropic Model of the Biaxial Mechanics of Brain White Matter." 7th World Congress of Biomechanics. July 6-11, 2014.

4. Dreischarf M, Zander T, Shirazi-Adl A, Puttlitz CM, Adam CU, Clayton J, Chen CS, Goel VK, Kiapour A, Kim YH, **Labus KM**, Little JP, Park WM, Wang YH, Wilke HJ, Rohlmann A, Schmidt H. "Comparison of Eight Published Lumbar Spine Finite Element Models." 7th World Congress of Biomechanics. July 6-11, 2014.

5. Hsieh AH, Han S, Hwang D, Chen C, Chou C, **Labus KM**, Yu M, Puttlitz CM, Chen Y. "Spatial and Temporal Considerations of Cellular Mechanobiology in the Intervertebral Disc." 7th World Congress of Biomechanics. July 6-11, 2014.

6. **Labus KM**, Hsieh AH, Puttlitz CM. "Lamellar and Interlamellar Shear Compared Across Regions of the Annulus Fibrosus." ASME Summer Bioengineering Conference. June 26-29, 2013.

AWARDS

- Journal of Biomechanical Engineering: Editor's Choice Paper, 2014: "A Computational Model to Describe the Regional Interlamellar Shear of the Annulus Fibrosus."

OTHER WORK EXPERIENCE

Reliability Engineering Summer Intern June, 2009 – August, 2009
Eli Lilly & Company
Indianapolis, Indiana, USA

- Ignited a passion for medical technologies
- Learned to take initiative to discover how I can best contribute to the company

Camp Counselor June, 2008 - August, 2008
Jewish Community Center
Indianapolis, Indiana, USA

- Developed interpersonal skills and responsibility while leading a group of 20 elementary-aged children
- Stepped out of my comfort zone and thrived in an environment that I was previously unfamiliar with

- Recognized for outstanding leadership by my supervisors by being selected as a Captain among counselors

NCAA ATHLETICS

NCAA Track & Field, Cross Country August, 2007 - May, 2011
University of Notre Dame
Notre Dame, Indiana, USA

- Developed a self-driven attitude and strong work ethic
- Developed excellent organizational and time management skills by balancing athletics with academics
- Learned the importance of teamwork, even in a seemingly individual sport