

# Curtis M. Goreham-Voss

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## **EDUCATION** The University of Iowa

M.S. Mechanical Engineering, GPA: 4.00

Thesis Topic: Finite Element Analysis of Tibial Cartilage Following Reconstructive Surgery

**Honors/Awards:** National Science Foundation Graduate Research Fellowship  
Phi Kappa Phi Graduate Fellowship

Iowa City, IA

August, 2007

## **North Dakota State University**

B.S. Mechanical Engineering, GPA: 3.98

Minor: Mathematics

**Honors/Awards:** Pi Tau Sigma Mechanical Engineering Honor Society  
Tau Beta Pi Engineering Honor Society  
Phi Kappa Phi International Honor Society  
Presidential Scholarship

Fargo, ND

May, 2005

**COMPUTER SKILLS** Finite Element – ANSYS, ABAQUS, Patran/Marc  
Programming – C, Visual Basic, MATLAB, Fortran  
Computational Dynamics – LMS Virtual.Lab

Solid Modeling – Pro/Engineer  
Microsoft Office

## **TECHNICAL EXPERIENCE** Orthopaedic Biomechanics Research Laboratory

Research Assistant, Engineering

- Performed finite element analyses of dynamic impacts of cartilage.
- Developed and implemented new procedure for wear simulations of spinal disc implants, cutting analysis time from several days to less than 3 hours.
- Provided technical support and advice to undergraduate and graduate students in the lab.

Iowa City, IA

August, 2007 – Present

Graduate Research Assistant

June, 2005 – July, 2007

- Performed finite element analysis of ankle cartilage and investigated connection between cartilage stress and osteoarthritis.
- Disseminated results through posters and presentations at national conferences and manuscripts submitted to biomedical engineering journals.
- Participated regularly in collaborative meetings taking suggestions for future work and contributing ideas to other projects.

## **North Dakota State University GraSUS Program**

Undergraduate Teaching Fellow

- Planned and implemented new laboratory experiments in local senior high school Physics classroom.
- Documented progress and reported to supervisors for grant renewal purposes.
- Attended seminars with other fellows and high school teachers to exchange teaching techniques and laboratory activities.

Fargo, ND

August, 2004 – May, 2005

## **Department of Mechanical Engineering, University of Kansas**

Summer Research Fellow

- Performed physical testing of synthetic vertebrae models to compare their mechanical properties with cadaveric specimens.
- Learned operation of multi-channel servo-hydraulic testing equipment as well as data control and collection systems.
- Developed testing procedures necessary to characterize vertebrae properties with minimal supervision.

Lawrence, KS

June, 2004 – August, 2004

## **Imation Corporation**

Engineering Intern

- Worked as a manufacturing engineering intern with diskette assembly team.
- Identified new potential sources diskette materials, contacted companies to secure sample for testing, and performed initial tests of new materials.

Wahpeton, ND

June, 2003 – August, 2003

- Interacted regularly with maintenance, quality control, and business unit representatives to improve assembly line speed, quality, and cost.

**ADDITIONAL TrueGrid Finite Element Preprocessing Package**  
**TRAINING**    Introductory Training Course

Livermore, CA  
 May, 2005

**PUBLICATIONS**

1. Goreham-Voss CM, Rudert MJ, Brown TD. Poroelastic finite element analysis of a step-off articular incongruity. 14th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, March 18, 2006, Chicago, Illinois.
2. Goreham-Voss CM, Rudert MJ, Brown TD. Poroelastic finite element analysis of a step-off articular incongruity. 2006 Midwest Graduate Student Biomechanics Symposium, March 31–April 1, 2006, Milwaukee, Wisconsin.
3. Goreham-Voss CM, Rudert MJ, Brown TD. Poroelastic finite element analysis of a step-off articular incongruity. The University of Iowa College of Engineering 4th Annual College of Engineering Research Open House, April 20, 2006, Iowa City, Iowa.
4. Goreham-Voss CM, Rudert MJ, Brown TD. Poroelastic finite element analysis of unstable motion of an incongruously reduced intra-articular fracture. 30th Annual Meeting of the American Society of Biomechanics, September 6–9, 2006, Blacksburg, Virginia.
5. Goreham-Voss CM, McKinley TO, Brown TD. A finite element exploration of cartilage stress near an articular incongruity during unstable motion. *J. Biomech.* 2007;40(15): 3438-47. PMID:2212609.
6. Hartmann JM, Rudert MJ, Pedersen DR, Baer TE, Goreham-Voss CM, Brown TD. Compliance-dependent load allocation between sensing versus non-sensing portions of a sheet-array contact stress sensor. *J. Biomech.* 2007. (In Revision)
7. Goreham-Voss CM, Brown TD. A 3D poroelastic finite element study of a step-off articular incongruity. 15th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, February 10, 2007, University of California - San Diego, La Jolla, California.
8. Goreham-Voss CM, Brown TD. Effect of local degeneration on cartilage stresses and stress transients during physiologic duty cycles. 54th Annual Meeting of the Orthopaedic Research Society, March 2-5, 2008, San Francisco, California.
9. Goreham-Voss CM, Tochigi Y, Rudert, MJ, Brown TD. Contact face geometry as a determinant of cartilage stress during impaction testing. 54th Annual Meeting of the Orthopaedic Research Society, March 2-5, 2008, San Francisco, California.
10. Goreham-Voss CM, Brown TD. A finite element study of the effect of cross-shear on wear of the Prodisc total disc replacement. The North American Congress on Biomechanics (NACOB 2008), August 5–9, 2008, Ann Arbor, Michigan. Abstract ID #72.
11. Goreham-Voss CM, McCabe DJ, Rudert MJ, Martin JA, Pedersen DR, Brown TD. Spatial correlations between local impact stress and cell death distributions. OARSI World Congress on Osteoarthritis 2008, September 18–21, 2008, Rome, Italy. Abstract 07-A-292-OARSI, Poster Presentation #121. Goreham-Voss CM, Brown TD. Effects of testing parameter perturbations in the ISO standard for total disc replacement wear. 55<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, February 22–25, 2009, Las Vegas, Nevada. Abstract ID: ORS2009-2298. Poster Presentation #2355, Poster Session 64: Arthroplasty—Implant Wear.
12. Goreham-Voss CM, Douni  O, Vicars R, Hall RM, Fisher J, Brown TD. Motion track variations in alternative wear testing protocols for total disc replacements. 55<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, February 22–25, 2009, Las Vegas, Nevada. Abstract ID: ORS2009-3240. Poster Presentation #2357, Poster Session 64: Arthroplasty—Implant Wear.
13. Goreham-Voss CM, Brown TD. Finite element wear simulation of the Charite total disc replacement, including cross-shear. 55<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, February 22–25, 2009, Las Vegas, Nevada. Abstract ID: ORS2009-2320. Poster Presentation #2417, Poster Session 64: Arthroplasty—Finite Element.
14. Tochigi Y, Martin JA, Rudert MJ, McCabe D, Goreham-Voss CM, Buckwalter JA, Brown TD. Acute phase pathology of cartilage injury in human ankle intraarticular fractures. 55<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, February 22–25, 2009, Las Vegas, Nevada. Abstract ID: ORS2009-2661. Poster Presentation #1078, Poster Session 25: Cartilage Impact Models.
15. Vicars R, Goreham-Voss CM, Brown TD, Fisher J, Hall RM. Agreement between novel physical and computational wear simulations for total disc replacement. 55<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, February 22–25, 2009, Las Vegas, Nevada. Abstract ID: ORS2009-1606. Poster Presentation #1751, Poster Session 52: Spine Biomechanics.

**CURRENT ORGANIZATIONS**

- American Society of Mechanical Engineers
- American Society of Biomechanics
- Orthopaedic Research Society
- Phi Kappa Phi International Honor Society
- Pi Tau Sigma Mechanical Engineering Honor Society
- Tau Beta Pi Engineering Honor Society