

Carl W. Imhauser
carl.imhauser@drexel.edu

University of Ulm
Institute of Orthopaedic Research and Biomechanics
14 Helmholtzstrasse
89081 Ulm
GERMANY
Tel: 49 731 500 33642

85 Schlesienweg
89075 Ulm
GERMANY
Tel: 49 0160 3849243

EDUCATION

Ph.D. Mechanical Engineering, August 2004, **Drexel University, Philadelphia, PA**

Thesis: "The Development and Evaluation of an Image-Based, 3-Dimensional, Patient-Specific Dynamic Model of the Hindfoot"

Advisor: Sorin Siegler

M.S. Mechanical Engineering, 2000, **Drexel University, Philadelphia, PA**

Thesis: "Biomechanical Evaluation of the Efficacy of External Stabilizers in the Conservative Treatment of Flatfoot Deformity: Experimental Design, Validation and Preliminary Testing"

Advisor: Sorin Siegler

B.S. Electrical Engineering, 1997, **Temple University, Philadelphia, PA**, *magna cum laude*

HONORS AND AWARDS

- DAAD (German Academic Exchange) Research Fellowship (6 months), Awarded to highly qualified student for performing research at a German University, begins September 2004
- Drexel University College of Engineering Graduate Research Award, Department of Mechanical Engineering, 2004
- Teaching Fellowship, Drexel University Department of Mechanical Engineering and Mechanics, 2003-2004
- Koerner Fellowship, Awarded to a graduate student in the college of engineering for academic merit, academic year 2002-2003
- Best Poster Award in basic and applied science, Drexel University Research Day 2002
- International Society of Biomechanics Doctoral Dissertation Grant, 2001
- Finalist, American Orthopedic Foot and Ankle Society Goldener Award for Outstanding Basic Science Research Paper, 2001
- Nissen Award Nominee for Outstanding Senior NCAA Gymnastics Student-Athlete, 1997
- NCAA Division I National Horizontal Bar Champion, 1996
- NCAA All-American, 1995, 1996
- NCAA Academic All-American, 1994-1997
- George Wallace Hayes Memorial Award, Presented to that member of the Temple University Gymnastics Team who manifests outstanding gymnastic skill and who best exemplifies "Wally." High ideals, courage enthusiasm, sincere concern for the welfare of his teammates and the kind of humility that uniquely enough is a quiet source of inspiration. 1997
- Temple University College of Engineering and Computer Science Dean's List, 1993-1997
- Eta Kappa Nu (Electrical Engineering Honors Society), 1997

RESEARCH EXPERIENCE

DAAD Research Fellowship (6 months), Institute of Biomechanics and Orthopaedics Research, University of Ulm, September 2004-Present

- Developing 3D finite element/feedback regulation models of the fracture healing process

Research Assistant, Drexel University, January 1998-August 2004

- Developed an image-based, patient-specific forward dynamic model of the ankle joint and subtalar joint to be used for investigating the effects of ligament injury, ankle joint arthrodesis and total ankle replacement on hindfoot mechanics.

- Participated in implementation and completion of NIH funded study entitled *Biomechanics of Foot/Ankle Injuries using 3D Imaging*. (supported by US DHHS grant AR46902)
- Used combination of mechanical testing and magnetic resonance imaging to evaluate the effects of chronic lateral ankle ligament injuries on ankle flexibility and kinematics. This information was used to evaluate the diagnosis and treatment of such injuries both *in vivo* and *in vitro*.
- Redesigned a 6 degree-of-freedom mechanical linkage for testing the flexibility characteristics of the ankle joint , which will be used to evaluate the mechanics of total ankle replacement, ankle joint arthrodesis and subtalar joint arthrodesis *in vivo*.
- Wrote research proposals for funding of Master's and potential doctoral thesis. Both projects were awarded funding:
 - Doctoral Research: DePuy Inc., Equipment donated for testing, \$36,000
 - Master's Research: EBI Inc., \$10,000
- Developed an experimental axial and tendon loading system for the quasi-static simulation of the gait cycle to investigate posterior tibialis tendon dysfunction, flatfoot deformity and their conservative treatments.
- Designed an experimental system for configuring the humerus with respect to the scapula in order to investigate the effects of posterior capsule tightening in the glenohumeral joint.
- Designed experiment for investigating the effects of ankle joint distraction, which is used in total ankle replacement implantation, on hindfoot mechanics.
- Advised Temple University medical students investigating the biomechanics of the glenohumeral joint.
- Advised/mentored 1 senior design group and 2 undergraduate honors students. The senior design project assessed the effects of forces applied across the ankle joint during ankle joint distraction, which is used during ankle joint replacement surgery, on hindfoot mechanics.

REFEREED JOURNAL PUBLICATIONS

Ringleb, S.I., Udupa, J.K., Siegler, S., **Imhauser, C.W.**, et al., The Effect of Ankle Ligament Damage and Surgical Reconstructions on the Mechanics of the Ankle and Subtalar Joints Revealed by Three-Dimensional Stress MRI ", J Orthop Res, Conditionally Accepted for Publication, August, 2004.

Siegler, S., Udupa, J.K., Ringleb, S.I., **Imhauser, C.W.**, et al., Bone Morphology and architecture of the ankle and subtalar joints revealed through a quasi-static three-dimensional stress-MRI technique, J Biomech, Accepted for publication, March, 2004.

Imhauser, C.W., Siegler, S., Abidi, N.A., Frankel, D.Z., The Effect of Posterior Tibialis Tendon Dysfunction on the Plantar Pressure Distribution and the Kinematics of the Arch and the Hindfoot. Clin Biomech, 19: 161-169, February, 2004.

Imhauser, C.W., Abidi, N.A., Gavin, K., Frankel, D.Z., Siegler, S., Biomechanical Evaluation of the Efficacy of External Stabilizers in the Conservative Treatment of Adult Acquired Flatfoot Deformity. Foot Ankle Int, 22(8): 727-737, August, 2002.

CONFERENCE PRESENTATIONS

Udupa, J., Siegler, S., Hirsch, B.E., Ringleb S.I., Okereke, E., Roach, N., Saha, P.K., **Imhauser, C.W.**, 3D Stress MRI for Studying the Functional Pathologies of the Ankle Complex. SPIE Medical Imaging Symposium, San Diego, CA, February, 2004.

Imhauser, C.W., Abidi, N.A., Gavin, K., Frankel, D.Z., Siegler, S., The Effect of the Posterior Tibialis Tendon on the Mechanics of the Arch and the Hindfoot. Oral Presentation, 4th World Congress of Biomechanics, Calgary, Canada, August, 2002.

Ringleb, S.I., Siegler, S., Udupa, J.K., **Imhauser, C.W.**, Hirsch, B.E., Saha, P.K., Odhner, D., Okereke, E., Roach, N., The Level of Symmetry in the Anthropometric and Mechanical Properties of the Ankle as Determined by a Mechanical/MRI Technique. Oral Presentation, 4th World Congress of Biomechanics, Calgary, Canada, August, 2002.

Koffler, K., Bader, D.A., Eager, M.R., **Imhauser, C.W.**, Siegler, S., Moyer, R.A., Kelly, J.D. IV. The Effect of Posterior Capsule Tightening on Glenohumeral Joint Translation in the Late-Cocking Phase of Pitching: A Cadaver Study. Oral Presentation, Arthroscopy Academy of North America's (AANA) 21st Annual Meeting, Washington, D.C., April, 2002.

Imhauser, C.W., Abidi, N.A., Gavin, K., Frankel, D.Z., Siegler, S., Biomechanical Evaluation of the Efficacy of External Stabilizers in the Conservative Treatment of Acquired Flatfoot Deformity. Oral Presentation, 2001 AOFAS Summer Conference, San Diego, CA, July, 2001.

Imhauser, C.W., Abidi, N.A., Gavin, K., Frankel, D.Z., Siegler, S., Biomechanical Evaluation of the Efficacy of External Stabilizers in the Conservative Treatment of Acquired Flatfoot Deformity. Poster Presentation, 18th Congress of the International Society of Biomechanics, Zurich, Switzerland, July, 2001.

Imhauser, C.W., Abidi, N.A., Gavin, K., Frankel, D.Z., Siegler, S., The Role of the Posterior Tibialis as a Functional Stabilizer of the Arch and of the Hindfoot. Poster Presentation, 18th Congress of the International Society of Biomechanics, Zurich, Switzerland July, 2001.

Imhauser, C.W., Abidi, N.A., Gavin, K., Frankel, D.Z., Siegler, S., Biomechanical Evaluation of the Efficacy of External Stabilizers in the Conservative Treatment of Acquired Flatfoot Deformity – Part I. Oral Presentation, 2001 AOFAS Winter Conference, Dallas, TX, February, 2001.

TEACHING EXPERIENCE

Adjunct Instructor, Drexel University, Goodwin College of Professional Studies, Winter 2004

- Taught lectures, developed and supervised laboratories for experimental undergraduate solid mechanics course.

Teaching Fellowship, Drexel University, Academic years 2003-2004

- Responsible for redesigning experiments, supervising teaching assistants and developing lectures for a mechanics of materials and dynamics laboratory under the supervision of a senior faculty member.

Teaching Assistant, Drexel University, September 1998-June 2002

- Recitation instructor for undergraduate statics course.
- Laboratory instructor for the solid mechanics sections of undergraduate mechanical engineering laboratories.

PROFESSIONAL DEVELOPMENT

- Participated in Engineering Education Scholars, a NSF funded workshop designed “to broaden the preparation of advanced engineering graduate students and junior faculty,” July 2002.

LEADERSHIP EXPERIENCE

- Co-founder and president, Drexel University Mechanical Engineering Graduate Student Association (MEGA), 2001-2002.
- Co-founder and secretary, Drexel University Graduate Student Research Council (GSRC), an organization of engineering students focused on improving research skills, career development and improving graduate student life, 2001-2002.
- Social coordinator for MEGA and GSRC, 2001-2003.
- Temple University Men’s Gymnastics Varsity Team Captain, 1995-1997.

INTERNATIONAL INDUSTRY EXPERIENCE

- Worked in manufacturing company maintaining mechanical and electrical equipment and programming PLC units, Gustav Imhauser Metaltechnik, Olpe, **Germany**, November 1997.
- Worked in quality control division of metal factory evaluating material samples using electron microscope, Diehl Metals, Nuremberg, **Germany**, July 1996.
- Worked in aluminum foundry machining finished products using manual and programmable tooling systems, Ohm and Haner Aluminum Foundry, Olpe, **Germany**, June 1995.

SPECIAL SKILLS

- German

VOLUNTEER WORK

- Oral Reader/ Reading Tutor, Alexander Adaire Elementary School, Philadelphia, PA, Academic Year 2002-2003

PROFESSIONAL MEMBERSHIPS

- IEEE
- International Society of Biomechanics
- American Society of Biomechanics