

University of Wisconsin – Madison
 Department of Mechanical Engineering
 1513 University Ave., Madison WI 53706-1539
 Tel. (608) 262-2690, Fax. (608) 265-2316

CAREER OBJECTIVE

To apply my understanding of mechanical design and the human musculo-skeletal system, in order to aid the development of biomechanical and safe solutions for the prevention, care and treatment of diseased or injured systems.

CAREER HIGHLIGHTS

- Specialized in pre-clinical evaluation of orthopedic implants, particularly by using both experimental and mathematical modeling techniques
- 19 years experience in orthopedic implant research and analysis, 6 years at University of Wisconsin – Madison, 10 years at Sulzer Orthopedics Ltd. in Switzerland, 3 years full-time and 6 years part-time at Queen's University in Canada
- Established and direct UW Bone and Joint Biomechanics Laboratory
- Advised 17 Graduate Students (6 Ph.D.) in Mechanical and Biomedical Engineering
- Ph.D. in Mechanical Engineering in the field of fatigue test prediction
- 14 research papers published and presented worldwide, 85 co-authored
- Awarded Best Paper Award at NAFEMS World Congress 2001 and New Investigator Recognition Award at Combined ORS 2001
- American (4,787,908) and European (A61F-2/42, 01810866.2) patent contributions

APPOINTMENTS

2003-
current UNIVERSITY OF WISCONSIN - Madison, Madison WI, USA
 Department of Mechanical Engineering, Department of Biomedical Engineering
 Assistant Professor

Teaching. I have taught a wide-breadth of ME courses including required undergraduate courses in Mechanics and Design of Machine Elements. In addition, I developed and taught a graduate course, Orthopaedic Biomechanics: Design of Orthopaedic Implants. I have particularly enjoyed teaching engineering design to first year and senior engineering students with the WISE (Women in Science and Engineering) section of Introduction to Engineering and the EPICS (Engineering Projects in Community Service) sections of senior design.

Research. My Bone and Joint Biomechanics Laboratory has carried-out several biomechanical investigations combining computational and experimental methods over a wide range scales from musculoskeletal biomechanics down to bone microstructures in the areas of: 1. Design of Rehabilitation and Sports Equipment; 2. Orthopaedic Biomechanics; and 3. Bone Mechanobiology.

1992-
2001 CENTERPULSE ORTHOPEDICS ZIMMER Co., Winterthur, Switzerland
 Research & Analysis Department, Biomechanics Group - Stress Analysis
 Project Manager and Deputy-Coordinator of the Pre-Clinical Stress Analysis Group

Pre-Clinical Evaluation of Implants. The objective of the Biomechanics Group is to support the development of orthopedic implants by researching and applying analytical, numerical and experimental methods in order to evaluate implant strength, fixation, and function. Projects are carried out in a team environment, for which my strong project management and communication skills were essential. Communication of project results included written technical reports as well as oral presentations at technical seminars and User Meetings. The quality and significance of my work was confirmed in the research community through presentations at international scientific meetings and through publications in conference proceedings and peer-reviewed journals.

Group Coordination. As deputy-coordinator of the Stress Analysis Group, I supported the management of the group's projects, resources, communications and working environment. I have also supervised 13 research students: 2 Ph.D. students on contract, 1 M.Sc. student, 6 "Diplomarbeit" students, and 4 summer students. The M.Sc. project resulted in a European patent application (01810866.2).

Example Projects: Fatigue Test Prediction, Physiological Fatigue Test Development for Tibial Base-Plates Virtual Biomechanics System for TKR Development, Biomechanical Considerations for Epi/Metaphyseal Hip Prostheses, Geometry and Elastic Modulus Optimization of a Non-Metallic Femoral Hip Stem, and Bone Modeling and Remodeling.

Collaborative projects have included: Institute of Orthopedic Research and Education (Houston, TX, USA), École Polytechnique Fédérale de Lausanne (Switzerland), Queen's University Kingston (Canada), Swiss Federal Laboratories for Materials (Duebendorf, Switzerland), Sulzer Innotec Ltd. (Winterthur, Switzerland), University of Bath (UK), Sulzer Orthopedics Inc. (Austin, TX, USA), University of Rostock (Germany), and Université de Technologie de Compiègne (France).

1989-1991 QUEEN'S UNIVERSITY AT KINGSTON, Kingston, Canada
Department of Mechanical Engineering
Teaching and Research Assistant

As a Professor's Assistant my duties were supervising and conducting undergraduate labs, grading, conducting tutorials, and occasionally lecturing. As a Research Assistant in the Clinical Mechanics Group my projects included: the material testing of metatarsal bone, 3D reconstructions and finite element analysis of bone and orthopedic implants.

PROFESSIONAL PREPARATION

2000 QUEEN'S UNIVERSITY AT KINGSTON, Kingston, ON, Canada
Ph.D. in Mechanical Engineering
Fatigue Test Prediction: An Evaluation of Methods Applied to the Standard Fatigue Testing of Orthopaedic Hip Stems.

1991 M.Sc. in Mechanical Engineering
An Evaluation of a Joint Replacement for the Great Toe - A Three-Dimensional Finite Element Study.
My work supported the development of this new joint replacement. The implant has European (A61F-2/42) and American (4,787,908) patents.

1988 B.Sc. in Mechanical Engineering, with Honours

AWARDS

New Investigator Recognition Award (NIRA)

Ploeg H., Soulhat J., Hertig D., O'Keane M., Roberts P., Grigoris P., Finite element analysis of a cemented surface replacement of the proximal femur, poster presentation at 4th Combined Meeting of the Orthopaedic Research Societies of the USA, Canada, Europe, and Japan (CORS), Rhodes, Greece, 2001, pg. 224.

Best Paper Award

Ploeg H., Taylor W., Warner M., Hertig D., Clift S., Finite element analysis and bone remodelling after total hip replacement, oral presentation at NAFEMS World Congress, Lake Como, Italy, 2001. Paper published in *The Evolution of Product Simulation, Proceedings of NAFEMS World Congress 2001*, Vol. 2, pp. 811-822, also published in Benchmark, International Magazine for Engineering Designers & Analysts, July 2001, pp. 13-17.

PERSONAL

Citizenships: Canadian and Dutch
Languages: English (mother), German (good), French (fair), Dutch (fair)
Memberships: International Society of Biomechanics, Canadian Society of Biomechanics, American Society of Mechanical Engineers, American Society of Biomechanics

PUBLICATIONS

Theses (2)

1. Ploeg H.L., Fatigue Test Prediction: An Evaluation Of Methods Applied to the Standard Fatigue Testing Of Orthopaedic Hip Stems, Ph.D. Thesis, Queen's University, Kingston, Ontario, Canada January 2000.
2. Ploeg H.L., An evaluation of a joint replacement for the great toe: a three-dimensional finite element study, M.Sc. Thesis, Dept. of Mechanical Engineering, Queen's University, Kingston, Ontario, Canada, October 1991.

Patents (3)

1. Femurhalsprothese, Inventors: Brian Le Gros, Markus Froehlich, Heidi-Lynn Ploeg, Urs Wyss, Application No. 01810866.2, 24. Oct. 2001.
2. Grosssehengrundgelenk-Prothese, Inventors: Urs Wyss, Gerald A. B. Saunders, David Siu, Theodore D. Cooke, Yuki Yoshioka, J. Timothy Bryant, European Patent, Patent Number: EP 0 289 276 B 1, Date of Patent: 29.01.92.
3. Metatarsal-Phalangeal Replacement Joint, Inventors: Urs Wyss, Gerald A. B. Saunders, David Siu, Theodore D. Cooke, Yuki Yoshioka, J. Timothy Bryant, United States Patent, Patent Number: 4,787,908, Date of Patent: Nov. 29, 1988.
4. Fully Integrated Technology for Complete Pre- and Post-Operative Assessments of Orthopedic Surgery, patent pending.

Refereed Journal Articles (16)

1. Burgers T., Lakes R., Ploeg H., Post Yield Relaxation Behavior of Bovine Cancellous Bone, *Journal of Biomechanics*, in review.
2. Vivanco J., Fang S., Levine D., Ploeg H., Evaluation of the mechanical behavior of direct compression molded porous tantalum-UHMWPE construct: a microstructural model, *Journal of Applied Biomaterials and Biomechanics*, 7(1):1-9, 2009, in press.
3. Kersh M.E. and Ploeg H., A kinematic model for pre-clinical evaluation of patellar implant, *International Journal of Experimental and Computational Biomechanics*, in press.
4. Ploeg H., Buergi M., Wyss U., Hip stem fatigue test prediction, *International Journal of Fatigue* 31(5):894-905, 2009.
5. Burgers T., Mason J., Ploeg H., Initial Fixation of a Femoral Knee Component: An In Vitro and Finite Element Study, *International Journal of Experimental and Computational Biomechanics*, 1(1):23-44, 2009.
6. Schmidt J., Berg D., Ploeg E.L., Ploeg H., Precision, repeatability and accuracy of Optotrak® active-marker motion tracking system, *International Journal of Experimental and Computational Biomechanics*, 1(1):113-127, 2009.
7. Potter J., Sauer J., Weisshaar C., Thelen D., Ploeg H., Gender differences in bicycle saddle pressure distribution during seated cycling, *Journal of Medicine & Science in Sports & Exercise*, 40(6):1126-1134, June 2008.
8. García S., Smith E., Ploeg H., A calibration procedure for a bone loading system, *Journal of Medical Devices*, 2:0106-1-01106-6, March 2008.
9. Burgers T., Mason J., Niebur G., Ploeg H., Properties of trabecular bone in the distal femur, *Journal of Biomechanics*, 41:1077-1085, 2008.
10. Sauer, J.L., Potter, J.J., Weisshaar, C.L., Ploeg, H., Thelen, D.G., Influence of gender, power and hand position on pelvic motion during seated cycling, *Medicine & Science in Sports & Exercise*, 39:2204-2211, 2007.
11. Schmitz M.J., Clift S.E., Taylor W.R., Hertig D., Warner M.D., Ploeg H., Bereiter H., Investigating the effect of mechanotransductive signal type on the finite element based prediction of bone remodelling around the Thrust Plate Prosthesis: A patient specific comparison, *Proc Inst Mech Eng [H]* 218(6):417-424, 2004.
12. Taylor W.R., Ploeg H., Hertig D., Warner M.D., Clift S.E., Bone remodelling of a proximal femur with the Thrust Plate Prosthesis: An in-vitro case, *Computer Methods in Biomechanics and Biomedical Engineering* 7(3):131-137, 2004.
13. Herren D.B., Ploeg H., Hertig D., Klabunde R., Modeling and finite element analysis of a new revision implant for the elbow, *Clinical Orthopaedics and Related Research* 420:292-297, March 2004.
14. Taylor W.R., Roland E., Rakotomanana L., Ploeg H., Hertig D., Klabunde R., Warner M.D., Clift S.E., A method for determining orthotropic materials properties for a long bone from CT data using FE modal analysis, *Journal of Biomechanics* 35:767-773, 2002.
15. Ploeg H.L., Wevers H.W., Wyss U.P., Bürgi M., Fatigue strength testing of hip stems with statistical analysis, *Bio-Medical Materials and Engineering* 9(4):243-263, 1999.
16. Frei S., Ploeg H., Reinschmidt C., Heuberger P. Fracturas de implantes de tibia - Consecuencias para las pruebas de los implantes (Tibial implant fractures – Consequences for implant testing), *Biomechanica* VII 13:58-64, 1999.

Conference Presentations, Oral (35)

1. García S., Crookshank M., MacIntyre, N., Harrison M., Smith E., Sellens R., Ploeg H., Structural properties of trabecular cores from femoral heads, North American Congress on Biomechanics (NACOB), Ann Arbor, Michigan, USA, August 2008.
2. Schmidt J., Dunbar M., Ploeg H. Factorial analysis predicts parameter interactions in FE model with revision implant, podium, 16th Congress of European Society of Biomechanics (ESB), Lucerne, Switzerland, July 2008.
3. Bischoff J., Kersh M., Ploeg H., Advanced material modeling in a virtual biomechanical knee, podium, ABAQUS Users Conference, Newport, RI, 2008.
4. Kersh M., Ploeg H., Muenchinger M., Siggelkow E., Sieber D., Modeling soft tissues: A knee joint pilot study, podium, 8th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE), Porto, Portugal, February 2008.
5. Burgers T., Mason J., Ploeg H., Validation of a finite element analysis of the press-fit fixation of a bone-implant interface in the distal femur, podium, 8th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE), Porto, Portugal, February 2008.
6. Burgers, T., Mason, J., Niebur G., Ploeg, H., Compressive properties of trabecular bone in the distal femur, podium, American Society of Biomechanics (ASB) Conference, San Francisco, CA, 2007.
7. Kersh M.E., Ploeg H., Burgkart R., Siggelkow E., Münchinger M., Creating a physiological knee model: experimental methods and validation concept, poster, International Society of Biomechanics (ISB) Conference, Taipei, Taiwan, 2007. Abstract published in *Journal of Biomechanics* 40:S581, 2007.
8. Kersh M.E., Ploeg H., Siggelkow E., Münchinger M., From medical imaging to knee models: factors in model generation, podium, International Society of Biomechanics (ISB) Conference, Taipei, Taiwan, 2007. Abstract published in *Journal of Biomechanics* 40:S99, 2007.
9. Freytag M., Ploeg H., Schmidt J., Shapiro V., Tsukanov I., Meshfree analysis from biomedical images: construction of approximate distance fields, podium, Computational Bioengineering Minisymposium at the 7th World Congress on Computational Mechanics, Los Angeles, CA, 2006.
10. Henderson A., Schmidt J., Ploeg H., Deluzio K., Dunbar M., Finite element & in-vitro testing of tibial stem length in revision total knee arthroplasty, podium, 14th Biennial Conference For The Canadian Society For Biomechanics (CSB), Waterloo, ON, Canada, 2006.
11. Henderson A, Schmidt J, Ploeg H, Deluzio K, Dunbar M, Tibial stem sizing in revision total knee arthroplasty, podium, *The Interaction of Mechanics and Biology in Knee Joint Restoration and Regeneration*, Berlin, Germany, 2006.
12. Schmidt J., Henderson A., Ploeg H., Deluzio K., Dunbar M., Primary fixation in a revision total knee arthroplasty may not imply long term fixation: the effect of stem length, podium, 16th Annual Meeting of the European Orthopaedic Research Society, Bologna, Italy, 2006.
13. Biegler K., Schmidt J., Ploeg H., Deluzio K., Dunbar M., A parametric analysis study on the number of materials required for a convergence of finite element results for a tibial bone model, podium, 14th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, Chicago IL, USA, 2006.
14. Henderson A., Schmidt J., Ploeg H., Deluzio K., Dunbar M., Finite element & in-vitro testing of tibial stem length in revision total knee arthroplasty, podium, 14th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, Chicago IL, USA, 2006.
15. Murphy K.C., Biegler K., Ploeg H., The design and finite element analysis of biomimetic bone scaffolds, podium, 14th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, Chicago IL, USA, 2006.
16. Schmidt J., Henderson A., Ploeg H., Deluzio K., Dunbar M., Finite element analysis of stem dimensions in a revision total knee arthroplasty using visible human computed tomography data, podium, 14th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, Chicago IL, USA, 2006.
17. Freytag, M., Ploeg H., Shapiro, V., Tsukanov, I., Meshfree stress modeling from biomedical images, podium, International Symposium on Computer Simulation in Biomechanics, Cleveland, OH, USA, 2005.
18. Kersh M., Ploeg H., Development of pre-clinical patellar component test for total knee arthroplasty, podium, Proceedings of IMECE2004: 2004 ASME International Mechanical Engineering Congress and R&D Expo, Anaheim, CA, 2004.
19. Siggelkow E., Hertig D., Widmer K.-H., Ploeg H., Construction and validation of a finite element model of a human pelvis, podium, 7th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE), Madrid, Spain, 2004.
20. Le Gros B., Wyss U., Ploeg H., Frohlich M., An analytical investigation of potential design changes for a reduction in hip stem elastic modulus, podium, 6th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE), Rome, Italy, 2001.

21. Schmitz M.J., Taylor W.R., Warner M.D., Hertig D., Ploeg H. and Clift S.E., Effect of changes in the relative rates of bone deposition and resorption on a finite element based simulation of bone remodelling around the Thrust Plate Prosthesis, podium, 6th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE), Rome, Italy, 2001.
22. Le Gros B., Wyss U, Ploeg H., Froehlich M., O848 Analysis of femoral hip prosthetic geometry and material interdependence, podium, 18th International Society of Biomechanics (ISB) Congress, Zurich, Switzerland, 2001, pg. 381.
23. Ploeg H., Soulhat J., Hertig D., O'Keane M., Roberts P., Grigoris P., Finite element analysis of a cemented hip resurfacing, podium, British Orthopaedic Research Society Meeting (BORS), Southampton, UK, 2001.
24. Ploeg H., Taylor W., Warner M., Hertig D., Clift S., Finite element analysis and bone remodelling after total hip replacement, podium, NAFEMS World Congress, Lake Como, Italy, 2001. Paper published in The Evolution of Product Simulation, Proceedings of NAFEMS World Congress 2001, Vol. 2, pp. 811-822. Awarded "Best Paper Award" and published in Benchmark, International Magazine for Engineering Designers & Analysts, July 2001, pp. 13-17.
25. Herren D., Ploeg H., Hertig D., Klabunde R., A new total joint replacement for elbow arthroplasty revision, podium, 4th Combined Meeting of the Orthopaedic Research Societies of the USA, Canada, Europe, and Japan (CORS), Rhodes, Greece, 2001, pg. 173.
26. Ploeg H., Taylor W., Hertig D., Warner M., Clift S., Bereiter H., FEA von Knochen mit Implantaten um Knochenumbau vorherzusagen, podium, Abaqus Anwendertreffen, Winterthur, Switzerland, 2000. Paper published in the proceedings.
27. Taylor W.R., Roland E., Klabunde R., Ploeg H., Clift S.E., Validation of an FE model of an implanted Thrust Plate Prosthesis using modal analysis, podium, 4th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE), Lisbon, Portugal, 1999. Paper published in Computer Methods in Biomechanics and Biomedical Engineering-3, eds. Middleton J., Jones M.L., Shrive N.G., Pande G.N., Gordon and Breach Publishing Group, London, UK, 2001, pp. 39-44.
28. Heinlein B., Frei S., Ploeg H., Bürgi M., The physiological tibia test, podium, 17th International Society of Biomechanics (ISB) Congress, Calgary, Canada, 1999.
29. Heinlein B., Frei S., Ploeg H., Der „physiologische Tibiatest“ - ein neues Konzept in der Implantatprüfung, podium, Deutsche Gesellschaft für Biomechanik, Ulm, Germany, 1999.
30. Terrier A., Rakotomana L., H. Ploeg, P.-F. Leyvraz, Comparison of a metal backed and a full polyethylene tibial component after TKR: evaluation of the stresses and relative micro-motions distribution at the interface, podium, International Conference on Knee Replacement (ImechE), London, UK, 1999.
31. Ploeg H.L., Wevers H.W., Wyss U.P., and Bürgi M., Finite element analysis and fatigue test prediction applied to the standard fatigue testing of hip stems, podium, 3rd International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE), Barcelona, Spain, 1997. Paper in Computer Methods in Biomechanics and Biomedical Engineering-2, eds. Middleton J., Pandi G., Jones M., Gordon and Breach Publishing Group, London, UK, 1998, pp. 139-146.
32. Ploeg H.L., Wyss U.P., Smith C.M., Dujovne A.R., A three dimensional finite element analysis in the development of a total joint replacement for the great toe, podium, 15th Annual Meeting of the American Society of Biomechanics (ASB), Tempe, USA, 1991.
33. Smith C.M., Wyss U.P., Pichora D.R., Ploeg H.L., Glenoid implant technology - Part I: Development of a three-dimensional finite element model, podium, 15th Annual Meeting of the American Society of Biomechanics (ASB), Tempe, USA, 1991.
34. Ploeg H.L., Wyss U.P., Smith C.M., 3D finite element analysis in the development of joint replacement for the great toe, podium, podium, 7th Biennial Conference of the Canadian Medical and Biological Engineering Society Conference (CMBEC), Banff, Canada, 1991.
35. Smith C.M., Wyss U.P., Pichora D.R., Ploeg H.L., Advances in glenoid implant technology - A finite element study, podium, podium, 7th Biennial Conference of the Canadian Medical and Biological Engineering Society Conference (CMBEC), Banff, Canada, 1991.

Conference Presentations, Poster (48)

1. Levasseur A., Ploeg, H. Petit Y., Influence of microstructure on the mechanical properties of vertebral bone assessed by quantitative computed tomography – study on synthetic model, Annual Meeting of the American Society of Biomechanics (ASB), State College, PA, August 2009

2. Kersh M., Ploeg H., Shin M., Siggelkow E., Muenchinger M., Data acquisition for specimen-specific computational models, poster, American Society of Mechanical Engineering – Summer Bioengineering Conference, Lake Tahoe, CA, USA, June 2009.
3. Vivanco J., Garcia-Rodriguez S., Smith E.L., Ploeg H., Material and mechanical properties of tricalcium phosphate-based (TCP) Scaffolds, poster, American Society of Mechanical Engineering – Summer Bioengineering Conference, Lake Tahoe, CA, USA, June 2009.
4. Schmidt J. and Ploeg H., Assessment of motion of long-stemmed tibial implant, North American Congress on Biomechanics (NACOB), Ann Arbor, Michigan, USA, August 2008.
5. Travis B., Ploeg H., Experimental and finite element investigations of the press-fit fixation of a bone implant interface in the distal femur, North American Congress on Biomechanics (NACOB), Ann Arbor, Michigan, USA, August 2008.
6. Aiyangar, A., Ploeg H., Validation of Elastic moduli assigned to porcine femoral bones using computed tomography (CT) Data, 16th Congress of European Society of Biomechanics (ESB), Lucerne, Switzerland, July 2008.
7. Vivanco J., Fang S., Levine D., Ploeg H. Microstructural mechanical FE analysis of direct compression molded porous tantalum-UHMWPE, poster, 16th Congress of European Society of Biomechanics (ESB), Lucerne, Switzerland, July 2008.
8. Aiyangar, A., Ploeg H., A technique for calculating area moment of inertia of long bones using Computed Tomography (CT) data, poster, American Society for Bone and Mineral Research (ASBMR) 29th Annual Meeting, Honolulu, HI, USA, 2007.
9. Smith E., Garcia S., Ploeg H., Calibration of the Zetos loading system, poster, American Society for Bone and Mineral Research (ASBMR) 29th Annual Meeting, Honolulu, HI, USA, 2007.
10. Garcia S, Ploeg H, Smith E, Calibration of the Zetos loading system, poster, American Society of Biomechanics (ASB) Conference, San Francisco, CA, 2007.
11. Schmidt, J., Henderson, A., Dunbar M., Ploeg, H., Finite element parameters affecting micromotion and strain energy density predictions in tibial model as determined by factorial analysis, poster, American Society of Biomechanics (ASB) Conference, San Francisco, CA, 2007.
12. Kersh, M.E., Ploeg, H., Burgkart, R., Siggelkow, E., Muenchinger, M., Creating a physiological knee model: experimental methods and validation concept, poster, International Society of Biomechanics (ISB) Conference, Taipei, Taiwan, 2007.
13. Schmitz, A.M., Ploeg, E.L., Beshai, L.M., Bryant, J.T., Ploeg, H., Stiffness analyses for the design development of a prosthetic foot, poster, 12th World Congress of the International Society for Prosthetics and Orthotics, Vancouver, BC, 2007.
14. Potter, J.J. Sauer, J.L., Weisshaar, C., Ploeg, H., Thelen, D.G., poster, Biomedical Engineering Society Annual Meeting, Combined analysis of pelvic motion and saddle pressure distribution during cycling, Chicago, IL, USA, 2006.
15. Garcia S, Ploeg H, Smith E, Zetos loading system: an evaluation and recalibration study, poster, American Society for Bone and Mineral Research (ASBMR) 28th Annual Meeting, Philadelphia, PA, 2006.
16. Freytag M., Ploeg H., Schmidt J., Shapiro V., Tsukanov I., Meshfree analysis from biomedical images: construction of approximate distance fields, poster, 7th World Congress on Computational Mechanics, Los Angeles, California, 2006.
17. Schmidt J., Henderson A., Ploeg H., Deluzio K., Dunbar M., Development of finite element models to critically evaluate stem selection for a revision total knee arthroplasty, poster, Fifth World Congress of Biomechanics, Munich, Germany, 2006.
18. Kersh M., Ploeg H., Contact area in dome-shaped and conforming patellar implants, poster, Fifth World Congress of Biomechanics, Munich, Germany, 2006.
19. Biegler K., Schmidt J., Ploeg H., Deluzio K., Dunbar M., A parametric analysis study on the number of materials required for a convergence of finite element results for a tibial bone model, poster, 14th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, Chicago IL, USA, 2006.
20. Henderson A., Schmidt J., Ploeg H., Deluzio K., Dunbar M., Finite element & in-vitro testing of tibial stem length in revision total knee arthroplasty, poster, 14th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, Chicago IL, USA, 2006.
21. Murphy K.C., Biegler K., Ploeg H., The design and finite element analysis of biomimetic bone scaffolds, poster, 14th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, Chicago IL, USA, 2006.
22. Schmidt J., Henderson A., Ploeg H., Deluzio K., Dunbar M., Finite element analysis of stem dimensions in a revision total knee arthroplasty using visible human computed tomography data, poster, 14th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, Chicago IL, USA, 2006.
23. Byrne N., Ploeg H., Deffenbaugh D., Finite element analysis of a total ankle arthroplasty over one stance phase. poster, International Society of Biomechanics Conference, Cleveland OH, USA, 2005.
24. Garcia S., Schmidt J., Ploeg H., A Validation Study: Using CT Scans to Calculate Volume, Weight, and Density, poster, International Society of Biomechanics Conference, Cleveland OH, USA, 2005.

25. Kersh M., Ploeg H., Deformation patterns form a pre-clinical patellar component test, poster, International Society of Biomechanics Conference, Cleveland OH, USA, 2005.
26. Ploeg H., Byrne N., Garcia S., Kersh M., Weghe Van de A., What factors affect the accuracy of solid models made from ct data? poster, International Society of Biomechanics Conference, Cleveland OH, USA, 2005.
27. Schmidt J., Engh J., Viceconti M., Ploeg H., What is the accuracy of surface models created from visible human male computed tomography data? poster, International Society of Biomechanics Conference, Cleveland OH, USA, 2005.
28. García S., Schmidt J., Ploeg H., A Validation Study: Using CT scans to calculate volume, weight, and density, poster, International Symposium on Computer Simulation in Biomechanics, Cleveland OH, USA, 2005.
29. Schmidt J., Engh J., Viceconti M., Ploeg H., What is the accuracy of surface models created from visible human male computed tomography data? poster, International Symposium on Computer Simulation in Biomechanics, Cleveland OH, USA, 2005.
30. Kersh M., Ploeg H., How does normal patello-femoral contact area change before and after deep knee flexion? Poster, American Society of Mechanical Engineering – Summer Bioengineering Conference, Vail CO, USA, 2005. Awarded 3rd place in Undergraduate poster competition.
31. Garcia S., Ploeg H., Smith E. Repeatability Study of the Zetos ex-vivo bone loading system using metallic and polymeric specimens, poster, American Society of Mechanical Engineering – Summer Bioengineering Conference, Vail CO, USA, 2005.
32. Schmidt J., Henderson A., Ploeg H., Deluzio K., Dunbar M., Development of surgical guidelines for tibial stem components in a revision total knee arthroplasty, poster, American Society of Mechanical Engineering – Summer Bioengineering Conference, Vail CO, USA, 2005.
33. Ploeg H., Smith E.L., Gerson A., García S., Broeckmann E., Jones D.B., Repeatability of the ex-vivo bioreactor bone organ culture chamber and loading system, poster, American Society for Bone and Mineral Research (ASBMR) 26th Annual Meeting, Seattle, WA, 2004.
34. Smith E.L., Gerson A., Ploeg H., Jones D.B., Pressure modulation during loading of a trabecular bone core in an ex vivo model, poster, American Society for Bone and Mineral Research (ASBMR) 26th Annual Meeting, Seattle, WA, 2004.
35. Ploeg H., Ploeg E., Byrne N., García S., Kersh M., Nair D., How accurate are solids models made from CT scan data?, poster, Thirteenth Biennial Conference, Canadian Society for Biomechanics (CSB), Halifax, NS, 2004.
36. Le Gros B., Wyss U., Ploeg H., Fröhlich M., Numerical analysis of a polymeric metaphyseal THA geometry for patients with hypersensitivity to metallic biomaterials, poster, 48th Annual Orthopaedic Research Society (ORS), Dallas, TX, 2002, Paper No. 981.
37. Schmitz M. J., Clift S. E., Taylor W. R., Hertig D., Warner M. D., Ploeg H. L., Bereiter H., A comparison of deviatoric, dilatational and energy based signals in bone remodelling predictions applied to the Thrust Plate Prosthesis, poster, 12th Annual European Research Society (EORS), Lausanne, Switzerland, 2002.
38. Schmitz M. J., Clift S. E., Taylor W. R., Hertig D., Warner M. D., Ploeg H. L., Bereiter H., Prediction of bone remodelling around the Thrust Plate Prosthesis: A patient specific finite-element study of the effect of remodelling signal, poster, International Conference Engineers & Surgeons, Joined at the Hip (IMechE Medical Engineering Division), 2002.
39. Ploeg H., Soulhat J., Hertig D., O'Keane M., Roberts P., Grigoris P., Finite element analysis of a cemented surface replacement of the proximal femur, poster, 4th Combined Meeting of the Orthopaedic Research Societies of the USA, Canada, Europe, and Japan (CORS), Rhodes, Greece, 2001, pg. 224. Awarded New Investigator Recognition Award (NIRA).
40. Taylor W.R., Warner M., Clift S.E., Ploeg H., Hertig D., Klabunde R., Bereiter H., Comparison between clinical findings and FE based bone remodelling predictions for the Thrust Plate Prosthesis, poster, 4th Combined Meeting of the Orthopaedic Research Societies of the USA, Canada, Europe, and Japan (CORS), Rhodes, Greece, 2001, pg. 275.
41. Frei S., Hertig D., Ploeg H., Heuberger P., Analysis and testing of the Dynamic Hip Screw plate and hip screw, poster, 66. Jahrestagung 2002 der deutschen Gesellschaft für Unfallchirurgie, Berlin, Germany, 2001.
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GRADUATE STUDENTS

Post-Doctoral Students (1 in progress)

Anthony Au	Fall 2008-Fall 2010 NSERC Fellowship
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PhD Students (2 completed and 4 in progress)

Travis Burgers	PhD ME Fall 2005-Summer 2008 PhD Thesis: <i>Measuring and Modeling the Press-Fit of a Femoral Knee Component</i> .
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Jill Schmidt	PhD ME Summer 2006-Spring 2009 PhD Thesis: <i>Tibial Component Migration using Roentgen Stereographic Analysis (RSA) and Fibrous Tissue Prediction</i> . NSF Fellowship
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Sylvana García	PhD ME Summer 2005-Summer 2009 (anticipated) PhD Thesis: <i>Numerical Modeling and Validation of Ex-Vivo Trabecular Bone Samples</i> .
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Juan Vivanco	PhD MSP Spring 2006-Fall 2009 (anticipated) PhD Thesis: <i>Bone Scaffold Design and Analysis</i> .
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Ameet Aiyangar	PhD ME Summer 2007-Spring 2010 (anticipated) PhD Thesis: <i>A Study on Patient Specific Acetabular Cup Deformation Measurement Methods and Finite Element Simulations</i> .
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Mariana Kersh	PhD ME Spring 2008-Spring 2010 (anticipated) PhD Thesis: <i>A Numerical Knee Joint Ligament Model with Robot Validation</i> . NSF Fellowship
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MS Students (16 completed and 4 in progress)

Geoff Piller	MS ME Fall 2009-Spring 2011 (anticipated) Thesis: <i>Presurgical planning & manufacturing system for personalized orthopedic implants</i> .
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Eric Bader	MS ME Fall 2008-Spring 2010 (anticipated) Thesis: <i>The effect of antibiotics on the mechanical properties of bone cement</i> .
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Jerald Berlin	MS BME Fall 2008-Spring 2010 (anticipated)
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Joshua Slane	MS BME, Fall 2008-Spring 2010 (anticipated) Thesis: <i>Analysis of Bicycle Glove Pressure Measurement for the Design of Safe and Comfortable Gloves</i> .
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Arinne Lyman	MS BME, Fall 2007-Spring 2008, Independent Study: <i>Fatigue Testing of Bone Cements</i> .
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Nipun Yamdagni	MS BME, Fall 2007-Spring 2008, Independent Study: <i>Deformation Testing of Hip Resurfacing Cup.</i>
Mariana Kersh	MS ME Fall 2005-Spring 2008 Thesis: <i>Development and Validation of a Pre-Clinical Test for the Patella Component of the Total Knee Joint Replacement.</i>
Meghan Crookshank	MSc (Mech. Eng.) Queen's University, Kingston ON, Fall 2005-Fall 2007 Thesis: <i>Optimizing fracture management - Correlating the physical properties of bone to computed tomography and dual energy x-ray absorptiometry to generate an estimate of bone quality.</i>
James Potter	MS BME Fall 2005-Spring 2007 Thesis: <i>Analysis of Bicycle Saddle Pressure Measurement for the Design of Safe and Comfortable Saddles.</i>
Ameet Aiyangar	MS ME Fall 2005-Spring 2007 Thesis: <i>Validation of Finite Element Models Created from Computed Tomography Data through Four-Point-Bending of Porcine Femurs.</i>
James Potter	MS BME Fall 2005-Spring 2007 Thesis: <i>Analysis of Bicycle Saddle Pressure Measurement for the Design of Safe and Comfortable Saddles.</i>
Dan Carlson	MS BME, Spring 2007-Fall 2007, Independent Study: <i>Static Testing of Bone Cements</i>
Kristopher Biegler	MS ME Fall 2005-Fall 2006 Thesis: <i>A Study on Acetabular Cup Deformation Measurement Methods and Finite Element Simulations.</i>
Julie Sauer	MS BME Fall 2005-Fall 2006 Independent Study: <i>Analysis of Pelvic Motion for the Design of Safe and Comfortable Saddles</i>
Christine Weisshaar	MS BME Fall 2005-Fall 2006 Independent Study: <i>On-Road Testing of Bicycle Saddles for the Design of Safe and Comfortable Saddles</i>
Jill Schmidt	MS ME Fall 2005-Spring 2006 Thesis: <i>Validation of Parameters Used in a Finite Element Model of a Revision Total Knee Arthroplasty.</i>
Adam Henderson	MSc BME, Dalhousie University, NS, Canada, Spring 2006 Thesis: <i>Numerical Modeling and Validation of the Tibial Component of a Revision Total Knee Replacement.</i>
Andrew Van de Weghe	MS BME, Fall 2004-Spring 2005, Independent Study: <i>Stiffness Analysis of the Niagara Foot</i>
Nick Byrne	MS BME Fall 2003-Summer 2005 Thesis: <i>Development and Validation of a Pre-Clinical Test for the Tibial Component of the Total Ankle Joint Replacement</i>
Sylvana García	MS ME-PES Spring 2004-Spring 2005