
BIOGRAPHICAL SKETCH

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NAME Baer, Thomas E.	POSITION TITLE Engineer II
eRA COMMONS USER NAME	

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
University of California at San Diego, California	B.A.	1965–1970	Philosophy
McGill University, Montréal, Canada		1970–1973	Philosophy
Pratt Institute, Brooklyn, New York		1981–1983	Industrial Design

A. Positions and Honors

Positions and Employment

1968–1970	Laboratory Mechanician	Scripps Institution of Oceanography, La Jolla, CA
1970–1973	Teaching Assistant	McGill University, Montreal, Canada
1974–1975	Engineering Technologist	Multi-State Devices, Montreal, Canada
1976–1979	Engineering Technologist	Canstar Communications, Toronto, Canada
1980–1983	Engineering Technologist	Sonometrics, INC., New York, NY
1983–1988	Industrial Designer	Hannah Design, New York, NY
1988–1997	Industrial Designer	Self-employed, New York, NY
1997–1999	Project Director	Not-for-profit community development project Guanajuato Mexico
1999–2002	Free-lance author and editor	Peachpit Press, Berkeley, CA
2002–Present	Engineer II	Orthopaedic Biomechanics Laboratory, University of Iowa, Iowa City, IA

Other Experience and Professional Memberships

Member of the Orthopaedic Research Society

B. Selected peer-reviewed publications

1. Tochigi Y, Saltzman CL, Amendola A, Rudert MJ, Baer TE, Brown TD. Direction of subtalar joint laxity with interosseous talocalcaneal ligament sectioning. American Orthopaedic Foot and Ankle Society's Annual 2002 Summer Meeting, July 11–14, 2002, Traverse City, Michigan.
2. Tochigi Y, Saltzman CL, Amendola A, Rudert MJ, Baer TE, Brown TD. Preferential direction of subtalar joint laxity with interosseous talocalcaneal ligament sectioning. Proceedings of the IV World Congress of Biomechanics, August 4–9, 2002, Calgary, Alberta, Canada, p. 460.
3. Tochigi Y, Saltzman CL, Amendola A, Rudert MJ, Baer TE, Brown TD. Preferential direction of subtalar joint laxity with interosseous talocalcaneal ligament injury. International Federation of Foot & Ankle Societies 1st Triennial Scientific Meeting, September 12–14 2002, San Francisco, California.
4. Tochigi Y, Amendola A, Rudert MJ, Baer TE, Brown TD, Saltzman CL. The Role of the Peri-ankle Ligaments in Stance Phase. 19th Annual Summer Meeting of the AOFAS, Hilton Head, SC, June 2003.

5. Tochigi Y, Amendola A, Rudert MJ, Baer TE, Brown TD, Hillis SL, Saltzman CL. The role of the interosseous talocalcaneal ligament in subtalar joint stability. Transactions of the 49th Annual Meeting of the Orthopaedic Research Society, February 2–5, 2003, New Orleans, Louisiana, p. 1302.
6. Tochigi, Y, Amendola A, Rudert MJ, Baer TE, Brown TD, Saltzman CL. Biomechanical effect of interosseous talocalcaneal ligament insufficiency on subtalar joint stability. American Academy of Orthopaedic Surgeons 70th Annual Meeting, February 5–9, 2003, New Orleans, Louisiana, p. 188.
7. Tochigi Y, Amendola A, Rudert MJ, Baer TE, Brown TD, Hillis SL, Saltzman CL. The role of the interosseous talocalcaneal ligament in subtalar joint stability. *Foot Ankle Int.* 2004 Aug;25(8):588–596.
8. Baer TE, Pedersen DR, Rudert JM, Kallemeyn (Vos) NA, Grosland NM, Brown TD. A novel device for calibrating sheet array pressure sensors and for monitoring their performance. Proceedings of the 28th Annual Meeting of the American Society of Biomechanics, September 8–11, 2004, Portland, Oregon. Abstract #239.
9. McKinley TO, Rudert MJ, Koos DK, Pedersen DR, Baer TE, Tochigi Y, Marsh JL, Brown TD. Whole-cycle contact stress, contact stress directional gradient, and loading rate changes in an ankle incongruity model. 5th Combined Meeting of the Orthopaedic Research Societies of the U.S.A., Canada, Japan and Europe, October 11, 2004, Banff, Alberta, Canada. Session: Joint Biomechanics, Paper Presentation #064.
10. Baer TE, Pedersen DR, Rudert MJ, Vos NA, Grosland NM, Brown TD. Calibrating and monitoring sheet array pressure sensors for intra-articular loading measurement. 5th Combined Meeting of the Orthopaedic Research Societies of the U.S.A., Canada, Japan and Europe, October 13, 2004, Banff, Alberta, Canada. Session: Arthroplasty II, Paper Presentation #115.
11. Paul MC, Glennon L, Baer TE, Brown TD. Direction-dependence of polyethylene wear for metal counterface scratch traverse. 5th Combined Meeting of the Orthopaedic Research Societies of the U.S.A., Canada, Japan and Europe, October 10–13, 2004, Banff, Alberta, Canada. Poster Presentation #217.
12. McKinley TO, Rudert MJ, Koos DK, Pedersen DR, Baer TE, Tochigi Y, Marsh JL, Brown TD. Time-variant contact stress, contact stress directional gradient, and loading rate changes in an ankle incongruity model. 5th Combined Meeting of the Orthopaedic Research Societies of the U.S.A., Canada, Japan and Europe, October 10–13, 2004, Banff, Alberta, Canada. Poster Presentation #276.
13. McKinley TO, Rudert MJ, Koos DK, Pedersen DR, Baer TE, Tochigi Y, Marsh JL, Brown TD. Time-variant contact stress, contact stress directional gradient, and loading rate changes in an ankle incongruity model. 9th International Society for Fracture Repair, November 2–11, 2004, Bologna, Italy. Podium Presentation, Poster #47, Abstract #S23.
14. Glennon LP, Baer TE, Martin JA, Brown TD. Experimental measurement of direction dependence of polyethylene wear for metal counterface scratch traverse. 51st Annual Meeting of the Orthopaedic Research Society, February 20–23, 2005, Washington DC. Poster Presentation #1679.
15. Lundberg HJ, Pedersen DR, Muste MV, Baer TE, Brown TD. Quantifying fluid ingress to the joint space during THA subluxation. 51st Annual Meeting of the Orthopaedic Research Society, February 20–23, 2005, Washington DC. Poster Presentation #833.
16. Baer TE, Pedersen DR, Rudert MJ, Vos NA, Grosland NM, Brown TD. Traveling-wave calibration of sheet array sensors for intra-articular pressure measurements. In: The 51st Annual Meeting of the Orthopaedic Research Society. Washington DC, 2005.
17. Glennon LP, Lack WD, Baer TE, Martin JA, Brown TD. Sliding direction-dependence of wear between polyethylene and a scratched metal counterface. Society for Biomaterials 30th Annual Meeting and Exposition: New Applications and Technologies, April 27–30, 2005, Memphis, Tennessee. Poster Presentation #715.
18. McKinley TO, Rudert MJ, Koos DC, Pedersen DR, Baer TE, Tochigi Y, Brown TD. Contact stress transients during functional loading of ankle step-off incongruities. *J. Biomech.* 2006;39(4):617–626.
19. Glennon LP, Paul MC, Lack WD, Baer TE, Martin JA, Brown TD. Direction-dependence of UHMWPE wear for metal counterface scratch traverse. XXth Congress of the International Society of Biomechanics and 29th Annual Meeting of the American Society of Biomechanics, July 31–August 5, 2005, Cleveland, Ohio. Hip Replacement: Podium Presentation.
20. McKinley TO, Rudert MJ, Koos DC, Pedersen DR, Baer TE, Tochigi Y, Brown TD. Stance phase aggregate contact stress and contact stress gradient changes resulting from articular surface stepoffs in human cadaveric ankles. *Osteoarthritis Cartilage.* 2006 Feb;14(2):131–138.
21. Baer TE, Stolley MP, Thedens DR, Brown TD, Saltzman CL. Clinical tip: Development of an ankle distraction device compatible with MRI and radiography. *Foot Ankle Int.* 2006 Jun;27(6):472–474. PMID2254510.

22. McKinley TO, Rudert MJ, Tochigi Y, Pedersen DR, Koos DC, Baer TE, Brown TD. Cambios dependientes de incongruencia de grados de estres de contacto en tobillos cadavericos humanos. *J. Orthop. Trauma.* 2006 Nov/Dec;20(10):747.
23. McKinley TO, Rudert MJ, Tochigi Y, Pedersen DR, Koos DC, Baer TE, Brown TD. Incongruity-dependent changes of contact stress rates in human cadaveric ankles. *J. Orthop. Trauma.* 2006 Nov/Dec;20(10):732–738.
24. Lundberg HJ, Pedersen DR, Baer TE, Muste MV, Callaghan JJ, Brown TD. Effects of implant design parameters on fluid convection, potentiating 3rd body debris ingress into the bearing surface during THA impingement/subluxation. *J. Biomech.* 2007;40(8):167. PMID1945119.
25. Heiner AD, Lundberg HJ, Baer TE, Pedersen DR, Callaghan JJ, Brown TD. Episodic subluxation increases third body ingress and embedment in the THA bearing surface. 31st Annual Meeting of the American Society of Biomechanics, August 22–25, 2007, Stanford, California. Abstract ID #263. Podium 3: Bone I.
26. Goetz JE, Derrick TR, Pedersen DR, Robinson DA, Conzemius MG, Baer TE, Brown TD. Hip joint contact force in the emu (*Dromaius novaehollandiae*) during normal level walking. *J. Biomech.* 2008;41(4):770–778. PMID2291359.
27. Heiner AD, Lundberg HJ, Baer TE, Pedersen DR, Callaghan JJ, Brown TD. Effects of episodic subluxation events on third body ingress and embedment in the THA bearing surface. *J. Biomech.* 2008; 41(10):2090–2096. PMID2572990.
28. Glennon LP, Baer TE, Martin JA, Lack WD, Brown TD. Sliding direction-dependence of polyethylene wear for metal counterface traverse of severe scratches. *J. Biomech. Eng.* 2008 Oct;130(5): 051006. PMID2593892.
29. Goetz JE, Pedersen DR, Robinson DA, Conzemius MG, Baer TE, Brown TD. The apparent critical isotherm for cryoinsult-induced osteonecrotic lesions in emu femoral heads. *J. Biomech.* 2008;41(10):2197–2205. PMID2612542.
30. Paul MC, Glennon LP, Baer TE, Brown TD. Field variable associations with scratch orientation-dependence of UHMWPE wear: A finite element analysis. *J. Biomech. Eng.* 2008 Dec;130(6):061019. PMID2593842.

C. Research Support

Ongoing Research Support

Department of Veterans Affairs John J. Callaghan (PI) 10/01/07–09/30/11

Biomechanics of Total Hip Impingement & Dislocation

Three research objectives are proposed, addressing emerging concerns with (1) the combined deleterious effects of reduced toughness and reduced liner thickness in highly cross-linked metal-on-polyethylene bearings, (2) impingement events in metal-on-metal and ceramic-on-ceramic bearings, and (3) potential anatomic limitation of the motion range increases geometrically afforded by larger head size designs.

Role: Designer/Machinist

5 P50 AR055533 Joseph A. Buckwalter (PI) 09/10/07–08/31/12

US DHHS, National Institutes of Health/NIAMS

New Approaches to Assess and Forestall Osteoarthritis in Injured Joints

The goal of the University of Iowa CORT is to develop new methods of forestalling post-traumatic osteoarthritis (PTOA) through a multi-disciplinary translational approach including biological science, bioengineering, imaging, and clinical research. The central theme is that joint injuries initiate a sequence of biologic events that lead to PTOA and that new treatments of joint injuries will minimize these deleterious events and promote joint healing.

Role: Research Assistant: Biomechanics & Imagine Core

5 R01 AR053899 Thomas D. Brown (PI) 09/07/07–08/31/11

US DHHS, National Institutes of Health

Local Biomechanics of Median Nerve Insult in Carpal Tunnel

The long-term goal of the study is to establish an objective mechanistic framework for linking CTS with quantifiable biomechanical influence factors. An interdisciplinary approach will be adopted, integrating research team member expertise in the areas of biomechanical stress analysis, hand surgery, and musculoskeletal MRI.

Role: Investigator

5 R01 AR053344 Jeffrey A. Weiss (PI)
US DHHS, National Institutes of Health
Biomechanics of the Dysplastic Hip

07/01/07–06/30/12

The overall hypothesis of this study is that acetabular dysplasia causes alterations in hip joint biomechanics, which predispose the joint to cartilage degeneration. Subject-specific, three-dimensional finite element modeling techniques will be developed and validated to study hip joint biomechanics. Then, using three patient populations (normal, traditional dysplastic and retroverted dysplastic), patient-specific finite element models will be used to determine stresses in and around the hip joint during simulated walking, stair-climbing and descending stairs. The primary focus of the University of Iowa subcontract will be development and validation of a sensor for transient contact stress measurement in the hip, based on the TekScan technology.

Role: Staff Engineer

Completed Research Support

Annunziato Amendola (PI)
ArthroSurface, Inc.

01/01/07–12/31/08

The Effects of Osteochondral Defects and Focal Resurfacing on Joint Contact Mechanics

The proposed research aimed to clarify the pathomechanics of focal osteochondral defects, both in the ankle and in the knee, and to assess the ability of resurfacing to restore functional joint contact mechanics.

Role: Research Associate

5 R01 AR049919-04 Thomas D. Brown (PI)
US DHHS, National Institutes of Health

04/01/03–03/31/08

The Emu as a Model for Necrotic Femoral Head Collapse

Unlike previous quadrupedal disease models, osteonecrosis induced cryogenically in (bipedal) emus progresses to collapse, apparently due to the mechanical demand. This grant supports work to quantify the experimenter-controlled parameters in this model (e.g., cryo-insult severity and location), and to quantify the biomechanics of emu versus human hips, with and without osteonecrosis.

Role: Research Assistant

Ali Fakhry (PI)
ITI Foundation

07/15/02–02/28/07

A Study in the Retention Profile of Ball Attachments Used for Implant-Retained Overdentures

This study first developed methodology for measuring the forces generated during the continuous seating and unseating of pre-fabricated attachment systems used to retain implant overdentures. This methodology was then used to compare the retention performance of different prosthetic attachment systems used in these overdentures.

Role: Consultant