

BIOGRAPHICAL SKETCH

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NAME Bloebaum, Roy Drake	POSITION TITLE Research Career Scientist and Director, Bone and Joint Research Laboratory, VA Salt Lake City HCS Research Professor, University of Utah		
eRA COMMONS USER NAME (credential, e.g., agency login) ROYBLOEBAUM			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Lindenwood University	B. Sc.	06/1974	Biology
University of Western Australia	B.Sc.Hon.	04/1977	Anatomy
University of Western Australia	Ph.D.	04/1982	Anatomy

A. Personal Statement

As the director of Bone and Joint Laboratory over the past 23 years, I have been lead- or co-author on over 100 papers on clinically related and translational work. My personal goal is to safely introduce osseointegrated implants (OI) for Veterans and warfighters with limb loss over the next five years. Under my direction, the Bone and Joint Research Lab was established in 1987. The mission statement of this lab is to *“contribute knowledge to the advancement of Orthopaedic, clinical and basic sciences through hypothesis-driven basic and translational research programs, providing education programs for patients, clinical care providers, fellows, researchers, and students, which will lead to improved clinical treatments and VA patient care.”* Accordingly, over the past 23 years, I have successfully managed over 14 major VA, NIH and DOD grants, 25 graduate students, 10 residents, 5 post doctorate fellows, 27 medical students and 36 undergraduate students. I have collaborated with 11 VA physicians. I hope my Curriculum Vitae and experience demonstrates my accomplishment and management abilities. I have over 30 years experience in establishing implant design criteria for implant attachment to the bone. This work has received national and international awards. The current challenge is to secure a permanent skin seal at the skin-implant interface to prevent periprosthetic OI infection. We have established models to pursue this goal. The team consists of orthopaedic surgeons, histologists, infectious disease and dermatology clinician researchers and bioengineers. To date, funds have been awarded by the VA RR&D, NIH, and DOD to address this major challenge. The lab is one of the few in the world capable of processing large implants in tissue without disturbing the interface. These are essential skills to assess the skin and bone response to the presence of an implant. In summary, I hope this statement demonstrates a record of successful and clinically relevant research projects for Veterans with arthritis, limb loss and bone disease. My record also demonstrates original contributions in the area of patent awards in the field of orthopaedic devices.

B. Positions and Honors

Positions and Employment

1974-1976	Associated Dean of Students, St. Mary's College, O'Fallon, MO.
1978	Post Graduate Research Fellow, University of California, Los Angeles (UCLA), Division of Orthopaedic Surgery, School of Medicine, Los Angeles, CA.
1981-1982	Research Associate, University (Univ.) of Southern California (SC) Orthopaedic Hospital, Dept. of Orthopaedics, Los Angeles, CA.
1982-1984	Assistant Professor Research Orthopaedics, Univ. of SC, Orthopaedic Hospital, Dept. of Orthopaedics, Los Angeles, CA.
1984-1987	Adjunct Associate Professor Bioengineering, Arizona State University, Tempe, AZ.

1987-2000 Director of Basic Science, Div. of Orthopaedic Surgery, Univ. of Utah School of Medicine (SOM), Salt Lake City (SLC), UT.

1987-1992 Research Associate Professor, Dept. of Orthopaedics, Univ. of Utah SOM, SLC, UT.

1988-1996 Research Associate Professor of Bioengineering, Univ. of Utah, SLC, UT.

1989-1991 Research Associate Professor of Biology, Univ. of Utah, SLC, UT.

1993-1995 NIH Grant and Proposal Reviewer for Musculoskeletal and NIDCD, Bethesda, MD.

1994-1997 Research Program Specialist in Orthopaedics, Department of Veteran Affairs, Washington, DC.

1998-2003 Board Member of the IRB, University of Utah, SLC, UT.

1999-2002 Institutional Review Board (IRB) Board Member, Health Sciences Division, Univ. of Utah, SLC, UT.

1999- 2006 School of Medicine Admissions Selection Committee member, Univ. of Utah SOM, SLC, UT.

2000-2003 Board of Regents for the Louisiana's Millennium Trust Health Excellence Fund.

1987-Present Co-Director, Bone and Joint Research Laboratory, VA SLC Health Care System, SLC, UT.

1992-Present Research Professor, Department of Orthopaedics, Univ. of Utah SOM, SLC, UT.

1992-Present Research Professor of Biology, Univ. of Utah, SLC, UT.

1996-Present Research Professor of Bioengineering. Univ. of Utah, SLC, UT.

1999-Present Research Career Scientist, Department of Veterans Affairs, Washington, DC.

1999-Present Albert and Margaret Hofmann Chair in Orthopaedic Research, Dept. of Orthopaedics, Univ. of Utah SOM, SLC, UT.

2001-Present Reviewer for National Institutes of Health (NIH) Musculoskeletal and Dental Sciences Special Emphasis Reparative Medicine Study Sections 01, 02, and 03 and Bioeng. Research Partnership Grants, Panel, Bethesda, MD.

2004-Present Reviewer for NIH National Institute on Aging, National Institute of Biomedical Imaging and Bioengineering, Bethesda, MD.

2004-Present Rehabilitation Research and Development (RR&D), Dept. of Veterans Affairs, Washington DC.

2005-Present Health Services Research and Development, Dept. of Veterans Affairs, Washington DC.

2004-Present Reviewer for NIH National Institute on Aging, National Institute of Biomedical Imaging and Bioengineering, Bethesda, MD.

2009-Present Reviewer for the NIH MOSS SBIR grant reviews, November.

2009-Present Reviewer for the NIH IAR 2010/01 ZRG1 MOSS-F (02) M- Musculoskeletal Engineering Proposals, Teleconference, December.

2010-Present National Health and Medical Research Council (NHMRC).

2010-Present Reviewer for the RR&D Service at the DVA, Center of Excellence/REAP, Washington, D.C.

Other Experience and Professional Memberships

Member, Society for Biomaterials
 Member American Academy of Orthopaedic Surgeons
 Member, Orthopaedic Research Society

Honors

Military: Distinguished Flying Cross, Airmedals, Air Force Commendation, Vietnam Service medal.
 Academic: Rotary International Scholarship, 1975-1976; Otto E. Au Franc Award, The Hip Society, 1979; SIROT Prize, 1991 (Society Internationale de Recherche Orthopedique et de Traumatologie); Who's Who in American Teachers; Society for Biomaterials Clemson Award for Applied Science, 2008.

C. Selected Peer-reviewed Publications (Selected from 127 peer-reviewed publications)

Most relevant to the current application

1. Williams, D. L., Bloebaum, R. D., & Petti, C. A. (2008). Characterization of *Staphylococcus aureus* strains in a rabbit model of osseointegrated pin infections. *J Biomed Mater Res A*, 85(2), 366-370.
2. Isaacson, B. M., Stinstra, J. G., MacLeod, R. S., Webster, J. B., Beck, J. P., & Bloebaum, R. D. (2009). Bioelectric analyses of an osseointegrated intelligent implant design system for amputees. *J Vis Exp*, 29, 1-6.
3. Rosenbaum Chou, T. G., JB, W., M, S., TL, R., & Bloebaum, R. D. (2009). Characterization of step count accuracy of Actigraph activity monitor in persons with lower limb amputation. *J Prosthet Orthot*, 21(4), 208-214.
4. Webster, J. B., Chou, T., Kenly, M., English, M., Roberts, T. L., & Bloebaum, R. D. (2009). Perceptions and acceptance of osseointegration among individuals with lower limb amputations: A prospective survey study. *J Prosthet Orthot*, 21(4), 215-222.
5. Isaacson, B. M., Vance, R. E., Rosenbaum Chou, T. G., Bloebaum, R. D., Bachus, K. N., & Webster, J. B. (2010). Effectiveness of resonance frequency in predicting orthopedic implant strength and stability in an *in vitro* osseointegration model. *J Rehabil Res Dev*, 46(9), 1109-1120.
6. Perry, E. L., Beck, J. P., Williams, D. L., & Bloebaum, R. D. (2010). Assessing peri-implant tissue infection prevention in a percutaneous model. *J Biomed Mater Res B Appl Biomater*, 92B(2), 397-408.
7. Chou, T. G., Petti, C. A., Szakacs, J., & Bloebaum, R. D. (2010). Evaluating antimicrobials and implant materials for infection prevention around transcutaneous osseointegrated implants in a rabbit model. *J Biomed Mater Res A*, 92(3), 942-952.
8. Williams, D. L., & Bloebaum, R. D. (2010). Observing the biofilm matrix of *Staphylococcus epidermidis* ATCC 35984 grown using the CDC biofilm reactor. *Microsc Microanal*, 16(2), 143-152.
9. Isaacson, B. M., Stinstra, J. G., MacLeod, R. S., Pasquina, P. F., & Bloebaum, R. D. (2010). Developing a quantitative measurement system for assessing heterotopic ossification and monitoring the bioelectric metrics from electrically induced osseointegration in the residual limb of service members. *Ann Biomed Eng*, 38(9), 2968-2978.
10. Isaacson, B.M., & Bloebaum, R.D. (2010). Bone bioelectricity: What have we learned in the past 160 years? *J Biomed Mater Res A*, 95A(4), 1270-1279.
11. Williams, D. L., Bloebaum, R. D., Beck, J. P., & Petti, C. A. (2010). Characterization of bacterial isolates collected from a sheep model of osseointegration. *Curr Microbiol*, 61(6), 574-583.
12. Isaacson, B.M., Weeks, S.R., Pasquina, P.F., Webster, J.B., Beck, J.P., & Bloebaum, R.D. (2010). The road to recovery and rehabilitation for injured service members with limb loss: A focus on Iraq and Afghanistan. *US Army Med Dept J*, Jul-Sep, 31-36.
13. Williams, D. L., & **Bloebaum, R.D.** (2011). Use of Delrin plastic in a modified CDC biofilm reactor. Technical Note. *Res J Microbiol*, 6(4), 425-429.

In Press

14. Isaacson, B.M., Brunker, L.B., Brown, A. A., Beck, J.P., Burns, G.L., & Bloebaum, R.D. (2010). An evaluation of electrical stimulation for improving periprosthetic attachment. *J Biomed Mater Res B Appl Biomater*, 2010, Accepted Dec 5.
15. Isaacson, B.M., Brown, A.A., Brunker, L.B., Higgins, T.F., & Bloebaum, R.D. (2011). Clarification of the structure and bone mineral content of heterotopic ossification. *J Surg Res*, Accepted Dec 29, 2010.

Additional recent publications (in chronological order)

1. Willie, B. M., Foot, L. J., Prall, M. W., & Bloebaum, R. D. (2008). Surface damage analysis of retrieved highly crosslinked polyethylene tibial components after short-term implantation. *J Biomed Mater Res B Appl Biomater*, 85(1), 114-124.
2. Willie, B. M., Foot, L. J., Prall, M. W., & Bloebaum, R. D. (2008). Examining the influence of short-term implantation on oxidative degradation in retrieved highly crosslinked polyethylene tibial components. *J Biomed Mater Res B Appl Biomater*, 85(2), 385-397.
3. Bloebaum, R. D. (2008). Rebuttal to Pitkin JRRD Guest Editorial, *J Rehabil Res Dev*. 45(4):vii-xiv. *J Rehabil Res Dev*, 45(9), xi-xii; author reply xii-xiii.

- Rosenbaum Chou, T. G., Child, J. R., Naughtin, R. J., Rigdon, R. R., Schumann, C., & Bloebaum, R. D. (2008). The relationship between femoral periprosthetic cortical bone geometry and porosity after total hip arthroplasty. *J Biomed Mater Res A*, 87(1), 107-115.

D. Research Support

Ongoing Research Support

Title: Research Career Scientist Award

The funding from this program allows the Principal Investigator to continue his research efforts.

Title: Predicting skeletal stability of endoprostheses for above elbow amputees

As a contributor, Dr. Bloebaum provides the scientific support to develop a method for predicting the mechanical stability of osseointegrated, percutaneous endoprostheses proposed for above-elbow amputees.

Title: Mobile porous subdermal barrier to maintain the skin seal of percutaneous devices

As a PI, he is overseeing and providing scientific support to develop and validate a new percutaneous device concept to prevent skin marsupialization.

Title: Tissue analysis of cervical trabecular metal interbody implants

As a scientific advisor, Dr. Bloebaum has contributed to the histological analysis of the implant with the surrounding tissue.

Title: Prevention of biofilm related infections using a novel, broad spectrum antimicrobial coating, CSA-13, on orthopaedic fixation plates

As a PI, Dr. Bloebaum is contributing to the development of a cationic steroid antimicrobial used as a coating on the orthopaedic implants to prevent biofilm formation and related infections.

Title: A Proposal to Congress for the Development of Highly Functional, Neurally Controlled, Skeletally Attached and Intelligent Prosthetic Devices: A Joint Request from the Department of Orthopaedics at the University of Utah and the Bioengineering Institute at Worcester Polytechnic Institute

As a PI, Dr. Bloebaum has contributed to the design and development of a stable, infection-free, skeletal attachment for percutaneous osseointegrated implants.

Completed Research Support

Title: The effects of electrical stimulation on bone ingrowth into osseointegrated implants designed for veteran amputees

As a PI and PhD advisor to the graduate student who submitted this proposal, Dr. Bloebaum has helped to successfully demonstrate that the electrical stimulation may work as a catalyst and increase initial skeletal attachment and reduce rehabilitation times.

Title: Development of infection free osseointegrated implants for active amputees

As a PI, Dr. Bloebaum has managed this study successfully to show that a porous-coated subdermal barrier-incorporated percutaneous OI implant limits periprosthetic infection.

Title: Tissue analysis of cervical trabecular metal interbody implants (goat study)

As the PI, Dr. Bloebaum reviewed the histology of the implant bone interface to confirm biocompatibility of materials.

Title: Development of osseointegrated implants for soldier following orthopaedic extremity trauma

As a PI, Dr. Bloebaum has contributed to the design and development of a stable, infection-free, skeletal implant for above the knee amputees.