WALTON W. BAXTER, III

Curriculum Vitæ

Medtronic, Inc. / 1851 East Deere Avenue / Santa Ana, California 92705
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Education

Ph.D., Bioengineering, University of California, San Diego*, 1999*
- *Dissertation:* Mechanical Analysis of Intravascular Medical Devices *In Vivo*
- Cardiac Mechanics Research Group, Professor Andrew McCulloch

M.S., Bioengineering, University of California, San Diego, *1994*
- *Areas of study:* Solid Mechanics, Numerical Methods, Biomechanics, Physiology

Bachelor of Mechanical Engineering, Georgia Institute of Technology, *1993*
- Highest Honors/Cooperative degree
- Certificate in Bioengineering

Professional Experience

Medtronic, Inc.
- Cardiac Rhythm Management Therapy Delivery, Senior Principal Scientist (1999-present):
  -Developing methods for noninvasive analysis of medical devices in the clinic.
  - Design for Reliability and Manufacturability Green Belt specializing in Use Conditions.
  -Working with academic collaborators to perform animal studies for device development.
  -Conducting clinical research studies with electrophysiologists and cardiologists in the U.S., Europe, Middle East, and Japan.
  -Fostering academic-industrial collaboration through corporate scientific forums and serving on Industrial Liaison Boards.

University of California, Irvine
- Guest lecturer for Biomedical Engineering classes (2000-present):
  -Teach approximately 30 classroom hours per year for upper division BME courses.
- Department of Bioengineering Lecturer (January-April 2006):
  -Taught 180-student graduate and undergraduate class—BME 121/221, "Organ Transport Systems."
  -Managed a team of six graduate assistants overseeing problem-based learning sessions.

University of California, San Diego
- Cardiac Mechanics Research Group Research Assistant (1994-1999):
  -Developed a method for noninvasive analysis of intravascular medical devices.
  -Invented a novel in vivo 4-D mechanical use condition measurement technique in continuous use for over 16 years.
- Department of Bioengineering Senior Teaching Assistant (1994-95):
  -Developed and implemented training workshops within the Bioengineering Department.
- Teaching Assistant (1993-95): *Taught upper level undergraduate biomechanics*.

Professional Experience (continued)

Georgia Institute of Technology
- Teaching Assistant (1992-93): *Taught undergraduate thermodynamics.*

Georgia Power Company
- Cooperative student (1989-92): *Helped design, test, and modify major plant components.*

Awards and Honors

- Elected Medtronic Technical Fellow, 2012.
- Elected Fellow, American Institute for Medical and Biological Engineering, 2008.
- Awarded 2009 Medtronic Cardiac Rhythm Disease Management Star of Excellence for leading a team exploring the root cause of a critical product issue.
- Nominated for Medtronic Star of Excellence award thrice (2001, 2002, 2003).
- Presented Therapy Delivery Productivity Excellence Achievement Quality (PEAQ) Award for setting industry wide connector test standards (2006).
- Nominated for 2003 Technical Contributor of the Year as part of Next Generation Ventricular tachyarrhthmia/ventricular fibrillation Advanced Test Development Team.
- Awarded UCSD Whitaker Graduate Fellowship.
- Received NIH Predoctoral Training Grant.
- Elected Pi Tau Sigma Engineering Honor Society member.

Patents

- "Algorithm for Accurate Three-Dimensional Reconstruction of Non-linear Implanted Medical Devices In Vivo," W. Baxter, US Patent #7457658, 2003.
- "Clinical Tool for Structure Localization," R. Lahm, W. Baxter, J. Morissette, T. Laske, US/International Patent Applications #20050148850 Filed, 2005.
- "Implantable Medical Electrical Lead Bodies Providing Improved Electrode Contact," W. Clemens, N. Werner, D. Loch, D. Hine, D. Hess, C. Pfeiffer, W. Baxter, US Patent Application # 20090248127 Filed, 2009.

Professional Activities

- Serve as Chair for the AIMBE Council of Industry, driving programming for AIMBE Fellows from Industry at the Annual Event and throughout the year.
- Co-Organizer, Modeling and Regulatory Submission Technical Session, 2014 World Congress of Biomechanics to be held in Boston, MA, July 6-11, 2014.
- Co-Chair for the 1st Annual ASME/FDA Frontiers in Medical Devices: Applications of Computer Modeling and Simulation held in College Park, MD, September 11-13, 2013. Led a committee of approximately 10 professionals from industry, academia, and the FDA.
- Co-Chair for the American Society of Mechanical Engineering's 2nd Annual Frontiers in Biomedical Devices conference (2007), technical program chair for the American Society of Mechanical Engineering's 3rd Annual Frontiers in Biomedical Devices conference (2008), and Cardiovascular Stents Session Chair for the 4th Frontiers in Biomedical Devices conference (2009).

Professional Activities (continued)

- Actively participate as a member of the American Institute of Medical and Biological Engineers, American Society of Mechanical Engineers, and Biomedical Engineering Society.
- Medtronic point person for the DARPA Micro/nano Fluidics Fundamentals Focus grant, a national research consortium based at the University of California, Irvine (2006-2008).
- Keynote speaker at the 13th Annual University of California, San Diego Department of Bioengineering Breakfast With Industry (2008).
- Invited speaker for the Think Tank Summit hosted by the American Society for Mechanical Engineers, Toronto, Canada, June 10-11, 2007.
- Served as scientific advisor on Association for the Advancement of Medical Instrumentation IS4 Connector Task Force (2006).
- Co-founder and co-chair of the Santa Ana Heart Valves Medtronic Forum Scientific Exchange Chapter (2000-2008).
- Actively serve on Departmental Industrial Advisory Committees with the Georgia Institute of Technology, University of California, Irvine, University of California, San Diego, University of California, Riverside, and San Diego State University.
- Regularly guest lecture at the University of California, Irvine, University of California, Los Angeles, University of Southern California, and San Diego State University teaching Bioengineering seminars and courses in Cardiovascular Anatomy.
- Perform community outreach by volunteering to speak in Southern California high schools about careers in science and engineering.

Scientific Interests

- Developing efficient image processing and three-dimensional reconstruction techniques for mechanical analysis of implanted interventional devices.
- Modeling mechanical interaction between biological tissues and invasive devices in order to bridge the gap between numerical modeling, bench testing, and clinical assessment of device efficacy.
- Designing, directing, and executing human research feasibility studies and large animal implantation and imaging experiments.
- Creating nonlinear finite element methods to produce numerical models of biological tissues and their interaction with interventional devices or permanent implants.
- Computer programming and software development using a wide range of platforms (Visual Basic, C, C++, Nokia Qt, X/Xmotif, OpenGL, PERL, sed/awk, etc.).

Refereed Publications

AIMBE College of Fellows [including Baxter, W.]: Medical and Biological Engineering in the Next 20 Years: The Promise and the Challenge, IEEE Trans Biomed Eng, V 60, No. 7, July, 2013.

Krahn, A.D., Morissette, J., Lahm, R., Haddad, T., Baxter, W., McVenes, R., Crystal, E., Ayala-Paredes, F., Cameron, D., Verma, A., Simpson, C., Exner, D., and Birnie, D.: Radiographic predictors of lead fracture: a systematic case control analysis, Heart Rhythm 2013, Denver, CO, May 8-11, 2013.

Refereed Publications (continued)

Baxter, W., Skadsberg, N., Johnson, W.B., Crossley, G., and Foreman, B.: New unanticipated insights on peak lead bending during pectoralis flexure, CARDIOSTIM 17th Annual World Congress in Cardiac Electrophysiology, Nice, France, June 16-19 2010.

Baxter, W., Skadsberg, N., Johnson, W.B., Crossley, G., and Foreman, B.: New unanticipated insights on peak lead bending during pectoralis flexure, Heart Rhythm Society, 31st Annual Scientific Sessions, Denver, May 12-15 2010.

Baxter, W.W., Sigler, D.A., Johnson, B.E.: Medical device deformation *in vivo*: an implanted force transducer. *Proceedings of the 2006 Summer Bioengineering Conference*, ASME, Amelia Island, FL, June 21-June 25, 2006.

Baxter, W.W., Morissette, J., Roberts, D., and Schwartz, S.: Acutely implanted cardiac lead shape measurement: physician preference only? *Proceedings of the 2003 Summer Bioengineering Conference*, ASME, Key Biscayne, FL, June 26-June 29, 2003.

Zhao, Y., Baxter, W.W., Johnson, B., Schendel, M., McCarty, J., McMahon, C., Lahm, R., Sun, H., Morissette, J., Laske, T., and Miller, J.: The use of nonlinear FEA modeling to determine the *in vivo* stresses in cardiac pacing lead coils for fatigue evaluation. *Proceedings of the 2003 Bioengineering Conference*, ASME, Key Biscayne, FL, June 26-June 29, 2003.

Baxter, W.W., Redmond, J., Schendel, M., Yu, W., Ryan, R., and Lemmon, J.: Reconstruction of Annuloplasty Devices in an Ovine Model by Biplane Videoradiography – 3D Motion and Finite Element Analysis. *Proceedings of the Sixth Annual Hilton Head Workshop on Prosthetic Heart Valves*. Hilton Head Island, SC, March 6-10, 2002.

Baxter, W.W. and McCulloch, A.D.: A quantitative method for noninvasive finite element / active contour analysis. *Medical Image Analysis* V5, pp. 255-270, 2001.

Baxter, W.W., Morissette, J., Laske, T., Lahtinen, S., Smits, K., and McCulloch, A.D.: Quantitative Assessment of Cardiac Lead Deformation *in vivo*. *Proceedings of the 2001 Bioengineering Conference*, ASME, Snowbird, UT, June 27-July 1, 2001; Vol. 50, pp. 483-484.

Baxter, W.W. and McCulloch, A.D.: A Novel Active Contour Method for Reconstructing Intravascular Medical Devices. Proceedings of the 1997 Annual Fall Meeting of the Biomedical Engineering Society. San Diego, CA, Oct. 4, 1997. *In: Annals of Biomedical Engineering;* 25(suppl. 1), pg. S-29.

Baxter, W.W., Waldman, L.K., McIntyre, P., and McCulloch, A.D.: Finite Element Modeling of Pacemaker Leads for Use During the Design Process. *1996 Advances in Bioengineering/The 1996 ASME International Mechanical Engineering Congress*, Atlanta, GA, Nov. 17-22, 1996; BED-V33, pp. 15-16.

Invited Lectures and Speeches

Baxter, W.: What Unique Applied Forces, Flexing, And Interaction With Other Leads, Devices, And Tissue, Do Leads Need To Withstand?, Europace Summit On Leads Management: Cardiac Lead Engineering: Designing For The Future To Improve Reliability, Performance, And Extractability, Athens, Greece, June 20 2013.

Baxter, W. What Have Engineers Learned from Force Loading and Use Conditions on Leads?, CARDIOSTIM 10th International Symposium On Pacing And ICD Leads, Nice, France, June 13 2012.