

THE UNIVERSITY OF TEXAS
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
FACULTY PERSONNEL RECORD

Full name: Jonathan W. Valvano

Title: Professor

Department: Electrical and Computer Engineering

Date of Birth: November 29, 1953

Citizenship: United States

Education: Massachusetts Institute of Technology, SB, 1977 (Computer Science and EE)
Massachusetts Institute of Technology, SM, 1977 (Computer Science and EE)
Harvard-MIT Division of Health Sciences and Technology, PhD, 1981
(Medical Engineering)

Current and Previous Academic Positions:

The University of Texas at Austin, Department of Electrical and Computer Engineering, Assistant Professor 1981-1986.

The University of Texas at Austin, Department of Electrical and Computer Engineering, Associate Professor 1986-1994

The University of Texas at Austin, Department of Electrical and Computer Engineering, Professor 1994-present

Other Professional Experience:

Naval Surface Weapons Center, Silver Spring, Maryland, Work Study 1972-1975.
Massachusetts Institute of Technology, Cambridge, Massachusetts, Teaching Assistant 1976-1977.

Lowell Institute of Technology, Cambridge, Massachusetts, Teaching Assistant, 1977-1978.

MIT Biomedical Engineering Center for Clinical Instrumentation, Cambridge, Massachusetts, Research Assistant 1976-1981.

Honors and Awards:

Whitaker Health Sciences Fund Fellowship, 1980-1981

Engineering Foundation Teaching Fellowship, 1983-present

ECE Departmental Teaching Award, Spring 1991

Gordon T. Lepley IV Endowed Memorial Teaching Award, Spring 1999

The Lockheed Martin Aeronautics Company Award for Excellence
in Engineering Teaching, Spring 2008

Teaching Embedded Systems in a MOOC Format, Experimentation and Lab
Oriented Studies: Best Papers, ASEE Annual Conference, June 2016

Memberships in Professional and Honorary Societies:

Eta Kappa Nu

Tau Beta Pi

Institute of Electrical and Electronic Engineers

American Society of Engineering Education

Publications:

A. Refereed Archival Publications (51):

(with Allen and Bowman), The Simultaneous Measurement of Thermal Conductivity, Thermal Diffusivity and Perfusion in Small Volumes of Tissue, *Journal of Biomechanical Engineering*, **106**, 192-197, August 1984.

(with Allen, Walsh, Hnatowich, Tomera, Burnengraber and Bowman), An Isolated Rat Liver Model for the Evaluation of Thermal Techniques to Quantify Perfusion, *Journal of Biomechanical Engineering*, **106**, 187-191, August 1984.

(with Hayes), Steady State Analysis of Self-Heated Thermistors Using Finite Elements, *Journal of Biomechanical Engineering*, **107**, 77-80, February 1985.

(with Welch, Pearce, Hayes, Motamedi), Effect of Laser Radiation on Tissue During Laser Angioplasty, *Lasers in Surgery and Medicine*, **5**, 251-264, 1985.

(with Ahmad, Womack), A High-Level Language for Automatic Sequential Control, *International Society for Mini- and Microcomputers*, 202-345, 1985.

Thermal Conductivity and Diffusivity of Biomaterials Measured with Self-Heated Thermistors, *International Journal of Thermophysics*, **6** (3), 301-311, 1985.

(with van Gemert, Welch, Bonnier, Yoon and Rastegar), Some Physical Concepts in Laser Angioplasty, *Seminars in Interventional Radiology*, **3** (1), March 1986.

(with Patel, Pahl, Denham), A Self-Heated Thermistor Technique to Measure Blood Flow from the Tissue Surface, *Heat and Mass Transfer in the Microcirculation of Thermally Significant Vessels*, American Society of Mechanical Engineers Heat Transfer Division, **61**, 11-16, 1986.

(with Chitsabesan), Thermal Conductivity and Diffusivity of Arterial Wall and Atherosclerotic Plaque, *Lasers in the Life Sciences*, **1** (3), 219-229, 1987.

(with Diller, Pearce, Welch and Wissler), Heat Transfer: What's New in Bioengineering, *SOMA*, **2** (2), July 1987.

(with Patel and Hayes), A Finite Element Analysis of a Surface Thermal Probe, *Network Thermodynamics, Heat and Mass Transfer in Biotechnology*, American Society of Mechanical Engineers Heat Transfer Division, **90**, 95-102, 1987.

(with Patel, Pearce, Pahl and Denham), A Self-Heated Thermistor Technique to Measure Effective Thermal Properties from the Tissue Surface, *Journal of Biomechanical Eng.*, **109** (4), November 1987.

(with Badeau and Pearce), Simultaneous Measurement of Intrinsic and Effective Thermal Conductivity, *Heat Transfer in Bioengineering and Medicine*, American Society of Mechanical Engineers Heat Transfer Division, **95**, 31-36, 1987.

Low Temperature Tissue Thermal Properties, *Low Temperature Biotechnology*, American Society of Mechanical Engineers Heat Transfer Division, **98**, 331-346, 1988.

(with Anderson), An Interlobular Artery and Vein Based Model for Self-Heated Thermistor

Measurements of Perfusion in the Canine Kidneys, *Bioheat Transfer- Applications in Hyperthermia, Emerging Horizons in Instrumentation and Modeling*, American Society of Mechanical Engineers Heat Transfer Division, **126**, 29-35, 1989.

(with Nho, Anderson) A Weinbaum-Jiji Model of Steady State Heated Thermistors in the Canine Kidney Cortex, *Advances in Measuring and Computing Temperatures in Biomedicine: Thermal Tomography Techniques, Bio-heat Transfer Models*, American Society of Mechanical Engineers Heat Transfer Division, **147**, 51-58, 1990.

(with Nho) Tissue Thermal Diffusivity Measured with Sinusoidal Heated Thermistors, American Society of Mechanical Engineers Heat Transfer Division, **189**, pp. 9-14, 1991.

(with Anderson, Santos) Self-Heated Thermistor Measurements of Perfusion, *IEEE Transactions on Biomedical Engineering*, **39:9**, pp. 877-885, 1992.

(with Yuan) Quantification of Errors Occurring when Measuring Spatial-Varying Temperatures, American Society of Mechanical Engineers Heat Transfer Division, **231**, pp. 39-46, 1992.

(with Arshad, Dunn, Vega, Serwer) Progress in Developing Improved Programs for the Pulsed Field Agarose Gel Electrophoresis of DNA, *Electrophoresis*, **14**, pp. 344-348, 1993.

(with Dalvi, Pearce) Directional Thermal Conductivity Measured in Bovine Aorta, American Society of Mechanical Engineers Heat Transfer Division, **268**, pp. 37-40, 1993.

(with Anderson) A Small Artery Heat Transfer Model for Self-Heated Thermistor Measurements of Perfusion in the Kidney Cortex, *Journal of Biomechanical Engineering*, **116**, 71-78, Feb. 1994.

(with Nho, Anderson) Analysis of the Weinbaum-Jiji Model of Blood Flow in the Canine Kidney Cortex for Self-Heated Thermistors, *Journal of Biomechanical Engineering*, **116**, 201-207, May 1994.

(with Yuan, Anderson) 3-D Small Artery Model of the Canine Kidney Cortex, American Society of Mechanical Engineers Heat Transfer Division, **288**, pp. 9-16, 1994.

(with Yuan, Rudie, Xu) 2-D Finite Difference Modeling of Microwave Heating in the Prostate, American Society of Mechanical Engineers Heat Transfer Division, **322**, pp. 107-115, 1995.

(with da Rocha, Bao) Measurement of the Dynamic Response of a Contact Probe Thermosensor in Conductive Media, American Society of Mechanical Engineers Heat Transfer Division, **322**, pp. 117-123, 1995.

(with Yuan, Rudie) Treatment of Benign Prostatic Hyperplasia, American Society of Mechanical Engineers Heat Transfer Division, *Advances in Heat and Mass Transfer in Biotechnology*, **337**, pp. 15-16, 1996.

(with da Rocha) Methodology for Modeling the Response of Temperature Probes in Convective Media, *Advances in Heat and Mass Transfer in Biotechnology*, **355**, pp. 213-214, 1997.

(with Bhavaraju) Thermophysical Properties of Swine Myocardium, *International Journal of Thermophysics*, Vol. 20, No. 2, 665, 1999.

(with M.D. Feldman, Y. Mao, J.W. Valvano, and G.L. Freeman), Development of a Multi-

frequency Conductance Catheter System to Determine Left Ventricular Function in the Mouse, American Journal of Physiology, August, 2000.

(with Youn, Telenkov, Kim, Bhavaraju, Wong, Milner) Optical and Thermal Properties of Nasal Septal Cartilage, Lasers in Surg. and Med., Vol 27, pp. 119-128, 2000.

(with Yuan, Holmes), Morphology of the Canine Prostate Vasculature, Microvascular Research, Volume 59, pp. 115-121, 2000.

(with Bhavaraju, Cao, Yuan, Webster) Measurement of Directional Thermal Properties of Normal and Ablated Swine Myocardium, IEEE Trans. Biomed. Eng., Volume 48, No 2, pp 261-267, 2001.

(with dos Santos, da Rocha, de O. Nascimento and Neto) Measurement of ejection fraction with standard thermodilution catheters, Medical Engineering and Medical Physics, Volume 24, pp. 325-335, 2002.

(with dos Santos, Shah, da Rocha, and Webster) An instrument to measure the heat convection coefficient on the endocardial surface, Physiological Measurement, Volume 24, pp. 321-335, 2003.

(with dos Santos, Will, da Rocha, de O Nascimento, Webster) In vivo measurements of heat transfer on the endocardial surface, Physiological Measurement, Volume 24, No. 3, pp. 793-804, 2003.

(with Raghavan, K., Wei, C.L., Kottam, A., Altman, D.G., Fernadez, D.J., Reyes, M., Feldman, M.D. and Pearce, J.A.) Design of Instrumentation and Data Acquisition System for Complex Admittance Measurement, Biomedical Sciences Instrumentation, 40, 453-457, 2004.

(with Wei, Feldman, and Pearce) Nonlinear Conductance-Volume Relationship for Murine Conductance Catheter Measurement System, IEEE Transactions in Biomedical Engineering, Volume 52 (10), pp. 1654-1661, 2005.

(with Shah, dos Santos, Haemmerich) An Instrument to Measure the Heat Convection Coefficient on the Endothelial Surface of Arteries and Veins, Medical Engineering and Medical Physics, 2005

(with da Rocha, dos Santos, Nascimento, Melo, Haemmerich) Effects of the time response of the temperature sensor on thermodilution measurements, Physiological Measurement, Volume 26, pp. 885-901, 2005.

(with Chia-Ling Wei, Marc D. Feldman, and John A. Pearce) Nonlinear Conductance-Volume Relationship for Murine Conductance Catheter Measurement System, IEEE Transactions On Biomedical Engineering, Vol. 52, No. 10, pp. 1654 – 1661, October 2005

(with Reyes, Steinhilber, Alvarez, Escobedo, Pearce) “Impact of Physiologic Variables and Genetic Background on Myocardial Frequency-Resistivity Relations in the Intact Beating Murine Heart”, Am. J. Physiol. Heart Circ. Physiol., (May 12, 2006)

(with Wei, Feldman, Nahrendorf, Peshock, Pearce) Volume Catheter Parallel Conductance Varies Between End-Systole and End-Diastole, IEEE Transactions on Biomedical Engineering, Vol. 54, No. 8, pp. 1480-1489, Aug. 2007.

(with Kharalkar, Hayes) Pulse-power integrated-decay technique for the measurement of thermal conductivity, Meas. Sci. Technol. 19075104 (10pp), June 12, 2008.

(with Raghavan, Porterfield, Kottam, Feldman, Escobedo, and Pearce), Electrical Conductivity and permittivity of murine myocardium, IEEE Transactions on Biomedical Engineering, Vol. 56, No. 8, August 2009

(with Kharalkar and Bauserman) Effect of Formalin Fixation on Thermal Conductivity of the Biological Tissue, Journal of Biomechanical Engineering, ASME July 2009, Vol. 131

(with Porterfield, Kottam, Raghavan, Escobedo, Jenkins, Larson, Trevino, Pearce, and Feldman) Dynamic Correction for Parallel Conductance, GP, and Gain Factor, α , in Invasive Murine Left Ventricular Volume Measurements. Journal of Applied Physiology. doi:10.1152, japplphysiol.91322.2008, 107(6), pp1693-1703, 2009., October 2009

(with John Porterfield, Erik Larson, James Jenkins, Daniel Escobedo, Jonathan Valvano, John Pearce, and Marc Feldman, Left Ventricular Epicardial Admittance Measurement for Detection of Acute LV Dilation, Journal of Applied Physiology (JAPPL-01047-2010R1), 2010

(with Karthik Raghavan, Marc D Feldman, John E Porterfield, Erik R Larson, J Travis Jenkins, Daniel Escobedo, John A Pearce) Bio-telemetric device for measurement of left ventricular pressure-volume loops using the admittance technique in conscious, ambulatory rats, Physiol. Meas. 32 (2011) 701–715

(with Porterfield JE, Larson ER, Jenkins JT, Escobedo D, Valvano JW, Pearce JA, Feldman MD) Left ventricular epicardial admittance measurement for detection of acute LV dilation. Journal of Applied Physiology 2011; 110: 799-806. PMID 3069629

(with Larson ER, Pearce JA, Feldman MD) Analysis of the Spatial Sensitivity of Conductance / Admittance Catheter Ventricular Volume Estimation, IEEE Transactions on Biomedical Engineering, TBME-01930-2012.R1, Volume: 60 Issue: 8, pp1-9, August 2013

B. Refereed Conference Publications (out of 28):

(with Wei, Feldman, Kottam, Altman, Raghavan, Fernandez, Reyes, Escobedo, Pearce) “Evidence of Time-Varying Myocardial Contribution by In Vivo Magnitude and Phase Measurement in Mice,” Proc. of IEEE-Engr. In Med. And Biol. Soc., 26th Annual International Conference, vol. 2, pp. 3674 – 3677, Sep. 2004.

(with Kharalkar) Finite element analysis and experimental verification of multilayered tissue characterization using the thermal technique, Engineering in Medicine and Biology Society. 28th Annual International Conference of the IEEE, pp. 3182-3185, August 2006.

(with Kottam, Porterfield, Raghavan, Fernandez, Feldman, Pearce) Real time Pressure-Volume loops in mice using complex admittance: measurement and implications, Engineering in Medicine and Biology Society. 28th Annual International Conference of the IEEE, pp. 4336 – 4339, Aug. 2006

(with Lee, Min, Manganaro) A 14b 100Ms/s Pipelined ADC with a Merged Active S/H and First MDAC, IEEE International Solid-State Circuits Conference, San Francisco, Feb 2008.

(with Pearce) Skin Burns: Numerical Model Study of Radio Frequency Current Sources,

Proceedings of the ASME 2009 Summer Bioengineering Conference (SBC2009), June 17-21, Lake Tahoe, CA, SBC2009-206161

(with Porterfield JE, Larson ER, Jenkins JT, Escobedo D, Pearce JA.) LV Preload Measurement Using Admittance for Early Heart Failure Detection, Proc. Soc. for Cardiovascular Angiography & Intervention (poster), May 2010

(with J.A. Pearce, J.E. Porterfield, E.R. Larson, J.W. Valvano, M.D. Feldman) "Accuracy Considerations in Catheter Based Estimation of Left Ventricular Volume", IEEE Engineering in Medicine and Biology, presentation to be given Buenos Aires, Argentina Aug. 31 – Sept. 4, 2010.

(with Porterfield JE, Larson ER, Jenkins JT, Escobedo D, Valvano JW, Pearce JA, and Feldman MD.) "Left Ventricular Volume for Heart Failure Monitoring Using Admittance", Proc. Biomedical Engineering Society, Austin TX, Oct. 2010.

(with Larson ER, Porterfield JE, Valvano JW, Feldman MD and Pearce JA.) "The Admittance Method for the Measurement of Left Ventricular Volume in Large Animals", Proc. Biomedical Engineering Society, Austin TX, Oct. 2010.

(with Pfeifer, D. and J. Valvano), "Kahn Process Networks Applied to Distributed Heterogeneous HW/SW Cosimulation," The 2011 Electronic System Level Synthesis Conference, ECSI. 5-6 June 2011.

Stroke Volume Detection Using Existing RV Shocking Leads, Anil T.G. Kottam, Ph.D., John E. Porterfield, Ph.D., Sandeep Sagar, M.D., Lucas Holt, Jonathan W. Valvano, Ph.D., and Marc D. Feldman, M.D., May 2014, Innovation Award, Heart and Rhythm Society (HRS)

Jonathan W. Valvano, Ramesh Yerraballi, Chad J. Fulton, Chinmaya Dattathri, Embedded Systems - Shape The World, ASEE International Forum, June 2014, Indianapolis

Admittance for Detecting the Progression of Heart Failure, Heart Rhythm Society May 2015. Sandeep Sagar, John E. Porterfield, Anil T.G. Kottam, Daniel Escobedo, Lucas Holt, John A. Pearce, Jonathan W. Valvano, Marc D. Feldman

Jonathan W. Valvano, Ramesh Yerraballi, Chad J. Fulton, Teaching Embedded Systems in a MOOC Format, Best paper, ASEE Annual Conference, June 2016, New Orleans

Admittance Derived Stroke Volume for Implantable Pacemakers, The 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, August 2016, Orlando, Lucas Holt, Andrew Wang, Mark Feldman, Megan Oglesby, Sandeep Sagar, John Pearce, Jonathan Valvano

C. Other Conference Publications (out of 39):

Kathryn Loeffler, John E. Porterfield, Ph.D., Erik R. Larson, Ph.D., Daniel Escobedo, G. Patricia Escobar, D.V.M., John A. Pearce, Ph.D., Marc D. Feldman, M.D., and Jonathan W. Valvano, Ph.D., Embedded Medical Devices: Pressure Volume Loops in Rodents, IEEE Potentials, November/December 2012.

D. Textbooks

Embedded Microcomputer Systems: Real Time Interfacing, Brooks-Cole Publishers, ISBN 0-534-36642-2, 2000.

Introduction to Embedded Microcomputer Systems: Motorola 6811 and 6812 Simulation, Brooks-Cole Publishers, ISBN 0-534-39177-x, 2002

Embedded Microcomputer Systems: Real Time Interfacing, Second Edition, Thomson-Engineering, ISBN 0534551629, 2006.

Introduction to Embedded Systems: Interfacing to the Freescale 9S12, Cengage Publishing 2009, ISBN-10: 049541137X | ISBN-13: 9780495411376, by J. W. Valvano, April 2009

Embedded Microcomputer Systems: Real Time Interfacing, Third Edition, Cengage Publishing, ISBN: 1111426252, 2010.

Embedded Systems: Introduction to the Arm Cortex™ M3, First Edition, Createspace, 474 pages, ISBN: 978-1477508992, published 5/2014

Embedded Systems: Introduction to ARM Cortex-M Microcontrollers, Fifth Edition, Createspace, 505 pages, ISBN: 978-1477508992, published 7/2012

Embedded Systems: Real-Time Interfacing to ARM Cortex- M Microcontrollers, Createspace, 4th Edition, 600 pages, ISBN: 978-1463590154, published 6/2014

Embedded Systems: Real-Time Operating Systems for the ARM Cortex-M Microcontrollers, Createspace, 378 pages, ISBN: 978-1466468863, published 1/2014

Embedded Systems: Introduction to ARM Cortex™ M Microcontrollers, Sixth Edition, Createspace, 499 pages, ISBN: 978-1477508992, published June 2016, Kindle Version July 2016

Embedded Systems: Real-Time Interfacing to ARM Cortex™ M Microcontrollers, Fifth Edition, 599 pages, Createspace, ISBN: 978-1463590154, published 6/2015, Kindle version published 7/2016.

Embedded Systems: Real-Time Operating Systems for ARM Cortex™ M Microcontrollers, Third Edition Createspace, 485 pages, ISBN: 978-1466468863, published 1/2017

Embedded Systems: Introduction to the MSP432 Microcontroller, First Edition, Createspace, 487 pages, ISBN-13: 978-1512185676, published June 2015

Embedded Systems: Real-Time Interfacing to the MSP432 Microcontroller, First Edition, Createspace, 591 pages, ISBN-13: 978-1514676585, published November 2015

Introduction to ARM® Cortex-M Microcontrollers, Volume 1, ISBN: 978-1477508992, 432 pages January 2017

Patents (out of 11)

U.S. Patent # 7,925,335 (2004) - Method and apparatus for determining cardiac performance in a

patient with a conductance catheter. Issued 12/2010.

US 12/086,040 (2006) - Method and apparatus for determining cardiac performance in a patient.
Issued 2009

US 12/086,040 (2006) - Method and apparatus for determining cardiac performance in a patient.

17 Ph.D. Supervisions Completed

64 M.S. Supervisions Completed

Revised: 1/19/2017