

Ivan Vesely, Ph.D.

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Date of birth: June 22, 1960
Citizenship: Canadian, Permanent Resident in the U.S.

Education: **Ph.D.** Biophysics, University of Western Ontario, London, Ontario, Canada, 1983-1987

B.E.Sc. Electrical Engineering, University of Western Ontario, London, Ontario, 1979-1983

Research Funding

- NIH R01: *A Composite Tissue Engineered Aortic Valve* \$1,464,000 – P.I.
- NIH 2R44HL072547-02A2 - *Antifibrotic Coatings for Rapidly Exchangeable Bioprosthetic Heart Valve* - \$1,616,000 – P.I.

Publications/Presentations

- 83 papers published since 1985 + 4 papers in various stages of review and publication
- 3 book chapters, ~300+ abstracts and papers in conference proceedings since 1985
- Invited speaker 87 times since 1987

Academic Experience

- *Founder and Chief Scientific Officer:* ValveXchange Inc.
- *Adjunct Professor:* Cardiology, University Colorado Health Sciences
- *Endowed Chair:* The H. Russell Smith Foundation Endowed Chair of Cardiothoracic Research, The Saban Research Institute of Children's Hospital Los Angeles (2003-2007)
- *Professor:* Cardiothoracic Surgery, The Keck School of Medicine, University of Southern California (2003-2007)
- *Visiting Associate:* California Institute of Technology (2003-2007)
- *Co-Director:* Applied Biomedical Engineering (ABE) Doctorate Program at Cleveland State University (2000 – 20003)

Business/Technology Experience

- Author of 12 issued patents
- Founder of Sonometrics Corporation – established company in London, Canada
- Founder of VXI – SBIR-funded startup company

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Academic Appointments:

2006 – present	<u>Adjunct Professor:</u> Cardiology, University Colorado Health Sciences Denver, Colorado
2004- 2006	The H. Russell Smith Foundation Endowed Chair of Cardiothoracic Research, The Saban Research Institute of Children’s Hospital Los Angeles <u>Professor:</u> Cardiothoracic Surgery, The Keck School of Medicine, University of Southern California <u>Director:</u> Cardiothoracic Surgery Research, The Saban Research Institute of Children’s Hospital Los Angeles
2004 – 2006	<u>Visiting Associate:</u> California Institute of Technology
2002 - 2003	Full Staff, Department of Biomedical Engineering, The Cleveland Clinic Foundation, Cleveland, Ohio
1994 - 2002	<u>Associate Staff,</u> Department of Biomedical Engineering, The Cleveland Clinic Foundation, Cleveland, Ohio
2000 - present	<u>Co-Director, Applied Biomedical Engineering Doctorate Program,</u> Cleveland State University
1999 - present	<u>Adjunct Professor,</u> Department of Chemical Engineering, Cleveland State University, Cleveland, Ohio
1998 - present	<u>Adjunct Associate Professor,</u> Department of Biomedical Engineering, Case Western Reserve University, Cleveland, Ohio
1989 - 1994	<u>Scientist,</u> John P. Robarts Research Institute, London, Ontario, Canada
1989 - 1994	<u>Assistant Professor,</u> Department of Electrical Engineering, University of Western Ontario, London, Ontario, Canada.
1990 - 1994	<u>Assistant Professor,</u> Department of Medical Biophysics, University of Western Ontario, London, Ontario, Canada.

Current Research Awards:

2008- 2010	NIH 2R44HL072547-02A2 - <i>Antifibrotic Coatings for Rapidly Exchangeable Bioprosthetic Heart Valve</i> - \$1,616,000 – Principal Investigator
2003 – 2008	NIH RO1 HL 070980 - <i>Composite Tissue Engineered Aortic Valve Prosthesis</i> - \$1,464,000 - Principal Investigator

Previous Awards:*In the U.S.*

- 2003 – 2007 NIH RO1 HL 070980-S1 – *Stem Cells for Composite Tissue Engineered Aortic Valve Prosthesis* - \$149,000 - Principal Investigator
- 2004 - 2007 Hoag Foundation – *Tissue-engineered Composite Materials for Reconstructive Surgery* - \$150,000 - Principal Investigator
- 2005 – 2007 Ralph Stern Foundation - *Computational Modeling for Pediatrics* – a pledge of \$200,000 over 4 years
- 2006 - 2007 Program Endowment for Cardiovascular Research at the Saban Research Institute - \$2 million
- 2002 - 2006 NIH RO1 EB002071 - *Micromechanics of the Aortic Valve: Durability Testing* - \$1,295,000 - Principal Investigator
- 2002 - 2004 NIH-NRSA Postdoctoral Fellowship (Sponsor for Todd Doehring, Ph.D.) *Micromechanics of aortic valve tissues* - \$35,000/year for 2 years
- 2001 - 2004 U.S. Department of Defense Peer Reviewed Medical Research Program (PRMRP) #2099 – *Advanced Soft Tissue Modeling for Telemedicine and Surgical Simulation* - \$1,845,080 - Principal Investigator
- 2001 - 2010 Mareb Foundation - Private donation
Genetic Basis for Myxomatous Mitral Valve Disease \$1,000,000 over 7 to 10 years - Vesely, Griffin: Co-P.I.'s
- 2000 - 2003 NIH RO1 HL57780 – *Elastin Damage: Mechanism of Bioprosthetic Valve Failure* - \$666,000 - Principal Investigator
- 1998 - 2002 NIH RO1 HL57236 - *Micromechanics of the Aortic Valve* - \$1,235,497 - Principal Investigator
- 1999 - 2001 Department of Defense Contract – *Tissue Engineering Initiative* - \$3,000,000 for two years – P.I. on subproject Cardiovascular materials
- 2000 – 2002 AHA Postdoctoral Fellowship (sponsor for Anand Ramamurthi, Ph.D.) *Evaluation of hyaluronan gels as cellular scaffolds for the development of tissue engineered heart valves* - \$30,000/year for 2 years
- 1999 – 2001 NIH-NRSA Postdoctoral Fellowship (sponsor for J. Grande-Allen, Ph.D.) *Glycosaminoglycan and Proteoglycan Distribution in Normal and Myxomatous Mitral Valves* - \$35,000/year for 2 years

- 1998 - 2001 AHA - *Mechanical, Morphologic and Clinical Correlates in Myxomatous Mitral Valve Disease* - \$165,000 - Principal Investigator
- 1997 - 1999 AHA-NEO - *Mechanical Properties of Myxomatous Mitral Valves* - \$65,500 - Principal Investigator
- 1995 - 1998 The Cleveland Clinic Foundation - Seed Funding - Principal Investigator
- In Canada*
- 1995 NSERC - Co-investigator on Group Equipment Grant - P.I.: M. Dokainish, \$77,000 for SGI computer system
- 1993 - 1995 Heart and Stroke Foundation of Ontario - Individual Operating Grant, *Bioprosthetic Heart Valve Design* - \$167,000 - Principal Investigator
- 1993 - 1995 MRC - Operating Grant - Co-investigator: D.R. Boughner, *Dynamic Fixation and High Speed Biaxial Testing of Artificial Heart Valves* - \$124,725 - Principal Investigator
- 1993 URIF - Partnership Research Grant, *Mechanical Testing of AOA-treated Artificial Heart Valve Material* - \$30,909 - Principal Investigator
- 1992 - 1995 NSERC - P.I. on Group Operating Grant - *Curvature and Motion Analysis of Aortic Valve Leaflets* - \$75,000 for three years - Principal Investigator
- 1991 - 1994 Whitaker Foundation - Individual Operating Grant, *Architecture and Micromechanical Modeling of Aortic Valve Leaflets* - \$174,613
- 1991 - 1993 Heart and Stroke Foundation of Ontario - Individual Operating Grant, *Bioprosthetic Heart Valve Design* - \$147,000 - Principal Investigator
- 1990 - 1995 Heart and Stroke Foundation of Ontario - Research Scholarship, *Salary award for five years.*
- 1989 - 1991 Heart and Stroke Foundation of Ontario - Individual Operating Grant, *Bioprosthetic Heart Valve Design* - \$88,535 - Principal Investigator
- 1989 - 1991 NSERC Operating Grant- *3-D Reconstruction of static and dynamic valve geometry* - \$75,000 for three years - Principal Investigator
- 1987 - 1989 NSERC Group Strategic Grant - P. I.: G. Campbell, *Design of artificial heart valve with an expansile stent* - \$220,000
- 1987 - 1988 Canadian Heart Foundation - Postdoctoral Fellowship,

Industrial Support:

2005	Medtronic Heart Valve Division – Equipment Donation
2001	Foster Miller – Research Contract - <i>Mechanical properties of a Net-Shape Textile Preform</i>
2001	Sulzer Carbomedics - Research contract – <i>Strain mapping in bioprosthetic valve cusps</i>
1998	Sulzer Carbomedics - Research contract - <i>Stent post deflection measurement</i>
1998	Sulzer Carbomedics - Research contract - <i>Shear testing of photofixed valves</i>
1998	Baxter CVS - Sponsored research contract with BME at CCF
1995	Research Contract for St. Jude Medical, St. Paul Minnesota, <i>Mechanical testing of cell extracted aortic valve cusps</i>
1994	Research Contract for St. Jude Medical, St. Paul Minnesota, <i>Mechanical testing of processed aortic valve cusps</i>
1994	Research Contract for CryoLife Inc. of Marietta, Georgia, <i>Examinations of cryopreserved human aortic valve cusps</i>
1993	Research Contract for CryoLife Inc. of Marietta, Georgia, <i>Mechanical testing of human aortic valve cusps cryopreserved with five methods</i>
1993	Research Contract for Medtronic of Irvine, California, <i>Mechanical testing of AOA-treated porcine aortic valves</i>
1991	Research Contract for CryoLife Inc. of Marietta, Georgia, <i>Mechanical testing of human aortic valve cusps cryopreserved with two methods</i>

Publications

- 1) Vesely I., Boughner D.R., A multipurpose tissue bending machine. *J.Biomech.* 18(7): 511-13, 1985.
- 2) Vesely I., Boughner D.R., Song T., Tissue buckling as a mechanism of bioprosthetic valve failure. *Ann.Thorac.Surg.* 46:302-308, 1988.
- 3) Vesely I., Boughner D.R., Analysis of the bending behavior of porcine xenograft leaflets and of natural aortic valve material: Bending stiffness, neutral axis and shear measurements. *J.Biomech.* 22(6/7):655-671, 1989.

- 4) Vesely I., Gonzalez-Lavin L., Graf D., Boughner D.R., Mechanical testing of cryopreserved aortic allografts: Comparison with xenografts and fresh tissue. *J.Thorac.Cardiovasc.Surg.* 99(1):119-123, 1990
- 5) Song T., Vesely I., Boughner D.R., Effects of dynamic fixation on the shear behavior of porcine xenograft valves. *Biomaterials* 11:191-196, 1990.
- 6) Vesely I., Menkis A., Campbell G., A computerized system for the video analysis of the aortic valve. *IEEE Transc.Biomed.Eng.*, 37(10): 925-929, 1990.
- 7) Vesely I., Analysis of the Medtronic INTACT bioprosthetic valve: Effects of "Zero Pressure" fixation. *J.Thorac.Cardiovasc.Surg.*, 101(1): 90-99, 1990
- 8) Vesely I., Eickmeier B., Campbell G., Automated 3-D reconstruction of vascular structures from high definition casts. *IEEE Trans.Biomed.Eng.*, 38(11), 1123-1129, 1991
- 9) Vesely I., Eickmeier W., Campbell G., A video tape based image archiving system for biomedical applications. *Comp.Biol.Med.*, 21(5):267-273, 1991.
- 10) Vesely I., Menkis A., Rutt B., Campbell G., Aortic Valve/Root Interactions in Porcine Hearts: Implications for Bioprosthetic Valve Sizing. *J.Cardiac.Surg.*, 6(4):482-489, 1991.
- 11) Vesely I., Noseworthy R., Micromechanics of the fibrosa and ventricularis of aortic valve leaflets. *J.Biomech.*, 25(1):101-113, 1992.
- 12) Vesely I., Krucinski S., Campbell G., Micromechanics and Finite Element Simulations: An Inside Look at Bioprosthetic Valve Function. *J.Cardiac.Surg.*, 7(1):85-95,1992.
- 13) Vesely I., Lozon A., Natural Preload of Aortic Valve Leaflet Components During Glutaraldehyde Fixation: Effects on Tissue Mechanics, *J. Biomech.* 26(2):121-131, 1993.
- 14) Vesely I., Lozon A., Talman E., Is Zero Pressure Fixation Truly Stress Free? *J.Thorac.Cardiovasc.Surg.*, 106(2):288-298, 1993.
- 15) Krucinski S., Vesely I., Dokainish M.A., and Campbell G., Numerical simulation of leaflet flexure in bioprosthetic valves mounted on rigid and expansile stents. *J.Biomech.*, 26(8):929-943, 1993.
- 16) Vesely I., Krucinski S., Campbell G., Dokainish M., An optimal mounting frame for bioprosthetic heart valves to reduce flexural stresses., *ASAIO Journal*, 40(2):199-205, 1994.
- 17) David H., Boughner D., Vesely I., Gerosa G., The pulmonary valve: Is it mechanically suitable for use as an aortic valve replacement. *ASAIO Journal*, 40(2):206-212, 1994.
- 18) Vesely I., Macris N., Dunmore P.J., Boughner D.R., The distribution and morphology of aortic valve lipids. *J.Heart.Valve.Dis.*, 3(4):451-456, 1994.

- 19) Leeson-Dietrich J., Boughner D.R., Vesely I., Porcine pulmonary and aortic valves: A comparison of their tensile viscoelastic properties at physiological strain rates. *J.Heart.Valve.Dis.*, 4(1):88-94, 1995.
- 20) Vesely I., Noseworthy R., Pringle G., Development of a hybrid xenograft/autograft bioprosthetic heart valve: In vivo evaluation of tissue extraction., *Ann.Thorac.Surg.*, 60:S359-64, 1995.
- 21) Lo D., Vesely I., Biaxial strain analysis of the porcine aortic valve., *Ann.Thorac.Surg.*, 60:S374-8, 1995.
- 22) Vesely I., Boughner D.R., Leeson-Dietrich J., Bioprosthetic valve tissue viscoelasticity: Implications on accelerated pulse duplicator testing., *Ann.Thorac.Surg.*, 60:S379-83, 1995.
- 23) Hansen B., Menkis A., Vesely I., Longitudinal and radial distensibility of the porcine aortic root. *Ann.Thorac.Surg.*, 60:S384-90, 1995.
- 24) Scott M., Vesely I., Aortic valve cusp microstructure: elastin's role., *Ann.Thorac.Surg.*, 60:S391-4, 1995.
- 25) Vesely I., New concepts in the design and use of biological prosthetic valves. *Cardiovasc.Pathol.*,4(4):287-291, 1995.
- 26) Dunmore-Buyze J., Boughner D.R., Macris N., Vesely I., A comparison of macroscopic lipid content within porcine pulmonary and aortic valves: Implications for Bioprosthetic Valves., *J.Thorac.Cardiovasc.Surg.*, 110(6):1756-1761, 1995.
- 27) Vesely I., A mechanism for decrease in stiffness of bioprosthetic heart valve tissues following crosslinking. *ASAIO Journal*, 42(6): 993-999, 1996.
- 28) Vesely I., Reconstruction of loads in the fibrosa and ventricularis of porcine aortic valves. *ASAIO Journal*, 42(5):M739-M746, 1996.
- 29) Mako J., Vesely I., Regional distribution of calcification in aortic valve cusps: an in-vivo study. *ASAIO Journal*, 42(5):M365-M367, 1996.
- 30) Scott M.J., Vesely I., Morphology of porcine aortic valve cusp elastin. *J.Heart Valve Dis.*, 5(5):464-471, 1996.
- 31) Duncan A.C., Boughner D.R., Vesely I., Dynamic glutaraldehyde fixation of a porcine aortic valve xenograft. I. Effect of fixation parameters on the final viscoelastic properties of the valve. *Biomaterials*, 17(19): 1849-56, 1996
- 32) Duncan A.C., Boughner D.R., Vesely I., Viscoelasticity of dynamically fixed bioprosthetic valves:. II. Effect of glutaraldehyde concentration. *J.Thorac.Cardiovasc.Surg.* 113:302-310, 1997.

- 33) Mako W.J., Vesely I., In vivo and in vitro models of calcification in porcine aortic valve cusps. *J. Heart Valve Dis.*, 6:316-323, 1997.
- 34) Vesely I., The Hybrid Autograft/Xenograft Bioprosthetic Heart Valve. *J.Heart.Valve.Dis.* 6:292-295, 1997.
- 35) Vesely I., Fawzy H.F., Fukamachi K., Drake M., Use of three-dimensional sonomicrometry to study the motion of the mitral valve, *ASAIO Journal*, 43(5):M465-M469, 1997.
- 36) Vesely I., Mako W.J., Comparison of the compressive buckling of porcine aortic valve cusps and bovine pericardium. *J.Heart Valve Dis.* 7:34-39, 1998.
- 37) Vesely I., The role of elastin in aortic valve mechanics. *J.Biomech.* 31(2):115-123, 1998.
- 38) Ricks J., Scott M.J., Vesely I., Assessment of glutaraldehyde crosslinking efficiency in porcine aortic valves with an amine-specific fluorescent probe, *Ann.Thorac.Surg.* 66:S240-S244, 1998.
- 39) Mako W.J., Shah A., Vesely I., Mineralization of glutaraldehyde-fixed porcine aortic valve cusps in the subcutaneous rat model: Analysis of variations in implant site and cuspal regions. *J.Biomed.Mater.Res.* 45(3):209-213, 1999.
- 40) Carew E.O., Talman E.A., Boughner D.R., Vesely I., Quasi-linear viscoelastic theory applied to internal shearing of heart valve leaflets. *J.Biomech.Eng.* 121(4):386-392, 1999.
- 41) Vesely I., Aortic root dilation prior to valve opening: Explained by passive hemodynamics. *J.Heart Valve Dis.* 9(1):16-20, 2000
- 42) Vesely I., Casaratto D., Gerosa G., Mechanics of cryopreserved aortic and pulmonary allografts. *J.Heart Valve Dis.* 9(1):27-37, 2000.
- 43) Adamczyk M.M., Lee T.C., Vesely I., Biaxial strain properties of elastase-digested porcine aortic valves. *J. Heart Valve Dis.* 9:445-453, 2000.
- 44) Carew E.O., Vesely I., Role of preconditioning and recovery time in repeated testing of aortic valve tissues: Validation through QLV theory. *Ann.Biomed.Eng.* 28:1093-1100, 2000.
- 45) Lee T.C., Midura R.J., Hascall V.C., Vesely I., The effect of elastin damage on the mechanics of the aortic valve. *J.Biomech.*, 34(2):203-210, 2001.
- 46) Grande-Allen K.J., Ratliff N., Griffin B., Cosgrove D.M. III, Vesely I., Rupture of the outer sheath may initiate complete chordal rupture in fibrotic mitral valve disease. *J. Heart Valve Dis.*, 10(1):90-93, 2001.
- 47) Barber J.E., Ratliff N.B., Cosgrove III D.M., Griffin B.P., Vesely I., Myxomatous mitral valve chordae. I: Mechanical properties, *J. Heart Valve Dis.*, 10(3):320-324, 2001

- 48) Grande-Allen K.J., Ratliff N., Cosgrove D.M. III, Griffin B., Vesely I., Myxomatous mitral valve chordae. II: Selective elevation of glycosaminoglycan content, *J. Heart Valve Dis.*, 10(3):325-333, 2001.
- 49) Vesely I., Barber J.E., Ratliff N.B., Tissue damage and calcification may be independent mechanisms of bioprosthetic heart valve failure. *J. Heart Valve Dis.* 10:471-477, 2001.
- 50) Barber J.E., Griffin B., Ratliff N.J., Cosgrove III D., Vesely I., Mechanical properties of myxomatous mitral valves, *J. Thoracic Cardiovasc. Surg.* 122:5,955-962, 2001.
- 51) Vesely I., The influence of design on bioprosthetic valve durability, *Journal of Long-Term Effects of Medical Implants*, 11 (3&4): 137-149, 2001.
- 52) Ramamurthi A., Vesely I., Smooth muscle cell adhesion on crosslinked hyaluronan gels. *J. Biomed.Mater.Res.*, 60:196-205, 2002.
- 53) Adamczyk M.M., Vesely I. Characteristics of compressive strains in porcine aortic valve cusps, *J. Heart Valve Dis.*, 11:75-83, 2002.
- 54) Mills W.R. Barber J.E., Skiles J.R., Ratliff N.B., Cosgrove III D.M., Vesely I., Griffin, B.P., Clinical, echocardiographic and biomechanical differences in mitral valve prolapse affecting one or both leaflets, *Am.J.Cardiol.*, 89(12):1394-9, 2002.
- 55) Adamczyk M.M., Vesely I. Biaxial strain distributions in intact explanted porcine bioprosthetic valves, *J. Heart Valve Dis.* 11(5):688-695, 2002.
- 56) Sedransk K.L., Grande-Allen K.J., Vesely I., Failure mechanics of mitral valve chordae tendineae. *J. Heart Valve Dis.* 11(5):644-650, 2002.
- 57) Carew E.O., Patel J., Garg A., Houghtaling P., Blackstone E., Vesely I., The effect of specimen size and aspect ratio on the tensile properties of porcine aortic valve tissues. *Ann.Biomed.Eng.* 31:526-535,2003.
- 58) Carew E.O., Vesely I., A new method for estimating the gauge length of soft biological tissues. *J.Biomech.*, 36:1039-1042, 2003.
- 59) Grande-Allen K.J., Mako W.J., Calabro A., Shi Y., Ratliff N.B., Vesely I., Loss of chondroitin 6-sulfate and hyaluronan accompany structural deterioration of porcine bioprosthetic valves, *J.Biomed.Mater.Res.*, 65A:251-259, 2003.
- 60) Setola V., Hufeisen S.J., Grande-Allen K.J., Vesely I., Glennon R.A., Blough B., Rothman R.B., Roth B., 3,4-methylenedioxymethamphetamine, (MDMA, "Ecstasy") induces fenfluramine-like proliferative actions on human cardiac valvular interstitial cells in vitro. *Mol. Pharmacol.* 63(6):1223-1229, 2003.
- 61) Liao J., Vesely I., A structural basis for the size-related mechanical properties of mitral valve chordae tendineae. *J.Biomech.*, 36:1125-1133, 2003.

- 62) Grande-Allen K.J., Griffin B.P., Ratliff N.B., Cosgrove III D.M., Vesely I., Glycosaminoglycan profiles of myxomatous mitral leaflets and chordae parallel the severity of mechanical alterations, *J.Am.Coll.Cardiol.*, 42(2):271-277, 2003.
- 63) Ramamurthi A., Vesely I., Ultraviolet light induced modification of crosslinked hyaluronan gels. *J. Biomed.Mater.Res.*, 66A:317-329, 2003.
- 64) Vesely I., The evolution of bioprosthetic heart valves and its impact on durability. *Cardiovasc.Pathol.*, 12(5):277-286, 2003.
- 65) Shi Y., Vesely I., Fabrication of mitral valve chordae using directed collagen gel shrinkage, *Tissue Engineering*, 9(6):1233-1242, 2003.
- 66) Spina M., Ortolani F., Messleman A.E., Gandaglia A., Bujan J., Garcia-Honduvilla N., Vesely I., Gerosa G., Casarotto D., Petrelli L., Marchini M., Isolation of intact aortic valve scaffolds for heart-valve bioprostheses: Extracellular matrix structure, prevention from calcification, and cell repopulation features. *J.Biomed.Mater.Res.* 67A(4):1338-50, 2003.
- 67) Shi Y., Vesely I., Characterization of statically loaded tissue-engineered mitral valve chordae tendineae, *J.Biomed.Mater.Res.* 69A(1):26-39. 2004.
- 68) Doehring T.C., Carew E.O., Vesely I. The effect of strain rate on the viscoelastic response of aortic valve tissue: a direct-fit approach. *Ann.Biomed.Eng.* 32(2):223-32, 2004.
- 69) Grande-Allen KJ, Calabro A, Gupta V, Wight TN, Hascall VC, Vesely I., Glycosaminoglycans and proteoglycans in normal mitral valve leaflets and chordae: Association with regions of tensile and compressive loading. *Glycobiology*, 14(7):621-33, 2004.
- 70) Allison David D., Drazba Judith A., Vesely Ivan, Kader Khalid N., Grande-Allen K. Jane, Cell viability mapping within long-term heart valve organ cultures, *Journal of Heart Valve Disease*. 13(2):290-196, 2004.
- 71) Carew E.O., Garg A., Barber J.E., Vesely I., Stress relaxation preconditioning of porcine aortic valves. *Ann. Biomed. Eng.*, 2(4):563-572, 2004.
- 72) Mills W.R., Barber J.E., Ratliff N.B., Cosgrove D.M. 3rd, Vesely I., Griffin B.P., Biomechanical and echocardiographic characterization of flail mitral leaflet due to myxomatous disease: further evidence for early surgical intervention. *Am Heart J*. 2004 Jul;148(1):144-50.
- 73) Liao J., Vesely I., Relationship between collagen fibrils, glycosaminoglycans and stress relaxation in mitral valve chordae tendineae, *Annals of Biomedical Engineering* 32(7):977-83, 2004.

- 74) Ramamurthi A., Vesely I., Evaluation of the matrix synthesis potential of crosslinked hyaluronan gels for tissue engineering of aortic heart valves, *Biomaterials*, 26(9):999-1010, 2005.
- 75) Grande-Allen K.J., Borowski A., Troughton R, Houghtaling P., DiPaola N., Moravec C.S., Vesely I., Griffin B.P., Apparently Normal Mitral Valves in Heart Failure Patients Demonstrate Biochemical and Structural Derangements: An Extracellular Matrix and Echocardiographic Study, *J.Am.Col.Cardiol.*, 45(1):54-61, 2005.
- 76) Doehring T.C., Kahelin M., Vesely I., Mesostructures of the aortic valve, *J. Heart Valve Dis.* 14(5);679-686, 2005.
- 77) Grande-Allen K.J., Barber J.E., Klatka K.,M., Houghtaling P., Vesely I., Moravec C.S., McCarthy P.M., Mitral Valve Stiffening in End-Stage Heart Failure: Evidence of an Organic Contribution to Functional Mitral Regurgitation, *J.Thorac.Cardiovasc.Surg.* 130(3):783-90, 2005.
- 78) Doehring T.C., Freed A.H., Carew E.O., Vesely I., Fractional order viscoelasticity of the aortic valve: An alternative to QLV. *J. Biomech. Eng.* 127(4):700-8, 2005.
- 79) Vesely I., Heart Valve Tissue Engineering: A Review, *Circulation Research. Circ.Res.* 2005;97;743-755.
- 80) Freed A.D., Einstein D.R., Vesely I., Invariant formulation for dispersed transverse isotropy in aortic heart valves: An efficient means for modeling fiber splay. *Biomechanics and Modeling in Mechanobiology*, 4:100-117, 2005.
- 81) Einstein D.R., Freed A.D., Stander N., Fata B., Vesely I., Inverse Parameter Fitting of Biological Tissues: A response surface approach. *Ann.Biomed.Eng.*, 33(12):1819-1830, 2005.
- 82) Shi Y., Rittman L., Vesely I., Novel geometries for tissue-engineered tendonous collagen constructs, *Tissue Engineering*, 12(9):2601-2609, 2006.
- 83) Liao J., Vesely I., Skewness Angle of Interfibrillar Proteoglycans Increases with Applied Load on Chordae Tendineae. *Annals of Biomedical Engineering*, 40(2):390-398, 2007.
- 84) Doehring, T.C., Kahelin M., Vesely I., Nonuniform Large Deformations of Soft Tissues during Uniaxial Extension, *Annals of Biomedical Engineering* (in review)
- 85) Bhatia A. Vesely I. The Effect of Glycosaminoglycans and Hydration on the Viscoelastic Properties of Aortic Valve Tissue. *Annals of Biomedical Engineering* (in review).

Invited Editorials

- 1) Vesely I., The Hybrid Autograft/Xenograft Bioprosthetic Heart Valve. *J.Heart.Valve.Dis.* 6:292-295, 1997.

Full Papers in Conference Proceedings

- 1) Krucinski S., Vesely I., Dokainish M., Campbell G. Influence of aortic root expansibility on heart valve function - A numerical and experimental investigation, Transactions of the International Symposium on Computer Methods in Biomechanics & Biomedical Engineering, 1992.
- 2) Vesely I., Krucinski S., Campbell G., Computer modeling vs. animal research in the study of artificial heart valves., Canadian Association for Laboratory Animal Science Newsletter., 27(2): 42-44, 1993.
- 3) Einstein D.R., Freed A.D., , Vesely I., Invariant formulation for dispersed transverse isotropy in tissues of the aortic outflow tract. Proceedings of the "IUTAM Symposium on Mechanics of Biological Tissue", Graz, Austria, June 27 - July 2, 2004.

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- 1) Vesely I., Eickmeier W., Campbell G., Three dimensional computer modeling in the analysis of aortic valve geometry. Proceedings of the 12th Annual Conference of the IEEE Engineering in Medicine and Biology Society, 1990. (**invited**)
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- 200) Vesely I., Liao J. Mechanics of mitral valve chordae. Presented at the 2005 Annual Meeting of the Biomedical Engineering Society, Baltimore, Maryland, October 2005.
- 201) Shi Y., Wei D., Vesely I., The association of collagen Type I and III in developing mitral valve chordae tendineae. Proceedings of the 10th Annual Hilton Head Workshop and 2nd Biennial Heart Valve Meeting, Hilton Head Island, South Carolina, March 2006.

- 202) Schroeder S., Vesely I., Pseudo-plastic behavior during aortic valve preconditioning. Proceedings of the 10th Annual Hilton Head Workshop and 2nd Biennial Heart Valve Meeting, Hilton Head Island, South Carolina, March 2006.
- 203) Dobkin D., Shi Y., Vesely I., The effect of aspect ratio on the mechanical strength of tissue engineered mitral valve chordae tendineae. Proceedings of the 10th Annual Hilton Head Workshop and 2nd Biennial Heart Valve Meeting, Hilton Head Island, South Carolina, March 2006.
- 204) Vesely I., Bhatia A., Relative role of water and GAGs on the viscoelastic properties of aortic valve cusps. Proceedings of the 10th Annual Hilton Head Workshop and 2nd Biennial Heart Valve Meeting, Hilton Head Island, South Carolina, March 2006.
- 205) Surucu M., Einstein D., Vesely I., Effects of fibril microstructure in micromechanical modeling of mitral valve chordae. Proceedings of the 10th Annual Hilton Head Workshop and 2nd Biennial Heart Valve Meeting, Hilton Head Island, South Carolina, March 2006.
- 206) Saber N., Vesely I., Computational modeling of pericardial valve assembly: Initial experience. Proceedings of the 10th Annual Hilton Head Workshop and 2nd Biennial Heart Valve Meeting, Hilton Head Island, South Carolina, March 2006.
- 207) Fata B., Einstein D., Stander N., Vesely I., A realistic inverse parameter fitting of biological tissues through regional optimization. Proceedings of the 10th Annual Hilton Head Workshop and 2nd Biennial Heart Valve Meeting, Hilton Head Island, South Carolina, March 2006.
- 208) Vesely I., Tissue engineering cardiac valves by manipulation of collagen and elastin-based materials, Proceedings of the International Society of Applied Cardiovascular Biology (ISACB), La Jolla, California, March 2006.
- 209) Dobkin D., Shi Y., Vesely I., The effect of aspect ratio on the mechanical strength and collagen density of tissue engineered mitral valve chordae tendineae. Proceedings of the International Society of Applied Cardiovascular Biology (ISACB), La Jolla, California, March 2006.
- 210) Iyer R., Shi Y., Vesely I., Bioreactor for developing tissue-engineered mitral valve chordae under applied tension. Proceedings of the International Society of Applied Cardiovascular Biology (ISACB), La Jolla, California, March 2006.
- 211) Shi Y., Vesely I., The association of collagen Type I and III in developing mitral valve chordae tendineae. Proceedings of the International Society of Applied Cardiovascular Biology (ISACB), La Jolla, California, March 2006.
- 212) Chen K., Einstein D., Vesely I., Implementation of dispersed orthotropy in aorta with finite element simulation. Proceedings of the International Society of Applied Cardiovascular Biology (ISACB), La Jolla, California, March 2006.

- 213) Schroeder S., Aortic valve preconditioning as a source of pseudo-plastic behavior. Proceedings of the International Society of Applied Cardiovascular Biology (ISACB), La Jolla, California, March 2006.
- 214) Surucu M., Vesely I., Micromechanical modeling of preconditioning and hysteresis in mitral valve chordae, Proceedings of the International Society of Applied Cardiovascular Biology (ISACB), La Jolla, California, March 2006.
- 215) Saber N., Vesely I., Initial trials in computational modeling of pericardial valve assembly. Proceedings of the International Society of Applied Cardiovascular Biology (ISACB), La Jolla, California, March 2006.
- 216) Chen H., Einstein D.R., Vesely I., 3-D fluid-structure interaction model of arterial clamping – A step towards simulating cardiovascular surgery. Proceedings of the International Society of Applied Cardiovascular Biology (ISACB), La Jolla, California, March 2006.
- 217) Fata B., Einstein D.R., Stander N., Vesely I., A realistic inverse parameter fitting of biological tissues through regional optimization: A response surface approach. Proceedings of the International Society of Applied Cardiovascular Biology (ISACB), La Jolla, California, March 2006.
- 218) Vesely I., Einstein D., Freed A., Saleeb A., Pindera M.J., Doehring T., Saber N., Diethelm K., Advanced soft tissue modeling for Telemedicine and Surgical Simulation. Presented at the US Army Military Health Forum, Puerto Rico, May 2006.

Technical Reports

- 1) Tissue Properties of CryoValve-ALV, an Aortic Valve Allograft treated with a more potent antibiotic, For CryoLife Inc., 1991.
- 2) Comparison of the in vivo Dimensional Analysis System, and the standard uniaxial tensile testing protocol., For AMGEN Inc., 1992.
- 3) Mechanical Testing of Human Aortic Valve Cusps Cryopreserved with Five Methods, For CryoLife Inc., 1993.
- 4) Mechanical Testing of AOA-treated Porcine Xenograft Valves, For Medtronic Inc., 1993
- 5) Mechanical Testing of Irradiated and Cell-Extracted Porcine Xenograft Valves. For St. Jude Medical, 1994.
- 8) Mechanical Testing of Extracted Porcine Xenograft Valves: SJM-2-ext. For St. Jude Medical, 1995.
- 9) Mechanical Testing of Extracted Porcine Xenograft Valves: SJM-3-ext. For St. Jude Medical, 1995.

- 10) Mechanical Testing of Extracted Porcine Xenograft Valves: SJM-4-ext. For St. Jude Medical, 1995.
- 11) Mechanical Properties of Porcine Aortic Valves: Extracted Tissues vs. Fresh Tissues: HVL-001. Internal, September 1995.
- 10) Stress-Strain Behavior of Diaphragm Material: HVL-002. For TAH Group, BME, September 1995.
- 11) Insertion Loads for Intra-Ocular Lens: HVL-003. For John Kapitan, Mechanical Design Group, BME, November 1995.
- 12) Mechanical Loading of TAH Left Guide Pin: HVL-004. For TAH Group, BME, November 1995.
- 13) Stress-Strain Behavior of Hexsyn Material: HVL-005. For TAH Group, BME, November 1995.
- 14) Bovine Pericardium: Determination of Mechanical Properties and Investigation of Lipid Distribution: HVL-006. For Dr. Pat McCarthy, Cardiothoracic Surgery, December 1995.
- 15) Compressive Behavior of Gel. HVL-007. For Slawomir Krucinski, BME, December 1995.
- 16) Force Testing of Surgical Clip No. 1. HVL-008. For Dane Donich, MD, Neurosurgery, February 1996.
- 17) Stress-Strain Behavior of Hexsyn Material Under Cyclic Loading: HVL-009. For TAH Group, BME, March 1996.
- 18) Mechanical behavior of cell extracted heart valve cusps. HVL-010. For Stacy Stephenson (internal report), March 1996
- 19) Blood Analog Study - Mechanical Properties of Bovine Pericardium: HVL-011. For LVAD Group, BME, April 1996
- 20) Force Testing of Neurosurgery Clip No. 2: HVI-012. For Dane Donich, MD., Neurosurgery, March 1996.
- 21) Mechanical properties of diabetic foot skin: HVL-013. For Brian Davis, BME, (in progress)
- 22) Bovine Pericardium - Determination of Mechanical Properties. HVL - 014 For BioVascular, Inc., July 1996.
- 23) Mechanical testing of freehand implantable connectors. HVL - 015. For NeuroControl Corp., September 1996.

- 24) The mechanical properties of pig aortic valve leaflet acellular matrix: A comparison of two cell removal protocols. HVL - 016. For Prof. Michele Spina, Instituto di Istologia de Embriologia, Padova, Italy, February 6, 1998.
- 25) Shear testing of photofixed porcine heart valve tissues. HVL - 017. For Sulzer Carbomedics, Austin, TX. September 21, 1998.
- 26) Measurement of stent post deflection in Labcor valves: Phase 1, in vitro studies. HVL - 018. For Sulzer Carbomedics, Austin, TX. November 18, 1998.
- 27) Microstrain analysis of pericardial bioprosthetic valves. HVL – 19, For Baxter CVS, Irvine, CA, December 8, 1998.
- 28) Mechanical properties of myxomatous mitral valves. HVL – 20, internal report, December 10, 1998.
- 29) Effects of aspect ratio changes on the mechanical properteis of porcine aortic valve strips tested in tension: Further evidence of leaflet anisotropy. HVL – 21, internal report, July 20, 1999.
- 30) Mechanical properties of a Net-Shape Textile Preform. NVL -2001-1, For Foster-Miller technologies, November 28, 2001
- 31) Mechanical Propertiesof a New Material For Use as a Vascular Patch Study Number: HVL-2003-1, For Peri-Tech, May 7, 2003

Submissions to Gen Bank

Stephenson S., Schnoke M. and Vesely I. Porcine Decorin mRNA sequence AF125537, AF140270, Submitted on Feb. 2, 1999.

Academic Honors and Awards

- Ontario Scholar, 1979
- Dean's honor list, 1980
- Student Presentation Award, Canadian Cardiovascular Society, 1986

Academic Experience

Co-Director: Applied Biomedical Engineering (ABE) Doctorate Program at Cleveland State University (2000 – 2003).

Instructor: Graduate Course in the Doctor of Engineering Program (CHE 794-51) Biomaterials, Cleveland State University, (1999, 2000, 2001, 2002, 2003)

Graduate Course in the Doctor of Engineering Program (CHE 694-51) Biomechanical Engineering, Cleveland State University, Fall Semester, 1998

3rd year Biomedical Engineering, (EBME 314), Case Western Reserve University, October, 1997, 1998, 1999, 2000, 2001, 2002.

Guest lecturer: 4th year Biomedical Engineering (EBME 406), Case Western Reserve University, April 29, 1996.

Instructor: 2nd year Electrical Engineering, ES-232b, University of Western Ontario, Spring Term '92,'93, '94.

Instructor: Graduate course in Electrical Engineering, "Selected Topics in Biomedical Engineering", University of Western Ontario, Fall Term '93.

Lecturer: 1st year Engineering Graphics, ES-029, University of Western Ontario, Spring Term 1990, 1991

Guest lecturer: 2nd year Engineering Computer Graphics, University of Western Ontario, Fall 1989, Spring 1990

- Director of the 4th year Biomedical Engineering Student projects at UWO, 1990 – 1994
- Fourth-year Engineering Student Supervisor, University of Western Ontario, 1988 – 1994
- Fourth-year Medical Biophysics Student Supervisor, University of Western Ontario, 1987 - 1994

Supervision of Personnel

- 1 Research Associate
- 1 Postdoctoral Fellow
- 1 Engineer
- 8 Ph.D. students
- graduated 8 M.S., 3 Ph.D. students and 5 postdoctoral fellows.

Postdoctoral Fellows Supervised

- Anthony Duncan, Ph.D. – Dynamic fixation of heart valves – 1993-'94
- Hosam Fawzy, M.D. – Mitral valve sonomicrometry – 1995 – '07
- Jane Grande-Allen, Ph.D. – Myxomatous mitral valve disease – 1998 -'03
- Anand Ramamurthi, Ph.D. – Tissue engineering using hyaluronan – 1999 - '03
- Todd Doehring, Ph.D. – Micromechanical analysis of valve tissues – 2001 – '04
- Daniel Einstein, Ph.D. – Computational modeling of valves – 2003 – '04
- Penelope Thomas, Ph.D. – Heart valve morphogenesis – 2004
- Nikoo Saber, Ph.D. – Computational modeling of valves – 2005 - present
- Haimesh Shah, M.D. – Heart valve failure mechanisms – 2005 - 2006

Thesis Supervision

Ph.D. Theses - 3:

- Jun Liao: Structure-Function Relationship in Mitral Valve Chordae. CSU, 2003
- Yaling Shi: Tissue-engineered Mitral Valve Chordae. Cleveland State University, 2003

- Michael Scott: The Elastin and Collagen Microstructure of Aortic Heart Valve Cusps. University of Western Ontario, 1997.

M.Sc. Theses – 8:

- Anuradha Soundararajan: Heart valve tissue engineering. USC - 2005
- Abhijit Singh Bhatia: Origin of heart valve viscoelasticity. CSU, 2004
- Kalpesh Patel: Design of flexural fatigue tester. CSU, 2004
- Lawrence Rittman: Novel geometries for tissue engineered collagen constructs. CSU, 2004.
- Evan Anderson: System for flexural and stretch fatigue testing of bioprosthetic heart valve tissue. Case Western Reserve University, 2001.
- Tse Chung Lee: The Role of Elastin in Aortic Valve Mechanics. Case Western Reserve University, 1999.
- Charn Leung Lo: Biaxial Strain Study of Porcine Aortic Valve Using Stereographic Technique. University of Western Ontario, 1994.
- Bjarne Hansen: Longitudinal and Radial Distensibility of the Porcine Aortic Root. University of Western Ontario, 1994.
- Jennifer M. Leeson: High Speed Tensile Testing of Bioprosthetic Heart Valve Tissue. University of Western Ontario, 1994.

B.Sc. Theses:

- Lauren Reed: Tissue engineering of mitral valves, Case Western Reserve University, 1999
- Kurtis Kasper: Mechanical properties of myxomatous mitral valves. Case Western Reserve University, 1998
- Paul Werle: Damage mechanisms in ultrasonic transducers. Cleveland State University, 1998
- Larry Foore: DSP based ultrasound signal detection. Cleveland State University, 1998
- Evan Anderson: Mechanics of the mitral valve apparatus. Case Western Reserve University, 1997.
- Tony P. Brunner: Design of a Dynamic Cell Culture System. University of Western Ontario, 1994.
- Gordon Niznik: The Design and Construction of a Dynamic Fixation Apparatus for Porcine Bioprosthetic Aortic Heart Valves. University of Western Ontario, 1994.
- Tian Fu: Design of Automated Image Acquisition System. University of Western Ontario, 1994.
- Alberto De-Santis: Design of an Image Processing Software Module. University of Western Ontario, 1994.
- Scott R. Lane: Real-Time, Three-Dimensional Heart Depolarization Display. University of Western Ontario, 1993.
- Ashley A. Truscott: Error Estimation in Segmenting Objects in 3-D Images. University of Western Ontario, 1993.
- Anselmo Pilla: Real-Time Three-Dimensional Cardiac Imaging. University of Western Ontario, 1993.
- David J. Renaud: Changes in the Elastic Moduli of Fresh Porcine Aortic Valve Leaflets following Fixation in 0.5% Glutaraldehyde. University of Western Ontario, 1993.
- Larisse Dhillon: Early Detection of Aneurysms. University of Western Ontario, 1993.
- Andrew Gubbels: Sonomicrometer Enhancement Implementing 16-Bit Counters into EPLDs. University of Western Ontario, 1993.

- Elias Cagiannos: The Structural Analyses of the Human Aortic Valve Using Image Processing Techniques. University of Western Ontario, 1992.
- Timothy Buskard: A New Heart Valve Bending Machine Using an Existing Hydrostatic Bearing. University of Western Ontario, 1992.
- Gene Wo: The Geometry of the Aortic Root as a Function of Pressure. University of Western Ontario, 1992.
- Donald Muterer: Study to Examine the Strain Field at the Pin Bone Interface in External Fixator Pins. University of Western Ontario, 1992.
- Amanda-Jane Wall: Thermal Shrinkage of Porcine Aortic Valve Tissue. University of Western Ontario, 1992.
- Rob Howe: The Effects of Embalming on the Mechanical Characteristics of Bone. University of Western Ontario, 1992.
- Shafiq Steven Hirani: Perforation Detecting Latex Gloves. University of Western Ontario, 1992.
- Lisa K. Ferjo: Collagen Fiber Orientation of Aortic Cusps. University of Western Ontario, 1992.
- Andrew Sharpe: Film Densitometry by Digital Imaging. University of Western Ontario, 1991.
- Felix Hong-Man Chan: Modification of Demultiplexer Inside the Epilepsy Unit. University of Western Ontario, 1991.
- Mark Weiner: Automated Detection of Microcalcifications in Mammograms. University of Western Ontario, 1991.
- Alex Gubbels: Alternate Controls for a Clock Radio. University of Western Ontario, 1991.
- Paul Endersby: Digital Imaging of Arteriovenous Malformations. University of Western Ontario, 1991.
- David A. Strasser: A Three-Dimensional Display of Heart Depolarization. University of Western Ontario, 1991.
- James Marvin Frew: The Application of Chaos Theory to the Analysis of Heart Rate Variability. University of Western Ontario, 1990.
- Kai Jarosch: Effects of Aortic Root Constriction on the Behavior of the Aortic Valve in the Isolated Porcine Heart. University of Western Ontario, 1990.
- Paul R. Watson: The Three Dimensional Mapping of the Aortic Root. University of Western Ontario, 1989.

Invited Speaker

- Medtronic Bioprostheses Symposium, Edmonton, Alberta, November, 1987
- Medtronic INTACT Valve Symposium, Quebec City, Quebec, February, 1989
- Medtronic Heart Valve Symposium, Calgary, Alberta, March, 1990
- Institute of Biomedical Engineering, Toronto, Ontario, February, 1990
- Medtronic Heart Valve Division, Irvine, California, August, 1990
- Medtronic General Meeting, Toronto, Ontario, April, 1991
- Pfizer Lecturer, Clinical Research Institute of Montreal, Montreal, Quebec, April, 1991
- Institute of Physiology, Czechoslovak Academy of Sciences, Prague, Czechoslovakia, May, 1991
- John P. Robarts Research Institute, London, Ontario, September, 1991
- Civil Engineering, University of Waterloo, Waterloo, Ontario, September, 1991

- Maritime Heart Center, Halifax, Nova Scotia, January, 1992
- Medtronic Heart Valve Division, Irvine, California, January, 1992
- CryoLife Inc., Marietta, Georgia, March, 1992
- Medtronic Heart Valve Symposium, Calgary, Alberta, March, 1992
- Fourth World Biomaterials Congress, Berlin, Germany, April 1992
- Grand Rounds, University of Nebraska Medical Center, Omaha, Nebraska, January, 1993
- The Cleveland Clinic Foundation, Cleveland Ohio, March, 1993
- Medtronic Heart Valve Symposium, Whistler, British Columbia, March, 1993
- John P. Robarts Research Institute, London, Ontario, October, 1993
- St.Jude Medical, St. Paul, Minnesota, October, 1993
- Medtronic Heart Valve Division, Irvine, California, November, 1993
- Faculty of Dentistry, London, Ontario, December, 1993
- The Cleveland Clinic Foundation, Cleveland Ohio, January, 1994
- Medical Devices - Aerospace Business Alliance Initiative, Toronto, February, 1994
- Medtronic Heart Valve Symposium, Quebec City, Quebec, February, 1994
- Cardiovascular Surgery Rounds, Cleveland Clinic Foundation, Cleveland Ohio, December, 1994
- Department of Biomedical Engineering, The Cleveland Clinic Foundation, Cleveland Ohio, January, 1995
- Dept. Cardiology, The Cleveland Clinic Foundation, Cleveland Ohio, January, 1995
- Society for Cardiovascular Pathology, Toronto, Ontario, March, 1995
- American Society for Artificial Internal Organs, Chicago, Illinois, May, 1995
- NHLBI Working Group on Heart Valves, Washington, D.C., April 1996
- Bioprosthetic Heart Valve Symposium, Charlotte, North Carolina, May 1996
- Biomedical Engineering, Ohio State University, May, 1996
- Biomedical Engineering, Case Western Reserve University, October, 1996
- Biomedical Engineering, Georgia Institute of Technology, April, 1997
- Moderator of Scientific Panel Discussion at Experimental Biology '97, New Orleans, April, 1997
- Royal Society of Medicine, London, England, November 1997
- Sulzer Carbomedics Inc., Austin, Texas, November, 1997
- Department of Cardiology, The Cleveland Clinic Foundation, November, 1997
- Orthopaedic Engineering Group, Case Western Reserve University, May, 1998
- Microscopy and Microanalysis Society, Atlanta, July 1998
- Computers in Cardiology Symposium, Cleveland, September 1998
- BMES Conference, Cleveland, October 1998
- Department of Cardiovascular Surgery, The Cleveland Clinic Foundation, October, 1998
- International Society of Optical Engineering (SPIE), BIOS '99, St.Jose, Ca. January 1999
- Department of Anesthesia Research, Cleveland Clinic Foundation, Cleveland, March, 1999
- International Symposium on Tissue Engineering for Heart Valve Bioprostheses, London, United Kingdom, June, 1999
- Lerner Research Institute Annual Retreat, September 1999
- Department of Surgery, University of Wisconsin, Madison, September 1999
- ASB Conference, Pittsburgh, October 1999
- Colorado Springs Osteopathic Foundation, April 2000
- Department of Biomedical Engineering, The Cleveland Clinic Foundation, May, 2000

- ASAIO Conference, New York City, June 2000
- BMES Conference, Seattle, October 2000
- Corazon, Inc. San Francisco, CA, March 2001
- International Symposium on Tissue Engineering for Heart Valve Bioprotheses, London, United Kingdom, June, 2001
- XVII Latin Meeting on Vascular Research, Padova, Italy, October 2001
- 8th Biennial Meeting of the International Society for Applied Cardiovascular Biology, St.Gallen, Switzerland, February 2002
- Department of Pharmacology, Case Western Reserve University, March, 2002
- Departments of Bioengineering and Mechanical Engineering, U. Pittsburgh, March, 2002
- Department of Biomedical Engineering, University of Alabama, Birmingham, June 2002
- XXIV Meeting of the International Society for Heart Research, Madison WI, June 2002
- 4th World Congress of Biomechanics, Calgary, Alberta, Canada, August 2002
- Biomatrix Inc., Richmond VA, August 2002
- Cardiac BioInterventions 2002, San Francisco, October, 2002
- University of Pennsylvania, Philadelphia, April, 2003
- University of Illinois, Chicago, April, 2003
- Department of Cardiology, The Cleveland Clinic Foundation, May, 2003
- ASAIO Conference, Washington, D.C., June, 2003
- Gordon Conference on Elastin and Elastic Fibers, Kimball Academy, NH, Aug. 2003
- Childrens Hospital Los Angeles, Los Angeles, California, August 2003
- University of Southern California, BME Dept., Los Angeles, California, February 2004
- Medtronic Heart Valve Division, Santa Anna, CA, July 2004
- Clemson University 2004 Annual NIH-NSF BBSI Symposium on Biomaterials Science and Engineering, Clemson, South Carolina, August 2004
- 8th University of Washington Engineered Biomaterials (UWEB) Summer Scientific Symposium, Seattle, Washington, August 2004
- UK and California Joint Symposium on Stem Cells, Tissue Engineering and Regenerative Medicine, Los Angeles, California, December, 2004
- Rockwell Scientific Co., Thousand Oaks, California, January 2005
- ISACB Mini Symposium, Cape Town, South Africa, February 2005
- Endovascular Interventions, Scottsdale, Arizona, February 2005
- Saban Developmental Biology Group Annual Retreat, La Canada, California, February 2005
- Childrens Hospital Los Angeles, GCRG Special Lecture, Los Angeles, March 2005
- University of Southern California Viterbi School of Engineering Honors Colloquium, April 2005
- University of Southern California, BME Dept. - BMRC Program, July 2005
- University of Cincinnati, Grand Rounds and Bioengineering Lectures, September 2005
- University of Arizona, Tucson, Bioengineering Seminar, November 2005.
- Medical University of South Carolina, Charleston, February 2006.
- Transcatheter Valve Symposium, San Francisco, April 2006.
- Colorado State University, Fort Collins, February, 2008.

Organizing of Conferences

- Conference Co-organizer – ISACB Conference, San Diego, CA, March 2006

- Conference Chair – Saban Institute Symposium on Cell and Tissue Engineering, Los Angeles, CA, September 2005
- Symposium organizer, World Biomaterials Congress, Sydney Australia, May 2004
- Session organizer, ISACB conference, Savannah, Georgia, February, 2004
- Symposium co-organizer, World Congress on Medical Physics and Biomedical Engineering, Sydney, Australia, August 2003
- Faculty Member, Cardiac Biointerventions 2002, October, San Francisco
- Organizer of Valve Symposium at the 4th World Congress of Biomechanics, Calgary, Alberta, Canada, August 2002
- Co-organizer, Second International Symposium on Tissue Engineering for Heart Valve Bioprosthesis, a Satellite Symposium of the 2nd World Symposium on Heart Valve Disease, London, UK, 2001
- Faculty Member, First International Symposium on Tissue Engineering for Heart Valve Bioprosthesis, a Satellite Symposium of the World Symposium on Heart Valve Disease, 1999
- Member, Scientific Advisory Board, World Symposium on Heart Valve Disease, June, 1999
- Member, Local Organizing Committee, BMES Annual Meeting, Cleveland, October, 1998
- Faculty member of the Royal Society of Medicine conference on the "Use of Pericardium in Cardiac Surgery", November 1997
- Co-organizer of the 11th Annual Conference of the Canadian Biomaterials Society, London, 1990.

Session Chair at Recent Scientific Conferences

- ISACB Biennial Conference, San Diego, California, March 2006
- Advances in Tissue Engineering & Biology of Heart Valves, Florence, Italy, September 2004
- World Biomaterials Congress, Sydney Australia, May 2004
- ISACB conference, Savannah, Georgia, February, 2004
- World Congress on Medical Physics and Biomedical Engineering, Sydney, Australia, August 2003
- 2nd Biennial Meeting of the Society for Heart Valve Disease, Paris, France, June 2003.
- BMES-EMBS, Houston, October, 2002
- Cardiac Biointerventions, San Francisco, October, 2002,
- IV World Congress Of Biomechanics, Calgary, Canada, August, 2002.
- XXIV Meeting of the International Society for Heart Research, Madison WI, June 2002
- 6th Annual Hilton Head Workshop on Prosthetic Heart Valves, March, 2002.
- First International Conference on Biomaterials (China), Beijing, China, August, 2001.
- Second International Symposium on Tissue Engineering for Heart Valve Bioprosthesis, London, UK, 2001.
- 1st Biennial Meeting of the Society for Heart Valve Disease, London, UK, 2001.
- BMES conference, Seattle, October, 2000.
- Sixth World Biomaterials Congress, Hawaii, May 2000.
- BMES-IEEE conference, Atlanta, November, 1999.
- World Symposium of Heart Valve Disease, Oxford, England, June 1999.
- BMES Conference, Cleveland, October, 1998.
- Workshop on Prosthetic Heart Valves: Future Technologies, Hilton Head, S.C., February, 1998.

- ASAIO Conference, May 1997
- VII International Symposium on Cardiac Bioprostheses, Barcelona, Spain, June 1997.
- Georgia Tech Workshop on Tissue Engineering, Hilton Head Island, February, 1997.
- ASAIO Conference, May 1996.
- ASAIO Conference, May 1995.
- ASAIO Conference, May 1994.

Abstract Review Committee Membership

- International Society for Biomechanics, Cleveland, Ohio, August 2005
- Advances in Tissue Engineering and Biology of Heart Valves, Florence, Italy, Sept. 2004
- IASTED International Conference on Biomechanics, Honolulu, Hawaii, August, 2004
- World Biomaterials Congress, Sydney Australia, May 2004
- ISACB conference, Savannah, Georgia, February, 2004
- Cleveland Clinic Lerner Research Institute Annual Research Day, August, 2003
- World Congress on Medical Physics and Biomedical Engineering, Sydney, Australia, August 2003
- Cleveland Clinic Lerner Research Institute Annual Research Day, August, 2002

Grant Review Study Sections

- NIH Special Emphasis Panel *reviewed 3 grants - February 2007*
- NIH CCHF study section meeting – *reviewed 6 grants – June 2006*
- South Carolina’s Research Centers of Economic Excellence Endowed Chairs Program – *Reviewed 1 grant - February 2006*
- NIH CCHF study section meeting – *reviewed 6 grants – October 2005*
- NIH CCHF study section meeting – *reviewed 5 grants – March 2005*
- NIH BRP study section *reviewed 2 grants - 2004*
- NIH Special Emphasis Panel *reviewed one grant - March 2004*
- NSF study section on Medical Technologies – *reviewed 9 grants - 2004*
- Murdock Trust reviewed one grant - February of 2004
- NSF – SBIR special panel on Biomaterials Technologies - 2003
- Canadian Regenerative Medicine Special Panel – 2003
- National Institutes of Health (NIH) - *reviewed 8 grants in 2003*
- University of Montana NSF EPSCoR State Competitive Grant Program – 2002
- National Institutes of Health (NIH) - *reviewed 6 grants in 2002*
- American Institute for Biological Sciences (AIBS) - *reviewed 2 grants for U.S. Army in 2001*
- Canadian Institutes of Health Research (CIHR) – *reviewed two grants in 2002*
- Italian Ministry for University and Research- *reviewed 2 grants in past 3 years*
- Heart and Stroke Foundation of Ontario (HSFO) - *reviewed several grants prior to -'94*
- Medical Research Council of Canada (MRC) - *reviewed several grants prior to -'94*
- Natural Sciences and Engineering Research Council of Canada (NSERC) - *reviewed several grants prior to -'94*

Editorial Boards

- Cardiovascular Pathology

Manuscript Review

- Acta Biomaterialia
- Annals of Biomedical Engineering
- Annals of Thoracic Surgery,
- Artificial Organs
- ASME Journal of Biomechanical Engineering
- Atherosclerosis
- Biochimica et Biophysica Acta
- Biomaterials
- Biotechnology Progress
- Cardiovascular Research
- Circulation
- IEEE Transactions on Biomedical Engineering
- Journal of Biomechanics
- Journal of Biomedical Engineering
- Journal of Biomedical Materials Research
- Journal of Heart Valve Disease
- Journal of Thoracic and Cardiovascular Surgery
- Matrix Biology
- Medical & Biological Engineering & Computing
- Tissue Engineering

Committee Membership

Current

- Member of the Executive Committee - ISACB (International Society for Applied Cardiovascular Biology)
- Society for Heart Valve Disease - Group leader: Working Group on Tissue Valve Mechanics and Materials.

Past

- Saban Institute Working Group on Web Development, 2003 - 2006
- Saban Institute Working Group on Desktop Support, 2003 - 2006
- Saban Institute Scientific and Administrative Committee for Stem Cell Research 2003 - 2006
- Saban Institute Scientific Council, 2003 - 2006
- Saban Institute Committee on Intellectual Property and Patents, 2003 - 2006
- Saban Institute Search Committee for Director of Clinical Research, 2003 - 2006
- Saban Institute Ad-Hoc Committee on Computer Support Restructuring, 2004
- Saban Institute Ad-Hoc Committee on California Prop. 71. – *Stem Cells*, 2004
- Selection Committee for new Staff at CCF:
 - Orthopaedic Engineering Staff member, 2000
 - Tissue Engineering Staff member, 1997-'99
 - Electrophysiology Staff member, 1997
 - Image Processing Staff member, 1997
 - BME Quality Assurance Manager, 1996

Anesthesiology Staff member, 1995

- Member of the BME Computer Committee, 1997-2003
- BME representative to the Research Institute Computer Core, 1998 - 2003
- Member of the CCF-LRI Committee on Appointments and Promotions - 2003
- Group leader of ASTM panel on Tissue Engineered Biomaterials (1998)
- Reviewer for The Research Institute Basic Science Abstracts (2001)
- Reviewer for The Research Institute Basic Science Abstracts (1995)
- Member CCF-CWRU joint Biomedical Engineering Program (2000)
- Member of Dept. Administrative Restructuring Working Group (1999)
- Member of Web Design Working Group (1998-'99)
- Member of Cardiovascular Devices R&D working group ('95-97)
- Member of the Research Institute Committee on Appointments and Promotions (CAP), '97-'98
- Heart and Circulation Group representative to the Robarts Research Institute Computer Committee (until 1994)
- Dept. of Electrical Engineering representative to the U.W.O. Computer Committee (until 1994)
- Secretary of Biomedical Engineering Western (until 1994)

Membership in Professional Societies

Current

- ISACB (International Society for Applied Cardiovascular Biology)
- Society for Heart Valve Disease

Past

- IEEE (Institute of Electrical and Electronic Engineers)
- Society for Biomaterials
- Tissue Engineering Society International
- American Heart Association

Issued Patents:

5,515,853: **Three-dimensional digital ultrasound tracking system** - Smith; Wayne L. (London, CA); Vesely; Ivan (Cleveland Heights, OH); Gubbels; Andrew W. (Mt. Brydges, CA). Assignee: Sonometrics Corporation (London, CA) – issued May 14, 1996

5,549,665: **Bioprosthetic valve** - Vesely; Ivan (London, CA); Krucinski; Slawomir (London, CA); Campbell; Gordon (London, CA); Boughner; Derek (London, CA); Dokainish; Mohan (London, CA). Assignee: London Health Association (London, CA) - issued August 27, 1996

5,728,153: **Stentless heart valve surgical support device** - Menkis; Alan (London, CA); Scott; Michael (London, CA) Vesely; Ivan (Cleveland Heights, OH) – issued March 17, 1998

5,779,638: **Ultrasound-based 3-D tracking system using a digital signal processor**- Vesely; Ivan, (Cleveland Heights, OH), Smith; Wayne L., (London, Canada), Assignee: Sonometrics Corporation, London, Canada - issued July 14, 1998

5,795,298: **System for sharing electrocardiogram electrodes and transducers** - Vesely; Ivan, (Cleveland Heights, OH), Edge; Marshall, (London, Canada), Assignee: Sonometrics Corporation, London, Canada - issued August 18, 1998

5,797,849: **Method for carrying out a medical procedure using a three-dimensional tracking and imaging system** - Vesely; Ivan, (Cleveland Heights, OH), Smith; Wayne, (London, Canada), Assignee: Sonometrics Corporation, London, Canada - issued August 25, 1998

5,817,022: **System for displaying a 2-D ultrasound image within a 3-D viewing environment** - Vesely; Ivan, (Cleveland Heights, OH), Assignee: Sonometrics Corporation, London, Canada - issued October 6, 1998

5,830,144: **Tracking data sheath** - Vesely; Ivan (Cleveland Heights, OH), Assignee: Sonometrics Corporation, London, Canada - issued November 3, 1998

5,868,673: **System for carrying out surgery, biopsy and ablation of a tumor or other physical anomaly** - Vesely; Ivan (Cleveland Heights, OH), Assignee: Sonometrics Corporation, London, Canada - issued February 9, 1999.

6,530,952: **Bioprosthetic Cardiovascular Valve System** - Vesely; Ivan (Cleveland Heights, OH), Assignee: The Cleveland Clinic Foundation, Cleveland, Ohio - issued March 11, 2003.

6,569,196: **System for Minimally Invasive Insertion of a Bioprosthetic Heart Valve** - Vesely; Ivan (Cleveland Heights, OH), Assignee: The Cleveland Clinic Foundation, Cleveland, Ohio - issued May 27, 2003.

7,011,681 B2: **Bioprosthetic Cardiovascular Valve System** - Vesely; Ivan (Lakewood, OH), Assignee: The Cleveland Clinic Foundation, Cleveland, Ohio - issued March 14, 2006.

Business Ventures:

Founder of Sonometrics Corporation, London, Canada.

Products: Digital Sonomicrometer - high precision laboratory instrument

Founder of ValveXchange Inc. – SBIR-funded start-up company in Aurora, CO