

# JAMES CHARLES LACEFIELD

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## EDUCATION

**Duke University**, Durham, NC

*Ph.D.*, Department of Biomedical Engineering, May 1999.

Dissertation title: *Angular Scatter Ultrasound Imaging Using Separated Arrays*

*B.S.E., cum laude*, Department of Biomedical Engineering, May 1992.

## LISCENSURE

*Professional Engineer*, Province of Ontario, licensed February 2005 – Present.

*Engineer in Training*, State of North Carolina, certified June 1992.

## ACADEMIC POSITIONS

**University of Western Ontario**, London, ON

<i>Associate Professor</i>	Department of Electrical and Computer Engineering	2007-Present
<i>Associate Professor</i>	Department of Medical Biophysics	2007-Present
<i>Faculty Member</i>	Biomedical Engineering Graduate Program	2001-Present
<i>Associate Scientist</i>	Robarts Research Institute	2001-Present
<i>Mentor</i>	CIHR Strategic Training Program in Cancer Research and Technology Transfer	2005-Present
<i>Assistant Professor</i>	Department of Electrical and Computer Engineering	2001-2007
<i>Assistant Professor</i>	Department of Medical Biophysics	2001-2007

**University of Rochester**, Rochester, NY

<i>Visiting Research Associate</i>	Department of Electrical and Computer Engineering	1999-2001
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## FELLOWSHIPS AND AWARDS

Biomedical Engineering Division Travel Award, American Society for Engineering Education, June 2002 (US\$800).

Frederick V. Hunt Postdoctoral Research Fellowship in Acoustics, Acoustical Society of America, 2000-2001 (US\$33,000).

Third Prize, Student Paper Competition in Biomedical Ultrasound/Bioresponse to Vibration, 138th Meeting of the Acoustical Society of America, Nov. 1999 (US\$150).

Tau Beta Pi Excellence in Teaching Award, Duke University chapter, 1998.

NSF/ERC Predoctoral Fellowship, Center for Emerging Cardiovascular Technologies, Duke University, 1992-99.

## **RESEARCH FUNDING**

### **Funds Currently Held**

*Principal Investigator: J.C. Lacefield*

*Title: Multiscale Three-Dimensional Modeling of Ultrasound Cancer Imaging*

*Source and Program: Natural Sciences and Engineering Research Council (NSERC) Discovery Grant*

*Amount Awarded: CAN\$141,750*

*Project Dates: 2007 – 2012*

*Principal Investigator: J.C. Lacefield*

*Title: Ultrasound Imaging of Fibrin Clot Dissolution Dynamics*

*Source and Program: University of Western Ontario Academic Development Fund New Research and Scholarly Initiative Award*

*Amount Requested: CAN\$3,575*

*Project Dates: 2009 – 2010*

*Principal Investigator: D.R. Boughner*

*Co-Investigators: K.A. Rogers, B.K. Rutt, M. Drangova, and J.C. Lacefield*

*Title: Early Image-Based Diagnosis of Aortic Valve Sclerosis in a Rabbit Model*

*Source and Program: Heart and Stroke Foundation of Canada Grant-in-Aid*

*Amount Awarded: CAN\$160,000*

*Project Dates: 2008 – 2010*

*Principal Investigator: F.S. Foster*

*Co-Investigators: J.C. Lacefield and 22 others*

*Title: Ontario Preclinical Imaging Consortium*

*Source and Program: Ontario Research Fund Research Excellence Program*

*Amount Awarded: CAN\$7,381,985*

*Project Dates: 2009 – 2014*

### **Past Funding**

*Principal Investigator: J.C. Lacefield*

*Title: Numerical Analysis of Aberration and Focus Compensation for Medical Ultrasound Imaging*

*Source and Program: Natural Sciences and Engineering Research Council Discovery Grant*

*Amount Awarded: CAN\$139,524*

*Project Dates: 2003 – 2007*

*Principal Investigator: J.C. Lacefield*

*Title: Volumetric Ultrasound Micro-Imaging of Treatment Response in Mouse Metastasis Models*

*Source and Program: Schulich School of Medicine and Dentistry CIHR Gap B Competition*

*Amount Awarded: CAN\$7,000*

*Project Dates: 2006 – 2007*

*Principal Investigator: J.C. Lacefield*

*Title: Assessment of Cardiac Valve Function in Neonatal Mice Using Ultrasound Micro-Imaging*

*Source and Program: University of Western Ontario Academic Development Fund New Research and Scholarly Initiative Award*

*Amount Awarded: CAN\$7,000*

*Project Dates: 2003 – 2004*

*Principal Investigator: D.R. Boughner*

*Co-Investigators: K.A. Rogers and J.C. Lacefield*

*Title: A Tissue Engineering Approach to Bioprosthetic Heart Valve Design*

*Source and Program: Heart and Stroke Foundation of Canada Grant-in-Aid*

*Amount Awarded: CAN\$294,564*

*Project Dates: 2006 – 2009*

*Principal Investigator:* D.R. Boughner

*Co-Investigators:* K.A. Rogers, B.K. Rutt, M. Drangova, and J.C. Lacefield

*Title:* Aortic Sclerosis in an Animal Model: Progression, Regression and Evaluation

*Source and Program:* Heart and Stroke Foundation of Canada Grant-in-Aid

*Amount Awarded:* CAN\$69,918

*Project Dates:* 2007 – 2008

*Principal Investigator:* J.W. Xuan

*Co-Investigators:* A.A. Driedger, J.I. Izawa, J.C. Lacefield, M. Moussa, and P.L. Zabel

*Title:* Micro- and Molecular Imaging for Pre-Clinical Trials in Genetically Engineered Mouse Prostate Cancer Models

*Source and Program:* Canadian Institutes of Health Research Operating Grant

*Amount Awarded:* CAN\$343,662

*Project Dates:* 2005 – 2008

*Principal Investigator:* J.W. Xuan

*Collaborators:* J.C. Lacefield, A. Fenster, J.L. Chin, J.I. Izawa, and M. Moussa

*Title:* Anti-Angiogenic Micro-Surgery Therapy of Genetically Engineered Mouse Prostate Cancer Monitored by 3-D Power Doppler Ultrasound

*Source and Program:* Prostate Cancer Research Foundation of Canada Research Grant

*Amount Awarded:* CAN\$60,000

*Project Dates:* 2006 – 2007

#### **BOOK CHAPTERS (\* indicates trainee)**

[1] K.C. Graham, L.A. Wirtzfeld,\* J.C. Lacefield, and A.F. Chambers, "Preclinical liver metastases: Three-dimensional high-frequency ultrasound imaging," in *Methods of Cancer Diagnosis, Therapy, and Prognosis, Volume 5: Liver Cancer*, M.A. Hayat, ed., Dordrecht, NL: Springer Netherlands, chap. 29, pp. 369-386, 2009.

[2] J.C. Lacefield, "Ultrasound micro-imaging," in *Encyclopedia of Cancer*, 2nd ed., M. Schwab, ed., Berlin: Springer-Verlag, pp. 3103-3107, 2009.

[3] J.W. Xuan, J.C. Lacefield, L.A. Wirtzfeld,\* M. Bygrave, H. Jiang, J.I. Izawa, M. Moussa, J.L. Chin, and A. Fenster, "Prostate secretory protein of 94 amino acids gene-driven transgenic prostate cancer: Three-dimensional ultrasound microimaging," in *Cancer Imaging, Volume 2: Instrumentation and Applications*, M.A. Hayat, ed., Boston: Elsevier Academic Press, chap. 3.46, pp. 619-628, 2008.

#### **REFEREED JOURNAL PUBLICATIONS (\* indicates trainee)**

[1] M.I. Daoud\* and J.C. Lacefield, "Stochastic modeling of normal and tumor tissue microstructure for high-frequency ultrasound imaging simulations," *IEEE Trans. Biomed. Eng.*, vol. 56, pp. 2806-2815, 2009.

[2] X. Zheng, D. Lian, A. Wong, M. Bygrave, T.E. Ichim, M. Khoshniat,\* X. Zhang, H. Sun, T. De Zordo, J.C. Lacefield, B. Garcia, A.M. Jevnikar, and W.-P. Min, "Novel small interfering RNA-containing solution protecting donor organs in heart transplantation," *Circulation*, vol. 120, pp. 1099-1107, 2009.

[3] M.I. Daoud\* and J.C. Lacefield, "Distributed three-dimensional simulation of B-mode ultrasound imaging using a first-order  $k$ -space method," *Phys. Med. Biol.*, vol. 54, pp. 5173-5192, 2009.

[4] J.C. Tillett, M.I. Daoud,\* J.C. Lacefield, and R.C. Waag, "A  $k$ -space method for acoustic propagation using coupled first-order equations in three dimensions," *J. Acoust. Soc. Am.*, vol. 126, pp. 1231-1244, 2009.

- [5] S.Z. Pinter\* and J.C. Lacefield, "Detectability of small blood vessels with high-frequency power Doppler and selection of wall-filter cut-off velocity for microvascular imaging," *Ultrasound Med. Biol.*, vol. 35, pp. 1217-1228, 2009.
- [6] A.M. Hamilton, K.A. Rogers, M. Drangova, Z. Khan,\* J.A. Ronald, B.K. Rutt, K.A. MacLean, J.C. Lacefield, and D.R. Boughner, "The *in vivo* diagnosis of early-stage aortic valve sclerosis using magnetic resonance imaging in a rabbit model," *J. Magn. Reson. Imaging*, vol. 29, pp. 825-831, 2009.
- [7] Z. Khan,\* D.R. Boughner, and J.C. Lacefield, "Anisotropy of high-frequency integrated backscatter from aortic valve cusps," *Ultrasound Med. Biol.*, vol. 34, pp. 1504-1512, 2008.
- [8] A.C. Waspe,\* H.J. Cakiroglu, J.C. Lacefield, and A. Fenster, "Design, calibration and evaluation of a robotic needle-positioning system for small animal imaging applications," *Phys. Med. Biol.*, vol. 52, pp. 1863-1878, 2007.
- [9] J.W. Xuan, M. Bygrave, H. Jiang, F. Valiyeva, J. Dunmore-Buyze, D.W. Holdsworth, J.I. Izawa, G. Bauman, M. Moussa, S.F. Winter, N.M. Greenberg, J.L. Chin, M. Drangova, A. Fenster, and J.C. Lacefield, "Functional neoangiogenesis imaging of genetically engineered mouse prostate cancer using three-dimensional power Doppler ultrasound," *Cancer Res.*, vol. 67, pp. 2830-2839, 2007.
- [10] L.A. Wirtzfeld,\* K.C. Graham, A.C. Groom, I.C. MacDonald, A.F. Chambers, A. Fenster, and J.C. Lacefield, "Volume measurement variability in three-dimensional high-frequency ultrasound images of murine liver metastases," *Phys. Med. Biol.*, vol. 51, pp. 2367-2381, 2006.
- [11] Q. Qiu,\* J. Dunmore-Buyze, D.R. Boughner, and J.C. Lacefield, "Evaluation of an algorithm for semiautomated segmentation of thin tissue layers in high-frequency ultrasound images," *IEEE Trans. Ultrason. Ferroelect. Freq. Contr.*, vol. 53, pp. 324-334, 2006.
- [12] I. Van Huizen, G. Wu, M. Moussa, J.L. Chin, A. Fenster, J.C. Lacefield, H. Sakai, N.M. Greenberg, and J.W. Xuan, "Establishment of a serum tumor marker for preclinical trials of mouse prostate cancer models," *Clin. Cancer Res.*, vol. 11, pp. 7911-7919, 2005.
- [13] L.A. Wirtzfeld,\* G. Wu, M. Bygrave, Y. Yamasaki, H. Sakai, M. Moussa, J.I. Izawa, D.B. Downey, N.M. Greenberg, A. Fenster, J.W. Xuan, and J.C. Lacefield, "A new three-dimensional ultrasound micro-imaging technology for preclinical studies using a transgenic prostate cancer mouse model," *Cancer Res.*, vol. 65, pp. 6337-6345, 2005. (Journal cover figure was selected from this paper.)
- [14] K.C. Graham, L.A. Wirtzfeld,\* L.T. MacKenzie, C.O. Postenka, A.C. Groom, I.C. MacDonald, A. Fenster, J.C. Lacefield, and A.F. Chambers, "Three-dimensional high-frequency ultrasound imaging for longitudinal evaluation of liver metastases in preclinical models," *Cancer Res.*, vol. 65, pp. 5231-5237, 2005.
- [15] A.M.Y. Cheung, A.S. Brown, L.A. Hastie,\* V. Cucevic, M. Roy, J.C. Lacefield, A. Fenster, and F.S. Foster, "Three-dimensional ultrasound biomicroscopy for xenograft growth analysis," *Ultrasound Med. Biol.*, vol. 31, pp. 865-870, 2005.
- [16] J.C. Lacefield, W.C. Pilkington, and R.C. Waag, "Comparisons of lesion detectability in ultrasound images acquired using time-shift compensation and spatial compounding," *IEEE Trans. Ultrason. Ferroelect. Freq. Contr.*, vol. 51, pp. 1649-1659, 2004.
- [17] J.C. Lacefield, J. Weaver, J.R. Spence, J. Dunmore-Buyze, and D.R. Boughner, "Three-dimensional visualization and thickness estimation of aortic valve cusps using high-frequency ultrasound," *Physiol. Meas.*, vol. 25, pp. 27-36, 2004.
- [18] J.C. Lacefield and R.C. Waag, "Spatial coherence analysis applied to aberration correction using a two-dimensional array system," *J. Acoust. Soc. Am.*, vol. 112, pp. 2558-2566, 2002.

- [19] *J.C. Lacefield* and R.C. Waag, "Examples of design curves for multirow arrays used with time-shift compensation," *IEEE Trans. Ultrason. Ferroelect. Freq. Contr.*, vol. 49, pp. 1340-1344, 2002.
- [20] *J.C. Lacefield*, W.C. Pilkington, and R.C. Waag, "Distributed aberrators for emulation of ultrasonic pulse distortion by abdominal wall," *Acoust. Res. Lett. Online*, vol. 3, pp. 47-52, 2002.
- [21] *J.C. Lacefield* and R.C. Waag, "Time-shift estimation and focusing through distributed aberration using multirow arrays," *IEEE Trans. Ultrason. Ferroelect. Freq. Contr.*, vol. 48, pp. 1606-1624, 2001.
- [22] *J.C. Lacefield* and O.T. von Ramm, "Angular scatter ultrasound imaging of wavelength scale targets," *J. Acoust. Soc. Am.*, vol. 108, pp. 1914-1919, 2000.
- [23] *J.C. Lacefield* and O.T. von Ramm, "Design and characterization of a real-time angular scatter ultrasound imaging system," *IEEE Trans. Ultrason. Ferroelect. Freq. Contr.*, vol. 47, pp. 222-232, 2000.

#### **REFEREED CONFERENCE PROCEEDINGS (\* indicates trainee)**

- [1] S.Z. Pinter\* and *J.C. Lacefield*, "Estimating vascular volume fraction in a network of small blood vessels with high-frequency power Doppler ultrasound," 31st Annual International Conference of the IEEE Engineering in Medicine and Biology Society, *Proc. IEEE EMBS Ann. Intl. Conf.*, pp. 2268-2271, 2009.
- [2] M.I. Daoud\* and *J.C. Lacefield*, "Stochastic modeling of tissue microstructure for high-frequency ultrasound imaging simulations," SPIE Medical Imaging 2009, *Proc. SPIE*, vol. 7262, article 726224, 2009.
- [3] S.Z. Pinter\* and *J.C. Lacefield*, "Understanding quantification of microvasculature with high-frequency power Doppler ultrasound," SPIE Medical Imaging 2009, *Proc. SPIE*, vol. 7265, article 726529, 2009.
- [4] M.I. Daoud\* and *J.C. Lacefield*, "Parallel three-dimensional simulation of ultrasound imaging," 22nd International Conference on High-Performance Computing Systems and Applications, *High Perform. Comp. Sys. Appl.*, pp. 146-152, 2008.
- [5] A.C. Waspe,\* D.W. Holdsworth, *J.C. Lacefield*, and A. Fenster, "Co-registration of a needle positioning device with a volumetric micro-computed tomography scanner for image-guided preclinical interventions," Fifth IEEE International Symposium on Biomedical Imaging, *Proc. Intl. Symp. Biomed. Imaging*, pp. 201-204, 2008.
- [6] A.C. Waspe,\* *J.C. Lacefield*, D.W. Holdsworth, and A. Fenster, "Registration of a needle-positioning robot to high-resolution 3-D ultrasound and computed tomography for image-guided interventions in small animals," SPIE Medical Imaging 2008, *Proc. SPIE*, vol. 6918, article 691807, 2008.
- [7] S.Z. Pinter\* and *J.C. Lacefield*, "Detectability of small vessels using high-frequency power Doppler ultrasound," 2007 IEEE International Ultrasonics Symposium, *IEEE Ultrason. Symp. Proc.*, pp. 1085-1088, 2007.
- [8] A.C. Waspe,\* *J.C. Lacefield*, and A. Fenster, "Registration of three-dimensional high-frequency ultrasound images to a robotic needle-positioning system for pre-clinical research," Fourth IEEE International Symposium on Biomedical Imaging, *Proc. Intl. Symp. Biomed. Imaging*, pp. 1132-1135, 2007.

- [9] Z. Khan,\* D.R. Boughner, and *J.C. Lacefield*, “Reconsidering the layer thickness distribution in aortic valve cusps using high-frequency ultrasound,” Fourth IEEE International Symposium on Biomedical Imaging, *Proc. Intl. Symp. Biomed. Imaging*, pp. 868-871, 2007.
- [10] M.I. Daoud,\* Y.-T. Shen,\* and *J.C. Lacefield*, “A scalable parallel implementation of a  $k$ -space method for large-scale ultrasound imaging simulations,” 2006 IEEE International Ultrasonics Symposium, *IEEE Ultrason. Symp. Proc.*, pp. 2194-2197, 2006.
- [11] A.C. Waspe,\* H.J. Cakiroglu, *J.C. Lacefield*, and A. Fenster, “Design and validation of a robotic needle positioning system for small animal imaging applications,” 28th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, *Proc. IEEE EMBS Ann. Intl. Conf.*, pp. 412-415, 2006.
- [12] Y.-T. Shen\* and *J.C. Lacefield*, “First-order speckle statistics of ultrasound breast images synthesized from a computational anatomy model,” Canadian Acoustical Association Acoustics Week in Canada 2005, *Can. Acoust.*, vol. 33, no. 3, pp. 86-87, 2005.
- [13] L.A. Hastie,\* K.C. Graham, A.C. Groom, I.C. MacDonald, A.F. Chambers, A. Fenster, and *J.C. Lacefield*, “Variability of three-dimensional high-frequency ultrasound measurements of small tumor volumes,” IEEE International Ultrasonics, Ferroelectrics, and Frequency Control 50th Anniversary Conference, *IEEE Ultrason. Symp. Proc.*, pp. 2185-2188, 2004.
- [14] Q. Qiu,\* J. Dunmore-Buyze, D.R. Boughner, and *J.C. Lacefield*, “Evaluation of the layered structure of aortic valve cusps using high-frequency ultrasound,” IEEE International Ultrasonics, Ferroelectrics, and Frequency Control 50th Anniversary Conference, *IEEE Ultrason. Symp. Proc.*, pp. 610-613, 2004.
- [15] *J.C. Lacefield* and R.C. Waag, “Evaluation of backpropagation methods for transmit focus compensation,” 2001 IEEE International Ultrasonics Symposium, *IEEE Ultrason. Symp. Proc.*, pp. 1495-1498, 2001.
- [16] *J.C. Lacefield* and R.C. Waag, “Effect of transmit focus characteristics on estimates of aberration,” 2000 IEEE International Ultrasonics Symposium, *IEEE Ultrason. Symp. Proc.*, pp. 1665-1668, 2000.
- [17] *J.C. Lacefield* and O.T. von Ramm, “Comparison of contrast in backscatter and angular scatter ultrasonic images,” 1996 IEEE International Ultrasonics Symposium, *IEEE Ultrason. Symp. Proc.*, pp. 1469-1472, 1996.

#### **REFEREED CONFERENCE PRESENTATIONS AND ABSTRACTS (\* indicates trainee)**

- [1] L.A. Wirtzfeld,\* M.E. Gregor,\* A. Fenster, and *J.C. Lacefield*, “Effect of weighting techniques for synthetic aperture focusing on tumor size measurement with high-frequency ultrasound,” 34th International Symposium on Ultrasonic Imaging and Tissue Characterization, *Ultrason. Imaging*, vol. 31, pp. 48-49, 2009.
- [2] Y.-T. Shen\* and *J.C. Lacefield*, “Computational models of aberration in ultrasound breast imaging,” 156th Meeting of the Acoustical Society of America, *J. Acoust. Soc. Am.*, vol. 124, p. 2446, 2008.
- [3] M.I. Daoud\* and *J.C. Lacefield*, “Stochastic modeling of murine liver microanatomy for high-frequency ultrasound imaging simulations,” Sixth International Conference on Ultrasonic Biomedical Microscanning, Malibu, CA, Sept. 23-26, 2008.
- [4] *J.C. Lacefield*, M. Bygrave, A. Surette, and D.M. Waisman, “Real-time high-frequency ultrasound imaging of fibrin clot formation,” Sixth International Conference on Ultrasonic Biomedical Microscanning, Malibu, CA, Sept. 23-26, 2008.

- [5] S.Z. Pinter\* and *J.C. Lacefield*, “Quantifying microvasculature using high-frequency power Doppler,” Sixth International Conference on Ultrasonic Biomedical Microscanning, Malibu, CA, Sept. 23-26, 2008.
- [6] L.A. Wirtzfeld,\* M.E. Gregor,\* A. Fenster, and *J.C. Lacefield*, “Effect of synthetic aperture focusing on tumor size measurement with high-frequency ultrasound,” Sixth International Conference on Ultrasonic Biomedical Microscanning, Malibu, CA, Sept. 23-26, 2008.
- [7] A.C. Waspe,\* D.W. Holdsworth, *J.C. Lacefield*, and A. Fenster, “A needle-positioning robot co-registered with volumetric x-ray micro-computed tomography images for minimally invasive small-animal interventions,” 54th Annual Scientific Meeting of the Canadian Organization of Medical Physicists, Quebec, QC, June 25-28, 2008.
- [8] M.I. Daoud\* and *J.C. Lacefield*, “Efficient three-dimensional simulation of ultrasound imaging using a parallel  $k$ -space method,” 31st Canadian Medical and Biological Engineering Conference, Montreal, QC, June 11-13, 2008.
- [9] M.M. Lizardo, B. Al-Khazraji, L.A. Wirtzfeld,\* I.C. MacDonald, A. Fenster, *J.C. Lacefield*, and A.F. Chambers, “Optical fluorescence and high-frequency (40 MHz) ultrasound imaging of spontaneous lymph node metastases in a xenograft model of breast cancer,” Canadian Breast Cancer Research Alliance Fifth Scientific Conference, Vancouver, BC, April 25-27, 2008.
- [10] Z. Khan,\* D.R. Boughner, and *J.C. Lacefield*, “Measuring the layer thickness distribution in aortic valve cusps using high-frequency ultrasound,” 13th International Symposium on Applied Electromagnetics and Mechanics, Michigan State University, Sept. 9-12, 2007.
- [11] A.C. Waspe,\* *J.C. Lacefield*, and A. Fenster, “Registration of three-dimensional high-frequency ultrasound images to a robotic needle-positioning system for pre-clinical research,” 13th International Symposium on Applied Electromagnetics and Mechanics, Michigan State University, Sept. 9-12, 2007.
- [12] X. Zheng, D. Lian, M. Li, X. Zhang, M. Khoshniat,\* H. Sun, W. Liu, J. Jiang, D. Chen, C. Vladau, M. Suzuki, *J.C. Lacefield*, B. Garcia, A.M. Jevikar, and W.-P. Min, “A novel siRNA-containing solution protecting donor organs in heart transplantation,” American Transplant Congress 2007, *Am. J. Transplant.*, vol. 7, no. S2, p. 147, 2007.
- [13] J.W. Xuan, M. Bygrave, H. Jiang, F. Valiyeva, J. Dunmore-Buyze, D.W. Holdsworth, J.I. Izawa, G. Bauman, M. Moussa, S.F. Winter, N.M. Greenberg, J.L. Chin, M. Drangova, A. Fenster, and *J.C. Lacefield*, “Functional neo-angiogenesis imaging of genetically engineered mouse prostate cancer using three-dimensional power Doppler ultrasound,” 98th Annual Meeting of the American Association for Cancer Research, *Proc. AACR*, vol. 48, abstract 5563, 2007.
- [14] X. Zheng, D. Lian, X. Zhang, M. Li, M. Khoshniat,\* H. Sun, W. Liu, J. Jiang, H. Wang, D. Chen, C. Vladau, M. Suzuki, *J.C. Lacefield*, B. Garcia, A. Jevikar, and W.-P. Min, “Protection of donor organs in heart transplantation using siRNA,” 2007 Canadian Society of Transplantation Annual Scientific Meeting, Banff, AB, March 15-18, 2007.
- [15] M. Khoshniat,\* X. Zheng, D. Lian, W. Min, and *J. Lacefield*, “High-frequency ultrasound techniques for quantitative assessment of cardiac function in mouse models of heart transplantation,” 2007 American Institute of Ultrasound in Medicine Annual Convention, *J. Ultrasound Med.*, vol. 26, p. S72, 2007.

- [16] J.W. Xuan, M. Bygrave, A. Fenster, J. Dunmore-Buyze, M. Drangova, D.W. Holdsworth, H. Jiang, F. Valiyeva, N.M. Greenberg, J.I. Izawa, M. Moussa, J.L. Chin, and *J.C. Lacefield*, "Imaging of cancer-associated angiogenesis in a transgenic mouse prostate cancer model using power Doppler ultrasound," 97th Annual Meeting of the American Association for Cancer Research, *Proc. AACR*, vol. 47, abstract LB-157, 2006.
- [17] L.A. Wirtzfeld,\* G. Wu, M. Bygrave, Y. Yamasaki, H. Sakai, M. Moussa, J.I. Izawa, D.B. Downey, N.M. Greenberg, A. Fenster, J.W. Xuan, and *J.C. Lacefield*, "Techniques to monitor transgenic mouse models of prostate cancer using ultrasound micro-imaging," American Association of Physicists in Medicine 47th Annual Meeting, *Med. Phys.*, vol. 32, p. 2154, 2005.
- [18] L.A. Wirtzfeld,\* K.C. Graham, L.T. MacKenzie, C.O. Postenka, A.C. Groom, I.C. MacDonald, A.F. Chambers, A. Fenster, and *J.C. Lacefield*, "Analysis of growth dynamics of treated murine liver metastases using volumetric ultrasound micro-imaging," American Association of Physicists in Medicine 47th Annual Meeting, *Med. Phys.*, vol. 32, p. 2134, 2005.
- [19] A.C. Wasp,\* H.J. Cakiroglu, *J.C. Lacefield*, and A. Fenster, "Design and calibration of a robotic needle positioning system for small animal imaging applications," American Association of Physicists in Medicine 47th Annual Meeting, *Med. Phys.*, vol. 32, p. 2133, 2005.
- [20] A.C. Wasp,\* H.J. Cakiroglu, *J.C. Lacefield*, and A. Fenster, "A three-dimensional micro-ultrasound image-guided and robotically assisted needle positioning system," 51st Annual Scientific Meeting of the Canadian Organization of Medical Physicists, Hamilton, ON, July 6-9, 2005.
- [21] Q. Qiu,\* J. Dunmore-Buyze, D.R. Boughner, and *J.C. Lacefield*, "Validation of high-frequency ultrasound measurements of tissue layer thickness," 149th Meeting of the Acoustical Society of America, *J. Acoust. Soc. Am.*, vol. 117, p. 2445, 2005.
- [22] Y.-T. Shen\* and *J.C. Lacefield*, "Computational synthesis of ultrasound breast images from a three-dimensional anatomical model," 149th Meeting of the Acoustical Society of America, *J. Acoust. Soc. Am.*, vol. 117, p. 2444, 2005.
- [23] L.A. Hastie,\* G. Wu, M. Bygrave, Y. Yamasaki, H. Sakai, M. Moussa, J.I. Izawa, D.B. Downey, N.M. Greenberg, A. Fenster, *J.C. Lacefield*, and J.W. Xuan, "Three-dimensional ultrasound micro-imaging for preclinical studies using a transgenic prostate cancer mouse model," 96th Annual Meeting of the American Association for Cancer Research, *Proc. AACR*, vol. 46, abstract 5268, 2005.
- [24] I. Van Huizen, G. Wu, A. Doherty Kirby, G. Lajoie, H. Sakai, A. Fenster, *J.C. Lacefield*, J.R. Reeves, C. Panchal, N.M. Greenberg, M. Moussa, and J.W. Xuan, "Establishment of a serum tumor marker for pre-clinical trials of mouse prostate cancer models," 96th Annual Meeting of the American Association for Cancer Research, *Proc. AACR*, vol. 46, abstract 1962, 2005.
- [25] A. Cheung, A. Duckett, L. Hastie,\* *J. Lacefield*, V. Cucevic, M. Roy, A. Fenster, M. Franco, B. Kerbel, and S. Foster, "Tumour burden and vasculature analysis using ultrasound biomicroscopy and micro computed tomography," 3rd Annual Meeting of the Society for Molecular Imaging, *Mol. Imaging*, vol. 3, abstract 071, 2004.
- [26] L.A. Hastie,\* G. Wu, M. Bygrave, Y. Yamasaki, D.B. Downey, A. Fenster, J.W. Xuan, and *J.C. Lacefield*, "Three-dimensional ultrasound micro-imaging of tumor progression in a transgenic mouse prostate cancer model," Fourth International Conference on Ultrasonic Biomedical Microscanning, Harriman, NY, Sept. 7-10, 2004.
- [27] *J.C. Lacefield*, "Computational evidence for a discrete-scatterer aberration model in medical ultrasound," 147th Meeting of the Acoustical Society of America, *J. Acoust. Soc. Am.*, vol. 115, p. 2522, 2004.

- [28] K.C. Graham, L.A. Hastie,\* L.T. MacKenzie, A. Fenster, A.C. Groom, I.C. MacDonald, *J.C. Lacefield*, and A.F. Chambers, "Tracking the progression of murine liver metastases through non-invasive ultrasound micro-imaging," 95th Annual Meeting of the American Association for Cancer Research, *Proc. AACR*, vol. 45, abstract 5119, 2004.
- [29] A.M. Cheung, A.S. Duckett, L. Hastie,\* *J.C. Lacefield*, V.A. Cucevic, M. Roy, A. Fenster, R.S. Kerbel, S. Man, and F.S. Foster, "Three dimensional analysis of early mouse tumor growth: micro ultrasound and micro CT correlations," 95th Annual Meeting of the American Association for Cancer Research, *Proc. AACR*, vol. 45, abstract LB-256, 2004.
- [30] D. Boughner, *J. Lacefield*, and J. Dunmore-Buyze, "Accurate 3-dimensional visualization of valvular internal layers and measurement of total tissue thickness by an *in vitro* non-compressive ultrasound technique," Canadian Cardiovascular Congress 2003, *Can. J. Cardiol.*, vol. 19, p. 150A, 2003.
- [31] C.W.M. Grant, A. Fenster, *J.C. Lacefield*, and D.L. Jones, "Liposomal contrast agents and high-frequency ultrasound," Liposomes: Drug Delivery Vehicles and Models of Biological Membranes, Hamilton, ON, July 19-20, 2003.
- [32] *J.C. Lacefield*, J.R. Spence, N.M. Marlatt,\* C.W.M. Grant, and A. Brown, "Analysis of cardiac valve function in neonatal mice using high-frequency ultrasound," 10th Congress of the World Federation for Ultrasound in Medicine and Biology, *Ultrasound Med. Biol.*, vol. 29, p. S180, 2003.
- [33] W.C. Pilkington, *J.C. Lacefield*, and R.C. Waag, "Image improvement with adaptive beamformation using aberration correction," 10th Congress of the World Federation for Ultrasound in Medicine and Biology, *Ultrasound Med. Biol.*, vol. 29, pp. S68-S69, 2003.
- [34] W.C. Pilkington, *J.C. Lacefield*, and R.C. Waag, "Ultrasonic b-scan imaging with adaptive beamformation using aberration correction," 143rd Meeting of the Acoustical Society of America, *J. Acoust. Soc. Am.*, vol. 111, p. 2352, 2002.
- [35] *J.C. Lacefield* and R.C. Waag, "Effect of aperture size on compensation of arrival time distortion," 141st Meeting of the Acoustical Society of America, *J. Acoust. Soc. Am.*, vol. 109, p. 2396, 2001.
- [36] D.B. Phillips, *J.C. Lacefield*, and R.C. Waag, "B-scan imaging using adaptive beamformation for aberration correction," 45th Annual Convention of the American Institute of Ultrasound in Medicine, *J. Ultrasound Med.*, vol. 20, pp. S65-S66, 2001.
- [37] R.C. Waag, *J.C. Lacefield*, D.B. Phillips, and L.J. Busse, "Ultrasonic wavefront coherence in the presence of aberration," 2000 IEEE International Ultrasonics Symposium, abstract 2J-5.
- [38] *J.C. Lacefield* and R.C. Waag, "Adaptive transmit focusing by numerical backpropagation of ultrasonic waveforms," 139th Meeting of the Acoustical Society of America, *J. Acoust. Soc. Am.*, vol. 107, p. 2779, 2000.
- [39] *J.C. Lacefield* and R.C. Waag, "Focusing characteristics of multi-row arrays in the presence of aberration," 44th Annual Convention of the American Institute of Ultrasound in Medicine, *J. Ultrasound Med.*, vol. 19, p. S99, 2000.
- [40] R.C. Waag, L.J. Busse, and *J.C. Lacefield*, "Ultrasonic wavefront coherence in the presence of aberration," 44th Annual Convention of the American Institute of Ultrasound in Medicine, *J. Ultrasound Med.*, vol. 19, pp. S97-S98, 2000.
- [41] *J.C. Lacefield*, D.B. Phillips, and R.C. Waag, "Calibration of a two-dimensional array system for ultrasonic aberration correction," 138th Meeting of the Acoustical Society of America, *J. Acoust. Soc. Am.*, vol. 106, p. 2136, 1999.

[42] R.C. Waag, D.B. Phillips, *J.C. Lacefield*, C.G. Draeger, F. Lin, and M. Tabei, "A two-dimensional array system for studies of ultrasonic imaging with aberration correction," 138th Meeting of the Acoustical Society of America, *J. Acoust. Soc. Am.*, vol. 106, p. 2134, 1999.

[43] *J.C. Lacefield* and O.T. von Ramm, "Image contrast enhancement using real time angular scatter ultrasonic imaging," 21st International Symposium on Ultrasonic Imaging and Tissue Characterization, *Ultrason. Imaging*, vol. 18, p. 40, 1996.

#### **TECHNICAL REPORT**

[1] *J.C. Lacefield*, "Report of the 23rd F.V. Hunt Postdoctoral Fellow (2000-2001)," *J Acoust. Soc. Am.*, vol. 114, pp. 2511-2512, 2003.

#### **EXTRAMURAL INVITED LECTURES (\* indicates trainee)**

[1] *J.C. Lacefield*, M.I. Daoud,\* S.Z. Pinter,\* L.A. Wirtzfeld,\* and A. Fenster, "Tools for planning and performing longitudinal cancer studies in mice using high-frequency ultrasound," 34th International Symposium on Ultrasonic Imaging and Tissue Characterization, *Ultrason. Imaging*, vol. 31, p. 74, 2009.

[2] *J.C. Lacefield* and A. Fenster, "Three-dimensional ultrasound imaging in mouse models of cancer," Seventh Imaging Network Ontario Symposium, Toronto, ON, Sept. 29 – Oct. 1, 2008.

[3] *J.C. Lacefield*, "High-frequency ultrasound imaging of antivasular treatment responses in mouse cancer models," 13th International Symposium on Applied Electromagnetics and Mechanics, Michigan State University, Sept. 9-12, 2007.

[4] *J.C. Lacefield*, "High-frequency ultrasound imaging of mouse cancer models," Frontiers in Imaging: Workshop on High Frequency Ultrasound Imaging of the Laboratory Mouse *In Vivo*, The Jackson Laboratory, Bar Harbor, ME, March 29-31, 2006.

[5] *J.C. Lacefield*, "Three-dimensional ultrasound microimaging of treatment responses in mouse cancer models," Preclinical and Small Animal Imaging Categorical Course, 2006 American Institute of Ultrasound in Medicine Annual Convention, *J. Ultrasound Med.*, vol. 25, pp. S24-S25, 2006.

[6] *J.C. Lacefield*, "Ultrasound micro-imaging program at Robarts Research Institute," Imaging Research Seminar, Sunnybrook and Women's College Health Sciences Centre, Toronto, ON, Nov. 18, 2003.

[7] *J.C. Lacefield*, "Analysis of cardiac valve structure and function using ultrasound micro-imaging," Centre for Imaging Research and Advanced Materials Characterization Summer Seminar Series in Biomedical Imaging, University of Windsor, July 11, 2003.

**GRADUATE THESIS SUPERVISION****In Progress**

<b>Student and Degree Program</b>	<b>Thesis Topic</b>	<b>Dates</b>
Mai El-Farnawany, M.E.Sc., Biomedical Engineering	Objective selection of power Doppler ultrasound acquisition parameters for microvascular imaging	Jan. 2010- Present
Christopher S.R. Waring* M.E.Sc., Biomedical Engineering	Image-guided robotic needle positioning system for small animal research	June 2009- Present

**Completed**

<b>Student and Degree Program</b>	<b>Thesis Title</b>	<b>Dates</b>
Stephen Z. Pinter Ph.D., Biomedical Engineering	<i>Investigating Vascular Quantification with High-Frequency Power Doppler Ultrasound from a Signal Detection Perspective</i>	Sept. 2005- Aug. 2009
Mohammad I. Daoud Ph.D., Elect. & Comp. Engineering	<i>Development and Validation of Parallel Three-Dimensional Computational Models of Ultrasound Propagation and Tissue Microstructure for Preclinical Cancer Imaging</i>	Aug. 2005- Aug. 2009
Adam C. Waspe* Ph.D., Biomedical Engineering	<i>Development of a Robotic Needle Positioning System for Three-Dimensional Image-Guided Interventions in Small Animals</i>	Sept. 2003- April 2009
Lauren A. (Hastie) Wirtzfeld* Ph.D., Biomedical Engineering	<i>Assessment of Tumour Growth in Murine Cancer Models with Three-Dimensional High-Frequency Ultrasound</i>	Sept. 2003- Dec. 2008
Yi-Ting Shen Ph.D., Elect. & Comp. Engineering	<i>Software for Modeling Ultrasound Breast Cancer Imaging</i>	May 2003- Dec. 2008
Zamir Khan M.E.Sc., Biomedical Engineering	<i>High-Frequency Ultrasound Methods for Non-Destructive Evaluation of Aortic Valve Tissue</i>	June 2005- Aug. 2007
Qiang Qiu M.E.Sc., Biomedical Engineering	<i>Thickness Measurement of Layered Soft Tissues Using High-Frequency Ultrasound</i>	July 2003- May 2005

\*Jointly supervised with Dr. Aaron Fenster

**UNIVERSITY AND INSTITUTE ADMINISTRATIVE SERVICE**

Health Sciences Research Ethics Board, 2009 – 2010.

Faculty of Engineering Executive Committee, 2009 – 2011.

Biomedical Engineering Graduate Program Steering Advisory Committee, 2008 – Present.

Biomedical Engineering Graduate Program Executive Committee, 2007 – Present.

Biomedical Engineering Graduate Program Curriculum Subcommittee, 2008 – Present.

Biomedical Engineering Graduate Program Scholarship Committee, 2002, 2005 – Present.

Electrical Engineering Undergraduate Curriculum Committee, 2006 – Present.

Department of Medical Biophysics Annual Performance Evaluation and Workload Committees, 2005 – Present.

Robarts Research Institute Preclinical Imaging Research Centre User Committee, 2006 – Present.

London Regional Cancer Program Small Grants Review Panel, 2008 – Present.

Schulich School of Medicine and Dentistry Health Research Task Force Subcommittee on City-Wide Linkages with Western Faculties, Hospitals, and Affiliated Research Institutes, 2007.

Biomedical Engineering Graduate Program Director Selection Committee, 2003, 2006.

Faculty of Engineering Outreach Advisory Committee, 2004 – 2006.

Department of Electrical and Computer Engineering Outreach Coordinator, 2003 – 2006.

Biomedical Engineering Faculty Search Committee, 2002 – 2003 (Advisory Member).

### **RESEARCH GRANT AND EXTERNAL SCHOLARSHIP REVIEWING**

Chair, Ontario Graduate Scholarships Academic Panel, 2010.

Internal Reviewer, Canadian Institutes of Health Research (CIHR) Proof of Principle Committee, Fall 2009.

Scientist Reviewer, Congressionally Directed Medical Research Programs (CDMRP) Breast Cancer Physical Imaging/Radiation Oncology Predoctoral and Postdoctoral Training Awards Panel, 2009.

External Reviewer, Natural Sciences and Engineering Research Council (NSERC) Collaborative Health Research Projects, 2009.

External Reviewer, NSERC Idea to Innovation Grants, 2008, 2009.

External Reviewer, CIHR Operating Grants, Spring 2009.

Member, Ontario Graduate Scholarships Academic Panels, 2008, 2009.

External Reviewer, NSERC Discovery Grants, 2004, 2007, 2008.

External Peer Reviewer, Wellcome Trust Equipment, Technology Development and Biomedical Resources Grants, 2007.

External Reviewer, NSERC Strategic Project Grants, 2006, 2007.

Scientist Reviewer, CDMRP Breast Cancer Predoctoral Training Awards Panel, 2006.

External Reviewer, Translational Research Panel, Ontario Cancer Research Network, Fall 2005.

Scientist Reviewer, Detection/Diagnosis/Prognosis Study Section, Susan G. Komen Breast Cancer Foundation, 2005.

Scientist Reviewer, CDMRP Breast Cancer Physical Imaging Panel, 2003, 2005.

Invited Reviewer, CIHR Operating Grants Medical Imaging and Physics Panel, Spring 2005.

### **JOURNAL AND CONFERENCE REVIEWING**

Author-in-Chief, *Springer Reference Live: Cancer*, 2009.

Referee, *IEEE Transactions on Biomedical Engineering*, 2005 – Present.

Referee, *IEEE Transactions on Medical Imaging*, 2008 – Present.

Referee, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, 2001 – Present.

Referee, *International Journal of Cancer*, 2007 – Present.

Referee, *Journal of the Acoustical Society of America*, 2004 – Present.

Referee, *Medical Physics*, 2008 – Present.

Referee, *Physics in Medicine and Biology*, 2004 – Present.

Referee, *Ultrasound in Medicine and Biology*, 2006 – Present.

Referee, *Journal of Theoretical Biology*, 2008.

Referee, *BMC Cancer*, 2007.

Referee, *Journal of Physics D: Applied Physics*, 2005.

Referee, *Investigative Ophthalmology and Visual Science*, 2002 – 2003.

Referee, *Journal of Electronic Imaging*, 2002.

Proceedings Referee, Canadian Conference on Electrical and Computer Engineering, 2008.

Proceedings Referee, International Symposium on Applied Electromagnetics and Mechanics, 2007.

Abstract Referee, American Institute of Ultrasound in Medicine Annual Convention, 2007.

#### **CONFERENCE SESSION AND WORKSHOP CHAIRING**

Organizer and Chair, Third Ontario Consortium for Small Animal Imaging High-Frequency Ultrasound Workshop, London, ON, June 25, 2007.

Special Session Chair, Canadian Acoustical Association Acoustics Week in Canada Conference, London, ON, October 2005.

Session Chair, 149th Meeting of the Acoustical Society of America, Vancouver, BC, May 2005.

Organizer and Chair, First Ontario Consortium for Small Animal Imaging High-Frequency Ultrasound Workshop, London, ON, February 4, 2005.

Session Moderator, 45th Annual Convention of the American Institute of Ultrasound in Medicine, Orlando, FL, March 2001.

#### **PROFESSIONAL SOCIETIES**

Acoustical Society of America, Associate Member 1999 – 2000, Member 2000 – Present.

American Society for Engineering Education, Member 2002 – Present.

Association of Professional Engineers of Ontario, Member 2005 – Present.

Institute of Electrical and Electronics Engineers (IEEE), Member 1999 – Present.

IEEE Engineering in Medicine and Biology Society, Member 2000 – Present.

IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society, Member 1999 – Present.

Founding Faculty Advisor, University of Western Ontario IEEE Engineering in Medicine and Biology Society Student Chapter, 2005 – Present.

Biomedical Ultrasound/Bioresponse to Vibration Technical Committee, Acoustical Society of America, 2006 – 2009.