J. BRANDON DIXON
ASSISTANT PROFESSOR
WOODRUFF SCHOOL OF MECHANICAL ENGINEERING

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I. EARNED DEGREES

Texas A&M University, College Station, TX, B.S., Biomedical Engineering, 2001
Texas A&M University, College Station, TX, Ph.D., Biomedical Engineering, 2006

II. EMPLOYMENT HISTORY

08/09 – present	***Assistant Professor***: George C. Woodruff School of Mechanical Engineering, Georgia Institute of Technology
06/06 – 07/09	***Post-doctoral Research Fellow***: Institute for Biomedical Engineering, Laboratory of Mechanobiology and Morphogenesis, Ecole Polytechnique Fedéralé de Lausanne (EPFL), Lausanne, Switzerland.
09/05-05/06	***Assistant Lecturer***: Department of Biomedical Engineering, Texas A&M University, College Station, TX
06/02-05/06	***Graduate Research Assistant***: Optical Biosensing Laboratory, Texas A&M University, College Station, TX
09/02-12/03	***Assistant Lecturer***: Department of Biomedical Engineering, Texas A&M University, College Station, TX
01/02-05/02	***Graduate Teaching Assistant***: Department of Biomedical Engineering, Texas A&M University, College Station, TX

III. HONORS AND AWARDS

1. Texas A&M Regents Fellowship, 2005
2. Texas A&M Biomedical Engineering Scholarship, 2005
3. Texas A&M University Distinguished Graduate Student Award for Excellence in Teaching, 2006
4. Whitaker Foundation International Scholar Fellowship, 2006-2007
5. Microcirculatory Society Award for Excellence in Lymphatic Research, 2007
6. Lymphatic Research Foundation Young Investigator Scholarship, 2008
7. NIH Pathway to Independence Award, 2008

8. Georgia Tech Class of 1969 Teaching Fellow, 2010

9. NSF Career Award, 2014

10. CETL/BP Junior Faculty Teaching Excellence Award, Georgia Institute of Technology, 2014

IV. RESEARCH, SCHOLARSHIP, AND CREATIVE ACTIVITIES

A. PUBLISHED BOOKS, BOOK CHAPTERS, AND EDITED VOLUMES

A1. Books

None

A2. Refereed Book Chapters

1. Weiler, M. J. and Dixon, J. B., "Non-invasive imaging of lymphatic function and lymph node mapping", In E. Berardesca, H. Maibach and K. Wilhelm (Eds.), *Non Invasive Diagnostic Techniques in Clinical Dermatology*, Springer, New York, NY, 2014.*

A3. Edited Volumes

None

B. REFEREED PUBLICATIONS AND SUBMITTED ARTICLES

B1. Published and Accepted Journal Articles

1. Wan Q., Dixon J. B., and Coté G.L., "Dual wavelength polarimetry for monitoring glucose in the presence of varying birefringence", *Journal of Biomedical Optics* 10(2), 24029(1-8), 2005.

2. Dixon J. B., Gashev A., Zawieja D. C., and Coté G. L., "Measuring microlymphatic flow using high speed video microscopy", *Journal of Biomedical Optics* 10(6), 064016(1-7), 2005.

3. Dixon J. B., Greiner S. T., Gashev A. A., Coté G. L., Moore Jr. J. E., and Zawieja D. C., "Lymph flow, shear stress, and lymphocyte velocity in rat mesenteric prenodal lymphatics", *Microcirculation* 13(7), 597-610, 2006.

4. Dixon J. B., Gashev A., Zawieja D. C., Moore J., and Coté G. L., "Image correlation algorithm for measuring lymphocyte velocity and diameter changes in contracting microlymphatics", *Annals of Biomedical Engineering*, 35(3), 387-396, 2007.

5. Dixon J. B., Raghunathan, S., and Swartz, M. A., "A tissue engineered model of the intestinal lacteal for evaluating lipid transport by lymphatics", *Biotechnology and Bioengineering*, 103(6), 1224-35, 2009.

6. Bonvin C., Overney J., Shieh A. C., Dixon J. B., Swartz M. A., "A multichamber fluidic device for 3D cultures under interstitial flow with live imaging: Development,

Characterization, and Applications", *Biotechnology & Bioengineering,* 105(5), 982-991, 2010.

7. Miteva D. O., Rutkowski, J. M., Dixon J. B., Kilarski, W., Shields, J. D., and Swartz, M. A., "Transmural Flow Modulates Cell and Fluid Transport Functions of Lymphatic Endothelium", *Circulation Research*, 106(5), 920-931, 2010.

8. Dixon, J. B., "Lymphatic lipid transport: Sewer of subway?", *Trends in Endocrinology and Metabolism*, 21(8), 480-487, 2010.*

9. Dixon, J. B., "Mechanisms of chylomicron uptake into lacteals", *Annals of the New York Academy of Sciences*, 1207, S1, E52-E57, 2010.*

10. Nipper, M. E. and Dixon, J. B., "Engineering the lymphatic system", *Cardiovascular Engineering and Technology,* 2(4), 296-308, 2011.*

11. Wan, W., Dixon, J.B., and Gleason, R.L., "Constitutive modeling of mouse carotid arteries using experimentally measured microstructural parameters", *Biophysical Journal* 102(12), 2916-2925, 2012.*

12. Weiler, M. J., Kassis, T., and Dixon, J.B., "Sensitivity analysis of functional near-infrared lymphatic imaging", *Journal of Biomedical Optics,* 17(16), 066019(1-11), 2012.*

13. Kassis, T., Kohan, A. B., Weiler, M., J., Nipper, M. A., Cornelius, R., Tso, P., and Dixon, J. B., "A dual channel in situ optical imaging system for quantifying lipid uptake and lymphatic pump function in vivo", *Journal of Biomedical Optics*, 17(8), 086005(1-13), 2012.*

14. Kornuta, J. A., Nipper, M. E., and Dixon, J. B., "Low-cost microcontroller platform for studying lymphatic biomechanics in vitro", *Journal of Biomechanics*, 46(1), 183-186, 2013.*

15. Weiler, M. J. and Dixon, J., B., "Differential transport function of lymphatic vessels in the rat tail model and the long term effects of Indocyanine Green as assessed with near-infrared imaging", *Frontiers in Vascular Physiology*, 4(215), 1-10, 2013.*

16. Reed, A.L., Rowson, S.A., and Dixon, J. B., "Demonstration of ATP-dependent transcellular transport of lipid across the lymphatic endothelium using an in vitro model of the lacteal", *Pharmaceutical Research*, 30(12), 3271-3280, 2013.*

17. Nelson, T. S., Akin, R. E., Weiler, M. J., Kassis, T., Kornuta, J. K., and Dixon, J.B., "Minimally invasive method for determining the effective lymphatic pumping pressure in rats using near infrared imaging", *American Journal of Physiology – Regulatory, Integrative, and Comparative Physiology*, 306(5), 281-290, 2014.*

18. Kornuta, J. A. and Dixon, J. B., "Ex-vivo lymphatic perfusion system for independently controlling pressure gradient and transmural pressure in isolated

vessels", *Annals of Biomedical Engineering*, 42(8), 1691-1704, 2014.*

19. Kassis, T., Skelton, H. M, Lu, I. M., Moorhead, A. R., and Dixon, J. B., "An integrated in vitro imaging platform for characterizing filarial parasite behavior within a multicellular microenvironment", PLoS Neglected Tropical Diseases, 8(11), e3305, 2014.

20. Dixon, J. B and Weiler, M. J., "Bridging the divide between pathogenesis and detection in lymphedema", Seminars in Cell and Developmental Biology, in press, 2015.

B2. Conference Presentation with Proceedings (Refereed)

1. Ericson, M.N., Ibey, B.L., Cote, G.L., Baba, J.S., Dixon, J.B., Hileman, M.S., Britton, C.L., and Wilson, M.A., "In vivo application of a minimally invasive oximetry based perfusion sensor", Proceedings of the Second Joint Engineering in Medicine and Biology/Biomedical Engineering Society Conference, 3, 1789-1790, 2002.

2. Dixon, J. B., Ibey, B. L., Ericson, M. N., Wilson, M. A., and Coté, G. L., "Monte Carlo modeling for perfusion monitoring", Proc. SPIE, 4965(7), 2003.

3. Dixon, J. B., Zawieja, D. C., Greiner, S. T., Gashev, A. A., and Coté, G. L., "Measuring microlymphatic flow using fast video microscopy", Proc. SPIE, 5701(9), 2005.

4. Dixon, J. B., Wan, Q., and Coté, G. L., "Motion compensation for detecting glucose through dual wavelength polarimetric system", Proc. SPIE, 5702(3), 15-22, 2005.

5. Dixon, J. B., Cote, G. L., Gashev, A. A., Greiner, S. T., Moore, J. E., and Zawieja, D C., "Image correlation method for measuring flow and diameter changes in contracting mesenteric microlymphatics *in situ*", Proc. SPIE, 6088(33), 2006.

6. Kassis, T., Weiler, M. J., and Dixon, J. B., "An in vivo optical imaging system for measuring lipid uptake, vessel contraction, and lymph flow in small animal lymphatic vessels", Proc. SPIE, 8229A(8), 2012.*

7. Weiler, M. J., Kassis, T., and Dixon, J. B., "Sensitivity analysis of near-infrared functional lymphatic imaging system", SPIE BIOS Proc. SPIE, 8229A(9), 2012.*

C. OTHER PUBLICATIONS AND CREATIVE PRODUCTS

1. Dixon, J. B., Hubbell, J. A., O'Neil, C. P., Swartz, M., and Velluto, D., "Block copolymers and uses thereof", US Patent: US20110223217 A1, 2011.

2. Dixon, J. B., "Engineering technologies to shed insight on disease progression and risk in lymphedema", LymphLink, Vol. 26, No. 3, 2014, Invited Research Perspectives Article*

3. Akin, R. A., Dixon, J. B., Nelson, T. S., and Weiler, M. J., "Lymphatic imaging and pressure measurement system", provisional patent, GTRC ID 6599, 2014.*

D. PRESENTATIONS

D1. Invited Talks

1. Dixon, J. B., "Exploring mechanisms of lipid uptake and transport in lymphatic endothelial cells", National Institute of Diabetes and Digestive and Kidney Diseases Workshop on Lymphatics in the Digestive System: Physiology, Health, and Disease, NIH, Bethesda, MD, Nov 3-4, 2009.*

2. Dixon, J. B., "Evidence of active regulation of lipid transport by lymphatics", National Heart, Lung, and Blood Institute, Individual K Awardees Meeting, NIH, Bethesda, MD, March 8-9, 2011.*

3. Dixon, J. B., "Engineering new approaches for lymphatic research and patient care", 16th State of Georgia Lymphedema Education & Awareness Program, Atlanta, GA, October 12, 2013.*

4. Dixon, J., B., "Physiology and biomechanics of lymphedema", Lymphedema: A Physician Intensive, Lighthouse Lymphedema Network, Atlanta, GA, February 27, 2014.*

5. Dixon, J. B., "Mechanical regulation of lymphatic pump function", Smooth Muscle Under Ground, San Diego, CA, April 25, 2014.*

6. Dixon, J. B. and Kornuta, J. A., "Utilization of a feedback controlled lymphatic perfusion system for determining effects of shear rate and pressure on lymphatic wall shear stress sensitivity" 7th World Congress of Biomechanics, Boston, MA, July 6-11, 2014.*

D2. Conference Podium Presentations

1. Dixon, J. B., Cote, G. L., Gashev, A. A., Moore Jr., J. E., and Zawieja, D. C., "Fluid response to lymphatic contractile function: an engineering approach", 1st Annual Cardiovascular Research Institute Retreat, Temple, TX, October 27-28, 2005.

2. Dixon, J. B., Cote, G. L., Gashev, A. A., Moore Jr., J. E., and Zawieja, D. C., "Estimating wall shear stress in contracting mesenteric microlymphatics", 5th World Congress of Biomechanics, Munich, Germany, July 29th – August 4th, 2006, (*invited talk)*.

3. Swartz, M. A., Rutkowski, J. M., Miteva, D., Issa, A., and Dixon, J. B., "Molecular and Biophysical Regulators of Lymphatic Transport", Experimental Biology 2008, San Diego, CA, April 5-9, 2008.

4. Cioffi, M., Bottan, S., Haessler, U., Dixon, J. B., Swartz, M. A., and Boschetti, F., "Computational models of dendritic cell chemotaxis in tissue engineered microenvironments", 8th World Congress on Computational Biomechanics, Venice, Italy, June 30 – July 5, 2008.

5. Cioffi, M., Bottan, S., Haessler, U., Dixon, J. B., Swartz, M. A., and Boschetti, F., "Modeling of dendritic cell chemotaxis in tissue engineered microenvironments", 16th Congress of the European Society of Biomechanics, Lucerne, Switzerland, July 6-9, 2008.

6. Dixon, J. B., Raghunathan, S., and Swartz M. A., "A tissue engineered model of intestinal lacteals for characterizing lipid and nanoparticle uptake and transport", TERMIS-NA 2008, San Diego, CA, Dec 7-10, 2008.

7. Dixon, J. B., Rutkowski, J. M., Randolph, G., and Swartz, M. A., "Active regulation of lipid transport and metabolism by lymphatics: complimentary in vivo and in vitro studies." Experimental Biology 2009, New Orleans, LA, April 18-22, 2009.

8. Dixon J. B., "Quantifying the Functional Transport of Lipoproteins by Lymphatic Endothelial Cells", Keystone Conference: Molecular/Cell Biology and Physiology of Triglyceride Synthesis and TG-Rich Lipoprotein Assembly and Secretion, Big Sky, MT, Jan 9-14, 2010.*

9. Dixon, J. B., "Engineering Tools for Studying the Interplay Between Mechanics and Biology in Lymphatic Lipid Transport", ASME Summer Bioengineering Conference, Naples, FL, June 16-19, 2010.*

10. Dixon, J. B., Kornuta, J., and Kassis, T., "Bioengineered tools for quantifying lymphatic function in lipid transport", BMES Conference, Austin, TX, October 2-9, 2010.*

11. Faulkner, M. F., Huffman, J., and Dixon, J. B., "An in vitro model of targeting orally delivered drugs on lymphatics and avoiding first-pass metabolism", Georgia Tech Industrial Partners Symposium, Atlanta, GA, October 21, 2010.*

12. Faulkner, M. F., Dixon, J. B., "An in vitro model to study lipid uptake and transport", Institute of Biological Engineering, Atlanta, GA, March 3-5, 2011.*

13. Dixon, J. B., Weiler, M., and Faulkner, M. F., "Quantifying the molecular mechanisms in vitro of lymphatic uptake of lipoproteins from the intestine", 23rd International Congress of Lymphology, Malmö, Sweden, September 19-23, 2011.*

14. Weiler, M. and Dixon, J. B., "Long-term effects of indocyanine green on lymphatic pump function in vivo", Experimental Biology, Presidents Symposium II: Young Investigator Novel Trends, San Diego, CA, April 21-25, 2012.*

15. Kornuta, J. A. and Dixon, J. B., "Isolated lymphatic vessel perfusion system for independently controlling hoop stress and shear stress", ASME Summer Bioengineering Conference, Fajardo, Puerto Rico, June 20-23, 2012.*

16. Parsons, K. D., Kassis T., and Dixon, J. B., "Design of an in vitro migration chamber for quantifying the homing patterns of parasitic worms", ASME Summer Bioengineering Conference, Fajardo, Puerto Rico, June 20-23, 2012.*

17. Kassis, T., Cornelius, R., and Dixon, J. B., "In situ quantification of lipid concentration effects on lymphatic pump function" BMES Conference, Atlanta, GA, October 24-27, 2012.*

18. Nipper, M. E., Kornuta, J. A., and Dixon, J. B., "Exploring the roles of biomechanics in lymphatic endothelial function", BMES Conference, Atlanta, GA, October 24-27, 2012.*

19. Weiler, M. J. and Dixon J. B., "Characterization of Near-Infrared Functional Lymphatic Imaging in the Rat Tail Model", ASME Summer Bioengineering Conference, Sun River, Oregon, June 26-29, 2013.*

20. Dixon, J. B., Akin, R. E., Weiler, M. J., and Kassis, T., "Non-Invasive Assessment of Lymphatic Pumping Pressure in a Rat Tail Model Utilizing Near-Infrared Imaging", ASME Summer Bioengineering Conference, Sun River, Oregon, June 26-29, 2013.*

21. Dixon, J. B., Weiler, M. J., and Nelson, T. S., "Non-invasive quantification of nitric oxide effects on lymphatic pumping *in vivo",* Vascular Biology 2013, Hyannis, Massachusetts, October 20-24, 2013.*

22. Dixon J. B., Nelson, T. S., and Weiler, M. J., "In vivo quantification of perturbations to lymphatic pump function and their consequence to lymph transport", Gordon Research Conference on Molecular Mechanisms in Lymphatic Function and Disease, Barga, Italy, March 9-14, 2014.*

23. Kassis, T. and Dixon, J. B., "Role of Mesenteric Lymphatic Vessels in Lipid Transport and Their Response to Increased Mechanical Load, Gordon Research Symposium on Molecular Mechanisms in Lymphatic Function and Disease, Barga, Italy, March 8-9, 2014.*

D3. Conference Poster Presentations

1. Dixon, J. B., Coté, G. L., Gashev, A. A., Greiner, S. T., Moore, J. E., and Zawieja, D. C., "Measurement of flow in contracting mesenteric microlymphatic vessels in situ", XXXV International congress of physiological sciences, Abstract #4735, San Diego, CA: March 31-April 5, 2005.

2. Dixon, J. B., Coté, G. L., Gashev A. A., Greiner, S. T., Zawieja, D. C., and Moore, J. E., "Estimation of wall shear stress in contracting microlymphatic vessels", USNCB Symposium on Frontiers in Biomechanics, Vail, CO: June 20-21, 2005.

3. Dixon, J. B., Gashev, A., Greiner, S., Zawieja, D., Moore, J., and Cote, J., "Image correlation method for measuring flow in contracting mesenteric microlymphatics", BMES Conference, Baltimore, MD: Sept 28 – Oct 1, 2005.

4. Dixon J.B. and Swartz M.A., "Novel in vitro and in vivo models for studying the role of lymphatics in lipid transport and metabolism", Gordon Conference on Cellular and Molecular Biology of Lipids, Waterville Valley, NH: July 22-27, 2007.

5. Dixon, J. B. and Swartz, M.A., "The role of lymphatics in lipid trafficking: novel in vitro and in vivo models", BMES Conference, Los Angeles, CA: Sept 26-29, 2007.

6. Dixon, J. B., Raghunathan, S., and Swartz, M. A., "'Engineering the intestinal microenvironment for optimizing nanoparticle drug delivery", CHUV Conference on Regenerative Medicine, Lausanne, Switzerland, Jan 17, 2008.

7. Dixon, J. B., Raghunathan S., and Swartz M. A., "Exploring the active regulation of lipid transport by lymphatics with a novel in vitro model", Gordon Research Conference on Molecular Mechanisms in Lymphatic Function and Disease, Ventura, California, March 2-7, 2008.

8. Miteva, D., Dixon, J. B., Rutkowski, J., Kilarski, W., Shields, J., and Swartz, M. A., "Transmural flow modulates cell and fluid transport functions of lymphatic endothelium: An early indicator of injury and inflammation?", Joint Meeting 2009 of the Society for Microcirculation and Vascular Biology and the Swiss Society for Microcirculation, Bern, Switzerland, October 8-10, 2009.

9. Raghunathan S., Dixon, J. B., and Swartz, M.A., An in vitro model of the intestinal lymphatics for transport studies of lipid and drug carriers", Joint Meeting 2009 of the Society for Microcirculation and Vascular Biology and the Swiss Society for Microcirculation, Bern, Switzerland, October 8-10, 2009.

10. Faulkner, M. F. and Dixon, J. B., "Quantifying the functional transport of lipoproteins by lymphatic endothelial cells", Keystone Conference: Obesity, Keystone, CO, January 12-17, 2011.*

11. Faulkner, M. F. and Dixon, J. B., "Engineered model of the intestine suggests active transport of lipid by lymphatics", ASME Summer Bioengineering Conference, Farmington, PA, June 22-25, 2011.*

12. Kornuta, J., A., Nipper, M. E., Korneva, A., and Dixon, J. B., "An in vitro model to quantify the effects of fluid shear stress on lymphatic pump function", ASME Summer Bioengineering Conference, Farmington, PA, June 22-25, 2011.*

13. Dixon, J. B., Kassis, T., and Weiler, M., “Imaging platforms for evaluating lymphatic pump function in vivo”, Gordon Research Conference on Molecular Mechanisms in Lymphatic Function and Disease, Ventura, California, March 4-9, 2012.*

14. Akin, R., Weiler, M., Dixon, J. B., "Non-Invasive quantification of lymphatic vessel pumping pressure in a rat tail", BMES Conference, Atlanta, GA, October 24-27, 2012.*

15. Reed, A. L., Rowson, S. A., and Dixon, J. B., "ATP-dependent transport plays a pivotal role in movement of lipid across the lymphatic endothelium", BMES Conference, Atlanta, GA, October 24-27, 2012.*

16. Kornuta, J. A., Salazar, E., Danielak, Z., and Dixon, J. B., "Low-cost microcontroller platform for real-time control of an isolated lymphatic vessel perfusion device," BMES Conference, Atlanta, GA, October 24-27, 2012.*

17. Weiler, M. and Dixon, J. B., "Advances in near-infrared lymphatic imaging and long-term effects of indocyanine green (ICG)", BMES Conference, Atlanta, GA, October 24-27, 2012.*

18. Skelton, H. M., Kassis, T., and Dixon, J. B., "Automated multi-dimensional microscopy for biomedical imaging", BMES Conference, Atlanta, GA, October 24-27, 2012.*

19. Rowson, S. A., Reed, A. L., and Dixon, J. B., "Relative importance of active transport in transcellular and paracellular lymphatic lipid transport", BMES Conference, Atlanta, GA, October 24-27, 2012.*

20. Nelson, T. S., and Dixon, J. B., “Effects of nitric oxide and lymphangion chain length on lymphatic pumping pressure in vivo” 7th World Congress of Biomechanics, Boston, MA, July 6-11, 2014.*

21. Caulk, A. W., Dixon, J. B. and Gleason, R. L., “Incorporation of Stress Analysis into a Model of Lymph Transport Through a Single Lymphangion” 7th World Congress of Biomechanics, Boston, MA, July 6-11, 2014.*

D4. Departmental Seminars

1. Department of Cellular Biology, University of Georgia, Dixon, J. B., “Engineering tools for studying the interplay between mechanics and biology in lymphatic lipid transport”, Athens, GA, September 7, 2010.*

2. Division of Cardiology, Department of Medicine, Emory University, Dixon, J. B., “Engineering tools for studying the interplay between mechanics and biology in lymphatic lipid transport”, Atlanta, GA, November 1, 2010.*

3. Institute for Bioengineering and Bioscience, Georgia Institute of Technology, Breakfast Club Seminar Series, Dixon, J. B., "Exploring Lymphatic Function: An Engineered Toolbox to Shed Light on Nature's Invisible Vessels", Atlanta, GA, January 8, 2013.*

4. Department of Biomedical Engineering, Texas A&M University, Dixon, J. B., "Exploring Lymphatic Function: An Engineered Toolbox to Shed Light on Nature's Invisible Vessels", College Station, TX, January 14, 2013.*

5. Department of Medical Physiology, Texas A&M Health Science Center, Dixon, J. B., "Exploring Lymphatic Function: An Engineered Toolbox to Shed Light on Nature's Invisible Vessels", Temple, TX, January 16, 2013.*

6. Institute of Bioengineering, Ecole Polytechnique Federale de Lausanne, Dixon, J. B., "Exploring lymphatic function: an engineered toolbox to shed light on nature's invisible vessels", Lausanne, Switzerland, March 17, 2014.*

7. Cardiovascular Biology Research Program, Oklahoma Medical Research Foundation. Dixon J. B., "Elucidating factors regulating lymphatic function across multiple length scales", Oklahoma City, OK, August 7, 2014.*

8. Department of Molecular Medicine, College of Veterinary Medicine, Cornell University. Dixon J. B., "Elucidating factors regulating lymphatic function across multiple length scales", Ithaca, NY, September 22, 2014.

E. GRANTS AND CONTRACTS

E1. AS PRINCIPAL INVESTIGATOR

Funded

Title of Project: "Quantification of lipid uptake in mesenteric lymphatics"
Agency/Company: Institute of International Education
Total Dollar Amount: $43,000
Role: Postdoctoral Fellowship
Collaborators: Melody Swartz (mentor)
Period of Contract: 7/1/2006 – 9/30/2007
Candidate's Share: $43,000

Title of Project: "K99 - Quantifying the role of lymphatics in lipid metabolism and transport"
Agency/Company: National Institute of Health - NHLBI
Total Dollar Amount: $89,000
Role: Postdoctoral Fellowship
Collaborators: Melody Swartz (mentor)
Period of Contract: 7/1/2008 – 6/30/2009
Candidate's Share: $89,000

Title of Project: "R00 - Quantifying the role of lymphatics in lipid metabolism and transport"
Agency/Company: National Institute of Health - NHLBI
Total Dollar Amount: $715,950
Role: PI
Collaborators: None
Period of Contract: 9/1/2009 – 8/31/2012
Candidate's Share: $715,950

Title of Project: "Multi-model imaging system for non-invasively assessing disease risk is in an animal model of post-masectomy related lymphedema"
Agency/Company: Emory Molecular and Translational Imaging Research Center Pilot Project Grant
Total Dollar Amount: $12,800
Role: PI
Collaborators: none
Period of Contract: 7/1/2012 – 6/30/2013
Candidate's Share: $12,800

Title of Project: "Dermal delivery of endothelin-1 and nitric oxide inhibitors to regenerate lymphatic pumping in a novel lymphedema model"
Agency/Company: Georgia Tech/ Emory Regenerative Engineering and Medicine Center
Total Dollar Amount: $50,000
Role: PI
Collaborators: Mark Prausnitz (GT, ChBE)
Period of Contract: 9/1/2012 – 6/30/2013
Candidate's Share: $44,000

Title of Project: "Lymphatic on a chip as a model host for lymphatic filariasis parasites"
Agency/Company: Bill & Melinda Gates Foundation
Total Dollar Amount: $100,000
Role: PI
Collaborators: None
Period of Contract: 5/1/2013 – 8/31/2014
Candidate's Share: $100,000

Title of Project: "Quantifying the role of load-induced remodeling in lymphedema progression"
Agency/Company: National Institutes of Health - NHLBI
Total Dollar Amount: $2,243,404
Role: PI
Collaborators: Rudy Gleason (GT, ME), Mari Muthuchamy (Texas A&M Health Science Center, Medical Physiology)
Period of Contract: 8/1/2013 – 5/31/2018
Candidate's Share: $1,899,500

Title of Project: "CAREER: Multi-scale approaches to quantify biomechanical control of lymphatic pump function"

Agency/Company: National Science Foundation
Total Dollar Amount: $400,000
Role: PI
Collaborators: None
Period of Contract: 7/1/2014 – 6/30/2019
Candidate's Share: $400,000

E2. AS CO-PRINCIPAL INVESTIGATOR

Funded

Title of Project: "Non-invasive NIR imaging towards establishing a role for lymphatic trafficking of exosomes in vivo"
Agency/Company: Petit Institute for Bioengineering and Bioscience
Total Dollar Amount: $100,000
Role: co-PI
Collaborators: Fredrick Vannberg (GT, Biology)
Period of Contract: 7/1/2012 – 6/30/2013
Candidate's Share: $50,000

Title of Project: "The development of a large animal model and lymphatic muscle cell therapy approach for treating secondary lymphedema"
Agency/Company: Institute for Regenerative Engineering and Medicine
Total Dollar Amount: $70,000
Role: co-PI
Collaborators: John Peroni (Univ of Georgia, Veterinary Medicine)
Period of Contract: 10/1/2014 – 6/30/2015
Candidate's Share: $35,000

F. OTHER SCHOLARLY AND CREATIVE ACCOMPLISHMENTS

1. LymphaTech – start-up company being launch out of our NIR Technology and the TI:GER team formed around this project. We are currently working with Nelson Mullins on establishing the company as an S-corp. We have $50,000 in initial investor money from the prize winnings of the TI:GER team at the Rice Business Plan Competition and the Oregon New Venture Championship. A write-up was done on the company that appeared in the Atlanta Business Chronicle on 5/9/2014.

G. SOCIETAL AND POLICY IMPACTS

1. $2 million dollar NIH grant featured in Atlanta Magazine, 9/23/2013
2. Part of a key focus discussion of outside experts at the NIDDK (NIH) on expanding lymphatic research in the digestive track, 11/3-11/4, 2009. Several Funding Opportunity Announcements came out of this effort (PAR-12-2598, -259, -260)
3. Organized and hosted the first ever lymphedema conference at Georgia Tech, which included 50+ patients from the state of Georgia as participants, 10/12/2013

4. Was the key research speaker at Atlanta's first "Lymphedema Intensive" educational workshop for physicians on lymphedema, over 30 physicians from the Atlanta-area attended this event, 2/27/2014

V. TEACHING

A. COURSES TAUGHT

Semester, Year	Course Number	Course Title	Number of Students
Spring, 2014	ME 3340	Fluid Mechanics	46
Spring, 2014	ME 8873/ BMED 6720	Biotransport	17
Fall, 2013	ME 3340	Fluid Mechanics	68
Summer, 2013	ME 3340	Fluid Mechanics	78
Spring, 2013	ME 2016	Computational Tech.	64
Spring, 2013	ME 8873/ BMED 6720	Biotransport	9
Fall, 2012	ME 3340	Fluid Mechanics	89
Spring, 2011	ME 8873/ BMED 8813	Biotransport	15
Fall, 2011	ME 3340	Fluid Mechanics	65
Fall, 2010	ME 3340	Fluid Mechanics	93
Fall, 2009	ME 3340	Fluid Mechanics	96

B. INDIVIDUAL STUDENT GUIDANCE

B1. Ph.D. Students

In Progress

1. Kassis, Timothy
   Major: Bioengineering
   Semester Advisement Began: Fall 2009
   Current Progress: Passed Qualifying Examination Spring 2011, Passed PhD Proposal 9/12/2012
   Thesis title: "Quantifying the Dynamics of Lymphatic Lipid Transport"
   STEP Teaching Fellow, Sept 2010 – Aug 2011
   NIH CTEng Trainee, Jan 2011 – Dec 2012
   American Heart Association Predoctoral Fellowship, Jan 2013 – Dec 2014
   Expected Graduation: May 2015

2. Weiler, Mike
   Major: Bioengineering
   Semester Advisement Began: Fall 2010
   Current Progress: Passed Qualifying Exam Summer 2012, Defended PhD Proposal: 12/5/2013
   Thesis title: "Design and Optimization of Near-Infrared Functional Lymphatic Imaging in Health and Lymphedema"
   CD4 GANN Fellowship Recipient, 2011-2012
   NSF Fellowship Recipient, Spring 2012
   TI:GER PhD Fellow, Sept 2012 – Aug 2014
   Expected Graduation: August 2015

3. Nelson, Tyler
   Major: Bioengineering
   Semester Advisement Began: Fall 2012
   Current Progress: Passed Qualifying Exam Spring 2014
   Tentative Thesis Project: "Modulating lymphatic pumping pressure as assessed with in vivo NIR imaging"
   TI:GER PhD Fellow, Sept 2014 – Aug 2016
   Expected Graduation: December 2016

4. Srinivasan, Swetha
   Major: Biology
   Semester Advisement Began: Fall 2012
   Co-Advisor Name: Fredrik Vannberg, Biology
   Current Progress: Passed Qualifying Exam Fall 2014, Defended Proposal Spring 2014
   Thesis Project: "Understanding immune effector functions of exosome pre and post exposure to bacterial and viral ligands"
   TI:GER PhD Fellow, Sept 2013 – Aug 2015
   Expected Graduation: May 2016

5. Hooks, Joshua
   Major: Bioengineering
   Semester Advisement Began: Fall 2013
   Tentative Qualifying Examination Date: Spring 2015
   Tentative Thesis Project: "Role of stretch in lymphatic muscle cell differentiation and phenotype"
   NIH Diversity Supplement Trainee
   Expected Graduation: May 2018

6. Lu, Iris
   Major: Bioengineering
   Semester Advisement Began: Fall 2013
   Tentative Qualifying Examination Date: Spring 2015
   Tentative Thesis Project: Lymphatic on a chip to serve as a model host for *brugia malayi*
   Expected Graduation: May 2018

<u>Completed</u>

1. Kornuta, Jeff
   Major: Mechanical Engineering
   Advised: 2009-2014
   Graduation Date: August 2014 (defended thesis 4/1/14)
   Thesis title: "Characterization of Lymphatic Pump Function in Response to Mechanical Loading"
   NSF Fellowship Recipient, Spring 2010

Current Position: Associate, Exponent

B2. M.S. Students

Completed

1. Huffman, Jamie
   Advised: Summer 2010 – Fall 2011
   Thesis title: "Design of a microfluidic device for lymphatic biology"
   Graduation Date: December 2011 (thesis option)
   Publications/presentations: IV.C.ii.15
   Current position: Research engineer, SpaceX

2. Akin, Ryan
   Advised: Spring 2012 – Fall 2012
   Thesis title: "Minimally Invasive Assessment of Lymphatic Pumping Pressure Using Functional Near Infrared Imaging"
   Graduation Date: May 2013 (thesis option)
   Publications/presentations: IV.A.17; IV.C.ii.26; IV.C.iii.14
   Current position: Consultant, Accenture

B3. Undergraduate Students

In Progress

1. Thomas Spencer
   Major: Mechanical Engineering
   Semester Advisement Began: Fall 2013
   Project title: Development of a microfluidic mosquito feeding platform for maintaining the *brugia malayi* lifecycle
   Air Products ME Undergraduate Research Award Recipient, Spring 2014
   Air Products Poster Competition, 1st Place, 2014
   PURA Award Recipient, Fall 2014

2. Mindy Ross
   Major: Biochemistry
   Semester Advisement Began: Fall 2013
   Project title: Optimization of NIR tracer probes for functional lymphatic imaging

3. Dennis Andre Norfleet
   Major: Biomedical Engineering, Univ of Tenessee
   Semester Advisement Began: Summer 2014
   Project title: Software interface of lymphatic perfusion system
   SURE REU Fellowship Recipient, 2014

4. Joi-Chi Chok
   Major: Mechanical Engineering
   Semester Advisement Began: Summer 2014
   Project title: Design and fabrication of a lymphatic vessel isolation device

Completed

1. Tzin, Henry

Major: Biomedical Engineering
Advised: Summer 2010
Project title: “Characterizing flow through a microfluidic model of the intestinal lacteal using Comsol”

2. Daugherty, Taylor
Major: Biomedical Engineering
Advised: Spring 2011
Project title: “Development of image processing algorithms for quantifying lymphatic function with NIR imaging”

3. Blackburn, Christopher
Major: Mechanical Engineering
Advised: Spring 2011
Project title: “Design and construction of a CO2 incubation chamber for live-cell imaging applications”

4. Tyler O’Malley
Major: Biology
Advised: Spring 2011 – Fall 2011
Project title: “Quantifying the effects of hyperlipidemia on lymphatic cancer metastasis”
Pettit Undergraduate Scholar 2011

5. Emilio Salazar
Major: Biomedical Engineering
Advised: Spring 2012
Project title: “"Implementation of a PIC32-based real-time controller for an isolated lymphatic vessel perfusion system”
Current Position: Ph.D. student, Neuroscience, Yale University

6. Zack Danielack
Major: Biomedical Engineering
Advised: Spring 2012
Project title: “Labview interface to control an isolated lymphatic vessel perfusion system”

7. Arina Korneva
Major: Biomedical Engineering
Advised: Spring 2010 – Spring 2012
Project title: “Design and implementation of a stretch device for studying the molecular response of lymphatic endothelial cells to mechanical stretch”
Petit Undergraduate Scholar, 2010
PURA recipient, 2011
Current Position: Ph.D. Student, Biomedical Engineering, Yale University

8. Kevin Parsons

Major: Mechanical Engineering
Advised: Spring 2011 – Summer 2012
Project title: "Development of a micofluidic model of the initial lymphatic environment for studying filarial worm migration"
Petit Undergraduate Scholar, 2011
PURA Travel Award recipient, 2012
Current Position: Ph.D. Student, Mechanical Engineering, Johns Hopkins University

9. Destiny Cobb
Major: Biomedical Engineering
Advised: Summer 2012
Project title: "Elucidating filarial worm lymphatic homing mechanisms"

10. Hudson Chancy
Major: Biomedical Engineering
Advised: Summer 2012
Project title: "Design and construction of instrumentation housing for microcontroller platform"

11. Phillip Johnston
Major: Electrical Engineering
Advised: Summer 2012
Project title: "Hardware verification of a real-time control platform for an isolated lymphatic vessel perfusion system"

12. Victor Yusuf
Major: Electrical Engineering
Advised: Summer 2012
Project title: "Intuitive graphical tool for interfacing a real-time controller with a PC"

13. Alex Cardwell
Major: Biomedical Engineering
Advised: Summer 2012
Project title: "Non-invasive brain computer interface for hardware control"

14. Sydney Rowson
Major: Biomedical Engineering
Advised: Fall 2011 – Fall 2012
Project title: "Investigation of the cytoskeleton and energy-dependent processes as mechanisms of lipid transport across the lymphatic endothelium"
Pettit Undergraduate Scholar, 2012
Current Position: Ph.D. student, Pharmacology, Emory University

15. Rachel Cornelius
Major: Biomedical Engineering
Advised: Spring 2012 – Fall 2012

Project title: "Quantification of lipid uptake and transport, and its effects on lymphatic pump function in healthy and diseased states. "

16. Laurissa Rybacki
    Major: Biomedical Engineering
    Advised: Spring 2012 – Fall 2012
    Project title: "Lymphatic endothelial cell response to components of oscillatory shear stress"

17. Curran Sidhu
    Major: Biomedical Engineering
    Advised: Summer 2012 – Fall 2012
    Project title: "Characterizing the role of cyclic strain on lymphatic pump function"
18. Tzin, Henry
    Major: Biomedical Engineering
    Advised: Summer 2010 – Spring 2014
    Project title: "Characterizing flow through a microfluidic model of the intestinal lacteal using Comsol"

B4. Service on thesis or dissertation committees

In Progress

1. Drew Owen (PhD BioE)
2. Candice Hovell (PhD BME)
3. Qingfen Pan (PhD BioE)
4. Faisal Ahmed (PhD BioE)
5. Alex Caulk (PhD, BioE)
6. Jordan Cicilliano (PhD, BioE)
7. Reggie Tran (PhD, BME)
8. Mike Tree (PhD, BioE)

Completed

1. Julianty Angsana (PhD, BME)
2. Micheal Zaucha (PhD, BioE)
3. Andrew Siefert (PhD, BioE)
4. Chris Edens (PhD, BME)
5. Melissa Kinney (PhD, BME)
6. Roy Wang (PhD, BioE)
7. Nduka Emenchukwu (PhD, BioE)
8. Marco Pisano (PhD, EPFL, Switzerland)
9. Maria Restrepo (PhD BioE)
10. Matt Futterman (Masters, ME)
11. Jaeho Oh (Masters, BioE)
12. Brain Jun (Masters, BIOE)
13. Eleanor DeHitta (Undergrad thesis option, BME)

B5. Mentorship of postdoctoral fellows or visiting scholars

In Progress

1. Zhanna Nepiyushchikh
   Position: Research Scientist II
   Semester Advisement Began: Spring 2014
   Project title: "Growth and remodeling in isolated lymphatic vessels in response to sustained elevated mechanical loading"

Completed

1. Faulkner, Matthew
   Advised: June 2010 – July 2011
   Project title: "Mechanisms of chylomicron uptake using a tissue engineered model of the intestinal lacteal"
   Current Position: Research Assistant Professor, Department of Biological Sciences, University of Arkansas

2. Nipper, Matthew
   Advised: January 2011 – January 2013
   Project Title: "Biomechanical control of isolated contractile lymphatics"
   Current Position: Senior Laser Applications Engineer, Laser Light Technologies Inc.

3. Reed, Alana
   Advised: October 2011 – November 2013
   Project Title: "Mechanisms of active lipoprotein and lipid transport by lymphatic endothelial cells"

C. OTHER TEACHING ACTIVITIES

1. Fall 2010 – Class of 1969 Teaching Fellow
2. Fall 2010 – Taught an advanced confocal workshop for the BBUGS graduate student group in IBB
3. Spring 2011 – Developed several modules on lymphatics, interstitial fluid transport, cell adhesion, and mechnotransduction to be incorporated into the graduate course, ME8803/BMED8813 – Biotransport
4. Spring 2011 – Wrote and delivered a two lecture module on optical imaging in turbid media and biological tissue for Dr. Forest's Optics course.
5. Spring 2014 – Developed and delivered a lecture on lymphatic physiology for BMED 3100 – Systems Physiology

VI. SERVICE

A. PROFESSIONAL CONTRIBUTIONS

1. Editorial Board Member, Technical Journals

   - *Frontiers in Vascular Physiology*, Review Editor, 2011 - present

2. Reviewer, Technical Journals

- *Aging and Disease*
- *American Journal of Physiology – Endocrinology and Metabolism*
- *American Journal of Physiology – Heart and Circulatory Physiology*
- *American Journal of Physiology – Regulatory, Integrative, and Comparative Physiology*
- *Annals of Biomedical Engineering*
- *BMC Physiology*
- *Bioengineering and Biotechnology*
- *Biomechanics in Modeling and Mechanobiology*
- *Circulation Research*
- *IEEE Journal on Selected Areas in Communications - Series on Molecular, Biological, and Multi-Scale Communications*
- *Journal of Biological Methods*
- *Journal of Biomechanical Engineering*
- *Journal of Biomechanics*
- *Journal of Biomedical Optics*
- *Journal of Lipid Research*
- *Lymphatic Research and Biology*
- *Microcirculation*
- *Microvascular Research*
- *Molecular and Cellular Biology of Lipids*
- *Pharmaceutical Research*
- *PLOS One*
- *Science Translational Medicine*

3. Reviewer, Grant Proposals and Panels

- Natural Sciences and Engineering Research Council of Canada – Chemical, Biomedical, and Materials Science Engineering Scholarships & Fellowships Selection Committee (2012-2013)
- NSF Biomechanics and Mechanobiology Program (5/2013)
- NIH Special Emphasis Panel on Lymphatics in Health and Disease in the Digestive, Urinary, Cardiovascular and Pulmonary Systems (11/2013, 3/2014)
- American Heart Association, Bioeng BSc3 (4/2014)

4. Reviewer, Other

- *Wiley Publishers, textbook proposal review (1)*
- *ASME Summer Bioengineering Conference Abstract Reviewer, 2010-2013*
- *BMES Conference Abstract Reviewer, 2012-2013*
- *TERMIS Conference Abstract Reviewer, 2013*

5. Society Memberships

    - *Biomedical Engineering Society*
    - *Microcirculatory Society*
    - *Tissue Engineering and Regenerative Medicine Society*
    - *American Society of Mechanical Engineers*

6. Society Administrative Duties

    - *Microcirculatory Society Programs and Meetings Committee*, 2012 - present

7. Conference Organizing Committees

    - *ASME Summer Bioengineering Conference* – Fluid Mechanics, 2010-present
    - *ASME Summer Bioengineering Conference* – Cellular and Tissue Engineering, 2010-present
    - *16th State of Georgia Lymphedema Education & Awareness Program*, "Emerging Technologies in Lymphatic Research and Care", hosted by the Institute of Bioengineering and Bioscience at Georgia Tech, 2013
    - *7th World Congress of Biomechanics* – Symposium on Lymphatic Physiology and Biomechanics, 2014

8. Conference Session Chairs

    - *ASME Summer Bioengineering Conference* – Model Systems and the Pericellular Environment, June 2011
    - *SPIE Photonics West BIOS* – Optical Imaging Systems for Cell and Lymph Analysis, January 2012
    - *ASME Summer Bioengineering Conference* – Microscale Fluid Mechanics, June 2012
    - *BMES Annual Meeting* – Lymphatic System Biomechanics, October 2012
    - *BMES Annual Meeting* – Engineered Tissue Models for Drug Discovery and Disease, October 2012

9. Conference Theme Chair
    - *ASME Summer Bioengineering Conference* – Fluids: Respiratory and other fluid mechanics, August 2011 – present

B. PUBLIC AND COMMUNITY SERVICE

1. CEISMC seminar - Invited talk to HS teachers about interfacing science and mathematics in the classroom, 12/6/2010
2. KITES Science and Engineering Festival, Scott Elementary School – Ran a half-day workshop with a few of the undergrads from the lab providing hands on bioengineering demonstrations and a local elementary school, 4/27/2012

3. Summer 2014 – Hosted 2 high-school students in the lab to provide them exposure to biomedical engineering research
4. Hosted a high school student in the lab for 1 year through Project ENGAGE, 2014

C. INSTITUTE CONTRIBUTIONS

Service Committees

1. Mechanical Engineering Faculty Awards Committee, 2009 –2012
2. Biomedical Engineering Graduate Committee, 2010 – 2014
3. Mechanical Engineering Academic Advising Committee, 2012 – present
4. Mechanical Engineering Faculty Advisory Committee, 2014 – present
5. BioEngineering Program Graduate Committee, 2014 - present

Qualifying Exam Committees

1. BioE Exam, Bioengineering Program, Spring 10 – present
2. BME Exam, Biomedical Engineering Ph.D. Program, Spring 10 – present
3. ME Fluids Exam, Mechanical Engineering Ph.D. Program, Fall 10 - present

Campus Events

1. Judge, Inventure Competition, 2010
2. Judge, Georgia Tech Innovation and Research Conference, 2010, 2011