

# CURRICULUM VITAE

## PERSONAL

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NAME: **Kevin Truett Seale**  
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## EDUCATION

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- 2000**                    **PhD - Biomedical Engineering**  
Vanderbilt University, Nashville TN  
Advisor: Thomas R. Harris MD, PhD  
Dissertation Title: *Ultrasound measurement of osmotic water exchange in the microvasculature of the dog lung*
- 1996**                    **MS - Biomedical Engineering**  
Vanderbilt University, Nashville TN  
Thesis Title: *Quantitation of lung vascular injury by simultaneous measurement of electrical impedance and ultrasonic velocity in flowing blood*
- 1993**                    **BS - Physics, minor: Math**  
The University of Georgia, Athens GA

## RESEARCH AND WORK EXPERIENCE

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- 2006 – Present**                    **Coordinator, SyBBURE (Systems Biology and Bioengineering Undergraduate Research Experience)**
- Supervision of students who have gone on to top graduate/medical school placements including Stanford, Berkeley, Purdue and University of Washington.
  - Overseeing Design Team Project for Ca<sup>++</sup> Flux Measurements in Whole Blood Leukocytes in a Microfluidic Device.
  - Directly supervising individual research projects of five undergraduates:
    - Pinocytic Loading of Primary CD4<sup>+</sup> Human T Cells
    - Calcium-Release Activated Calcium Channel Cycling
    - Microfluidic Cytokinetic Toximetry
    - Multiple Vantage Point Microscopy of Budding Yeast
- 2005 – Present**                    **Research Associate and VIIBRE fellow**  
*Vanderbilt Institute for Integrated Biosystems Research and Education*  
*Vanderbilt University Department of Biomedical Engineering*  
*Mentor: John P. Wikswo*

- Primary Investigator of Studies of Whole Blood and Leukocytes in Microfluidic Devices Vanderbilt IRB # 070376.
- Independently driving goal-oriented research – setting and meeting short and long-term goals
- Provisional patent application filed by Vanderbilt for an adaptation of electrical engineering technology to biological research

**2005**

**Instructor - BME 210 Biological Transport Phenomena**

*Vanderbilt University Department of Biomedical Engineering*

- Independently organized and conducted lectures for 53 students
- Study by NSF Engineering Education Resource Center found that my students learned as well as those placed with seasoned professors

**2000-2004**

**Chief Engineer**

*Microarrays Incorporated, Nashville TN*

- Designed, constructed and maintained high-level microarray instrumentation and control software
- Performed research into sources of microarray DNA deposition variation and troubleshooting of product quality issues
- Scheduled and managed product manufacturing including product quality improvement
- Trained and supervised personnel and provided technical support to clients

**1995-2000**

**Pulmonary Research Fellow**

*Vanderbilt University, Dept. of Biomedical Engineering*

- Conducted isolated perfused dog lung experiments
- Developed and implemented mathematical model of lung microvascular osmotic exchange for early detection of Acute Respiratory Distress Syndrome in humans

**1994-1995**

**Graduate Teaching Assistant**

*Vanderbilt University*

- Biomedical Engineering Lab Course
- Electrical Engineering Circuits Course
  - Graded papers, lectured, tutored, set up and maintained lab equipment

**1990-1994**

**Research Technician**

*The University of Georgia, Physics Department*

- Participated in DARPA project to develop submarine laser
- Designed and constructed laser-heated crystal growth chamber for growing 10  $\mu\text{m}$  diameter single-crystal fibers
- Wrote control software, machined parts

## **PROGRAMMING AND COMPUTER SKILLS**

C/C++	Metamorph Image Acquisition Suite
ImageJ	SolidWorks
LabView	Galil Motion Control
MATLAB	Parker Motion Planner
Visual Basic	Microsoft Office

## **MEMBERSHIPS AND HONORS**

<b>2007</b>	Member, Editors Club at Vanderbilt
<b>2007</b>	Member, Tennessee Academy of Sciences
<b>2007</b>	Member, Union of Concerned Scientists
<b>2006</b>	Member, American Association for the Advancement of Science (AAAS)
<b>2005</b>	Member, Biomedical Engineering Society (BMES)
<b>2005</b>	Postdoctoral Travel Award, Frontiers in Live Cell Imaging Meeting
<b>1993</b>	L.L. Hendren Memorial Scholarship for Physics, UGA
<b>1992</b>	C.H. Wheatley Award for Excellence in Physics, UGA
<b>1991</b>	Sigma Pi Sigma National Physics Honor Society, UGA
<b>1991</b>	President of The Society of Physics Students, UGA
<b>1988</b>	Outstanding New Member University of GA Block & Bridle Club

## **PEER-REVIEWED PUBLICATIONS**

**Seale, KT**, Rieserer, R, Markov, D, Ges, I, Janetopoulos, C, Wikswo, JP, Mirrored Pyramidal Wells for Simultaneous Multi-Perspective Three Dimensional Microscopy. *Journal of Microscopy (In Review)*.

**Seale, KT**, Faley SL, Wikswo, JP., Macro to nano: A Simple Method for Transporting Cultured Cells from Milliliter Scale to Nanoliter Scale and Back. *Lab On A Chip (In Preparation)*.

Faley, SL, **Seale, KT**, Hughey, JJ, Schaffer, DK, McKinney, B, Baudenbacher, F, Wikswo, JP., Microfluidic platform for real-time signaling analysis of multiple single T cells in parallel, *Lab on a Chip (In Review)*.

JJ Hughey, JP Wikswo and **KT Seale**, "Intra-Microfluidic Pinocytic Loading of Human T Cells." IEEE/NIH Life Sciences Systems and Applications, Annual Meeting, Bethesda, MD, November 2007, Conference Proceedings.

McQuain MK, **Seale KT**, Peek J, Fisher TS, Levy S, Stremmler MA, Haselton FR., Chaotic mixer improves microarray hybridization. *Anal Biochem.* 2004 Feb 15;325(2):215-26. PMID: 14751256

McQuain MK, **Seale KT**, Peek J, Levy S, Haselton FR., Effects of relative humidity and buffer additives on the contact printing of microarrays by quill pins. *Anal Biochem.* 2003 Sep 15;320(2):281-91. PMID: 12927835

**Seale KT**, Pou NA, Krivitski N, Harris TR., Quantification of lung microvascular injury with ultrasound. *Ann Biomed Eng.* 2002 May;30(5):671-82. PMID: 12108841

**Seale KT**, Harris TR., A three-compartment model of osmotic water exchange in the lung microvasculature. *Ann Biomed Eng.* 2000 Aug;28(8):1019-27. PMID: 11144663

## **OTHER PUBLICATIONS AND PLATFORM PRESENTATIONS**

**KT Seale**, “Cyborg Cells, Creating Life in the Laboratory?” Current Events Editorial, *Annals of Biomedical Student/Postdoc Training, Research, and Current Topics*, Issue 1, Fall 2007.

**KT Seale**, BA McKinney, PR Norris, SL Faley and JP Wikswo, “Nanophysiometry: Linking Function to Genomics Via Continuous Physiological Monitoring of Single Cells” Fifth Symposium on the Functional Genomics of Critical Illness and Injury, November 2007, *Awarded Platform Presentation*

**KT Seale**, R Reiserer, JW Chamberlain, C. Janetopoulos and JP Wikswo, “Multiple Vantage Point Microscopy Using Mirrored Pyramidal Wells.” BMES Annual Fall Meeting, September 2007, *Platform Presentation.*

JW Chamberlain, JP Wikswo and **KT Seale**, “Long-Term Cytokinesis Studies Studies Of Human T Cell Populations in a Microfluidic Device.” Biomedical Engineering Society Annual Fall Meeting, September 2007, *Poster Presentation.*

EG. Kim, JP Wikswo and **KT Seale**, “Quantification of Cell Motion in a Microfluidic Device.” Biomedical Engineering Society Annual Fall Meeting, September 2007, *Poster Presentation.*

JJ Hughey, JP Wikswo and **KT Seale**, “Intra-Microfluidic Pinocytic Loading of Jurkat T Cells.” Biomedical Engineering Society Annual Fall Meeting, September 2007, *Poster Presentation.*

**KT Seale**, R Reiserer, D Markov, I Ges, C Janetopoulos and J Wikswo, “Simultaneous Multi-Perspective Three Dimensional Microscopy with Mirrored Pyramidal Wells.” Focus on Microscopy International Symposium, April 2007, Valencia, Spain, *Platform Presentation.*

S Faley, **KT Seale**, J Hughey, D Unutmaz, F Baudenbacher, J Wikswo, “Novel Microfluidic Platform for the Analysis of T Cell Signaling Pathways.” SPIE Biophotonics West, San Jose, January 2007, *Platform Presentation.*

**KT Seale**, J Wiksw, "BioMEMS Methods for Cell Biology." Vanderbilt Ingram Cancer Center Annual Fall Retreat, November 2007, *Platform Presentation*.

**KT Seale**, S Faley, J Hughey, B McKinney, D Unutmaz, F Baudenbacher, J Wiksw, "Automated Parallel Measurement of Signaling Events in Single T Cells Using a Novel Nanophysiometer". Biomedical Engineering Society Annual Fall Meeting, October, 2006, *Platform Presentation*.

**KT Seale**, R Reiserer, D Markov, I Ges, J Wiksw, "BioMEMS Micromirror Wells for High Resolution Simultaneous Three Dimensional Imaging of Cells". Biomedical Engineering Society Annual Fall Meeting, October, 2006, *Platform Presentation*.

S Faley, **KT Seale**, J Hughey, D Unutmaz, J Wiksw, "Novel Microfluidic Platform for the Analysis of T Cell Signaling Pathways.". Biomedical Engineering Society Annual Fall Meeting, October, 2006, *Platform Presentation*.

**KT Seale**, S Faley, J Hughey, D Unutmaz, F Baudenbacher, J Wiksw, Poster: "Automated Detection and Analysis of T-cell intracellular calcium using a nanophysiometer". NIH Frontiers in Live Cell Imaging meeting. April, 2006. Bethesda, MD.

King KR, **KT Seale**, TR Harris, Visualization-based analysis of a pulmonary capillary osmotic model, FASEB J. 13(4, Part I): A423, 1999.

**KT Seale**, Book Review - Flow-Dependent Regulation of Vascular Function. IEEE Engineering in Medicine and Biology, 16(5):179-180, 1997.

**KT Seale**, S Bosan, JM Dendy, SU Adams, NA Pou, N Krivitski, TR Harris, Osmotic transport coefficients decrease significantly with vascular injury in dog lungs. FASEB J. 11(3):A129, 1997.

**KT Seale**, Book Review - The Electrical Engineering Handbook. IEEE Engineering in Medicine and Biology, 15(6):136-137, 1996.

### **SyBBURE SCHOLAR AND OTHER SELECTED PRESENTATIONS**

EGR Kim, JP Wiksw and KT Seale, Cytokinetic Toximetry In a Microfluidic Device. 117th Annual Meeting of the Tennessee Academy of Sciences, November 2007, Platform Presentation.

C Wright, K. Seale, R. Reiserer, E Boczko, C Stowers and J Wiksw, Using Micromirrors to Obtain Three Dimensional Images of Cells. 117th Annual Meeting of the Tennessee Academy of Sciences, November 2007, Platform Presentation.

E. Kim, **K Seale** and J Wikswo, Quantification of the Motion of Non-Adherent Cells in a Microfluidic Device. 74th Annual Meeting of the Southeastern Section of the American Physical Society, November 2007, *Platform Presentation*.

C Wright, E Boczko, J Wikswo, **K Seale**, Novel micromirrors to obtain three-dimensional images of cells. 74th Annual Meeting of the Southeastern Section of the American Physical Society, November 2007, *Platform Presentation*.

“BioMEMS Methods for Cell Biology” Vanderbilt Department of Cancer Biology Retreat, Selected Speaker, November 2006.

“A Microchip CD4 Counting Method for HIV Monitoring in Resource-Poor Settings.” Microbiology and Immunology Journal Club Guest Speaker, Vanderbilt University Medical Center, October 2006.

“Bayesian Inference of Cell Signaling Causality,” Microbiology and Immunology Journal Club Guest Speaker, Vanderbilt University Medical Center, February 2006.

“Instrumentation and Control for Quantitative, Experimental Systems Biology,” Microbiology and Immunology Journal Club Guest Speaker, Vanderbilt University Medical Center, August 2005.

“DNA Microarrays: Past Present and Future,” BME Department Guest Speaker Seminar, Vanderbilt University, 2004.

“Minimally invasive measurement of lung vascular transport properties: a mathematical model for the measurement of osmotic exchange with ultrasound,” Physiome Symposium, Seattle, 1999.

“Measurement of Filtration and Reflection Coefficients of Lung Microvasculature,” TN BME, Memphis, 1998.

“Quantitation of Osmotic Exchange Coefficients with Ultrasound,” BMES, San Diego, 1997.

“Measurement of Lung Injury with Ultrasound,” FASEB Annual Meeting, New Orleans, 1997.

“A Three-Compartment Model of the Lung Microvasculature,” FASEB Annual Meeting, Washington, 1996.

## **OTHER INTERESTS**

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Member of First Lutheran Church, Nashville TN  
YMCA-Certified open water SCUBA diver  
Expert Skier