

## ABRAHAM P. LEE – BIOGRAPHICAL SKETCH

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### (a) Professional Preparation:

University of California, Berkeley	Ph.D.	1989-1992	Mechanical Engineering
University of California, Berkeley	M.S.	1986-1989	Mechanical Engineering
National Tsing Hua Univ., Taiwan	B.S.	1992-1986	Power Mechanical Engineering

### (b) Appointments

- 2010- present** William J. Link Professor & Chair, Biomedical Engineering Department, University of California at Irvine
- 2006- present** Director, DARPA-Industry Micro/nano Fluidics Fundamentals Focus (MF3) Center
- 2003- present** Professor, Department of Mechanical & Aerospace, University of California at Irvine
- 2002- present** Professor, Graduate Advisor (since 2003-2008), Assoc. Chair (2005-2008), Department of Biomedical Engineering, University of California at Irvine
- 2001- 2001** Senior Technology Advisor, Office of Technology and Industrial Relations, National Cancer Institute (NCI)
- 1999- 2001** Program Manager, Microsystems Technology Office (MTO), Defense Advanced Research Project Agency (DARPA)
- 1992- 1999** Group Leader, Principal Research Engineer, Postdoctoral Engineer, Center for Microtechnology, Lawrence Livermore National Laboratory (LLNL)

### (c) Publications

#### Publications Most Closely Related to Proposal

1. Robert Lin, Jeffrey S. Fisher, Melinda G. Simon and Abraham P. Lee. [Novel on-demand droplet generation for selective fluid sample extraction.](#), *Biomicrofluidics*, 6, 024103, 2012.
2. A. C. Hatch, J. S. Fisher, S. L. Pentoney, D. L. Yang, and A.P. Lee, "Tunable 3D Droplet Self-Assembly for Ultra-High-Density Digital Micro-Reactor Arrays", *Lab Chip*, vol. 11 (15), 2509-2517, 2011.
3. Andrew C. Hatch, Jeffrey S. Fisher, Armando Tovar, Albert T.H. Hsieh, Stephen L. Pentoney, David L. Yang, and Abraham P. Lee, "1-Million Droplet Array with Wide-Field Fluorescence Imaging for Digital PCR", *Lab Chip*, 2011, 11, 3838-3845.
4. Albert Tsung-Hsi Hsieh, Nicole Hori, Rustin Massoudi, Patrick Jen-Hao Pan, Hirotaka Sasaki, Yuh Adam Lin, Abraham P. Lee. [Nonviral Gene Vector Formation in Monodispersed Picoliter Incubator for Consistent Gene Delivery.](#) *Lab Chip*, vol. 9, pp. 2638 - 2643, 2009.
5. Shia-Yen Teh, Robert Lin, Lung-Hsin Hung, and Abraham P. Lee, "[Droplet Microfluidics](#)", *Lab on a Chip*, vol. 8 (2), pp. 198-220, 2008.

#### Other Significant Publications

6. Yu-Hsiang Hsu, Monica L. Moya, Parinaz Abiri, Christopher C.W. Hughes, Steven C. George and Abraham P. Lee, [Full range physiological mass transport control in 3D tissue cultures](#), *Lab Chip*, 2013,13, 81-89
7. Jente Lu,\* Chesca A. Barrios, Amanda R. Dickson, Jamison L. Nourse, Abraham P. Lee and Lisa A. Flanagan\*, [Advancing practical usage of microtechnology: a study of the functional consequences of dielectrophoresis on neural stem cells.](#), *Integrative Biology*, 2012, DOI: 10.1039/c2ib20171b, July 14, 2012.
8. Michael Kendall+, David Bardin+, Roger Shih, Paul A. Dayton, Abraham P. Lee, [Scaled-Up Production of Monodisperse, Dual-Layer Microbubbles Using a Multi-Array Microfluidic Module for Medical Imaging and Drug Delivery](#), *Bubble Science, Engineering and Technology*, in press. .
9. Jungwoo Lee, Abraham P. Lee, Kirk K. Shung, "Microfluidic Droplet Sorting with a High Frequency Ultrasound Beam", *Lab on a Chip*, 2012, in press (LC-ART-11-2011-021123.R2).
10. Yuka Okabe\*, Yulin Chen\*, Rishi Purohit, Robert M. Corn, and Abraham Lee "[Piezoelectrically Driven Vertical Cavity Acoustic Transducers for the Convective Transport and Rapid Detection of DNA and Protein](#)

[Binding to DNA Microarrays with SPR Imaging - A Parametric Study](#)", *Biosensors and Bioelectronics*, vol.35, 1, 15 May 2012, pp. 37-43.

11. Melinda G. Simon, Robert Lin, Jeffrey S. Fisher, and Abraham P. Lee [A Laplace pressure based microfluidic trap for passive droplet trapping and controlled release](#), *Biomicrofluidics* 6, 014110 (2012).
12. Shia-Yen Teh, Ruba Khnouf, Hugh Fan, Abraham P. Lee, "Stable, Biocompatible Lipid Vesicle Generation by Solvent Extraction-Based Droplet Microfluidics", *Biomicrofluidics*, 5, 044113, 2011
13. Javier L. Prieto, Jente Lu, Jamison L. Nourse, Lisa A. Flanagan, and Abraham P. Lee. [Frequency Discretization in Dielectrophoretic Assisted Cell Sorting Arrays to Isolate Neural Cells](#), *Lab on a Chip*, 2012, 12(12), 2182–2189.
14. Maulik V. Patel, Armando R. Tovar and Abraham P. Lee, "Lateral Cavity Acoustic Transducer as an on-chip cell/particle switch", *Lab Chip*, 2012, **12**, 139-145
15. David Bardin, Thomas D. Martz, Paul S. Sheeran, Roger Shih, Paul A. Dayton, and Abraham P. Lee High-Speed, Clinical-Scale Microfluidic Generation of Stable Phase-Change Droplets for Gas Embolotherapy., *Lab Chip*, 2011, 11, 3990-3998. .

#### **PATENTS (selected from a total number of US patents issued: 35)**

1. Patent Number 7,291,154 October 6, 2007, "Shape Memory Polymer Actuator and Catheter"
2. Patent Number 7,250,775 July 31, 2007, "Microfluidic Devices and Methods based on Measurements of Electrical Admittance"
3. Patent Number 7,081,227 July 25, 2006, "Amphiphilic Mediated Sample Preparation for Micro-Flow Cytometry"
4. Patent Number 6,575,965 June 10, 2003, "Medical Devices Utilizing Optical Fibers for Simultaneous Power, Communications, and Control"

#### **(d) Synergistic Activities**

- Lab on a Chip, Associate Editor, Editorial Board Member, 2009-present
- American Institute of Medical and Biological Engineering (AIMBE), Member/Fellow, from 3/2006.
- American Society of Mechanical Engineers (ASME), Fellow (elected 2010)

#### **(e) Collaborators & Other Affiliations • Collaborators and Co-Editors**

Dr. K. Kirk Shung, University of Southern California  
Dr. Steven George, University of California at Irvine  
Dr. Hugh Fan, University of Florida  
Dr. Paul Dayton, University of North Carolina at Chapel Hill  
Dr. Lisa Flanagan, University of California at Irvine  
Dr. Phil Felgner, University of California at Irvine  
Dr. Jeff T.-H. Wang, Johns Hopkins University

#### **Advisees:**

*Graduate Students (Year of Degree):* Yuka Okabe (Ph.D. 2012), Javier Lopez-Prieto (Ph.D. 2011), Rob Lin (Ph.D.2011), Andrew Hatch (Ph.D. 2011), Jente Lu (Ph.D. 2011), Shia-Yen Teh (Ph.D. 2010), Armando Tovar (Ph.D. 2010), Kanaka Hettiarachchi (Ph.D. 2009), Jeffrey Fisher (Ph.D. 2009), W.-Y. Tseng (Ph.D. 2008), T.-H. Hsieh (Ph.D. 2008), Lung-Hsin Hung (Ph.D., 2007), Lisen Wang (Ph.D., 2007), Y.-C. Tan (Ph.D., 2005), Sony V. Lemoff (Ph.D., 2001), W.C. Chao (M.S. 2005), Reza Moghbel (M.S. 2006), Uland Liao (M.S. 2007), Rajtarun Madango (M.S. 2008), Maulik Patel, Roger Shih, Crystal Rapier, Mindy Simon, David Bardin, Nick Martin, Derek Vallejo

#### *Postdoctoral Researchers:*

Szu Wang (2003), John Collins (2002-2006), Yu-Hsiang Hsu (2010-present), Eugene Huang (2009-2010)

#### **Advisors:**

Graduate Advisor (Ph.D.): Professor A.P. Pisano (University of California, Berkeley).

Postdoctoral Mentor: Dr. M. Allen Northrup (Microfluidic Systems Inc.).