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## BIOGRAPHICAL SKETCH

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NAME Tien, Joe Y.	POSITION TITLE Associate Professor of Biomedical Engineering		
eRA COMMONS USER NAME (credential, e.g., agency login) jtien@bu.edu			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
University of California, Irvine	B.S.	1990-1993	Mathematics
University of California, Irvine	B.S.	1990-1993	Physics
Harvard University	Ph.D.	1993-1999	Physics
Johns Hopkins School of Medicine	postdoctoral	1999-2002	Biomedical engineering

### A. Personal Statement

I am currently an Associate Professor of Biomedical Engineering at Boston University. My research group develops methods to form perfused, functional human microvessels that can support the metabolism of engineered tissues. We adopt an interdisciplinary approach that relies on expertise in soft lithography, biomaterials, microvascular biology and physiology, and numerical modeling to understand the physical and chemical mechanisms that control the functionality of engineered microvessels. We take great pride in training the next generation of tissue engineers who use quantitative methods to assess and improve tissue function. Recent trainees and their current positions include: Gavi Price (postdoc, MGH/Harvard), Andrew Golden (postdoc, Novartis), Ken Chrobak (research scientist, Baxter Healthcare).

### B. Positions and Honors

#### Positions:

- 2008-2009 Visiting Fellow, Department of Chemical Engineering, Princeton University (sabbatical leave with C.M. Nelson).
- 2008-present Member, Program in Materials Science and Engineering, Boston University.
- 2008-present Associate Professor of Biomedical Engineering (tenured), Boston University.
- 2003-present Member, Program in Molecular Biology, Cell Biology, and Biochemistry, Boston University.
- 2002-2008 Assistant Professor of Biomedical Engineering, Boston University.
- 1999-2001 Postdoctoral fellow, Department of Biomedical Engineering, Johns Hopkins School of Medicine (with C.S. Chen).
- 1995-1999 Research assistant, Department of Chemistry and Chemical Biology, Harvard University (with G.M. Whitesides).
- 1992-1993 Research assistant, Department of Physics, University of California, Irvine (with G.L. Shaw)

#### Honors:

NIH/NIBIB Edward C. Nagy New Investigator Award (2006), Boston University Provost's Innovation Award (2002-2003), NIH/NHLBI National Research Service Award (2001-2002), Johns Hopkins University Distinguished Postdoctoral Fellow (1999-2001), NSF Fellow (1993-1996), UC Irvine Herbert H. Chen Award (1992), Barry Goldwater Scholar (1991-1993), UC Irvine Campuswide Honors Program (1990-1993), UC Regents Scholar (1990-1993)

### C. Publications (total: 39; total number of citations: 3071; Hirsch index: 23)

#### Selected papers:

- Truslow, J.G. & Tien, J., Perfusion systems that minimize vascular volume fraction in engineered tissues. *Biomicrofluidics*, in press.
- Price, G.M. & Tien, J. Methods for forming human microvascular tubes in vitro and measuring their macromolecular permeability. in *Biological Microarrays (Methods in Molecular Biology, vol. 671)* (eds.

- Khademhosseini, A., Suh, K.-Y. & Zourob, M.), pp. 281-293 (Humana Press, Totowa, NJ, 2011).
- Price, G.M., Wong, K.H.K., Truslow, J.G., Leung, A.D., Acharya, C. & Tien, J., Effect of mechanical factors on the function of engineered human blood microvessels in microfluidic collagen gels. *Biomaterials* 31, 6182-6189 (2010).
- Wong, K.H.K., Truslow, J.G. & Tien, J., The role of cyclic AMP in normalizing the function of engineered human blood microvessels in microfluidic collagen gels. *Biomaterials* 30, 4706-4714 (2010).
- Truslow, J.G., Price, G.M. & Tien, J., Computational design of drainage systems for vascularized scaffolds. *Biomaterials* 30, 4435-4443 (2009).
- Price, G.M. & Tien, J. Subtractive methods for forming microfluidic gels of extracellular matrix proteins. in *Microdevices in Biology and Engineering* (eds. Bhatia, S.N. & Nahmias, Y.), pp. 235-248 (Artech House, Boston, MA, 2009).
- Price, G.M., Chu, K.K., Truslow, J.G., Tang-Schomer, M.D., Golden, A.P., Mertz, J. & Tien, J., Bonding of macromolecular hydrogels using perturbants. *J. Am. Chem. Soc.* 130, 6664-6665 (2008).
- Price, G.M., Chrobak, K.M. & Tien, J., Effect of cyclic AMP on barrier function of human lymphatic microvascular tubes. *Microvasc. Res.* 76, 46-51 (2008).
- Golden, A.P. & Tien, J., Fabrication of microfluidic hydrogels using molded gelatin as a sacrificial element. *Lab Chip* 7, 720-725 (2007).
- Nelson, C.M. & Tien, J., Microstructured extracellular matrices in tissue engineering and development. *Curr. Opin. Biotechnol.* 17, 518-523 (2006).
- Chrobak, K.M., Potter, D.R. & Tien, J., Formation of perfused, functional microvascular tubes in vitro. *Microvasc. Res.* 71, 185-196 (2006).
- Tien, J., Golden, A.P. & Tang, M.D. Engineering of blood vessels. in *Microvascular Research: Biology and Pathology*, Vol. 2 (eds. Shepro, D. & D'Amore, P.A.), pp. 1087-1093 (Elsevier Academic Press, San Diego, CA, 2006).
- Tang, M.D., Golden, A.P. & Tien, J., Fabrication of collagen gels that contain patterned, microscale cavities. *Adv. Mater.* 16, 1345-1348 (2004).
- Chen, C.S., Tan, J.L. & Tien, J., Mechanotransduction at cell-matrix and cell-cell contacts. *Annu. Rev. Biomed. Eng.* 6, 275-302 (2004).
- Tang, M.D., Golden, A.P. & Tien, J., Molding of three-dimensional microstructures of gels. *J. Am. Chem. Soc.* 125, 12988-12989 (2003).
- Tan, J.L., Tien, J., Pirone, D.M., Gray, D.S., Bhadriraju, K. & Chen, C.S., Cells lying on a bed of microneedles: an approach to isolate mechanical force. *Proc. Natl. Acad. Sci. USA* 100, 1484-1489 (2003).
- Tien, J., Nelson, C.M. & Chen, C.S., Fabrication of aligned microstructures with a single elastomeric stamp. *Proc. Natl. Acad. Sci. USA* 99, 1758-1762 (2002).
- Gracias, D.H., Tien, J., Breen, T.L., Hsu, C. & Whitesides, G.M., Forming electrical networks in three dimensions by self-assembly. *Science* 289, 1170-1172 (2000).
- Breen, T.L., Tien, J., Oliver, S.R.J., Hadzic, T. & Whitesides, G.M., Design and self-assembly of open, regular, 3D mesostructures. *Science* 284, 948-951 (1999).
- Tien, J., Terfort, A. & Whitesides, G.M., Microfabrication through electrostatic self-assembly. *Langmuir* 13, 5349-5355 (1997).

#### **D. Research Support (in last three years)**

R01 EB005792 (PI) 5/1/06 – 2/28/10  
NIH/NIBIB

*Synthesis and Characterization of Patterned Microvascular Networks*

This project will systematically test how different perfusion conditions and geometries affect the functions and evolution of blood microvascular networks.

R21 HL092335 (PI) 7/1/09 – 6/30/11  
NIH/NHLBI

*Engineering Functional Lymphatic Networks In Vitro*

This project will develop methods to create human microlymphatic channels and networks in vitro within extracellular matrix gels.

BC086287 (PI) 9/1/09 – 8/31/10  
DoD/Army BCRP

*Effect of Interstitial Pressure on Epithelial Invasion from Human Mammary Ducts*

This project will test the hypothesis that interstitial hypertension suppresses mammary epithelial invasion.