

## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2. Follow this format for each person. DO NOT EXCEED FOUR PAGES.

NAME OF FELLOWSHIP APPLICANT Jonathan H. Tsui	POSITION TITLE Graduate Research Assistant
eRA COMMONS USER NAME (credential, e.g., agency login) jhtsui	

*EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Cornell University, Ithaca, New York	B.S.	8/08	Materials Science & Engineering
Cornell University, Ithaca, New York	M.Eng.	5/09	Biomedical Engineering
University of Washington, Seattle, Washington	Ph.D.	09/12 – present	Bioengineering

### A. Personal Statement

The goal of this research is to study the ability for the micronenvironmental control of cell fate in the context of tissue engineering and regenerative medicine through the development and use of novel biomaterials-based strategies. Specifically, we will investigate the effects of substrate topography and stiffness on maintaining satellite cell stemness and self-renewal so that they may be used as part of a treatment for sarcopenia. My academic training and pre-doctoral research experiences have provided me with a solid foundation in bioengineering-related disciplines including biomaterials fabrication and characterization, molecular biology, and biochemistry. My undergraduate at Cornell University consisted of developing hydrogel materials that were modified to allow for temporal control of growth factor delivery such that cartilage tissue could be engineered more successfully. I learned quickly that biochemical cues were critical to generating tissues with properties that approached that of healthy native tissue, and that biomaterials-based platforms could offer significant flexibility and control over the introduction of such cues to cultured cells. During my time as a research at Children's Hospital Boston, my research focused on the targeted delivery of therapeutics and on the development of novel biomaterials to achieve this task. I was also involved in research in organic-inorganic composites for tissue engineering, which is a relatively recent approach in biomaterial design. I further developed my benchtop and animal model skills during this time and also gained a tremendous amount of experience in project development from conception to publication, as I was given the lead role in a project to design a drug-eluting suture system that resulted in a co-first author article. I benefitted greatly from working in an environment where scientists and clinicians worked closely as this allowed me to gain insight into the importance of developing technologies that are not only scientifically interesting but are also clinically relevant.

### B. Positions and Honors

#### Positions and Employment:

6/2008 – 8/2008    Research & Development Intern, Replication Medical, Inc., Cranbury, NJ  
 2009 – 2012        Research Assistant II, Laboratory for Biomaterials & Drug Delivery, Children's Hospital  
 Boston, Boston, MA

### C. Publications

#### Peer-Reviewed Research Papers:

1. Jiao A, Trosper NE, Yang HS, Kim J, **Tsui JH**, Frankel SD, Murry CE, Kim DH. A thermoresponsive nanofabricated substratum for the engineering of three-dimensional tissues with layer-by-layer architectural control. *ACS Nano*. 2014; in press.
2. Chaterji S, Kim P, Choe SH, **Tsui JH**, Lam CH, Ho DS, Baker AB, Kim DH. Synergistic effects of matrix nanotopography and stiffness on vascular smooth muscle cell function. *Tissue Eng. Part A*. 2014; in press.

3. Yang HS\*, Ieronimakis N\*, **Tsui JH**, Kim HN, Suh KY, Reyes M, Kim DH. (2014) Nanopatterned muscle patches for enhanced myogenesis and dystrophin expression in a mouse model of muscular dystrophy. *Biomaterials*, 35:1478-1486. (\*denotes equal contribution)
4. **Tsui JH**, Lee WH, Pun SH, Kim JK, Kim DH. (2013) Microfluidics-assisted *in vitro* drug screening and carrier production. *Adv. Drug Deliv. Rev.*, 65:1575-1588.
5. Wang L\*, Shankarappa SA\*, Tong R, Ciolino JB, **Tsui JH**, Chiang HH, Kohane DS. (2013) Topical drug formulations for prolonged corneal anesthesia. *Cornea*, in press. (\*denotes equal contribution)
6. Lee JJ, Jeong KJ, Hashimoto M, Kwon AH, Rwei A, Shankarappa SA, **Tsui JH**, Kohane DS. (2013) Synthetic ligand-coated magnetic nanoparticles for microfluidic bacterial separation from blood. *Nano Lett.*, in press.
7. Shankarappa SA, **Tsui JH**, Kim KN, Reznor G, Dohlman JC, Langer R, Kohane DS. (2012) Prolonged nerve blockade delays the onset of neuropathic pain. *Proc. Natl. Acad. Sci. U.S.A.*, 109:17555-17560.
8. Cohen-Karni T, Jeong KJ, **Tsui JH**, Reznor G, Mustata M, Wanunu M, Graham A, Marks C, Bell DC, Langer R, Kohane DS. (2012) Nanocomposite gold-silk nanofibers. *Nano Lett.*, 12:5403-5406.
9. Tian B\*, Liu J\*, Dvir T\*, Jin L, **Tsui JH**, Qing Q, Suo Z, Langer R, Kohane DS, Lieber CM. (2012) Macroporous nanowire nanoelectronic scaffolds for synthetic tissues. *Nat. Mater.*, 11:986-994. (\*denotes equal contribution)
10. Shankarappa SA\*, Sagie I\*, **Tsui JH**, Chiang HH, Stefanescu C, Zurakowski D, Kohane DS. (2012) Duration and local toxicity of sciatic nerve blockade with coinjecting site 1 sodium-channel blockers and quaternary lidocaine derivatives. *Region. Anesth. Pain M.*, 37: 483-489. (\*denotes equal contribution)
11. Weldon CB\*, **Tsui JH**\*, Shankarappa SA, Nguyen VT, Ma M, Anderson DG, Kohane DS. (2012) Electrospun drug-eluting sutures for local anesthesia. *J. Control. Release*, 161: 903-909. (\*denotes equal contribution)
12. Dvir T\*, Bauer M\*, Schroeder A, **Tsui JH**, Anderson DG, Langer R, Liao R, Kohane DS. (2011). Nanoparticles targeting the infarcted heart. *Nano Lett.*, 11: 4411-4414. (\*denotes equal contribution)

#### Abstracts/Presentations:

1. **Tsui JH**, Janebodin K, Ieronimakis N, Yang HS, Lih D, Reyes M, Kim DH. Sphingosine 1-Phosphate Nanopatterned Scaffolds for Engineering Vascularized Skeletal Muscle Tissue. Abstract for poster presentation, Annual Meeting of the Biomedical Engineering Society; 2013 Sept 25-28; Seattle, WA.
2. Yang HS, Ieronimakis N, **Tsui JH**, Lih D, Reyes M, Kim DH. Nanopatterned Muscle Cell Patches for Enhanced Myogenesis and Muscular Regeneration. Abstract for poster presentation, 11<sup>th</sup> Annual Workshop of the Nano and Micro Systems Research Network; 2013 Jul 8-10; Seattle, WA.
3. Shankarappa SA, **Tsui JH**, Kim KN, Reznor G, Dohlman JC, Langer RS, Kohane DS. Therapeutic Use of Liposome Encapsulated Saxitoxin for the Treatment of Chronic Neuropathic Pain. Abstract for poster presentation, 41<sup>st</sup> Annual Meeting of the Society for Neuroscience; 2011 Nov 12-16; Washington, DC.
4. Degala S, **Tsui JH**, Milton SD, Bonassar LJ. The Effect of Peptide Sequence on IGF-I Release and Biosynthetic Response of Chondrocytes in Modified Alginates. Abstract for poster presentation, 56<sup>th</sup> Annual Meeting of the Orthopaedic Research Society; 2010 Mar 6-9; New Orleans, LA.
5. Yu N, Vandebroek EE, **Tsui JH**, Bonassar LJ. Effect of Binding Site Density on IGF-I Release and Chondrocyte Matrix Assembly in Modified Alginate Hydrogels. Abstract for poster presentation, 55<sup>th</sup> Annual Meeting of the Orthopaedic Research Society; 2009 Feb 22-25; Las Vegas, NV.

#### **D. Research Support**

##### Pending Research Support:

American Heart Association Pre-Doctoral Fellowship  
 Principle Investigator: Jonathan H. Tsui  
 Advisor: Deok-Ho Kim

Period: 07/2014 – 06/2016