

Stanford



Wonjae Lee

Instructor, Neurosurgery

CONTACT INFORMATION

- **Alternate Contact**

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Bio

ACADEMIC APPOINTMENTS

- Instructor, Neurosurgery

HONORS AND AWARDS

- Career Development Award (K grant), NIH (NCI) (2017-2021)
- Mogam Scientific Scholarship, Mogam Scientific Foundation (2006)

PROFESSIONAL EDUCATION

- Ph.D., Stanford University (2010)
- B.S., POSTECH (2001)

LINKS

- Lab site: <http://med.stanford.edu/x-tel.html>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

One of the key characteristics of life is the dynamic cross-scale interactions across different levels of biological organization, such as molecules, genes, cells, tissues, organs and an organism, in their own multi-scaled environmental contexts. The dynamic property of these interactions results in variation in physiological traits across individuals, shaping individuality of an organism. The overall research direction of my laboratory is to establish in vitro experimental platforms in which we can investigate this cross-scale interaction efficiently to develop personalized therapeutic strategies. Because many aspects of cross-scale interactions are mediated by blood circulation and crosstalk between the vasculature and perivascular tissues, our current efforts are focused on engineering the functional vasculatures in pathophysiological conditions of various human tissues. We have successfully developed in vitro experimental models equipped with the capacity of real-time monitoring of individual cell behaviors, which enables effective identification of the vascular routes that induce desirable behaviors of endogenous or exogenously grafted cells. Our in vitro model allows precise and independent control of the experimental parameters in highly time- and cost- efficient ways and facilitates the development of therapeutic and preventive treatment strategies in consideration of the phenotype variations across the patient population.

Teaching

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Neurosciences (Phd Program)

Publications

PUBLICATIONS

- **Engineering Three-Dimensional Vascularized Cardiac Tissues.** *Tissue engineering. Part B, Reviews*
Williams, M. A., Mair, D. B., Lee, W., Lee, E., Kim, D.
2021
- **A versatile system to record cell-cell interactions.** *eLife*
Tang, R., Murray, C. W., Linde, I. L., Kramer, N. J., Lyu, Z., Tsai, M. K., Chen, L. C., Cai, H., Gitler, A. D., Engleman, E., Lee, W., Winslow, M. M.
2020; 9
- **3D patterned stem cell differentiation using thermo-responsive methylcellulose hydrogel molds** *Scientific Reports*
Lee, W., Park, J.
2016; 6: 29408
- **Directed axonal outgrowth using a propagating gradient of IGF-1** *ADVANCED MATERIALS*
Lee, W., Frank, C. W., Park, J.
2014; 26: 4936–4940
- **The Design of a Heterocellular 3D Architecture and its Application to Monitoring the Behavior of Cancer Cells in Response to the Spatial Distribution of Endothelial Cells** *ADVANCED MATERIALS*
Lee, W., Park, J.
2012; 24 (39): 5339-5344
- **Hydrophobic nanoparticles improve permeability of cell-encapsulating poly(ethylene glycol) hydrogels while maintaining patternability** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Lee, W., Cho, N., Xiong, A., Glenn, J. S., Frank, C. W.
2010; 107 (48): 20709-20714
- **The reliable targeting of specific drug release profiles by integrating arrays of different albumin-encapsulated microsphere types** *BIOMATERIALS*
Lee, W., Wiseman, M. E., Cho, N., Glenn, J. S., Frank, C. W.
2009; 30 (34): 6648-6654
- **Viral infection of human progenitor and liver-derived cells encapsulated in three-dimensional PEG-based hydrogel** *BIOMEDICAL MATERIALS*
Cho, N., Elazar, M., Xiong, A., Lee, W., Chiao, E., Baker, J., Frank, C. W., Glenn, J. S.
2009; 4 (1)