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Engineering & Scientific Consulting

Daniel Cheung, Ph.D.

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Professional Profile

Dr. Daniel Cheung's expertise is in tissue engineering with specialization in cardiovascular tissue engineering and 3D printing/bioprintable biomaterials. He has expertise in characterizing cell phenotype and behavior within 3D hydrogel systems (including collagen, gelatin, hyaluronic acid, nanocellulose, and decellularized tissues) using histology, immunohistochemistry, gene expression, and western blotting.

Dr. Cheung is proficient in large animal tissue dissection and preparing specimen for uniaxial mechanical testing, cell isolation, and tissue culture. He also has experience in using SolidWorks, Autodesk Fusion 360, and 3D printers for rapid prototyping of custom bioreactors (strain, perfusion, and pulsatile) and coding in MATLAB, Python, R, and FIJI/ImageJ for data acquisition and analysis.

Prior to joining Exponent, Dr. Cheung completed his Ph.D. in Biomedical Engineering at Cornell University where he evaluated human mesenchymal stem cell behavior on tissue-derived biomaterials for fabricating tissue engineered heart valves. Specifically, he incorporated decellularized heart valve tissues or plant-derived components with methacrylated gelatin or methacrylated hyaluronic acid hydrogels to modulate cell phenotype. He also designed, built, and validated a bioreactor system to condition ex vivo and engineered heart valve tissues.

Academic Credentials & Professional Honors

Ph.D., Biomedical Engineering, Cornell University, 2019

M.S., Biomedical Engineering, Cornell University, 2016

B.S., Bioengineering, Oregon State University, 2013

National Science Foundation Graduate Research Fellowship Program, Cornell University, 2015-2018

Howard Hughes Medical Institute Med-Into-Grad Fellowship, Cornell University, 2014-2015

Prior Experience

Advanced Intern, United Therapeutics, June 2018 - August 2018

Graduate Teaching Assistant, Cornell University, August - December 2015, January - May 2019

Visiting Researcher, Weill Cornell Medicine, June - August 2014

Summer Scholar, Wake Forest Institute for Regenerative Medicine, June - August 2012

Amgen Summer Scholar, University of Washington, June - August 2011

Publications

Cheung DY, Duan B, Butcher JT. Bioprinting of Living Aortic Valve. In: 3D Bioprinting in Regenerative Engineering: Principles and Applications, edited by Khademhosseini A., Taylor and Francis Group LLC, 2017.

Cheung DY, Duan B, Butcher JT. Bioprinting of Cardiac Tissues. In: 3D Biofabrication for Biomedical and Translational Research, edited by Atala A and Yoo J., Academic Press, 2015.

Cheung DY, Duan B, Butcher JT. Current Progress in Tissue Engineering of Heart Valves: Multiscale Problems, Multiscale Solutions. Expert Opin Biol Ther. 2015;15(8):1155-72. doi: 10.1517/14712598.2015.1051527. Epub 2015 Jun 1.

Wang Z, Cheung D, Zhou Y, Han C, Fennelly C, Criswell T, Soker S. An in vitro culture system that supports robust expansion and maintenance of in vivo engraftment capabilities for myogenic progenitor cells from adult mice. BioResearch Open Access. 2014 Jun 1;3(3):79-87. doi: 10.1089/biores.2014.0007.

Presentations

Cheung DY, Butcher JT. “Hybrid Hydrogel Containing Decellularized Aortic Valve Leaflets Promotes Myofibroblastic Differentiation”. Tissue Engineering and Regenerative Medicine International Society, San Diego, CA, December 2016.

Cheung DY, Duan B, Butcher JT. “3D printable hydrogel matrix derived from decellularized aortic valve leaflets promotes fibroblastic differentiation”. Biomedical Engineering Society, Tampa, FL, October 2015.

Cheung DY, Hooper RC, Jacoby A, Asanbe O, Duan B, Laibangyang A, Spector JA, Butcher JT. “Angiogenesis from Biofabricated Hierarchical Vasculature within engineered Tissue Flaps”. Tissue Engineering and Regenerative Medicine International Society, Boston, MA, September 2015.

Duan B, Hockaday LA, Kang K, Cheung DY, Butcher JT. “Prescribed Matrix Environments within 3D Tissue Printed Tri-Leaflet Heart Valves Promote Differentiated Phenotypes of Mesenchymal Stem Cell”. Cornell Center for Materials Research Annual Symposium, Ithaca, NY, May 2015.

Cheung DY, Hockaday LA, Duan B, Li K, Kaldany A, Butcher JT. “Development of Parallel Pulsatile Flow Bioreactors for 3D Printed Tissue Engineered Heart Valve Conditioning”. Tissue Engineering and Regenerative Medicine International Society, Washington, D.C., December 2014.

Cheung DY, Cohen BP, Asanbe OA, Zhang P, Osoria HL, Spector JA, Butcher JT. “Autologous skin flap transplantation for reconstructive surgeries: A need for tissue engineered solutions”. Biomedical Engineering Seminar Series, Ithaca, NY, August 2014.

Cheung D, Ryder M, Schilke KF. “Structural and activity characterization of irradiated antimicrobial peptide (WLBU2) for use in blood processing and biomedical applications”. American Institute of Chemical Engineers, San Francisco, CA, November 2013.