2018 Faculty Advisor Request form for Graduate Student Position

Location: Wake Forest University

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<th>Project Title:</th>
<th>3D Bioprinted Cardiac Tissue on Cardiac Remodeling and Function</th>
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<td>Position Need:</td>
<td>1 MS/PhD (PhD preferred), start May or August 2018</td>
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<td>Funding:</td>
<td>Pending</td>
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Advisor: Sang Jin Lee, PhD
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Specific Project Description:
Due to high mortality and morbidity, heart failure remains to be a leading cause of death in the United States. Most heart failures exhibit cardiomyocyte loss, and the adult mammalian heart does not sufficiently regenerate cardiomyocytes after damage. Today, heart transplantation offers the best option at the end-stage of heart failure. However, replacing the failed heart with a healthy one raises several limitations such as shortage of organ available for transplantation, immune rejection, and surgical complications.

To overcome these limitations, bioengineered cardiac tissues have been developed by either seeding cells on polymeric substrates or condensing cells in a plastic molds; however, their utilizations have been limited due to lack of cellular organization, uniformity, and scalability.

In my lab, we utilize 3D bioprinting technologies that show promise as a viable option for creating complex, composite tissue constructs that are designed to regenerate or replace a damaged tissue or organ. These printing methods can place cell-laden hydrogels in a layer-by-layer fashion, replicating the complex 3D structures.

Other Notes: The WFIRM is an international leader in translating scientific discovery into clinical therapies. We are the first in the world to successfully implant a laboratory-grown organ into humans and today are working to grow more than 30 different organs and tissues in the laboratory. WFIRM mission is “to improve patients’ lives by developing regenerative medicine therapies and support technologies”.