

PhD Opening: Engineering Aspects in Cryopreservation

[Biothermal Technology Laboratory](#)
Department of Mechanical Engineering
Carnegie Mellon University
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Why Cryopreservation?

Cryopreservation is the preservation of tissues and organs at very low temperatures.

From a recent [Nature Biotechnology](#) paper (June 2017):

- “The ability to replace organs and tissues on demand could save or improve millions of lives each year globally and create public health benefits on par with curing cancer.”
- “Unmet needs for organ and tissue preservation place enormous logistical limitations on transplantation, regenerative medicine, drug discovery, and a variety of rapidly advancing areas spanning biomedicine.”
- “..., recent discoveries provide proofs of principle for breakthroughs in a family of research areas surrounding biopreservation.”
- “A growing body of evidence indicates that a transformation in organ and tissue preservation is now achievable.”

Our Engineering Contributions to Cryopreservation Research:

Activity at the [Biothermal Technology Laboratory](#) applies engineering fundamentals for the benefit of biology and medical applications. Related efforts range from basic research, through technology development, to experimentation on biological systems. Core engineering areas include thermal sciences, solid mechanics, sensors and instrumentation, geometric modeling, computation, and engineering design.

This specific PhD research opening is a part of an NIH-funded project to study thermal and mechanical effects during cryopreservation. Related research work involves measurements of physical properties of materials, and computation of thermal effects and solid mechanics effects.

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