SEMINAR IN PHYSICS

Friday, January 25, 2019
3:30-4:25 – Ross 0220

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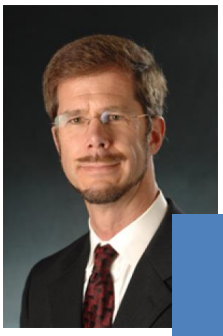

Dr. Robert R. McLeod

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3D Printing of Implants for Human Cartilage Regeneration

Regenerative medicine is an exciting new approach to healing in which the body is encouraged to regrow damaged tissues in ways it normally cannot. Cartilage, like that in your knee, is a good example of what can be damaged by impact or repetitive motion. Cartilage does not heal and the damaged areas eventually lead to osteoarthritis.

I will describe the results of our multidisciplinary team that has fabricated mechanically complex inserts filled with bone-derived stem cells in order to regrow both bone and cartilage in the human knee. Challenges span stem-cell biology, materials science, optics, mechanics and surgical implementation.

McLeod Lab
University of Colorado at Boulder

Our research is at the interface of optics and materials science. We create new photoresponsive materials, typically polymers, to address important problems in regenerative medicine, lithography and bio-optics. We expose these materials with novel optical patterning tools such as stereolithographic 3D printers, direct laser write or interference lithography. The parts we fabricate are often beyond the capability of current characterization tools, so we also develop new tomographic, holographic and microscopic measurement techniques.

Our work is highly interdisciplinary and thus we collaborate extensively with materials scientists, cell biologists, surgeons and engineers in academia, national labs and industry. Students and post-docs in the group come from both Electrical Engineering and Physics, typically specializing in Optics, and Materials Science, typically specializing in soft and polymer materials.

https://www.colorado.edu/faculty/mcleod/