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10:30 AM



**Dr. Lawrence Bronk**

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#### BACKGROUND

Lawrence Bronk is a medical physicist and faculty member at the MD Anderson Cancer Center Proton Therapy Center. He holds a Ph.D. in Medical Physics from MD Anderson, an M.S. in Nuclear Engineering from UT Austin, and a B.S. in Physics from MIT.

With a unique background bridging radiation physics and wet-lab radiobiology, Lawrence Bronk has collaborated for over a decade on investigating the spatial variations of biological effects in particle therapy. He pioneered the development of high-throughput mapping methods for proton and heavy ion radiobiology.

Having recently completed his medical physics residency and joined the faculty, Dr. Bronk combines clinical expertise in treatment planning and quality assurance with extensive experience in experimental radiation biology and novel irradiation systems.

# Spatial mapping biological response along charged particle beams



## Abstract

Proton radiation therapy is a promising strategy to improve the therapeutic index of radiotherapy in the treatment of tumors as it inherently allows for greater sparing of normal tissues. However, due to historical limitations in available biological data and imaging precision among others, clinical applications continue to assign a constant, spatially invariant multiplier of 1.1 to the physical dose delivered by protons relative to x-rays.

This relative biological effectiveness (RBE) of protons has been a topic of academic discourse since its definition. There is developing acceptance that proton RBE is in fact variable in clinical settings; thus, to maximize the benefit of proton therapy, we must accurately measure and model energy-dependent effects.

This seminar will cover our group's efforts in developing high-throughput irradiation platforms to systematically measure the spatial variations in RBE along charged particle beams.

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