

RIOT is pleased to present: Dr. Tom Hrinivich Medical Physics Resident, Department of Radiation Oncology and Molecular Radiation Sciences, Johns Hopkins University, Baltimore MD

Phd Alumnus, Department of Medical Biophysics, Western University, London ON



*Dr. Tom Hrinivich*

#### **What area of research are you in?**

My research area of interest is radiotherapy for the treatment of cancer. High doses of radiation can be used to kill cells. By delivering radiation precisely to a patient's

tumour, it is possible to kill cancer cells while minimizing damage to cells in normal tissue. This can lead to control of a patient's disease while reducing the treatment's side effects. Our ability to deliver radiation to a patient's tumour depends on our ability to find the tumour within the body and on our ability to target that tumour with radiation. Tumour localization and targeting are performed using medical imaging technologies, such as x-ray computed tomography (CT), ultrasound, and magnetic resonance imaging (MRI).

My PhD work was on advanced techniques using ultrasound and MRI for the guidance of radiotherapy for prostate cancer. My prior lab at Robarts Research Institute in London has developed techniques that allow physicians to find prostate tumours using MRI by measuring changes in blood flow associated with cancer; they can then place small radioactive seeds directly within tumours using needles guided by ultrasound.

#### **What is the most exciting thing you have worked on?**

The lab in London has developed hardware and software that automatically tells physicians where needles are located in the prostate, providing more accurate and time-

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efficient radiotherapy. This technology incorporates 3D ultrasound, robotics, and software based on graphics processing units, or GPUs, designed for the video game industry. This technology is currently being translated for routine clinical use.

#### **What might you do on a typical day off?**

When I can, I like to get outside and ride my bike. I recently moved to the east coast and have been having fun exploring cities and state parks.

#### **Has cancer research impacted how you live your life/changed your perspective on how you view life?**

My experience working in the field of cancer research has mainly shown me the great things that people can accomplish through creativity and hard work. Cancer impacts society in many different ways, and coming up with effective methods to improve the lives of patients requires thinking outside the box. The scientists I work with have exemplified creative problem solving and have changed the way I think about problems.

#### **What's next in your field?**

New technologies and techniques are constantly being introduced in the field of

radiotherapy. Based on my experience, I believe that the next major advancements in this field will be related to radiation-biology. Radiation can be used to destroy cancer cells effectively. Scientists are working to better understand the ways that radiation and cancer cells interact. These interactions include immune system responses and DNA damage and repair. By better understanding the mechanisms that govern these interactions, we can improve the ways that radiotherapy is prescribed, delivered, and combined with other treatments.

#### **What is the one thing you want people to know about cancer?**

Scientific research continues to improve the quality of treatment available to patients. However, cancer continues to impact many people. Discovering effective treatments for these complex diseases requires hard work and creativity. While cures may not be discovered tomorrow, supporting cancer research today is a way to ensure better lives for all future cancer patients.

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