

IsoSiM PROGRAM: FOSTERING THE NEXT GENERATION OF SCIENCE LEADERS

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At TRIUMF, Canada's national particle accelerator laboratory, staff and students know a thing or two about collaborative research. From recreating nuclear reactions at the heart of stars to developing the next best radioisotope for imaging diseases, the laboratory is a hub where multidisciplinary teams come together to tackle a broad range of research problems.

With its activities spanning basic research to commercialization in numerous fields, TRIUMF is involved in a wide diversity of foci which is accompanied by many different requirements for developing and operating specialized infrastructure. In this multidisciplinary environment, TRIUMF community members work together across disciplines, challenging what may be viewed as traditional research silos and formats while fostering a highly collaborative culture. Students in particular experience a highly multidisciplinary milieu and develop instrumental skills in learning to work and thrive collaboratively. They also gain valuable insights into the merits of different outreach approaches. The traditional outreach method typically involves bridging science and society via knowledge sharing with the general public. Another, perhaps less obvious approach (though one that is no less vital to successful interdisciplinary collaboration), is the building of bridges across the various scientific research disciplines by adapting to their different vernaculars and cultures.

"In this era of scientific research, it's not enough for students to endeavour to become experts in just their own field," said Dr. Reiner Kruecken, TRIUMF Deputy Director, Program Director for the Isotopes for Science and Medicine (IsoSiM) program, and UBC Professor of

Physics. "It's very important to expose upcoming students to the languages within different research fields."

This consideration was front and centre when TRIUMF joined forces with the University of British Columbia (UBC) to establish the Isotopes in Science and Medicine (IsoSiM) program. IsoSiM – launched in 2014 with funding from the National Science and Engineering Research Council's Collaborative Research and Training Experience (NSERC CREATE) initiative – provides UBC graduate students with hands-on experience in the production, preparation, and application of isotopes in fields like environmental stewardship, characterization of new materials, investigations of the foundations of the universe, and disease diagnosis and treatment. The IsoSiM program started in April of 2014 and has produced five graduates to date. Currently, there are 26 students in various stages of completing their IsoSiM education and training.

TRIUMF, in alliance with UBC's world-class research programs, leverages its vast isotope expertise to give IsoSiM students an array of experiences as numerous and diverse as isotopes themselves. "At the bleeding edge of science, the boundary between disciplines is inherently blurred," said IsoSiM and UBC Chemistry Ph.D. student Ryan McFadden. "Having expertise in multiple complementary fields is essential for pushing the limits of our understanding." In studying isotopes and the breadth of their applications, trainees gain hands-on experience working with physicists, material scientists, chemists, oceanographers, radiologists, pharmaceutical scientists, and others.

Between the subject matter of isotopes – which have an incredibly wide range of uses – and the multidisciplinary setting of the training program itself, trainees develop outstanding outreach skills that maximize their capacity to collaborate. The IsoSiM management team continually receives feedback from program graduates about the real-life value of the skills they developed in their cohort. "Collaboration between the various disciplines is increasingly important for doing high-quality scientific research," said IsoSiM and UBC Physics Ph.D. student Aris Chatzichristos. "It is important to learn how to communicate effectively with people from different backgrounds, and IsoSiM offers numerous opportunities to do just that."



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SUMMARY

IsoSiM is a hands-on, interdisciplinary training program that cultivates capacity for collaboration by providing rich and diverse experiences in the production and application of radioisotopes.

Keywords: Science Technology Engineering and Mathematics (STEM), isotopes, interdisciplinary studies, NSERC CREATE, isotopes, medical isotopes, graduate studies.



Ryan McFadden, IsoSiM student, Ph.D. student at UBC Department of Chemistry

The IsoSiM program provides a multiplicity of practical experiences, from specialized coursework and international research experiences to summer schools, industrial internships, and public outreach; the diverse curriculum provides trainees with interdisciplinary skills to tackle complex research challenges. Additionally, IsoSiM trainees participate in enriched professional development opportunities, equipping them with high-value vocational skills that amplify their capacity to be team players and quickly make quality contributions to an organization, whether in an academic or industry role. These



Zeynab Nosrati, IsoSiM student, M.Sc. student at UBC Faculty of Pharmaceutical Sciences

opportunities include developing their proficiency in advanced research writing, public speaking and engagement, project management, knowledge translation, entrepreneurship, and more. Industry partners themselves also recognize the value in the multifaceted nature of the IsoSiM program. “Companies like mine specifically look for students who are well-rounded,” said Dale Tiessen, Regional General Manager of GE Healthcare, an IsoSiM partner. “[IsoSiM]’s intent is to set students up for success no matter where they go.”

The IsoSiM program provides trainees with an interdisciplinary repertoire of skills and applied knowledge, and strives to cultivate the next generation of leaders in science and science collaboration. For more information about the program, including application details, please visit isosim.ubc.ca.

TRIUMF is Canada’s national particle accelerator laboratory. It is an international centre for discovery and innovation, advancing fundamental, applied, and interdisciplinary research for science, medicine, and business.