Canadian Association of Physicists

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Contribution ID: **3478** Type: **Oral Competition (Undergraduate Student) / Compétition orale (Étudiant(e) du 1er cycle)**

(U*) Novel methods to model the spread of COVID-19 in Kingston and inform public health policy

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In this study led by a group of multidisciplinary undergraduate students, a novel model for the propagation of COVID-19 was developed to understand the spread in Kingston, as well as the effect of vaccination interventions. The simulation is coded using the Monte Carlo method with an agent-based model in python, to simulate a realistic COVID-19 situation using current known virus parameters. With team members from various faculties, disciplines, and levels of education (undergrad, masters, and postdoc) working on this project, undergrads get the opportunity to learn how to collaborate with people within the department that have different areas of strength and physics knowledge. Students also had the opportunity to work alongside experts from other departments, including the Department of Health Sciences, which gives us experience working with individuals from other specialties.

The modelling framework was originally developed in the context of research with an all-physics group over the summer of 2020 and has since been enhanced by adding the input of students from other disciplines. Each person has been developing a broad set of practical research skills with a focus on certain skills of use in physics (as this is primarily a physics-based group). These skills include evaluating scholarly articles and extracting information relevant to our project, developing proposals and applying for funding, communicating our results through scientific writing, and learning to code in Python which is a very useful skill in many fields of science. This project involves learning to develop complex production software collaboratively using the version control software Git. Throughout this project, students get to see the entire software life cycle, from initial planning and creating a simple model, then incrementally adding new features and improving the model, and finally making production level code for use by our peers. Along the way, learning new programming techniques such as Monte Carlo simulations, learning to write strong code, and gaining experience critically examining and optimizing software. From this, preliminary findings highlight the reduction in spread from non-pharmaceutical interventions using the developed agent-based modelling techniques.

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