GAC-MAC London 2021

November 1-5, 2021

GEOLOGICAL ASSOCIATION OF CANADA
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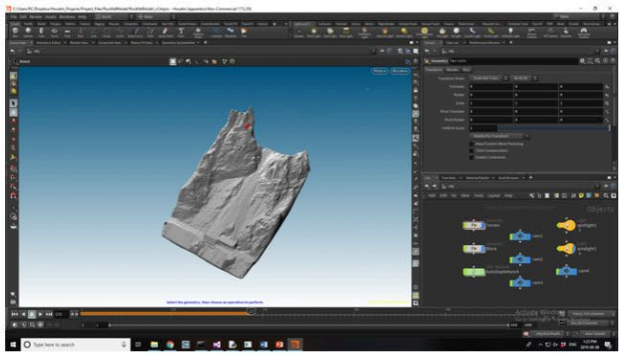
Exploring Geosciences Through Time and Space
Explorer les géosciences à travers le temps et l'espace

Gaming the Earth: Geoscience Applications of Game Engines, Augmented Reality, and Virtual Reality

Organizers: Rob Harrap (Queen's University), Jean Hutchinson (Queen's University), David Bonneau (Queen's University), Paul-Mark DiFrancesco (Queen's University), harrap@queensu.ca

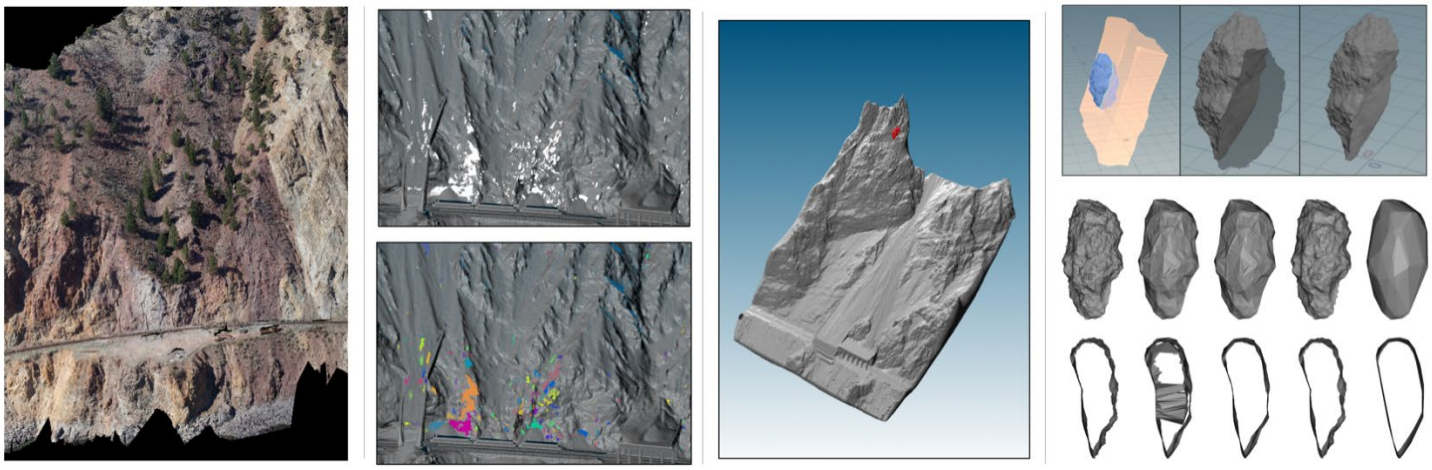
1 day pre-meeting Virtual Short Course – Saturday October 30, 2021

Visualization, model building, and simulation in the geosciences traditionally rely on software tools like GIS, mining and geophysical visualization packages, custom code in environments like MATLAB, and custom tools created for specific tasks such as rockfall simulation, groundwater modeling, and the like. While many of these tools are powerful, custom built tools tend to emphasize one aspect of a situation. With the increasing power of game engines - which after all have to be able to represent 3d environments and simulate phenomena such as smoke, fire, and explosions to be engaging - researchers have begun to apply these engines as general purpose platforms for geoscience needs.



These tools also strongly support multiple interaction modes from touch screen to augmented reality to virtual reality, all flexibly using the same world model. Recent events have led to dramatically increased interest in how to interact with geological spaces remotely, whether for education or research communication needs, and game environments handle this very well. This course will cover the range from simple model construction in the Unity game engine, through applications in geoscience education and simulation. We will also cover the construction of game objects from LiDAR or photographs, the use of online assets, plug in tools with to solve specific needs such as

terrain shaping, and other practical issues in making projects happen. Hands on exercises with real-world data will be emphasized. Examples will include our work on simulating rockfalls in western Canada.



Intended audience: Industry, Government and Academic Researchers, Students, Educators (K-12), Educators (12-17 y.o.)

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