

Predictive rendering of bluish colourations that can be observed when light is transmitted through snow

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A duo of Cheriton School of Computer Science researchers has digitized snow into a new model that can be applied to better understand the impact of climate change.

SPLITSnow is a spectral light transport model for snow and part of a larger body of research that simulates how light interacts with complex materials. While previous models exist, SPLITSnow is one of the most comprehensive models to date, which accounts for a variety of snowpack properties, such as density and water content, as well as the size and shape distributions of the individual grains. SPLITSnow also attempts to account for the crystalline makeup of grains.

The new model will also allow the team to generate important data for climate scientists around the world. Their major goal is to simulate this essential part of the ecosystem to gain more insight into fundamental environmental processes as part of the university's overall objective of being a global leader in sustainability research, education and innovation to benefit the environment, economy and society.

“One current problem facing scientists is the greening phenomenon,” said [Gladimir Baranoski](#), a Professor at the Cheriton School of Computer Science who leads the Natural Phenomena Simulation Group. “Many regions of the world are seeing vegetation growth much earlier and more widely in the season cycle than they have previously, which can alter the whole balance of energy.”

By understanding how the sun's light is affected by snow — and how that transmission may be altered depending on the particular characteristics of the snow — scientists can better predict how the presence or absence of snow because of climate change will affect plant growth.

“Different wavelengths can be seen as signals for different processes affecting the growth of snow-covered plants,” said [Petri Varsa](#), a PhD candidate advised by Professor Baranoski and the lead author of the research. “Some keep plants dormant, and some facilitate growth. Even small changes in the quantity and the quality of light propagated by snow may dramatically affect ecosystems.”

- Read the [full article on Waterloo News](#).

To learn more about this research, please see Petri Varsa, Gladimir Baranoski. 2023. [Rendering the Bluish Appearance of Snow: When Light Transmission Matters](#). *IEEE Computer Graphics and Applications*.