New tools for backcountry safety

University of Calgary researchers develop infrared cameras and computer models for avalanche prediction

In more than 90 percent of fatal avalanche accidents, the avalanches are triggered by the victim or someone in their party – be they skiers, snowboarders or snowmobilers. With the winter season now underway for outdoor enthusiasts, University of Calgary researchers are developing new methods to advance the science of avalanche prediction. Experts in Applied Snow and Avalanche Research Group have discovered that infrared camera technology gives them glimpses of the temperatures of the intricate layers in the snowpack for the first time. This is providing new clues that could lead to better prediction of deadly avalanches. Researchers are particularly interested in the melt-freeze crusts, which are formed by layers of snow that get wet, freeze, then get buried. "Infrared cameras allow us to measure changes in temperature right next to the melt-freeze crusts, and this something people have been trying to measure for decades without success," explains Dr. Bruce Jamieson, NSERC Research Chair in Avalanche Risk Control at the Schulich School of Engineering. "Avalanches that are very hard to forecast tend to release on top of these layers, so we're very interested in how the weak grains grow on top of the melt-freeze crusts." Computer models of popular backcountry areas – such as the Crowsnest Pass in Alberta and Rogers Pass in British Columbia – are also in the testing stage. "We generate terrain maps of where the snow might be warming up and these maps can help people choose the safest routes on a given day," says Cora Shea, a PhD candidate in the Department of Geoscience who has a background in computer science. "We're working to make these models able to display and compare a lot of data in a short time so professionals such as ski hill operators and backcountry guides can make the most of their snow forecasting time." Another area of avalanche research involves field observations during the summer months to understand the potential impact of extreme avalanches. Katherine Johnston, a master's student at the Schulich School of Engineering, spent much of last summer in the wilderness inspecting damage to trees and other vegetation. "This gives valuable information about the destructive potential of the path and magnitude of avalanches that have taken place in recent decades," explains Johnston. "This information is vital for land use planning and future industrial, residential and recreational development in the mountains." "We are very fortunate to have research of this caliber conducted with front-line avalanche workers in mind," says Ian Tomm, executive director of the Canadian Avalanche Association. "Dr. Jameson's work has given the community of professional avalanche workers some of our most valuable and effective tools. We follow his work and that of his team very closely, and we look forward to applying their findings to our work of public avalanche safety."