



SPLITTING THE TRACK

In 2013, the American Avalanche Association (AAA) rolled out a dramatic change to alter the face of U.S. avalanche education. In launching a new set of avalanche-course guidelines, the AAA set forth a plan to better reach recreationists and professionals on two separate tracks. Through a course at Nelson, British Columbia's Ymir Lodge, avalanche guru Colin Zacharias and internationally certified guide Rob Coppolillo show how this new pathway helps skiers and riders make better decisions in the mountains.

by Scott Yorko | photos by Mahiting Patelis

HELICOPTERS ARE LOUD. The high-pitched engine squeals beneath the deafening pulse of overhead rotors, which blast snow against surrounding trees and the people scurrying frantically to unload the bird while screaming instructions back and forth over the apocalyptic wind pounding from all sides. But when Colin Zacharias, 59, steps out of the AS 350 B3E helicopter on the cold, bluebird day in early March, donning a pair of orange protective earmuffs, his stoic face and calm stride seem more suited to exiting a limo at a movie premier.

Zacharias has come to Nelson, British Columbia's rustic Ymir Lodge to teach his only Level 2 recreational avalanche course of the season. As former technical director of the Association of Canadian Mountain Guides (ACMG), avalanche forecaster of the 1988 Winter Olympics and technical advisor for the American Institute for Avalanche Research and Education (AIARE) since 2004, Zacharias is spearheading this course to convey the newly updated AIARE 2 course material that teaches from a new Level 2 course manual and AIARE Risk Management Framework system that he helped author. His 39 years of professional work with avalanches make it hard to find a more qualified instructor.

With a polite, Canadian smile and a disarming gaze, Zacharias is a measured storyteller who speaks with the air of someone familiar with holding the attention of an entire room. Inside the 20-person hut, he sips coffee while softly chatting with each guest about his or her backcountry experience. Within a few minutes, a circle has gathered around the "Snow Yoda" to listen to his words. "You don't have to be an expert to make good decisions," he says beside the fireplace while casually laying out the objectives we'll cover over the next seven days, which will include 24 total hours of coursework—the standard length of the new Level 2 recreational curriculum. "You just need to be good within your experience and knowledge base. Common sense goes a long way, and the key to decision-making is recognizing patterns."

Sunlight is bouncing off the snow-covered treetops, so within 20 minutes he's finished his introduction and we're outside in the snow, reviewing nuances of avalanche equipment and rescue techniques until the sun dips behind a ridge across the valley.

DAY TWO STARTS EARLY. We all shuffle around the hut in down booties searching for coffee as morning light pours through the windows, but Zacharias is sitting at a table dressed for the day, his headlamp still on from predawn weather observations. Our group of 14 splits into two with co-instructor Rob Coppolino of Vesta Mountain Guides taking half the team. Zacharias's group gains a ridge just above the lodge and drops an east-facing tree run through shin-deep powder. It's a low snow year for British Columbia, but the turns are still exceptional, and Zacharias yodels as he skis through the trees to keep the group together.

We surface in a flatter clearing on the same aspect to dig some snow pits and see what the layers can tell us. Zacharias plants his ski tips at an angle and hangs a thermometer in their shade but never sticks the device into the snow. "You can tell a lot more from the wind and sky than a thermometer," he says from under a black wool ball cap. After some layer identification, our group does a few column tests and extended column tests, reporting the results for fellow group members to record.

Seven taps from the elbow yield a small collapse on a buried melt/freeze crust 30 cm below the surface. Or was it five taps? The group has lost count and can't recall. "The number of taps is irrelevant," Zacharias chimes in with patience. "It's just whether it's easy, moderate or hard. We're really just looking to identify weak layers and whether they're large, loose and propagating. We're not worried about the difference between sudden collapse and middle planar...leave that stuff to the scientists." The purpose of the forecast conditions for pure reference, but it's not a tool to determine whether or not we should ski a particular slope. That, he stresses, should be decided before you even step onto the snow.

WHEN I TOOK my Level 2 avalanche course three years ago, I felt like I'd wandered into the wrong classroom. The other students ranged from a veteran coping with post-traumatic stress disorder to aspiring internationally certified guides to a Department of Transportation snowplow driver looking to become a highway forecaster. We spent three days digging perfect snow-pack test pits, recording the depth, moisture, grain size, form and density of each layer. First thing in the morning, the instructor would spew an overload of new snow-science terminology for hours in the classroom before we ventured out to identify snow crystal shapes under a miniature magnifying glass.

After three days of hustling through rapid-fire snow-science discussion and stabbing layers with thermometers to test temperature gradients, I felt feeling like I'd only retained a third of the information. Plus, we'd barely had time to discuss terrain choices, slope assessment or how to handle the many human factors that can influence our decisions in the mountains.

"We had this mix of aspiring professionals and interested recreationists, and that made it a very difficult course to teach, because we had to cover stuff that professionals were going to need, like [an] introduction to all of the...technical scientific stuff," says Brian Lazar, executive director of AIARE from 2005



[Previous Spread] Common sense and kickturns can go a long way.

[Left] A morning debracketing holds course attendees' attention—or was this the story about a bear chasing down a moose?

[Below Left] Colin Zacharias digs out a pit to double check the avalanche conditions.

[Below Right] The mission behind the lesson: Stay safe enough for face shots.

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to 2014 and current deputy director of the Colorado Avalanche Information Center (CAIC), about the old course structure offered by AIARE, as well as other avalanche-course providers. “We had to spend quite a bit of time focusing on the observational and recording standards that you’re going to need as a professional. Those are not necessarily the main skills that a backcountry recreationist needs.”

In 2018, the American Avalanche Association (AAA), which oversees avalanche education in the U.S., finally updated its guidelines to separate courses into two separate tracks—professional and recreational—similar to Avalanche Canada’s addition in 1997 of a recreational avalanche course. After completing the same Level 1 course followed by a one-day advanced rescue course, the pathways for professional and recreational users diverge. Professional students now take a Pro Level 2 before a Pro Level 3 (both of which cover more snow science and technical observation skills), while recreational students progress to a Rec Level 2 course, with more focus on revamped decision-making checklists and protocols. This coursework overhaul, under guidelines set forth by AAA, was implemented across all U.S. avalanche course providers, including AIARE, the American Avalanche Institute and others.

“People are not getting smoked in the backcountry because they can’t tell the difference between facing and depth hoar,” Coppolillo says back at the lodge in our post-tour debrief one day. “People are getting smoked because they’re making bad decisions.”

FROM THE CLASSROOM to the skitrack, it’s not uncommon to hear folks say, “Your brain is the best tool in the backcountry!” But, as it turns out, our brains don’t actually work so well when we’re hungry, tired, overwhelmed with information and options or, most importantly, when our cognitive biases kick in. Once we decide on a goal—like skiing a particular couloir we’ve had our eye on all winter—our brains actively (but usually unconsciously) begin looking

for information to support that decision. This all happens while unconsciously ignoring or minimizing the relevance of information—wind slab potential, rapid warming, etc.—that does not support the decision.

“We can’t underestimate how much desire creates an emotional attachment to the outcome and drives our decision-making process,” Zacharias says one evening while clicking through a photo slideshow of avalanches that occurred in seemingly low-consequence areas: in the trees, on an 18-degree slope that remotely triggered an adjacent aspect above or after 74 people had already skied a face—situations often labeled as “fine” and “not going to slide” based on a false confidence.

To help manage our cognitive biases in avalanche education, Zacharias and AIARE leaned heavily on decades of accident reports and 30 years of research on the neuroscience of cognitive biases when revamping their curriculum. Most of this decision-making research is drawn from aviation, business, medicine and public-messaging studies.

The biggest takeaway is the importance of checklists, which are proven to dramatically reduce the rate of error when used properly, especially with a time crunch and other stresses at play. AIARE’s old field book focused on technical observation of conditions that factored into travel plans, whereas the new field book is set up as a full checklist with boxes to tick under the three phases: 1) Plan your trip, 2) Ride safely, 3) Debrief the day. This framework specifically outlines how to clearly identify hazards while checking in with the group along the way. Likewise, the old course manual presented on the first day of class read like a snow-science textbook. The new manual is meant to give students tools for managing hazards rather than simply identifying them.

“All of these little checklists are part of a risk-management process that the student now has a constant reference for in the manual that explains how to approach everything,” Zacharias says. “I think that’s the key difference between the old curriculum and the new one.”

[Left] In the S&Kirk Range’s Ymir Bowl, which receives an average of 40 feet of snow each year, there’s wide-open skies and no room for bad decisions.

[Above] Zacharias schools the class on common assumptions about avalanches and snowpack.



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Rather than spending hours in a classroom listing all of the potential human factors to which we commonly fall prey, the new curriculum teaches students to pre-bias decisions against those factors before heading into the field. Terrain options are "coded" as simple, challenging or complex based on slope angle, safe zones, terrain traps and snow characteristics. The more decision-making we do ahead of time, like deciding that complex terrain is off limits for the day, the less likely it is for us to fall victim to the "scarcity" heuristic: seeing others get first tracks and blindly following or rushing to beat them to fresh turns.

"It's way harder to back off after your second turn with your tips pointed downhill in good weather and excellent snow giving you confirmation bias," Zacharias says on the second evening—sitting under a disco ball and flashing party lights that someone had turned on to jazz up our debrief and desert hour. "Not only is it easier to do a better job analyzing risk and assessing hazard when trip-planning ahead of time, it's easier to come to consensus. Having a protocol for risk puts everyone on the same page with less indecision."

[Above] A morning check of bacons, hunger and tiredness before heading out to make unbiased decisions.

[Right] Rob Coppollito follows protocol and leaves any bad habits behind.





(Above) An avalanche professional for 40 years, Colin "Snow Yoda" Zacharias has been

(Below) Getting granular without losing the big-picture goals of the day.



"So, HOW ARE we going to die today?" Coppillo asks in our morning meeting on the third day. "Well, it was really windy last night," a lawyer from Steamboat points out. "So if we drop every run from the top of the ridge onto leeward slopes, it's a lot more likely we'll get suckered onto an unstable slab that'll take us for a ride over a cliff or bury us."

"I'm pretty worked from touring all week," says another man from Colorado. "So that could affect my decision-making when we're out there and maybe blind me to some instability that could kill me."

Coppillo isn't just trying to be morbid; his goal is to get students to engage in the "pre-mortem" protocol for the day. "The left prefrontal cortex was identified by UC Santa Barbara neuroscientist Michael Gazzaniga as the part of the brain that tries to give a cause-and-effect narrative to our life," he says. "The dude studied corpses and split brains in half and discovered that as soon as you give someone a scenario with the worst-case outcome, their brain immediately begins to connect the dots on how that outcome could occur or why." For this reason, pre-mortem check-ins are an effective tactic to use at critical decision points, whether in the backcountry, in the classroom or on the battlefield.

On the morning of Day 6, a group of us sets out to gain a ridge and drop into a new aspect in unfamiliar terrain. Wind has deposited several inches of fresh snow onto the treed slope, and our maps show what looks like an apron fanning out at the bottom of a chute running along a tall rock wall. The chute looks fat with fluffy snow that has been protected from the sun, so there's no crust underneath. The slope angle is steeper than 35 degrees at the top with a rollover in the middle that we assume will continue into the valley below without too many trees or a cliff. Our group of six men and one woman begins assessing the run and deliberating the hazards.

The tone of our discussion begins to suggest it's a steep enough angle to slide; that we don't know what's below; but that it looks pretty consistent and there's nothing too gnarly to get raked through if it did go. "I say we go for it," I chime in after getting cold and impatient with several minutes of debate.

"Wait a minute," the lone female says. "I thought we decided in our trip plan today that we're headed into an unfamiliar place and not going to step it up to challenging or complex terrain regardless of how it looks."

This comment isn't coming from a natural leader who typically speaks up in this type of group dynamic, especially with all male touring partners, but all she has to do is reference our agreed-upon plan. The structure of our preparation has given her the language to bring us back to the decision we made with more sober minds, rather than focusing on the goods right in front of us. So we call it off and ride fun, mellow powder down the ridge to where we drop a more open line with a better view of the runout.

"We can close runs once we're in the field, but we can't open up new terrain," we remind each other in a group discussion following the decision. Since our established primary goal was to come home safely, not to ski a particular line, we aren't bummed that we skipped the potentially more thrilling option. "The key to avalanche risk reduction is to remain flexible," Zacharias says as we give him our trip report from the day. "Every morning, I get psyched on my Plan B and expect it to happen. If the stars align for Plan A, then great."

I still don't have a firm grasp on temperature gradient differentials or crystal grain identification of snow metamorphism or funicular versus pendular wet snow regimes, but since taking the new Level 2 course, I've noticed that I'm consciously more aware of times when my brain is trying to trick me into thinking something is less risky than it is. This happens not just in the backcountry, but also while paragliding, driving and assessing potential relationships. The earlier I can recognize this factor and even anticipate it ahead of time, the more control I feel over my ability to effectively manage risk well before it's staring me in the face. ■

Editors' Note: AAIRE is one of many avalanche-education providers in the United States, all of which are now offering recreational and professional avalanche-course tracks and fees, even caravans and decision-making checklists to manage inherent operator issues. See a list of upcoming avalanche courses in the back of this issue and a list of all course providers at the American Avalanche Association's website, avalanche.org.