

# Cool runnings towards a PhD

Iain Roberts is combining a doctorate at the University of Edinburgh with the sport of skeleton bobsled. By **Anne Giacomantonio**

**S**o you think you understand physics? You think you know about engineering in practice? Well how about calculating the fractions of a centimetre required to make the tracks on your sled the fastest, and in doing so winning an Olympic medal?

Iain Roberts is attempting to do just that. He's combining his full-time slider (the term skeleton bob sled athletes use to describe themselves) training with a PhD in the mechanics of skeleton bobsled and ice friction, and the sport of skeleton bobsled.

Skeleton bob sled involves sliding head first down an ice track at up to 85 miles an hour on a steel sled steered by the slider shifting their weight.

"It all depends on weight transference and actual bending of the sled, so the better you understand how the sled interacts with the ice and how your movements transfer through the sled to the track, the better you can perform," explains Roberts.

"Most sleds tend to be of a generic design. But with medals won and lost by 0.01 seconds, a sled tailored to the individual could be the advantage that wins a gold medal."

Roberts started sliding three years ago when he was given the opportunity to try his hand at a military training track in Norway. He now competes for the New Zealand team. The track doesn't feature regularly on the competition circuit but it still has a special place in his memory.

"It's so clear in my mind. It's probably the slowest run you will ever do but it feels like the fastest because you are on sensory overload, your head touching the ice. No one told me, but because of the G force you aren't able to hold your head up, and the sound is quite loud.



"There are no breaks, once you're going you're going... you just have to deal with what comes. When I first started, I used to reassure myself with my physics background, thinking that the tracks were built for this purpose so not much can go wrong. I put my faith in physics. Looking back, that was maybe a false assumption because if you get it wrong you can be airborne.

"Saying that, even the top guys hit the wall, if you make a touch in a certain place you can go faster. But when you first start you are hitting left and right and your speed is so low that you are saving yourself [from injury]. The impacts themselves are no more than bumps and bruises. It's only very harsh lines where you go so wrong you can break things.

"It's not like hitting concrete at 80 mph because ice is more forgiving. At the end of the day it's a slippery surface.

"On the first run there were two voices in my head – one saying get off and the other saying stay on. But as soon as I finished the first run I just felt like a six year old. I just wanted to run up the top of the hill and go again. Some people run in the opposite direction. It's a sport you either love or hate."

Roberts loved it so much he started bouncing ideas about with his colleagues at Edinburgh University where he studied his physics degree. What knowledge, tools and experience are required to build a sled like this? And what effect can it have on the overall performance?

"It became apparent that, because there are so many variables, it was quite a good research topic."

So he worked in a coffee shop for two years while training and creating research proposals to find funding for his PhD.

"These things make you stronger in the long run because it makes you realise how much you want it. Initially I was a little wary because I didn't know how well the racing side would react with the academic side.

"But it's a rare opportunity to be able to immerse yourself in something you love. I spend every single waking hour on the one goal of trying to go as fast as possible.

"I have a lot to learn as an athlete, as well as trying to understand the equipment.

"Say you're thinking about the runners underneath the sled, they have specific cuts, having a 1.1mm spine, a 1.2mm spine or a 1.5mm spine. How important is it to have those? Can you get away with saying in these ice conditions 1.2mm is good? The research helps you have faith and confidence in your equipment because, at the end of the day, it's the athlete that wins the race not the sled.

"If you go into a race, standing on the start line, thinking this is the best possible set up for me, maybe it's more of a psychological advantage. It helps your self-belief and a happy athlete is the best placed on the day.

The confusing part for Roberts is when and where to stop analysing and just get on with the sliding.

*'When I first started, I used to reassure myself with my physics background'*

"I have a couple of test sleds; it's really interesting information coming out of them. It's got excited about where it's going.

"There are probably 10 ways for measuring anything you want but it's up to you to decide which you think is most appropriate for that application. If you think of something you want to find out there is a way of finding it out.

"Again if you think about it too much – you should just get on and slide at some point."

Roberts is due to complete his PhD in the summer of 2009 – just in time for the 2010 Winter Olympics in Vancouver, Canada.

He is also aiming to compete in the World Championships next year in Lake Placid – Roberts' favourite track. It will be a good test of the equipment's progress.

With a reliable and well researched sled Roberts is right on track for glory.