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ROCKY MOUNTAIN OUTLOOK

Series speaker focuses on glaciers, climate change

By Lynn Martel - Rocky Mountain Outlook

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After completing an undergraduate degree in engineering physics at the University of Toronto, Dr. Shawn Marshall worked for a year doing nuclear physics at Atomic Energy Canada's Chalk River Nuclear Labs.

While there though, he noticed all the PhD research scientists were doing all of the most interesting work. Altering course, Marshall enrolled at the University of British Columbia in a geophysics program for PhD studies, following the idea of studying oceanography – waves, currents and climate. Serendipity intervened, however, when he met UBC professor emeritus in glaciology Dr. Garry Clarke.

Now associate professor with the department of geography and Canada research chair in

climate change at the University of Calgary, Marshall has become one of the country's most respected authorities on glaciers and related climatology.

And on Wednesday, May 19, Marshall will share a presentation focussing on climate change and what can be learned from our glaciers and ice sheets at the final event of the Canadian Rockies Snow and Ice Initiative 2010 Speakers Series.

"Our climate has always changed, but what is different this time round?" Marshall asks. "Do we really know where we are headed? What role do the icefields play in this?"

To find answers to these questions, Marshall and his team of students and volunteers have spent about 150 days annually since 2003 conducting field research at sites ranging from Kananaskis Country's Haig Glacier to Iceland to Ellesmere Island, where he once worked with a team drilling a core to bedrock dating back to the last ice age. Among his favourites is the "marvellous" Lloyd George Glacier, tucked in a remote northern B.C.'s Kwadacha Wilderness Area, which, due to budget cuts (his budget for next year will be half what it was this year), will soon be shut down. Accessed by a 75-minute helicopter ride from Fort Nelson and so remote that it's unlikely anyone has ever reached it overland, Marshall said the site is simply too expensive to maintain.

"That is too bad, it is a fascinating place that has been professionally neglected," Marshall said.

Budget cuts are but one of the challenges, along with time and good help, of carrying out the long-term studies that are crucial to gaining a clear understanding of the workings of Mother Nature.

"The trick in the university world is to define short-term research studies, projects that actually end, rather than plan to do anything for 30 plus years – that is just too hard," Marshall said. "Unfortunately, this really precludes genuine monitoring efforts."

Fortunately though, the proximity and easy accessibility of the Haig Glacier makes it an ideal study spot, Marshall said.

"The Haig Glacier is great that way," Marshall said. "It's good skiing in and out all winter and a great trail run in summer. You can even do a daytrip there in high summer to pull off a mass balance survey and to



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replant poles along the glacier centreline, as long as you have good strong students to work with who can run all day.”

An avid skier and runner who has lived in Canmore since 2002, Marshall commutes to teach at the U of C three days a week, while maintaining a network of 320 backcountry weather stations in southwestern Alberta that provide plenty of mountain biking and trail-running outings.

And fortunately, he pointed out, a lot of valuable field work can be carried out very simply.

“We’re very low-tech and simple in the field,” Marshall explained. “I’m mostly looking at

glacier-climate processes – surface energy balance; melt modelling, how temperature changes with elevation and surface environment, glacier runoff measurements in some places. We set up weather stations; measure the spatial and temporal evolution of snow/ice albedo, set up stream gauging sites in front of the glaciers, do standard mass balance measurements with stakes and snow pits. There’s lots of good old-fashioned digging of snow with good strong student help. Nothing innovative in our fieldwork, to be honest, but there is such a dearth of knowledge out there that just getting out for some basic measurements in some of these places is

necessary.”

Marshall and his team also work with precipitation and snowpack isotopes, trying to track the origins of cloud water vapour and the synoptic weather systems that bring snow. As a modeller, Marshall spends lots of time simulating past ice ages, recent glacier and ice sheet changes, and the future evolution of the ice in Greenland and Antarctica.

While he laments how a funding decrease will create a data gap, Marshall said he looks forward to spending more time analyzing

the data he has been collecting for nearly a decade.

“I just love physics and chemistry and mathematics applied to the pursuit of understanding our world, understanding our environment,” Marshall said. “I want to make some of the connections between the physics of our system – the atmosphere, ocean, glaciers, hydrology – and the ecology. More technically, I also want to understand and develop better models for

how the ocean is currently attacking the major ice sheets in Greenland and Antarctica. This is a huge problem for sea level rise and society, and one that has blind-sided glaciologists. The big polar ice sheets are starting to fall apart and not many people really saw it coming.”

Ultimately, Marshall said he hoped he could help communicate scientific discoveries and knowledge with the general public, a task for which he expressed thanks for the efforts of Canmore’s Bob Sandford, Canadian chair of the UN’s water for Life initiative.

“Science offers a vehicle to try to push society forward in the right directions, with respect to conservation and climate and sustainability about the way we live,” Marshall said. “We are

going in the wrong direction right now, obviously, and that is painful, but we have to keep it up and find a way to get through, to make the difference.

“I do hope to help to somehow move these from ‘externalities’ in our view of the world into something that is intrinsically valued in the public, political and policy spheres. Otherwise, we (scientists) are just kids playing in our own sandboxes; having fun, but not making the difference we need to make.”

The final CRSI Speakers Series presentation takes place at Canmore Collegiate High School on Wednesday, May 19 at 7 p.m.

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