University of Lethbridge

News Release

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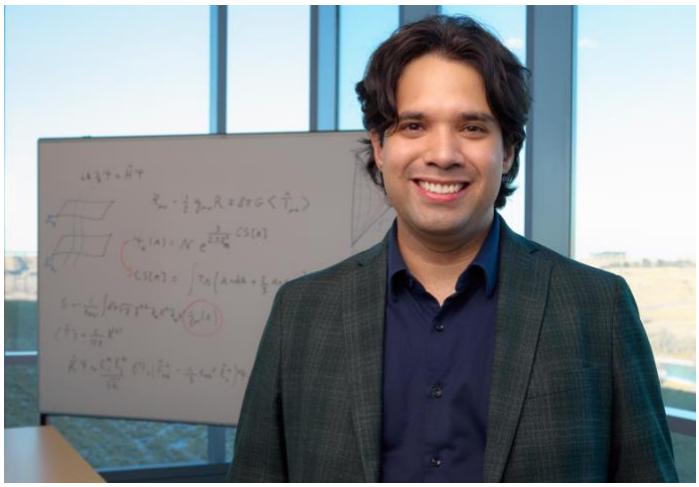
Quantum expertise boosted by addition of QHA Research Chair Dr. Heliudson Bernardo

Alberta is quickly becoming a hub of excellence for quantum research and one of the key nodes responsible for driving that reputation is the University of Lethbridge.

Anchored by established theoretical physicists such as Dr. Saurya Das and boosted by the collaborative provincial network of Quantum Horizons Alberta (QHA), ULethbridge further bolstered its strength as a research powerhouse by recently adding QHA Research Chair Dr. Heliudson Bernardo. Das, who has been at the forefront of quantum research initiatives for years, calls the 33-year-old Bernardo a rising star in the field.



"We're absolutely thrilled to now have Heliudson as part of our group," says Das. "He has a very strong record of top-notch, international quality research, and he's come here and already hit the ground running. He's created a strong research team and is continuing to add to it, so we couldn't have found a better chair."

Bernardo was trained in his native Brazil and earned his Bachelor of Science in Physics at University of Brasília, before master's and PhD studies at São Paulo State University. He then had graduate and postdoctoral postings at Montreal's McGill University before a move to the vaunted Ivy League, with a postdoctoral stint at Brown University.

As he explains, it's not a surprise he turned his sights to southern Alberta.

"Just looking at this building (Science Commons), I feel the university is very bold in terms of stepping up and trying to shape the future of science in general," says Bernardo. "Since quantum is so popular and gaining the attention of many people internationally, it's natural for such a bold university to invest in that field."

So, just what is quantum and why is it so important?

“We use the results of theoretical research in quantum in our daily lives. Your smartphone is only working because of quantum theory. The GPS that you use in your car also works just because of quantum theory. Medical imaging is also something that requires quantum to work,” says Bernardo. “All those devices, which are essentially the foundation of the modern society in terms of technology, are based on quantum theory.”

His particular research expertise is focused on theories of quantum gravity, which he describes as the physics that’s required to solve theoretical problems such as black hole singularities and what happened to the universe close to the Big Bang.

“I build new quantum theories and use cosmology as a laboratory to test them — by confronting them with real observations of the universe,” he says.

What he, his colleagues and trainees are working on won’t be found on a store shelf tomorrow or in your Amazon cart, but the theoretical work they are doing lays the foundation for these technological advances. The strength of QHA and Canadian quantum research is that it is at the forefront of what Das refers to as the second quantum revolution.

“It’s hard to predict a revolution, but what we can do is read the signs and create the infrastructure and build the foundations for it and hope it works,” he says. “Canada, in particular, is putting in a lot of resources, and you can see the signs that things are happening.”

One of the exciting aspects of quantum research, says Heliudson, is that it has no boundaries, and the students he is training are well equipped to succeed in a vast array of careers.

“I feel Alberta wants to shape the future of quantum research and the application of quantum research, and we are right in the middle of that,” says Bernardo. “The training of students is very important, because researching the foundations of quantum theory gives them valuable skills like problem solving, skills that can be used in industry and fields like finance, financial markets and multiple other places.”

Bernardo’s QHA appointment is for five years with the possibility of renewal.

To view online: https://www.ulethbridge.ca/unews/article/quantum-expertise-boosted-addition-qha-research-chair-dr-heliudson-bernardo

PHOTO: Dr. Heliudson Bernardo (name pronounced with a silent ‘H’)

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Our University's Blackfoot name is Iniskim, meaning Sacred Buffalo Stone. The University is located in traditional Blackfoot Confederacy territory. We honour the Blackfoot people and their traditional ways of knowing in caring for this land, as well as all Indigenous Peoples who have helped shape and continue to strengthen our University community.