

Driven

IBM Watson AI XPRIZE



The Cave Hill team includes (l-r) Dr. Curtis Gittens, Dr. Mechelle Gittens, Nicholas Hoyte, Prof. Ian Hambleton, Christina Howitt

Using Artificial Intelligence to Combat Health Challenges

A multidisciplinary group of experts, drawn from computer science, statistics, and public health, are developing an artificial intelligence-powered (AI) system to predict human behaviour in those predisposed to diabetes. This system has the potential to revolutionise the world's approach to health behaviour change.

The cognitive AI simulation and virtual counsellor system (**Driven**) seeks to identify the root causes of patient decision making and behaviour, and is under development by the group led by computer scientist, Dr. Curtis Gittens, a lecturer in the Faculty of Science and Technology at Cave Hill.

Having entered the highly competitive, internationally acclaimed \$5 million **IBM Watson AI XPRIZE** competition last year, the local experts secured the approval of a global panel of judges to move onto Round 2.

It is the only team from Latin America and the Caribbean to advance, and is going up against groups from Canada, United States, Italy, United Kingdom, India, Vietnam, China, Australia, Norway, France, Poland, Germany and Israel.

"Considering the number and quality of the teams that are in the competition, we are pleased with the fact that we get to move on to Round 2. In Round 1, the entire Latin American and Caribbean region was only represented by us and a team from Ecuador. There



were 90 teams in North America, between the US and Canada, and over half of those teams have been eliminated. When you consider the fact that we were considered strong enough to enter Round 2, given the sheer number of teams from developed countries, it says something about the work that we're doing. For us to get into Round 3, we are focusing on getting the full system running and proving our technology," Dr. Gittens said.

The IBM Watson AI XPRIZE challenges teams to develop powerful AI applications, demonstrating how humans can collaborate with AI technologies to tackle the world's greatest challenges. The focus this time around is on Health & Wellness, Learning & Human Potential, Civil Society, Space & New Frontiers, Shelter & Infrastructure, and Energy & Resources.

Dr. Gittens said that preliminary feedback from one of **the IBM Watson AI XPRIZE** liaisons indicated that they stand a good chance of making it to Round 3 once the system is constructed and proven.



Brendon Duncan

Only 59 teams from 14 countries have advanced from the initial 148 teams that entered the challenge which concludes in 2020.

The system being developed by the national team consists of cognitive architecture, an agent-based model and simulation system, a virtual counsellor and a data analytics engine.

The team believes that identification of the root causes of unhealthy behaviours would allow health professionals to develop highly-personalised behavioural interventions, hopefully reducing an individual's risk of developing a major chronic disease by addressing the key inhibitors and facilitators to healthy lifestyle change and adherence.

They explain that **Driven** is different from current AI technologies because it probes the reasons behind these types of psychosocial behaviours, and in doing so, would provide public health interventionists with a valuable lifestyle management tool that provides insight into the persistence of people eating a poor diet.

"What we want to do is create a psychologically realistic, virtual version of a person. We capture what the person likes, their emotional profile, what foods they eat, where they live and their social and physical environment to create a virtual world with that virtual person in it. The goal is to run a number of simulations using scenarios in which they are faced with food choices; for example, going to Christmas dinner or birthday parties or just going out to dinner, and identify the triggers that will lead them to choose the food that they shouldn't be eating."

The World Health Organisation has said that non-communicable diseases (NCDs) were responsible for 39.5 million or 70 percent of global deaths in 2015, with cardiovascular diseases, cancers, diabetes and chronic lung diseases being the main contributors. Diabetes, in particular, accounted for 1.6 million of those deaths.

"We are in the competition to win, but we recognise that, if we build the system and apply it to our situation in the Caribbean,

we can make a significant change in the way NCDs are treated. The XPRIZE Foundation has a huge network of people you're exposed to through mentorship, workshops and conferences. You get to meet a global community of leading thinkers in the area and you get the opportunity to share your ideas with them. Being able to have a significant impact on how chronic non-communicable diseases are treated is nothing to sneeze at. It's something that will be a significant benefit even if we don't make it to the finals," Dr. Gittens explained.

The inroads by these academics coincide with Cave Hill's transformation to a Smart Campus, an initiative that combines innovation in facilities design and management, curriculum reform and the continuous enhancement of its learning environment and administrative processes.

"It seems to be a convergence of events," Dr. Gittens noted. *"It's a good time to be doing this, especially with the Smart Campus initiative. If we continue to be successful in the competition we believe it would inspire students to strive to take their position on the global stage and be recognised for excellence in work and research. It will also show that we don't have to look to North America and Europe for leadership in technology and innovation."*

The AI project is the result of research conducted by Dr. Gittens and his wife, Dr. Mechelle Gittens, in the fields of AI and mobile health respectively, combined with the research expertise of the Data Group in the George Alleyne Chronic Disease Research Centre.

The other members of team **Driven** are: Catherine Brown, Qualitative Data Analyst; Dr. Peter Chami, Machine Learning Specialist; Brendon Duncan, Mobile Application Developer; Professor Ian Hambleton, Biostatistician (Predictive Analytics); Christina Howitt, Data Scientist; Nicholas Hoyte, Software Developer (AI Perception); Dr. Selvi Jeyaseelan, Research Methodologist/Research Manager; and Dr. Natasha Sobers-Grannum, Primary Care Physician/Clinical Epidemiologist. ♦



Catherine Brown



Dr. Selvi Jeyaseelan



Dr. Natasha Sobers-Grannum

Absent is
Dr. Peter Chami