

# CHAPTER II

## IMPACTING LIVES THROUGH RESEARCH AND INNOVATION



The Hon Reverend Ronald Thwaites, Minister of Education and Guest Speaker at the 2012 Research Days Opening Ceremony, and The Hon. Phillip Paulwell, Minister of Science, Technology, Energy and Mining, look on as Professor Gordon Shirley, Pro Vice Chancellor and Principal of the UWI, Mona Campus introduces Miss Stephanie Abrahams, President of the Guild of Students, UWI, Mona to the Hon Sharon Ffolkes-Abrahams, Minister of State in the Ministry of Industry, Investment and Commerce. Also present was the Hon Arnaldo Brown, Minister of State in the Ministry of Foreign Affairs and Foreign Trade.



Members of the audience at the Opening Ceremony for Research Days 2012, held January 26 and 27 under the theme, "Promoting Health and Wellness: UWI, Mona's Innovative Approach."



As the leading teaching and research institution in the Region, the UWI holds the awesome responsibility of identifying critical areas of need for new knowledge and innovation, and responding to these with researched solutions that positively impact the lives of Caribbean people.

During the 2011/2012 academic year, the UWI, Mona Campus secured approximately J\$143 Million for new externally funded projects on a wide range of topics, including: the development of a demonstration and training centre for high yield crops and training in advanced fruit and vegetable production technology; examination of the status of maternal, paternal, newborn and infant health and wellbeing; promoting marketing competitiveness and adaption to climate change; limestone forest conservation; the study of older persons, and studies on HIV and disabilities, to name a few.



Dr. Roger Irvine and Dr. Orville Williams demonstrate the uses of the UWI Cardiac Surgery Simulator during its Official Launch at Research Days 2012. The innovation continues to be in high demand as major universities and hospitals in the USA, as well as the University of the West Indies continue to get good outcomes in training trials.



Dr. Paul Ramphal and Dr. Daniel Coore, inventors of the Cardiac Surgery Simulator, explain its functioning to Professor Gordon Shirley, as Dr. Roger Irvine and Dr. Orville Williams demonstrate various uses of the device.

## Research Days 2012

Held under the theme, "Promoting Health and Wellness: UWI, Mona's Innovative Approach," the UWI, Mona Campus demonstrated the depth and potential far-reaching impact and application of its research work during Research Days 2012. The official launch of the Cardiac Surgery Simulator developed by Dr. Paul Ramphal and Dr. Daniel Coore held the spotlight, with kids and adults alike marvelling at its ingenuity and sophistication.

Other important innovations featured included GasLo, a Blackberry application that allow users to find the cheapest gas station closest to their location; JamNav - VCS (vehicle concierge service), which adds the interactive link between conventional fleet management and tracking systems in Jamaica; and Mapstream, which extracts information from social data streams such as Twitter and Facebook and map social trends. Research displayed included work on climate change and its potential impact on the livelihood of Jamaicans; parasitic flatworm infection of local seawater cultured tilapia; human health implications of rat lungworm infections in Jamaica; as well as works on autism, prostate and various other forms of cancers, and heart disease.





## Key New Research and Innovations Advanced During 2011/2012

Continuing on the successes of the 2010/2011 academic year, which in part drove the displays of Research Days 2012, both faculty and students at Mona advanced key pieces of research and developed important innovations during 2011/2012. These include:



- Development of the **Renewable Energy Driven Microcontroller Based fully Automated and Controlled Hydroponic Greenhouse System**. This innovation, patent pending, is the brainchild of student Ewan Pitter and faculty Dr. Paul Aiken from the Electronics Engineering Unit at Mona. The system aims to provide a viable solution to the pressing issue of land availability to meet the ever growing food needs of an increasing population.

Hydroponic Systems support plant growth using water with nutrient additives through a delivery system. These systems generate very high crop yields when compared to current farming techniques on land with poor nutrient content. While most greenhouse systems require significant manual labour to monitor nutrient and water contents, a fully automated hydroponic system requires minimal manual labour.

A model of the Renewable Energy Driven Microcontroller Based Fully Automated and Controlled Hydroponic Greenhouse System in use.



- Development of a Solar Panel Tester, courtesy of work undertaken by student Darrell Gordon, under the supervision of faculty Dr Paul Aiken. The result is a device that should prove critically important as we increasingly embrace solar power as an alternate renewable energy source.

The plethora of solar panel technology currently used in developing these devices mean significant variation in performance, depending on the environment in which they are being used. Therefore, following manufacturer's performance measures, which are usually taken in conditions alien to ours, oftentimes result in customers being dissatisfied with the level of performance they see locally. The solar panel tester will accurately determine performance levels of these devices in local conditions, allowing suppliers and users to make the most appropriate investment to satisfactorily meet their specific power requirements.

Prototype of the Solar Panel Tester developed by student Darrell Gordon, under the supervision of faculty Dr Paul Aiken.

- The combined effort of the Department of Chemistry and Department of Physics led to the development of a simple



Participants at the Mobile Financial Services Conference, which explored a shared services approach to the delivery of mobile financial services in Jamaica, held December 12, 2011.

optimized process for efficiently converting Waste Cooking Oils to Petroleum-Grade Biodiesel. The project will provide training and technical support to community organizations and interest groups desirous of implementing this sustainable practice for managing frying oil wastes.

- A study conducted by the Mona School of Business and Management in partnership with Solutions for Society, an emerging societal Think Tank, examined the economic potential for implementing a Mobile Financial Service System in Jamaica. Further work will be necessary with policy-makers, the private sector and multi-lateral agencies to develop a comprehensive guide that could help to determine the most appropriate framework for its broad-based introduction.

These findings provided significant and compelling rationale for the likely benefits from the implementation of this system as an effective means of extending financial services to traditionally unbanked consumers, thereby driving financial inclusion, more efficient commerce, and, though indirectly, job creation and innovation through a more vibrant financial sector.





Some of the findings of the study were quite interesting and instructive:

- 34 percent of the adult population in Jamaica do not own bank accounts and must use cash and or the non-bank payment outlets at relatively high costs.

- Of the 66 percent that own bank accounts, only 12 percent own transactional accounts (money transfer accounts, checking accounts and credit cards).

- Therefore, over 80 percent of adult Jamaicans have limited access to a low-cost, safe payments channel.

- Research being conducted by Dr André Coy of the Department of Physics on the project, "Emulating Human Speech Recognition: A Scene Analysis Approach to Improving Robustness in Automatic Speech Recognition," seeks to address current limitations with Automatic Speech Recognition systems. The outcomes of this research present a systematic approach to the automatic recognition of speech signals from overlapping speakers using techniques inspired by what we know of human hearing. Experimental results prove that developing speech recognition systems that mimic human speech processing increases the robustness of these systems to noise, even when the noise is speech from other individuals.

The potential benefits of this new approach are tremendous as it would enable us to use automatic speech recognition to tackle real-world problems. Potential direct applications to the Jamaican society would include literacy education, for example developing an



Recipients of Principal's Awards for Outstanding Research with Principal, Professor Gordon Shirley at the 2012 Research Days Awards Ceremony, held Friday, January 27.