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# Harnessing Intellectual Capital for Research

Research is the foundation for social, cultural, economic and environmental innovations that drive society forward. The UWI Mona Campus, in keeping with tradition as the premier research institution in the English-speaking Caribbean, continued to strengthen its research capabilities.

## STRENGTHENING THE CAMPUS'S RESEARCH CAPABILITY

In academic year 2016/17, we executed a number of strategies to strengthen our research capability. The Campus hosted the Second Mixed Methods International Conference where Caribbean researchers were encouraged to adopt a new approach in investigating facts to arrive at more accurate conclusions. While the tools for quantitative research are well known and available, those tools for qualitative are more unfamiliar. Mona's Mixed Methods group, led by Dr Loraine Cook, collaborating with the Office of Graduate Studies and Research Campus Coordinator Professor Denise Eldemire-Shearer, worked towards advancing knowledge of this approach to research. Fifty (50) staff and students attended a workshop where the mixed methods programme was introduced, and the Campus institutionalised the programme, becoming a Chapter of the International Association of Mixed Methods. Data is currently being analysed to quantify the noticeable impact on our researchers' use of qualitative research methods.



Scenes from the Regional Mixed Method Conference



In order to increase research output and build private sector research partnerships, we updated the Mona Online Research Database (MORD) to enhance computing support to researchers, grouping researchers around sustainable development goals and Jamaica's economic agenda, while ensuring academic freedom and inclusion of all research – applied and pure.

Mona Information Technology Services (MITS) enabled all staff and students to access another analytical tool, QDA Minor – a statistical package – that was funded by the Office of the Pro Vice-Chancellor,

Graduate Studies and Research. Further, MITS extended and enhanced computing support for researchers, research and innovation management, and support for work-group collaboration among researchers. Specifically, a High-Performance Computer Cluster (HPCC) platform, a deliverable of the IDB funded Pilot Programme for Climate Resilience, was installed. The HPCC will primarily be used to produce the 'Big Data' Caribbean small island states (SIDS) need to accurately forecast and mitigate the effects of climate change on the region. In general, the HPCC will be used broadly for scientific modelling, visualisation and data analytics. It has been designated the acronym SPARKS: Scientific Platform for Applied Research and Knowledge Sharing.

### Research impacting development challenges

The Centre for Advanced Research in Renewable Energy (CARRE) located on the campus, is the result of a research project called the 'Low Greenhouse Gas Emissions: Promoting Energy Efficiency & Renewable Energy Building in Jamaica (LGGE) Project'. This research project was devised by Professors Anthony Clayton, CD and Tara Dasgupta, CD, and funded by the Global Environmental Facility (GEF). Technical assistance was provided by the United Nations Environment Programme (UNEP). With assistance from the Mona School of Engineering Energy Management Unit (EMU), the project resulted in the design, procurement and construction of the Caribbean region's first Net-Zero Energy Building (NZEB).

The long-term benefits of the NZEB are: reduced environmental impacts, lower operating and maintenance costs, better resilience to power outages and natural disasters and improved energy security. The building will save approximately 50,000 kilowatts of

**THE CONSTRUCTION OF THE CARIBBEAN REGION'S FIRST NET-ZERO ENERGY BUILDING (NZEB) WITH ASSISTANCE FROM THE MONA SCHOOL OF ENGINEERING ENERGY MANAGEMENT UNIT (EMU).**



*Official Opening of the Net-Zero Energy Building, October 2017*

energy annually, which translates to a reduction in carbon dioxide emission of 34.5 metric tonnes per year. The building also serves as a prototype for zero energy building principles and strategies that respond to climatic conditions, and will serve as an emergency shelter.

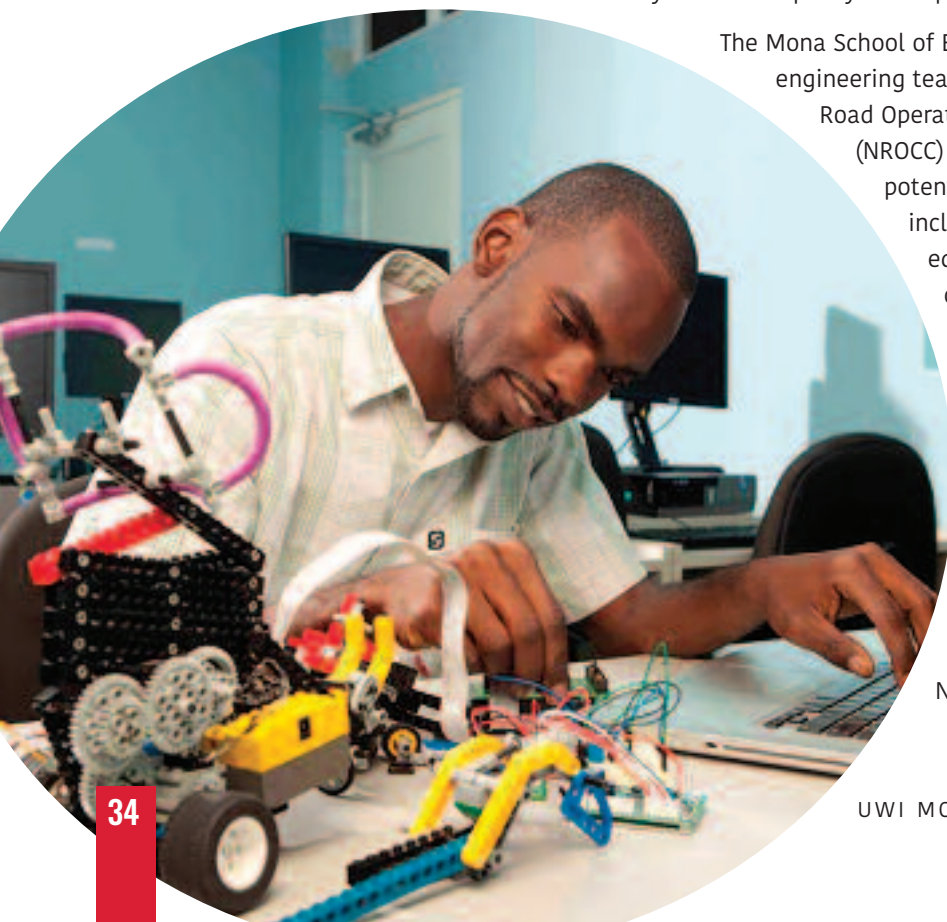
The EMU also implemented a Campus Energy Awareness Programme (EAP) that seeks to: achieve improvement in all areas of energy efficiency and conservation; manage energy as a controllable expense; improve Campus energy productivity by requiring less, or a constant amount of energy to produce more graduates, and realise increased revenues; and galvanise the involvement of the Campus community towards heightened energy consciousness, conservation and efficiency practices in the workplace.

As part of the research project, the EMU conducted an energy audit which led to the retrofitting of the National Housing Trust (NHT) headquarters in Kingston, the adjoining car park and the Emancipation Park for improved energy efficiency. A Memorandum of Understanding was signed between the NHT and The UWI in 2016 to cover the assessment of the most advanced retrofit solutions to increase energy efficiency and performance of existing buildings. The NHT headquarters complex is now a demonstration project under the LGGE programme. It is designed to show how energy-efficient building technology can be used as a model in both retrofit and new construction for the region's contractors and builders.

Also in the Faculty of Science and Technology, the Earthquake Unit acquired funds to implement a seismic resilience project in Font Hill, Westmoreland. This will increase the number of seismic stations to 13, putting Jamaica in a safer position against the ravages of earthquakes.

The Physics Department launched The Mona Fire Research Group (MFRG), a multi-disciplinary group engaged in studying the science of fires. MFRG fills a void in the Caribbean in terms of fire research and fire protection engineering, and will ensure that our region play its part in terms of fire safety issues and policy development.

The Mona School of Engineering's (MSE's) civil and electronics engineering teams have been working with the National Road Operating and Constructing Company Limited (NROCC) to resolve environmental issues that potentially resulted from roadway construction, including the design and deployment of equipment to remotely sense environmental conditions. With its geology partners, MSE is ready for engagement with NROCC to identify critical areas for research and start the process of effecting tangible solutions. In cases where short-term solutions are required with high levels of technical competences via projects-driven Request for Proposals (RFPs) or otherwise, the Mona-Tech Engineering Services Ltd – the commercial arm of the MSE – stands ready to partner with NROCC.



# Research Projects at the Mona Geoinformatics



The research work undertaken in the Mona Geoinformatics Ltd continues to provide public service in the national interest. MGI was at the forefront of the national preparations for the possible impact of Hurricane Matthew in October 2016, advising the prime minister on activities.

MGI's road safety activity extended into enforcement work with the Jamaica Constabulary Force's Traffic Division, guiding enforcement strategy and deployment, including targeted action against certain vulnerable groups. In the reporting period, MGI closely worked with the JCF in targeting motorcycle fatalities in Westmoreland, among other locations.

MGI developed a full virtual New Kingston for the Jamaica Public Service and its Smart City concept, which will look at the widespread deployment of public wi-fi and smart sensors that can aid in traffic management, energy consumption, public security and transport, among other improvements.

MGI's reputation of innovation continued in the 2016/17 period. This included the incorporation of virtual reality models, in addition to the usual 3D model developments.



*Dr Parris Lyew-Ayee, Jr showing Prime Minister Andrew Holness the latest information on Hurricane Matthew and likely impact areas in Jamaica.*



*Working with SSP Calvin Allen, Commanding Officer of the JCF Traffic Division*



*Parris Lyew-Ayee Jr., Director of Mona Geoinformatics with CEO of the National Works Agency, E.G. Hunter, in the emergency operations room at the NWA.*

Professor Helen Asemota of the UWI Biotechnology Centre, and the State University of New York (SUNY) Binghamton have been collaborating to identify the different forms of pathogens that exist in Jamaica. The hope is that the team will be able to revolutionise yam production through development of low-cost biosensors and molecular genetic tools that can detect diseases and allow for early intervention. The National Science Foundation (NSF) recently granted funding to the UWI and SUNY to carry out this project. Also collaborating are the Northern Caribbean University (NCU), The Southern Trelawny Environmental Agency (STEA) and yam farmers in Manchester and Southern Trelawny. This synergy will facilitate the sharing of ideas among the universities and support the transfer of technology.

**WITH MORE THAN 30 PHD AND MPHILL THESES THAT HAVE BEEN PRODUCED, MANY MORE CAMPUS RESEARCHERS ARE STILL STUDYING THE USE OF YAMS IN TREATMENT OF ILLNESSES, AND AS INDUSTRIAL RAW MATERIALS**



The biosensors will be able to detect the presence of anthracnose disease caused by the fungus *Collectotrichum Gloeosporioides*. While the pathogen may be controlled by chemical fungicides, these may lead to environmental damage and fungicide resistance. The fungus has had a devastating effect on the production of yam crops in Jamaica since 2004, especially sweet yam, a yam in great demand in the international market, but for which Jamaica is unable to meet the demand because of the anthracnose disease.





Asemota, who heads the multi-disciplinary UWI Yam Biotechnology Research Group, has been leading the UWI's efforts in yam research for over two decades. With her guidance, the team has produced more than 100 refereed international journal publications, four patents and more than 200 conference abstracts. Some of their current research areas include finding ways to mitigate waste of yam crops, and the use of specific biomolecular properties in yams as possible sports medical foods /nutraceuticals.

In recent years, the studies have progressed under the theme, "Yams – from farm to finished products", with the aim of promoting Jamaican yams as food, medicine and an industrial raw materials source. The research has contributed in no small way to drawing attention locally and internationally to Jamaican yams, and to the improved quality of yams grown locally. The research has also uncovered the medicinal value of Jamaican yams in the treatment of ailments such as cancer, hypercholesterolemia, diabetes and acquired or genetic disorders such as hyperlipidemia. With more than 30 PhD and MPhil theses that have been produced, many more Campus researchers are still studying the use of yams in treatment of illnesses, and as industrial raw materials. The patents resulting from the research set the stage for the development of marketable products.

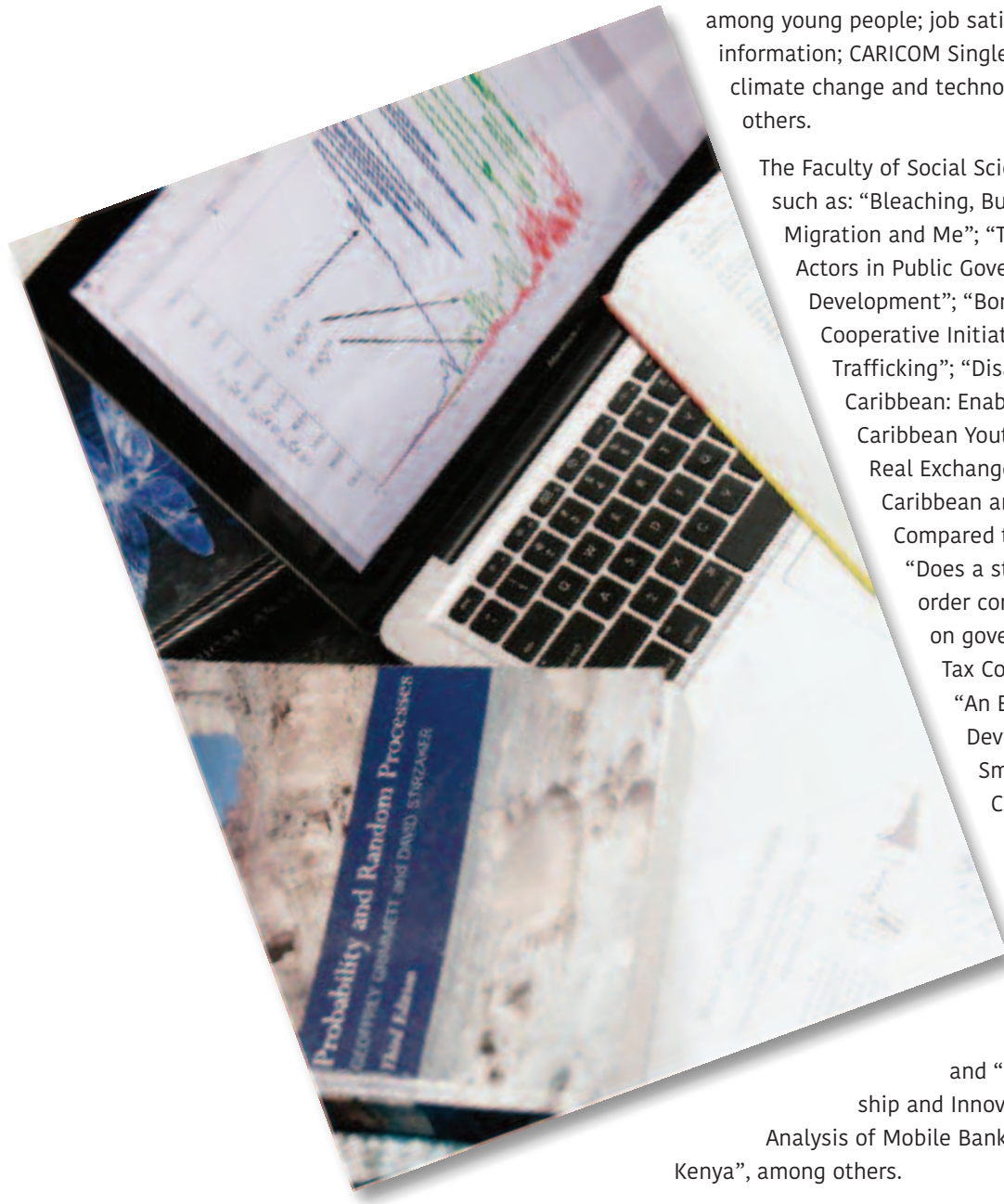
**IN RECENT YEARS, THE STUDIES HAVE PROGRESSED UNDER THE THEME, "YAMS – FROM FARM TO FINISHED PRODUCTS", WITH THE AIM OF PROMOTING JAMAICAN YAMS AS FOOD, MEDICINE AND AN INDUSTRIAL RAW MATERIALS SOURCE**



## Research papers, presentations and conferences

The outcome of our robust research culture in the academy was demonstrated through the quality and quantity of peer-reviewed journal articles, book chapters, and books published during the year. The publications covered a wide range of issues: cultural differences; racist and ethnic differences in family profiles; early childhood education; child poverty and child rights; self-esteem; body dysmorphic disorder; disordered eating attitudes; depression; negritude and blackness and the demand for authenticity; gender equality in Jamaica; violence and poverty; intergenerational profiles and individual outcomes; re-integration of prisoners; migrant health and ICT's; intergenerational living arrangements and well-being in comparative prospective; multigenerational families; multigenerational issues in an aging society; domestic violence; parenting and academic achievement; body image and depressive symptoms; biracial and multiracial identity; demographic and social factors in the use of licit drugs; issues around marijuana, its legalisation and trade; violence among young people; job satisfaction; housing and information; CARICOM Single Market; gender and age; climate change and technology, among numerous others.

The Faculty of Social Sciences researched topics such as: “Bleaching, Bullying and Me”; “Barrels Migration and Me”; “The Case For Subnational Actors in Public Governance and Development”; “Border Security and Cooperative Initiatives to Counter Illicit Drug Trafficking”; “Disability and ICTs in the Caribbean: Enabling Visually Impaired Caribbean Youth”; “Current Account and Real Exchange Rate Dynamics in the Caribbean and Latin America Compared to the G7 Countries”; “Does a stronger system of law and order constrain the effects of FDI on government size?; “Improving Tax Compliance in Jamaica”; “An Evaluation of Software Development Practices Among Small Firms in Developing Countries”; “Mainstreaming Disaster Risk Management into Management Education”; “Re-inventing, Revolutionising and Transforming Caribbean Tourism”; and “Barriers to Entrepreneurship and Innovation: An Institutional Analysis of Mobile Banking in Jamaica and Kenya”, among others.





The Department of Economics (DoE) staged its inaugural West Indies Economic Conference (WECON) under the theme, “Small Economies, Unlimited Possibilities”. Over the one-and-a-half days, twenty-five papers were presented by academics from 10 countries. The topics explored included labour market discrimination, income inequality, tax compliance, the impact of hurricanes, finance, and trade. Some 120 persons attended, including representatives from the public and private sectors, and students and colleagues from The UWI and other tertiary institutions. The conference provided an opportunity for academics from around the world to discuss important issues affecting small economies, and to share ideas about future research and research methodologies.

The conference has helped to re-ignite an atmosphere of research and scholarly exchange within the DoE.



*A section of the audience*



**Above:** Professor David Tennant, Head of DoE chairing the conference, “Small Economies, Unlimited Possibilities”  
**Below:** Professor Arye Hillman delivering his keynote speech

DoE also launched a policy discussion series in an effort to guide and impact economic policy-making and thought in Jamaica and the Caribbean. The series explored solutions to current problems that directly impact economic policies. Themes included: “Critical Considerations that will determine the Extent and Nature of Jamaica’s Future Involvement with CARICOM”; “Private Sector Perspective on the Prospects and Pitfalls of Jamaica’s Future Involvement with CARICOM”, and “An Economic Outlook for the Caribbean – 2017”.

In partnership with the Ministry of Economic Growth and Job Creation, The UWI hosted a Caribbean Outreach event, the visit of the Inter-Governmental Panel on Climate Change (IPCC) Caribbean. Other partners were The Caribbean Development Bank, the Caribbean Community Climate Change Centre, the Inter-American Development Bank and Panos. This regional outreach event was aimed at raising awareness, especially among policymakers and the scientific community from the region about the IPCC, its role, and activities.



The Mona ICT (MICT) Policy Centre's research into the area of cybercrimes led to CARIMAC's hosting of the 4th National Cyber Security Conference under the theme, "Mobile Money, Online Banking and Citizen Awareness".



CARIMAC's Director, Professor Hopeton Dunn, addressing the audience at the 4th National Conference on Cyber Security

**Nurturing research students**

One of the primary aims of The Office of Graduate Studies and Research (OGSR) is to enhance and increase the research output of our research students. With this in mind, in 2016/17 the Office implemented and institutionalised training programmes to enhance research supervision which was determined to be a critical factor in the time taken to complete research degrees. OGSR also continued to encourage students along their research journey through its Evening of Excellence where students are celebrated for outstanding achievements. In the reporting year, two students received the Most Outstanding Thesis Award: Dr Stacy Stephenson (PhD Molecular Biology) and Dr Sharon Gardner (PhD Language Education). In addition, the departments of Community Health and Psychiatry and Language, Linguistics and Philosophy were recognised for graduating the most research degrees in 2015/16.



Scenes from the Evening of Excellence – Awardees with supervisors, PVC and Campus Coordinator



### New research partnerships/collaborations

In its continuing effort to broaden and solidify its research value, the Campus continued in its tradition of maintaining and establishing both local and international research partners. Of particular note are those which the Faculty of Medical Sciences formalised in the reporting year:

- Research collaboration with Colgate (Dentistry).
- Formalisation of research collaboration with the University of Pennsylvania, School of Dental Medicine.
- Initiation of research collaboration with the Zahnmedizinische Fakultät of the Freie Universität Berlin, Germany (Dentistry).
- Establishment of a MOU between the Harvard/MGH Center on Genomics, Vulnerable Populations and Health Disparities and the University of West Indies Medical School, to develop cancer genomics research and other areas of cancer research. This partnership will provide opportunities for collaboration on international research projects.



CEO, Private Sector Organisation of Jamaica (PSOJ), Dennis Chung (second left) and Vice-Chancellor, The University of the West Indies (UWI), Sir Hilary Beckles (second right) present the signed document following the signing of a memorandum of understanding establishing the joint innovation committee to drive research and innovation, at the PSOJ head office on May 17, 2017. They are flanked by PSOJ member Twain Richardson (left) and UWI Pro Vice-Chancellor, Planning, Professor Densil Williams.

### Making research accessible to the public

To address national concerns that the UWI research output is often not visible in the public domain, the Faculty of Social Sciences formalised its “Shaping the Public Discourse” special initiative. This initiative sought to provide public access to the research work of the Faculty. Consequently, during the period under review, there was a significant increase in the number of articles published in Jamaica’s two leading newspapers, focussing on findings from research undertaken by academic staff in the Faculty.



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# UWI Mona

# RESEARCH DAYS 2017

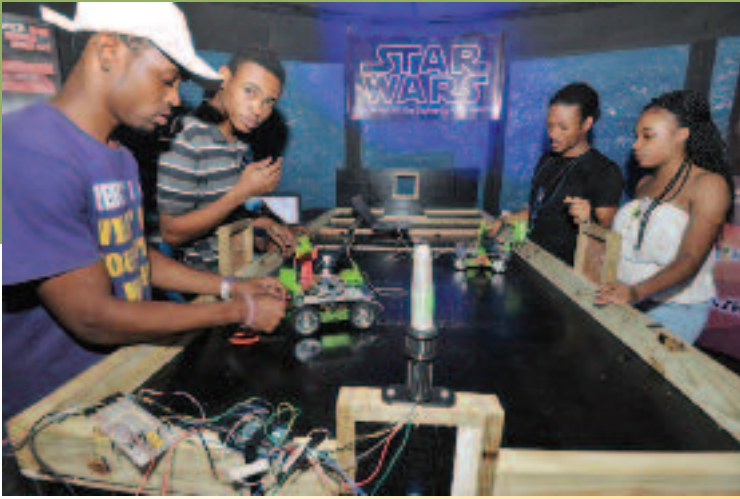
The 18th staging of the Campus's annual Research Days, under the theme "Driving Development through Research and Innovation", was aimed at making the public aware of the academy's research skills honed over these 69 years and positively impacting Jamaica's economic development. The media, including social media, was integrally engaged in the three-day exhibit which showcased recent research. Crime, Human Rights and Justice emerged as an underlying theme, especially in the Faculties of Law, Social Sciences and Medical Sciences. More than 4,500 persons, including students, visited the main exhibition. In all, there were 60 major exhibits, 127 posters and 50 interactive displays.

There were also other signature events, including forums, public lectures, panel discussions, book launches and tours of heritage sites, that contributed to visitors' appreciation of the depth and breadth of The UWI expertise and acquired institutional knowledge.

The work of 23 researchers and their teams was highlighted in the Research for Development booklet. Their research covered a wide range of topics, many of which are linked to the economic agenda. The work of six students was also highlighted.



# “Driving Development through Research and Innovation”



**Principal's Research Awards:** Twenty-nine (29) awards for outstanding research were made during the Principal's awards ceremony in the categories 'best research publication, most outstanding research activity, project with greatest economic potential' and 'most outstanding researcher'.