FACULTY OF PURE AND APPLIED SCIENCES

MONA

Year ending July 31, 2011

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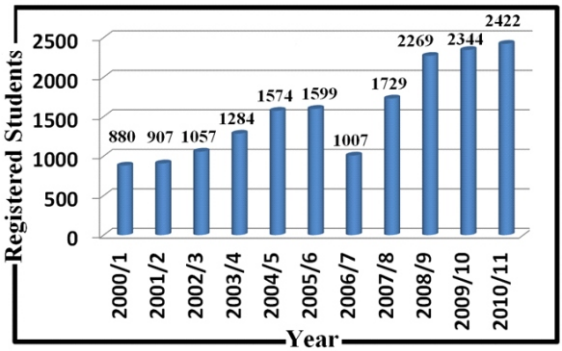
PhD *Louisiana State* – **Dean**

Overview

Preparation of the distinctive UWI graduate – initiatives, notable achievements

Student Enrolment and Access to Faculty Programmes

The number of students enrolled in our Faculty has steadily grown over the last decade as shown below.



Departments continued to be innovative and flexible in dealing with the large student numbers by adding extra class and laboratory streams, including weekend and evening classes, and adding equipment to improve throughput in laboratory sessions. The Faculty has recognized this healthy growth in student numbers and is working on mechanisms for taking in up to twice the current intake.

Initiatives for enhancing the learning experience for 2010-11

Curriculum Reform

The Faculty has undertaken a collective curriculum reform process across all its Departments for about three years. This was done very carefully to ensure that the respective disciplines had the opportunity to establish standards and benchmarks for their content coverage, instructional time allocations, laboratory skills development and other teaching and learning activities. All Departments were ready with reforms at level 1 in 2010/11; some even started teaching in 2010/11 under new curricula. This process will continue with reforms of advanced level programmes in 2011/12. The fundamental goals of the curriculum reform are to modernize the Faculty's programme offerings, engage greater use of instructional and learning technologies, promote programme diversity and flexibility, enhance the depth of majors and improve throughput, especially at level 1. Most courses in the Faculty will henceforth (normally) be of three credits each; this should facilitate students to take courses outside the Faculty and those from other faculties to readily access our courses. It is hoped that these reforms will result in demand lead programme offerings with a useful degree of customization to suit diverse career aspirations. Also, the six credit level 1 courses are a burden to students. These have been split into two three credit-self-contained modules so that weaknesses in a section does not result in failure to meet requirements of a large collection of materials packed in a six credit course. Failure at Level 1 in the Faculty is usually an alarming 40-60%.

New Programmes and Courses:

(i) **Mathematics:** To deal with the poor performance at level 1, the Departments of Mathematics developed two new courses, one specially designed for chemistry and another for physics students. The Department also developed a level 1 statistics course to improve the quality of data processing and utility in the Faculty as well as four others for the mathematics majors.

(ii) **Engineering**: Development of advanced level courses of the new Electronics Engineering programmewas completed. The programme is run out of the Department of Physics.

(iii) Life Sciences: The Department of Life Sciences now offers a new BSc in Environmental Biology, a revised BSc in Tropical Horticulture, four majors (Animal Biology, Applied Plant Sciences, Marine Biology and Terrestrial and Freshwater Ecosystems) and minors in Human Biology, Conservation Biology and Plant Sciences.

(iv) Computing: The Department began to implement its plan to expand the curriculum into the five areas of computing (Computer Science, Information Technology, Information Systems, Computer Engineering and Software Engineering) by adding the BSc in Information Technology to its programme offerings.

Mechanisms for Enhancing Learning:

(i) **Learning and teaching technologies**: The Department of Mathematics secured mathematical software for use in the students' computer lab such as Maple, LaTEX and "R". The Department of Life Sciences installed new laminar flow hoods, autoclaves, microscopes and other equipment to support the increasing number of students choosing Molecular Biology, Virology, Immunology and Parasitology courses. There were teaching/learning space expansion and improvements as well.

(ii) **Tutorial and Peer-Led Learning**: Opportunities for reflective learning such as tutorials given by peers or required by the department can be rewarding. The Department of Life Sciences has seen marked improvements in performance of level 1 students from poor pass rates 52/65 in 2009/10 to 80/81% for 20010/11. This following implementation of compulsory tutorial attendance with graded tutorial exercises that contribute to final course grade. Extension of these strategies to advanced levels will be attempted in 2011/12. The peer-led learning and book loan programmes in the Department of Chemistry as well as the Bridging Mathematics programme also continued to be helpful in learning.

(iii) **International Student exchange, internships and placements:** International exchange activities continued with the University of Gothenburg, Sweden; four chemistry

academics exchanged visits (two each direction), three undergraduate from Sweden visited Mona and two Mona graduate students spent a semester at the University of Gothenburg.The Department of Computing, in response to a recommendation from the Quality Assurance review of 2009, designed a new course, *Internship in Computing* and set up an in house Software Development Unit to facilitate internships. Professional certification courses were also introduced, a Cisco Networking Academy was established and two cohorts have completed the first two modules of the four on Cisco's CCNA programme. A software modelling workshop, led by Professor Robert France of Colorado State University, was implemented in collaboration with the University of Technology.

(iv) **Student 'professional' societies:** Departments continued to pay special attention to involvement of students in professional societies and similar opportunities for learning. The slate of Physics students getting First Class Honours was made up largely of members of the Physics Honour Society. Two of them were honoured for their outstanding academic performance at the Prime Minister's Youth Awards. The Geography and Geology Department continued its tradition of involving students in professional and scholarly activities. The Chemical Society (a student organization) was very much involved in preparations and implementation of activities observing the International Year of Chemistry (including production of a magazine). The Actuarial Student Society is involved in grooming students for careers as actuaries with support from senior persons in the profession.

Improvements in Graduate Studies;
notable accomplishments of graduates

New Programmes: Enrollment in the new MSc programme being offered jointly with the Faculty of Social Sciences, **'Entrepreneurship in Agriculture'** stood at 11 for 2010/11. Development of the MSc in **Food and Agro-Processing Technology** was completed with extensive input from the local industry and well established academic food science institutions around the world. The final version of the programme reflects major efforts by the Department of Chemistry, which already offers a BSc

programme in Food Chemistry and significant contribution from the Department of Life Science, which has an internationally competitive capacity in post-harvest technologies. Professor Ralph Robinson (Life Sciences) led the development of the **Research Ethics (ETHI6010) course,** which soon after approval, enrolled 11 MPhil and PhD students from several departments in the Faculty.

Graduate Achievements: A number of our graduate students received awards or commendations:

Mr. Donovan Campbell (Department of Geography and Geology) was one of three international postgraduate students to receive an award for their doctoral research at the Third International Conference on 'Climate Change: Impacts and Responses', in Rio de Janeiro, Brazil in July 2011. His research was also featured on the NASA on-line publication 'Sensing Our Planet: NASA Earth Science Research Features'.

At the Scientific Research Council's Innovations in Science and Technology Competition for the year 2010, the Institute of Natural Products swept all the major prizes in the competition. The Institute won First prize in the Manufacturing, Food and Agriculture Category, and First prize as the Overall Winner of the Competition went to **Dr. Trevor Yee, Ms. Charah Watson and Ms. Nemoi Chisholm** project, "A study of Two Invasive Citrus pests in Jamaica, *Heraclidesandraemon* and *Papiliodemoleus* and the Development of Control Measures against them." In addition **Mrs. Simone Badal-McCreath**, PhD candidate supervised by Dr. Rupika Delgoda of the Institute of Natural Products won the Young Scientist of the Year Award. The title of her presentation was, "Uncovering the Anticancer Efficacies of Jamaican Natural Products".

Mr. David Picking, MPhil student also supervised by Dr. Rupika Delgoda, was awarded the best student presentation at the 56th Annual Caribbean Health Research Council (CHRC) in Georgetown, Guyana, in April 2011. His oral presentation was entitled. "The prevalence of herbal medicine home use and concomitant use with pharmaceutical medicines in Jamaica".

Improving research/ innovation output, notable achievements, distinctive research output

The Faculty continued its focus on internationally competitive research.

Research/Innovation Output

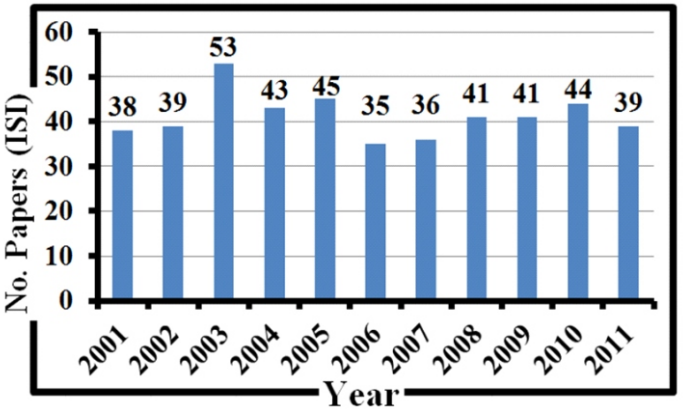
The 2010/11 publication profile for the Faculty is shown in the Table below. It shows that there was no significant increase in total publications over 2009/10. However, there were greater interactions with the international community via conference presentations and the Department of Geography and Geology recorded a significant increase (to 24) in refereed papers over 2009/10 (from 15).

Department/ Centre/ Institute/ Unit	Number of Items									
	Refereed Articles/ Chapters		Patents		Non Refereed materials		Conference Presentations		Books & Edited Works	
	2010/ 11	2009/ 10	2010/ 11	2009/ 10	2010/ 11	2009/ 10	2010/ 11	2009/ 10	2010/ 11	2009/ 10
Biotechnology	11	9	–	–	–	–	11	6	–	–
Chemistry	21	22	–	–	3	3	19	–	1	1
Computing	8	19	–	–	–	–	19	8	1	2
Electron Microscopy	2	2	–	–	1	5	–	–	–	–
Geography / Geology	24	17	–	–	3	1	33	18	3	4
Life Sciences	15	20	–	1	6	8	21	9	9	2
Mathematics	15	15	–	–	–	–	4	4	2	2
Natural Products Institute	4	–	–	–	–	–	14	–	–	–
Physics	11	6	–	–	2	–	7	9	–	–
Total	**111**	**110**	**0**	**1**	**15**	**17**	**128**	**54**	**16**	**11**

While the number of refereed papers is reasonable the number of papers making it into the highly respected Thomson Reuters ISI data base (Web of Knowledge) is disappointingly small and almost stagnant (see figure below). It is important to grow the number of our publications in

international data bases. Our international reputation and impact as well as strategic position as the leading and dominant research institution in the region depend on achieving a significant presence on the international front. The 2010 UNESCO World Science Report (http://publishing.unesco.org/sommaire.aspx?Code_Livre=4770) indicates that 71% of publications cited by the Web of Knowledge and coming from the CARICOM area originate from the UWI. This scholastic leadership position must be consolidated in view of other institutions strengthening their work.

Furthermore, the asymmetry in the distribution of the Faculty's papers in the Web of Knowledge data based need to be addressed. About 54% of papers in the data base for 2001 to 2011 originate from the Department of Chemistry. Efforts to raise the contribution of other disciplines will be a focus for the coming years.



Notable Research Achievements

In March 2011, **Dr. Marcia Roye** received the prestigious 2010-2011 L'Oreal-UNESCO Advanced Fellowship "in the footsteps of Marie Curie" for Women in Science. Dr. Roye's award was presented in Paris France where she travelled to attend the ceremony. The award was the first of its kind, having recently been initiated by L'Oreal-UNESCO to mark the centennial of Marie Curie's Nobel Prize in Chemistry.

Support for Governments, the Regions and international community:

The Faculty continued to be a source of expert service for government and the private sector. Matters consulted on include, water quality and impact on ecology, threat of invasive butterfly species on the citrus industry, climate change and adaptation, energy technologies and exploration, provision of coast re-vegetation seedlings from the Port Royal Marine Labs, services of a Hyperbaric (Recompression) Chamber at the Discovery Bay Marine Laboratory for divers across the island, tracking and finding solutions to marine invasive species (especially the Lion Fish), laboratory testing for some national sports programmes and agro-product chemical profiles, earthquake activity tracking, plant disease and antiretroviral drug resistance patterns. The Cardiac Surgery Simulator, continued to be in demand as major Universities and hospitals in the USA as well as the University Hospital of the West Indies. It got good outcomes in training trials.

Service to the wider community, including the Open Campus community; notable achievements

A number of Departments are involved in consultancy work and outreach activities that promote and enhance UWI's impact. Several departments ran workshops to enhance the understanding of important concepts and the competitiveness of sixth formers for entry into University programmes.

The Department of Mathematics again organized a very successful Mathematics Olympiad competition that saw Jamaica again send a team to the regional competition in Mexico. This year the Mathematical Olympiad was sponsored by Sterling Asset Management Limited, University of the West Indies, Mona and several other companies. In 2011, the department added the Vivian Rochester Junior Mathematical Olympiad, which was sponsored by University of the West Indies and Insurance Association of Jamaica (IAJ).

Addressing the funding constraints

The Faculty and allied entities topped the UWI Mona faculties in the amount of external funding raised (J$187 million or J$259 million when adjusted to include a government grant to ICENS). Funds from sources other than UWI Mona have grown by about 39% over 2009/10. Like in 2009/10, the Department of Life Sciences has been most successful in securing external grant funding. Details are available in the individual Departmental reports, which follow.

The Bursary-provided data on external grants do not include all funds raised from summer school, consultancies and other Departmental activities. Thus, the Faculty is playing its part in covering for shortfalls in government funding but there is room for the Faculty to achieve more. In order to be more effective in grant-fund raising the Faculty, with support from the Campus, has setup a Resource Mobilization Unit to facilitate staff members with developing their research ideas into fundable research projects. A coordinator for the Unit was appointed and data is being gathered to inform a future Campus-wide initiative.