

**FACULTY OF PURE AND
APPLIED SCIENCES
MONA**

Year ending July 31, 2005



Professor Ronald E. Young, BSc, MSc *UWI*, PhD *St. And.* – Dean

Dean's Overview

INTRODUCTION

In the year 2004-2005 the Faculty of Pure & Applied Sciences, presumably like most others, overspent its curtailed budget, while focusing its efforts on diversifying and amplifying its sources of income in order to cope with the financial strictures.

At the same time, the Faculty is seeking to improve student-centeredness, increase the relevance and quality of its programmes and course offerings, and step up the quality, quantity and applicability of its research output.

HIGHLIGHTS

In September, the Dean attended a workshop on “Applications of order theory to homeland defense and computer security” put on by the DIMACS group at Rutgers University, and spoke on “*An Institute of Mathematical Methods in Counter-Terrorism: A new model for North-South Cooperation*”.

In October, a team for the Natural Products Institute, Mona Institute of Applied Science and the Department of Chemistry attended the 3rd Conference of the International Society for the Development of Natural Products in Nanjing. At that meeting Jamaica which held the first meeting where the Society was formed, was granted a permanent seat on the Board of the Society. The team used the opportunity to visit several Science Parks and to develop several connections in China.

The Mona **Campus Research Day 2005** focused on “*Natural Hazards, Disasters and Sustainable Development*” with activities guided by the Department of Geography & Geology, led by Mr. Rafi Ahmad. Four interactive fora were held, dealing with different aspects of the important question of natural hazards, their effects on development and the need for strategic management to avoid or mitigate disasters and speed recovery when they strike. **Natural Hazards Information Packs** comprising CDs and DVDs developed by the Unit for Disaster Studies in the Department of Geography & Geology, Mona Informatix and the Mona Information Technology Support Unit (MITS) were distributed at the conference.

At the Research Day Awards Ceremony at the Mona Visitors Lodge, Faculty members honoured by the University as outstanding researchers included:

For Best Publications –

Dr. Willem Mulder (and collaborators) for his paper on “*The Electrocapillary Effect at an Electrode Modified with an Insoluble Redox-Active Self-Assembled Monolayer*”, and

Dr. Danielle Aquart & Professor Tara Dasgupta for their paper on “*Dynamics of Interaction of Vitamin C with some Potent Nitrovasodilators, S-nitroso-N-acetyl-D, L-penicillamine (SNAP) and S-nitrosocaptopril (SNOCap), in Aqueous Solution*”;

For Best Edited Collection –

Drs. Dale and Mona Webber for “*A collection of studies conducted from the Port Royal Marine Laboratory*”

on the status of Kingston Harbour, Jamaica, in relation to continued organic pollution” which appeared in a special edition of the Bulletin of Marine Science;

For Most Outstanding Research Activity –

Professor Yvette Jackson for her studies on “*Synthesis of the Kuanoniamines and Related Alkaloids*”;

For Project Attracting the Most Research Funds –

Dr. Mona Webber for landing a grant of \$4,536,750 over 15 months from the Environmental Foundation of Jamaica, to study “*The Mangrove Ecosystem: A Biodiversity Hotspot*”;

For Project with the Greatest Business/Economic Impact –

Professor Tara Dasgupta for his project on the “*Fate of Pesticides in Tropical Ecosystems*” which led to the sustainable offering of excellent analytical services for monitoring pesticides and other persistent organic pollutants (POPs) in the environment.

The Faculty held its 7th **Biennial Research Conference** in May. The theme of the lead-off Public Forum was “*Education Meeting the Needs for Development*”. **Dr. June George** of the Department of Educational Research & Development, St. Augustine Campus, delivered the keynote address. Plenary speakers at the conference were **Dr. Raymond Wright** of the Petroleum Corporation of Jamaica who spoke on “*Surging Demand, Diminishing Resources*” and **Professor George Maul**, Florida Institute of Technology, Chairman of the IOCARIBE Tsunami Steering Group of Experts, who spoke on “*Development of a Tsunami Warning and Mitigation System for the Caribbean and Central West Atlantic Region*”. The conference included 39 oral and 30 poster presentations. A high point was the forging of the “**Mona Resolution**” on Education, Outreach and a Tsunami Warning System for the Caribbean, arising out of the session on *Natural Hazards, Disasters and Sustainable Development*. This has gained some attention in various international fora.

In this the **International Year of Physics** the Physics Department was suitably active, organising a Physics Week in early April, a subsequent workshop on Dengue Fever and Climate and a certificate course in Alternative Energy in June.

In the summer, the Faculties of Pure & Applied and Medical Sciences, in collaboration with **Generating Genius**, a London group headed by **Dr. Tony Sewell**, hosted 10 Jamaican and 10 British boys of West Indian descent. The boys were afforded exposure to university level experiences in science and medicine in order to stimulate them to consider seriously a career in medicine or biomedical research. The programme will continue for successive summers.

PUBLICATIONS

As a result of the financial squeeze combined with resignations, retirements and deaths, total staff complement fell by 18 (17%) and refereed publications by 25 (22%); output therefore slipped to 1.00 from 1.07 per capita last year. Non-refereed and conference presentations together again rose this year by 6.8% from 177 last year to 189. Of the teaching Departments, Chemistry overtook Geography & Geology with a productivity of 1.4 refereed papers per full time staff vs 1.3 for the Department of Geography & Geology. The latter overwhelmingly dominates in conference presentations and non-refereed articles (reports, monographs etc.) with a total of 5.1 per full time staff member.

Department	No. Acad. Staff	Refereed Publications	Non-Refereed Publications	Conference Presentations
Biotechnology Centre	5	2	2	19
Chemistry	18	26	3	21
Geography & Geology	7+7	18	16	56
Life Sciences	19	15	6	20
Mathematics & Computer Science	7+7	13	0	4
Physics	10	6	0	16
Centre for Marine Sciences	2	4	3	14
Electron Microscopy Unit	2	1	0	2
NPI/MIAS	3	2	0	7
TOTAL:	87	87	30	159

UNDERGRADUATE

In 2004/2005 the Faculty registered a total of 1555 students, an increase of 202 (15%) over the intake in 2003/2004, when 1353 students were on the register (data supplied by the Student Records System). The Table below shows the number of individual courses and total registrations in these courses. The number of courses offered fell drastically in Mathematics (46%), and overall in the Faculty (13.6%). The mean number of students per course rose by 41% in Mathematics, 33% in Geology, and 12% in Life Sciences. In Computer Science mean registration per course fell by 23.5%. These changes were probably related in part to the introduction of Mathematics as a prerequisite for entry into Computer Science. Mean course load per full-time lecturer remained constant at 1.8 courses, with credit load rising slightly to 8.3 from 7.9 last year.

Department	No. of Courses	Total Credits	Summed Enrolment	Mean No. /Course	Load /Staff Member	
Chemistry	24	129	1821	75.9	1.3*	6.6†
Geog./Geol.:						
Geography	17	68	718	42.2	2.4	9.7
Geology	14	64	420	30.0	2.0	9.1
Life Sciences	32	138	1914	59.8	1.7	7.3
Math & Comp. Sci:						
Computer Science	16	62	1091	68.2	2.3	9.7
Mathematics	14		1410	100.7	2.0	8.9
Physics	23	104	903	39.3	2.3	10.4
TOTAL	140	624	8277	59.1	1.8	8.3
*This column shows load as courses/individual. † This column shows load as credits/individual						

Failure rate in the undergraduate final examinations fell from a high of about 22.6% to 20%, and the percentage of First Class Honours fell to 8%. The fall in numbers sitting the final exam in 2003/2004 was reversed decisively, with a rise in numbers from 274 to 317 (15%).

Level of Degree	2002/2003		2003/2004		2004/2005	
	N	%	N	%	N	%
First	27	9.4	26	9.5	26	8.2
Upper Second	87	30.4	81	29.6	99	31.2

Lower Second	90	31.5	70	25.5	84	26.5
Pass	37	12.6	35	12.8	45	14.2
Fail	46	16.1	62	22.6	63	19.9
Total Sitting	287	100.0	274	100.0	317	100.0
Total Registered	1178		1353		1555	

GRADUATE STUDIES

In 2004/2005, in spite of the introduction of 11 postgraduate diploma students, the Faculty registered a total of 373 graduate students in various programmes, compared with 465 in 2003/2004 (down 20%) with the main losses being in the MSc and MPhil registrations. It seems possible that raised fees plus financial hardship could account for these losses. None-the-less, the graduating group increased by 18%, mainly in research students again perhaps prompted by the financially driven need to get finished.

GRADUATES						
	Registered			Graduating		
	2002/03	2003/04	2004/5	2002/3	2003/4	2004/5
MIS	73	73	73	21	21	21
MSc	82	142	87	27	30	26
MPhil	181	188	143	14	15	19
PhD	61	62	59	10	5	16
Diploma			11			
TOTAL	397	465	373	68	71	82
*MIS students are jointly taught by MSB and Computer Science staff						

The Geology sub-department continues to avoid the introduction of taught Graduate level courses and the Department of Chemistry to resist introduction of taught MSc programmes. In general, the engagement in Graduate teaching is relatively low (mean Courses/Staff member = 0.69) except in the case of Computer Science, in which the graduate and undergraduate course loads per staff member, were equal (2.3) with a mean enrollment of 27 students per graduate course. The overall teaching load (graduate and undergraduate) in the Computer Science sub-department, therefore, was 4.6 courses per full-time staff member.

GRADUATE						
Department	No. of Courses	Total Credits	Enrolment	Mean No./ Course	Courses/ Staff Member	
Chemistry	7	22	170	24.3	0.4†	1.7*
Geog./Geology: Geog.	7	53	87	12.4	1.0	3.4
Geol.	0	0	0	n/a	n/a	2.0
Life Sciences	11	44	148	13.5	0.57	2.3
Math & Comp Sci: CSci	16	68	431	26.9	2.29	4.6
Math	10	49	86	8.6	1.43	3.4
Physics	9	51	76	8.4	0.90	3.2
TOTAL	60	287	998	16.6	0.69	2.29

†This column indicates mean number of courses for graduate level only *This column indicates mean number of courses including both graduate and undergraduate levels

GRANTS

Grants reported to have been brought in from sources external to the University, increased by 53% to J\$122,072,996 from last year's J\$ equivalent of \$79,611,415 although the total number of grants remained virtually unchanged at 33. The Departments of Chemistry and Life Sciences showed outstanding improvement.

DEPARTMENT	INTERNAL GRANTS	N	EXTERNAL GRANTS	N	INCOME* GENERATED	N
Chemistry	2,692,598	2	44,354,059	5	17,655,088	9
Geog/Geology	0	0	12,601,000	4	0	0
Life Sciences	67,195	1	32,556,705	15	2,412,236	3
Math & Comp Sci	0	0	0	0	1,400,000	1
Physics	0	0	1,040,750	1	2,149,473	4
Biotechnology	496,000	2	16,526,482	3	620,000	3
CMS	218,000	2	13,594,000	4	?	?
NPI	0	0	1,400,000	1	0	0
TOTAL:	\$3,473,793	7	\$122,072,996	33	\$24,236,797	21
*Income here is surplus after expenditures						
All currency is stated in J\$ equivalentents converted at a rate of J\$62 to US\$1						

Reported Internal grants, however, fell drastically in both amount (60%) and number (46%). We have added this year a column on income generated. This is quite significant and poised to get even better. We hope in future to report, in all cases, surpluses after expenditures on overheads rather than gross income, and to include more complete information from the CMS, Mathematics & Computer Science, MIAS and NPI.

CONCLUSION

The Faculty has seen some set-backs due to the financial difficulties and internal reorganizations. There have, none-the-less, been significant, positive advances in some areas. Undergraduate registrations continue to rise steadily.

We would also like to see greater progress in terms of curriculum reform aimed at increasing the efficiency of delivery of the undergraduate programmes. With the increased cost of graduate programmes and the financial challenges being faced by prospective students, the fall in graduate registrations this year, after a small rise last year, was predictable. Income generating activities aimed at the short, medium and long term have been pursued vigorously, and we are hoping to see significant returns soon.