FACULTY OF PURE AND APPLIED SCIENCES

MONA

Year ending July 31, 2010

Professor Ishenkumba Kahwa, BSc, MSc *Dar,* **PhD** *Louisiana State* **– Dean**

Overview

Preparation of the Distinctive UWI Graduate – Initiatives, Notable Achievements

The Faculty continued to expand access to the wide range of its programme offerings for 2009-10. Each Department, except Physics, registered an increase in the number of students.

Innovations in dealing with increased enrollment

The intense outreach campaign implemented in previous years continued to impact positively on demand for courses in the Faculty. The pressures that accompanied last year's large increase in student registration also continued, especially at Level I. Department heads, especially those in small understaffed ones such as Geography and Geology, had to exercise creativity with respect to use of laboratory and teaching space, equipment and staff deployment. Temporary staff, weekend laboratories and other measures were taken to ensure that all demands for courses in our Faculty were met.

Initiatives for enhancing the learning experience for 2009-10 included:

New Programmes:

Agriculture: Development of new agriculture programmes of study at both the graduate and undergraduate levels were developed. A new MSc programme being offered jointly with the Faculty of Social Sciences, 'Entrepreneurship in Agriculture' was developed and approved; the first intake is expected to be admitted in August 2010 and will be hosted by the Department of Life Sciences. The programme on 'Agro-processing

continued to be discussed and its development is expected to be completed in 2011. Students signed-up for Level I courses related to the Tropical Horticulture programme but the exact number of students who will eventually take the programme will be known when they show up for Level II courses.

Engineering: A new Electronics Engineering programme – the first UWI Engineering programme to be offered outside of the St. Augustine campus admitted a cohort of 17 students in 2009/10. The Faculty is grateful to the Electronics Unit and the Faculty of Engineering at St. Augustine which in collaboration with the Department of Physics worked together to successfully to roll out the programme in the 2009/10 academic year.

Chemistry:

Peer-Led Learning Project: The programme which started in 2008/9 continued this year with about 20% of the Level I students participating; analysis of the student performance on examinations revealed a 10% improvement for participants in the Peer-Led Learning Project.

Book Loan Programme: The Department started a book loan programme to facilitate availability of adequate and state of the art learning materials for students, especially those who have challenges with affording the expensive but necessary books. The programme cost J$1.5M and was well received, especially at the introductory and preliminary levels.

International Student exchange: These continued with the University of Gothenburg, Sweden; two chemistry graduate students were exchanged in each direction this year.

The Occupational and Environmental Safety and Health Programme continued to be valued as it attracted 41 students, its largest cohort ever, and had to set up a class in Montego Bay while the St. Augustine Campus started the programme with about 50 students.

Computing: The Department has completed revision and restructuring of the MSc Computing; the new programme will be ready to take in students in the 2010/11 academic year.

Life Sciences: A revised and restructured M.Sc. programme in Marine and Terrestrial Ecosystems (MaTE): Assessment and Monitoring was run for the first time with 10 students.

Mathematics: The Department implemented a new Programme, MSc in Mathematics and Modeling. The 'Mathematics Bridging programme' was continued and assessment of learning outcomes indicated a 37% improvement for those accessing the programme.

Physics: Level II courses in electronics and revamped materials science, alternative energy and medical physics majors came on stream.

Student professional societies: New student societies such as the Physics Honour Society, Physics Alumni Association were established while others like the Chemical Society and the Geographical Society were strengthened. A contingent of 13 geography graduate students and their supervisors presented papers at the prestigious Annual Meeting of the Association of American Geographers held in Washington, D.C. in April 2010.

Improvements in Graduate Studies; notable accomplishments of graduates

There were infrastructural improvements which enhanced the quality of graduate education in the Faculty. The renovation of the Department of Mathematics building was completed thereby providing excellent facilities and surroundings for teaching, learning and research. A new Biodiversity Centre funded by the Environmental Foundation of Jamaica was opened at the Port Royal Marine Laboratory thereby opening new opportunities for graduate research and outreach activities. Life Science's computer facilities, microscope services and student transportation were also vastly improved. The Department of Physics opened a new Graduate Student Research Centre, with individual work stations, common areas for discussion and relaxation, and a kitchenette. The roof laboratory for Environmental Physics and Alternative Energy was also refurbished and reopened.

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

The faculty continued its advancement in research.

Research/Innovation Output

Department/Centre/ Institute/Unit	Number of Items				
	Refereed Articles/ Chapters	Patients	Non-Refereed Materials	Conference Presentations	Books and Edited Works
Biotechnology	9			6	
Chemistry	22		3		1
Computing	19			8	2
Electron Microscopy	2		5		
Geography/Geology	17		1	18	4
Life Sciences	20	1	8	9	2
Mathematics	15			4	2
Physics	6			9	
Total	**110**	**1**	**17**	**54**	**11**

Notable Research Achievements

Guest editorships and review of articles for international journals:

There is growing recognition of the good quality research capacity in the Faculty as evidenced by 7 guest editorships of journals/conference proceedings. Staff members continue to serve the international scholarly community through refereeing services in many fields covered by the Faculty's disciplines.

Support for Governments and the Regions:

The Climate change research group in the Physics Department and emerging such effort in the Department of Life Sciences have been called upon to help the region monitor and prepare for adverse weather changes

and improve the regional argumentation at the Copenhagen 2009 conference on Global Climate Change.

Invasive Species and Forest Conservation:

The Department of Life Sciences has been called upon to help the country deal with invasive species, especially the Lion Fish. The conservation work being done in the Department has attracted large sums of renewed and new funding as its global significance continues to be recognized and highly valued. There were also several collaborative visits from the USA to the Department in this regard.

Cardiac Surgery Simulator: This UWI innovation has continued to improve and generate impressive interest and orders for units from a consortium of major cardiac surgery schools in the USA (such as University of North Carolina (Chapel Hill), Rochester University, Massachusetts General Hospital (Harvard Medical School), Mayo Clinic, Vanderbilt University, and University of Washington. Three (3) more will be built and delivered to Johns Hopkins University, University of Southern California, and Stanford University.

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. Computing Department has spearheaded better reporting of Science and its potential by running a workshop for journalists. All Departments run workshops to enhance the competitiveness of sixth formers for entry into University programmes.

The Department of Mathematics organized a very successful Mathematics Olympiad competition that saw Jamaica send a team to the regional competition for the first time. This year the focus is on improving performance at such tournaments.

Transformation of the administrative culture and processes to better respond to all our stakeholders

The Department of Mathematics and Computer Science was split in 2008/9 into the Department of Mathematics and the Department of Computing; the new Departments are growing very well as shown above.

Addressing the funding constraints.

Resources continues to be a major issue for the Faculty but departments, centres, units and institutes have been moderately successful in attracting funding. Over all, about US$1.5million, Euro 450,000 and J$90 million were raised from various sources by Faculty members to support their teaching and research work. I want to single out the Department of Life Sciences which attracted the most external funds this year comprising of several large grants as shown below. There are several large grants in the pipeline and our efforts will be increased this year as we build on this moderate success. The notable incomes **(those over J$3M)** are:

Notable External Grants

Dr. Dayne Buddo and Dr. Karl Aiken secured funding to make CMS the Lead Agency for the 4-year National Lionfish project valued at **US$431,000.**

Dr. Byron Wilson co-PI with Dr. Kurt McLaren, **MacArthur Foundation, US$340,000.**

Dr. Byron Wilson co-PI with Dr. Kurt McLaren **Environmental Foundation of Jamaica, J$3,349,300.**

Dr. Byron Wilson co-PI with Dr. Kurt McLaren **Forest Conservation Fund, J$12,372,000.**

Dr. Byron Wilson co-PI with Dr. Kurt McLaren, Global Environmental Foundation**, US$178,245-** project implemented through UNEP, CABI, and NEPA.

Prof. Dale Webber, Caribbean Community Centre for Climate Change grant to initiate an International Coral Observatory Network Station at the Discovery Bay Marine Laboratory. Value **US$105,000.**

Prof. Dale Webber, Discovery Bay Marine Laboratory has secured **US$135,000** to replace the Crews (environmental monitoring) station with an ICON station.

Dr. Daniel Coore, Computing – Cardiac Simulator- **US$81,000**.

Department of Computing (contact: Dr. Daniel Coore)- UNESCO, **US$39,000** - various programmes enhancing reporting of science.

Prof. I. A. Kahwa on behalf of UWI in a consortium of seven Universities, **Euro450,000** from the DAAD, Germany, to form an International Network for Energy and Environmental Sustainability (INEES) and support its work addressing MDG #7.

The Occupational and Environmental Safety and Health programme recorded income of **J$27 million**.

DEPARTMENT OF CHEMISTRY

Professor Paul B. Reese, BSc (Hons), *UWI,* **DPhil,** *Sussex,* **CChem, FRSC – Head of Department**

OVERVIEW

The 2009-2010 academic year was a productive one for the Department of Chemistry. Despite the budgetary constraints, the department has managed to maintain its standards of excellence in teaching and research. It continues to provide an environment which fosters and promotes the development of highly trained professionals.

Forty-seven undergraduate students, including five who gained first class honours, completed a Bachelor of Science in Chemistry and two postgraduate students completed their Doctor of Philosophy degree while another two completed their Master of Philosophy. Enrolment at the Introductory and Advanced levels continues to increase steadily.

The Peer-Led Team Learning (PLTL) initiative continues to improve the learning experience and performance of introductory level students. Other programmes such as the Occupational and Environmental, Safety and Health (OESH) programme and the CAPE workshops continue to have a positive impact on the participants.

Several of our academic staff have been featured and awarded for their excellent performance in teaching and research. The Department snatched half of the awards in the Faculty of Pure and Applied Sciences from the Principal's Research Day Awards Ceremony. Additionally, the 21 refereed publications and 15 presentations at major conferences is an indication of the quality of research being produced by the Department.

Over **J$3 Million** of research grants was secured for several projects in the department, while another **J$12.5 Million** in income was generated.

HIGHLIGHTS OF MAJOR ACTIVITIES

The Mona Symposium

The twenty third "Mona Symposium: Natural Products and Medicinal Chemistry" was held on January 4-7, 2010. The Organizing Committee was comprised of Mr. Oscene Barrett (Student Representative), Drs. Nadale Downer-Riley, Winklet Gallimore, Julie-Ann Grant, Sandra Jarrett, Donna Minott-Kates, Roy Porter and Profs. Yvette Jackson, Helen Jacobs and Paul Reese (Organizing Secretary).

More than 60 persons, including 35 visiting participants, attended the conference. There were 28 international attendees (from Canada, Japan, Germany, the UK and the USA) and seven regional attendees (from Cave Hill and St. Augustine campuses and UTECH). The scientific programme consisted of nine plenary lectures, eleven short papers and a poster session. Tribute was paid to Professor William Reynolds who has made an enormous contribution to the discipline, spanning 50 years. Prof. Reynolds has assisted many students from the University of the West Indies (Cave Hill, Mona and St. Augustine) with their research work and has been a consistent participant in the Mona Symposium during the last 14 years.

The Occupational and Envirnonmental, Safety and Health (OESH) Programme

For the academic year 2009-2010, a record-breaking 41 students registered for the MSc programme of which 14 were part time. Seven students registered for the BSc programme.

Peer-Led Team Learning (PLTL) Project

The Peer-Led Team Learning (PLTL) programme had been implemented by Dr. Novelette Sadler-McKnight and Mr. Imron Miller in the 2008-2009 academic year. Due to the success of the pilot project, the programme was executed on a larger scale. Approximately 20% of the introductory level

students participated and, on average, their final marks were 10% higher than those not participating.

Outreach Activities

CAPE Workshop

The annual workshop on spectroscopy and chromatography for students sitting the Caribbean Advanced Proficiency Examinations (CAPE) in Chemistry was held between January 18 and 22. There was a 56% increase in the number of participants compared to last year. A total of 762 students and 36 teachers from 35 secondary institutions across the island participated.

BEd (Distance) Project and BEd/Open Campus Programme

The Department accommodated six students from the Open Campus programmes for laboratory sessions during the summer.

The Chemical Society

The membership of The Chemical Society Mona (ChemSoc) for the academic year 2009-2010 was 36, although approximately 130 persons attended the meetings regularly. The topic "Alternative/Renewable Energy" was the focal theme of several presentations and discussions. The Society undertook a number of fun, educational and motivational activities. It offered academic advice and conducted free tutorials for the members and visitors in preparation for end of semester examinations.

Student Enrolment

The number of students enrolled for courses at the preliminary level decreased by 33% from the last academic year, while enrolment in courses at the introductory level increased by 7%. Six new graduate students joined the Department.

Level	2006/2007	2007/2008	2008/2009	2009/2010
Preliminary	203	189	193	129
Introductory	223	377	492	526
Postgraduates	60 (32 F/T; 28P/T)	64 (32 F/T; 32 P/T)	59 (31 F/T; 28 P/T)	45 (24 F/T; 21 P/T)

Book Loan Scheme

Due to the significant increase in enrolment over the past two years, access to required textbooks through the library facility has become very competitive. In an effort to increase access and improve performance the Department launched a book loan scheme. Books were purchased for Chemistry students at all levels, at a total cost of J$1.5 Million, and were rented by semester. The programme was well subscribed. Demand for textbooks for the introductory courses was highest, followed by those for the preliminary courses.

ACHIEVERS AND AWARDEES

Principal's Research Day Awards

Two members of staff received the Principal's Research Day Award for Best Research Publication. They are **Professor Willem Mulder** for his paper entitled "Potential of zero charge as a sensitive probe for the titration of ionisable self-assembled monolayers," *Electrochem. Commun.* 2008, 10, 1548-1550 and **Dr. Camille Bowen-Forbes** for her paper – "Ursolic acid analogues: non-phenolic functional food components in Jamaican raspberry fruits," *Food Chemistry,* 2009, 116, 633-637. **Drs. Michael Coley** and **Anthony Greenaway** received the Principal's Research Day Award for the Research Project with Most Potential for Economic Impact. The title of their project is "Caustic-soluble cadmium and zinc in JAMALCO bauxite."

Silver Musgrave Medal

Professor Helen Jacobs was the recipient of the Silver Musgrave Medal for Organic Chemistry (October 2009) from the Institute of Jamaica.

TWAS Fellowship

Dr. Marvadeen Singh-Wilmot was selected as one of five Young Affiliate Fellows of the Third World Academy of Sciences for 2010.

Faculty Teaching Awardees

Drs. Michael Coley, Donna Minott-Kates, Willard Pinnock and **Marvadeen Singh-Wilmot** were recipients of the award for Outstanding Achievement in Teaching at the Faculty Awards Ceremony. Dr. Marvadeen Singh-Wilmot also received the award for the Most Outstanding Achievement in Teaching.

Deparmental Awards and Prizes

Seven undergraduate students received awards, ranging from $10,000 to $60,000, for their academic performance in Chemistry. They are **Orain Brown** (Cedric Hassall), **Tomeika Myers** (Garfield Sadler), **Je-Ann Murray** (Wilfred Chan), **Ruel Campbell** (L. J. Haynes), **Isaac Morrison** (Chemistry Department), **Michal Camejo** (Pavelich/Honkan) and **Kervern James** (Bert Fraser-Reid).

Promotion & Tenure

Dr. Roy Porter was promoted to the level of Senior Lecturer at the January sitting of the Campus Appointments Committee. **Dr. Camille Bowen-Forbes'** contract was extended for an additional three years, while **Drs. Marvadeen Singh-Wilmot** and **Paul Maragh** were granted indefinite tenure.

Research Fellowships

Drs. Camille Bowen-Forbes and **Roy Porter** were recipients of UWI Research Fellowships for the period August 2009 – July 2010. The investigations were conducted by **Dr. Kayanne McCook-Russell** – *"Study on the Phytochemical and Nutraceutical Potential of Rubus ellipticus Fruits (Cheeseberry)"* (with Dr. Bowen-Forbes) and **Dr. Petrea Facey** – *"Investigations of Endophytic Marine Fungi associated with Jamaican Mangroves for Novel and Bioactive Compounds"* (with Dr. Porter).

POSTGRADUATES

Two postgraduate students successfully defended their theses and were awarded the PhD degree. They are **Andrew Morris** supervised by Prof. Y. Jackson and Kenesha Wilson supervised by Dr. Willard Pinnock. Another **two** students, **Paul Clare** and **Tavia Riggon,** (supervised by Prof. P. Reese and Dr. W. Gallimore respectively) successfully completed their MPhil degrees. Three students transferred from the MPhil to the PhD programme.

Student Exchange Programme

Two MPhil students, **Rochette Sinclair** and **Jevon Samuels,** visited the University of Gothenburg, Sweden from January 19 to June 10, 2010. While there they continued their research projects and read two graduate courses each. During that period the Department hosted four visiting undergraduate students from that University.

PAPERS PRESENTED

- **C. S. Bowen-Forbes**, V. Mulabagal, Y. Liu, K. McCook-Russell and M. G. Nair, "Jamaican Blackberry and Raspberries with Health-Beneficial Properties" (Poster). Denbigh Agricultural Show, Clarendon, Jamaica (July -August 2010).

- P. Nelson and **H. Ellis,** "Room Temperature Molecular and Lattice Structures of a Homologous Series of Anhydrous Zinc(II) n-Alkanoates". TWAS-ROLAC Caribbean Young Scientist and Technologist Conference, Ocho Rios, Jamaica (January 2010).

- O. Barrett, **N. Downer-Riley** and **Y. Jackson,** "Novel Approaches to the Synthesis of Benzothiazoles and their Analogues". 239th American Chemical Society National Conference, San Francisco, California, USA (March 2010).

- P. C. Facey and **R. B. R. Porter,** "Investigations of Endophytic Marine Fungi Associated with Jamaican Mangroves for Novel and Bioactive Compounds". BiCentenario- Colloquium of the

Alexander von Humboldt Foundation, Mexico City, Mexico (June 2010).

- **M. A. Singh-Wilmot,** R. Sinclair, "Tetranuclear and Nonanuclear Lanthanide(III) Nanoclusters: Synthesis and Structures," (Poster). TWAS-ROLAC Caribbean Young Scientist and Technologist Conference, Ocho Rios, Jamaica. (January 2010).
- **M. A. Singh-Wilmot** "Novel Materials from Lanthanide(III) Nanoclusters". 7th Regional Conference of Young Scientist of TWAS-ROLAC, Rio de Janeiro, Brazil (May 2010).

Papers presented at 23rd Mona Symposium on Natural Products and Medicinal Chemistry, Kingston, Jamaica (January 2010).

- **C. S. Bowen-Forbes,** V. Mulabagal, Y. Liu and M. G. Nair, "Anthocyanin content and biological activity of extracts and phytochemicals from Jamaican *Rubus* fruits" (Poster)
- O. Barrett, **N. Downer-Riley** and **Y. Jackson,** "Approaches to the Synthesis of Benzobisthiazoles and their Derivatives"
- A. L. C. Morris and **Y. A. Jackson,** "Synthesis of a 6H-Chromeno[3,4-b]quinoline and a 6a,12a-Dehydro-7- azarotenoid"
- S-A. Parker and **H. Jacobs,** Semi-synthetic Polyprenylated acylphloroglucinols (PPAPs) from 7-epi-nemorosone, the major constituent of *Clusia flava.* (Poster).
- A. A. Johnson and **H. Jacobs,** A 2-acylcyclohexane-1,3-dione from *Peperomia* sp. nov. of Jamaica. (Poster).
- F.W.O. Banton and **R. B. R. Porter,** "Secondary metabolites from the aerial parts of *Bursera lunanii,"* (Poster).
- P. C. Facey and **R. B. R. Porter,** "Bioactive Compounds from Endophytic Marine Fungi Associated with the Jamaican White Mangrove, *Laguncularia racemosa L."* (Poster).

- D. A. C. Biggs, **R. B. R. Porter,** W. F. Reynolds, P. C. Facey and L. A. D. Williams, "Insecticidal, antioxidant and antimicrobial activities of abietane diterpenoids from *Hyptis verticillata"* .
- P. C. Peart, A. R. M. Chen, **P. B. Reese** and W. F. Reynolds, "The biotransformation of 3ß,17ß-dihydroxyandrost-5-ene using free and immobilized fungi".

PUBLICATIONS

Refereed Journal Articles

* **M. Bakir** and O. Brown, "Synthesis, characterization and molecular sensing capability of fac-[Re(CO)3(k2-N,N-dpktsc)Cl] where dpktsc = di-2-pyridylketone thiosemi-carbazone" *J. Mol. Struct.* 2009, 930, 65–71.

* **M. Bakir,** O. Green and **M. Singh-Wilmot,** "Synthesis, Spectroscopic, and X-ray Crystallographic Analysis of Manganese Compounds of Di-2-pyridyl ketone thiophene -2-carboxylic acid hydrazone (dpktch): The Reaction of Mn(CO)5Br with dpktch," *J. Mol. Struct.,* 2010, 967, 174-182.

* Y. Liu, V. Mulabagal, **C. S. Bowen-Forbes** and M. G. Nair, "Inhibition of lipid peroxidation, cyclooxygenase enzyme, and human tumor cell proliferation by compounds in herbal water," *Mol. Nutr. Food Res.* 2009, 53, 1177-1186.

* E. Petrunak, A. C. Kester, Y. Liu, **C. S. Bowen-Forbes,** M. G. Nair and G. E. Henry, "New benzophenone O-glucoside from *Hypericum ellipticum." Nat. Prod. Comm.* 2009, 4, 507-510.

* G. E. Henry, M. S. Campbell, A. Zelinsky, Y. Liu, **C. S. Bowen-Forbes,** L. Liya, M. G. Nair, D. C. Rowley and N. P. Seeram, "Bioactive acylphloroglucinols from *Hypericum densiflorum," Phytother. Res.,* 2009, 23, 1759-1762.

* **C. S. Bowen-Forbes** and **D. A Minott,** "Structural characterization of hypoglycin B, a diastereomeric dipeptide

from the ackee fruit *(Blighia sapida Koenig)* by NMR experiments," *Magn. Reson. Chem.,* 2009, 47, 1004-1006.

* **N. K. Downer-Riley** and **Y. A. Jackson,** Highlight Syntheses. *Annu. Rep. Prog. Chem., Sect. B: Org. Chem.,* 2010, **DOI:** 10.1039/b927090f.

* R. C. Higgins, N. O. Townsend and **Y. A. Jackson,** "Benzylic Oxidation of N-Acyl-1,2,3,4-Tetrahydroquinolines," *Heterocycles,* 2009, 78, 3011-3021.

* J. A. Grant, T. Bonnick, M. Gossell-Williams, T. Clayton, J. M. Cook and **Y. A. Jackson,** "Synthesis, Pharmacological Studies and Molecular Modeling of some Tetracyclic 1,3-Diazepinium Chlorides", *Bioorg. Med. Chem.,* 2010, 18, 909-921.

* A. L. C. Morris and **Y. A. Jackson,** "Synthesis of a 6H-Chromeno[3,4-b]quinoline and a 6a,12a-Dehydro-7-azarotenoid," *Heterocycles*, 2010, 81, 371-380.

* O. V. Barrett, **N. K. Downer-Riley** and **Y. A. Jackson,** "Synthesis of Some Novel Benzobisthiazoles," *Heterocycles,* 2010, 8, 1641-1649.

* D. S. Simpson, S. McLean, W. F. Reynolds and **H. Jacobs,** "Tetranortriterpenoids from *Spathelia sorbifolia (Rutaceae),"* *Natural Product Communications* 2010, 5, 859-862.

* **P. T. Maragh,** "Reaction Mechanisms in Solution," Annu. Rep. Prog. Chem., Sect. A: Inorganic Chemistry, 2010, 106, 410-428.

* M. A. W. Lawrence, **P. T. Maragh** and **T. P. Dasgupta,** "Kinetics and mechanism of the aquation of a series of mixed-metal oxo-centered trinuclear cations, μ_3-oxo-triaqua-hexakis(carboxylato)bis-(chromium(III)(iron(III))$^+$,$[Cr^{III}_2Fe^{III}O(RCOO)_6(H_2O)_3]^+$, (R = H, CH_3, CH_3CH_2 and $(CH_3)_2CH$) in perchloric acid media," *J. Coord. Chem.,* 2010, 63, 2517-2527.

* **W.H. Mulder,** "On the Theory of Electrostatic Interactions in Suspensions of Charged Colloids," *Soil Science Society of America Journal,* 2010, 74, 1-4.

* G-A. Junor, **R. B. R. Porter,** T. H. Yee and T. Waugh, "The volatile constituents from the leaves, bark and fruits of Bursera aromatica (Proctor) found in Jamaica," *Journal of Essential Oil Research*, 2010, 22, 19-22.

* Y. A. Bailey-Shaw, K. D. Golden, A. G. M. Pearson and **R. B. R. Porter**, "Characterization of Jamaican Agro-Industrial Wastes. Part I: Characterization of Amino Acids Using High Performance Liquid Chromatography: Precolumn Derivatization with Phenylisothiocyanate," *J. Chromatogr. Sci.,* 2009, 47, 674-680.

* D. A. C. Biggs, **R. B. R. Porter** and W. F. Reynolds, "Sesquiterpene and acyclic diterpenes from Hyptis verticillata Jacq," *Natural Product Communications,* 2009, 4, 307-310.

* P. R. D Wright, **R. Rattray**, G. Lalor and R. Hanson, "Minimal health impact from exposure to diet-sourced cadmium on a population in central Jamaica," *Environ. Geochem. Health,* 2010, DOI 10.1007/s10653-010-9318-6

* **M. Singh-Wilmot, I. Kahwa,** A. J. White, D. J. Williams and A. Lough, "Tunable Electronic Interactions in Small Lanthanide(III) Clusters: The Comparative Effects of OH^- and O^{2-} Supramolecular Glues on Europium(III)-to- Dysprosium (III) Energy Transfer," *Polyhedron*, 2010, 29, 270-279.

* K. R. Christian and **J. C. Jackson,** "Changes in total phenolic and monomeric anthocyanin composition and antioxidant activity of three varieties of sorrel (*Hibiscus sabdariffa*) during maturity," *J. Food Comp. and Anal.,* 2009, 22, 663-667.

Non-Refereed Publications

* **C. Bowen-Forbes,** UWI Notebook: Jamaican raspberry fruit with health-beneficial properties, *The Gleaner,* 2009, February 7, 2010, Arts: 5.

* **M. D. Coley,** J. James and **A. M. Greenaway,** "Mineralogy of Chromium and Zinc in Jamalco Bauxites" 2nd Project Report, Alcoa of Australia Ltd., September, 2009

* **M. D. Coley,** J. James and **A. M. Greenaway,** "Mineralogy of Chromium and Zinc in Jamalco Bauxites" 3rd Project Report, Alcoa of Australia Ltd., March, 2010.

Book

* **Kenneth E. Magnus** and **Robert J. Lancashire**, "The Department of Chemistry, UWI, Mona, with emphasis on the early years", Ian Randle Publications, 2010. ISBN 978-976-637-410-5.

INCOME GENERATION & RESEARCH GRANTS

Dr. H. Ellis

- **J$80,000.00** from the Ministry of Agriculture for Consultancy.

Dr. A. Greenaway

- **US$1,200.00** from the United Nations University International Network on Water, Environment and Health for collection of fish for testing for Persistent Organic Pollutants.
- **J$300,000.00** from commercial analyses.
- From the Mona Campus Committee for Research & Publications and Graduate Awards: **US$1,700.00** for standard reagents to support project;
- **US$3,200.00** for centrifuge

Prof. H. Jacobs

- **J$1,447,470.00** from the Research Fellowship Committee (Special New Initiative Grant), Mona to fund project entitled *"Technology-enhanced isolation of natural products for enzyme-based and whole-organism bioactivity screening."*

Dr. R. Porter

- **$191,000.00** from the Research and Publications and Graduate Awards for the project *"Phytochemical Investigation of Jamaican Bursera species."*

- **£6,500** from the Alexander von Humboldt Foundation.

Prof. P. Reese

- **US$2,100.00** from the Mona Campus Committee for Research & Publications and Graduate Awards (February 2010) to cover costs associated with project entitled *"Biotransformation of terpenes using endophytic fungi."*

Dr. N. Sadler-McKnight

- Generated a total of **J$2,484,600.00** from outreach activities.

Dr. M. Singh-Wilmot

- **US$3,000.00** from the Mona Campus Committee for Research & Publications and Graduate Awards for project entitled *"Novel Framework Materials from Lanthanide(III) Nanoclusters and their Use as Gas Adsorbent and Fluorescence Sensors."*

Other Income Generated

- Summer School – **$7,677,355.50**
- Rental of Facilities – **$267,500.00**
- Consultation Fees – **$1,846,688.02**

PUBLIC SERVICE

Prof. M. Bakir

- Referee to the Journals: *Coordination Chemistry, Inorganic Chemical Communications, Talanta* and *Polyhedron.*

Prof. T. Dasgupta

- President, Caribbean Academy of Sciences
- Executive Committee Member, Regional Office of International Council of Science
- Member, Organizing Committee of UNITAR Project (Office of Prime Minister)
- Chairman, National Adhering Organization for IUPAC
- Member, POPs National Implementation Programme in Jamaica
- Member, Third World Academy of Sciences
- Editor, *Jamaica Journal of Science and Technology*

Dr. H. Ellis

- Member, Bureau of Standards Jamaica Paints and Surfaces Committee.

Dr. W. Gallimore

- Member, 23rd Mona Symposium Organising Committee
- First Year Experience (FYE) Facilitator

Dr. A. Greenaway

- Member, National Ozone Commission.
- Member, Bureau of Standards Jamaica Water System Components Technical Committee.
- Member, Jamaica National Agency for Accreditation Technical Advisory Committee.

Prof. Y. Jackson

- Scientific Consultant, Tanaud International.

- Regional Editor, MOLECULES.
- Reviewer for paper submitted to various chemistry journals.
- Member, Board of Governors, Hampton School for Girls.

Prof. H. Jacobs

- Member, Chemicals Review Committee, Ministry of Health and Environment
- UWI Representative, University Council of Jamaica's Academic Board of Studies (for science).
- Chief Editor, *Jamaica Journal of Science and Technology*
- Referee for papers submitted to *Natural Product Communications*
- Member, Organic Chemistry Division of the International Union of Pure and Applied Chemistry (IUPAC)

Prof. R. Lancashire

- Secretary, Caribbean Academy of Sciences.
- Appointed Secretary of IUPAC Committee on Printed and Electronic Publications (CPEP).
- IUPAC representative to ICSU Committee on Data for Science and Technology (CODATA).
- Member, Advisory Group on ChemSpider.com.

Dr. P. Maragh

- Assistant Chief Examiner, CXC CSEC Chemistry
- External Examiner for Chemistry, University of Technology
- External Examiner for Chemistry, Joint Board for Teacher Education
- External Examiner for Chemistry, MICO University
- External Examiner for Chemistry, College of Agriculture, Science & Education

Dr. D. Minott-Kates

- Vice Chaiman, CARICOM Regional Organization for Standards and Quality (CROSS-Q)

- Member, Scientific Research Council Board Sub-Committee for Food Technology
- Member, WIGUT Management Committee
- Board Member, Grove Primary School, Gordon Town
- Executive Member, Mona Preparatory School Parents Teachers Association

Dr. W. Pinnock

- Faculty of Pure and Applied Sciences Rep., University Hospital of the West Indies Research Ethics Committee
- Board Member, National Water Resources Authority
- Chairman, Technical Advisory Sub-Committee, National Water Resource Authority

Dr. R. Porter

- Member, Technical Committee for Propane-Butane Liquefied Petroleum Gas standards, Bureau of Standards Jamaica.
- Member, Technical Committee (TC 93) for all standards relating to starch and its by-products, Bureau of Standards, Jamaica.
- First Year Experience (FYE) Facilitator

Dr. R. Rattray

- Secretary, Laboratories Association of Jamaica
- Director, Lions Club of Mona

Prof. P. Reese

- Member, Equine Drug Testing Committee, Jamaica Racing Commission.
- Member, Product Research & Development Committee, Scientific Research Council.
- Board Member, Jamaica National Agency for Accreditation, Ministry of Industry, Technology, Energy & Commerce.

– Chair, Technical Advisory Committee, Jamaica National Agency for Accreditation, Ministry of Industry, Technology, Energy & Commerce.

Dr. N. Sadler-McKnight

– Executive Secretary, Chemistry Alumni and Friends (CHEMSAF)

– Member, Technical and Finance Committee of the Scientific Research Council (SRC)

– Faculty Advisor, UWI Circle K Club

– External Examiner, Chemistry, College of Agriculture, Science and Education (CASE)

Dr. M. Singh-Wilmot

– First Year Experience (FYE) Facilitator

– Member, Cooperative Development Committee, Jamaica

– Young Affiliate Fellow of the Third World Academy of Sciences (2010)

DEPARTMENT OF COMPUTING

Daniel Coore, SB, SM, PhD – Head of Department

Staffing

Up to July 31, 2010, the academic staff complement of the Department remained as it was at the start of the academic year, with the exception that **Dr. J. Huw Evans** resigned from his Lecturer post, to return to the UK. In order to coordinate the newly approved MSc Computer Science programme, the Department welcomed the services of **Mrs. Fiona Porter-Lawson,** who also filled our vacant Senior Secretary position.

WORK OF THE DEPARTMENT

A revised MSc Computer Science programme was approved in February 2010, for offer in September, 2010. This revision is an update of the programme that was being administered by MIAS since 2003, and also marks the point of reacquisition of administrative duties for the programme by the Department. The new programme has been completely restructured to contain an explicit core as well as defined clusters of specialised courses from which students must choose their electives. This structure provides a framework within which the programme can readily adapt to changes in staff specialisation and in market demands for specific areas, without jeopardising the programme's aims.

The Department continues to engage in consulting activities. The work that was done for the **Jamaica National Group** continues as additional features have been requested for the tool that we custom developed for them. We have also begun work with **Enterprise Technology International** to investigate some applications of surveillance equipment in which they have invested. Also, our software engineering services have

been retained by **Medical Networks Ltd.** to design a medical information system targeted at doctors in private practice.

In February 2010, the Department facilitated a workshop to provide training to journalists and media professionals in reporting on Science. In total, 21 persons from 6 Caribbean countries participated, and in the end, established the Caribbean Science Journalism Network (CSJN). The Department also developed websites to host the activities of the CSJN as well as a platform to facilitate the dissemination, exchange and application of science and technology – both of which are still in the process of being populated before being launched. The workshop and website development was funded by a UNESCO contract.

Research Activities

The Department continues its work on the **Cardiac Surgery Simulator** project [see 2008-09 report for a description of the project and its impact]. A second generation prototype of the hardware was completed in June, which significantly improves its usability. In the first generation prototype, the simulator operator had to manage an array of pumps and valves, in addition to the computer interface; the system has now been automated to the point where the operator manages everything through the computer interface. Work continues on its control software and its user interface.

The need for these enhancements was triggered when we began negotiations in April 2009, with a few prominent teaching hospitals in the USA, who plan to use the simulator in the development of new curricula in cardiac surgery training. We expect to complete six (6) units by the end of 2010, which will be delivered to University of North Carolina (Chapel Hill), Rochester University, Massachusetts General Hospital (Harvard Medical School), Mayo Clinic, Vanderbilt University, and University of Washington. Shortly thereafter, three (3) more will be built and delivered to Johns Hopkins University, University of Southern California, and Stanford University. We anticipate that the involvement of these august institutions with the simulator will improve its chances of being successfully commercialised.

Funding Awards

Dr. Daniel Coore received US$81,000 from the consortium of teaching hospitals mentioned above, to build 6 units of the cardiac surgery simulator. A further US$40,500 is anticipated to build the remaining 3 units.

PAPERS PRESENTED

Peer-Reviewed

- **Curtis Busby-Earle** and **Ezra K. Mugisa**: Web Security: A Cross-Sectional View of Businesses Operating in Jamaica. In Proceedings of 2010 International Conference on Information Resources Management (Conf-IRM), May 16-18, 2010, Montego Bay, Jamaica.
- **C. Busby-Earle** and **E.K. Mugisa:** Metadata for Boilerplate Placement Values for Secure Software Development using Derived Requirements. In M.H. Hamza (Editor) - Proceedings of the IASTED International Conference, November 2-4, 2009, Cambridge, Massachusetts, USA, pages 196-201, ACTA Press 2009.
- **Paul Gaynor** and **Daniel Coore.** "A scheme for reduced latency in wireless sensor networks using self organized mirrors." Proceedings of IEEE South Eastcon 2010 pp64-67. ISBN 978-1-4244-5854-7. Concord, NC, USA. March, 2010.
- Claudine Allen and **Ezra Mugisa**: Achieving Learning Object Interoperability and Reusability Through Object Orientation. In Proceedings of The 2nd IEEE International Conference on Education Technology and Computer (ICETC 2010), June 22-24, 2010, Shanghai, China.
- D Stephenson and **S Suresh,** "AutoRefs – A Software for Automated Referencing System", Proceedings of ISRST International Conference on software Engineering Theory &

Practice (SETP 10), Orlando, USA, July 12-14, 2010. Pp.147-152. ISBN: 978-1-60651-023-0

- C.A McTavish and **S Suresh,** "Intelligent Agent based Hotel Search and Booking System", Proceedings of 2010 IEEE International conference on Electro/Information Technology, Chicago, USA, May 20-22, 2010. pp.331-336. ISBN: 978-1-4244-6874-4

- N. Benjamin and **S Suresh,** "Failure Performance Study of Hierarchical agent based Patient Health Monitoring in Wireless Body Sensor Mesh Networks", Proceedings of 2009 IEEE International Conference on Advances in Computing, Control and Telecommunication Technologies, Trivandrum, India, December 28-29, 2009.pp 85-87. ISBN:978-0-7695-3917-7

- N. Benjamin and **S Suresh**, "Performance of Hierarchical Agent based Wireless Sensor based Mesh Network for Health Care"-Proceedings of the 8thIEEE International conference on Computer Information Systems and Industrial Management, Coimbatore, Chennai, December 9-11, 2009. Pp.1653-1656. ISBN: 978-1-4244-5612-3

- K Miller and **S Suresh**, "Monitoring Patient Health using Policy based Agents in Wireless Body Sensor Mesh Networks-Proceedings of 2nd IEEE International conference in World Congress on Nature and Biologically Inspired Computing (NABIC 09), Coimbatore, Chennai, December 9-11, 2009. Pp.503-508. ISBN: 978-1-4244-5612-3

- L Henry and **S Suresh**, "Applications of Intelligent Agent for Mobile Tutoring", Proceedings of 2nd ACM International conference on Interaction Sciences: Information Technology, Culture and Human (ICIS 09), Seoul, Korea, November 24-26, 2009. Pp 963-969. ISBN: 978-1-60558-710-3

- S. Duklon and **S Suresh,** "Personal Mobile Information System", Proceedings of 2nd ACM International conference on Interaction Sciences: Information Technology, Culture and

Human (ICIS 09), Seoul, Korea, November 24-26, 2009. Pp. 592-598. ISBN: 978-1-60558-710-3

- T. Edwards and **S Suresh,** "Intelligent Agent based Hospital Search & Appointment System", Proceedings of 2nd ACM International conference on Interaction Sciences: Information Technology, Culture and Human (ICIS 09), Seoul, Korea, November 24-26, 2009. Pp 561-568. ISBN: 978-1-60558-710-3

- K Miller and **S Suresh**, "Role of Intelligent Agents and Wireless Body Sensor Mesh Networksin Patient Monitoring", Proceedings of the 5th IEEE International conference in Networked Computing, Seoul, Korea, August 25-27, 2009.pp 369-375. ISBN: 978-0-7695-3769-6/09

Invited

- **Daniel Coore,** "Bridging the Techno-Cultural Gap between Administration and Students: Preparing Students for High-Growth Industries". Association of Caribbean Higher Education Administrator (ACHEA) 9th Annual Conference. Ocho Rios, Jamaica. July 8-10, 2010.

- **S Suresh**, Seminar/Training on Opnet, Rajalakshmi Engineering College, Anna University, Chennai, India. Feb 4-5, 2010

- **S Suresh,** "Intelligent Agents and their Industrial Applications", Centre for Development of Advanced computing (CDAC)-Ministry of Information Technology, Government of India. Feb 2, 2010.

- **S Suresh,** Workshop/Training programme on Opnet/ ns2, MNM Jain Engineering College, Anna University, Chennai, India. Feb 1, 2010.

- **S Suresh**, "Software Agents and their Industrial Applications", Institute of Electronics and Telecommunication Engineering (IETE) conference on Current Academic Research in Communication & Networking (CARCN-2010), Department of

Electronics & Telecommunication Engineering, Sathyabama University, Chennai, India, Jan. 28-30, 2010.

- **S Suresh,** "Theoretical and practical Aspects of Networking", seminar/training programme, Velammal Engineering College – IETE sponsored, Anna University, Chennai, India. Jan. 25, 2010.
- **S Suresh**, "Intelligent Agents and their Applications in Commerce and Industry", IEEE International conference on Advances in Computing, Control and Telecommunication Technologies, Trivandrum, India, Dec. 28-29, 2009.
- **S Suresh,** "Intelligent Agents with commercial and Industrial Applications", 1st IEEE International Conference in Advanced Computing, Chennai, India. Dec. 13-15, 2009

PUBLICATIONS

Books

* **Daniel Coore**. "The Growing Point Language: A Developmental Approach to Generating Interconnect Topologies on an Amorphous Computer." (226 pages). LAP Lambert AcademicPublishing, Saarbrücken, Germany. ISBN 978-3-8383-5841-3. June, 2010

* **S Suresh,** et al (Editor), "Information Processing and Management", Springer-Verlag, Communications in Computer and Information Science, Vol. 70, 680 Pages. ISBN: 978-3-642-12213-2, Mar. 2010

Book Chapters

* **Ashley Hamilton-Taylor,** and Kadian Davis. "Interactive Learning for Computer ScienceEducation via SKA Algorithm Visualisation". In Active and Interactive Teaching and Learning Guide (ed. Mervin Chisholm). Published by Jamaica Fulbright-Humphrey Alumni Association(JFHAA) in association with Public Affairs Section of the American Embassy. Kingston, Jamaica. May 2010.

Journal Articles

* **G. Mansingh,** K. M. Osei-Bryson, and H. Reichgelt. "Building ontology based knowledge maps to assist knowledge process outsourcing decisions". *Knowledge Management Research and Practice,* 7, pp 37-51. 2009

* **G. Mansingh,** K.M. Osei-Bryson, and H. Reichgelt. "Issues in knowledge access, retrieval and sharing – Case studies in a Caribbean health sector". *Expert Systems with Applications*, 36, pp 2853-2863. 2009

* K Miller and **S Suresh,** "Policy based Agents in Wireless Body Sensor Mesh Networks for Patient Health Monitoring", *International Journal of u and e-services, science and Technology,* SERC publishing, Vol.2 (4), pp.37-50, 2009

* N Benjamin and **S Suresh,** "Performance Study of Hierarchical agent based Patient Monitoring Wireless Body Sensor Mesh Networks", *International Journal of Embedded systems and Computer Engineering,* Serial publications, Vol.1 (2), pp.59-70, 2010

* N Benjamin and **S Suresh,** "Performance of Wireless Body Sensor Mesh Network for Health Application", *International Journal of Computer Information System and Industrial Management,* Vol. 2(1), pp. 20-28, 2010.

Student Throughput

A total of 37 students graduated from one of our two undergraduate programmes. This represented a decrease from 54 in academic year 2008-2009. There were 29 students from FPAS1 and 6 students from FHE2 who completed the Computer Science major and 2 (in FPAS) who completed the Computer Studies Option. These numbers are further broken down by gender and class of degree as follows:

Programme Faculty	BA Computer Science			BSc Computer Science			BSc Computer Studies Option		
	FHE			FPAS			FPAS		
Gender	**M**	**F**	**Total**	**M**	**F**	**Total**	**M**	**F**	**Total**
1st Class	1	0	1	2	2	4	0	0	0
Upper 2nd	0	0	0	2	1	3	0	0	0
Lower 2nd	2	1	3	7	3	10	0	0	0
Pass	2	0	2	8	4	12	1	1	2
Totals	**5**	**1**	**6**	**19**	**10**	**29**	**1**	**1**	**2**

Richard Pyne completed a PhD in Computer Science, under the supervision of **Dr. Ezra Mugisa,** in October 2009. This is only the second PhD produced by the Department.

Awards

The Department was pleased to grant the Dr. Karl Robinson Award, for the best performance in Computer Science courses up to Semester 1 of year 3 in the programme, to **Mr. Nathan Collman**.

DEPARTMENT OF GEOGRAPHY AND GEOLOGY

Professor David Barker, BSc *Wales*, **PhD** *Bristol*, **Dip Urb & Reg Studies** *Birmingham* – **Head of Department**

WORK OF THE DEPARTMENT

The Department of Geography and Geology continued to mount a full programme of undergraduate teaching and postgraduate supervision in spite of the continuing and increasing challenges imposed by budget and resources (both human and physical, including space and equipment).

Professor Simon Mitchell (Geology) and **Dr David Miller** (Geography) were granted sabbatical leave for the year. As part of his research activities, Professor Mitchell visited England, the Netherlands, Texas and Mexico City. **Ms Shakira Khan** was appointed to take over Professor Mitchell's teaching for the year, but because of organizational problems relating to replacing Dr Miller, he was given permission to take his sabbatical year beginning with Semester II; he will return to the Department in Semester II, 2010/2011. His Level II course (Geosphere and Hydrosphere) was taught by Professor Paul Shaw and Dr Matthew Wilson, from the St Augustine campus.

With existing vacancies remaining unfilled, the Department faces severe problems in finding qualified lecturing staff to mount the full range of undergraduate courses necessary for the completion of both the Geography and the Geology Majors. **Mr Kevon Rhiney** and **Mr Robert Kinlocke** were appointed as Temporary Assistant Lecturers, and **Mr Donovan Campbell** was appointed as a Teaching Assistant. **Dr Lyndon Brown** was appointed as Head of the Earthquake Unit.

Student numbers in first-year Geology were, for the second successive year, far higher than expected, again creating enormous difficulties in

Geology practical classes. These difficulties were compounded by the shortage of demonstrators/teaching assistants and put pressure on the use of scientific equipment for laboratory work.

The Geography section of the Department (staff and postgraduate students) was well represented at the Annual Meeting of the Association of American Geographers held in Washington, D.C. in April 2010. The group of thirteen staff and postgraduates was the largest contingent from the Department ever to attend this prestigious meeting, and a total of twelve papers were presented and three panel sessions organized, details of which are included later in this report.

The book *Global Change and Caribbean Vulnerability: Environment, Economy and Society at Risk*, co-edited by Dr Duncan McGregor, Dr David Dodman (former lecturer in Geography) and **Professor David Barker** (Geography), was awarded the prize for the bestselling environmental studies book published by UWI Press in the period 2007-2010. **Dr Parris Lyew-Ayee** (Director of the Mona GeoInformatics Institute and affiliated to the Department) and **Mr Rafi Ahmad** (Geology) were awarded the prize for the best publishing proposal for their *Natural Hazard Atlas of Jamaica*, to be published shortly.

The Department continued to administer the Earthquake Unit, the Unit for Disaster Studies, and the Marine Geology Unit

INCOME GENERATION

Dr Michael Burn (Geography) was part of a team including Allison Bain (P.I.), Lisa Kennedy and Debbie Pearsall which received a grant of C$37,000 from the Social Sciences and Humanities Research Council of Canada for a research project on "Human Eco-dynamics in Barbuda – New Approaches for Caribbean Archaeology."

Dr Sherene James-Williamson, Geology Museum Curator, received a grant of C$12,000 from the Canada Fund for Local Initiatives for the upgrade of the education capacity of the museum with the installation of interactive whiteboard and multimedia facilities for effective teaching and learning. Mr Stephen Hallihan, the Canadian High Commission to

Jamaica, officially opened the learning centre on March 11, 2010. The Principal of the Mona Campus, Professor Gordon Shirley, was in attendance.

Dr Susan Mains (Geography) received a UWI Research and Publications and Graduate Grant of US$1,298 for a research project on "Media and Place (MAP) Lab: Centre for Qualitative Analysis of Caribbean Geographies."

Professor Simon Mitchell (Geology) received a grant of US$5,000 from the Petroleum Corporation of Jamaica, Sargress Energy and CaribX for graduate research and travel on a variety of small-scale consultancies.

The **Marine Geology Unit** received a grant of US$8,460 from the World Resources Institute, Washington, D.C., USA, for research on coastal flooding related to reef protection and weather systems. The Unit completed its final report on "Beach Erosion at Long Bay, Negril" for the Environmental Foundation of Jamaica.

PAPERS PRESENTED

D. Barker

- With D. Campbell. "Climate change and adaptation in Jamaica's agriculture: farmers' perceptions of changing weather patterns in different agro-ecological zones." Annual Meeting, Association of American Geographers, Washington, D.C., USA, April 2010.
- With D. Miller (organizers), Panel on "Global Change and Caribbean Vulnerability. (1) Land, Livelihoods and Landscapes. (2) Environment, Hazards and Ecology." Annual Meeting, Association of American Geographers, Washington, D.C., USA, April 2010.

M. Burn

- With F. Mayle & T. Killeen. "Differentiation of pollen spectra from Amazonian rainforest communities and implications for lowland palaeoecology in tropical South America." *Eos*

Transactions of the American Geophysical Union, Foz do Iguassu, Brazil, 2010.

S. James-Williamson

- "The University of the West Indies Geology Museum: a university-wide teaching resource." Annual Symposium of the Archaeological Society, UWI, Mona, May 6, 2010.

S. Khan

- With **E. Robinson**, R. Coutou & M. Johnson. "Beach erosion and sea-level rise at Long Bay, Negril, western Jamaica." Quaternary Land-Ocean Interactions: Driving Mechanisms and Coastal Responses, IGCP Project 495.INQUA Annual Conference, October 25-31, 2009, Myrtle Beach, South Carolina, U.S.A.

S. Mains

- "(Re) imagining Caribbean spaces: transnational islands and shifting tidalectics." 29th Annual West Indian Literature Conference, UWI, Mona, April 2010.
- "Islandness and 'stories-so-far': engaging tidalectics in Caribbean placemaking." Annual Meeting, Association of American Geographers, Washington, D.C., USA, April 2010.

A. Mandal

- With A. Haiduk. "Assessment of the water quality of the groundwater of the Kingston basin." Sixth Annual Meeting and Geosciences World Community Exhibition, Singapore, August 11-15, 2009.
- "Modelling of rainfall-induced river flooding of Port Maria, St Mary, Jamaica." Eighth International Conference on Disasters, Havana, Cuba, June 14-18, 2010.

David Miller

- "Geomorphologic and sediment dynamics in Manatee Bay, St Catherine, Jamaica: a hurricane impact complex response system." Annual Meeting, Association of American Geographers, Washington, D.C., USA, April 2010.

S. Mitchell

- "Jamaica's geology – Jamaica's geologists. 180 years since the first geological map of Jamaica. 150 years since the establishment of the first Geological Survey. 140 million years of geological history. A personal celebration." Department of Geography & Geology, UWI, Mona, November 16, 2009.
- "Geological background." Second Licensing Round, Petroleum Corporation of Jamaica Promotion. Geological Society of London, London, March 1, 2010.
- "Geological background." Second Licensing Round, Petroleum Corporation of Jamaica Promotion, Houston, Texas, U.S.A., April 27, 2010.
- "Jamaican copper mines of the mid-nineteenth century." The Archaeological Society of Jamaica, 8th Symposium, UWI, Mona, May 6, 2010.

K. Rhiney

- "Citizens associations and participatory urban governance: the case of the Portmore Municipality, Jamaica." Annual Meeting, Association of American Geographers, Washington, D.C., USA, April, 2010.

PUBLICATIONS

Books and Journal Issues

D. Barker

* with D. McGregor, & D. Dodman (eds.). Global Change and Caribbean Vulnerability: Environment, Economy and Society at Risk. UWI Press, Kingston, Jamaica, 2009. 389pp.

S. Mains

* with T. Skelton (guest editors). "Special Section on Neoliberalism, Mobilities and Development: Caribbean Intersections." *The Singapore Journal of Tropical Geography*, 30, 2009.

* "Tenth Anniversary Special Issue." *Qualitative Research on Geography Specialty Group Newsletter: People, Place, Praxis*. April 2010

S. Mitchell

* with **T. Steman** (eds.). *Caribbean Journal of Earth Science*, 41, 2010.

Refereed Book Chapters and Journal Articles

D. Barker

* with D. McGregor, & D. Campbell. "Environmental change and Caribbean food security: recent hazard impacts and domestic food production in Jamaica." In D. McGregor, D. Dodman & D. Barker (eds.), Global Change and Caribbean Vulnerability: Environment, Economy and Society at Risk. UWI Press, Kingston, Jamaica, 2009, 3-21.

* with D. Dodman & D. McGregor. "Caribbean vulnerability and global change: contemporary perspectives." In D. McGregor, D. Dodman & D. Barker (eds.), Global Change and Caribbean Vulnerability: Environment, Economy and Society at Risk. UWI Press, Kingston, Jamaica, 2009, 197-217.

* D. Dodman, & D. McGregor. "Beyond Caribbean vulnerability: towards resistance and resilience." In D. McGregor, D. Dodman & D. Barker (eds.), Global Change and Caribbean Vulnerability: Environment, Economy and Society at Risk. UWI Press, Kingston, Jamaica, 2009, 365-384.

M. Burn

* with F. Mayle & T. Killeen. "Pollen-based differentiation of Amazonian rainforest communities and implications for lowland palaeoecology in tropical South America." *Palaeogeography, Palaeoclimatology, Palaeoecology*, 295, 2010, 1-18.

D. Campbell

* with C. Beckford "Negotiating uncertainty: Jamaican small farmers' adaptation and coping strategies, before and after hurricanes – a case study of Hurricane Dean." Sustainability, *1*(4), 2009, 1366-1387.

S. Mains

* with T. Skelton. "Intersections of neoliberalism, mobilities and development in the Caribbean: an introduction." *The Singapore Journal of Tropical Geography*, 30, 2009, 151-157.

S. Mitchell

* "The Cretaceous crinoids *Uintacrinus socialis* from Jamaica and its significance for global correlation." *Geological Magazine*, 146, 2009, 037-940.

* "Revision of three large species of Barrettia from Jamaica." *Caribbean Journal of Earth Science*, 41, 2010, 1-16.

* with I. Brown. "Lithostratigraphy of the Cretaceous section in the Benbow Inlier, Jamaica." *Caribbean Journal of Earth Science*, 41, 2010, 25-37.

* with A. Hastie, A. Kerr, & I. Millar. "Geochemistry and tectonomagmatic significance of Lower Cretaceous island arc lavas from the Devil's Racecourse Formation, eastern Jamaica."

In K. James, M. Lorente & J. Pindell (eds.), The Origin and Evolution of the Caribbean Plate. Geological Society of London Special Publication SP328, December 2009, 339-410.

* A. Hastie, A. Kerr, I. McDonald, J. Pearce, M. Wolstencroft & I. Millar. "Do Cenozoic analogues support a plate tectonic origin for Earth's earliest continental crust?" *Geology*, 38, 2010, 495-498.

* with J. Pons. "Systematic and biostratigraphic significance of the American rudist bivalve Durania aguilae Adkins, 1930." *Journal of Paleontology*, 84, 2010, 554-555.

K. Rhiney

* "Forging new linkages in a changing global economy? The case of cooperatives and their link with the Negril tourism industry." *Caribbean Geography*, 15(2), 2009, 142-159.

* "(Re)defining the link? Globalization, tourism and the Jamaican food network." In D. McGregor, D. Dodman & D. Barker (eds.), Global Change and Caribbean Vulnerability: Environment, Economy and Society at Risk. UWI Press, Kingston, Jamaica, 2009, 237-258.

E. Robinson

* with R. Ramsook. "A new record of the Paleocene larger foraminifer *Ranikothalia catenula* in the Wagwater Formation of eastern Jamaica." *Caribbean Journal of Earth Science*, 40, 2009, 21-23.

* with D. Rowe, S. Khan. "Hurricanes or tsunami? Comparative analysis of extensive boulder arrays along the southwest and north coasts of Jamaica. Lessons for coastal management." In D. McGregor, D. Dodman & D. Barker (eds.), Global Change and Caribbean Vulnerability: Environment, Economy and Society at Risk. Kingston: The University of the West Indies Press, 2009, 49-73.

T. Stemann

* with H. Loeser, & S. Mitchell. 'Oldest scleractinian fauna from Jamaica (Hauterivian, Benbow Inlier).' *Journal of Palaeontology*, 83(3), 2009, 333-349.

Technical Report

K. Rhiney

* "Analytical Study on Industry within Jamaica of a National Spatial Plan" (lead author). Prepared on behalf of the Centre for Leadership and Governance, Department of Government, UWI, Mona. Sponsored by the National Environment and Planning Agency and the Office of the Prime Minister. Project Coordinator: Dr Lloyd Waller, Department of Government, UWI, Mona.

PUBLIC SERVICE

D. Barker

- Editor, *Caribbean Geography*.
- Convenor, CAPE Geography.
- President, Jamaica Geographical Society.
- Editorial Committee and writer, *CaribXplorer Magazine*.

S. James-Williamson

- Council member, Jamaica Institute of Environmental Professionals.
- Chairperson and Treasurer, National Environmental Education Committee;
- Member, Steering Committee, NEEC/PANOS Caribbean Climate Change Project.
- Vice President, Geological Society of Jamaica;
- Member, Publications Committee, Natural History Museum of Jamaica, Institute of Jamaica.

– Member, Steering Committee, International Conference on Rudists 2011.

S. Mains

– Co-chair, Qualitative Research Specialty Group, Association of American Geographers, 2009-2011.

– Editorial boards of: *Handbook of Human Geography series; The Journal of Media Geography; The Spaces of Democracy and Democracy of Space*; and *Revista Brasileira do Caribe.*

– Manuscript reviewer for: *ACME: An International e-Journal for Critical Geographies; Gender, Place and Culture; Journal of Cultural Geography;* and *Professional Geographer.*

– Council member, Jamaica Geographical Society.

– Special local correspondent, Caribbean Hurricane Network – StormCARIB.

S. Mitchell

– Permanent member, Standing Committee for the Caribbean Geological Conference.

– Member, Scientific Committee, International Rudist Congress.

– Chairman, Commission on Jamaican Lithostratigraphy.

– Council member, Geological Society of Jamaica.

– Editor, *Caribbean Journal of Earth Science.*

– Chairman, Ninth International Congress on Rudist Bivalves, Kingston, Jamaica, 2011.

E. Robinson

– Member, Jamaican National Council on Ocean and Coastal Zone Management.

– Fellow, Third World Academy of Science.

– Member, Coastal Education and Research Foundation.

– Board Member, International Centre for Environmental and Nuclear Science.

– Member, Geological Society of Jamaica.

– Member, Jamaica Institute of Environmental Professionals.

– Board Member, Centre for Marine Sciences.

– Member, Graduate Faculty, Florida International University, U.S.A.

CATEGORIES OF STUDENTS

Undergraduate Students: Geography

Year I:	115
Year II:	53
Year III:	45

Undergraduate Students: Geology

Year I:	130
Year II:	44
Year III:	45

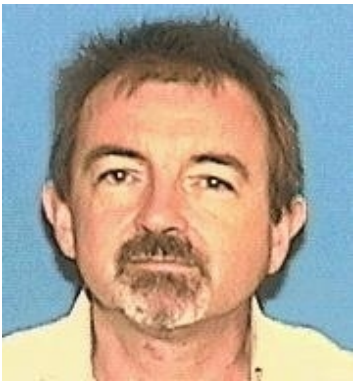
Postgraduates:

MPhil Geography:	7
MPhil Geology:	5 (1 completed)
PhD Geography:	9
PhD Geology:	1

DEPARTMENT OF LIFE SCIENCES

Eric Hyslop, BSc (Hons.) *Aberdeen*, **PhD** *Open University*
– Head of Department

WORK OF THE DEPARTMENT



During the 2009/10 academic year the Department of Life Sciences was able to achieve a number of important successes.

Undergraduate Enrolment and Curriculum Reform

The number of students enrolling in level 1 Life Sciences courses remained high in the 2009/10 academic year as a result of the drive to attract students to UWI. While, as would be expected, numbers declined in level 2 and 3 courses, all undergraduate offerings were more than adequately subscribed. Resource shortfalls were less of an issue than in previous years but some gaps were evident. In a number of level 3 courses more students enrolled than could be accommodated in the existing single lab stream and a second stream had to be added.

There was progress in curriculum reform as the Level 1 courses in Life Sciences were successfully reconstituted as 3 credit courses, 2 per semester, which it was envisaged would add to the quality of academic content offered at level 1 as well as introducing a level of flexibility not previously available in the existing 6 credit courses. Plans were also finalized for the implementation of the first of the agriculture based B.Sc. degrees; that of Tropical Horticulture, in the 2010/11 academic year. This was part of the Department/ Faculty response to the country's needs in this area.

Undergraduate Teaching

The Department maintained its high standard of teaching for the most part with 78% of lecturers in Semester 1 and 62% in Semester 2 scoring 4.0. Only one lecturer and one course (both in Semester 2) recorded scores in the 2.0 – 2.9 range. Several staff members were honoured at the Faculty of Pure and Applied Sciences awards ceremony for the quality of their teaching. The first year courses continue to have high failure rates, 31 and 38%, respectively, indicating the need for special intervention for these students.

Postgraduate research and teaching

The now merged and modified MSc programme Marine and Terrestrial Ecosystems (MaTE): Assessment and Monitoring was run for the first time with an intake of 10 students. Concomitantly, a new cohort of 17 students was admitted to the MSc in Plant Protection and Production (PPP). Student assessments were conducted on these programmes for the first time in 2009/10 and the results indicated scores ranging from 3.7- 3.9 for courses and 3.8 – 4.0 for lecturers.

Plans for the implementation of a new Faculty programme, MSc in Agricultural Entrepreneurship, to be housed in the Department of Life Sciences were drawn up and it was expected that this programme would start in the 2010/11 academic year.

In contrast the number of students entering new MPhil/PhD programmes (3) was lower than in previous years. There were a number of successful transfers from MPhil. to PhD (3) during the academic year as well as PhDs successfully completed(5). Perhaps necessitated by staff movements/absences and stricter application of GS&R regulations, the number of completing M.Phil. students (20 submitted) was also large in comparison to previous years.

The following graduated with post graduate qualifications during 2009/10

MSc MERS/TEAM

Loderick Brown

Nichole Sang

Omar Spence

MPhil Zoology

Tovia Elliott	Supervised by Dr. Mona Webber
Cheridah Todd	Supervised by Prof. Ralph Robinson

MPhil Marine Sciences

Peter Gayle	Supervised by Dr. Mona Webber

PhD Botany

Emma Ranston	Co-Supervised by Prof. Dale Webber
Philip Rose	Supervised by Prof. Dale Webber
Nickeisha Reid	Supervised by Dr. Jane Cohen

PhD Marine Sciences

Ava Maxam	Supervised by Prof. Dale Webber
Dayne Buddo	Supervised by Dr. Mona Webber

Summer School

The 2008/9 summer school was successfully mounted in July to August (a month later that the regular Summer School period) so as to facilitate the High School teachers participating in the Ministry of Education Youth and Culture (MOEYC) Project which offers High School teachers the opportunity to do first and second year Biology courses towards obtaining a degree. Summer school continues to be an important source of income generation for the Department.

Infrastructure and equipment

Several improvements to infrastructure were achieved during the academic year, these included completion of the upgrade of the academic staff, postgraduate and undergraduate computing facilities with superior desktop machines, the provision of a new black and white as well as a new colour printer.

One lab was upgraded in terms of the seating arrangement and a new 25 capacity seminar room was created by internal partitioning of a foyer area. 40 additional new microscopes were purchased for use in undergraduate labs and the department also purchased a new16 capacity bus for use on field trips with smaller classes such as MSc courses.

Outreach activities

The official opening of the UWI/EFJ Biodiversity Centre based at the Port Royal Marine Laboratory (PRML) took place in January 2010 and this facility has since been heavily utilized by students from local schools and colleges. Since the opening numbers of visitors to the PRML has increased by over 60%. Also in the area of outreach the department undertook a programme of visits to those community colleges offering our Preliminary Biology course with a view to improving delivery and to promoting communication between the various institutions involved.

The number of overseas users accommodated at the Discovery Bay Marine Laboratory (DBML) increased by nine from 233 to 242 with 3 of the 9 being individual researchers.

The Pan-Caribbean Reef Restoration workshop (hosted by Dr. Judith Mendes) was held at DBML from June 20-25. There were 24 participants from 14 countries around the Caribbean (The Bahamas, Barbados, Belize, Bermuda, The Cayman Islands, Colombia, Costa Rica, Curacao, Grenada, Jamaica, Puerto Rico, Trinidad and Tobago, Turks and Caicos Islands) as well as the USA and Israel, with 2 days of talks and two days of hands on demonstrations of the latest reef restoration techniques. Funding was provided by USAID.

Discovery Bay Marine Laboratory

Eight UWI courses were facilitated at DBML along with three UWI graduate students and two Post Doctorial students. One Life Sciences MSc course was run out of the Laboratory (mounted by Dr. M. Webber and Dr. D. Buddo). The Invasive Species Laboratory with its new National Lionfish project has attracted four applications for graduate research. So far one graduate student has been accepted to be supervised by Dr. D. Buddo, with co-supervision by Dr. K. Aiken. The DBML had one UWI 'graduate student in residence' in 2008/2009 co-supervised by Dr. M. Webber and Dr. D. Buddo funded by the EFJ Ballast Water Project. In addition, three overseas graduate students and five overseas Post Doctorial researchers were facilitated at the DBML.

Staff developments and Research activity highlights

The department was proud to support the promotion of Dr. Dale Webber to the rank of Professor. Life Sciences academic staff were heavily involved in the administration of the Faculty of Pure and Applied Sciences with three members; Professor Ralph Robinson, Professor Dale Webber and Dr. Mona Webber holding the posts of Deputy Dean and Associate Deans respectively.

Dr. Noureddine Benkeblia continued publishing extensively in his research area and was recognized internationally by his appointment to the editorial board of several international journals. Dr. Byron Wilson also maintained a substantial international profile through his work on Jamaica's threatened herpetofauna and was successful in attracting funding from a variety of sources to support this.

Dr Paula Tennant was the recipient of the Principal's Research Day award in the category of Best Researcher and Dr. Judith Mendes received the award for the Research Project attracting the most funds titled "Caribbean Reef Education and Training Initiative", Research Day 2010.

Achievement of 2008/9 targets

Three of the four targets set in the last report were achieved or partially achieved. As already stated the MATE MSc programme was successfully

implemented. The opening of the Biodiversity Centre at PRML helped to expand facilities there and as outlined above changes were made to improve infrastructure in the Department of Life Sciences. In addition, it is clear that throughput of graduate students registered for research degrees has markedly improved this academic year.

Research Output

In 2009-2010 the research output of the department consisted of 22 referred publications, 1 patent, 8 conference presentations (a number of which were given at international conferences overseas) and 8 technical reports/non-refereed articles. The publication rate of a few individuals is particularly impressive, but some persons are not publishing as they should. The crude average, based upon 16 academic staff at Mona and 4 at Scientific Officer level or above, a total of 20 staff, gives an average of 1.85 publications per staff member when all categories of publications are considered. This is comparable to the 1.8 recorded in the 2008-9 Departmental report. The research output in terms of refereed journal papers of 0.85 in 2008-9 has also improved to 1.15 in 2009-10.

Course Development

The Department was again not able to continue the curriculum development to the Level 2 and 3 courses. However, the Level 1 courses were re-visited with the resultant creation of four 3-credit courses across the two semesters.

Research based targets

The number of research based Journal articles did not increase significantly in 2009-10 but the quality of publications and the numbers of staff involved showed improvement, with papers appearing in Journals like Estuarine, Coastal and Shelf Science (JIP= 2.462) and 15 of the 20 staff producing the articles.

Targets for 2010-11

- To conduct curriculum reform of the entire advanced programme in the DLS.
- To review and revise the existing Graduate programmes so as to improve teaching and learning as well as income generation.
- To improve the quality of the infrastructure and increase space in the DLS for the delivery of quality teaching and research.
- To increase the quantity and quality of staff publications
- To continue to conduct research of national importance and ensure that the general populace is made aware of its significance by engaging in outreach activities.

PAPERS PRESENTED

- Passley, D., **Aiken K.A.** & G-A. Perry. First characterisation of the Jamaica spearfsihing sector. 62nd Annual Gulf & Caribbean Fisheries Institute, Cumana, Venezuela, 5-10 Nov. 2009; 7pp
- Steen, Sanya, **Jane Cohen** and **Noureddine Benkeblia**. Effects of the Plant Growth Regulator 'Stimulate™' on some Postharvest Qualities of Tomato Grown in Tropical Greenhouse. VI International Postharvest Symposium, 8-12 April 2009, Antalya, Turkey.
- **Peter Gayle.** DBML Coral Gardening, USAID Pan Caribbean Reef Restoration Workshop, Jun 2010
- Lindo JF, Waugh C, Todd C, Brown P and **Robinson RD** (2010). The emergence of *Angiostrongylus cantonensis* as a cause of eosinophilic meningitis in Jamaica: Progress and pitfalls. Proceedings of the International Symposium on Angiostrongylus and Angiostrongyliasis. (April 8-9, 2010), Bangkok, Thailand. p. 12.
- **Robinson RD** (2010). Teaching Ethics: Incorporating Ethics into an Undergraduate Science Curriculum. 4th Annual Forum

of the Bioethics Society of the English-Speaking Caribbean, Georgetown, Guyana (May 27-28, 2010). *Bioethics Caribe* 4: 2pp.

- Olarte Castillo XA, Rojas Y, **Tennant P**, Fuchs M, Sierra R, Bernal AJ, Fermin G and S. Restrepo S (2010) Origin, evolution and molecular epidemiology of *Papaya ringspot virus*. Plant Viruses Exploiting Agricultural and Natural Ecosystems. 11th International Plant Virus Epidemiology Symposium and 3rd Workshop of the Plant Virus Ecology Network. Cornell University, Ithaca, New York, June 20-24, 2010.

- **Wilson, B. S.,** and R. van Veen. 2009. Taxon report for Jamaican Iguana, Annual meeting of the IUCN Iguana Specialist Group, in Dominica.

- **Robinson, R.,** and **B. S. Wilson**. 2009. Conservation – an ethic of resource use, allocation, and protection. 3rd Annual Bioethics Forum, Bioethics Society of the English-Speaking Caribbean. St. Augustine, Trinidad (UWI), June 5, 2009.

- **Robinson, R.** 2010. Teaching ethics: Incorporating Ethics into an Undergraduate Curriculum. "An Ethical Pathway to Universal Access to Health: The Role of Rights, Citizens and Science" 4th Annual Bioethics Forum, George Town, Guyana, May 2010.

PUBLICATIONS

* **Aiken, K.A**. & G-A. Perry. 2009. "Fish nurseries in Kingston Harbour - do they still exist?" *Proceedings 61st Annual Gulf & Caribbean Fisheries Institute,* Guadeloupe, French West Indies, Nov. 2009; Fort Pierce, Florida :303-313

* **Tennant, P.** and **Benkeblia, N**. (Guest Editors) (2009). Citrus 3. *Tree and Forestry Science and Biotechnology*. *GSB Publisher***,** Isleworth (UK), *3(2)*, Pp. 1-142.

* **Benkeblia, N.** and Shiomi N. (2009). 6Th International Fructan Symposium Proceedings. *Dynamic Biochemistry, Process Biotechnology and Molecular Biology*, *GSB Publisher*, Isleworth (UK), Pp. 1-101.

* Yojiro, I, Shuichi, O, **Benkeblia, N.** and Shiomi, N. (2010). Variation of sucrose hydrolase, 1-kestose hydrolase, inulin hydrolase, 1-SST and 1-FFT in burdock root stored under different temperatures. *Postharvest Biology and Technology* 52: 232-238.

* Yojiro, I, Shuichi, O, Taiki, Y, Shinichi, K, **Benkeblia, N.** and Shiomi, N. (2010). Variation of1-kestose, nystose and higher fructooligosaccharides in burdock root stored under different temperature regimes. *Agriculture and Biology Journal of North America* 1(4): 491-494.

* **Boyd, F**. & DeviPrasad, P.V., 2009. The Effects of *Anabaena variabilis* on the Development of Rice plants in Jamaica. *Jamaican Journal of Science and Technology* 19-20: 20-30. ISSN: 1016-2054.

* **Boyd, F; Tennant, P.; Robinson, D**.; McLaren, I., 2008. Student Perceptions and Outcomes of a WAC Intervention Exercise in an Introductory Biology Course. *Caribbean Journal of Education* 30(2):217-247. ISSN: 0376-7701

* **Boyd, F**. & DeviPrasad, P.V., 2008. Effect of Cyanobacterial Inoculation and Inorganic Fertilizer on Rice Yields in Jamaica. *Tropical Agriculture*, *(Trinidad)* 85(2): 112-119**.**

* **Gayle, P.M.H**., B.H. Charpentier, O. Spence 2010. The Jamaican CARICOMP Site: using a temporal data set to assist in managing coastal resources. *Revista Biol de Tropical,* Vol. 58: 63-69.

* Chai, S.L., E.V.J. Tanner & **K.P. McKLaren** (2009). High Rates of Forest Clearance and Fragmentation Pre- and Post-National Park Establishment: The Case of a Jamaican Montane Rainforest. *Biological Conservation*, 142: 2484 - 2492.

* **Robinson RD** (2009). What to look for under the sea. Ramsay PA, Harding **VA, Cools JA** & **McLaren IA** (2009) "Blooming with the pouis: a rhetorical reader for Caribbean tertiary students." Chapter 20 (pp. 95-97). Ian Randall Publishers.

* Bennett S, **Tennant** P, Mc Laughlin W (2010) First report of *Hop stunt viroid* infecting citrus orchards in Jamaica. *Plant Pathology* 59: 393

* Fisher L, **Tennant** P, Mc Laughlin W (2010) Detection and characterization of *Citrus tristeza virus* stem pitting isolates in Jamaica. *European Journal of Plant Pathology* 127: 1-6.

* Powell M, Wheatley A, Omoruyi F, Asemota H, Williams NP, **Tennant** PF (2010) Comparative effects of dietary administered transgenic and conventional papaya on selected intestinal parameters in rat models. *Transgenic Research* 19: 511-518.

* Maxam, A.M. and **D.F. Webber**. 2010. The influence of wind-driven currents on the circulation and bay dynamics of a semi- enclosed reefal bay, Wreck Bay, Jamaica. *Estuarine, Coastal and Shelf Science.* Vol. 87 pp 535-544.

* McLaren, I. and **D.F. Webber**. 2009. Writing right: Enhancing student engagement and performance in an Ecology course. *International Journal of Environmental and Science Education*. Vol.4 (4) pp.365-380.

* Maxam, A.M. and **D.F. Webber**. 2009. Using the distribution of physicochemical variables to portray reefal bay waters. *Journal of Coastal Research.* Vol. 25 (6) pp.

* Persad, G. and **Webber, M**. (2009). The use of Ecopath software model trophic interactions within the zooplankton community of Discovery Bay, Jamaica. *The Open Marine Biology Journal,* 2009, 3:95-104.

* **Wilson, B.S.,** Koenig, S.E., van Veen, R., Miersma, E., and D.C. Rudolph. 2010. Cane toads a threat to West Indian wildlife: mortality of Jamaican boas attributable to toad ingestion. *Biological Invasions,* June 2010.

* Lewis, D.S., van Veen, R., and **B.S. Wilson**. 2010. Conservation implications of small Indian mongoose (Herpestes auropunctatus) predation in a hotspot within a hotspot: the Hellshire Hills, Jamaica. *Biological Invasions*, May 25, 2010.

* Newman, M.E., **K.P. McLaren** and **B.S. Wilson**. 2010. Use of object-oriented classification and fragmentation analysis (1985 - 2008) to identify important areas for conservation in Cockpit Country, Jamaica. *Environmental Monitoring and Assessment,* February 10, 2010.

* Rheubert, J.L., **Wilson, B.S.,** Wolf, K.W., and K.M. Gribbins. 2010. Ultrastructural study of spermiogenesis in the Jamaican Grey Anole, *Anolis lineatopus* (Reptilia: Polychrotidae). *Acta Zoologica*, February 26, 2010.

* Gribbins, K.M., J.L. Rheubert, E.H. Poldemann, M.H. Collier, **B. Wilson,** and K. Wolf. 2009. Continuous spermatogenesis and the germ cell development strategy within the testis of the Jamaican Gray Anole, *Anolis lineatopus. Theriogenology* 72:484-492

Patents Awarded

United States Patent #7,709,534 awarded May 4, 2010

"Medicaments for the treatment of Strongyloides stercoralis infections"

Inventors: Wayne Forbes, **Ralph Robinson** & Paul Reese

Assignee: The University of the West Indies, Mona

Technical reports and Non-refereed Articles

* **Benkeblia, N.** (2010). Horticulture in Jamaica. *Chronica Horticulturae* 50: 25-29

* **Creary, M**. 2010. Coastal and Marine Environment: UWI Thesis Inventory. A review of the theses on the Jamaican coastal

and marine environment. Centre for Marine Sciences, UWI. 54pp

* **M. Creary,** T. Edwards 2010. Status of coral reefs in the Drivers River Watershed, East Portland, Jamaica. March 2010. Prepared for the National Environment and Planning Agency/Global Environment Facility-Integrating Watershed and Coastal Areas Management Project (NEPA/GEF-IWCAM). 74 pp

* **M. Creary,** T. Edwards 2010. Status of coral reefs in the Drivers River Watershed, East Portland, Jamaica. March 2010. Benthic community identification for The Driver River Watershed. Prepared for the National Environment and Planning Agency/Global Environment Facility-Integrating Watershed and Coastal Areas Management Project (NEPA/GEF-IWCAM). 22pp

* **D. Buddo** and D. Lee 2009. Baseline Survey of the Fisheries Sector in *CARICOM* – 13 Participating Countries – Final Report sent to the CARICOM Regional Fisheries Mechanism (CRFM), December, 2009.

* **D. Buddo** 2009. Marine Ecological Assessment of Little Bay, Montserrat as part of an EIA for the development of a new port post-destruction of the volcano

* **D. Buddo** 2010. Assessment of Capacity-Building Needs for the Convention on Biological Diversity Capacity and Needs for Taxonomic Knowledge – Final Report submitted April, 2010 to the National Environment and Planning Agency.

* **D. Buddo** and D. Lee. 2010. Expansion, Consolidation and Strengthening of Marine Protected Areas Network in the Organization of Eastern Caribbean States – Draft Report: July, 2010

Income Generation

Dr. Karl Aiken secured a consultancy for the project "Improving Jamaican Agricultural Production (IJAP)" Ministry of Agriculture & Fisheries with IICA Jamaica, 5TH Workshops in Fisheries Management, May, 2010.

Mr. Peter Gayle, Principal scientific officer, DBML has secured a Project funded by the UWI under the New Initiative Grant "South Coast Diving Fisher DCS Project" (J$1.8M)

Ms. Marcia Creary Environmental Data Officer in CMS analyzed data and prepared reports on the "Status of coral reefs in the Drivers River Watershed, East Portland, Jamaica" for the NEPA/GEF-IWCAM project. (US$7,400)

Dr. Dayne Buddo and Dr. Karl Aiken secured funding to make CMS the Lead Agency for the 4-year National Lionfish project (US$431,000.)

Dr. Dayne Buddo, Academic coordinator, DBML with Dr. Ava Maxam, has secured a Project funded by the UWI under the New Initiative Grant. "Ballast Water Risk Management" Project is endorsed by the International Maritime Organization. ($1.5M)

Dr. Dayne Buddo secured a World Bank and The Nature Conservancy consultancy: – Marine Protected Areas (MPA) Project for five countries in the Organization of Eastern Caribbean States (OECS) (US$ 23,500)

Dr. Byron Wilson

- MacArthur Foundation ($340,000U.S; Co-PI, with PI. **K. McLaren**).
- Environmental Foundation of Jamaica ($3,349,300JA; PI with Co-PI **K. McLaren**)
- Mohamed bin Zayed Conservation Fund ($25,000U.S.; submitted through IUCN-ISG
- Forest Conservation Fund ($12,372,000JA; Co-PI with PI K. McLaren)

- Mohamed bin Zayed Species Conservation Fund ($4,981U.S.; Co-PI with PI M. Welsh)
- Beneficia Foundation ($10,000U.S.; Co-PI with R. Hudson)
- Global Environmental Foundation ($178,245U.S.; PI with Co-PI K. McLaren; project implemented through UNEP, CABI, and NEPA)

Dr. Dale Webber

- Caribbean Community Centre for Climate Change grant to initiate a International Coral Observatory Network Station at the Discovery Bay Marine Laboratory. Value US$105,000
- Discovery Bay Marine Laboratory has secured US$135,000 to replace the Crews (environmental monitoring) station with an ICON station.

PUBLIC SERVICE

Dr Karl Aiken

- Member of Board of Directors & Chair, Caribbean Maritime Institute (CMI), CMI Academic Council)
- Member, CITES Scientific Authority of Jamaica
- Board Member, Fisheries Advisory Board of Ministry of Agriculture & Fisheries
- Member & Chair, Fish Sancturies sub-committee

Dr. Noureddine Benkeblia

- Member, Editorial Board of the Journal:
- *Serial Editor* of Potato Issues
- *Serial Editor* of Citrus Issues
- Chairperson, SERT (Roots and Tubers Section), **ISHS**

Mr. Frederick Boyd

- Member, Standards Subcommittee, Jamaica Organic Agricultural Association (JOAM)

Dr. Dayne Buddo

- National coordinator, Marine Invasive Group NEPA

Dr Jane Cohen

- Member, Scientific Authority (CITES) of Jamaica
- Member, Alien Invasive Species Working Group of Jamaica

Ms. Marcia Creary

- President, Jamaica Institute of Environmental Professionals
- Member, Caribbean Academy of Sciences
- Member, International Society for Reef Studies
- Node Coordinator, Northern Caribbean and Western Atlantic Node, Global Coral Reef Monitoring Network (GCRMN)
- Vice-Chairperson, Jamaica Clearing House Mechanism (JaCHM) Steering Committee
- Member, Steering Committee, Biodiversity Add-on Project
- Member, National Ambient Marine Water Quality Standards Committee

Mr. Peter Gayle

- Member, Diving sub-group of the working group on Fisheries Management and related matters of the National Council on Oceans and Coastal Zone Management.

Dr. Kurt McLaren

- Member, Board - Forestry Department.

Professor Ralph Robinson

- Board of Directors, Jamaica Agricultural Development Foundation
- Member, National Committee to Develop Guidelines for the Aquaculture Industry in Jamaica
- Member, National Shrimp Aquaculture Policy Sub-Committee
- Scientific Member, The National Bioethics Committee of Jamaica

Dr. Kisan Vaidya

- Member, Gene Bank Committee, Jamaica
- Member, Review Committee (Agriculture related articles) of the Jamican *Journal of Science and Technology*

Dr. Dale Webber

- President, Tornadoes Swimming Club.
- Deputy Chairman, Mona Preparatory School Board of Governors.
- Chairman and NGO Member, Board of Directors, Environmental Foundation of Jamaica.
- Council Member, The Jamaica Institute of Environmental Professionals (JIEP)
- Reviewer, Elsevier Science Publishing (Environmental Science and Policy)
- Member, National council on Ocean and Coastal Zone Management (NCOCZM) Ministry of Foreign Affairs and Foreign Trade.
- Member, Editorial Board of the Jamaica Institute of Environmental Professionals (JIEP)

Dr. Mona Webber.

- Member, CITES (NEPA) committee on endangered species.
- Member, Caribbean Academy of Sciences, Jamaican Chapter.
- Member, National Ramsar committee (NEPA).
- Member, Association of Marine Laboratories of the Caribbean.
- Member, Science and Technology Advisory Committee of the Jamaica National Commission for UNESCO.
- U.W.I. representative, National Environmental Education Committee.

Dr. Byron Wilson

- Member, Working Group on Invasive Species, NEPA
- Member, IUCN SSC Iguana Specialist Group
- Member, IUCN SSC Amphibian Specialist Group

Income

Activity/Programme	Earning
Lab space rental	$ 644,000.00
Sale of lab manuals	$ 848,555.00
Summer School	$4,000,111.00
DLS consultancy	$ 16,240.00
Grants and donations	$ 62,240.00
Port Royal consultancy	$ 67,800.00
Documentation Centre	$ 291,000.00
MSc Programmes	$2,380,345.29

CATEGORIES OF STUDENTS

Undergraduate numbers:

Preliminary (Year 0)	–	72
Introductory (Level I)	–	566
Advanced (Level II)	–	175
Advanced (Level III)	–	103

Class of Degrees 2009/2010 Graduates	
I	0
II i	14
II ii	49
Pass	21
Total	**84**

	Types of Degrees 2009/2010 Graduates	
1	Botany Major	4
2	Zoology Major	19
3	Marine Biology Major	5
4	Experimental Biology Double Major	18
5	Environmental Biology Double Major	25
6	Biology with Education	2
7	Microbiology major	9
	Total	**84**

Student Prizes

Preliminary Biology Prize	Ms. Te'Anne Chisholm
First Year Biology	Ms. Nashekia Guyah
(2 candidates)	Mr. Canute Ricketts
Dr. Devi Prasad Prize	Ms. Tiffany Campbell
Avinash Potluri Prize	Mr. Isaac Morrison
Second Year Zoology Prize	Ms. Dominique Fearon
LB Coke Prize in Plant Physiology	Mr. Brahim Diop
Dr. Sasikala Potluri Prize	Mr. Brahim Diop
Vincent Hugh Wilson McKie award	Ms. Kimberly Salmon

DEPARTMENT OF MATHEMATICS

Professor Alexandra Rodkina, MPhil, PhD *Kiev,* **DSc** *Moscow*
– Head of Department

WORK OF THE DEPARTMENT

Renovation of the Department's building is almost finished. Members of staff have moved into their offices in December 2009. The preparation of the Computer Laboratory has begun.

Dr. Nagarani Ponakala received the Principal's award for the best publication of the article entitled "Effect of boundary absorption on dispersion in Casson fluid flow in an annulus – Application to catheterized artery".

Research Output

Since August 2009 to July 2010, the Department published 15 articles in refereed journals, published 2 books and gave four invited conference presentations.

At present the most developed part of the research activity of the Department of Mathematics can be characterized as *"Mathematics and Modelling"*. It comprises three groups of research: **Stochastic Analysis, Physiological Fluid Dynamics, and Mathematical Physics**. In addition, to the Department's monthly seminar, each group has its own research seminars.

Dr. Conall Kelly has completed his work for the New Initiative Grant.

Dr. Conall Kelly and PhD candidate Mr. Peter Palmer visited the Department of Mathematics at Heriot-Watt University, Edinburgh, UK in June 2010 to collaborate with the research group of Dr. Evelyn Buckwar

on the topic of 'Linear Stability Analysis of numerical methods for stochastic differential equations'. The visit was preceded by two semesters of preparatory research seminars and was funded by a New Initiative Grant. "Overall, the project resulted in 3 articles accepted for publication in 2010; one article submitted for publication and currently in review, one further article in draft form; and one draft chapter in Mr. Palmer's PhD thesis which will be adapted for publication in an International Journal."

Summer School

The Department's summer school, which was coordinated by Dr. Samuel McDaniel, offered nine courses and was once again successful.

Mathematics Bridging Programme

The 2009/10 Mathematics Bridging Programme, designed to improve the basic mathematics skills of incoming FPAS students, took place each Thursday afternoon for 8 weeks in Semester 1. Twenty-eight (28) students participated, of whom 3 were recipients of the Mathematics Bridging Programme Award. Diagnostic testing was used upon entry and exit, and exiting participants showed an average improvement of 37% of their score upon entry resulting in one student almost tripling his score. Plans are in place for future success.

Mathematical Olympiad

In 2009, the Department initiated a set of activities designed to improve the mathematical learning outcomes in Jamaican high schools, which included the launching, in collaboration with Sterling Asset Management Limited, of the Jamaican Mathematical Olympiad in February 2010. Over a three month period, National Mathematics Champions in each of the Grade 7-11 was crowned after four rounds of examinations from which a Jamaican Mathematical Olympiad team of high school students was selected to compete in the XII Central American and Caribbean Regional Mathematical Olympiad. First time competing internationally, they placed 11th out of 14 participating countries. In the future, the Department will continue to organize the Olympiad and form national teams to compete internationally.

Organization of School and Workshops

Dr. D. Batic and Prof. Winklmeier (Universidad de Los Andes, Bogota D.C., Colombia) organized the 2nd School in Mathematical Physics: "Functional analytic methods in general relativity and quantum mechanics" aimed at undergraduate and graduate students and researchers. The school took place from the 31st of May to the 4th of June 2010, at the Mathematics Department of Universidad de los Andes, Bogotá and had 150 participants.

Research Day

Research Day preparation in 2009 was coordinated by Mr. Richard Plummer. Three posters about the research at the Department were prepared for the exhibition. A Mathematics Competition for 2nd and 3rd year students was held prior to Research Day and the winners were awarded at the Departmental Booth. Short quizzes for students were conducted at the booth for two days and attracted a lot of students. Presentations on research and career were given at the Department.

Outreach Activities

The Department continues to participate in outreach activities, in collaboration with the Faculty Office, promoting our Department and recruiting students. Visits were also made to a few non-traditional High Schools and workshops conducted. Plans are on the way to strengthen our relationship with one of our feeder Colleges, CASE.

MSc Programme

The MSc in Mathematics Programme was restarted in Semester II, 2009/10. It was preceded by two qualifying courses taught in Semester I. Two graduate courses were taught in Semester II and 1 graduate course was taught in June-July 2010.

Curriculum Revision

A new undergraduate double major programme "Mathematics and Modelling Processes" was approved in 2009/2010. Several students have registered for this programme.

Five new 2nd and 3rd years courses as well as three 1st year 3 credit courses for the mathematics major students have been developed and approved by AQUAC. One first year course, specially designed for Physics students, was also approved.

Staffing

Two new members of staff were employed at our department. They have already become active members of our team: Dr. Davide Batic joined the department in November 2009 and Mr. Richard Plummer joined the department in January 2010.

Faculty Outreach Work & Community Colleges

The Department was well represented at both the Western and Eastern Fairs, organized by the University and the Faculty of Pure and Applied Sciences, resulting a record number of intakes in the Department and the Faculty.

We worked with and monitored a number of Community Colleges that offer our Preliminary Mathematics courses, resulting in a review of the generally low pass rate among the Community Colleges. Weekly problem papers and worksheets have been forwarded to these institutions to address this. We will be making recommendations to ameliorate our relationships.

Editorial And Reviewer's Activity

Nagarani Ponakala – was the reviewer for the following journals: Applied Mathematics and Computation, Mathematical Bioscience, Applications and Applied Mathematics, Chemical Engineering Communications.

Alexandra Rodkina and **Conall Kelly** – were reviewers for the following journals: Computers and Mathematics with Applications, Discrete and Continuous Dynamical Systems, Applicable Analysis, Stochastics, Mathematical Problems in Engineering and Automatica, among others.

Alexandra Rodkina - was editor for the journal*:* International Journal of Difference Equations.

Distinguished Visitors

In January 2010, **Prof. Girija Jayaraman** (Applied Mathematician for over 30 years) from Indian Institute of Technology, New Delhi, India visited and presented two lectures "Partnership between Mathematics and Cardiovascular Research" and "Modeling Aquatic Ecosystems".

Prof. Marek Nowakowski, Departamento de Fisica, Universidad de los Andes, Bogota, Colombia, visited the department in March 2010.?His visit was carried out with a grant received from Facultad de Ciencia, Universidad de los Andes. Prof. Marek Nowakowski gave a seminar and performed research activity in the framework of the project "Metrics on manifolds inspired by Quantum Gravity" together with Dr. Davide Batic.

In April, the Department hosted a "*Distinguished Lecture"* in Mathematics, by **Prof. Xuerong Mao,** Head of the Department of Statistics and Modelling Science, University of the Starthclyde, Glasgow, a Fellow of the Royal Society of Edinburgh, UK. Prof. Xuerong Mao has a long history of research collaboration with Prof. A.Rodkina and Dr. C. Kelly.

PAPERS PRESENTED

- **St. Elmo Whyte.** International Association of Black Actuaries in New York August 4 to7 2010.
- **Conall Kelly** and **Alexandra Rodkina**. 8th AIMS Conference on Dynamical Systems, Differential Equations and Applications, May 25 - 28, 2010, Dresden University of Technology, Germany.
- **Conall Kelly.** TWAS-ROLAC Caribbean Young Scientist & Technologist Conference, January 2010, Ocho Rios, Jamaica.
- **Conall Kelly.** XVII International Symposium on Mathematical Methods Applied to the Sciences, February 2010, University of Costa Rica, San Jose, Costa Rica.
- **Nagarani Ponakala.** TWAS-ROLAC Caribbean Young scientist and technologist Conference, Ocho Rios, Jamaica, W.I, January 20-22, 2010.

PUBLICATIONS

Books & Monographs

* **McDaniel, S.** *"*Cape One Mathematics*"*. Bushy Head Series, Phoenix Printery, 2011

* **McDaniel, S**. "Cue Cards and Multiple Choice Questions". Bushy Head Series, Phoenix Printery, 2011

Refereed Journals Articles

* Guerrero, I. A., **D. Batic** and Nowakowski, M. "A non commutative model for a mini black hole", *Class.Quant.Grav.* 26, 245006 (9pp), 2009;

* **D. Batic** and Nicolini, P. "Fuzziness at the horizon", *Physics Letters* B 692, 32 (4pp), 2010;

* Guerrero, I. A., **Batic, D.** and Nowakowski, M. "Maximal extension of the Schwarzschild spacetime inspired by noncommutative geometry". *J. Math. Phys.* 51, 022503 (17pp), 2010;

* Santacruz, C. A., **D. Batic** and Nowakowski, M. "On the existence of certain axisymmetric interior metrics". *J. Math. Phys.* 51, 082504 (27pp), (2010);

* **Nagarani, P.** "Peristaltic transport of a Casson fluid in an inclined channel", *Korea Australia Rheology Journal,* 22(2), 2010, 47-63.

* **Nagarani, P**., Sarojamma, G. and Jayaraman, G. "Effect of boundary absorption on dispersion in Casson fluid flow in an annulus - Application to catheterized artery". *Acta Mechanica,* 202, 2009, 47-63.

* Buckwar, Evelyn and **Kelly, C**. "Towards a systematic linear stability analysis of numerical methods for systems of stochastic differential equations," *SIAM Journal on Numerical Analysis,* 48(1):298-321, 2010.

* Appleby, J.A.D., **Kelly**, C., Xuerong Mao, and **Rodkina**, **A**. "On the local dynamics of polynomial difference equations with fading stochastic perturbations", *Dynamics of Continuous, Discrete & Impulsive Systems. Series A.* 17 (3), (2010), 401-430.

* Appleby, J. A. D., **Rodkina, A**., and Schurz. H. "On the Oscillation of Solutions of Stochastic Difference Equations". *Matematicas: Ensen'anza Universitaria, Revista de la Coproraci'on ERM,* (2009).

* Appleby, J. A. D., **and Rodkina, A**., "Stability of Nonlinear stochastic Volterra difference equations with respect to a fading perturbation". *International Journal of Difference Equations,* 4 (2), (2009) 165-184.

* **Rodkina, A**., and Schurz, H. "On Positivity and Boundedness of Solutions of Nonlinear Stochastic Difference Equations". Discrete and Continuous Dynamical Systems. Supplement 2009, pp. 640-649.

* Appleby, J. A. D., **Rodkina, A**., and Schurz, H. "Non-positivity and oscillations of solutions of nonlinear stochastic difference equations with state-dependent noise". *Difference Equations and Applications,* 6 (7), (2010), 807-830.

* Appleby, J. A. D., Riedle, M. and **Rodkina, A.** "On Asymptotic Stability of linear stochastic Volterra difference equations with respect to a fading perturbation." *Advance Studies in Pure Mathematics*, 53, ICDEA2006, (2009), pp. 281-292.

* **Rodkina, A.** "On Nonoscillatory Regime for Stochastic Cubic Difference Equations with Fading Noise". *Proceedings of the 14th International Conference on Difference Equations and Applications.* Istanbul. Turkey, ISBN 978-875-6437-80-3, (2009), 283-290.

* Appleby, J. A. D., McCarthy, M. and **Rodkina, A.** "Growth Rates of Delay-Differential Equations and Uniform Euler Schemes". *Proceedings of the 14th International Conference on Difference Equations and Applications.* Istanbul. Turkey, ISBN 978-875-6437-80-3, (2009), 117-124.

* Appleby, J. A. D., Guzowska, M., **Kelly, C.,** and **Rodkina, A.** "Preserving positivity in solutions of discretised stochastic differential equations". *Applied Mathematics and Computation,* 217 (2010), 763-774.

INCOME GENERATION

UNESCO Project

In October 2009, The Department obtained a contract with UNESCO valued at US$12,100.00 for "Mathematical Intervention into the Caribbean" to support a visit of the professor from India to enhance our Modelling programme and Bridging programme; a small part of the Olympiad activity, and to obtain statistical data about the CXC exams in the Caribbean. The Project is completed, but work in the CXC analysis has just begun.

PUBLIC SERVICE

Collaboration with different units at UWI and outside of UWI

Dr. Samuel McDaniel assisted with the delivery of Biostatistics in the Community Health and Psychiatry Department's PhD programme. He also offered statistical and data collection consulting services to the Ministry of Agriculture and Fisheries, developing and delivering training modules to agricultural extension officers and serves as a Mathematics external examiner for a number of courses at The Mico University and at The College of Agriculture, Science and Education (CASE).

Students

PhD candidate, Mr. F. Arunaye (supervisors: Prof. A. Rodkina, and Prof. Bhatt, St. Augustine campus) successfully defended his dissertation in December 2009.

Two undergraduate students - Mr. Dujon Dunn and Mr. Nigel Johnson participated in a Mathematics Competition and were awarded prizes that were presented to them at the annual Research Day. Four undergraduates

also received prizes at the Faculty Award's Ceremony for outstanding work – Runako Williams, Joel Jackson, Kervern James and Dujon Dunn.

This year 37 students will be graduating with a major offered by the Department. The following data provides a breakdown by major:

Major	No. of Graduants
Mathematics (Major)	14
Actuarial Science	21
Mathematics with Education	2

Information on Students

The following table indicates the number of Mathematics students registered by level and programme.

Maths (BSc)	Actuarial Science	Maths with Education	
Prelim.	170		
Level 1	422	34	2
Level 2	18	44	1
Level 3	10	34	2

DEPARTMENT OF PHYSICS

Michael A. Taylor, BSc, MPhil, *UWI,* **PhD** *U of Maryland, College Park,* **– Acting Head of Department.**

HIGHLIGHTS

The Department concluded the second year of its five year plan aimed at revamping its curriculum, increasing undergraduate student numbers, improving the quality of its graduates, and stimulating relevant research. The year was spent laying groundwork but there were enough encouraging signs to suggest that the efforts being made will bear fruit in the near future. Some highlights of the year are as below.

- The first year of the degree programme in Electronics Engineering was successfully completed. The inaugural intake of students was 17 and an official launch was held in November 2009 in conjunction with the Faculty of Engineering, St. Augustine.
- Approvals were gained for new second year courses in Electronics in keeping with a revamping of that major, and for modifications to the Medical Physics major. Modifications to the Alternative Energy and Material Science majors were extensively discussed and approvals are to be sought in the upcoming academic year.
- Staffing continued to be a challenge for the Department. Dr. Skobla proceeded on sabbatical and Dr. Michael Taylor acted as Head for the year. It had been hoped that at least 2 of 5 vacant positions would have been filled however this did not materialize. Notwithstanding, teaching standards remained high.

Six staff members were recognized for Excellence in Teaching at the annual Faculty Awards Ceremony. They were **Mr. Ricardo Paharsingh, Dr. Michael Taylor, Mr. Samuel Daniel, Dr. Paul Aiken, Mr. Chad Andrade** and **Prof. Anthony Chen. Mr. Ricardo Paharsingh** also received an award for Most Outstanding Achievement in Teaching. Two research fellows joined the staff – Mr. Trevor Hall (Climate Studies) and Prof. Emilia Milieva (Medical Physics).

- The Department opened a new Graduate Student Research Centre. The Centre includes individual work stations for graduate students, common areas for discussion and relaxation, and a kitchenette. This is in keeping with a renewed thrust on research. The roof laboratory for Environmental Physics and Alternative Energy was also refurbished and reopened.

- A three week modular course in Alternative Energy was conducted during the summer of 2010 in collaboration with the Environmental Foundation of Jamaica (EFJ), the Scientific Research Council (SRC) and Alternate Energy Sources (AES). There were 74 participants and Professor A. Anthony Chen (Professor Emeritus) served as the course moderator.

- The Department launched the Physics Honours Society (PHS) to encourage excellence at the undergraduate level. In each semester the 20 best students from Levels II and III (based on the previous semester's exams) were recognized. The PHS carries with it rewards and incentives for excellence including the opportunity for 4 weeks of paid summer internship with the Department doing research alongside staff members. Six students qualified for the internship in summer 2010.

- The Mona Physics Alumni Society had its inaugural meeting in October 2009. Bylaws were adopted and a Secretariat to govern the operation of the society was established. Mr. Lindon Falcolner was elected as the first President.

Undergraduate Teaching and Graduate Programmes

The department continued to see high student assessment scores for its staff members, underscoring the general commitment by all to excellence in teaching. Of 50 total assessments, 46 exceeded 4.0. The Department average for lecturers was 4.4 and for courses was 4.0. Student numbers at the Introductory level showed a slight decrease (see below) compared to the previous year. The 30% increase at this level noted in last year's report did not translate into a comparable increase at Level II. The number of students taught over all years increased slightly.

The Department admitted 4 new MPhil students and 3 PhD students. This is as opposed to no admissions the previous year. Nonetheless, the number of full time postgraduate research students in the Department is less than desired and efforts at recruitment in the upcoming academic year will continue. One MPhil student, Miss Mei Chi Lau passed on during the year. The MSc in Digital Technology continued with a new batch of 7 students. Efforts to restructure the programme and increase throughput were successful as 10 students completed the requirements for graduation.

Total undergraduate student enrolment in departmental courses was as below (brackets indicate numbers in 2008/2009 for comparison).

	Semester 1	**Semester 2**	**Year Totals**
Preliminary	87 (87)	64 (81)	**151 (168)**
Intro Physics	207 (223)	145 (141)	**352 (364)**
Intro Engineering	17 (--)		**17**
Intro Electronics		46 (--)	**46**
Year II	172 (158)	143 (150)	**315 (308)**
Year III	108 (87)	162 (108)	**270 (195)**
Totals	**591 (555)**	**560 (480)**	**1151 (1035)**

Postgraduate student enrolment was as follows:

MPhil 10 students (F/T & P/T)	PhD 6 students	MSc 15 students (all years)

Research

The Department produced 9 conference papers, 5 refereed publications and 1 article. These numbers fall short of the targets set but it is anticipated that research output will increase in the coming years given the efforts underway to stimulate research. Notwithstanding, the Climate Studies Group continues to establish itself as an authority on Caribbean climate and was repeatedly called upon to advise the government and country during the severe drought during the year as well as leading up to the global climate change talks in Copenhagen at the end of 2009. The new renewable energy research group continues its quest to identify priority areas for research and teaching in this field. New grants totaled in excess of 10 million dollars (see section below). Significantly, graduate student research grants accounted for approximately 10% of the total.

Outreach

Approximately 1000 high school students benefitted from the annual CAPE Workshop series held in January 2010. For the first time, the department also hosted 3 days of physics demonstrations for CSEC which saw over 500 students in attendance.

Outreach was not limited to high schools as collaborations with public and private institutions facilitated the staging of 4 workshops and 2 training courses. Collaborators included the Astronomical Association of Jamaica, the Petroleum Corporation of Jamaica, the Environmental Foundation of Jamaica, the Scientific Research Council, the United Nations Environment Programme Caribbean Environmental Programme, and the United Nations Development Programme.

PAPERS PRESENTED

- **Taylor, MA** 2009: Modeling Climate Change in the Caribbean. 1st National Climate Conference of Suriname. Paramaribo, Suriname. October 19, 2009.
- **Field, D**, and **C. McNamarah**, 2010: The Performance of Photovoltaic Technologies under Jamaica's Climatic Conditions.

Caribbean Young Scientist and Technologist Conference Ocho Rios, Jamaica. January 20-22, 2010

- **Coy A**, 2010: "The Use of Automatic Speech Recognition in the Teaching of Literacy", UWI School of Education, Literacy Symposium, Kingston, Jamaica. March 11-12, 2010
- **Voutchkov, M**, 2010: Electromagnetic Radiation: Cell Phones and Your Health. Medical Association of Jamaica Symposium 2010. Kingston, Jamaica. June 10-13, 2010.
- **McNamarah C**., **D. Field**, 2010: A Cost Analysis of Photovoltaic Technologies under Jamaica's Climatic Conditions. IEEE Photovoltaic Specialist Conference. Hawaii, USA June 20 - 25, 2010.
- **McNamarah C**., 2010: Performance of PV's under Jamaica Climatic Conditions. 2nd Annual Caribbean Sustainable Energy Forum. Montego Bay, Jamaica. June 21 - 25, 2010.
- **Chen A. A**., 2010: Small Scale Wind and Photovoltaics Feasibility. 2nd Annual Caribbean Sustainable Energy Forum. Montego Bay, Jamaica. June 21 - 25, 2010.
- **Taylor, MA**, **T. S. Stephenson**, A. Owino and **A. A. Chen**, 2010: The Importance of the Southwestern Caribbean. American Geophysical Union 2010 Joint Assembly. Iguazu Falls, Brazil on August 8-12, 2010.
- **Scarlett, C**., **D. Walwyn**, **MA Taylor** and **TS Stephenson**, 2010: An Investigation of Lightning Strikes over Jamaica. American Geophysical Union 2010 Joint Assembly. Iguazu Falls, Brazil on August 8-12, 2010.

PUBLICATIONS

Articles

* **Paul Aiken**, **AMD Amarakoon**, 2009: Renewable Energy as a Solution to the Energy Crisis. *Carib Xplorer,* vol 1, Issue 1.

Peer Reviewed

* Barker, J., N. Ma, **A. Coy** and M. Cooke, 2010, Speech fragment decoding techniques for simultaneous speaker identification and speech recognition *Computer Speech and Language*, 24(1):94-111, 2010.

* Rose, R. C., A. Norouzian, A. Reddy, **A. Coy**, V. Gupta and M. Karafiat, 2010: Subword-Based Spoken Term Detection in Audio Course Lectures. Proceedings IEEE International Conference on Acoustics, Speech and Signal Processing, March 14-19, 2010.

* **Stephenson, T. S**., **M. A. Taylor** and J. M. Spence, 2010: Jamaica, [*in* State of the Climate in 2009]. *Bull. Amer. Meteor. Soc.*, 91 (6), S79-S82.

* **Campbell J. D.,Campbell J. D., M. A. Taylor, T. S. Stephenson, R. Watson,** F. S. Whyte, 2010: Future Climate of the Caribbean from a Regional Climate Model, *International Journal of Climatology* DOI: 10.1002/joc.2200.

* **Ponnambalam, MJ.,** 2010: A Conversation in Physics, *Bulletin of the Indian Association of Physics Teachers:* 2:132-134.

INCOME GENERATION

- The MSc in Digital Technology programme generated 2.6 million in fees and summer school netted 1.4 million.

- Drs. Michael Taylor and Tannecia Stephenson received US$20,500 funding from the UNDP GEF Small Grants Programme for "Tell It - Disseminating Caribbean Climate Change Science & Stories".

- In August 2010 the Department of Physics' Wave Energy Proposal was approved by the Global Energy Facility (GEF). The total project cost is US$2.2 million. GEF contribution will be US$750,000.00, with the balance being co-financing and in-kind. The project coordinator is Dr. Gary Jackson.

- Dr. André Coy received J$1.5 million from the Principal's New Initiative Grant for Capacity building in Speech and Hearing Research.
- Graduate Student research netted approximately J$1.3 million in Research and Publication funding.

PRIZES

Undergraduate prizes were awarded to:

Professor John Lodenquai Prize for Introductory Physics	–	Jermaine Williams
Level II Departmental Prize	–	Rhonda Bryan Jenise Smith
Francis Haddon Bowen Bursary	–	Ralphston Johnson
Michael Tharmanahthan Ponnambalam Bursary	–	Kemar Roberts

Three students graduated with MPhils: Roxann Stennet, Lawrence Brown and Yhanique Barrett.

PUBLIC SERVICE

Paul Aiken

- Vice Chair, IEEE-Jamaica Section
- Engineering Programme Evaluator, for Caribbean Accreditation Council for Engineering and Technology (CACET)

Anthony Chen

- Member, Council of the Institute of Jamaica
- Chairman, UNDP-GEF Community Based Adaptation Programme in Jamaica
- Member, GEF- Small Grants Programme

Andre Coy

- Reviewer Journals, *IEEE Transactions on Audio, Speech and Language Processing, Computer Speech and Language, Instrumentation Science & Technology*

Victor Douse

- Chairman, Cement Technical Committee, Bureau of Standards.
- Technical Assessor, Jamaica National Agency for Accreditation (JANAAC)

Leary Myers

- Member, International Who's Who Historical Society

Tannecia Stephenson

- Member, National Committee for Climate Change Adaptation and Disaster Risk Reduction
- Reviewer Journals, *Climate Research, Climate Dynamics*

Michael Taylor

- Member, Steering Committee, Pilot Project on Climate Resilience (Caribbean)
- Member, National Committee of the International Global Biosphere Programme.
- Alternate Chair, UNDP-GEF Community Based Adaptation Programme, Jamaica
- Member, Caribbean Disaster Emergency Management Agency, Educational Sector Sub-Committee.
- External Examiner, Physics, College of Agriculture Science and Education
- Reviewer Journals: *Journal of Geophysical Research, International Journal of Climatology, Journal of Climate, Climate Dynamics*

Mitko Voutchkov

- Member, Heavy Metal Task Force, Ministry of Health
- Life Member, International Society of Environmental Geochemistry and Health.
- Chairman, Technical Advisory Committee "In-situ Methods for Characterization of Contaminated Sites", International Atomic Energy Agency (IAEA)
- IAEA Technical Co-operation Expert in Nuclear Physics