

## 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).

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

Postgraduate student enrolment was as follows:

MPhil 10 students (F/T & P/T)	PhD 6 students	MSc 15 students (all years)
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## 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. 1<sup>st</sup> 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. 2<sup>nd</sup> Annual Caribbean Sustainable Energy Forum. Montego Bay, Jamaica. June 21 - 25, 2010.
- **Chen A. A.**, 2010: Small Scale Wind and Photovoltaics Feasibility. 2<sup>nd</sup> 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 Explorer*, 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:

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