

## DEPARTMENT OF LIFE SCIENCES



**Dr. Dwight Robinson** BSc *UWI*, PhD  
Head of Department

**G**uided by the recommendations of the Quality Assurance Review completed in the previous academic year, the Department assessed, realigned and refocused its efforts as part of its continued commitment to achieving the goal of contributing to the University realizing its mission by making available, through excellence in teaching, research, outreach and public service, high quality education and training for Life Science students.

### **WORK OF THE DEPARTMENT**

The Department invested some time in reviewing the report from the Quality Assurance review of the Department that was completed in the previous academic year. Our response and an Action Plan were prepared and presented to the Faculty of Science and Technology Board and the Academic Board. Actions on several recommendations were also initiated.

## **STAFF MATTERS**

- Dr. Philip Rose and Dr. Margelette Tabanor successfully completed the Post-graduate Certificate in University Teaching and Learning offered by The Centre for Excellence in Teaching and Learning, UWI, Mona Campus.
- Dr. Jane Cohen was part of a collaborative research team, which included Dr. Andre Coy and Professor Michael Taylor from the Department of Physics, to obtain the Principal's Award for Best Research Publication, for the Faculty of Science and Technology. The article was titled, "Increasing the Accuracy and Automation of Fractional Vegetation Cover Estimation from Digital Photographs."
- Professor Mona Webber was appointed to the Science Advisory Committee of the Jamaica National Commission for UNESCO (2016–2019).
- Three members of staff were recognized for their long service to the UWI. They were Dr. Kurt McLaren and Dr. Dwight Robinson for 15 years and Dr. Jane Cohen for 21 years. Mr. Donald Simpson and Mr. Rodney Smith received the distinguished worker award at the Faculty's Awards ceremony held in March 2017.

## **GRADUATE MATTERS**

The department welcomed five new MPhil students and a new PhD student at the beginning of the 2016/2017 academic year.

Machel Emanuel, a PhD student, attended the 3rd All African Horticultural Congress held in Ibadan, Nigeria, August 7–16, 2016. He made an oral presentation and copped the ISHS student award for the best oral presentation.

## **UNDERGRADUATE MATTERS**

There were a total of 844 students registered in undergraduate programmes in the Department during the 2016/17 academic year. The major changes were a 14% increase in registration at level 0 and a 21% decrease in

registration at level 1 when compared to the previous year. The numbers in advanced courses remained relatively constant.

## **OUTREACH**

Through the Biology Student Association (BSA), the Department was involved in several outreach activities. These included the Annual Beach Cleanup exercise held on September 17, 2016 and the University's Club Fusion on Thursday, September 22, 2016.

Our Herbarium Curator, Mr. Patrick Lewis, provided regular assistance to the Jamaica Conservation Development Trust (JCDDT) with a botanical survey of several trails in the Blue Mountains and assisted the Jamaica Bauxite Institute (JBI) with plant identification by participating in a JBI field trip to Maggoty, St. Elizabeth to assess the status of abandoned bauxite ponds.

The Department teamed with the Faculty's Outreach and Development Unit to participate in several outreach activities. There was an increase in a request from preparatory and primary schools for students and their teachers to visit the Herbarium and Animal Museum in the Department. Over 100 guests were welcomed to the facilities during the year.

This year the Department held the first of what is expected to be an annual CAPE Biology Workshop. Forty-eight students from four schools participated. Both teachers and students expressed satisfaction with the workshop and requests for a workshop specifically for teachers were received.

As part of Life Sciences commitment to support local entities that have responsibility to manage Jamaica's natural resources, the Department, through Dr. Philip Rose and Mr. Patrick Lewis, hosted a one-day Dendrology workshop on common morphological characters used in plant identification for 25 Forest Rangers of the Forestry Department.

## **Port Royal Marine Laboratory (PRML)**

The PRML continued to play a very important role in supporting

teaching and research in Life Sciences as well as other Departments and Centres on the UWI Mona Campus. In 2017 the PRML facilitated the largest number of students conducting coral ecology lab classes whilst scuba diving in recent times. Postgraduate research has focused on coral reef health and water quality across the Port Royal Cays in collaboration with the Department of Chemistry. The Lab also provided support for the collection of specimens to the University of Technology, and logistical support throughout the year for monitoring activities undertaken by the National Environment & Planning Agency for the Iguana Conservation project. PRML continues to implement the CMS-run National Works Agency Palisadoes Mangrove Rehabilitation Project. In December 2016-January 2017 the PRML scientific team established the Port Royal Cays as a GCRMN location with coral reef health surveys across all the cays as the start of an annual monitoring programme and contribution to the regional GCRMN-Caribbean database. The PRML also hosted a range of external visitors including the Association of Caribbean States (ACS)/Korea International Cooperation Agency (KOICA) delegation to Jamaica on April 26, 2017. The purpose of the delegation's trip was to gain a better understanding of how Jamaica can be integrated into the ACS project – "Impact Assessment of Climate Change on the Sandy Shorelines of the Caribbean: Alternatives for its control and resilience". Other visitors included researchers from Woodshole Oceanographic Institute, Florida State University, and the board of the Alligator Head Foundation, Jamaica.

PRML supported the Department's outreach activity by hosting in excess of 100 visitors (mainly student from high schools across the island) to educational tours of the mangroves and surrounding environments together with the onsite Biodiversity Centre. Other outreach activities include coastal cleanups in the area (land-based and underwater). The outreach activities of the PRML led the PRML being selected as one of the 14 national Nuh Dutty Up Jamaica Cleanup Network Coordinators, specifically for the Port Royal Community.

### **Centre for Marine Sciences**

The Centre for Marine Sciences (CMS) through the Discovery Bay Marine Lab (DBML) provided support for training and research in marine biology and related disciplines by making its facilities available to local and international students and researchers. Some of the international students hosted were from institutions such as McMaster University, Stony Brook University and the University of Illinois.

The CMS in collaboration with the Inter-American Development Bank (IDB) planned and conducted the Coral Lifeline Workshop which was a part of the IDB's Coral Reef Restoration Program. The Coral Lifeline Workshop was the first of its kind in Jamaica as it sought to bring together scientist from the field of Marine Biology and Engineering, Non-Governmental Agencies, National Agencies and more importantly the Private Sector companies that had a vested interest in, as well as those whose livelihoods were linked directly to, the coastal and marine environment.

Members of the CMS and DBML participated in several training workshops during the year. These included the Compliance, Monitoring and Enforcement of the Ballast Water Management Convention held at the Caribbean Maritime Institute in August 2016 and the Guidelines in Conducting Port Biological Baseline Surveys Workshop hosted by the International Maritime Organization and the Maritime Authority of Jamaica in September 2016. Mrs. Marcia Creary Ford participated in the Caribbean Coastal Area Management (C-CAM) Foundation session that sought to discuss the proposed Management Effectiveness Tracking Tool (METT) for Southwest Cay Special Fishery Conservation Area in September 2016.

The DBML played a major role in increasing the awareness of young Jamaicans about the marine environment and factors affecting the health of the marine environment by making presentations at several schools as well as hosting teachers and students from primary, secondary and tertiary level educational institutions across the island at the Lab. Some of the institutions hosted included the Convent of Mercy, Servite Primary,

Ardenne High, Edwin Allen High, Herbert Morrison High, Frome Technical High, Jose Marti Technical High, Kellits High, Ocho Rios High, Port Antonio High, Wolmers' Boy's, Sydney Pagon STEM Academy, Brown's Town Community College, Knox Community College and Moneague College.

The CMS was involved in some new research activities during the year. One such activity was a collaborative effort with the International Centre for Environment and Nuclear Science (ICENS) to sample water columns of the Kingston Harbour for micro-plastics, zooplankton and fish larvae. Members of CMS and DBML also conducted Global Coral Reef Monitoring Network (GCRMN) Survey Dives in the Discovery Bay area in February 2016. Activities under the UWI/National Works Agency (NWA) Mangrove and Sand Dune Rehabilitation Project along the Palisadoes continued. Signs were erected along the Palisadoes (near the Gypsum pier) to increase the awareness of pedestrians and drivers about the mangrove replanting aspects of the rehabilitation work.

As the host of the only functional Hyperbaric Chamber in Jamaica, the DBML led by Mr. Camilo Trench (Hyperbaric Chamber Safety Officer) conducted the first in a series of Hyperbaric Chamber use and awareness workshops for the North East Regional Health Authority (NERHA) at the St. Ann's Bay Hospital and at the DBML. The one-day workshop was titled "Hyperbaric Medicine in Jamaica" and was an attempt to streamline hyperbaric medical treatment logistics and improve the appreciation for hyperbaric medicine in the main public hospitals receiving such patients. Approximately 30 doctors and nurses participated.

The CMS/DBML received funding (J\$5,000,000) through the IDB-Special Climate Change Adaptation Fund for the project titled: "Establishing one raceway system for growing fragmented coral for ecosystem restoration with flowing water maintained by renewable energy." The project is administered through the Environmental Foundation of Jamaica in collaboration with the Ministry of Economic Growth and Job Creation and is based at the DBML. Mrs. Marcia Creary Ford of the CMS was successful in her grant application to the Global Biodiversity Information Facility (GBIF). The project is entitled "Capacity Building for Biodiversity

Data Sharing through the Caribbean Coastal Data Centre (CCDC), Jamaica”. The project serves to contribute to the building of capacity in the CCDC to better organize and manage biodiversity data.

## PAPERS PRESENTED

- **Emanuel, Machel.** “Apio Inc. Greahte Way Modified-atmosphere technology of ackee fruit (*Blighia sapida*) arils: Efect of temperature on package O2 and CO2 during storage.” 3rd All African Horticultural Congress. Ibadan, Nigeria, August 7–16, 2016. Oral Presentation.
- **Tennant, Paula.** An insight into the development of virus resistant transgenic crops. UWI-UNUBIOLAC International Biotechnology Symposium on the “State of the Art and Future of Agrobiotechnology in Latin America and the Caribbean. August 8, 2016.
- **Palmer, S.E.** & Gayle, P.M.H. Calipers to 3D models: Measuring the survival and growth of 5 reef-building coral species on in situ tree nurseries, Discovery Bay, Jamaica. UWI-IDB Coral Reef Restoration Program, Coral Lifeline Workshop, August 16, 2016.
- **Gayle Peter.** Coral Restoration at the Discovery Bay Marine Lab, Jamaica – Best Approaches for local Nurseries and Outplanting. NOAA Workshop to Advance the Science & Practice of Caribbean Coral Restoration. Nov 15–17, 2016, Fort Lauderdale, Florida, USA.
- Dale R. Rankine, Michael A. Taylor, Tannecia S. Stephenson, **Jane E. Cohen**, Andre D. Coy and Rasheeda Hall-Hanson. 2016. “Agricultural Crop Production in a Drier Caribbean – Quantifying Future Impacts on Jamaican Sweet Potato Production.” Presented at the Intergovernmental Panel on Climate Change (IPCC) Outreach Workshop, co-hosted by the Ministry of Economic Growth and Job Creation of Jamaica and the University of the West Indies, November 30 – December 1, 2016, Kingston, Jamaica.
- Lee, M.F, Waugh, C., Brown, M.D., Noble, S., **Robinson, R.D.**, Walochnik, J. and Lindo, J.F. (2016). Emerging zoonotic parasitic diseases in Jamaica: progress and research gaps. Society for Scientific Advancement 5th Annual Conference “Towards Precision Medicine in the Caribbean”. Kingston, Jamaica.

- **Palmer, S.E**, Gayle, P.M.H., Anderson, D., Douglas, D-L., Charpentier, B., Charpentier, F., Trench, C., Francis, P., Henry, D., Creary-Ford, M., Thomas, S.L., Maddix, G-M., Buddo, D., Webber, D., Webber, M. 2017. Calipers to 3D models: Measuring the survival and growth of five reef-building coral species on *in situ* tree nurseries, Discovery Bay, Jamaica. Association of Marine Laboratories of the Caribbean 38th Scientific Conference. Mérida, May 2017.

## PUBLICATIONS

### Books, Book chapters & Monographs

- Amarakoon II, Hamilton CL, Mitchell SA, **Tennant PF**, Roye ME (2016) Biotechnology. In: S Badal and R Delgoda (eds) *Pharmacognosy: Fundamentals, Applications and Strategy*. Academic Press. pp 549-561.
- **Benkeblia, N.** (2016). Chromatographic techniques of mono- and di-saccharides analysis. In: A-C. Eliasson (Ed.). *Carbohydrates in Food*. CRC Press, Boca Raton (FL), pp. 1–17.
- C. Linardich, G. Ralph, K. Carpenter, N. Cox, D.R. Robertson, H. Harwell, A. Acero P, W. Anderson Jr., F. Barthelat, J.-L. Bouchereau, J. J. Brown, J. Buchanan, **D. Buddo**, B. Collette, M. Comeros-Raynal, M. Craig, M. Curtis, T. Defex, J. Dooley, W. Driggers III, C. Elfes Livsey, T. Fraser, R. Gilmore Jr., L. Grijalba Bendeck, A. Hines, R. Kishore, K. Lindeman, J.-P. Maréchal, J. McEachran, R. McManus, J. Moore, T. Munroe, H. Oxenford, F. Pezold, F. Pina Amargós, A. Polanco Fernandez, B. Polidoro, C. Pollock, R. Robins, B. Russell, C. Sayer, S. Singh-Renton, W. Smith-Vaniz, L. Tornabene, J. Van Tassell, J.-C. Vié, and J. T. Williams (2017). *The Conservation Status of Marine Bony Shorefishes of the Greater Caribbean*. Gland, Switzerland: IUCN. viii + 75 pp.
- Galbraith, A. and **Webber, M.** (2017). An Assessment of the effects of eutrophication on the Meiofauna Community of Kingston Harbour, Jamaica. In: F. Howell (ed). *Eutrophication: Causes, Mechanisms and Ecological Effects*. NOVA Publishers, USA. pp 1–57.

- **Tennant P** and Fuchs M (2016) Engineered Resistance to Viruses: A Case of Plant Innate Immunity. In: DB Collinge (ed) *Plant Pathogen Resistance Biotechnology*. John Wiley and Sons, Inc., USA. pp 155–170.

#### Refereed Journal Articles

- **Benkeblia, N.** (2016). Fructans and mineral nutrition. *Journal of Nutritional Therapeutics*, 5: 68–74.
- **Benkeblia, N.** (2016). Application of metabolomics to postharvest science of fresh crops. *CAB Reviews*, 11: 1–8.
- **Chin, D, Aiken, K. & D. Buddo.** (2016). Lionfish population density in Discovery Bay, Jamaica. *Intl. J. of Scientific & Engineering Research*, Vol.7 (12)
- Franck, A., **Lewis, P.**, Oberli, A., Haynes-Sutton, A., **Rose, P.**, & Campbell, K. (2017). The Jamaican endemic *Exostema orbiculatum* belongs to Erithalis (Rubiaceae). *Phytotaxa*, 297(3), 273–281.
- Lopez, M. G. and **Benkeblia, N.** (2017). Profiling of Short Chain Fructooligosaccharides (scFOS) of Two Ackee (*Blighia sapida* Koenig) Varieties Through Different Maturation and Ripening Stages. *Current Nutrition & Food Science*, 13: 37–42.
- **McLaren, K.**, S. Monroe and **B.S. Wilson** (2016). The Arctic oscillation, climatic variability and biotic factors influenced seedling dynamics in a Caribbean moist forest. *Ecology*, 97, 2416–2435.
- Morgan, K. and **Benkeblia, N.** (2017). Effects of modified atmosphere packaging (MAP) on microbiological and sensory quality of ackee fruit arils (*Blighia sapida* Koenig) stored under refrigerated regimes. *Packaging Research* 2: 12-21.
- Neetha Nanoth Vellichirammal, Purba Gupta, **Tannice A. Hall**, and Jennifer A. Brisson. (2017). Ecdysone signaling underlies the pea aphid transgenerational wing polyphenism. Proceedings of the National Academy of Sciences.
- **Nimrod, S.H.**, Easter-Pitcher, A., **Aiken, K.**, **Buddo, D.** & C. Franco. (2017). Status of *Diadema antillarum* populations in Grand

Anse Bay, Grenada, 30 years after mass mortality. *Bulletin of Marine Science*, 93 (3), 11pp.

- **O'Connor, AT., Robinson, D.**, Dasgupta, T.P. Aaron T. and Drouillard K. (2017) Bioaccumulation of Polychlorinated Biphenyls (PCBs) in Atlantic Sea Bream (*Archosargus rhomboidalis*) from Kingston Harbour, Jamaica. *Bull Environ Contam Toxicol.* doi:10.1007/s00128-017-2132-4
- **Philip E Rose, Keron C St. E. Campbell, Tracy Commock**, Nancy Korber, Janet Mosely Latham, Marianne Swan, Brett Jestrow, Javier Francisco-Ortega (2017). David Fairchild's Expedition to Jamaica on Board *Utowana*. *The Journal of the Torrey Botanical Society*, 144(2):139–152.
- **Prospere, K., K. McLaren**, T. Pienkowski and **B.S. Wilson** (2016). Assessing the status of an artisanal shrimp fishery in a Ramsar wetland in Jamaica: the effects of extreme La Niña episodes, elevated temperature and seasonality on landings. *Limnologica*, 59, 140–154.

## INCOME GENERATION

The CMS/DBML received J\$5,000,000 in funding through the IDB-Special Climate Change Adaptation Fund to establish a system for growing fragmented coral for ecosystem restoration using renewable energy.

## PUBLIC SERVICE

### Dr. Karl Aiken

- Board Member & Chair of Fish Sanctuaries, Sub-committee Fisheries Advisory Board of Ministry of Agriculture & Fisheries
- Member, Aquaculture Industry Advisory Board, Ministry of Agriculture & Fisheries.
- Member, Board of Directors of the Caribbean Coastal Area Management Foundation (CCAMF)
- Member, CITES Scientific Authority of Jamaica, NEPA

**Professor Noureddine Benkeblia**

- Associate Editor, *Canadian Journal of Plant Science*
- Member of the Canadian Society of Plant Science
- Member of the Organizing Committee of the 2nd Asian Horticultural Congress, 26–28 September, 2017, Chengdu, China.
- Member of the Organizing Committee of the International Conference on Food Technology and Nutritional Science, 26–27 June, 2017, Baltimore, MD, USA.

**Dr. Dayne Buddo**

- International Maritime Organization: Expert Task Force for Ballast Water Management Training
- Member, Regional Lionfish Committee
- Resource Scientist, Regional Ballast Water Task Force
- Member, National Fish Sanctuaries Committee
- Member, National Steering Committee for the Regional Invasive Species Project
- Member, National Invasive Species Working Group
- Board of Advisors, Ocean Foundation

**Dr. Jane Cohen**

- Member and Vice-chair, CITES Scientific Authority of Jamaica
- Member, Advisory Working Group on the Review of the Evaluation of Significant Trade, CITES
- Member, Jamaica Organic Agriculture Movement
- Member, Jamaican Society for Agricultural Sciences
- Member, Natural History Society of Jamaica
- Member, Plant Conservation Group, National Environment and Planning Agency (NEPA)
- Member, Plantwise National Steering Committee, CABI & Ministry of Agriculture & Fisheries, Jamaica

- Member, Soil Health Technical Working Group, Ministry of Agriculture & Fisheries

**Mrs. Marcia Ford**

- Chairperson, National Biodiversity Clearing House Mechanism Steering Committee
- Member, The Jamaica Statistical Society
- Member, Global Coral Reef Monitoring Network -Caribbean Steering Committee
- Member, International Society for Reef Studies Member
- Member, Caribbean Academy of Sciences
- Member, Technical Advisory Committee for Component 3 of the Pilot Program for Climate Resilience
- Council Member, Jamaica Institute of Environmental Professionals (JIEP)

**Mr. Peter Gayle**

- Chairman, Association of Marine Laboratories of the Caribbean (AMLC) Planning Subcommittee
- Member, Diving sub-group of the working group on Fisheries Management and related matters of the National Council on Oceans and Coastal Zone Management
- Member, National Fish Sanctuaries Network
- Reviewer, Revista de Biología Tropical & Wildlife Biology in Practice

**Dr. Eric Garraway**

- Advisor, Vincentian Students Association
- Member, Advisory Board, National History Division, Institute of Jamaica
- Member, Association of Tropical Lepidoptera
- Member, Natural History Society of Jamaica
- Member, Jamaican Iguana Working Group, NEPA

**Dr. Tannice Hall**

- Member, Natural History Society of Jamaica

**Dr. Eric Hyslop**

- Jamaica Clearing-House Mechanism Steering Committee, Institute of Jamaica
- Member, CSEC Subject panel in Biology
- Member, NEPA Endangered Animals Recovery working group
- Member, Jamaican Iguana Working Group, NEPA

**Dr. Kurt McLaren**

- Member, National Invasive Species Working Group, NEPA

**Dr. Suzanne Palmer**

- Member, Association of Marine Laboratories of the Caribbean (AMLC)
- Member, International Society for Reef Studies (ISRS)

**Dr. Dwight Robinson**

- Director, Caribbean Academy of Sciences, Jamaica Chapter
- Director, College of Agriculture Science and Education
- Deputy Chair, Protection of Plant Genetic Resources for Food and Agriculture Management Authority
- Chair, Pesticides Control Authority Pesticides Review Committee
- External Assessor for the Registration of Pesticides by the Pesticides Control Authority

**Professor Ralph Robinson**

- Board of Directors, Jamaica Agricultural Development Foundation
- Executive Member & Regional Rep, Bioethics Society of the English-Speaking Caribbean
- Justice of the Peace, St. Andrew, Jamaica
- Member, American Society of Parasitologists

- Member, Lay-Magistrates' Association of St Andrew, Jamaica
- Scientific Member, The National Bioethics Committee of Jamaica
- Member, Training Advisory Committee for UWI/The University at Buffalo's D43 application (Global Infectious Diseases Research Training Program) to the Fogarty International Center, National Institutes of Health, USA

**Dr. Philip Rose**

- Member, National Invasive Species Working Group, NEPA
- Member, American Society of Plant Taxonomists (ASPT)
- Member, Jamaica Institute of Environmental Professionals (JIEP)

**Professor Paula Tennant**

- Member, American Phytopathological Society
- Member, Caribbean Academy of Sciences, Jamaica Chapter
- Member, Jamaica Society of Scientists and Technologists

**Mr. Camilo Trench**

- Coordinator/Member, Alloa Fisherman's Cooperative: Discovery Bay Special Fisheries Conservation Area Steering Committee

**Professor Mona Webber**

- UWI's representative, National Conservation Trust Fund of Jamaica (NCTFJ) Board
- Member, National Council on Ocean and Coastal Zone Management (NCOCZM)
- Co-chair, Diving Sub-Group, NCOCZM
- Member of the Board, Association of Marine Laboratories of the Caribbean
- Member, CITES, Scientific Authority of Jamaica
- Member, National Ramsar Committee
- Member, Jamaica Conservation Partners

**Professor Byron Wilson**

- Member, IUCN SSC Amphibian Specialist Group
- Member, IUCN SSC Boa and Python Specialist Group

**STUDENTS**

**Departmental Prizes to students**

Preliminary Biology, Don Skelding Prize	Sherrick Davis
1st year Biology, Charlotte Goodbody Prize	Jonathan Shepherd
Plant Diversity, Devi Prasad Prize	Tiffany Smith
Animal Diversity, Avinash Potluri Prize	Jaidene Webster
Plant Form, Sasikala Potluri Prize	Shanice Campbell
Plant Physiology, Lloyd Coke Prize	Stevaughn-Lee Chin
2nd year Zoology, Vincent Hugh McKie Prize	Ramona Jaggon
Ivan Goodbody Prize, Best 2nd year in Marine Biology Major	Jodi-Ann Chung