



DEPARTMENT OF LIFE SCIENCES

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

WORK OF THE DEPARTMENT

During the 2018–2019 academic year the Department continued its activities towards the achievement of the strategic goals outlined in its 2017–2022 strategic plan, which is fully aligned to the University's Triple A Strategy outlined in its 2017–2022 strategic plan. Focus was placed on improving the experience of our students, increasing access of institutions and communities to the Department, adjusting programmes and research activities to respond to current needs of the society and strengthening existing partnerships with internal and external collaborators while forging partnerships with new collaborators.

ACCESS

The Department continued its outreach activity that started in the previous academic year. This effort resulted in a 7% increase in the number of students entering the Department at Level 1 in the 2018/19 academic year when compared to the previous year.

Research and Consultancy Services: The Department was involved in several special projects and partnerships during the year. Memorandum of Understandings were signed between the Centre for Marine Sciences, and the National Environment and Planning Agency for the UWI-CMS/DBML to assess the current status of the Winn's Morass mangrove stand in Trelawny and its potential for rehabilitation and the Ministry of Industry, Commerce, Agriculture and Fisheries'- Fisheries Division to facilitate the completion of the 2018 Queen Conch Abundance Surveys.

The Herbarium continued to provide assistance in plant identification to the National Environment and Planning Agency, the Scientific Research Council as well as students from the University of Technology, University in Sweden and Berkley University.

Outreach/In-reach Activities: The Department through the Biology Students

Association (BSA), Centre for Marine Sciences – Discovery Bay Marine Laboratory and the Port Royal Marine Laboratory were active participants in International Coastal Cleanup Day on September 15, 2018. This activity was done in partnership with the JDF Coast Guard, JMMB Joan Duncan Foundation, Leo Club of Kingston, Tornadoes Swim Club and China Harbour Engineering Company (CHEC).

As part of our in-reach activities the Port Royal Marine Laboratory and the Discovery Bay Marine Laboratory hosted approximately 2500 visitors during the reporting period. The visitors consisted of Jamaican students at the primary, secondary and tertiary levels of the educational system and several students from international universities. Members of the local private and public sector were also hosted as we sought to increase awareness about environmental issues that are affecting the quality of life in Jamaica. In support of the efforts of the Forestry Department to preserve Jamaica's forests, a dendrology workshop for Foresters was hosted by the Department.

In order to increase awareness about the work of the Department, our outreach team participated in Career Rap Sessions and Environment and Science Days in some High Schools.

ALIGNMENT

Work continued on the partnership between the Food and Agriculture Organization of the United Nations ("FAO") and UWI Mona for the provision of services for the promotion of alternatives to highly hazardous pesticides and strengthen pesticides management in the Caribbean.

The Department continued its partnership with the Zika AIRS Project, which started the previous year, to develop local capacity to conduct research and other activities towards the management of mosquitoes and mosquito borne diseases.

The Centre for Marine Sciences accepted an invitation to partner with the Association of Commonwealth Universities to conduct an audit of research and innovation capacity in marine plastics across universities of the Commonwealth and the United Kingdom's National Oceanography Centre on a Coastal Risk Information Service (C-RISe) project on coastal applications of satellite data in the area of coastal assessment and rehabilitation.

AGILITY

Several staff members participated in national, regional and international meetings and workshops. Some of the meetings attended by our faculty included the meeting of the Crop Science Society of America, Jamaica Clearing House Mechanism, Frontier of Science, the Third WECAFC/OSPESCA/CRFM/CFMC regional meeting on the management of Queen Conch resources and the Urban Development Corporation

and National Environment and Planning Agency's Great Goat Island Stakeholder. Workshops included an IUCN Redlist Assessor Training Workshop in The Bahamas, Global Biodiversity Information Facility (GBIF) Biodiversity Information for Development (BID) Data use workshop in Suriname and Monitoring, the Modelling for Coastal Zone Management Conference and Technical Workshop in Grenada, and the Workshop on Collaborations for innovative technology solutions: a capacity building seminar for technologists and decision makers, part of the Workshop on Science, Technology and Innovations for SDGs co-organized by UN DESA, ESCAP, UNCTAD in Bangkok, Thailand. Conferences included the international conference 'Climate change: Impacts on food and nutrition security' in Trinidad and Tobago, 21st General Meeting and Conference of the Caribbean Academy of Science in Jamaica, the 10th Conference on Island Sustainability in Guam and the 71st Gulf and Caribbean Fisheries Institute conference in Colombia. The Department in partnership with the International Iguana Foundation co-hosted the 4th meeting of the Caribbean Partners in Amphibian and Reptile Conservation (PARC) in January 2019.

The Department had reason to congratulate Professor Mona Webber who was recognised as one of the UWI's 70+ Outstanding Women as part of the UWI 70th Anniversary initiative. Two staff members were recognized at the Principal's Research Award 2019; Professor Nouredine Benkeblia, most outstanding researcher and Dr. Karl Aiken for public policy.

PUBLICATIONS

Books, Book chapters & Monographs

- **Benkeblia, N.** (2019). *Climate Change and Crop Production: Foundations for Agroecosystem Resilience*. CRC Press, Boca Raton (FL), 191 p.
- **Webber, M., Henry, W., and T. Christian.** April 2019. *Clean Kingston Harbour: Pipe Dream or Pot of Gold?* Grace Kennedy Foundation Lecture 2019. Grace Kennedy Foundation, ISBN978-976-8041-40-1. 134 p.
- **Benkeblia, N., Schattman, R.E., Wiener, S. and Roesch-McNally, G.** (2019). Climate change and crop production: Set the stage for resilience. In: *Climate change and crop production: Foundations for agrosystem resilience*. N. Benkeblia (Ed.), CRC Press, Boca Raton (FL), pp. 1–18.
- **Benkeblia, N. and Francis, C. A.** (2019). Crop species responses and adaptation to rise in carbon dioxide and temperature. In: *Climate change and crop production: Foundations for agrosystem resilience*. N. Benkeblia (Ed.), CRC Press, Boca Raton (FL), pp. 19–34.
- **Benkeblia, N.** (2019). Wild relative species and genetic engineering: Improving crops in response to climate change. In: *Climate Changes and Crops Production:*

From Genome to Ecosystem. N. Benkeblia (Ed.), CRC Press, Boca Raton (FL), pp. 71–82.

- **Benkeblia, N.**, McHenry, M., Crips, J. and Roudier, P. (2019). Tropical crops and resilience to climate change. In: *Climate change and crop production: Foundations for agrosystem resilience*. N. Benkeblia (Ed.), CRC Press, Boca Raton (FL), pp. 83–04
- **Benkeblia, N.**, Radeva, D. (2019). Climate change and resilience of agroecosystems: Mitigation through agroforestry, permaculture, and perennial polycultures. In: *Climate change and crop production: Foundations for agrosystem resilience*. N. Benkeblia (Ed.), CRC Press, Boca Raton (FL), pp. 105–130.
- Fermin F, **Tennant P**, Mazumdar-Leighton S (2018) Transgenic Virus-Resistant Papaya: Current Status and Future Trends. In: B Patil (ed) *Genes, genetics and transgenics for virus resistance in plants*. Caister Academic Press. pp 141–158.
- Greenaway AG, Grizzle EL, Hollon RE, Kahwa I, Lowe L, Riley C, **Robinson RD**, Senior K, Tucker, C. & Xavier DK (2017). *Associate and Bachelor's Degrees: Standards for the Natural Sciences and Mathematics*. ©University Council of Jamaica. ISBN 978-976-8281-09-8.

PAPERS PRESENTED AT CONFERENCES

- **Steen, S.S.**, Mellado-Mojica, E., Lopez, M.G. and **Benkeblia, N.** 2018. Metabolomics profiling of carbohydrates reveals coordinated balance of translocated photosynthates saccharides and short-chain fructooligosaccharides to sink of onion (*Allium cepa*) during development and bulbing. Annual Meeting of the Crop Science Society of America, 4–7 November, Baltimore, MD, USA.
- **Sybron, A.**, Hossain, M.B. Vaidya, K., Rai, D.K. and **Benkeblia, N.** 2018. Metabolomic profiling reveals coordinated switches in secondary phenolics metabolism in ackee fruit (*Blighia sapida* Koenig) during opening and maturation. Annual Meeting of the Crop Science Society of America, 4–7 November, Baltimore, MD, USA.
- **Smith, T.A.**, Mellado-Mojica, E., **Vaidya, K.**, Lopez, M.G. and **Benkeblia, N.** 2018. Metabolome profiling of monosaccharides pool reveals active pentose pathway in Otaheite (*Syzygium malaccense*) fruit during ripening. Annual Meeting of the Crop Science Society of America, 4–7 November, Baltimore, MD, USA.
- **Machel Emanuel, Nadia McDonald and Dwight Robinson.** The efficacy of alternative (Biorational) insecticides in suppressing damage caused by insect pests affecting Callaloo (*Amaranth xanthosoma*) and Pak Choy (*Brassica rapa*) production in Jamaica. Climate Change: Impacts on Food and Nutrition Security, 12–16th November 2018, Port-of-Spain Trinidad.

- **Desireina D.S. Delancy, Tannice A. Hall and Eric Garraway.** An Assessment of Host-plant Preference of *Aphis gossypii* in Jamaica. The 21st General Meeting and Conference of the Caribbean Academy of Science, Mona, Kingston Jamaica, 27–30 November 2018. Oral.
- **Fradian V.N. Murray, Jane E. Cohen and L. Myers-Morgan.** Rapid Propagation of Improved Cassava Varieties Using the Multiple Shoot Removal Technique. The 21st General Meeting and Conference of the Caribbean Academy of Science, Mona, Kingston Jamaica, 27–30 November 2018. Oral.
- **Taneisha A. Barrett, Eric Garraway, Catherine Murphy, and Tannice Hall.** Duration of life cycle stages of four species of Blowflies (Diptera: Calliphoridae). The 21st General Meeting and Conference of the Caribbean Academy of Science, Mona, Kingston Jamaica, 27–30 November 2018. Oral.
- **Burton, Saskia D., Jane E. Cohen, and Fradian V. N. Murray.** 2019. Shoot morphological characteristics of six Colombian varieties of cassava (*Manihot esculenta* Crantz) grown in Jamaica. 55th Annual Meeting Caribbean Food Crops Society, July 8 to 12, 2019, Dominican Republic.
- **Dale Rankine, Jane Cohen, Michael Taylor, Tannecia Stephenson, and Andre Coy.** 2019. Towards a Methodology for Modeling Climate Impacts on Caribbean Agriculture – the Case of Jamaica. 55th Annual Meeting Caribbean Food Crops Society, July 8 to 12, 2019, Dominican Republic.
- **Rochelle S.H. Daley, Eric Garraway, and Catherine Murphy.** Morphology of Third Instar Larvae of Three Species of Flies (Family: Sarcophagidae) of Potential Forensic Importance in Jamaica. The 21st General Meeting and Conference of the Caribbean Academy of Science, Mona, Kingston Jamaica, 27–30 November 2018. Poster.
- **Ameka N. Myrie and Dwight E. Robinson.** Coffee crop phenology and infestation by the Coffee Berry Borer, *Hypothenemus hampei* (Ferrari) (Coleoptera: Curculionidae) in the High-lands and Blue Mountains of Jamaica. The 21st General Meeting and Conference of the Caribbean Academy of Science, Mona, Kingston Jamaica, 27–30 November 2018. Poster.
- **Gavin Campbell and Eric Hyslop.** The ecology of temporary tropical ponds at the University of the West Indies, Mona, Jamaica. The 2nd International Conference on Community Ecology. University of Bologna in Bologna, Italy, June 4-6, 2019. DOI: 10.13140/RG.2.2.29731.09762/1.
- **Palmer, S.E. Campbell, D., Hay, D.B., Lee, S., Lang, J.C.** Ecological and socio-economic indicators of fishing pressure on coral reefs: Portland Bight Protected Area, Jamaica. Association of Marine Laboratories of the Caribbean 39th Scientific Conference, Punta Cana, Dominican Republic. May 2019. Oral.

- **Coore, K., Palmer, S.E.** The Importance of Water Quality in the Coral Reef Health Assessment of the Port Royal Cays, Jamaica. Association of Marine Laboratories of the Caribbean 39th Scientific Conference, Punta Cana, Dominican Republic. May 2019. Oral.
- **Green, C., Small, H., Palmer, S.E.** Usage and Disposal Patterns of Visitors to the UWI Port Royal Marine Laboratory, Jamaica. Association of Marine Laboratories of the Caribbean 39th Scientific Conference, Punta Cana, Dominican Republic. May 2019. Poster.
- **Palmer, S.E., Burn, M.J. & Holmes, J.** A multi proxy analysis of extreme wave deposits in a tropical coastal lagoon in Jamaica, West Indies. 20th INQUA Congress, Dublin, Ireland. August 2019. Oral.
- **Burn, M.J. and Palmer, S.E.** Harmonizing marine and terrestrial palaeoclimate archives to reconstruct hurricane activity in the Caribbean. 20th INQUA Congress, Dublin, Ireland. August 2019. Oral.

Refereed Journal Articles

- **Commock T, PE Rose, KC Campbell, B Jestrow, J Francisco-Ortega.** Jamaica's endemic plant genera: updates in research, taxonomic knowledge, phytogeography and conservation. *Webbia* 73:2, 247–268.
- **Webber, M. & Aiken, K.** 2018. Sargassum, the problematic seaweed. *Jamaica Journal*, Vol. 37, Nos. 1–2 :98–105.
- **Rose, D. and Webber, M.** 2019. Characterization of microplastics in the surface waters of Kingston Harbour, Jamaica. *Science of the Total Environment* 664: 753–760.
- **M.A. Emanuel, P.F. Tennant, J.K. Brecht and D.J. Huber.** Effect of BreatheWay® microporous membrane on gaseous atmosphere and shelf life of ackee fruit. *Acta Hort.* 1225. ISHS 2018. DOI 10.17660/ ActaHortic. 2018.1225.23, Proc. III All Africa Horticultural Congress p173–181.
- **Sanderson, D., Voutchkov, M. and Benkeblia, N.** (2019). Bioaccumulation of cadmium in potato tuber grown on naturally high levels cadmium soils in Jamaica. *Science of the Total Environment* 649: 909–915.
- **Benkeblia, N.** 2019. Variation of reducing and total sugars starch, total phenolic contents in unripe and ripe jackfruit (*Artocarpus heterophyllus*) and West Indian locust (*Hymenaea courbaril*) fruits. *International Journal of Plant Science and Horticulture* 1: 49–55.
- **Kimberley A. Blissett, Machel Emanuel & Andrea Goldson Barnaby** (2019): Biochemical properties of tree ripened and post harvest ripened *Mangifera indica*

(cv. East Indian), *International Journal of Fruit Science*, DOI: 10.1080/15538362.2019.1596866

- **McLaren, K.**, D. Luke, P. Bellingham, E.J.V. Tanner and J. R. Healey (2019). Reconstructing the effects of hurricanes over 155 years on tropical rain forest structure and tree diversity. *Agricultural and Forest Meteorology*, 276, 107621.
- **McLaren, K.**, McIntyre, K., and **K. Prospere** (2019). Using the random forest algorithm to integrate hydroacoustic data with satellite images to improve the mapping of shallow nearshore benthic features in a marine protected area in Jamaica. *GIScience & Remote Sensing*. doi: 10.1080/15481603.2019.1613803
- Beauchamp, J.S., **B. S. Wilson**, **K. McLaren**, J. A. Wasilewski, L. P. Henriques, and F. J. Mazzotti. 2019. Satellite telemetry of *Crocodylus acutus* in Jamaica: habitat selection and management implications. *Caribbean Naturalist* 61:1-13
- **Stephenson, K.A.**, M.A. Taylor, T.S. Stephenson, A. Centella, A. Bezanilla, J. Charlery. “The Regional Climate Science Initiative: Value Added and Lessons Learnt.” *Caribbean Quarterly* 64 no. 1 (2018): 1125. DOI: 10.1080/00086495.2018.1435314.
- T. S. Stephenson, M. A. Taylor, A. R. Trotman, C. J. Van Meerbeeck, V. Marcellin, K. Kerr, J. D. Campbell, J. M. Spence, G. Tamar, M. Hernández Sosa, and **K. Stephenson**. [Regional Climates] Caribbean [in State of the Climate in 2017]. *Bull. Amer. Meteor. Soc.* 99 no. 8 (2018): S200-203 IF 7.929

Other

- **Machel Emanuel** and Andre Haughton. The Cannabis Economy: Will the region move with the global trends? Caribbean Export Outlook, 3rd Edition. Caribbean Business Publications, Miller Publishing Company, St. Thomas Barbados. p 68–71.
- **Stephenson, K.A.**, T.S. Stephenson, and A. Centella-Artola. 2019. Advancing Climate Science and Response for Caribbean Islands. EOS Meeting Report.

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 Nouredine Benkeblia

- Associate Editor, *Canadian Journal of Plant Science*
- Member of the Canadian Society of Plant Science
- Member of the Canadian Society of Agronomy
- Member of the Crop Science Society of America
- Member, Agricultural Science, University Council of Jamaica (UCJ)
- Editor/Reviewer of the International Panel on Climate Change (IPCC)
- Appointed Assessor of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).

Dr. Frederick Boyd

- Liaison for Department of Life Sciences / Nature Preservation Foundation partnership
- Member, Board of Education, East Jamaica Conference of SDA
- Member, Research & Development and Seed Production Subcommittee, National Organic Agriculture Steering Committee (NOASC)
- External Examiner, Joint Board of Teacher Education (JBTE)
- Member - Standards Subcommittee, Jamaica Organic Agricultural Association (JOAM)
- Member, Accreditation Panel (Biological Sciences), University Council of Jamaica
- Member, American Society of Plant Biologists

Dr. Jane Cohen

- Member and Vice-chair, CITES Scientific Authority of Jamaica
- 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 Industry, Commerce, Agriculture & Fisheries, Jamaica
- Member, Soil Health Technical Working Group, Ministry of Industry, Commerce, Agriculture & Fisheries

Dr. Machel Emanuel

- Member, International Society for Horticultural Sciences
- Member, American Society for Horticultural Sciences
- Member, International Technical Committee for development of standards for cannabis in Jamaica

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)
- Reviewer, *The International Journal of Tropical Biology and Conservation* (Revista de Biología Tropical).

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, Jamaica Institute of Environmental Professionals (JIEP)
- 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)
- Board Member, Association of Marine Laboratories in the Caribbean.

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
- Scientific Member, The National Bioethics Committee of Jamaica
- Member, Bioethics Society of the English-Speaking Caribbean
- Member, Standards Advisory Committee, The University Council of Jamaica.
- Justice of the Peace, St. Andrew, Jamaica
- Member, Justices of the Peace and Lay-Magistrates' Association of St Andrew, Jamaica
- Member, American Society of Parasitologists
- 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)
- Member of the Scientific Authority (NEPA/MEGJC).

Dr. Kimberly Stephenson

- Member, Jamaican Iguana Recovery Group
- Member, Ja REEACH II Project Advisory Committee
- Member, State of the Environment (SOE) 2017 Report Project Steering Committee Meeting, NEPA
- Co-editor, Special Issue of Caribbean Quarterly on 'Climate Change and Education for Sustainable Development' 2018.

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
- Member, National Fish Sanctuaries Network
- UWI's representative- National Marine Parks Advisory Board.

Professor Mona Webber

- Member, National Council on Ocean and Coastal Zone Management (NCOCZM)
- Chair, Diving Sub-Group, NCOCZM
- Member of the Board, Association of Marine Laboratories of the Caribbean
- Member, CITES, NEPA-Scientific Authority of Jamaica
- Member, NEPA Technical Review Committee (TRC)
- Member, Jamaica Conservation Partners (C.B. Facey Foundation)
- Member, Science and Technology Advisory Committee of the Jamaica National Commission for UNESCO
- Associate, Sustainable Adaptive Gradients for Coastal Environments (SAGE).

Professor Byron Wilson

- Member, IUCN SSC Amphibian Specialist Group
- Member, IUCN SSC Boa and Python Specialist Group
- Member, IUCN SSC Iguana Specialist Group
- Associate Editor: *Caribbean Naturalist*.