

DEPARTMENT OF OF LIFE SCIENCES

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

WORK OF THE DEPARTMENT

The 2022/23 academic year saw the return to face-to-face teaching which was welcomed by the Department as it was impossible to provide our students with the hands-on experience and real-life skills, that are an essential component of tutoring in the Life Sciences, in the virtual space. However, not having operated fully in the face-to-face mode for more than two years, the shift posed some major challenges for both students and staff. The need to fully reactivate an aging physical plant that had been dormant or operating well below capacity for more than two years, revealed several deficiencies that were sometimes challenging to address in a tight fiscal space. Several inter-personal challenges also came to the for as staff and students adapted to a different kind of in-person interaction in the physical learning environment. Our team, in partnership with our students, had to quickly re-learn and re-initiate various, techniques, practices and management strategies to ensure an organized and welcoming learning environment that was conducive to efficient and effective teaching and learning. Despite the many challenges, we were able to weather the transition reasonably well by embarking on an open and inclusive solution-oriented approach that engaged members of all levels of staff and students.

With the country and the world emerging from the COVID-19 pandemic induced 'diapause' the Department was able to re-activate and strengthen its engagement with its internal and external stakeholders. Our Biology Students' Association and members of staff engaged in physical activities to mark National Tree Planting Day, International Coastal Clean-up Day, World Wetland Day and International Day of Forests. Our participation in national, regional and international conferences had a welcomed increase with ten graduate students and staff members attending and making presentations at five regional and international conferences. Our outreach and in-reach activities were revived this year as we welcomed a total of 2588 visitors to our facilities on the Mona Campus and at our two Marine Laboratories in Port Royal and Discovery Bay.

A major highlight for the year was the selection of Leneka Rhoden, a graduate student in Life Sciences, to represent Jamaica at the 2022 United Nations Climate Change Conference (COP27) from November 8–18, 2022 in Sharm El-Sheikh, Egypt, where she served as a panellist and lead session facilitator at the International Universities Climate Alliance. Several members of the Life Sciences family were recognized for their contributions to the wider scientific community. Among them were Professor Mona Webber who was awarded the ‘Order of Distinction in the Rank of Commander,’ Dr Eric Garraway was a recipient of a Silver Musgrave Medal for his contribution to science and Professor Nouredine Benkeblia who was recognised by Wiley publishers for producing the top cited paper among work published in an issue of the *Journal of Food Safety*.

ACCESS

STUDENTS

An ongoing review of our academic programmes and majors continued with a focus on increasing the flexibility of these programmes to reduce the difficulty associated with students accessing elective courses associated with these programmes. With the full engagement of students in laboratory and field activities, several challenges arose as many of our students in the advanced levels were being exposed to this level of practical involvement for the first time in their University involvement. However, our technical and administrative teams developed and implemented plans tailored for different courses and activities to ensure that the students were able to adapt to the increase level of involvement in a manner that enhanced their student experience. The Department’s effort to engage potential students continued through our participation in the Faculty’s CAPE workshop programme and by opening our facilities for tours by small groups of students from different high schools across the country. Through these efforts we were able to interact with in excess of 600 students from approximately 30 high schools across the island.

Noel Ellis, Le’Anne Ledgister, Nicholas Lee and Sashell Nelson, were re-inducted into the Life Sciences Honours Society based on their continued excellent academic performance during the academic year, while eight students were newly inducted. The new inductees were Melecia Gordon, Dominique Bryan, Sasha Wilson, Melissa Brown, Krystal Thompson, Lael Charles, Jameili Thomas, and Xaundra Bryant.

Seven students were awarded prizes at the Faculty of Science and Technology Annual Awards Ceremony for outstanding performance in specific subject areas. They were Rohan Lorne who received the Preliminary Biology Don Skelding Prize, Jason Grant who received the 1st year Biology Charlotte Goodbody Prize, Stephannie

Forbes who received the Plant Diversity Devi Prasad and Animal Diversity Avinash Potluri Prizes, Crystal Scott who received the Plant Form Sasikala Potluri Prize, Sashell Nelson who received the Plant Physiology Lloyd Coke Prize, Nicholas Lee who received the 2nd year Zoology Vincent Hugh McKie Prize and Zionté Baptiste who received the Ivan Goodbody Prize for Marine Biology.

PUBLICATIONS

The ongoing effort by the Department, through the Research and Publication Committee, to improve the quantity and quality of scholarly output continued. New research activities and collaborations with internal and external stakeholders were initiated and rekindled. The list of scholarly outputs during the reporting period is presented below.

Book

- **Benkeblia, N.** (2023). *Climate Change and Agriculture: Perspectives, Sustainability and Resilience*, Wiley & Sons, Chichester, UK, 496 p. <https://www.wiley.com/en-us/Climate+Change+and+Agriculture:+Perspectives,+Sustainability+and+Resilience-p-9781119789772>.

Book Chapters

- **Vandebroek I** (2023) *Traveling traditions: Dominican ethnobotany in service of caring for the community. In: Decolonizing Paradise: A Radical Ethnography of Environmental Stewardship in the Caribbean*, ed. Rosalina Diaz, 203–230. New York: Peter Lang, 318 pp. *Published: 9 February 2023*.
- Imran, **Benkeblia, N.**, Amanullah, and Al-Tawaha, A. (2023). *Climate Change and Agriculture: State of the Art, Challenges, and Perspectives In: Climate Change and Agriculture: Perspectives, Sustainability and Resilience. N. Benkeblia (Ed.)*. Wiley & Sons Publisher, Chichester, pp. 1–27.
- Al-Tawaaha, A.R.M.S., Khanoum, S., **Benkeblia, N.**, Amanullah, Imran, Khalid S., Al-Tawaaha, A., Mondal, M., Odat, N., Dey, A., Alimad, N., Thangadurai, D., Jeyabalan Sangeetha, J., Islam, S. and Shatnawi, M. (2023). *Adapting crops to climate change. In: Climate Change and Agriculture: Perspectives, Sustainability and Resilience. N. Benkeblia (Ed.)*. Wiley & Sons Publisher, Chichester, pp. 53–77.
- Al-Tawaha, A.M.S., Mrabet, R., Banayati, M., Santhosh, B., **Benkeblia, N.**, Imran, Amanullah, Khalid, S. and Al-Tawaha, A.R., Alatrash, H., Jabbour, Y., Dey, A., Thangadurai, D., Sangeetha, J. and Islam, S. (2023). *Role of biotechnology in climate-resilient agriculture. In: Climate Change and Agriculture: Perspectives, Sustainability and Resilience. N. Benkeblia (Ed.)*. Wiley & Sons Publisher, Chichester, pp. 78–94.

- Al-Tawaaha, A.R.M.S., Odat, N., **Benkeblia, N.**, Kerkoub, N., Labidi, Z., Bou-mendjel, B., Nasri, H., Imran, Amanullah, Khalid, S., Al-Tawaha, R.R., Bayanati, M., Alatrash, H., Dey, A., Thangadurai, D., Sangeetha, J. and Islam, S. (2023). Breeding crops for tolerance to salinity, heat, and drought. In: *Climate Change and Agriculture: Perspectives, Sustainability and Resilience*. **N. Benkeblia (Ed.)**. Wiley & Sons Publisher, Chichester, pp. 95–110.
- Al-Tawahaa, A.M.S., Vyas, P., Karnwal, A., **Benkeblia, N.**, Sanmukh, S.G., Torrents Serra, E., Imran, Amanullah, Khalid, S., Al-Tawaha, A.R., Dey, A., Alimad, N., Thangadurai, D., Sangeetha, J., Islam, S. and Shatnawi, M. (2023). Biological Nitrogen fixation in non-legume plant and changing climate. In: *Climate Change and Agriculture: Perspectives, Sustainability and Resilience*. **N. Benkeblia (Ed.)**. Wiley & Sons Publisher, Chichester, pp. 227–238.
- Al-Tawaha, A.M.S., Dar, J.A., Sultan, A., **Benkeblia, N.**, Amanullah, Imran, Khalid, S., Al-Tawahaf, A.R., Odat, N. and Alatrash, H. (2023). Climate change and cereal production. In: *Climate Change and Agriculture: Perspectives, Sustainability and Resilience*. **N. Benkeblia (Ed.)**. Wiley & Sons Publisher, Chichester, pp. 263–284.

Journal Articles

- Tizazu Gebre, **Bhaskarrao Chinthapalli**, Memhiru Morka Anjulo and **Dwight Robnison**. The impacts of post plantation management practices on growth and survival rate of selected tree species in Mirab Abaya District, Southern Ethiopia: An experimental approach. *Journal of Horticulture and Forestry*. Vol. 14(3), pp. 28–41, <https://doi.org/10.5897/JHF2022.0693> Published September 2022.
- **Toni-Ann L. Miller** and **Eric J. Hyslop**. The First Record of *Parachromis managuensis* (Günther, 1867) (Cichliformes, Cichlidae) and an Analysis of its Feeding Habits in Jamaica. *Caribbean Journal of Science* (2022), 52: pp. 152–161, <https://doi.org/10.18475/cjos.v52i2.a2>. Published September 2022.
- **Trench, Camilo**, Shanna-Lee Thomas, Delroy Thorney, Gina-Marie Maddix, Patrice Francis, Hugh Small, Carla B. Machado, Dale Webber, Thierry Tonon and **Mona Webber**. 2022. Application of stranded pelagic sargassum biomass as compost for seedling production in the context of mangrove restoration. *Frontiers in Environmental Sciences. Sec. Conservation and Restoration Ecology*. <https://doi.org/10.3389/fenvs.2022.932293> Published September 2022.
- R. J. Shellock, C. Cvitanovic, M. C. McKinnon, M. Mackay, I. E. van Putten, J. Blythe, R. Kelly, P. Tuohy, K. M. Maltby, S. Mynott, N. Simmonds, M. Bailey, A. Begossi, B. Crona, K. A. Fakoy, B. P. Ferreira, A.J.G. Ferrer, K. Frangoudes, J. Gobin, H. C. Goh, P. Haapasaari, B. D. Hardesty, V. Häussermann, K. Hoareau, A-K. Hornidge, M. Isaacs, M. Kraan, Y. Li, M. Liu, P. F. M. Lopes, M. Mlakar, T. Morrison, H. A. Oxenford, G. Pecl, J. Penca, C. Robinson, S. Selim, M.

Skern-Mauritzen, K. Soejima, D. Soto, A. K. Spalding, A. Vadrot, N. Vaidianu, **M. Webber**, and M. S. Wisz 2022. Building leaders for the UN Ocean Science Decade: A guide to supporting early career women researchers within academic interdisciplinary marine research institutions. *ICES Journal of Marine Science* (2022), <https://doi.org/10.1093/icesjms/fsac214> Published December 2022.

- **Tremaine Bowman** and **Eric J. Hyslop**. 2022. The feeding ecology of four species of Mojarras (Family: Gerreidae) inhabiting a brackish water stream in Jamaica. *Caribbean Journal of Science* (2022), 52: pp. 353–372. <https://doi.org/10.18475/cjos.v52i2.a15>
- **Marsha A. Bowers**, Costas Zachariades, **Dwight E. Robinson**, **Jane E. Cohen**, Michael von Tschirnhaus and Osariyekemwen Uyiye (2023). Helical shoot-tip mines on three genera of Asteraceae in Jamaica are caused by different species of *Melanagromyza* – implications for the biological control of *Chromolaena odorata* using *Melanagromyza eupatoriella*. <https://doi.org/10.1016/j.biocontrol.2023.105151>.
- C. Scott Clem, Brittany D. Wingert, Andrea R. Kautz, Amanda L. Roe, Teagan Mulford, David Bettman, Robert T. Conrow, Gregory A. Dahlem, Heloisa Fernandes Flores, **Latoya Foote**, Silvia Gisondi, James N. Hogue, Janis Matsunaga, Maricelle **Méndez-Soto**, Ko Mochizuki, Ketzaly Munguía Ortega, William Rawson, Jingli Xuan, Brian Brown. Checklist of true flies (Diptera) from San Luis Obispo County, California, U.S.A.: An outcome of the Fly School II taxonomic workshop. *The Pan-Pacific Entomologist*, 98(4) : 270–299. <https://doi.org/10.3956/2022-98.4.270>.
- **Campbell, G. R., & Hyslop, E. J.** (2023). Technical reports: Methods – The application of temperature and light intensity as intermittency sensors in a temporary pond. *Water Resources Research*, 59, e2021WR031574. <https://doi.org/10.1029/2021WR031574>
- Khalifa Attallah O.M., Delgoda, R. and **Benkeblia, N.** 2023. Profiling primary metabolites of Governor’s Plum *Flacourtia indica* (Burm.f.) Merr. at two different ripe stages. *Journal of Tropical Agricultural Science*, Volume 46, Issue 1, pp. 1–15. <https://doi.org/10.47836/pjtas.46.1.0>
- Krauss, K.W., Whelan, K.R., Kennedy, J.P., Friess, D.A., Rogers, C.S., Stewart, H.A., Grimes, K.W., **Trench, C.A.**, Ogurcak, D.E., Toline, C.A. and Ball, L.C., Framework for Facilitating Mangrove Recovery after Hurricanes on Caribbean Islands. *Restoration Ecology*, p.e13885. <https://doi.org/10.1111/rec.13885> Published 11 February 2023
- Dominguez Almela, V., Appeaning Addo, K., Corbett, J., Cumberbatch, J., Dash, J., Marsh, R., Oxenford, H., Tonon, T., Van Der Plank, S., **Webber, M.** and Tompkins, E., 2023. Science and policy lessons learned from a decade of adaptation to the emergent risk of sargassum proliferation across the tropical

Atlantic. *Environmental Research Communications*. <https://doi.org/10.1088/2515-7620/acd493>. Published May 2023.

- Marsh. R., Nikolaos Skliris, Emma L. Tompkins, Jadunandan Dash, Victoria Dominguez Almela, Thierry Tonon, Hazel A. Oxenford, **Mona Webber**. 2023. "Climate-sargassum interactions across scales in the tropical Atlantic." *PLOS Climate*. PCLM-D-22-00149R2 <https://doi.org/10.1371/journal.pclm.0000253>. Published June 2023
- **Benkeblia, N.** 2023. Gas chromatography-mass spectrometry and liquid chromatography-mass spectrometry metabolomics platforms: Tools for plant oligosaccharides analysis. *Carbohydrate Polymer Technologies and Applications*, 5, e100304. <https://doi.org/10.1016/j.carpta.2023.100304>
- Albuquerque UP, Ladio A, Duarte Almada E, **Vandebroek I**, Pulido Silva MT, Stern da Fonseca-Kruel V (2023) Exploring biocultural diversity in urban ecosystems: An ethnobiology perspective. *Ethnobiology and Conservation* 12: 10, <https://doi.org/10.15451/ec2023-06-12.10-1-12>

Technical Report/Scientific Reports/White Papers

- **Thomas, S., Thorney, D. and Trench, C.** 2023. Queen Conch Induced Spawning by Density Manipulation Project Report 2023. Discovery Bay Marine Laboratory, Centre for Marine Sciences, The University of the West Indies, Mona Campus, Jamaica. Technical/Project Report. CMS02-2023 (45) March 2023. Submitted to National Environment and Planning Agency Scientific Authority.
- Haye, Dannielle; Young, Robyn; Webber, Mona; Tonon, Thierry; Chinthapalli Bhaskar Rao 2023. A comparative study on the effect of Sargassum soil amelioration on seed germination and seedling growth of corn (*Zea mays*), scotch bonnet pepper (*Capsicum chinense*) and tomato (*Solanum sp.*). Centre for Marine Sciences, The University of the West Indies, Mona Campus, Jamaica Technical Report. CMS03-2023 (37pp) April 2023. Submitted to MonaGeoinformatix for the Sargassum- SARTRAC project.
- Cox A., **Richards A., Thomas S-L.**, Irvine J., and **Trench C.** 2023. Jamaica Coral Reef Report Card: 2023 Status of Coral Reefs within North Coast Special Fishery Conservation Areas. Centre for Resource Management and Environmental Studies, University of the West Indies, Cave Hill, 21 pp.

ALIGNMENT

Our interactions with local communities and partnership with local, regional and international groups, continued as we increased our effort to align our research and outreach activities with the needs of the nation and the region. Partners included

the Caribbean Coastal Area Management Foundation, the Coral Restoration Consortium, the Jamaica Environment Trust, the National Environment and Planning Agency, Forestry Department, Planning Institute of Jamaica, Pesticides Control Authority of Jamaica and the Tourism Product Development Company.

PUBLIC SERVICE

Our staff members continued their participation in, and service to, the wider society by their membership on committees and boards outside of the University. These are listed below.

Prof. Nouredine Benkeblia

- Associate Editor: *Canadian Journal of Plant Science*. <https://cdnsciencepub.com/journal/cjps/about/editorial-board>.
- Academic Editor: *PLOS Climate*. <https://journals.plos.org/climate/s/editorial-board>.
- Associate Editor: *P. Journal of Tropical Agricultural Science* <http://www.pertanika.upm.edu.my/pjtas/ebm>.
- Topic Editor: *Frontiers in Soil Sciences. Climate Change Mitigation Strategies for Sustainable Crop Production in Sub-Saharan Africa*. <https://www.frontiersin.org/research-topics/31108/climate-change-mitigation-strategies-for-sustainable-crop-production-in-sub-saharan-africa>.
- Topic Editor: *Frontiers in Genetics. Advanced Genetics and Genomics and Climate Change Resilient Crops: Roots, Tubers, and Cereals*. <https://www.frontiersin.org/research-topics/37578/advanced-genetics-and-genomics-and-climate-change-resilient-crops-roots-tubers-and-cereals>.
- Topic Editor: *Frontiers in Plant Sciences. Ecometabolomics and Crop Responses to Climate Change: Acclimation, Alleviation and Resilience*. <https://www.frontiersin.org/research-topics/53463/ecometabolomics-of-crop-responses-to-climate-change-acclimation-alleviation-and-resilience>.
- *Review Editor: Frontiers in Plant Science*
- Review Editor, Inter-Governmental Panel on Climate Change (IPCC).
- Appointed Member of the *Regional Economic and Scientific Commission in the Caribbean (CREES)* of The Francophone University Agency (AUF) (2022 – 2025).
- Assessor of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).
- Associate Editor, *Canadian Journal of Plant Science*
- Associate Editor: *Journal of Tropical Agricultural Science*
- Academic Editor, *PLOS Climate*

- Topic Editor: *Frontiers in Soil Sciences*. Climate Change Mitigation Strategies for Sustainable Crop Production in Sub-Saharan Africa.
- Topic Editor: *Frontiers in Genetics*. Advanced Genetics and Genomics and Climate Change Resilient Crops: Roots, Tubers, and Cereals.
- Review Editor: *Frontiers in Plant Science*
- Review Editor, Inter-Governmental Panel on Climate Change (IPCC).
- Editor/Reviewer of the International Panel on Climate Change (IPCC)
- Member of the Canadian Society of Horticultural Science
- Member of the Canadian Society of Agronomy
- Member of the Crop Science Society of America
- Member, Agricultural Science, University Council of Jamaica (UCJ).
- Member of the International Union of Conservation of Nature, (IUCN). Commission on Ecosystem Management.
- Member of the Regional Economic and Scientific Commission in the Caribbean (CREES) of The Francophone University Agency (AUF) (2022–2025).
- Member of the Commission on Ecosystem Management (CEM)
- Member of the International Union of Conservation of Nature (IUCN).

Dr. Frederick Boyd

- Member, CITES (NEPA-Scientific Authority)
- Member, Board of Education, East Jamaica Conference of SDA
- External Examiner, Joint Board of Teacher Education (JBTE)
- Member, Accreditation Panel (Biological Sciences), University Council of Jamaica
- Member, American Society of Plant Biologists

Dr. Machel Emanuel

- Member of the International Society for Horticultural Sciences
- Member of the American Society for Horticultural Sciences
- Member of International Technical Committee for development of standards for cannabis in Jamaica
- Vice-Chair of the Bureau of Standards Jamaica’s Cannabis National Technical Committee
- Chairman of the Product Development, Cannabis Industry Development Taskforce Sub-committee.

Dr. Tannice Hall

- Member, Natural History Society of Jamaica

Dr. Denneko Luke

- Member, NEPA Biodiversity Committee

Dr. Chinthapalli Bhaskar Rao

- Member, Academic Council, AP Agricultural University
- Fellow, Department of Biotechnology (DBT), New Delhi, India
- Fellow, Institute of Life Sciences, Mizzou, USA
- Fellow, Volkswagen Stiftung, Hannover, Germany
- Member, Biological Society of Ethiopia.
- Member, Indian society of Chemists and Biologists.
- Member, Metabolomics Society and Plant Metabolomics.
- Reviewer of Journal of Food Composition and Analysis, Elsevier Journals
- Reviewer of African Journal of Food Science, Academic Journals
- Reviewer of Research in Biotechnology, Update publishing house

Dr. Dwight Robinson

- Director, Caribbean Academy of Sciences, Jamaica Chapter
- Director, College of Agriculture Science and Education
- Director, Nature Preservation Foundation
- Chair, Pesticides Control Authority Pesticides Review Committee

Prof. Paula Tennant

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

Dr. Camilo Trench

- Coordinator/Member, Alloa Fisherman's Cooperative: Discovery Bay Special Fisheries Conservation Area Steering Committee
- Member, National Fish Sanctuaries Network
- Member, UWI's representative, National Marine Parks Advisory Board
- Board Member, Association of the Marine Labs of the Caribbean (AMLC) institutional rep for the UWI CMS/DBML

- Member, Project Steering Committee for IWeco National Sub-Project 1.4 (UWI's representative) “Biodiversity Mainstreaming in Coastal Landscapes within the Negril Environmental Protection Area of Jamaica”
- Member, Technical Advisory Committee for IWeco National Sub-Project 1.4 Component 2
- Member, The Moneague College's Program Advisory Committee (PAC) for the Associate of Applied Science in Agro-processing
- President, Ferncourt High School Alumni Association

Dr. Julie Tsatsaros

- Member, Society for Environmental Restoration (SER)
- Member, Society for Freshwater Science
- Member, North American Association of Environmental Educators
- Member, American Society for Environmental History
- Board Member, Hermits Peak Watershed Alliance, New Mexico, USA

Dr. Ina Vandebroek

- Editor-in-Chief, *Economic Botany*
- Topic Editor, Traditional Knowledge in Food Activism and Governance, Frontiers in Sustainable Food Systems
- Deputy Editor, *Journal of Ethnobiology and Ethnomedicine*
- Editorial Board Member, Checklist in Ethnobiology
- Editorial Board Member, Ethnobiology and Conservation
- Member of the Alliance for Diversity and Inclusion in Ethnobiology (ADIE)
- Member, Biocultural Collection Managers Group (USA)
- Council Member, Society for Economic Botany (USA)

Prof. Mona Webber

- Chair, NEPA Biodiversity Committee
- Member, National Council on Ocean and Coastal Zone Management (NCOCZM)
- Chair, Diving Sub-Group, NCOCZM
- Member, CITES (NEPA-Scientific Authority)
- 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

- Member, National Fisheries Advisory Council
- Member, Scientific and Technical Sub-Commission of the Caribbean Sea Commission (CSC)
- Member, Natural Resource Conservation Authority (NRCA) Board.

AGILITY

The Department continued discussions with national and regional partners to determine how we may assist with their training and research needs. Discussions are far advanced with the Fisheries Division of the Ministry of Agriculture, Fisheries and Mining re the development of an improved course in fisheries and aquaculture. Our marine laboratories continue to provide valuable support in monitoring and conservation of our marine resources. During this year the Port Royal Marine lab was engaged by the National Environment and Planning Agency on a consultancy service for coral reef restoration at Port Royal Cays at a value of US\$186,875.