

THE BIOTECHNOLOGY CENTRE



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Director

INTRODUCTION

The Biotechnology Centre, keeping in line with its strategic plans, focused on research training, teaching, and activities geared towards producing the distinctive graduate, increasing visibility through interaction with local and global communities, bioskills training and product development research through orchestrated outreach activities and networking. The academic staff members are:

Prof. Helen Asemota (Research Group Leader for Bioengineering Yams/Tuber crops & Biomedical research for value chain expansion), Prof. Paula Tennant (Research Group Leader for Molecular Virology & Transgenic Papaya research), Dr. Marcia Roye (Research Group Leader for Geminiviruses), Dr. Sylvia Mitchell (Research Group Leader for Medicinal Plants & Tissue Culture). Dr. Mitchell was promoted to Senior Lecturer during the period under review. Prof. Nouredine

Benkeblia of Department of Life Sciences also initiated research on tree crops at the Centre during the period.

RESEARCH

The key areas of research in the period comprised the following:

- a. Agro-based studies: including medicinal plants, bioengineering of yams biomaterials for value chain expansions, moringa, forestry preservation, molecular virology, as well as study of begomoviruses and other viruses associated with tropical crops such as, citrus, potato, cucurbits and yam improvement research through studies of anthracnose diseases of yams.
- b. Biomedical research: on investigations of the glycemic indices of Jamaican foods (in collaboration with the Scientific Research Council) and analysis of mechanism of action of supplements or secondary metabolites in animal model of diseases such as, diabetes, hypercholesterolemia, sickle cell anaemia, prostate cancer, in collaboration with the Basic Medical Sciences Department and other departments such as Chemistry, Chemical Pathology, Surgery, Life Sciences and TMRU.
- c. Biomagnetic Therapy and associated metabolic effects in diabetes mellitus in collaboration with the Departments of Basic Medical Sciences, Physics and Chemical Pathology and physicist in North Carolina.

Postgraduate Students

A total of 19 postgraduate students studied in the year under review, for the PhD or MPhil in Biotechnology at the Centre. The students are Kimberly Foster, Chantal Marriott, Nicaïne Mayne, Princess Bell, Nikashae Scott, Lowen Williams, Chenielle Delahaye-McKenzie, Cheryl Green, Raxon Gordon-Simmonds, Soyanni Holness, Kimani Kitson-Watson, Adriel Ramkissoon, Deiondra Robinson, Racquel Wright, Rashaun Harris, Sharae Clark, Julian Bailey, Jordan

Freeman and Shivanjanli Dondapati. Nicaine Mayne applied for Leave of Absence for Semester II of the 2105–2016 academic year, and Soyanni Holness voluntarily withdrew. The Centre also caters for some students registered in other departments but conduct research at the Centre. These students include Aliza Lindo of the Department of Life Sciences, Keaton Logan, Melissa Williams, Sasha-Gay Williams and Kenroy Wallace of the Department of Basic Medical Sciences. The students are attached to various research groups of the Centre.

TEACHING AND TRAINING

In addition to the research training and supervision of post graduate research students, the academic members of the Centre (Prof. Asemota, Dr. Roye, Prof. Tennant, and Dr. Mitchell) were during this period, involved in teaching at both undergraduate and postgraduate levels.

Undergraduate courses: Courses taught were within the Department of Basic Medical Sciences (BMS) of the Faculty of Medical Sciences (FMS) and the Department of Life Sciences of the Faculty of Science and Technology (FST). The courses included: Biotechnology I, Biotechnology II, Molecular Biology I, Molecular Biology II, Introduction to Microbiology and Molecular Biology, Food Microbiology and Biotechnology, Plant Biotechnology, Science Medicine and Technology, Biochemistry for Physical Therapy Students, Biochemistry Laboratory Research Project, and Plant Biochemistry & Physiology, along with their associated lab classes. In the Department of Life Sciences, members of staff taught in Molecular Biology & Genetics, Principles of Plant Biotechnology, Virology, and Plant Biotechnology.

Postgraduate courses: Members of Biotechnology Centre's staff also taught in the following postgraduate course: "Standards and Risk Management in Agricultural Production Systems", one of the courses in the MSc in Agricultural Entrepreneurship Programme in the Faculty of Science and Technology. The Centre also has an approved taught Masters programme, MSc. in Biotechnology, which is starting in the next academic year.

OTHER MAJOR ACTIVITIES

Bioservices and Bioskills Training/Workshops

Funds were received for three main bioservices and bioskills training:

- (Dr. Sylvia Mitchell rendered bioservices to the Government of Jamaica and under an MOU between UWI and the Bureau of Standards, received a grant for a Bamboo Project in the sum of Forty three thousand dollars (43,000 USD), out of which eight thousand dollars (8000 USD) will come to the Biotechnology Centre for the production of tissue-cultured bamboo and the rest of the funds under the MOU for farmer training and field testing of these plantlets.
- Prof. Helen Asemota (Project PI) working with Dr. Melaine Randle and Shivanjali Dondapati, received a special grant of Twenty Six Thousand Dollars (26,000 USD) in February 2016, from the United Nations University Biotechnology Programme for Latin America and the Caribbean (UNU-BIOLAC), to organize and stage the 2016 International Biotechnology Symposium and Training Workshop in Agro Biotechnology for Latin America and Caribbean region at Mona campus, on DNA Fingerprinting of Plants. The activities were scheduled to take place from August 8–12, 2016 (the beginning of the new academic year). For the organization of the symposium/workshop, the Centre was aided by the FST (Prof. P. Reese) Dean’s Office staff (Mrs. Miriam Lindo and her group), the FMS (Prof. H. Fletcher) Dean’s Office and the UWI (Pro. Dale Webber) Pro Vice-Chancellor’s Office of Graduate Studies and Research, as well as various Stakeholders (such as the SRC, MSET, IICA, CARDI, PIOJ, NCST, JIPO, NCU, CMI, Cocoa Research Board, Trinidad, etc.). The detailed report of this training will appear in next academic year’s annual report.
- Dr. Roye organized another Non-Degree Short Term Training Programme labelled “Genetic Engineering for Science Teachers and Students Workshop.” This was the 13th Annual workshop on

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“Laboratory Concepts in Genetic Engineering” for Cape and A Level Biology High School students, as well as Science Teachers from Tertiary Level Institutions in Jamaica, was held December 18–19, 2015. With the assistance of Laboratory Technicians from the Basic Medical Sciences Department and the Centre’s postgraduates, participants were trained to extract plasmid DNA, digest the plasmid DNA with restriction enzyme, and run gel electrophoresis. Two workshops were convened at the Faculty of Medical Sciences Complex for Research and Teaching. On the first day, Thursday the 18th of December, the Centre had eighty participants from Knox Community College, Shortwood Teachers’ College and St. Andrew High School, while on the 19th students came from Mannings High School, St. George’s College and St. Jago High School. Overall there were more than one hundred and sixty (160) participants for both days.

- The Centre started the academic year under review with the training of a foreign intern, in the person of Ms. Suvi Rantamo, from the Department of Biosciences, University of Helsinki, Finland. This internship earned the Centre one thousand US dollars (USD1000.00) in the period ending August 21, 2015.

FOREIGN VISITS BY BIOTECHNOLOGY CENTRE STAFF/STUDENTS

The following members of staff engaged in various overseas trips during the period:

- Prof. Asemota attended the National Science Foundation (NSF) PI meeting in Washington D.C. in December 2015 to discuss BREAD PHENO Research in which SUNY will collaborate with the UWI.
- Dr. Sylvia Mitchell attended ISO/TC296 Bamboo and Rattan Technical Committee (TC) April 26–28, 2016, Beijing, China. Dr. Mitchell was asked to represent Jamaica at this meeting. This was the first plenary meeting of this TC of ISO (International Organization for Standardization). Work was done on three standards; terminology, charcoal and flooring, which eventually will become international standards.

- Mr. Jordan Freeman ('Sweelevia's Nature's Tea' team) participated at the International Business Model Competition on April 29–30, 2016 at the Microsoft Campus, Redmond, Washington and came top 10 in the competition.
- The Director of the Biotechnology Centre and Yam Biotechnology Research group Leader, Prof. Asemota, visited Mexico as part of the Jamaica Delegation to the 8th Jamaica-Mexico Bilateral Commission in May 2016. She gave a presentation at the Commission.
- Dr Marcia Roye visited Cuba, September 14–18 2015, as part of a Caricom Science Technology and Innovation Committee delegation. The purpose of the visit was to meet with strategic organizations and government ministries to discuss the development of a Memorandum of Understanding (MOU) to initiate collaborations and learn from scientists and technologists in Cuba.
- Miss Chantal Marriott visited the University of Arizona Tucson for 6 weeks My-June 2016. She was hosted by Dr Judith Brown of School of Plant Sciences where she was using next generation sequencing to characterize begomoviruses associated with crops, weeds and ornamentals from Jamaica.
- Ms. Sasha Gay Wright and Mr. Kenroy Wallace are currently visiting Southern University of Baton Rouge, USA to carry out research which forms part of their PG programme.

VISITORS TO THE BIOTECHNOLOGY CENTRE

The Centre received several visitors in the period, among whom are the following Scholars:

- (Dr. John Williams a Gates Millennium Scholars Alumnus and Assistant Professor of Biology from the Department of Natural and Forensic Sciences at Albany State University (ASU) — Georgia, USA visited the Centre between March 23 – 26, 2016. A draft Memorandum of Understanding (MOU) for a programme of collaboration has been sent from ASU and submitted for review.
- The Dean of the School of Science and Agriculture (SUSSA-BR),

Southern University of Baton Rouge (SUBR), Dr. Laurence Henry, through arrangements by the Centre, met with Prof. Asemota, the Dean of FST, Prof. Paul Reese, and some research students on March 23, 2016, at the FST Dean's Office, to pursue a collaborative programme with The University of the West Indies, Mona. A Memorandum of Understanding (MOU), resulting from the discussions, was signed between UWI Mona and SUBR. Two UWI Research students are presently visiting SUBR to cover aspects of their postgraduate training.

- Dr. Wesley Gray of Southern University of Baton Rouge visited the Centre in February 2016. He gave a seminar and advanced discussions around collaboration between our two Universities. This led to the subsequent visit by his Dean and the MOU signed as discussed in (ii) above. The two students (1 PhD, 1 MPhil) are currently studying in Dr. Gray's lab at the Southern University of Baton Rouge (SUBR) in New Orleans.
- Prof. Jacqueline Hibbert from Morehouse School of Medicine in Atlanta, GA, USA visited Centre in January 2016. Prof Hibbert has hosted Biotech Centre student Raquel Wright, PhD student of Prof. Asemota, at her lab in Atlanta several times and for the NIH research fellowship she obtained.
- Dr. Asem Sappal, Provost, Oaksterdam University, Oakland, California, USA, visited the Centre from November 16–18, 2015 and gave a seminar on Cannabis research and Education. The Seminar which took place at the FMS Lecture Theatre II was well attended. Dr. Sappal has since followed up with various collaboration requests.
- Dr. Palmira Guevara from the University of Venezuela, Consultant for United Nations University Biotechnology Programme for Latin America and the Caribbean (UNUBIOLAC), visited the Centre from November 23–27, 2015 in connection with the international symposium/workshop being planned for the Latin American & Caribbean Region under the United Nations Biotechnology Programme. During the visit, Prof. Guevara was asked to work with Dr. Melaine

Randle (former Senior Lab Technologist of the Centre) and Mrs. Shivanjanli Dondapati (Research Assistant to the Director). The proposal for DNA Fingerprinting of Plants Symposium & Workshop, earlier submitted by Dr. Melaine Randle and Prof Asemota for UNUBIOLAC funding, was upgraded with the help of Prof. Palmira working with the team, Asemota\Randle\Dondapati, and the lab sessions focused on

- Prof. Vincent Wright, Dean, College of Natural and Applied Sciences, Northern Caribbean University (NCU) & Dr. Patience Alonge, Associate Professor, College of Natural and Applied Sciences, NCU—former associate student of the Centre, visited the Centre on November 16, 2015 and on December 15, 2015 in connection with joint yam research and cancer research.
- Mrs. Winsome Minott, CEO, MINT Management/KATALYXT (a community based finance services corporation), visited the Centre on November 6, 2015 for meetings with Prof. Asemota, Biotechnology Centre staff members and some research students regarding a joint seminar on taking the ‘lab to the streets’ to enhance agricultural biotechnology dimensions.
- Dr. Cliff Riley, Director of the Scientific Research Council, Jamaica visited the Centre to have discussions about upcoming collaboration for the academic year 2016–2017.
- Prof. Dale Webber, the Pro-Vice-Chancellor, Graduate Studies & Research, UWI & Professor Denise Eldemire-Shearer, Campus Coordinator, School of Graduate Studies and Research, UWI Mona, visited the Centre to discuss and lend support to the “United Nations University Biotechnology Programme for Caribbean & Latin America (UNUBIOLAC) Training Workshop” for which the Centre had received a grant to organize.

COLLABORATIONS AND MOUS

- The Centre collaborates internally with various Departments in the FMS and FST for Research and Teaching, particularly the Departments of Basic Medical Sciences (BMS), Psychiatry and Community Health,

Chemistry, Life Sciences, and Physics. The Centre remains grateful to the host of Experts/Professors/Lecturers in the FMS and FST, neighbouring Universities/research institutions as well as foreign institutions who support in team supervision of our postgraduate students.

- In the year under review, the Centre secured 2 MOUs and 1 MOU Draft under review – one MOU with the Bureau of Standards for the Bamboo project, one MOU with Southern University of Baton Rouge and a draft MOU from Albany State University under review.
- Our current list of international and local collaborators include: Morehouse School of Medicine, USA; School of Pharmacy, Roosevelt University, USA; SUNY Binghamton, USA; University of Toronto, Mississauga, Canada; University of Arizona, Tucson; Albany State University, USA; University of Salento, Italy; Cordoba University, Colombia; Southern University of Baton Rouge, New Orleans; Redeemers University, Nigeria; Trees that Feed Foundation, Illinois, USA; University of California, Davis (UC-Davis); The Bamboo Project, Government of Jamaica; Bureau of Standards, Jamaica; JAMPRO; PIOJ, IICA, The National Environment and Planning Agency (NEPA); OAS; The 4H Club, Jamaica; Agro-Systems Consultants, Jamaica; Grace Kennedy Limited; National Committee on Science and Technology (NCST); Northern Caribbean University (NCU); STEA; Scientific Research Council (SRC); Ministry of Science, Energy & Technology (MSET); CMI; The Ministry of Agriculture, Commerce and Fisheries (MICAF); University of Venezuela; University of Los Andes; CARDI.

SPECIAL PROJECTS

Development and Field Testing of Paper-Based Biosensors to Increase Productivity of Small Holder Agricultural in Developing Countries

This is an NSF sponsored project in collaboration with The State University of New York (SUNY) at Binghamton. Local collaborators in the project are Northern Caribbean University (NCU) and The Southern Trelawny Environmental Agency (STEA). This project seeks to revolutionize

yam production in Jamaica through the development and field testing of low-cost genotyping and phenotyping biosensors and molecular genetic tools, UWI will work with small holder yam farmers in Jamaica with the help of NCU in Manchester and STEA Trelawny. The project will facilitate biosensor nano-technology transfer.

Bioengineering Of Yams & Other Selected Caribbean Roots and Tuber Crops Biomaterials for Value-Chain Expansion & Precommercialization Analyses

This Jamaica–Mexico Bilateral Commission Project involves collaboration with Mexican Scientists. The project focuses on bioengineering biomaterials from selected crops for value-chain expansion & pre-commercialization analyses. This proposed project is intended to boost agro industry via expansion of value chain of selected Caribbean crops- especially Yams, Sweet potato, Dasheens, Cocoyam as well as plants such as Moringa, Sugarcane and some herbs. For this project Prof. Helen Asemota is working in collaboration with Prof. Benkeblia, Dr. Riley of the SRC and Prof. Yahlia of Guerera University, Dr. Fernando of CIAD and other collaborators in Mexico.

UWI-UNU-BIOLAC International Biotechnology Symposium/Training Workshop On 'DNA Fingerprinting Of Plants: Approaches, Applications and Relevance to the Agricultural Sector in the Caribbean And Latin America'

This Project concerns the staging and hosting of international biotechnology training workshop by the UWI Mona Biotechnology Centre, FST, for the United Nations University Biotechnology Programme. The first is the 2016 International Biotechnology Symposium and Training Workshop in Agro-biotechnology for the Caribbean and Latin American Region, here at Mona Campus. The event was scheduled for August 8 to 12, 2016 at the Faculty of Medical Sciences Teaching and Research Complex (FMSTRC), UWI, Mona Campus. The training is geared towards the improvement of crop productivity with emphasis on DNA profiles for cultivar identification and transgenic plants tracing as part of the biotechnological methods needed to enhance productive efficiency in the agro sector in the Caribbean and Latin American region, in order to

provide participants with requisite hands-on practical training useful in Agricultural biotechnology.

Bamboo Research Project

The Bamboo Research Project is a sub-sector of the OAS Pre-processing Peckham bamboo project and is being managed by the Bamboo Research Management Committee, convened at the Bureau of Standards. Several meetings were held during the month. Two plots of land in Clarendon – one at Clapham (mined-out bauxite lands) and Peckham have been identified. Training of local residents took place between May and July 2016. A pest risk analysis is being carried out prior to importing two varieties of Bamboo, *Dendrocalamus asper* and *D. latiflorus*, which in addition to *Bambusa vulgaris* will be initiated into tissue culture, conserved and multiplied at the Centre.

BIOTECHNOLOGY CENTRE SEMINAR SERIES

The Centre conducted a series of seminars during the reporting period:

- Dr. John Williams from Albany State University-Georgia, USA gave a seminar presentation entitled, “Invertebrate Models for Thyroid Disrupting Agents” on March 24, 2016.
- Dr. Wesley G. Gray from Southern University in Baton Rouge-Louisiana, USA gave a seminar presentation entitled, “Bioactivity of *Cola acuminata* (Bissy) in Prostate Cancer Cells” on February 8, 2016.
- Dr. Cheryl Stewart from the University of Pretoria, South Africa gave a seminar presentation entitled, “Genomics Driven Healthcare – the Cystic Fibrosis Example” on January 12, 2016.
- Mrs. Winsone Minott gave a marketplace and products display seminar on November 24, 2015 at the Biotech Centre-Katalyxt Event which was held at the E. Nigel Harris Conference Room, UWI Headquarters, and Mona Campus. She presented on the topic, Dimensions – Jamaica’s Agricultural Biotechnology Marketplace (JABM).”

- Professor Helen Asemota gave a presentation on “Dimensions to Agro-biotechnology Marketplace” at the Biotech Centre-Katalyxt Event of November 24, 2015 which was held at the E. Nigel Harris Conference Room, UWI Headquarters, Mona Campus.
- Dr. Aseem Sappal from Oaksterdam University gave a seminar presentation entitled, “Cannabis Industry: Research, Medicine, Education & Business” on November 18, 2015.
- Prof. Asemota gave a seminar presentation on "Pain Bio-markers and possible roles for Cannabis biomaterials“. Embracing NIH Call PA-15-188 – Cannabis & Pain: Concepts Development. Presented at FMS SODECO Seminars, SODECO Office, West Road, UWI Mona. Friday March 11, 2016.

MPhil TO PHD UPGRADE SEMINARS

- Sasha Gay Wright, a post-graduate student of Prof. Asemota, gave her upgrade seminar on “In vitro analysis of Yellow yam and beetroot extracts for anti-cancer activity using prostate cancer cell lines” on May 19, 2016 at the FMSTRX Complex.
- Prof. Asemota’s student Melisa Williams gave her MPhil to PhD Upgrade Seminar on “The Effects of Biomagnetic Therapy in Type 2 Diabetic Rats” on April 22, 2016.

PRODUCTS DISPLAY

The students and staff of the Centre display many products during the period:

- Dr. Melaine Randle, Senior Laboratory Technologist, Biotechnology research students and Chanielle Delahaye-McKenzie – Dr. Mitchell’s Ph.D. student, displayed products they developed on behalf of the Centre at the Biotech Centre-Katalyxt Event.
- The Mona Symposium: Natural Products and Medicinal Chemistry – January 4–7, 2016: The Biotechnology Centre’s students displayed products like candles, soaps, bio based products & food products made from yam and Moringa at Public Forum entitled "Natural

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Products for National Development" which was open to the public on the evening of January 5th from 5:30-7:00 pm. Promising public attention was garnered for the products. The Centre presented three posters in the Poster session (see details under publications).

- Dr. Sylvia Mitchell attended the Shortwood Teacher's College inaugural Health and Garden Fair on November 19, 2015, she opened the garden by planting-out Tissue Cultured pineapples that were donated by the Centre. Dr. Mitchell also displayed Tissue Culture Plantlets and gave a presentation on how they were produced.
- The Centre took part in the Scientific Research Council (SRC) Open Day workshop activities on Tuesday November 12, 2015 at their Hope Gardens offices at 10 a.m. Dr. Sylvia Mitchell's group also displayed some products and Tissue Culture plantlets as well as Prof. Asemota's group on moringa, yam by products and PhytoBio-Foods.

BIOTECHNOLOGY CENTRE NEWSLETTERS

The Biotechnology Centre produced three Newsletter Series (#03, #04 and #05) which were circulated during the period under review, via Mona Messaging. The Centre's Newsletter Series features the research activities of staff/students, incubatees and interns, outreach activities, collaboration with local and international partners as well as special initiatives of the Centre.

THE BIOTECHNOLOGY CENTRE/ KATALYXT JOINT SEMINAR SERIES, NOVEMBER 24, 2015

The Biotechnology Centre and Mint/Katalyxt jointly organized a public seminar event, geared towards promoting "Dimensions to the Agricultural Biotechnology Marketplace". The event with a theme focusing on 'moving the lab to the streets' was staged at the Nigel Harris Conference Room at the UWI Headquarters on Tuesday November 24, 2015. Delegates from various community based organizations and tertiary level research institutions, as well as Biotechnology research students were present.

Katalyxt is a community-based private sector initiative committed to forming partnerships to strengthen the capacity of Small and Medium Enterprises (SMEs) in Jamaica. Their interaction with the Centre was aimed at further stimulating interest and promoting biotechnology entrepreneurship in the Centre's research outlook. The students who participated had the opportunity to meet with some successful entrepreneurs in the nation who freely shared their experiences with the students.

BIOTECHNOLOGY CENTRE 'SCIENCE FAIR' NOVEMBER 27, 2015

The Biotechnology Centre, in collaboration with the Scientific Research Council (SRC), held a "Science Fair" on November 27, 2015 in the Centre's parking lot. The fair was opened by the Director of the Centre, Professor Helen Asemota. There were products displays and demonstrations of soap making, DNA isolation and formulated products. A lot of students from High and Primary Schools were exposed to a number of demonstrations; and by-products developed by the Centre's staff and research students. The visiting students were also given guided tours of the Centre's laboratories. The idea was partly aimed at "Getting them young for Biotechnology" as emphasized by Professor Asemota in her opening speech.

PARTICIPATION IN THE 2015 UWI-VINCENT HOSANG VENTURE COMPETITION & THE NATIONAL MODEL COMPETITION

The Biotechnology Centre continues to encourage biotechnology research students to be interested in bio-entrepreneurship ventures, and apply the technological advancements they are learning in developing value added products, which can enter the local and international market place. To promote developments towards the biotechnology marketplace at the Centre, the students were encouraged to participate in the November 2015 Vincent HoSang UWI Venture Competition organized by the Mona School of Business and Management (MSBM) in collaboration with Mr. Vincent HoSang. The following Biotechnology Centre students represented by six competition groups participated in the 2015 Venture Competition, in November 2015 at the UWI Campus.

Group Name	Student Members
1. Di-Yamo's	Shivanjali Dondapati & Princess Bell
2. PhytoBio-Foods	Nikolai Lutas & Carlton Barrows
3. Yammie Treats	Kevin Donaldson & Chad Morgan
4. Glace Café	Jordan Freeman
5. Truerevel	Nikashae Scott
6. Herbal Jamaica	Marlon Thomas & Rashaun Harrison

Mr Jordon Freeman, Mr Carlton Barrows and Mr Nikolai Lutas, students of the Biotechnology Centre were awarded first and second places, respectively, at the event. (<http://jamaica-gleaner.com/article/news/20151130/young-entrepreneurs-get-big-boost>).

These two teams entered for the National model competition in 2016 and won 2nd and 3rd places in the Nation. Jordan Freeman's Team represented UWI at the International competition in USA and came in the top ten.

UWI MONA RESEARCH DAYS, FEBRUARY 2016

During Research Days 2016 the Biotechnology Centre:

- Displayed a total of 5 posters from the various research groups of the Centre.
- Displayed finished products at the Centre's tables/booths in The Science Experience Park, FST Spine and Main Exhibition Tent. Sweet Potato Pudding made from tissue culture sweet potatoes, Moringa Bites and Moringa Bars were some of the products on display.
- Presentations – Forty six students and teachers from various schools, Knox Community College, Quality Academics and Jonathon Grant High School toured the Centre where they viewed displays,
- Demonstrations of lab activities – Simple DNA extractions, tissue culture and other work.

Some of the Centre's Yam nutraceutical products and byproducts were also displayed. The theme of the 2016 Research Days was "Come Explore Tomorrow Solutions Today".

OUTREACH TO PRIMARY SCHOOLS

Mona Preparatory School Inventors Club

The Biotechnology Centre Assisted the Inventor's Club of Mona Preparatory in developing a project for entry in the Scientific Research Council's Science Fair. The project "Plantbased homemade organic fertilizers and their effect on plant growth" led to Mona Preparatory placing second in their category. (ii). Mona Preparatory Kindergarten 2

Both Kindergarten 2 classes of Mona Preparatory School visited the Biotechnology Centre's Medicinal Plant Garden and the Department of Life Science's Botany Garden on March 23, 2016 in a visit jointly hosted by the Centre and Life Science. Dr. Sylvia Mitchell presented on behalf of the Centre and Mr. Patrick Lewis on behalf of Life Sciences.

CONFERENCES AND WORKSHOPS ATTENDED BY STAFF AND STUDENTS

- ISO/TC296 Bamboo and Rattan Technical Committee (TC) April 26-28th, Beijing, China. Dr. Mitchell represented Jamaica at this meeting. This was the first plenary meeting of this TC of ISO (International Organization for Standardization). Work was done on three standards; terminology, charcoal and flooring, which eventually will become international standards.
- Patent Examination Workshop (Chemistry and Biology), JIPO. Dr. Mitchell also received Certificate of Participation at the Patent Examination Workshop (Chemistry and Biology), JIPO, July 4-8th and 25-29th, 2016.
- The University Diabetes Outreach Programme (UDOP) 22nd Annual International Conference – "Diabetes and the Nervous System...Is there a role for Cannabis compounds?"

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- The Director of the Centre, Prof. Helen Asemota and Research Assistant, Mrs. Shivanjali Dondapati, represented the Centre at this Conference which was held on April 28–30, 2016 at the Hyatt Ziva Resort, Rose Hall, Jamaica. There were two presentations from Yam Biotechnology Research group members, Ryan Francis and Melisa Williams, who are both Postgraduate students of Prof. Asemota, at the Conference. Ryan Francis, PhD. Candidate, presented on “Glycemic Index as a tool in developing functional foods: impact on Research Scientist hyperglycemia and satiety”. Ms. Melisa Williams, MPhil. Student supervised by Prof. Asemota, presented a poster on “The Effects of Biomagnetic Therapy in Type 2 Diabetic Rats”
- Training Workshop on Pitching. Mrs. Shivanjali Dondapati, Research Assistant & Mr. Carlton Barrows, Incubatee at the Centre attended a training workshop on “Pitching” which was held on April 19th, 2016 at the Jamaican Manufacturers Association (JMA), Jamaica as part of their preparation for collaborating with Katalyxt/Mint on an initiative “Bringing innovative agricultural information solutions to the process of exchange of agricultural goods.
- Faculty of Medical Sciences 2016 Conference. Two of Prof. Asemota’s students presented on the use of natural product by prostate cancer subjects (Sasha-Gay Wright), and Biomagnetic therapy in diabetic mellitus (Melissa Williams)
- The 8th Jamaica-Mexico Bilateral Commission Preparatory meetings. Prof. Asemota and Shivanjanli Dondapati attended the preparatory meetings for the Technical Cooperation at the Ministry of Foreign Affairs & Foreign Trade, Jamaica in May 2016.

STAFF /STUDENT ACHIEVEMENTS & AWARDS

- The Biotechnology Centre offers congratulations to Jordon Freeman for making the Dean’s List-Honour Roll for the academic year and Dr. Sylvia Mitchell for Best Research Publication in collaboration with the Natural Products’ Institute for the publication TRAMIL, Ethnomedical Survey in Jamaica.

- The Centre also congratulates Dr. Sylvia Mitchell for her promotion to Senior Lecturer, which was backdated to August 2014.
- Third Annual National Business Model Competition (NBMC) – 2016 National Business Model Competition: Jordon Freeman, MPhil. Biotechnology student and Research Assistant in the Pre-commercialisation of Yam Products Project of the Centre, and Carlton Barrows (Incubatee of the Centre) along with Nikolai Lutas (BSc. Biotechnology researching at the Centre) all supervised by Prof. Helen Asemota's team in collaboration with the Mona School of Business were finalists in the National Business Model Competition-2016 held March 31-April 1, 2016. They received the second and third place awards, respectively.

PUBLICATIONS

In the period 2015-2016, the Centre achieved eight (8) International Refereed Journal Publications, one (1) book, five (5) book chapters, seventeen (17) Conference Abstracts/Presentations, and two Newsmedia articles as listed below:

Refereed Journals Publications

- Dewayne Stennett, Andrew Wheatley, Lowell Dilworth, **Helen Asemota**. (2016). Optimal dosage determination of a hypocholesterolemic bitter yam proprietary preparation in diet-induced hypercholesterolemic mice. *Journal of Basic and Applied Research* 2(3): 281-290.
- **Sylvia Mitchell** (2016) A profile of a Caribbean Ethnobotanist, *Plants and Heritage, Society for Economic Botany*, Issue 6, Page 4.
- Lowell L. Dilworth, Felix O. Omoruyi, **Helen N. Asemota**. (2015). Effects of IP6 and Sweet Potato (*Ipomoea batatas*) Phytate on Serum, Liver and Faecal Lipids in Rats. *International Journal of Food Science and Nutrition Engineering* 5(1): 53–58.
- Perceval S. Bahado-Singh, Cliff K. Riley, Andrew O. Wheatley, Michael S. Boyne, Errol Y. Morrison and **Helen N. Asemota**. (2015). High fiber Caribbean diets with low-intermediate GI improve

- glycemic control cardiovascular and inflammatory indicators in overweight persons with type 2 diabetes: a randomized control study. *Current Research in Nutrition and Food Science*. <http://www.foodandnutritionjournal.org/volume3number1/>. Available online at <http://www.foodandnutritionjournal.org/coming-issue/>
- Marsha-Lyn McKoy, Kevin Grant, **Helen Asemota**, Oswald Simon & Felix Omoruyi. (2015). Renal and Hepatic Function in Hypercholesterolemic Rats Fed Jamaican Bitter Yam (*Dioscorea polygonoides*). *Journal of Dietary Supplements* 12 (2): 173-183
 - Picking D., R. Delgoda, N. Younger, L. Germosén-Robineau, I. Boulogne. **S.A. Mitchell** (2015). TRAMIL ethnomedicinal Survey of Jamaica. *Journal of Ethnopharmacology*. 169: 314-327.
 - Ramkissoon, A.P., Amarakoon, I.I., Hamilton, C., Pierre,R.B., Eyzaguirre, L.M., Carr, J.K., Blattner, W.A., and **Roye, M.E.** (2015). Analysis of Reverse Transcriptase and Protease Genes of HIV for Antiretroviral Drug Resistance in Treatment-Exposed Jamaican Pediatrics. *Aids Research and Human Retroviruses*. Volume 31, Number 00, 2015 .
 - Bahado-singh P.S, Riley C.K, Wheatly A.O, Boyne M.S, Morrison E.Y, Asemota H.N. (2015). High Fiber Caribbean Diets with Low-Intermediate GI Improve Glycemic Control, Cardiovascular and Inflammatory Indicators in Overweight Persons with Type 2 Diabetes: A Randomized Control Study. *Curr Res Nutr Food Sci*. 3(1)

Books

- **Tennant, Paula**, and Gustavo Fermin. 2015. *Virus Diseases of Tropical and Subtropical Crops*. CABI Wallingford, UK. 264 pages (iii). Book Chapters:
- Fermin, Gustavo, Jeanmarie Verchot, Abdolbaset Azizi and **Paula Tennant**. 2015. Viruses Affecting Tropical and Subtropical Crops: Biology, Diversity, Management in *Virus Diseases of Tropical and Subtropical Crops*. Paula Tennant and Gustavo Fermin, editors. CABI Wallingford, UK. 264 pages

- Fermin, Gustavo and Paula Tennant. 2015. Viruses Affecting Tropical and Subtropical Crops: Future Perspectives in *Virus Diseases of Tropical and Subtropical Crops*. **Paula Tennant** and Gustavo Fermin, editors. CABI Wallingford, UK. 264 pages
- Latanya C. Fisher, **Paula Tennant** and **Vicente J Febres**. 2015. Tristeza in *Virus Diseases of Tropical and Subtropical Crops*. Paula Tennant and Gustavo Fermin, editors. CABI Wallingford, UK. 264 pages
- Fermin, Gustavo, **Melaine Randle** and **Paula Tennant**. 2015. Papaya Ringspot in *Virus Diseases of Tropical and Subtropical Crops*. Paula Tennant and Gustavo Fermin, editors. CABI Wallingford, UK. 264 pages
- **Cindy-Leigh Hamilton**, Sudeshna Mazumdar-Leighton, Icolyn Amarakoon and **Marcia Roye**. 2015. Tomato Yellow Leaf Curl in *Virus Diseases of Tropical and Subtropical Crops*. **Paula Tennant** and Gustavo Fermin, editors. CABI Wallingford, UK. 264 pages (iv).

Presentations at Conferences/Meetings

- **Wright, R.**, Lee, K., Hyacinth, H., Hibbert, J., Reid, M., Wheatley, A and **Asemota, H.** Potential for use of Moringa oleifera extracts in Oxidative Stress Conditions. The Mona Symposium: Natural Products and Medicinal Chemistry. Mona, Kingston, January 4 -7, 2016. Poster.
- **Francis, R.**, Bahado-Singh, P., Smith, A-M., Wheatley, A and **Asemota, H.** Glycemic Index of Fruits Commonly Consumed in Jamaica. The Mona Symposium: Natural Products and Medicinal Chemistry. Mona, Kingston, January 4 -7, 2016. Poster.
- **Wright, S-G.**, **Asemota, H.** and Aiken, W. The Prevalence of Use of Natural Products among Prostate Cancer Patients in Jamaica: A Cross-Sectional Study. The Mona Symposium: Natural Products and Medicinal Chemistry. Mona, Kingston, January 4 -7, 2016. Poster.
- **Sadik.O.**, **Asemota, H.** Development and Field Testing of Paper-

based biosensors to increase productivity of small holder agriculture in developing countries. The UWI, Mona Research Days 2016. Poster.

- Francis, R., **Asemota, H.** Glycemic Index as a tool in developing functional foods: Impact on Research Scientist hyperglycemia and satiety. The 22nd Annual International Conference on “Diabetes and the Nervous System...Is there a role for Cannabis compounds?” Hyatt Ziva Resort, Rose Hall, Jamaica, April 28–30, 2016. Oral presentation
- **Williams, M., Asemota, H.** The Effects of Biomagnetic Therapy in Type 2 Diabetic Rats. The 22nd Annual International Conference on “Diabetes and the Nervous System...Is there a role for Cannabis compounds?” Hyatt Ziva Resort, Rose Hall, Jamaica, April 28–30, 2016. Poster
- **Benkeblia N, Boyd F.** 2016. “Common Pre- and Post-Harvest Diseases of Vegetable Crops in Jamaica”. International Conference on Integrated Disease Management in Tropical Vegetables, The University of the West Indies, St. Augustine, Port of Spain, Trinidad and Tobago, June 16–17, 2016. Oral.
- **Benkeblia N, Boyd, F.** 2016. “Pre-harvest Factors affecting Post-harvest Diseases of Vegetable Crops in Jamaica”. International Conference on Integrated Disease Management in Tropical Vegetables, The University of the West Indies, St. Augustine, Port of Spain, Trinidad and Tobago, June 16–17, 2016. Poster.
- **Benkeblia N.** 2016. “Can Metabolomics be a key to Understand Fructans Metabolism?” 8th International Fructan Symposium, Oaxaca, Mexico, June 26–July 1, 2016. Plenary Lecture.
- Lopez, M.G. and **Benkeblia, N.** 2016. Profiling of short chain fructooligosaccharides (scFOS) of ackee (*Blighia sapida* Koenig) through different maturation stages. 8th International Fructan Symposium, June 26th–July 1st, 2016, Oaxaca, Mexico (Poster).
- Steen, S.S., Lopez, M.G. and **Benkeblia, N.** 2016. Profiling of saccharides –glucose, fructose and sucrose- and short-chain fructooligosaccharides – 1-kestose, 1-nystose and DP5 of the photosynthetic

leaves and the bulb of onion (*Allium cepa*) during growing and bulbification. 8th International Fructan Symposium, June 26th – July 1st, 2016, Oaxaca, Mexico (Oral).

- **Asemota, H.N.** 2016. Bioengineering of Yams & other selected Caribbean Roots and Tuber Crops Biomaterials for Value-chain Expansion & Pre-commercialization analyses. Presented at the 8th Jamaica-Mexico Bilateral Commission Technical Cooperation Meetings, SRE, Mexico City. Mexico. May 16–18, 2016.
- **Mitchell, SA.** 2016. Bioprospecting in the Caribbean Region – Implications for Indigenous and Local communities. Advancing the Nagoya Protocol in Countries in the Caribbean Region. Jamaica National Workshops. July 25, Kingston and July 28, Montego Bay. Hosted by IUCN-ORMACC in corporation with UNEP and the Government of Jamaica.
- **Mitchell, SA.** 2016. Bioprospecting in Jamaica – Implications for local communities. Advancing the Nagoya Protocol in Countries in the Caribbean Region. Jamaica National Workshops, July 26, Kingston; July 29, Montego Bay. Hosted by IUCN-ORMACC in corporation with UNEP and the Government of Jamaica.
- **Mitchell, S.A.** 2016. Considerations for scientific study on medicinal plants in the Caribbean so as to safely integrate folk medicine into conventional medicine healthcare’, A.D.J.C. Annual scientific study day on the topic: "Scientific research in tropical island" Martinique conference, April 21st, 2016
- **Mitchell, SA.** 2016. Global Perspectives on the Biotechnology and Tissue Culture Propagation of Cannabis. In session: Cannabis sativa: the Science Behind the Smoke. June 12, 2016, PS3
- **Mitchell, SA.** 2016. Bamboo tissue culture ‘catalyzing the process’, Peckham Certification Ceremony, Bureau of Standards Jamaica, April 8th, 2016.

Newspaper Articles

- **Sylvia Mitchell.** April 26th – *Daily Observer* article ‘Money in

Medicinal Plants’ http://www.jamaicaobserver.com/news/Money-in-medicinal-plants-researcher_47589

- **Marcia Roye.** April 12, 2016 – *Daily Observer* article ‘Hope for farmers plagued by plant viruses’ http://www.jamaicaobserver.com/news/Hope-for-farmers-plagued-by-plantviruses_47593

INCOME GENERATION

During the period August 1, 2015 to July 31, 2016, income generated from Bioservices & Bioskills training, Internship, Symposium/Workshops and Grants amounted to approximately ninety thousand United States dollars (USD90,000.00) – comprising USD 8,000.00 from Government Bamboo Project (by Mitchell) – to be paid to Biotech Account; USD26,000.00 from United Nations University (by Asemota/Randle/Dondapati) - paid; USD56,000.00 from 1st year of NSF Project (Asemota) as Sub-award from SUNY, Binghamton – to be paid; and JMD320,000 (by Asemota/Dondapati/Stewart) from Bioskills training – paid; totaling USD90,000 and JMD320,000.

PUBLIC SERVICE

Professor Helen Asemota

- Ordained Clergy (Rev.) – serving Holiness Christian Church Denomination as a Pastor.
- Chairman and Co-Founder, Imade Asemota Foundation for Sickle Cell Research and Patients’ Welfare (IAF), North Carolina, USA.
- International Measurement Convention (IMEKO) Rep. in Jamaica.
- STEM Women of Science Concave (SWOC), USA. Founding Member.
- Member of the Jamaica Delegates to the 8th Jamaica-Mexico Bilateral Commission

Dr. Sylvia Mitchell

- Member of Caribbean Access and Benefit Sharing (ABS) Development Initiative Steering Committee
- Member of the Society for In vitro Biology – Education Chair, and Co-Editor
- Member, Management Board, College of Agriculture and Science Education (CASE)
- Member, Standards Council, Standards and Technical Sub-Committee, National Quality Awards, and Chair of the Board of Examiners, Bureau of Standards of Jamaica (BJS)
- Member, Hope Garden's Education and Research Sub-Committee, NPF

Dr. Marcia Roye

- Assistant Dean for Graduate Studies & Research, Faculty of Science & Technology, Mona

Professor Paula Tennant

- Head of Department of Life Sciences, Mona