

DEPARTMENT OF CHEMISTRY



Dr Roy Porter, BSc, PhD, *UWI*
Head of Department

OVERVIEW

The Department of Chemistry continues to fulfill its mandate to provide first class teaching, research and service with the aim of producing competent, well rounded chemist with professional development, thereby continuing to enrich the development of the University community, the nation and the world at large. Consequently, at the end of the academic year, we graduated fifty six (56) students with B.Sc. Degrees eleven (11) of whom received first class honours. Sixteen (16) with MSc.in Occupational Environmental Safety and Health (OESH) five (5) of whom received distinctions, and one (1) student was awarded a PhD. One (1) M.Sc. Food and Agro-Processing Technology (FAPT) degree was awarded.

HIGHLIGHTS OF MAJOR ACTIVITIES

Staff Movements

Drs. Camille Bowen-Forbes and Kerry Ann Green lecturers in the department have moved on to take up overseas opportunities. Miss Camelia Campbell also tendered her resignation as Senior Secretary in the department to assume an Administrative position at another location on the campus. Miss Wendy McNeish who was on secondment to the Estate Management Department has been appointed permanently to that department. Subsequently, Miss Carol Gardner has been assigned to the position previously held by Miss McNeish. Dr. Ainka Brown has been appointed to the post of Research Fellow

On 20th December 2016, the department hosted a Christmas Luncheon/Retirement Function at Waterfalls Limited in honour of the contribution made by Ms. Christine Montague and Professor Yvette Jackson, to the department. Citations issued to the retirees expressed the Department's gratitude, and the retirees were overjoyed with the gesture of appreciation.

Department Seminars

Dr. Marvadeen Singh-Wilmot, assisted by Dr. Nadale Downer-Riley coordinated the year's departmental seminars. Eighteen (18) engaging and informative seminars covering a wide range of topics were delivered by visitors, faculty and postgraduates; seminars delivered by visitors to the department are listed below.

- Professor Allan Headley, Texas A&M University, "Ionic Liquid Supported Organocatalytic Systems for Enantioselective Reactions".
- Dr. Grace-Anne Bent, University of the West Indies, St. Augustine, "Towards a deeper understanding of the mechanisms of interaction between acrylamide and key body fluids thiols".

Student enrolment:

Table 1: Number of students reading courses in chemistry, 2013–2017.

Level	2013–2014 Sem 1/Sem 2	2014–2105 Sem 1/Sem 2	2015–2016 Sem 1/Sem 2	2016–2017 Sem 1/Sem 2
Preliminary	223/206	197/173	233/197	225/182
Introductory	542/481	552/501	600/534	566/498
Advanced	255/218	239/198	218/188	256/233
Postgraduates	69/66	80/69	66/49	54/48

HIGHER DEGREE AWARDED

Table 2: Higher degrees in Chemistry awarded in 2016/2017 AY

Degree Completed	Name	Supervisor(s)
PhD	April Johnson	Professor Helen Jacobs

Book Loan Scheme

The Department continues to operate its book loan scheme for the undergraduate students. The demand for the introductory courses continues to be the highest demand, followed by those for the preliminary courses.

Chemistry Honours Society

On 29th September 2016 the Department hosted an Induction Ceremony for the Chemistry Honours Society, the Guest Speaker was Professor Allan Headley. Twenty-One (21) students were awarded, nine (9) students

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were first time Bronze Award recipients, seven (7) received the Silver Award for being an awardee for two successive semesters, three (3) received the Gold Award for their 3rd consecutive semester as awardees and two (2) Diamond awardees for being inducted into CHS for four consecutive semesters. At the second Induction Ceremony on February 23rd, 2017, twelve (12) students were inducted into the society. Eight (8) Bronze Award, two (2) Silver Award, and two (2) Gold Awards. The Guest Speaker was Dr. Peter Nelson.

NEPA Visible Emission Training

On January 17, 2017, the Department facilitated the staging of the Biannual Visible Emissions Observer (VEO) Certification Training offered by the National Environment and Planning Agency (NEPA). The VEO Training was administered by representatives of Eastern Technical Associates (ETA), a company based in the United States of America. VEO Training School is accredited by the United States Environment Protection Agency (US-EPA).

CAPE Workshop

During the period 9th–13th January, 2017, the Department hosted another successful series of workshops on Spectroscopy and Chromatography for the Caribbean Advanced Proficiency Examinations (CAPE) in Chemistry. Over 850 students and teachers from 40 high schools and community colleges across the island participated. Dr. Salder-McKnight and Mrs. Samuels continue to organize these workshops and their efforts are truly appreciated.

Research Days & Awards

The Department of Chemistry participated in Research Days 2017 activities with a booth display in the Main Exhibition Tent Village entitled “Chemistry in Nature: From the Mountainside to the Seaside”. Other activities held throughout those days included; mounted displays along the main spine in the Faculty of Science and Technology. An ice

cream making demonstration was conducted in the Food teaching lab, sampling of jams and chips as well as sampling of cassava bread developed by the UWI- Agricultural and Research Innovation Facility in collaboration with the Chemistry Department. The chemistry behind “popcorn” was also a highlight of the day’s activities.

Professor Mohammed Bakir and Dr. Peter Nelson received the Principal’s Award for the Best Research Publication for the article “Spectroscopic and electrochemical properties of di-2-thienyl ketone thiosemicarbazone (dtksc): electrochemical reactions with electrophiles (H⁺ and CO₂)”.

ACADEMIC VISITORS TO THE DEPARTMENT

During the academic year, the following persons visited the Department

- Ms. Vivette Gooden, Quality Assurance Manager, Grace Kennedy Limited, conducted lectures in the Dairy Chemistry course offered by the Food and Agro Processing Technology (FAPT).
- Professor Allan Headley, who was on Sabbatical leave from The Texas A & M University offered his services to the department for one semester. He taught one (1) postgraduate course and also taught courses in the Applied Chemistry Section.
- Dr. Benine Khan, Fulbright scholar (from University of Texas, Dallas) shared her time between the Chemistry Department and The School of Engineering for the 2016/2017 AY. She taught a number of courses in the Applied Chemistry Section.
- Professors. Ake Nilsson and Thomas Olsson, lecturers from the Department of Chemistry, University of Gothenburg, Sweden, visited the Department November 21–December 1, 2016.
- Professor Melvin Pascall, Ohio State University delivered lectures in Food and Agro Processing Technology (FAPT) Programme.

FUNDED PROJECTS

Dr. Peter Nelson:

- The development of polymeric Ion Selective membranes

Stimuli Modulated Phase switching Polymeric and Oligomeric Liquid Crystals as Smart Drug Transport Vehicles

Dr. Novelette Sadler-McKnight:

- Ambient air quality data and assessment for health and environment policies in Jamaica

Dr. Ian Thompson:

- “Spoilage Reduction and Shelf Life Extension of Produce & Products / Application of Post-Harvest Management Techniques”.

STAFF/ STUDENT EXCHANGE

Messrs. Dwight Messam and Miguel Thaxter visited the University of Gothenburg, Sweden for semester 2 of the 2016–2017 academic year whilst Phuong Phan spent the semester at Mona. This is part of the ongoing programme of staff and student exchange between the Departments of Chemistry, University of Gothenburg, Sweden and The University of the West Indies, Mona Campus.

OUTREACH

The Chemistry Department continues to engage in outreach activities to enrich the minds of students, particularly through visiting students from primary and high school across the island. A group of forty-one (41) students from the Norman Gardens Primary School visited the Chemistry Department on Friday, October 28, 2016. The students visited the NMR lab where they were informed about the NMR magnet and the applications of NMR in research. They also got an opportunity to conduct a TLC experiment on an extract from a natural product. On February 23, 2017 Dr. Nickiesha Stephenson visited the students at St. Andrew’s Preparatory School, where she explored and demonstrated to the students how science can be integrated into their curriculum.

Staff and students of the Chemistry Department participated in the CB UWI 5K run/walk event held on November 13, 2016. They also assisted with the manning of the FST’s booth at the event. Dr. Winklet Gallimore

should be commended for her efforts with these initiatives. Members of the Chemistry Department (under its ChemFit banner), also participated in the Sagicor Sigma 5.5K run/walk which was held on Sunday, February 19, 2017. The team placed ninth overall among universities and colleges, and received a certificate for participation

On December 16, 2016, Dr. Andrea Goldson Barnaby collaborated with the First Year Experience (FYE) and initiated a visit to TurnBerry Primary School in St. Anns Bay. A donation of a Microwave, Charts and other useful learning tools was made to the school.

As a component of the FST Week of activities, members of the Guild and their collaborators visited the Maxfield Park Children's Home on February 25, 2017, to make donations and show science experiments to the eager group of children from the home. It was a very engaging and learning experience for the children who learnt a lot about science. The Chemistry Department was represented by Dr. Winklet Gallimore.

PAPERS PRESENTED

- **Campbell, S.**, Brown Alga, "Styopodium zonale: Secondary Metabolites and their Pharmaceutical Potential". The MaNaPro 2016, The 15th International Symposium on marine natural products/Database and Dereplication Workshop. Brazil. August 29–September 2, 2016. Poster Presentation.
- **Davis, D.** "Isolation, Characterization and Investigation of the Bioactivities of Compounds and Extracts from the Caribbean Sponge, *Halichondria melanodocia*". The MaNaPro 2016, The 15th International Symposium on marine natural products/Database and Dereplication Workshop. Brazil. August 29–September 2, 2016. Poster Presentation.
- **Goldson Barnaby, A.**, Williams, R. "Biochemical investigation into the functional properties of *Delonix regia*, *Cassia fistula* and *Blighia sapida* extracts", 252nd ACS National Meeting & Exposition, Philadelphia, PA, United States, August 21–25, 2016. Poster Presentation.
- **Rambaran, M., Mulder, W., Abbas, Z.**; "The Effects of the Absorption

of Ions on the Physicochemical Properties of Silica Nanoparticles”. 46th World Chemistry Congress, IUPAC 2017, São Paulo, Brazil. July 12, 2017. Poster Presentation.

- **Roye C.** “Characterization of the Bioactive Compounds found in Jamaican Plant, *Mallontonia gnaphalodes*”. The MaNaPro 2016, The 15th International Symposium on marine natural products/Database and Dereplication Workshop. Brazil. August 29–September 2, 2016. Poster Presentation.
- Stewart, S. and **Stephenson, N.A.** “Harvesting the Sun’s Energy, Learning by Doing: Increasing Undergraduate Students’ Confidence, Motivation and Knowledge Gains” American Education Research Association Annual Meeting, San Antonio, TX, USA, April 27, 2017. Poster Presentation.
- **Stephenson, N.** and **Sadler-McKnight, N.** “Improving students’ critical thinking using the Science Writing and Workshop Template”. Gordon Research Conference on Chemistry Education, Bates College, Maine; June 18–23, 2017. Poster Presentation.
- **Stephenson, N.** and **Sadler-McKnight, N.** “Pushing students over the edge with explicit critical thinking engagement.” Paper presented at the 24th Biennial Conference on Chemical Education, University of Northern Colorado, Colorado; July 31–August 4, 2016.

PUBLICATIONS

Referred Journal Articles

- **Bowen Forbes, C. and Goldson Barnaby, A.** “Fats”. In *Pharmacognosy: Fundamentals, Applications and Strategy*. Ed. Badal-McCreath S. and Delgoda, R. Academic Press, (2016). 425–441.
- **Brown V.H.,** Brown N. “A review of the Knowledge, Attitudes and Practices of Registered Auto Mechanics in the Kingston and St. Andrew Metropolitan Region on the Disposal of used Motor Oils”. *Journals of Arts and Science and Technology*, 9 (2016): 1 11.

- Bartnik, M and **Facey, P.** “Glycosides”. In *Pharmacognosy: Fundamentals, Applications and Strategy*. Ed. By Badal-McCreath, S., Delgoda, R. Academic Press, (2016).101–161.
- **Gallimore, W.** “Marine Metabolites: Oceans of Opportunity”. In *Pharmacognosy: Fundamentals, Applications and Strategy*. Ed. By Badal-McCreath, S., Delgoda, R. Academic Press, (2016). 237–400.
- **Green, K. A., Maragh, P.T.,** Abdur-Rashid, K., Lough, A.J., **Dasgupta, T.P.** “Benzimidazol-2-ylidene ligated palladacyclic complexes of *N,N*-dimethylbenzylamine – Synthesis and application to C–C coupling reactions”. *Inorganica Chimica Acta* 449, (2016): 38–43.
- **Goldson Barnaby, A.,** Reid R., Warren D. “Phenylalanine ammonia lyase activity, antioxidant properties, fatty acid profile, mineral content and physiochemical analyses of *Cissus sicyoides* berries”. *Journal of Berry Research* 7, 2 (2017): 117–127.
- **Goldson Barnaby, A.,** Reid, R., Warren, D. “Antioxidant activity, total phenolics and fatty acid profile of *Delonix regia*, *Cassia fistula*, *Spathodea campanulata*, *Senna siamea* and *Tibouchina granulosa*”. *Journal of Analytical and Pharmaceutical Research* 3, 2 (2016): 2–7.
- **Mulder, W.H.** “Study of UV filters as an *in silico* (QSAR) graduate project’.D. González-Arjona, G. López-Pérez, M. Gustavo González, M.M. Domínguez. *Journal of Laboratory Chemical Education* 5, 4 (2017): 55–66.
- Jones, S., **Porter, R.,** C. Bishop “Implementing Medical Ganja in Jamaica”. *International Journal of Drug Policy* 42, (2017): 115–117.
- Jones, S., Bishop, C., **Porter, R.** “Temperature management of potatoes in packaging with reusable plastic crates in the fresh produce supply chain”. *Australian Journal Crop Science* 11, (2017): 638–643.
- **Downer-Riley, N. K., Jackson, Y. A.** “Recent Advances in the Synthesis of 1, 3-Azoles” *Current Topics in Medicinal Chemistry* 16, 30 (2016): 3617–3626.
- **Singh-Wilmot, M.A.,** Sinclair, R.A., Kahwa, I. A., Lough, A.J. “Eu³⁺ Substitutional Defects and Their Effect on the Luminescence Special and Decay Dynamics of One Dimensional Rare Earth

Coordination Polymers and Trinuclear Complexes Derived from the Self-Assembly of Sal-Type Metalloligands” *Journal of Luminescence*, 182 (2017): 98–106.

- **Smith J.A., Singh-Wilmot, M.A.**, Carter, K.P., Cahill, C.L., Lough, A. J., Knee, C. S. “Eight Rare Earth Metal organic Frameworks and Coordination Polymers from 2- Nitroterephthlate: Syntheses, Structures, Solid-State Luminescence and an Unprecedented Topology”. *New Journal of Chemistry*, 40 (2016): 7338–7349
- Collier, T. L., Normandin, M. D., **Stephenson, N. A.**, Livni, E., Liang, S. H., Wooten, D. W., Esfahani, S.A., Stabin, M.G., Mahmood, U., Chen, J., Wang, W., Maresca, K., Waterhouse, R.N., El Fakhri, G., Richardson, P. F., and Vasdev, N. “Synthesis and Preliminary PET imaging of ¹¹C- and ¹⁸F-isotopologues of the ROS1/ALK inhibitor lorlatinib” *Nature Communications* 8, (2017): 1–12
- Yuan, G.; Wang, F., **Stephenson, N. A.**, Wang, L., Rotstein, B. H.; Vasdev, N., Tang, P. and Liang, S.H. “Metal-free ¹⁸F labeling of aryl-CF₂H via nucleophilic radiofluorination and oxidative C-H activation”. *Chem. Commun* 53 (2017): 126–129.

INCOME GENERATING

- Dr. Ian Thompson received \$5,000,000.00 from the Environmental Foundation of Jamaica (EFJ) through the Climate Change Adaptation Fund to support the research on “Spoilage Reduction and Shelf Life Extension of Produce & Products / Application of Post-Harvest Management Techniques”.
- Dr Novelette Sadler McKnight received funding under the Erasmus Plus Programme for the academic year 2016–18 for two (2) faculty and four (4) students under the exchange cooperation between the Department of Chemistry, The University of the West Indies, Mona and the Molecular Biology Department, the University of Gothenburg, Sweden. Funding received totalled **SEK 252920** or approx. **\$4,296,630JMD**.

- Dr Peter Nelson received a New Initiative Grant amounting to \$1,400,000.00 for the project “Stimuli Modulated Phase switching Polymeric and Oligomeric Liquid Crystals as Smart Drug Transport Vehicles”.

Consultation fees, summer school and other departmental income: \$14,401,916.61

PUBLIC SERVICE

Dr. Andrea Goldson-Barnaby

- Food Safety Modernization Act (FSMA) Workshop for Food industry personnel Preventive Control Qualified Individual (PCQI) Certification. Certification required by all food exporters to the United States of America Training Session, May 24–26, 2017.
- Food Safety Modernization Act (FSMA) Workshop for Kingston and St. Andrew Health Department Inspectors/Regulators Preventive Control Qualified Individual (PCQI) Certification. Certification required by all food exporters to the United States of America Training Session, July 26–28, 2017, 20 Participants.

Dr. Peter Nelson

- Member, Soaps and Detergents Committee, Bureau of Standards, Jamaica.
- Member, School Board, Lysson’s Kindergarten, Lyssons, St. Thomas (since 2017)
- Technical Secretary, Disinfectant Committee, Bureau of Standards Jamaica

Dr. Roy Porter

- Member, Ministry of Science, Energy and Technology, Hazardous Laboratory Waste Ad hoc Committee (HALWAC).

Dr. Novelette Saddler-McKnight

- Coordinated CAPE Chemistry Spectroscopy workshop, January 13–17, 2017.

Dr. Marvadeen Singh-Wilmot

- Study skills and motivational talk to fourth formers at Manchester High School, April 2017.
- Appointed to the Board of the Natural History Museum of Jamaica – February 2017.

STUDENTS

At the Award Ceremony for the Faculty of Science and Technology held on March 23, 2017, the prizes and scholarships for undergraduate students in chemistry were awarded to:

Jonique Smith	The Cedric Hassall Scholarship
Nakeda Dennison	The Kenneth Magnus prize for Applied Chemistry
Zaynna James	The Food Chemistry Prize
Roxanne Francis	The Garfield Sadler Award
Junior Johnson	The Willard Pinnock Prize
Tahjna Robertson	The Leonard J. Haynes Award
Christophe Tracey	The Chemistry Department Prize
Shanice Hinds	The Pavelich/Honkan Prize.