



DEPARTMENT OF CHEMISTRY

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

OVERVIEW

The Department of Chemistry continues to foster an environment which encourages an appreciation for Chemistry and its benefits to the wider society. The Department therefore carries on its mission to harness the talents, abilities and potential of our students and empowering them to think critically, intelligently and independently, aligning them to be fit for purpose.

To build on this initiative, the Department, has throughout the year, put its focus on a number of staff engagement activities to encourage staff to work as part of a team with a view to achieving the Department's objective, and by extension, that of the University. It is with the support of all levels of staff that the Department has been able to provide guidance and support to our academic programmes.

We also owe our gratitude to external stakeholders and visitors, who have in their own way, helped to shape our students' journeys by their donations and sponsorship.

At the end of the academic year the department was delighted to see forty-three (43) undergraduate students graduate with a BSc in Chemistry. For higher degrees, there were four (4) PhD, two (2) MPhil, and nine (9) MSc graduates.

Workshops

The MSc Food and Agro Processing Technology (FAPT) programme conducted the following workshops:

- Food Packaging Workshop in June, 2019. The presenter was visiting professor, Prof Melvin Pascall. Participating companies were: Rainforest Seafoods, Dairy Industries, Scientific Research Council, PA Benjamin, Jamaica Bureau of Standards, Tijule, Grace Canning, Ministry of Health, National Accreditation Board. There were a total of twenty-three (23) participants.

- Two staging of the Food Safety Preventive Controls Training Sessions, with one being held in May and another held in August. Some of the participants included Honey Bun, UWI, and Environmental & Maintenance Management Services (EMMS).

Donations

The family of the late Professor Wilfred Chan offered two awards to Natural Products graduate students over the course of the next five years. The first is a travel award to assist a graduate student who is attending an international conference to present a talk on their research. The other is the WRC Award for excellence in natural products research.

Culligan, Jamaica donated and installed a Culligan LC 150 Reverse Osmosis Unit for Distiller Pretreatment to the Sir William Bartley Undergraduate Laboratory.

Staff Movements

During the course of the year, the following staff members bid the Department farewell: Ms. Toni Johnson, Mr. Omroy Shaw, Ms. Tashira Graham, Dr. Dennis Bailey (retired), and Professor Ishenkumba Kahwa (retired). The following persons joined the Department: Mr. Rakeem Martin, Ms. Samara Johns, Mr. Michael Henry, and Mr. Coniel Roye.

Dr. Vaughn Rattray proceeded on Sabbatical leave for the academic year. As a result, Dr. Rosemarie Wilson was engaged to assist with the teaching duties for the Applied Chemistry section.

Staff and Student Engagement Activities

- The Chemistry Department hosted its Christmas Social on Friday December 14th, 2018. As usual, staff got the chance to relax and bond with colleagues. The Department's "Easter Mingle" Social was held in April.
- The Department's annual Labour Day Project initiative was held on May 17th. As usual, staff and graduate students volunteered their time and effort to repair and beautify areas within the Department.
- The UWI Chemical Society (ChemSoc) conducted a fundraising initiative by hosting a play at the Pantry Playhouse. The group netted a profit \$167,700.00, a portion of which was used to fund the startup of the Chemistry Student Assistance Fund to assist students in need.
- Three staff members were honoured at the UWI's annual Long Service awards.

They were Ms. Carleen Watson, Mrs. Mitzie Hibbert Samuels and Dr. Michael Coley. Together they served the University for a total of sixty (60) years.

- Drs. Debbie Ann Gordon-Smith, Michael Coley and three (3) students attended the Caribbean Water and Wastewater Association (CWWA) 27th Annual Conference and Exhibition in October, at the Hilton Rose Hall Resort, Montego Bay, Jamaica.
- Dr. Peter Nelson and his graduate student, Ms. Deneikah Jackson visited the lab of a collaborator (Dr. Irvin Booysen) at the University of Kwazulu Natal Pietermaritzburg Campus in South Africa. The purpose of the visit was to allow in-depth discussions on collaborative research projects. The visit was funded by the National Commission on Science and technology through a bilateral agreement which exists between Jamaica and South Africa.
- Dr. Andrea Goldson Barnaby participated in a Pilot ACS Global Exchange on Development of Student Laboratory Safety Skills via a virtual meeting on April 9 and 23, 2019.
- The Department of Chemistry's Student Chapter of the American Chemical Society (ACS) participated in online Skype sessions with representatives from the Puerto Rico Student Chapter on April 10 and 17, 2019.
- Dr. Andrea Goldson Barnaby and Ms. Debbie Ann Phillips (undergraduate student) attended the American Chemical Society Festival Training Institute, Lima, Peru, in June 2019.
- Dr. Debbie Ann Gordon Smith represented the department/faculty at the Frontiers of Science Meeting, hosted and sponsored by the Royal Society in the UK. The meeting was held in March under the theme "Climate Change and Developmental Biology".
- Dr. Marvadeen Singh-Wilmot, and her PhD Student, Mr. Zeyar Min, were awarded a LAAMP (FAST) (Lightsources for Africa, the Americas, Asia and Middle East Project) award to spend two months at the Brookhaven National Lab. The LAMP project is an IUPAP-IUCr project within the ICSU Grants Programme 2016–2019.
- Dr. Nickeisha Stephenson received the Canada-CARICOM Faculty Leadership Scholarship tenable at the University of Toronto and CAMH (The Centre for Addiction and Mental Health) in Toronto Canada. While there, she worked in the labs of Dr. Neil Vasdev, Director of the Azrieli Centre for Neuro-Radiochemistry.
- Dr Paul Maragh attended the 256th National Meeting of the American Chemical Society, Boston, MA, U.S.A. August 19–23, 2018.
- Dr. Gallimore visited the University of York through a collaborative research project between York and the University of the West Indies. The project sought to

identify possible applications of the invasive Sargassum seaweed. As a part of the research component of the project, graduate students Doleasha Davis and Sanjay Campbell visited the University of York to conduct research work on the project.

Department Seminar

The coordination of the department seminars was again overseen by Dr. Marvadeen Singh-Wilmot. Throughout the academic year she coordinated Twenty (20) engaging and informative seminars covering a wide range of topics, which were delivered by visitors, faculty and postgraduates; seminars delivered by visitors to the department are listed below:

- Professor Ishenkumba Kahwa (Former Deputy Principal, UWI Mona and Chairman of the Hazardous Substances Regulatory Authority), “The Hazardous Substances Regulatory Authority: Nuclear and Radiation Sources and Chemists”.
- Professor Mona Webber (Director, Centre for Marine Sciences and Mr. James S. Moss Solomon Snr. Chair in Environmental Management) “Environmental Stewardship: Addressing the Issue of Plastic and Styrofoam Reduction”
- Professor Domingo Gonzalez-Arjona (Department of Physical Chemistry University of Seville Spain), “QSAR Applications in Chemistry – An Introduction”.
- Miss Karleen Black (Scientific Officer – Earthquake Unit, FST) in collaboration with Mr. Vaughn Brown, Maintenance Supervisor, Chemistry, “Earthquake Preparedness”.
- Mrs. ELECIA MYERS (Resource Mobilisation Coordinator, FST, UWI), “Leveraging Funding Opportunities for Chemistry: The Role of the FST Resource Mobilisation Unit.”
- Dr. Roland Lee (Assistant Professor of Chemistry, Department of Physical Sciences, MacEwan University, Edmonton, Alberta, Canada), “Exploration of Alternative Solvents and Catalysts”.
- Professor Joerg Feldmann (Director, Trace Element Speciation Laboratory (TESLA), University of Aberdeen, Scotland), “Speciation Analysis and Nanoparticles Characterisation Help to Describe Industrial and Biological Processes”.

Student Enrolment:**Table 1:** Number of students reading courses in chemistry 2015–2019

Level	2015-2016 Sem 1/Sem 2	2016-2017 Sem 1/Sem 2	2017-2018 Sem 1/Sem 2	2018-2019 Sem 1/Sem 2
Preliminary	233/197	225/182	220/177	172/141
Introductory	600/534	566/498	573/486	540/485
Advanced	218/188	256/233	246/224	252/205
Postgraduates	66/49	54/28	65/45	37/39

Book Loan Schemes

The Department continues with the operation of the book loan scheme for undergraduate students. The demand for the books at the introductory level continues to outnumber those for the preliminary and advance courses.

Chemistry Honours Society (CHS)

For semester one, a joint Honors Society Ceremony was held along with the Department of Physics and the Faculty of Engineering. Professor Klaus von Klitzing was the Keynote speaker.

Prof. Klaus von Klitzing, is the Director of the Max Planck Institute for Solid State Research and is a highly decorated scientist, who was the 1985 Nobel Laureate for Physics. He is a member of a host of science academies throughout the world, including the Vatican, and is one of only two living scientists with a physical constant that carries his name (von Klitzing constant, RK).

For semester two, the CHS Ceremony was held on February 21, 2019. Guest Speaker was Dr. Winklet Gallimore. There were eleven (11) awardees, ten (10) of whom were first time awardees and received the Bronze Award, while one (1) student received the Silver Award for qualifying for the CHS in two successive semesters. Special thanks to the team which ensured that the event was successful.

CAPE Workshop

During the period 14–18 January, 2019, the Department held another successful series of workshops on Spectroscopy and Chromatography for the Caribbean Advanced Proficiency Examinations (CAPE) in Chemistry. Over one thousand (1000) students and teachers from fifty-two (52) high schools and community colleges across the

island participated. Dr Sadler-McKnight and Mrs. Samuels continue to organize these workshops and their efforts are truly appreciated.

Visible Emissions Observer Training

On January 22, 2019 and July 23, 2019 the Department facilitated the staging of the Biannual Visible Emissions Observer (VEO) Certification Training offered by the National Environment and Planning Agency (NEPA).

Research Days

The Department of Chemistry participated in Research Days 2019 under the theme “70 years of Natural Product Research (1948–2018)” and featured booth displays from Professor Paul Reese’s Organic Chemistry Research group on topics such as Enzyme Modelling, Cell immobilization, Natural Product Chemistry, and Reaction Mechanisms. There were also the usual displays along the “spine way” of the Faculty of Science and Technology.

The Principal’s Research Day Awardees (2019) from the Department were:

- *Dr. Michael Coley – Best Research Publication (Faculty of Science & Technology).*
- *Dr. Andrea Goldson-Barnaby – Best Research Publication (Faculty of Science & Technology).*
- *Dr. Andrea Goldson-Barnaby – Most Outstanding Researcher (Faculty of Science & Technology).*
- *Prof. Mohammed Bakir – Research Project with the greatest Multidisciplinary/Cross Faculty Collaboration (UWI, Mona Campus)*

International Year of the Periodic Table

In celebration of the International Year of the Periodic Table, the Department hosted a Public Lecture in February 2019, as part of the Research Days activities. The lecture was delivered by Professor Emeritus Robert Lancashire on the topic, “The Elements that Changed the Caribbean”.

Faculty Award Ceremony

At the 2019 Annual Faculty Awards Ceremony, Drs. Michael Coley, Andrea Goldson Barnaby, and their collaborators were recognized for respectively being awarded as one of the Principal’s Research Awardees 2018, for best research publication. Dr. Goldson Barnaby was also recognized as one of the Most Outstanding Researchers/Research Activity.

Mr. Daniel Gillings was awarded the Distinguished Worker Award for the MONATS category.

Academic Visitors to the Department

During the academic year, the following persons visited the Department

- Professor Klaus von Klitzing, Director, Max Planck Institute for Solid State Research
- Professor Joerg Feldmann, Director, and Dr. Eva Krupp, Co-Director of Trace Element Speciation Laboratory (TESLA), at the University of Aberdeen, Scotland.
- Dr. Roland Lee and Dr. Laura Cabral, MacEwan University, Edmonton, Alberta, Canada Prof Melvin Pascall, Ohio State University
- Prof. Domingo Gonzalez-Arjona, Department of Physical Chemistry University of Seville Spain.

OUTREACH ACTIVITIES

Outreach activities for the year were coordinated by co-chairs Dr. Ainka Brown and Dr. Petrea Facey. The Department continued to engage the public via demonstrations and open day activities. The following are some of the activities that were undertaken:

- UWI Research Days Activities, February 6–8, 2019. This included displays and demonstration by member of Professor Paul Reese's research group. The focus was on Enzyme Modelling, Cell Immobilization, Natural Product Research, and reaction Mechanism.
- Launch of the "*International Year of the Periodic Table*" (IYPT).
- Scavenger Hunt and Chemiluminescence demonstration (Dr. Marvadeen Singh-Wilmot's Research Group)
- Participated in the Jamaica Cancer Society's fundraiser, Relay for Life 2019. There were displays and demonstrations relating to the theme "*Skin Cancer and Sunscreens*".
- Participated in the 2019 staging of Green Expo. Dr. Michael Coley /Ms. Denise Campbell showcased their research on *Biodeisel from waste cooking oils*.
- Participated in the *Meteorological Service* of Jamaica 'Weather, Climate, and Climate Change' quiz for prep and primary schools. There were displays and demonstrations relating to *Measuring pH using Red Cabbage*
- Conducted tours of the Chemistry Department and demonstrations for Belair High School. Fifteen (15) students toured the analytical instrumentation facilities and were given an overview of the uses of the instruments.

- Hosted the Liguanea Chess Club Summer Camp where a group of twenty-one (21), 6–12 year olds were engaged in chemistry experiments.
- Dr. Singh-Wilmot conducted the “Safety in Science” presentation at Ardenne High as they launched their Safety in Science Workshop.
- Dr. Singh-Wilmot facilitated a PEP preparation workshop on Separating Mixtures, with Grade 6 students at the Hopefield Preparatory school. Students received hands on exposure to separating methods such as paper chromatography and separatory funnel, and worked in teams to develop problem solving and critical thinking skills.
- Engaged in the Faculty of Science and Technology Outreach Committee Retreat which was held July 1, 3 & 5, 2019.

PAPERS PRESENTED

- Annaleise H.L. Aiken, **Ian L. Thompson**, Diptendu Chatterjee, and G. Harvey Anderson. “Producing Valuable Protein Concentrates from the Cassava Crop’s Post Harvest Waste Products”. The Caribbean Academy of Sciences 21st General Meeting and Conference. Kingston, Jamaica. November 2018. (Poster Presentation).
- Christopher Hossack, Zeyar Min, and **Marvadeen Singh-Wilmot**. “Synthesis, Characterisation, Luminescence and Sensing Capabilities of a New 2-Hydroxyterephthalate Lanthanide MOF”. The Caribbean Academy of Sciences 21st General Meeting and Conference. Kingston, Jamaica. November 2018. (Poster Presentation).
- **Coley, Michael**. “Policy-directed management of waste cooking oil in small Caribbean economies”. Caribbean Water and Wastewater Association (CWWA) 27th Annual Conference an Exhibition. Montego Bay, Jamaica. October 2018. (Oral Presentation)
- **Coley, Michael**. “The Riverton Landfill Jamaica – Challenges and Opportunities”. Caribbean Water and Wastewater Association (CWWA) 27th Annual Conference an Exhibition. Montego Bay, Jamaica. October 2018. (Oral Presentation)
- Coniel Roye, **Winklet Gallimore**, JeAnn E Watson and Rupika Delgoda. “Characterisation of bioactive compounds found the Jamaican soft coral *Pterogorgia anceps*”. **Biennial Regional Chemistry Conference and Expo 2019**, UWI, St. Augustine, Trinidad, 22–24 May 2019. (Oral Presentation)
- Dwight Messam, **Novlette Sadler McKnight**, **Michael Coley** and Johan Boman. “Characterisation of Trace Elements and Organic Compounds”. The Caribbean Academy of Sciences 21st General Meeting and Conference. Kingston, Jamaica. November 2018. (Poster Presentation).

- **Gallimore, Winklet.** “Towards the exploitation of the invasive alga *Sargassum* for the benefit of Jamaica”. University of York; July 2019. (Oral Presentation)
- **Goldson Barnaby, A.,** Duffus, K., Virgo, H., Reid, R. “Free radical scavenging activity, total phenolics and metabolites identified in *Rivina humilis* berries”. Caribbean Academy of Sciences (CAS) 21st Biennial Meeting and Conference, Mona Visitor’s Lodge, University of the West Indies. Nov 27–30, 2018. (Oral Presentation).
- **Gordon Smith, Debbie-Ann.** “Assessment of the water resources in the Kingston hydrologic basin, Jamaica, using isotope techniques” (215). Session: Isotopes in groundwater age dating. International Symposium on Isotope Hydrology: Advancing the Understanding of Water Cycle Processes. Vienna. May 2019. (Oral Presentation)
- **Gordon Smith, Debbie-Ann.** “Stable isotope compositions of surface waters in Jamaica: Case studies from Rio Cobre and the Milk River watersheds” (#58). Session: “Isotopes in the assessment of groundwater systems”. International Symposium on Isotope Hydrology: Advancing the Understanding of Water Cycle Processes. Vienna. May 2019. (Oral Presentation) <https://multinclude.eu/multinclude-case/harvesting-the-suns-energy-2/>
- Isaac Morrison, JeAnn E. Murray, **Roy Porter** and Rupika Delgoda. “The Potential Chemo-preventive Value of a Prenylated Flavonoid Isolate of Jackfruit”. The Caribbean Academy of Sciences 21st General Meeting and Conference. Kingston, Jamaica. November 2018. (Oral Presentation).
- Jermaine A. Smith, **Marvadeen A. Singh-Wilmot**, Korey P. Carter and Christopher L. Cahill. “New Rare-Earth Metal-Organic Frameworks”. The Caribbean Academy of Sciences 21st General Meeting and Conference. Kingston, Jamaica. November 2018. (Oral Presentation).
- Kadane Morris, **Paul Maragh**, Tara Dasgupta and Kamaluddin Abdur-Rashid “The Application of Cationic Rhodium and Ruthenium Complexes to Catalytic Hydrogenation and Allylic Isomerization”. 256th American Chemical Society National Meeting & Exposition. August 19–23, 2018. Boston, MA, U.S.A. (Poster Presentation)
- Kadane Morris, **Paul T. Maragh**, **Tara P. Dasgupta** and Kamaluddin Abdur-Rashid. “Transition-Metal Catalysis for the Production of Active Pharmaceutical Ingredients”. The Caribbean Academy of Sciences 21st General Meeting and Conference. Kingston, Jamaica. November 2018. (Oral Presentation).
- Kellyann Clarke, **Roy Porter**, **Petrea Facey** and Camille Thoms-Rodriguez. “Essential Oil Composition and Antimicrobial Activity of Cannabis Sativa Grown in Jamaica at Five Stages of Maturity”. The Caribbean Academy of Sciences 21st

- General Meeting and Conference. Kingston, Jamaica. November 2018. (Oral Presentation).
- Littlelet N. Scarlet-Banks, Kamaluddin Abdur-Rashid, **Paul T. Maragh** and **Tara Dasgupta**. “Chiral Ruthenium Aminophospine and Phosphine Iminopyridine Complexes for Asymmetric Catalytic Transformation”. The Caribbean Academy of Sciences 21st General Meeting and Conference. Kingston, Jamaica. November 2018. (Oral Presentation).
 - M Bakir. “Adventures in the coordination chemistry of heteroaromatic ketone hydrazonic compounds”. Abstracts of Papers of the American Chemical Society 256. August 2018.
 - Malcolm, M. and **Goldson Barnaby, A.** “Proximate analysis and antioxidant properties of *Samanea saman* seeds.” ACS Spring 2019 National Meeting in Orlando, FL, March 31–April 4, 2019. (Poster Presentation).
 - Marc A. Collins and **Paul B. Reese**. “Calcium alginate immobilized filamentous fungal cells as catalysts for biotransformation reactions”. **Biennial Regional Chemistry Conference and Expo 2019**, UWI, St. Augustine, Trinidad. May 2019. (Oral Presentation)
 - **Marvadeen Singh-Wilmot**. “Lanthanide (III) Containing Materials: From Polynuclear Clusters to Coordination Polymers and Metal Organic Frameworks”. **Biennial Regional Chemistry Conference and Expo 2019**, UWI, St. Augustine, Trinidad. May 2019. (Oral Presentation)
 - **Michael D. Coley**, Denise Campbell and Dale R. Rankine. “Integrated Production of Biodiesel and Purified Glycerol from Waste Cooking Oil”. The Caribbean Academy of Sciences 21st General Meeting and Conference. Kingston, Jamaica. November 2018. (Oral Presentation).
 - **Patrice C. Peart**, Avril R.M. Chen, Marc A. Collins and **Paul B. Reese**. “Generation of Analogues of Natural Products using Immobilised Fungal Cells”. **Biennial Regional Chemistry Conference and Expo 2019**, UWI, St. Augustine, Trinidad. May 2019. (Oral Presentation)
 - Samantha Brown-Dewar, **Tara P. Dasgupta** and **Paul T. Maragh**. “Residual Levels of Furan in Some Caribbean Foods Using Headspace Gas Chromatograph Mass Spectrometer (HS/GC-MS)”. The Caribbean Academy of Sciences 21st General Meeting and Conference. Kingston, Jamaica. November 2018. (Oral Presentation).
 - Shannen C. Lorraine, **Paul T. Maragh**, **Tara P. Dasgupta**, Kamaluddin Abdur-Rashid. “Chiral Transition Metal Diphosphine Complexes and Their Applications in Asymmetric Catalysis”. The Caribbean Academy of Sciences 21st General Meeting and Conference. Kingston, Jamaica. November 2018. (Oral Presentation).
 - **Stephenson, Nickeisha** and Dr Saran Stewart. “Harvesting the Sun’s energy:

Measuring Undergraduate Students' Science Confidence, Motivation and Knowledge Gains". Inclusive Education and Curriculum Development. From Theory to Practice, Multinstitute Project, ECHO. (Webinar Presentation).

- Zeyar Min, **Marvadeen Singh-Wilmot** and Richard Taylor. "Crystal Engineering of Lanthanide Metal-Organic Frameworks (Ln-MOFs) Using Conceptual Tertiary Building Units (TBUs)". The Caribbean Academy of Sciences 21st General Meeting and Conference. Kingston, Jamaica. November 2018. (Oral Presentation).

PUBLICATIONS

- BE Freeman, **WH Mulder**. "Insect Dynamics in Heterogeneous Environments and the Relevance of Retrospective Life Tables and Cyclic Budgets: An Integrated Approach". *Journal of Entomological Science* 54, 4 (2019) 325–344.
- Dahl, K.; Garcia, A.; **Stephenson, N. A.**; and Vasdev, N. "'In-loop' 18F-Fluorination: A proof of Concept Study" *Journal of Labelled Compounds and Radiopharmaceuticals* 62, 7 (2019):292–297.
- Deneikah T. Jackson, **Peter N. Nelson**. "Preparation and Properties of Some Ion Selective Membranes: A Review". *Journal of Molecular Structure*, 1182 (2019): 241–259.
- E Faghani, M Kolahi, **A Goldson Barnaby**, B Sohrabi. "Physiological traits and anatomic structures of the seed for two short cotton season genotypes (*Gossypium hirsutum* L.) under water stress". *Journal of Integrative Agriculture* 18,(2019):2–11.
- E Faghani, M Kolahi, B Sohrabi, **A Goldson Barnaby**. "Anatomic features and antioxidant activity of cotton seed (*Gossypium hirsutum* L.) genotypes under different irrigation regimes". *Journal of Plant Growth Regulation* (2019):1–14.
- **Goldson Barnaby, A.**, Clarke, J., Warren, D., Duffus, K.. "Free radical scavenging capacity, carotenoid content and NMR characterization of *Blighia sapida* aril oil". *Journal of Lipids*. (2018)
- J Clarke, **A Goldson Barnaby, R Reid**. "Lauric acid composition of *Cocos nucifera* (coconut) oil". *Seed Technology* 39, 1 (2018):73–79.
- Jermaine A. Smith, **Marvadeen A. Singh-Wilmot**, Korey P. Carter, Christopher L. Cahill, and James A. Ridenour. "Lanthanide-2,3,5,6-Tetrabromoterephthalic Acid Metal–Organic Frameworks: Evolution of Halogen...Halogen Interactions across the Lanthanide Series and Their Potential as Selective Bifunctional Sensors for the Detection of Fe³⁺, Cu²⁺, and Nitroaromatics". *Crystal Growth & Design* 19, 1 (2019):305-319.
- KA Blissett, **A Goldson Barnaby**, M Emanuel. "Biochemical properties of tree ripened and post harvest ripened *Mangifera indica* (cv. East Indian)". *International Journal of Fruit Science*. (2019):1–12.

- Liang, S.H.; Wang, L.; **Stephenson, N. A.**; Rotstein, B. H.; and Vasdev, N. “*Facile 18F labeling of non-activated arenes via a spirocyclic iodonium(III) ylide method and its application in the synthesis of the mGluR5 PET radiopharmaceutical [18F]FPEB*”. *Nature Protocols* 14,5 (2019):1530–1545.
- **M Bakir**, MW Lawrence, P Nelson, MB Yamin. “*Catalytic C–C cross-coupling and hydrogen evolution by two Pd (II)-complexes of di-2-pyridyl ketone benzoyl hydrazones*”. *Journal of Coordination Chemistry* 72, 13 (2019):2261–2278.
- **M Bakir**. “*X-ray crystallographic, spectroscopic and electrochemical properties of a bi-stable di-2-thienyl ketone 2, 4-dinitrophenyl hydrazone (dtkdnph)*”. *Journal of Molecular Structure* 1173, (2018):942–950.
- M Yazdi,, M Kolahi, E Mohajel Kazemic, **A Goldson Barnaby**. “*Study of the contamination rate and change in growth features of lettuce (Lactuca sativa Linn.) in response to cadmium and a survey of its phytochelatin synthase gene*”. *Ecotoxicology and Environmental Safety*. 180, (2019):295–308.
- **Nelson, Peter**. “*1H-indazoles from phenylhydrazenes: A exploratory DFT study of a possible intramolecular evolutionary synthetic route*”. *Journal of Molecular Structure* 1181 (2019): 423–427.
- **Nelson, Peter**. “*A theoretical assessment of the primary hydration shell formation for calcium pyrophosphate*”. *Journal of Molecular Structure*, volume 1190 (2019): 144–147.
- **Nelson, Peter**. “*Spectroscopic, Optical Sensing and RedOx Behaviour of 1, 5-diphenylcarbazon*”. *Journal of Molecular Structure*. Accepted, May 2019.
- Nijole J. Young, **Michael D. Coley**, Anthony M. Greenaway. “*Mineralogical investigations of Jamaican hematite-rich and goethite-rich bauxites using XRD and solid state 27Al and 31P MAS NMR Spectroscopy*”. *Journal of Geochemical Exploration* 200 (2019) 54–76.
- Norda S. Stephenson, Imron R. Miller, and **Novelette P. Sadler-McKnight**. “*Impact of Peer-Led Team Learning and the Science Writing and Workshop Template on the Critical Thinking Skills of First-Year Chemistry Students*”. *Journal of Chemical Education* 96, 5 (2019): 841–849.
- Sharna-kay A. Daley, **Nadale K. Downer-Riley**. “*An Improved Synthesis of Balsaminone A*”. *Synlett* 30,03 (2019): 325–328.

Book Chapter

- **Downer-Riley, N. K.** “*Synthesis and Functionalization of S heterocycles via CDC Reactions*”. In *Heterocycles via Cross Dehydrogenative Coupling*, Srivastava, A & Jana, C. K. Eds: Springer Nature, 2019, 279–308 (ISBN 9811391440, 9789811391446)

INCOME GENERATION

- Consultation fees, summer school and other departmental income: \$7,974,636.29
- Dr Winklet Gallimore received a contribution of \$1,500 USD from the Matsumae International Foundation (MIF), Japan, to support research.
- A grant valued at £30,000, to conduct work on possible applications of the invasive Sargassum seaweed was obtained by Dr. Winklet Gallimore through a collaboration with the University of York [Global Challenges Research Fund (GCRF)]. As part of the collaborative project, £5,000 was allocated as a contribution towards laboratory work conducted at the Chemistry Department in Jamaica.
- Dr. Marvadeen Singh-Wilmot received J\$1,600,000.00 from the New Initiative grant for the project “Rare-Earth Metal Organic Frameworks for Sensing Pollutants and Explosives”.
- Professor Paul Reese received £4,000 from the Royal Society of Chemistry Research Fund Grant (RF19-4687) to purchase laboratory glassware for a project entitled “Chemistry of polyketide natural products from *Paraconiothyrium cyclothyrioides*”.
- Dr. Debbie-Ann Gordon-Smith received a travel grant received from the International Atomic Energy Agency (IAEA) (2000 euros). She received JMD\$100,000 from the UWI Research and Publications Grant Fund to present at the International Symposium on Isotope Hydrology: Advancing the Understanding of Water Cycle Processes, May 2019, Vienna.
- Dr. Andrea Goldson Barnaby received a grant from the American Chemical Society Chemistry Festival in the amount of US\$3000.
- The following graduate students received awards from the Mona Campus Committee for Research & Publications and Graduate Awards: Jordan McKenzie and Ricaldo Pryce (US\$4,788.86 and J\$117,499.00); Jermaine Smith (US\$3000); Romario Smith (US\$2448.42).

PUBLIC SERVICE

Dr. Donna Minott Kates

- Board Chairman of the Grove Primary and Infant School, Gordon Town, St. Andrew.

Dr. Andrea Goldson-Barnaby

- Member, National Mirror Committee on Starch, Bureau of Standards Jamaica, May 2019.

- Guest speaker at the Caribbean Academy of Science (CAS) Food Safety Forum, April 2019.

Dr Vaughn Rattray

- Member, Board of Directors of the International Centre for Environmental and Nuclear Sciences (ICENS).

Dr. Novelette Saddler McKnight

- Coordinated CAPE Chemistry Spectroscopy workshop, January 14–18, 2019.

Dr. Winklet Gallimore

- Membership on the Joint Board of Teacher Education (JBTE).
- Participant in the preliminary process of judging in the Scientific Research Council 2019 National Science & Technology Fair.

Dr. Peter Nelson

- Member, Bureau of Standards Soap Committee

Dr. Roy Porter

- Member, National Commission on Science & Technology (NCST) Hazardous Laboratory Waste Adhoc Committee (HALWAC).

STUDENTS

Graduate student, Mr. Marc Collins was awarded first prize for the best graduate student oral presentation at the Biennial Regional Chemistry Conference and Expo, held in Trinidad.

At the Award Ceremony for the Faculty of Science and Technology held 26th March 2019, the prizes and scholarship for undergraduate students in the chemistry department were awarded to:

Anthony Brown	The Chemistry Department Prize
Odesha Taylor	The Garfield Sadler Award
Rochelle McKenzie	The Pavelich/Honkan Prize
Christopher Hossack	The Cedric Hassall Scholarship
Sarah Barnett	The Leonard J. Haynes Award
Wilbert Buchanan	The Kenneth Magnum prize for Applied Chemistry
Colleen Reid	The Wilfred Chan Award
Annie Roach	The Willard Pinnock Prize