

MONA SCHOOL OF ENGINEERING



Dr. Paul Aiken, BSc. MPhil. *UWI*, MSc. PhD *Columbia University*
Head of School

WORK OF THE DEPARTMENT

Overview

In response to the demands of our biomedical and health sectors, MSE has added the BSc. in Biomedical Engineering to our list of engineering programmes. In an effort to increase access to our engineering programmes, we have also added a 1-year preliminary engineering programme which consists of the necessary components of mathematics, sciences, computer and laboratory techniques and communications skills for the beginner engineer. The first cohort of Jamaican students entering this programme have been awarded a US\$5,000 bursary (50%) toward their tuition. Total applications for engineering programmes continues to increase with more 1,200 applicants for the 2017–18 academic year.

We continue to strengthen our partnerships with local and international industries. Our civil and electronics engineering teams have been working

with the National Road Operating and Constructing Company Limited (NROCC) to resolve environmental issues that potentially resulted from roadway construction, including the design and deployment of equipment to remotely sense environmental conditions. We intend to launch our first shared engineering project design with Binghamton University where four of our final year electronics and computer systems engineering students will work with four of their final year electronics and computer engineering students on two Capstone Projects.

The IEEE student body continued to excel in the annual international robotics competition by IEEE South East USA. Last year our very own Mr Jason Brown (final year computer systems engineering student) won the coveted Best Paper award from a pool of 1000 applicants.

The MSE continues to work hard towards creating a world class teaching and research facility, with strong synergies with our industrial and commercial partners. We have successfully attracted four new academic staff including a professor of electronics and electrical engineering (formerly of University of Florida). ABET International accreditation will be doing a site visit on October 8–12 for assessment of our BSc Electronics Engineering. This is our first attempt at international accreditation and we will use the learning experience from this exercise to facilitate accreditation of all our engineering programmes.

Enrolment Statistics

The number of applicants for engineering continues to increase, with the largest number applying to civil engineering. The graph in Figure 1 shows the breakdown of the total number of applicants to each programme, number of offers made, number of acceptances of those offers, and the eventual number that registered. Biomedical engineering was approved late in the academic year so there was not much time for advertising the programme hence the low number of applications. There has been significant interest and the number of applications is expected to greatly improve this year.

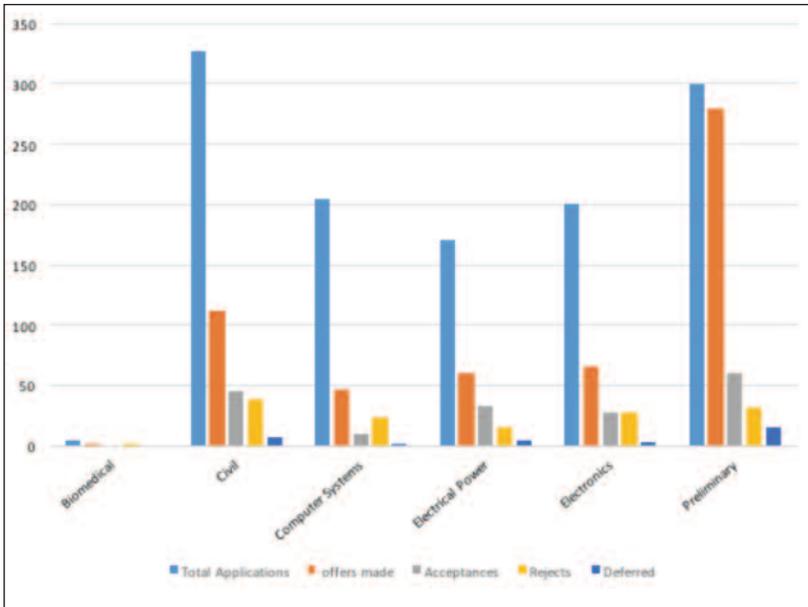


Figure 1: Application statistics for August 2017 for each engineering programme.

Strategic Initiatives to Improve Students' Learning Experience

New lab facilities: The Electronics lab facilities benefited from the addition of a soldering room and an assembly room for improved facilities for students completing their projects.

Wireless Door Access System: Phase two of the wireless door access system developed by Mr. Lindon Falconer was implemented. This includes the installation of cameras with real time access via computers and smart phones so that persons may see who is at the door before granting them access.

Introduction to Yacht Design: MSE introduced a Yacht design programme which will be implemented over 3 summers. This first cohort includes civil engineering students from MSE and architecture students from UTech. In the first summer (2016) students were introduced to design vocabulary with reference to the YD-40 (sample yacht). In the second

module (summer 2017) students focused on more practical aspects and built a model yacht. At the end of the programme students would have acquired the knowledge of the fundamentals of yacht design and development and would be eligible to become certified yacht designers.

Seven Storey Building Design for Faculty of Social Sciences: Three Civil Engineering students benefited from a paid internship as a part of a project to design a new seven storey building for the Faculty of Social Sciences. The students who began in June 2016 were given a scholarship valued at \$250,000 towards their 2017/18 tuition.

Academic Partnerships

University of Florida: The MoU with the University of Florida continues to bear fruit with MSE benefiting from improved teaching capacity from UoF academic staff.

SUNY/Binghamton University: The UWI Mona/ MSE signed a Memorandum of Understanding (MoU) with SUNY/Binghamton University to support partnerships in teaching and research. Faculty from the MSE visited SUNY Binghamton and two points of collaboration discussed are now being implemented:

- 2 joint final year projects with students from MSE and SUNY Binghamton
- A UWI graduate has transitioned into an MSc programme there with GRE waived based on the MoU

University of Pennsylvania: Since the start of 2016, the University of Pennsylvania (UPenn) initiated discussions with MSE toward partnerships in teaching, research and student and staff exchanges. Discussions are ongoing.

Accreditation

The Mona School of Engineering submitted a self-study document to ABET as the initial stages of application for accreditation for our BSc Electronics Engineering programme. Dr. Aiken participated in an ABET

workshop on July 13, 2017 in Baltimore and received guidance on all expectations and requirements during the site visit. A Team Chair (TC), John Vian of Boeing, and two Programme Evaluators (PEVs) have been assigned to the visit which will take place from October 8–10, 2017. ABET is one of the leading global engineering accrediting bodies with the direct oversight of the Washington Accord.

OUTREACH ACTIVITIES

UWI Research Days 2017 This year the Mona School of Engineering's (MSE) participation in Research Days continued to expand even further. The objective was to have more interactive displays of research projects. This year the school displayed a number of research projects that our engineering students worked on throughout the year. In the Tent (the main public display area), the MSE decided to have a Star Wars theme, in which the UWI – IEEE Mona Robotics Team displayed a robotic project that they were currently working on at the time, for the Hardware Challenge at the IEEE South Eastern Conference. This involved displaying two autonomous robots that were designed and built by students to do a number of prescribed tasks in a particular time frame. The electronics engineering students also designed and built an autonomous delivery drone, which was on display and for which they had scheduled demonstration on the nearby UWI lawns outside of the tent. The engineering student bodies also mounted displays along the spine in the faculty.

High Schools Visits: Representatives from the Mona School of Engineering in collaboration with the Marketing, Recruitment and Communications office visited a number of high schools and community colleges during the academic year. This has always been one of our major marketing space for our programmes and we make every effort to ensure that we fully participate.

Marketing Opportunities: The Mona School of Engineering took advantage of the opportunity to advertise during the finals for the TVJ Schools Challenge Quiz and the TVJ coverage of National Inter-Secondary School Athletics Championships.

Cocktail Reception in Honour of Jentech Consultants Limited: The Mona School of Engineering (MSE) hosted a cocktail reception on September 20, 2016 in honour of Jentech Consultants Limited. Jentech Consultants was presented with a plaque in appreciation of their invaluable contributions of time, resources and expertise to the development and implementation of the BSc Civil Engineering Programme.

DONATIONS/CONTRIBUTIONS

Engineering Bursaries: Every year, very needy students who meet the minimum eligibility requirements are offered an engineering bursary in the range of J\$200,000 to J\$400,000. The recipient can be at any level in the programme and must maintain a minimum GPA of 3.0 to continue the bursary. Thus far, a total amount of J\$34.75 million have been awarded.

Renovations in FST: Renovations sponsored by MSE for the Department of Physics, Materials Science Lab and the Science Library were completed at a cost of J\$26.5 million. The Science Library was rebranded as the **Science and Engineering Branch Library**. This was officially opened on May 17, 2017 by Minister of Science, Energy and Technology, Dr. the Hon. Andrew Wheatley.

Engineering Alumni Association

The Mona School of Engineering Alumni Association hosted their first annual general meeting on November 4, 2016. They hosted various other activities throughout the year including:

- Ratification of the Constitution on September 1, 2016
- UWI Electronics Club Visit and Happy Hour for undergraduate students on October 20, 2016
- Career Talk on March 30, 2017
- Fundraiser – Benefit Play on April 2, 2017

ENERGY MANAGEMENT UNIT

Overview

The Energy Management Unit (EMU) was officially formed in February 2016 having assumed all the roles of the now disbanded Energy Conservation Project Office (ECPO). The ECPO was initially part of the Office of the Campus Bursar and the EMU is now part of the Mona School of Engineering.

The EMU aims to ensure that all campus buildings function at high energy performance. Hence, the EMU assumes the responsibility for leading the development of findings and recommendations regarding campus buildings and facilities. It does this on behalf of the entire campus community, which includes: Departments, Offices, Halls of Residence, Public Spaces, Lecture Theatres, among other areas and transmits those recommendations and suggestions to the relevant technical bodies such as the Campus Technical and Environment Committee (TEC) and decision-making bodies including Campus Senior Management.

Aims of EMU

The EMU aims to make all campus buildings high performance buildings which, according to the United States Energy Independence and Security Act of 2007, is a building that integrates and optimizes on a life-cycle basis all major high-performance attributes, including energy and water conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations. This defines the EMU's functions and responsibilities over the past year, 2016–2017 that has been to:

- Develop and maintain performance criteria for maintenance of energy efficient buildings.
- Evaluate and prequalify building technology and products.
- Conduct related and needed investigations into issues affecting indoor air quality in buildings.

- Assemble, store, and disseminate technical data and related information pertinent to energy conservation and efficient projects such LED Lighting Retrofit, Solar PV and Cogeneration.
- Implement energy conservation and efficiency projects.
- Monitor and evaluate performance of implemented energy conservation and efficiency measures for sustainability.

For example, over the past academic year the EMU has worked with: the Office of the Campus Principal in the development of a Campus-wide light emitting diode (LED) lighting upgrade project; the Institute for Sustainable Development in the design, procurement and construction of the Caribbean Region's first Net-Zero Energy Building; the Department of Microbiology in the acquisition, implementation and assessment of a multi-million dollar grant funded energy conservation and efficiency project; and the Campus Projects Office in the identification of a suitable entity to carry out an assessment of the Sir Alistair McIntyre Complex mould infestation problem and then contributed to the development of terms of reference for mould remediation. This is just a few of the projects the EMU has been integrally involved in.

Relevance of EMU to Campus

It follows, that the contribution of the EMU is of importance to the Campus Community as it readily helps to address poor building operation and maintenance strategies, which can significantly degrade overall building energy performance. The EMU's impact is not limited to new construction and major renovations, which are only a fraction of the campus energy use. Indeed, after the building has been constructed, the operators and occupants are left to do the heavy lifting.

INCOME GENERATION

Income from MSE

The Mona School of Engineering generated revenue of J\$166.5m in tuition collected from its four BSc programmes.

Commercial Activities: Mona-Tech Engineering Services Limited

Mona-Tech Engineering Services was operationalized on April 7, 2015 and represents the commercial arm of the Mona school of Engineering. Its mandate is to provide internship type training to graduates of the MSE and to provide expert engineering support services to the Mona Campus, Jamaica and the Caribbean region. In doing so, Mona-Tech will generate a revenue stream for the Mona Campus, its majority shareholder.

Mona-Tech successfully completed its second year of operation. Some notable achievements during its 2016–17 operation were:

- Redevelopment of a proposal to complete the development of the Combined Heat and Power (CHP) plant (Co-Gen plant). Mona-Tech’s proposal was accepted by the Principal, and was presented to the campus and the university where it was approved. Seven Megawatts (7 MW) of electricity generators will be installed to provide for all the campus’s electrical energy needs. The exhaust and hot water from these engines will be used to power the absorption and hot water chillers to provide 2200 Tons Refrigeration of cooling. Expected cost saving to the campus is in excess of J\$300 million per year.
- Introduction of New Fortress Energy (NFE) to the campus and successfully negotiated very competitive LNG prices. Mona-Tech also directed the campus in forming a very strong partnership with NFE which will result in several scholarships and internships to our students and research opportunities for academics.
- Renewal and expansion of the Co-Gen plant Operation and Maintenance contract to include all customer sites
- Renewal of the AC Preventative Maintenance contract to include service to the UWI Mona-Western Jamaica Campus.
- Procurement of other projects and contracts, external to UWI, including Petrocaribe, UHWI, and Total Gas.

2016–17 Revenue was J\$68 million and Expense was J\$57 million giving a Surplus of J\$11 million.

PAPERS PRESENTED

- **Dr. Paul Aiken** presented at a public forum on Public Private Partnerships: a Development tool for Jamaica hosted by the Mona School of Business and Management on June 21, 2017. His presentation was entitled, “The role that Engineering plays in designing and developing sustainability in production”.
- **Dr. Omar Thomas** presented along with co-author Chadwick Barclay on the following: “A low-cost navigation device for the blind or visually impaired.” Authors: Chadwick Barclay, Andre coy, Omar Thomas, Paul Aiken, on September 20, 2016.
- **Dr. Paul Aiken** presented at a Forum on Construction as a driver for Economic Growth hosted by the Mona School of Business and Management. His presentation was entitled, “Building a Trained Workforce for the Construction Industry”.

Seminars / Workshops

- **Mr. Stanley Smellie** Participated in the “Forum on Regional Cooperation: Developing Quality Infrastructure for Photovoltaic Energy Generation in Latin America and the Caribbean” held in Santiago de Chile during the week September 11–15, 2017. The workshop was coordinated by the German Government.
- **Mr. Stanley Smellie** Attended “U.S. Department of Energy 2017 National Energy Codes Conference” held in Pittsburgh, USA during the week of July 17–20, 2017.
- **Ms. Cherri-Ann Scarlett** Attended a workshop entitled, “Implementation of IMO Model Course 4.05 on Energy Efficient Operation of Ships” in Panama City, Panama in April 2017. The workshop was coordinated by the International Maritime Organisation.
- **Dr. Omar Thomas** Attended a workshop entitled “Energy Efficiency in the Built Environment in the Caribbean: Energy Policy”, at the Jamaica Pegasus Hotel under the “Low Greenhouse Gas Emissions: Promoting Energy Efficiency & Renewable Energy Building in

Jamaica” (LGGE) project of the Institute of Sustainable Development (ISD) at The UWI on March 23, 2017.

- **Ms. Cherri-Ann Scarlett** Attended the JPS Women in Energy Conference during March 9–10, 2017 her participation was sponsored by MSE
- **Ms. Joni Hall** Attended the JPS Women in Energy Conference during March 9–10, 2017 her participation was sponsored by MSE.
- **Mr. Lindon Falconer** Installed a Computer Network in the recently opened Vision Resource Centre at Jamaica Society for the Blind (JSB). This project was done in conjunction with a group of level III Electronics Engineering and Physics students.
 - Phase 1 of the project was done during December 2016 and January 2017.
 - Phase 2 commenced in February 2017 and involved linking the networks between the old and new buildings.
- **Mr. Lindon Falconer** Attended and supervised students in the IEEE Southeastern Conference 2017 hosted in Charlotte, North Carolina from March 31–April 2, 2017.
- **Dr. Omar Thomas** Attended the Transportation Research Board (TRB) 96th Annual Meeting from January 7–11, 2017 in Washington, D.C. U.S.A.
- **Mr. Stanley G. Smellie** Attended the 2016 World Energy Engineering Congress Conference and Trade-Show held in Washington D.C. USA during the period September 21–22, 2016.
- **Mr. Stanley G. Smellie** Attended the Association of Energy Engineers (AEE) 2016 Legend in Energy Awards VIP Dinner and Induction Ceremony held on September 20th, 2016 aboard the Washington DC Odyssey cruise line.
- **Mr. Stanley G. Smellie** Attended the Nationally Appropriate Mitigation Actions (NAMA) Development in the Cooling Sector and Investment-Grade Calculation, Analysis and Financial Modelling for Sustainable Energy Applications workshops in Frigate Bay, St. Kitts and Nevis, during the period September 12–16, 2016.

PUBLIC SERVICE

- **Aiken, Paul;** UWI Mona representative on the University Council of Jamaica (UCJ) Engineering Accreditation Committee.
- **Scarlett, Cherri-Ann;** Validation of instructional/materials for Renewable Energy curriculum for HEART Trust NTA National TVET Centre.
- **Smith, David A. Y.;** Industry representative on the UCJ Engineering Accreditation Committee.
- **Smellie, Stanley;** Appointed by Caribbean Regional Organisation for Standards and Quality (CROSQ) as an Advisor to Regional Project Team for the Regional Energy Efficiency Building Code.

STUDENTS

International Recognition

- A team of students and a facilitator, Mr. Lindon Falconer, participated and placed 13th out of 41 universities in the Institute of Electrical and Electronics Engineers (IEEE) Southeast Conference Robotics Competition, which was held March 31st to April 2nd, 2017 in Charlotte, North Carolina. **Jason Brown**, a final year computer systems engineering student, placed first in the Technical Paper Competition (a first for a Jamaican university). It must be noted that this was from a field of 1,000 applicants, most of whom were graduate students in US Universities.
- **Aisha Robinson**, a final year electronics engineering student, was selected as one of four finalists for the Society of Light and Lighting's (SLL) Young lighter of the year award. Her paper titled "A Visible Light Communication Scheme for Use as Accent Lighting," was presented at the Lux Live exhibition held at the London ExCel Centre, UK on 23–24 November 2016. The paper explored the potential for using the visible light from accent lighting fixtures, instead of radio frequency, to deliver information to visitors' mobile

phones. It emphasized the design constraints for the lighting fixtures to be used.

Student Clubs and Societies

The students of the Mona School of Engineering are actively involved in student chapters of

- Institute of Electrical and Electronics Engineers (IEEE)
- Jamaica Institution of Engineers (JIE)
- Institute of Structural Engineers (IStructE)

Scholarship and Bursaries

- 20 students were awarded a total of \$9,150,000.00 in MSE bursaries for the academic year 2016/2017
- **Kadeem Campbell** received the Grace Kennedy Foundation Scholarship valued at J\$500,000.
- **Ashley Ewan** received the BNS Staff Open Scholarship valued at J\$1,280,500.
- **Dennis Orane** received the Ministry of Education – Special Scholarship valued at J\$500,000 and the Grace Kennedy Foundation Scholarship valued at J\$100,000.
- **Henel Vidal** received the Grace Kennedy Foundation Scholarship valued at J\$100,000.
- **Sherika Anderson** received the Grace Kennedy Foundation Scholarship valued at J\$430,000.
- **Anthony Bryan** received the UWI Open Scholarship valued at \$1,089,840.
- **Scott Lee Young** received the CB/UWI 5K Scholarship valued at \$300,000.
- **Romaine Nugent** received the UWI Township Scholarship valued at \$J1,280,000.
- **Rickel Williams** received the UWI Academic Bursary valued at J\$30,000.

2016 Graduation

The first cohort of Civil Engineering and Computer Systems Engineering students graduated with one First Class Honours from the Civil Engineering Programme and one First Class Honours from Electronics Engineering.