

MONA SCHOOL OF ENGINEERING



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WORK OF THE DEPARTMENT

Overview

Mona School of Engineering (MSE) has enrolled the first cohort in the BSc Electrical Power Engineering during August 2015. These first year students were readily employed as summer interns by JPSCo who eagerly anticipates their completion of the programme and joining their team. Applications for the 2016–17 year for the BSc Electrical Power Engineering has increased to over 130, with at least 33 confirmed acceptances. The number of applicants for engineering is trending up with over 850 applications for the four engineering programmes for the 2016–17 academic year.

The first cohort of five (5) Civil Engineering and four (4) Computer Systems Engineering students completed their programme of study in May 2016, along with the fifth cohort of Electronics Engineers. Traceability studies revealed that they were all gainfully employed within a month of

completing their final examination. Our industries are demanding larger number of our graduates and are pursuing various forms of partnerships geared towards attracting more students into engineering and providing tuition assistances and loans.

We have established academic partnerships with University of Florida and SUNY Binghamton University, and successfully implemented our very first online class. Prof Haniph Latchman taught the level 2 control systems course (ECNG2009) from his office at the University of Florida, to students sitting here in our Video Conference Room. This is significant for us as it sets the precedence for future classes to be taught by world renowned professors, who would have been otherwise unavailable. We will be exploring additional partnerships this year and have responded to preliminary discussions with the college of Engineering at the University of Pennsylvania, which they initiated.

The MSE successfully secured funding of J \$96 million to purchase state-of-the-art lab equipment for our undergraduate laboratories. We now have lab facilities for our electronics, electrical, civil and computer systems lab that put us on par with some of the top engineering schools. We continue to attract high-quality full time and part time lecturers with regional and international academic and relevant industrial experiences.

Our students continue to shine on the international arena. They competed and placed third in the International IEEE Southeast Robotics Competition, held in Virginia, USA. Engineering students continue to participate in engineering societies such as the Jamaica Institution of Engineers (JIE) student chapter and the Institute of Electrical and Electronics Engineers (IEEE) student chapter. Importantly, an Engineering Alumni Society was formed and an executive body has been formally created.

Enrolment Statistics

The number of applicants for engineering continues to increase, with the largest numbers applying to civil engineering. The graph in Figure 1 below 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. Electrical power engineering commenced Sept 2015 so no prior data would have been available.

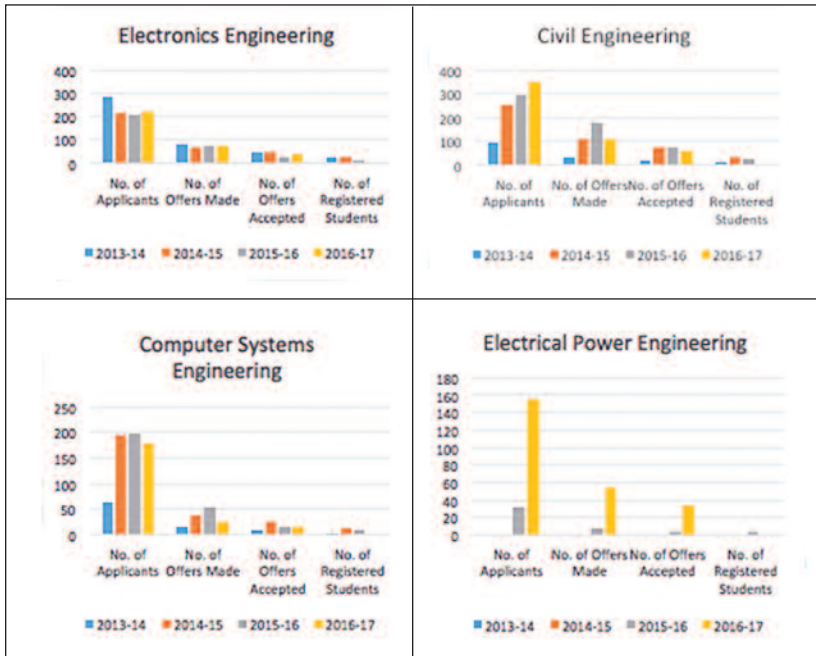


Fig. 1 Application statistics since August 2013 for each engineering programme.

It is important for us to study this trend as we use it to analyse our enrolment. For example, we noted that in this year (2015–16) there were a total of 297 applicants for civil engineering from which 181 offers were made to qualifying students. Only 28 students registered for civil engineering in September 2015 in spite of 77 applicants accepting our offer. The main reason cited is the lack of funding to pay the US\$10,000 tuition. It has therefore become very important for us to assist our students in finding ways to fund their education. The Director of MSE has been meeting with financial companies with the aim of persuading them to participate in special student loan programmes for engineering students. No firm commitments have been reached as yet, but we remain very optimistic, since the guaranteed employment for our graduates should minimize or eliminate repayment risk.

STRATEGIC INITIATIVES TO IMPROVE STUDENT'S LEARNING EXPERIENCE

Virtual Learning Environment

The Mona School of Engineering launched its virtual learning environment, the Mona School of Engineering Virtual Learning Environment (MSEVLE). This system hosts a wide range of academic resources for staff and students across all four (4) engineering programmes. Additionally, the offices and laboratories were upgraded with LAN and wireless internet access points. Lecture rooms were renovated to increase student comfort and new chairs/desk were added.

Online parts store

The MSE has created an online store where students may order components for labs and projects. Students now have the convenience of purchasing components for their respective programmes online with the launch of the MSE Stores, an online store and inventory management system which facilitates online purchasing of electronics components for students

Online Teaching

The School has retrofitted its conference room to facilitate its first virtually flipped class in collaboration with Professor Hanif Latchman of the University of Florida (UoF). The use of technology mediated mechanisms as well as the flipped class room approach, is part of an ongoing research project on innovative teaching methods being introduced at the University of Florida's Electrical and Computer Engineering (ECE) Department.

New lab facilities

The Director of the MSE and the Campus Bursar worked jointly to secure a \$96 million loan to purchase equipment for the engineering undergraduate laboratories. This initiative was the brain child of Dr.

Ronald Robinson, of the Office of the Principal, who was instrumental in accessing potential funding for MSE developmental goals. The labs are now fully equipped for the coming academic year. The range of lab equipment may be viewed on our web page at <http://www.mona.uwi.edu/engineering/labs-and-facilities>.

Low Cost Programmer for Students

A low cost embedded systems programmer has been acquired and fully tested by Mr. Lindon Falconer (Electronics Engineer in MSE). The testing was completed in January 2016. This programmer along with an extension development platform will be introduced to students laboratory courses in years 1 and 2, and allow the student to develop and test microcontroller circuit designs in their own time. This is expected to enhance the lab learning experience for the Electronics and Computer Systems Engineering students.

Wireless Door Access System

In December 2015, Lindon Falconer designed, built and installed a wireless system for controlling the electronic lock and access on the main door in the Mona School of Engineering. This system includes a wireless buzzer that indicates when someone is at the door and enables the receptionist to remotely open the door by the press of a button. The next phase will include the installation of cameras with real time access via computers and smart phones.

ACADEMIC PARTNERSHIPS

University of Florida: The UWI Mona/ MSE signed a Memorandum of Understanding (MoU) with the University of Florida to support partnerships in teaching and research. The primary objective of this MoU is the development of cooperative efforts between Florida and UWI Mona, which will enhance the academic and research interchange between the two institutions. Recognizing the importance of mutual collaboration and the contributions to society made by institutions of

higher education, the parties desire to promote exchange between the faculty and students of the two institutions as well as the exchange of academic and research information. Specific projects in an area of educational or research interest will be selected as a result of coordination by Florida and UWI Mona at the appropriate administrative level in each institution. Professor Haniph Latchman of UoF has been assigned the role of academic manager to liaise with and facilitate the terms of the MoU. The partnership has already fostered the implementation of online course offering by Professor Latchman to second year engineering students in the MSE.

SUNY/Polytechnic Institute

Dr Tania Henry established on-going research collaboration and signed visiting scientist agreement with SUNY Polytechnic Institute's, college of Nanoscale Science and Engineering, University of Albany. Research activities involved group III-Nitride semiconductor nanostructures.

SUNY/Binghamton University

Two draft Memoranda of Agreement (MoAs) have been submitted by SUNY/Binghamton University for collaboration with UWI/the Mona School of Engineering, starting academic year 2016–17. The first MoA speaks to The UWI Mona (and especially UWI Mona's School of Engineering) and Binghamton University (lead by the Thomas J. Watson School of Engineering and Applied Science) establishing a collaborative program that provides qualified students from UWI Mona an accelerated path to obtain a Master's degree in Electrical and Computer Engineering from Binghamton University through a combination of selected online courses and courses taken in residency on the Binghamton University campus.

The second MoA aims to foster advancement in teaching, research, academic collaboration and cultural understanding and to create avenues for enhancing learner experience at both entities, as well as strengthen both entities by finding ways of combining their complementary resources

and strengths. As part of this collaboration, UWI Mona and Binghamton University will broadly explore the following avenues for cooperation:

- Short courses, seminars, workshops, and courses provided by Binghamton University to UWI Mona
- Discussions on industry/university collaboration
- Faculty and/or administrator visits
- Support of conferences and workshops, the mode of support will be determined depending on topic, timing, and other considerations
- Discussions and sharing of information on incubation of start-up companies
- Discussions regarding Binghamton University's Center for Learning and Teaching
- Collaborative academic programs

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. Additional applications will be made for Civil and Computer Systems Engineering during the coming academic year. ABET is one of the leading global engineering accrediting body with the direct oversight of the Washington Accord.

OUTREACH ACTIVITIES

UWI Research Days 2016: The Mona School of Engineering's involvement in The UWI Research Days 2016 was greater this academic year with more interactive displays at the Tent and in the Faculty. The main interactive displays at the Tent were: Autonomous Robot for Shipping

Barge Challenge for the IEEE International Robotics Competition by the UWI Mona Robotic Team (the team came 3rd in the IEEE Competition). Structural Model of the Mona School of Engineering Building by the final year civil engineering students.

High Schools Visits

Representatives from the Mona School of Engineering in collaboration with the Marketing, Recruitment and Communications department 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.

Elaine Bryan Foundation Inspirational Luncheon

The University of the West Indies (UWI), Mona Campus, and particularly, the Mona School of Engineering (MSE) were invited to participate in the Elaine Bryan Foundation Inspirational Luncheon, Ritz-Carlton, Buckhead, Atlanta, Georgia, on May 15, 2016. An outreach team from The University of the West Indies consisting of Mr. Noel Morgan, Mrs. Marjorie Bolero-Haughton, Dr. Omar Thomas and Ms. Shanique Gray attended the Luncheon. The UWI outreach team was given the opportunity to promote the university at the luncheon. Mrs. Marjorie Bolero-Haughton gave a presentation on Programmes offered at The UWI with special emphasis on Engineering and other Science, Technology, Engineering, Arts and Mathematics (STEAM) programmes. The presentation was very well received and participants asked for the accompanying videos to be placed on the Elaine Bryan Foundation website. The UWI was named in their Magazine as one of the Foundation's Sponsor for the 2016 Inspirational Luncheon.

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\$25.6 million has been awarded.

Registry Retreat

The MSE sponsored in excess of \$2 million to facilitate the 2016 retreat of the Office of the Campus Registrar to host a workshop to develop “Radical Collaborative” skills among senior and middle managers within the Registry. MSE hopes that this will assist the campus in attaining the strategic objectives in the management of its affairs.

Renovations in FST

The MSE donated \$22.2 million to facilitate renovation works to the Material Science laboratory of the Physics Department and to the entrance/lobby area and 2nd floor of the Science Library. Works commenced in July and are on track for completion at end of August. Works for resurfacing of the Spine walkway was approved for J\$14 million, but awaits availability of funds.

ENGINEERING ALUMNI ASSOCIATION

The Mona School of Engineering Alumni Association was launched on May 27, 2016. The president and other members of the executive body was appointed via a nomination and voting process. The main aims of this Alumni Association are to provide:

- a. a forum for the exchange of ideas which reflect the common interests of its members and uphold the principles, the integrity, and the traditions of the Mona School of Engineering;

- b. an avenue for the establishment of social, cultural and professional network among members;
- c. a vehicle for liaising between alumni in Jamaica and alumni in other parts of the world;
- d. a vehicle for liaising with Mona School of Engineering, identifying its requirements for maintaining its standards, for further development and for delivering the best quality education at the tertiary level, and
- e. a vehicle for developing and implementing projects aimed at supporting Mona School of Engineering, strengthening its institutional framework and encouraging the educational and intellectual development of its students.

AWARDS, GRANTS AND RECOGNITION

- **Dr Omar Thomas** – Recipient of the Research and Publication Fund, which was used to fund the trip to the 2016 International Conference on Transportation Development ASCE Conference in Houston, Texas.
- **Dr Adrian Lawrence** was awarded the ASTM International Journal of Testing and Evaluation's Outstanding Article Award for paper titled “Effects of Thermal Conductivity of Soil on Temperature Development and Cracking in Mass Concrete Footings”, published in Volume 43, Issue 5, 2014 (Awarded in December 2015)
- **Dr Tania Henry** received the research and publication grant of J\$ 1.5 million to support her research in Organic Light Emitting Diodes (OLED) and nano-engineering.
- **Dr. Tania Henry** – Recipient of the UWI Study and Travel Grant, which was used to fund the trip to the 58th Electronic Materials Conference (2016) in Newark, Delaware

PAPERS PRESENTED

- **Henry, Tania & Henderson, Nathan**, “Investigating the Effects of Photoanode Doping on the Performance of DSSCs.” UWI Research

Days, 2015, University of the West Indies, Mona, Campus (Poster Presentation).

- **Henry, Tania & Henderson, Nathan** “Investigating the Effect of Rare-Earth Photoanode Doping on Dye-Sensitized Solar Cells (DSSC) Performance.” Faculty of Science and Technology (FST) Conference, University of the West Indies, Mona Campus, (Oral Presentation)
- **McMorris, N. and Thomas, O.** “Emerging Trends in Effective Bridge Management versus Bridge Maintenance.” Jamaica Institution of Engineers Conference, Kingston Jamaica. September 21–23, 2015.
- **Thomas, Omar S. and Sobanjo, J. O.** “Semi-Markov Decision Process: A Decision Tool for Transportation Infrastructure Management Systems.” Proceedings of the 2016 International Conference on Transportation and Development, ASCE, pages 384–396. Houston, Texas. June 26–29, 2016.
- **Thomas, O.** “Effective Bridge Management versus Bridge Maintenance”. University of the West Indies, Research Days 2016, February 17–19, 2016.
- **Lawrence, Adrian;** "Mass Concrete Foundations – To Insulate or Not to Insulate?". Florida Transportation Builders Association/Florida Department of Transportation Specifications and Structures Committee Meeting, Orlando, Florida USA. November 2015

SEMINARS / WORKSHOPS

- **Omar Thomas** – AutoCAD Civil 3D Fundamentals Training held on June 20–23, 2016 at Novgar Services Limited, Kingston, Jamaica.
- **Omar Thomas** – Short Course: Updates to 2010 Highway Capacity Manual (HCM) to be held on June 26, 2016 at the ASCE International Conference on Transportation and Development 2016.
- **Omar Thomas** – American Society of Civil Engineers (ASCE) Annual Convention in New York, New York, USA. I attended a

number of professional development technical sessions, which were mainly focused on looking at the design, construction and maintenance of a number of bridges in New York City. (October 11–14, 2015).

- **Kirk Spence** chaired a session at the IEEE Communication Society Smart Grid Conference in Miami. November 2015.
- The MSE/MonaTech sponsored the participation of three female members of staff, **Sheena Woodburn, Shanique Gray, and Felicia Whyte**, to attend the JPS Women in Energy Conference (March 10–11, 2016).

PUBLICATIONS

- **Thomas, Omar S.** and Sobanjo, J. O. (2016) “Semi-Markov Models for the Deterioration of Bridge Elements.” The American Society of Civil Engineers’ (ASCE’s) *Journal of Infrastructure Systems*. 10.1061/(ASCE)IS.1943-555X.0000298.

INCOME GENERATION

Income from MSE

The Mona school of engineering continues to generate income from tuition collected for its four BSc programmes. A summary of the finances is as follows:

Item	Income	Expenditure
Billed Tuition	J\$ 141.6 million	
Actual amount paid	J\$ 98.2 million	
Surplus from last year	J\$ 36.1 million	
Engineering bursaries awarded		J\$ 25.3 million
Total unpaid tuition		J\$ 30.6 million
Total expense for 2015-16		J\$ 62.8 million
Cumulative Surplus	J\$71.5 Million	

Mona School of Engineering

Of the bursaries awarded, J\$6.6 million was awarded to 18 full-fee paying students during 2015–16, who started the programme since Sept 2013 and after. The remaining J\$18.7 million represents 80% of the full-fee that had been awarded to students who were registered before 2013 under the UGC subsidies fees, as was recommended during programme piloting. To facilitate full fee and UGC fee in the bursary accounting systems, the UGC was treated as a bursary award.

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.

During its first year of operation Mona-Tech established its presence on the Mona campus as a viable engineering entity that readily assists the campus in solving various engineering issues. Some notable achievements during its 2015–16 operation were:

- Facilitated a savings of J\$20 Million per year to the Mona Campus after Management and Operation of the AC Service park was contracted to Mona-Tech on January 1, 2016.
- Provided Technical oversight to Principal's office for determining a viable energy solution for the Mona Campus. This could lead to independence from JPS Grid and a potential revenue stream of US\$3.9 million per year.
- Proposed a contract for service for preventative maintenance for all AC units on the Mona campus (expected start date is September 2016). This is expected to save the campus a minimum of J\$20 million per year.
- Provided internships for students of the MSE

- Provided maintenance and consultancy services to University Hospital of the West Indies (UHWI)
- Served as the preferred Energy Audit Consultants by PetroCaribe. Mona Tech was also contracted to manage the implementation of the recommendations it made from the energy audits.
- Secured an agreement with the Minister of Health and his senior technocrats to be contracted for Biomedical Instrument repairs for all hospitals. Mona-Tech will assist in creating a policy framework to guide the procurement and maintenance procedure of biomedical equipment in Jamaica.
- Provided engineering and technical support to the construction and commissioning of the Cassava Processing Plant in St Elizabeth (ELIM)
- Effected many repairs to instruments on Mona Campus

Mona-Tech is growing at a very rapid pace and is quickly becoming the choice company for engineering support services in Jamaica. The paid up capital of Mona-Tech is J\$22.5 million and the summary of its financial performance up to July 31, 2016, is shown below.

Item	Forecasted	Actual	Comments (reasons for deviation)
Income	\$20,400,000	\$34,976,941	<ul style="list-style-type: none"> • MTES has been successful in securing additional contracts for engineering services • Maintenance projected earnings short fall by \$5mil, but engineering services exceeded its projection by \$13 mil. • \$6.6 mil was recovered (re-funded) for subcontracted services
Expenditure	\$20,280,599	\$44,695,649	<ul style="list-style-type: none"> • MTES fronted the cost for tools and contracted services in excess of \$19 million above the projected value and has not recover all investments as yet. • Salaries for new staff at the start of 2016
Surplus/ (Deficit)	\$119,401	(\$9,718,708)	<ul style="list-style-type: none"> • This short fall of \$9.6 mil is due to the increase in receivables from un-refunded payments made for tools and sub-contracting

Mona School of Engineering

A 5-year strategic plan has been completed with forecast surplus in excess of J\$600 Million by July 31, 2020.

The financial forecast for next year (Aug. 1, 2016–July 31, 2017) is as follows:

Item	Forecast for Aug. 1 2016 to July 31, 2017
Income	\$203,450,399
Expenditure	\$65,340,632
Surplus/(Deficit)	\$138,109,767

PUBLIC SERVICE

- **McMorris, Nicolas;** Coordinated Mona School of Engineering hosting of the second in its series of public lectures entitled “Jamaica’s First LEED® Building: A Case Study” on Thursday, April 9, 2015. The Guest Speaker was Mr. Federico Aguilar, Caribe Hospitality’s Project Director for Central America and the Caribbean.
- **Henry, Tania;** Panelist: women in motion networking series™: women in technology, New York, NY, hosted by the National Minority Business Council (NMBC), August 2015.
- **Smith, David A. Y.;** Worked as a member of the International Organising Committee (IOC) for the PIANC-COPEDEC conference to be held in Rio de Janeiro, Brazil. 2016
- **Aiken, Paul;** UWI Mona representative on the University Council of Jamaica (UCJ) Engineering Accreditation Committee.
- **Smith, David A. Y.;** Industry representative on the UCJ Engineering Accreditation Committee.
- **Aiken, Paul;** International Liaison for IEEE Smart Grid Conference, held in Miami by the IEEE Communication Society. November 2015

STUDENTS

International Recognition

- An eleven member delegation of students and a facilitator participated and placed third in the Institute of Electrical and Electronics Engineers (IEEE) Southeast Conference Robotics Competition, which was held March 30–April 3, 2016 in Virginia.

Scholarship and Bursaries

- Victoria Grant and Damali Cohen, 2nd year Civil Engineering students were the recipients of a full scholarship valued at US\$10,000.00 per year from the Gore Developments Limited.
- Over \$25 million engineering bursary was awarded

2015 Graduation

- Six students graduated with First Class Honours from the Electronics Engineering Programme.