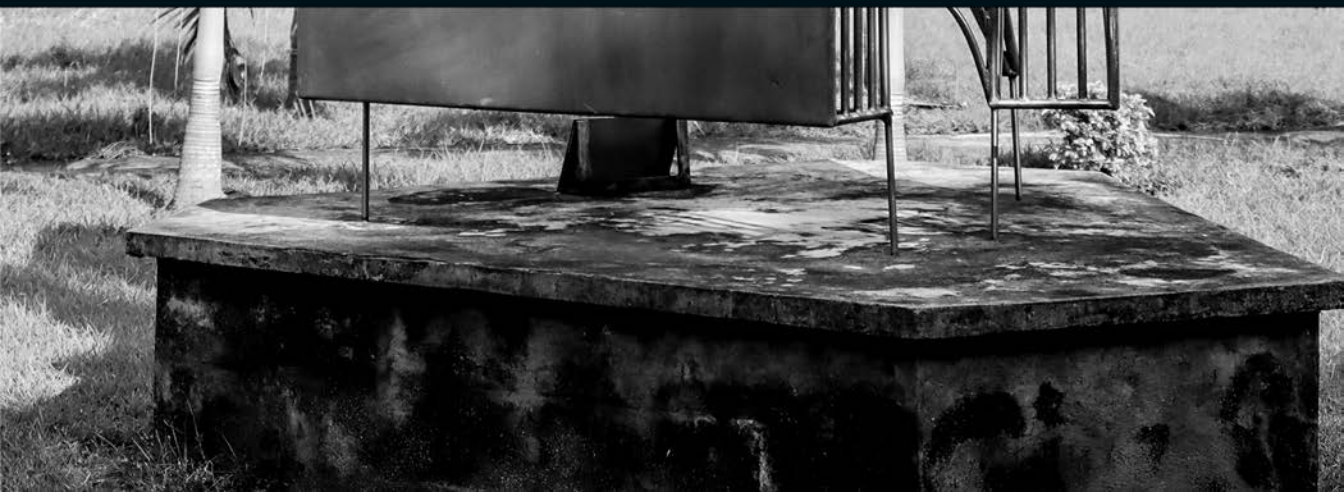




UWI

**MONA CAMPUS
JAMAICA WEST INDIES**





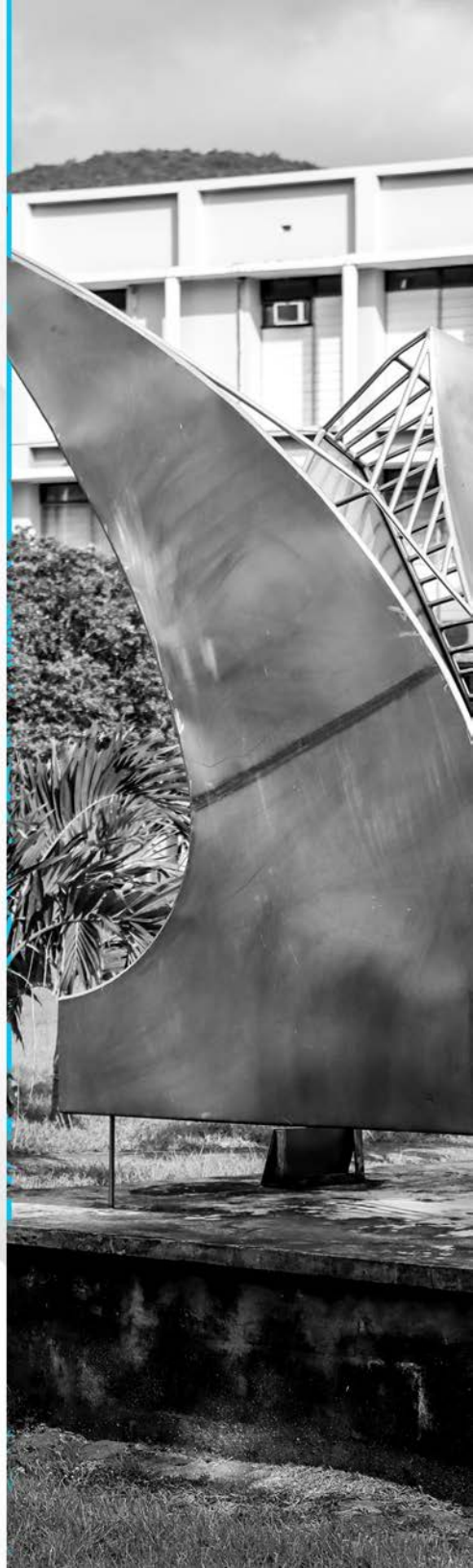
MONA

FACULTY OF ENGINEERING

Year Ending July 31st, 2021



Dr. Adrian Lawrence · Dean
Ph.D., P.E.



FACULTY OF ENGINEERING

WORK OF THE FACULTY

DEAN'S OVERVIEW

During the 2020-21 academic year, the Faculty of Engineering (FOE) continued to effect changes to the curricula of its programmes. These modifications are a part of an ongoing endeavour to improve course content, bringing them in alignment with recommendations from ABET, as well as, the teaching and learning objectives of the Faculty. Some course codes were also changed to eliminate confusion with the UWI, St Augustine courses. (See appendix 1). The FOE's intent to create a world class teaching and research facility; forging strong synergies with our industrial and commercial partners is still in focus. The Faculty of Engineering and the University on a whole, begun the new Academic year where it ended the previous year; in the throes of a global pandemic. In response, the decision was taken to deliver all course lectures online, and defer all laboratory exercises to Semester II and the Summer Term. While the pandemic has presented many challenges, several growth opportunities have materialized. The move to online course delivery has allowed us to extend the reach of Engineering at Mona. The pandemic also increased interest in the Faculty's programmes as a more feasible option for the 2020 graduating class of high school students, many of whom may have pursued their tertiary education overseas. Having gained their attention, on the Faculty Team, administrative, technical and support staff, has been showing them that the engineering education they receive at Mona is equivalent, and in fact superior, to that of most other institutions.

1.1. Student Number Statistics

The number of applicants for engineering experienced a slight decrease, in the enrolment for the Preliminary Engineering programme declining by 17, when compared to the 2019-2020 academic year. Civil Engineering registered the highest number of new students of all the degree programmes. Table 1 below shows a preliminary breakdown and variation in responses, as well as, the number of new students registered.

Table 1: Admission Numbers

Programme	RESPONSES				
	Acceptance	Deferred	Reject- ed	No Response	No. of Offers
Biomedical Engineering	32	4	26	13	75
Civil Engineering	74	4	26	24	128
Electrical Power Engineering	27	1	32	15	75
Electronics Engineering	31	1	30	7	69
Preliminary Engineering	100	17	83	107	307
Total	264	27	197	166	654

Registration Breakdown as at October 2020:

Preliminary Engineering:	38
Biomedical Engineering:	21
Civil Engineering:	48
Electrical Power Engineering:	16
Electronics Engineering:	19
Total New students:	142

Total number of students enrolled: 308 students were registered at the beginning of the academic year. A significant number were at risk of de-registration as a result of financial blocks. However, relief to the Civil Engineering cohort came in the form of a grant provided by the Caribbean Catastrophe Risk Insurance Facility (CCRIF), which allowed for the clearance of the outstanding balances of students with GPAs above 3.0.

1.2. Academic Partnerships : New Fortress Energy (NFE): The Faculty continues to benefit from NFE increasing partnerships in STEM outreach and creating sponsorships for teaching of a semester 2 course on LNG Technologies. The course, EPNG3012 Cryogenic

Engineering, introduces students to low-temperature engineering via the design and analysis of cryogenic systems. It includes the physics and engineering principals of cryogenic materials and fluids with emphasis on liquid natural gas technology, rectification system design, and instrumentation.

1.2. Carib Cement/Cemex Campus: Ten final year students from the Faculty of Engineering participated in the inaugural CEMEX Campus programme; a collaborative initiative between The University of the West Indies, Mona, the University of Technology Jamaica and Caribbean Cement Company Ltd. CEMEX Campus is a work exposure programme which was being delivered in Jamaica for the first time with the intended purpose of exposing students to cutting-edge research and development in the cement industry, state-of-the-art technology and the operations of a multi-national company. Leaders and technical experts of the Caribbean Cement Company and CEMEX operations delivered presentations on health and safety, lime operations and aggregates, cement technology, quality, sustainability, supply chain, social impact, sales, distribution, planning, and human resources management and provided coaching to the students over the duration of the programme.

1.3. Accreditation

Having received ABET accreditation for the BSc in Electronics Engineering, the Faculty is now preparing for the next visit of the ABET review team for reaccreditation of the BSc, Electronics Engineering programme in 2022. A series of workshops are also being held as we prepare for the visit to ensure conformity to the ABET requirements. The faculty is desirous of obtaining accreditation for our four remaining BSc programs; Civil, Electronics, Electrical Power and Biomedical Engineering, as we maintain our efforts towards continuous improvement and maintaining high standards in our academic offerings and delivery modalities.

1.4. Outreach Activities

The Next S.T.A.G.E. The Faculty of Engineering collaborated with the Mona Engineering Society to host a virtual event entitled "The Next S.T.A.G.E." (Scholarships, Transition and General Employment), on March 4, 2021. The aim was to heighten awareness, among current FOE students and prospective students, of scholarship and other funding opportunities available to them. There was also a focus to give students insights on what employers and scholarship application reviewers were looking for, to enable individuals to better package themselves for success in these endeavours. This event replaced our usual open day.

- **High Schools:** Representatives from the FOE collaborated with the Marketing, Recruitment and Communications Department to host a number of virtual information sessions with high schools and community colleges during the academic year. The virtual platform became our major marketing space for our programmes. We continued to pivot and adjust with the prolonged impact of the pandemic, as we make every effort to pursue new recruits and fully participate in the University's promotional and recruitment process.
- **Marketing Opportunities:** The Faculty of Engineering ran advertisements on Facebook, Instagram and Google.

1.5. Donations/Contributions

- **Engineering Bursaries:** The Faculty continues to assist needy students who meet the minimum eligibility requirements with an engineering bursary. The value of bursaries awarded range from J\$200,000 to J\$400,000. The recipients can be at any level of a programme, but must maintain a minimum GPA of 3.0 to continue receiving a bursary.
- **CCRIF Grant:** In November 2020, the Caribbean Catastrophe Risk Insurance Facility (CCRIF) provided a grant of US\$92,000, which allowed for the clearance of the outstanding balances of all final year Civil Engineering students who had GPAs above 3.0. This CCRIF Grant helped the Faculty in its mission of graduating competent well trained engineers who will go on to participate in the continued development and fulfilment of the region's sustainable infrastructural needs.
- **New Fortress Energy:** New Fortress Energy (NFE) continued its support of the Cryogenics Engineering course here at the FOE. The curriculum is fully funded by New Fortress Energy including all prescribed texts, lab equipment, simulation software tools and licenses. The additional support given in the current reporting period came in the form of ten (10) laptop computers and a summer internship programme at the company's LNG plants in St. Catherine, Clarendon, and Montego Bay.

1.6. Energy Management Unit (EMU)

The EMU within the Faculty of Engineering is committed to contributing to the restoration of the Mona Campus to financial health whilst successfully transitioning it into a green and environmentally smart campus.

- The EMU continues to make meaningful contributions in the areas such as strategic funding of the university, grantsmanship, and cost cutting initiatives, economic analysis of proposals. In addition, and central to its operations, the EMU continues to lead in the campus-wide management of energy and environmental policies and programmes, which

are important aspects of The UWI Triple A Strategic Plan.

- Secured the interest of the Petroleum Corporation of Jamaica (PCJ) for a multi-million-dollar contract to safely remove mercury from fluorescent lamps prior to disposal. The project has been significantly delayed, due to the pandemic, however, negotiations continue to determine the way forward.
- Collaborated with the Estate Management Department and developed a pricing mechanism for water utility that streamlined the cost recovery process, considering significant operational changes made to campus water supplier. The cost saving measures continues to benefit the University significantly.

1.9. Employee Engagement and Development

- The Faculty of Engineering hosted its annual Staff Retreat at the Faculty on July 23, 2021. The focus of the retreat was to look at our teaching and delivery systems, facilities, administrative system, and technical and support services. Measures to further improve our efficiencies and the finalization of the Faculty's strategic plan were discussed.
- Administrative and Technical Staff participated in training and development programs for capacity building during the academic year, such as, performance appraisal and setting objectives, estate and wealth management.

1.10 Graduate Research Degrees

- In Academic Year 2020/2021, there were six (6) graduate students enrolled in the Faculty of Engineering - three (3) students pursuing PhDs and three (3) enrolled in MPhil programs. The students' area of research span the fields of Biomedical, Civil Engineering, Electronics and Computer Engineering, and Transportation Engineering.
- Students attended a total of three (3) seminars for the 2020/2021 academic year. These presentations exposed graduate students to the varying research methodologies employed by Faculty, and were introduced in an effort to broaden the scope of knowledge exchange within the Faculty which was intended to enhance the quality of the research output of the Faculty. The Faculty of Engineering registered its first two (2) successful PhD graduates who will be among the UWI, Mona, post-graduate class of 2021. Both graduates are Academic staff of the Faculty.

1. PAPERS PRESENTED

- Hayles, J., Alli, K.S. (2021). A Convolutional Neural Network Based Robust Automated Real-Time Image Detection System for Personal Protective Equipment-Automation in Construction.
- Alli, K.S., Latchman, H.A. (2021). A Semi-definite Programming Method for Solving a Multiarea Bi-objective Economic Dispatch Problem. Abstract Accepted for the 2021 International Energy and Sustainability Conference, Farmingdale State College, State University of New York in collaboration with the University of the West Indies, Mona Campus, Kingston, Jamaica.
- Alli, K.S., Latchman, H.A., (2020). "Methods of Solving Multi-Area Economic Dispatch Problems- A Survey and Proposed Candidate SDP Approach" accepted January 2020", IConETech-2020 (June 1st - 5th) - International Conference on Emerging Trends in Engineering & Technology (IConETech-2020) at FOE, UWI St. Augustine Campus
- Falconer, L., March 12, 2021: Virtual Presentation at the IEEE SoutheastCon2021 Conference. Title: "Modelling the Effects of Hearing Aid Algorithms on Speech and Speaker Intelligibility as Perceived by Listeners with Simulated Sensorineural Hearing Impairment."
- Falconer, L. March 18, 2021: Presentation at Department of Chemistry (Faculty of Science and Technology, UWI) Colloquium. Topic: "Modelling the Effects of Hearing Aid Algorithms on Speech and Speaker Intelligibility as Perceived by Listeners with Simulated Sensorineural Hearing Impairment."
- Rakhee. March, 15-20, 2021. "Introduction to Deep Learning", UGC sponsored online short term course on "Machine Learning", UGC Human Resource Development Centre, JNTUH, India.
- Rakee. February 25, 2021. "Routing Protocols for Wireless Body Area Network using Soft Computing Approach", Faculty of Engineering, The University of West Indies, Mona Campus, Jamaica.
- Smellie, S., March 18, 2021. "Sustainable Energy Management for Climate Resilience at The UWI Mona". The International Energy and Sustainability Conference (IESC2021), Department of Electrical and Computer Engineering Technology, Renewable Energy and Sustainability Centre (RESC) at Farmingdale State College.
- Smellie, S., June 17, 2021 "CREEBC in a Snapshot: ASHRAE Compliance (A Virtual Town Hall)." CARICOM Regional Organization for Standards and Quality (CROSQ).
- Smellie, S. April 13, 2021. "Quality in Energy: Importance of Energy Code in the Build-

ing and Energy Sectors". Hosted by CARICOM Regional Organization for Standards and Quality (CROSQ).

- Smellie, S., September 10, 2021. "Energy Efficiency: A Vital Strategy for the Energy Transition Status, Potential and Opportunities in Africa and the Caribbean. Energy Innovation Network
- Thomas, O. March 2021. "Strategies for a National Campaign on eMobility" was presented at the International Energy & Sustainability Conference (IESC) 2021. (Principal Investigator and Supervisor of a Capstone Project done by final year Civil Engineering Students at Mona). The presentation received an award by the IESC Conference organizers and sponsors.

2. PUBLICATIONS

- Alli, K.S., Latchman, H.A. (2021). A Semi-definite Programming Method Weighted Sum Based for Solving a Multiarea Emission/Economic Dispatch Problem. International Journal of Electrical Power and Energy Systems, Elsevier. Ref: IJEPES_2020_1498
- Charlton, C.S.; Stephenson, T.S.; Taylor, M.A.; Douglas, C.A. Characterizing Bushfire Occurrences over Jamaica Using the MODIS C6 Fire Archive 2001–2019. Atmosphere 2021, 12, 390. <https://doi.org/10.3390/atmos12030390>
- Falconer, L., Coy, A., Barker, J. 2021. "Modelling the Effects of Hearing Aid Algorithms on Speech and Speaker Intelligibility as Perceived by Listeners with Simulated Sensorineural Hearing Impairment." In SouteastCon 2021, pp. 1-8. The Institute of Electrical and Electronics Engineers (IEEE). <https://ieeexplore.ieee.org/document/9401882>.
- Martin, H., Mohan, N., Ellis, L., and S. Dunne (2021). Explore the role of Knowledge, Attitude and correct Practice in the use of PPE on Construction Sites. ASCE Journal of Architectural Engineering.
- Grant, L., and Latchman, H., A Data Oriented Approach to the Problem of Power Grid Non-Technical Losses in Developing Countries, Proceedings of the 12th International, Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC), pp. 7-12, March, 2021
- Latchman, H.A., Aiken, P., Anderson, S., Bernard¹, R., and Gordon, R., A Hybrid Asynchronous-Synchronous Learning Network (HASLN) Flipped-Classroom Approach in Engineering Education, Proceedings of the 12th International, Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC), pp. 181-185, March, 2021

- Latchman, H.A., McNaughton, M.L., Anderson, S., Bridging the Digital Divide – Digital Literacy and Customized Open-source Solutions, Keynote Address, Proceedings of the 12th International, Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC), pp. 189-197, March, 2021
- Sanderson, D., Alli, K.S., Aiken, P. (2021) "An Integrated Cadmium Extraction System (ICES) effective reduction of cadmium in the soil for bench-scale and field study application", Case Studies in Chemical and Environmental Engineering 4 (2021) 100107. Published by Elsevier, Available at ScienceDirect: <https://doi.org/10.1016/j.cscee.2021.100107>

3. INCOME GENERATION

- Income for FOE: Preliminary reports from Commercial Operations showed the FOE generated revenue of J\$ 320,846,088.73 from tuition collected for the Preliminary Engineering programme and four BSc programmes for the 2020/2021 academic year.
- Expenditure: Expenditure for 2020-2021 totalled \$ 177,701,104.73.
- Surplus: Surplus for the 2020-2021 Academic Year totalled J\$ 143,144,984.00
- Energy Management Unit (EMU): With the delays experienced with major projects. Earnings from the EMU was significantly reduced, a small income of \$22, 889, was generated from commercial activities within the Unit.
- Mona-Tech Engineering Services (MTES): MTES is now in its sixth year of operations. In Academic Year 2020-2021, MTES provided the following services to the University:
 - Oversight for the management and maintenance services of the CoGen plant
 - Provide Air Conditioning maintenance and repair services to the Mona and WJC campuses. All split and window units are serviced at least twice per year creating an estimated energy savings of over \$30 million per year.

4. PUBLIC SERVICE

- Aiken, Paul
 - Senior Member, Institute of Electrical and Electronics Engineers (IEEE)
 - Member, Board of Directors, Petrojam Limited.
 - Member, Continuing Education Committee, Professional Engineers Registration Board

(PERB)

- Member, Engineering Accreditation Committee, University Council of Jamaica (UCJ).
- Ellis, Leighton
- Journal manuscript reviewer, ASCE Journal of Management in Engineering (2012 – present)
- Journal manuscript reviewer, ASCE Journal of Legal Affairs and Dispute Resolution in Engineering and Construction (2019 – present)
- Institution of Civil Engineers (ICE) Representative for Jamaica, the International Committee of ICE. Effective February 2, 2021 for a period of three (3) years
- Vice President for Caribbean Water and Wastewater Association (CWWA)
- Falconer, Lindon
- Member of the IEEE and the Acoustical Society of America.
- Examiner, Board of Examiners (Licensing of Electricians) Ministry Of Science, Technology, Energy and Mining (MSTEM).
- Lawrence, Adrian
- Peer reviewer, American Concrete Institute's (ACI) Journal.
- Reviewer for the American Concrete Institute's (ACI) Technical Activities Committee (TAC).
- Instructor, Professional Engineering (PE) License Exam, United States.
- Serves on the Jamaica Bureau of Standards' Building and Associated Materials Technical Committee
- McMorris, Nicolas
- Member, Board of Directors of the Professional Engineering Registration Board (PERB)
- Assistant Chief Examiner, CAPE for Building & Mechanical Drawing
- Rakhee
- Reviewer for International Conference on Computing Science, Communication and Security (COMS2 2020)", INDIA, 2020.

- Technical Committee member for International Conference on Computing Science, Communication and Security (COMS2 2020).
 - Editorial member for book titled, "Quantum Cryptography and the Future of CyberSecurity", IGI Global Publisher.
 - Technical Committee advisor for 2nd International Conference on Computing Science, Communication and Security (COMS2 2020). Research collaboration with Prof. Ramesh Rayudu, University of Wellington, New Zealand.
 - Reviewer for SPRINGER JOURNAL, Journal of Ambient Intelligence and Humanized Computing
- Rose, William
- Member, Excelsior High School Past Student Association Fund Raising Committee; raised funds and procured tablets for needy students to participate in online learning.
 - Member, Optimist club of Trench Town
 - Panelist, for the World Engineering Day for Sustainable Development, Future Forum, endorsed by UNESCO.
- Smellie, Stanley
- President of the Lions Club Mona: Lead, manage, plan and execute various service projects, including Sustainability, Vision, Hunger, Homelessness, Childhood Cancer, Diabetes, and service projects that serve our community specific needs.
 - Represented The UWI Regional University at, "82nd Special Meeting of the COTED (Energy)." 22 -23 September 2020 and 30 September 2020 via GoToMeeting.
 - Represented The UWI Regional University at "Technical Advisory Committee Meeting for The Technical Assistance Programme for Sustainable Energy in the Caribbean (TAPSEC)". 15 January 2020. CARICOM Secretariat.
- Smith, David
- Member Greater Caribbean Regional Engineering Accreditation System (GCREAS)
- Thomas, Omar
- Member, Jamaica Institution of Engineers (JIE)
 - Member, Professional Engineering Registration Board (PERB) Continuing Education Committee

- Member, Financial Committee, Karen Peart Foundation
- Member, American Society of Civil Engineers (ASCE) Infrastructure Systems Committee, Transportation & Development Institute (T&DI).
- Member, Planning Committee for "Charging Ahead: Jamaica's Advancement Towards Electric Vehicle Technologies" Forum. Thursday, June 24, 2021. Retained some of the speakers for the event and served as the YouTube Moderator for the online forum. This was a collaborative effort of the Faculty of Engineering and the Faculty of Science and Technology.

5. NATIONAL ENGAGEMENT AND OUTREACH

- Dr. Paul Aiken; Director of Mona-Tech Engineering Services, and his team, continues to provide biomedical repairs services to the University Hospital of the West Indies' (UHWI) on ventilators and patient monitoring systems, in response to the COVID-19 pandemic.
- Ms Christina Douglas Member, Climate Studies Group, Mona, current project: "State of the Jamaican Climate 2019"

6. STUDENTS

1.1 Professional Development & Internship:

The Faculty of Engineering, UWI Mona hosted its annual Work Readiness and Professional Development Programme, virtually, during the months of March and April 2021. The programme was undertaken in partnership with FOE Staff and a number of Mona Campus and external entities (see appendix 2). The programme consists of professional development seminar presentations in areas such as resume writing, interview techniques, mock interviews. Forty six final year students participated, the feedback from interviewers was positive. The programme allows the student to acquire a minimum of 200 hours of internship to gain experience in their field of study. However, internship opportunities have reduced significantly because of the pandemic. Flow Jamaica provided four (4) internships. The Discovery Bay Marine Lab Microgrid Project provided three (3) and Mona-Tech Engineering Services provided one (1).



Summer Internship Students at the New Fortress Energy LNG Plant in St Catherine

6.2 Student Clubs and Societies

Students of the Faculty of Engineering engaged in activities of the campus chapters for the following professional bodies mainly via virtual platforms:

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

The Mona Engineering Society (MES) also partnered with the Faculty for the Next S.T.A.G.E. virtual event.

6.3 Scholarships and Bursaries

- Scholarships:

The Ministry of Education, Youth and Information (MoEYI)

At the start of the 2020/2021 academic year, the records show that twenty-two (22) students of the Faculty of Engineering were recipients of the MOEYI – Maths, Science and Technical and Vocational Education and Training (MSTVET) Scholarship.

- Elaine Bryan Foundation (EBF):

Six (6) engineering students received laptops from the EBF, this was two (2) more than the previous year. The EBF also conducted informal mentorship session with Jamaican awardees on October 23, 2020. Students were given motivational tips and were made aware of the many job opportunities available in social media and information technology. The EBF is focused on providing support to students enrolled in Science, Technology, Engineering, Art and Mathematics (STEAM) programmes. The Faculty's partnership with the Elaine Bryan Foundation has been solidified with the founder Dr Elaine Bryan pledging continued support for the Mona Engineering students.

- New Fortress Energy:

This academic year New Fortress Energy awarded 10 scholarships of US\$5,000 each, and provided a stipend for one (1) student.

- HJ Fenton Memorial Scholarship:

One student was awarded the 2020/2021 HJ Fenton Memorial scholarship. The scholarship, which is issued every three years, will pay the student's full tuition, boarding and book grant.

Table 2. below shows a summary of bursaries disbursed per programme, total awarded and the percentage per program.

Table 2: Number of Bursaries Awarded

Engineering Programme	No. of Awardees	Amount credited	%age of Bursaries Awarded per Programme
Biomedical Engineering BSC M	7	2,200,000.00	18
Civil Engineering BSC M	15	4,636,896.00	38
Electrical Power Engn BSC M	6	1,900,000.00	15
Electronics Engineering BSC M	7	2,200,000.00	18
Preliminary Engineering	4	1,480,500.00	10
Grand Total	39	12,417,396.00	100%

•Students' Loan Bureau: In addition, the Government of Jamaica (GOJ) through the Students' Loan Bureau (SLB) continues to provide loans for our engineering students. The loan threshold remained at J\$1M for the 2020-21 academic year.

6.4 Graduation 2020

The UWI's Virtual Graduation Ceremony held on Thursday January 14, 2021 saw the Faculty of Engineering presenting thirty-eight (38) graduands towards the Class of 2020. A total of 11 first class honours were awarded, seven (7) from the Civil Engineering programme, three (3) from the Electronics Engineering programme and one (1) from the Electrical Power Engineering programme.

Appendix 1

FOE Work Readiness and Professional Development

Programme Partners

- Caribbean Climate Innovation Centre
 - Smith, Warner International
 - The Office of the Principal
 - FOE Academic Staff
 - Digicel Jamaica
 - Flow Jamaica
- Jamaica National Commercial Bank (JNCB)
- Environmental and Engineering Managers Ltd
 - CEAC Solutions Ltd
 - NHL Engineering
- Placement and Career Services UWI Mona
 - Human Resources UWI Mona
- Mona Entrepreneurial and Commercialization Centre