



DEPARTMENT OF COMPUTING

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– Head of Department

OVERVIEW

The Department of Computing (DoC) continues to offer multiple undergraduate and postgraduate programmes in Computer Science, Information Technology, Software Engineering and Data Science. We regularly revise our programmes to keep them in line with international curricula recommendations for Computing.

The DoC continues to contribute towards society, as various faculty members gave talks and participated in many workshops locally, regionally, and internationally. Between July 3–28, 2023, the DoC organized and hosted the second offering of a residential coding programme called JamCoders (<https://jamcoders.org.jm/>). This summer camp focused on algorithms and programming for 48 high school students drawn from 12 parishes of Jamaica. This programme was organized by the faculty from the Department of Computing at The UWI, Mona, members of the Caribbean Diaspora working at Google and The University of California – Berkeley, and the reggae artiste, Jamar McNaughton aka Chronixx, via his CHOR Foundation.

We run internship programmes in two formats, general and targeted. In the general category, our students work in various private and public companies in Jamaica. We run a targeted internship program with Jamaica’s National Commercial Bank (NCB). In the summer of 2022/23, we successfully completed training (virtually) the sixth cohort of the NCB-UWI Agile Laboratory Project with 15 students.

Our student numbers continue to grow, especially in the postgraduate and advanced undergraduate Computing courses. Numbers in the introductory, i.e., level 1, computing courses have rebounded to the numbers last seen in 2019/20, while those in the advanced courses remained stable across the 2020/21 to 2022/23 period. However, these numbers are roughly 15.5% up from our 2018/19 numbers.

The United States Bureau of Labor Statistics predicts that employment in computing and information technology occupations will grow much faster than the average for all occupations over the 2022–2032 period. Similar forecasts are not readily available

for Jamaica; however, we have observed great demand for computing interns and graduates. Our graduates from the undergraduate and graduate programmes are highly sought after and can easily find employment locally and internationally.

The Department continues to operate with very limited resources, both in terms of people and infrastructure; however, it manages to provide a quality education to our students. Both of these factors impose very tight constraints on further growth in the computing discipline at the Mona Campus. In the short term, the Department needs access to a computing lab that allows all of its first-year students to have at least one face-to-face lab session each week.

PROGRAMMES AND STUDENT NUMBERS

The department continues to offer undergraduate and postgraduate programmes as shown below.

Undergraduate

- BSc General
 - Computer Science major (CS)
 - Software Engineering major (SE)
- BA (Computer Science major)
- BSc Information Technology (IT) – Offered at both Mona and the Western Jamaica Campus
- BSc Software Engineering – Mobile Application Technologies – There was no new intake in the current year.

Graduate/Postgraduate

- MSc – Applied Data Science
- MSc – Computer Science
- MSc – Information Systems (Computer-Based Master's in Information Systems – CBMIS)
- Postgraduate Diploma in IT—No intake in the current year
- Postgraduate Diploma in Applied Data Science
- Postgraduate Certificate in Applied Data Science
- M.Phil. and PhD – Computer Science

The number of students registered in the various programmes in the 2022/23 academic year are displayed in Table 1. The data in Table 1 reflects the number of distinct students who register for courses at each level within the specified academic years.

Table 1. Students registered in the Department of Computing in the last five (5) years.

LEVEL	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023
Introductory (Year 1)	622	555	523	486	552
Advanced (Years 2 & 3)	432	443	497	500	499
PG. Cert. Applied Data Science	-	2	1	1	-
PG. Diploma Information Tech.	5	-	1	-	-
PG. Diploma Applied Data Science	-	-	2	1	1
M.Sc. Computer Science	27	22	29	35	34
M.Sc. CBMIS	76	68	57	74	62
M.Sc. Applied Data Science	-	8	21	26	42
M.Phil. Computer Science	9	10	7	7	5
Ph.D. Computer Science	6	5	5	5	3
Total Postgraduate Population	123	115	123	149	147

Our advanced level student numbers have been stable since 2020/21, but they are about 15.5% up from 2018/19. The trends suggest that we are at about the limit of our capacity for advanced courses. Our introductory level student numbers, on the other hand, reversed the decline seen since 2019/20, and have rebounded to very close to pre-pandemic values. Also of note, is the increase in the numbers in the M.Sc. Applied Data Science programme. The programme has been quite attractive to the corporate sector, and numbers have grown even with a 60% increase in fees since the programme's inception.

Table 2 shows our graduation numbers in various undergraduate majors and programmes. This year we graduated the third cohort of the BSc Software Engineering – Mobile Application Technologies. No research students completed their degrees in the 2022/23 academic year; however, there were seven (7) graduates each from the M.Sc. Computer Science and M.Sc. Applied Data Science programmes.

Table 2: Undergraduate Students Graduating Across Majors in 2022

Major	First Class M/F	Upper Second M/F	Lower Second M/F	Pass M/F	Total M/F
Computer Science (B.Sc.)	15/14	20/12	19/10	6/1	60/37
Computer Science (B.A.)	0/0	1/1	0/0	3/0	4/1

Computer Studies	0/0	1/0	0/0	0/0	1/0
Information Technology	0/2	8/2	3/5	4/2	15/11
Software Engineering	0/3	0/2	0/1	0/0	0/6
Software Engineering – Mobile Application Technologies	0/0	0/1	0/0	0/0	0/1
Total	15/19	30/18	22/16	13/3	80/56=136

ACCESS

Courses were delivered primarily face-to-face throughout the 2022/23 academic year; however, students at the Western Jamaica Campus had several courses delivered in the blended modality. Approval was sought and granted for the B.Sc. Information Technology programme to be delivered in the blended mode. The postgraduate programmes in Computer Science and Applied Data Science have permission to deliver courses in the blended modality. The Department also ensured that lab assistants were in place virtually and in person to assist with course work.

WORKSHOPS AND SEMINARS

- Dr. Ricardo Anderson presented “AI for a Positive Planet: Personalized Learning to Empower Positive Behaviour Change,” on September 28, 2022, at the third annual Artificial Intelligence for Information Accessibility conference.
- Dr. Claudine Allen participated in The Software Architecture Gathering, an International Software Architecture conference held online from November 14–17, 2022. Her presentation was entitled, “Clarifying Quality Requirements for Architectural Design.”
- Prof. Daniel Coore presented at an AI in Information Services: Implications, Applications and Added Value Workshop. The workshop was hosted by the Dept. of Library and Information Studies, UWI Mona and Go School of Information, Netherlands. Prof. Coore’s topic was “Anticipating the Impact of Large Language Models on Education.”
- Dr. Curtis Busby-Earle was the principal organiser for the first Global Security Perspective Online International Symposium held April 17–19, 2023. This was a collaboration with the University of Leeds, UK. Presentations were made on the general theme of security from academics from the Mona, St. Augustine and Five Islands campuses, in addition to others from Mexico, the UK, Kenya and South Africa. Dr. Busby-Earle also organised a two-day workshop on April 18

and 19, aimed at providing academics with the skills and tools to develop and formulate a research agenda. The virtual workshop was conducted by Professor Lisa-Dionne Morris from the University of Leeds.

- Prof. Gunjan Mansingh presented at the first Global Security Perspective Online International Symposium, April 17, 2023. The title of her talk was, “In the World of AI and Data, how secure are we?”
- Prof. Gunjan Mansingh participated in a panel on “The AI Revolution: Transforming the world as we know it”, Tech Talk Tuesday, JTDA – Jamaica Technology and Digital Alliance (formerly JCS), June 27, 2023.
- Dr. Sean Miller presented “AI Art and Large Language Models in Game Development” at the 2023 TechFusion Fest Conference on April 25, 2023. Dr. Miller explored the ground-breaking impact of image generators and large language models on the future of game development and the gaming industry.
- Mr. Anthony Drummonds presented a conference paper titled, “The Impact of Phishing on Smart City Development: Can Behavioural Economics Provide and Explanation?” at the Caribbean Sustainable Cities Conference 2022. Mr. Drummonds was also a member of the conference’s technical planning committee. The conference was held November 16–18, 2022. The aim was to reflect critically on the Caribbean’s attainment of Sustainable Development Goal 11: Sustainable Cities and Communities. Mr. Drummonds also hosted a special student workshop titled, “Surviving and Conquering the Digital Space.” Students from schools across Jamaica participated.
- Mr. Anthony Drummonds and Dr. Ilenius Ildephonc (UWI, Five Islands) organized a virtual Cybersecurity Workshop on October 27, 2022, entitled, “Cyber-Care, Cyber-Aware.” The workshop had international and regional presenters. Students from Mona, WJC and Five Islands campuses engaged in various cybersecurity challenges to raise their awareness. The workshop had the following presentations on the various aspects of cybersecurity.
 - Dr. Lavanya Elluri, Texas A&M University, Central Texas (TAMUCT), “Automating Regulations for Data Security on the Cloud.”
 - Dr. Sean T. Miller, Lecturer, Department of Computing, UWI, Mona, “Bots and Botnet Detection.”
 - Mr. James Clavin, CTO of Hilltop Institute, “Integrating Blockchain with Knowledge Graphs for Securing Health Data Exchange.”
 - Mr. Anthony Drummonds, Instructor, Department of Computing, UWI, Mona, “Phishing Attacks in the Caribbean.”
- Dr. Gunjan Mansingh was a panellist on Attracting and Retaining Top Talent at the Jamaica Technology and Digital Alliance Annual Conference. The theme of the conference, held November 17–18, 2022, was Creating a Sustainable Digital Future.

- Prof. Daniel Coore was the invited guest speaker at the Code Jamaica Awards for achievement in the Bebras, Kangaroo Math and Oxford University Coding Challenge competitions. This was an event hosted by Halls of Learning, celebrating Jamaican primary and secondary school students who had consistently reached the finals of these 3 international mathematics and coding competitions. The awards ceremony was held on November 22, 2022.
- Dr. A. G. Hamilton-Taylor presented a special screening of his 3D documentary, “An Ethiopian Journey in 3D: Exploring Ancient Ethiopian Heritage Virtuality” at the Ethiopian Orthodox Tewahedo Church in Kingston on October 16, 2022. This was for the visit of H. I. H. Prince Ermias Sahle-Selassie, President of the Crown Council of Ethiopia.

OUTREACH/IN-REACH ACTIVITIES

- Dr. Philippa Bennett attended the Girls in ICT Day held at the AC Marriott Hotel on April 27, 2023. On the same day, Prof. Gunjan Mansingh, in supporting women in tech, participated in the CARICOM girls in ICT and RSC International Celebration of Girls in ICT Day. The theme was ‘Girls in ICT and the boys who support them.’ Prof. Mansingh spoke about creativity with artificial intelligence. Prof. Mansingh also participated in the Global Services Sector (GSS) Gender Conference and Workshop held at the Pegasus Hotel Kingston on March 31, 2023. She was a panellist for a session titled “Imagining a future of gender equality in Jamaica’s GSS.”
- Dr. Hamilton-Taylor presented on the activities of the WAVE Lab as a panellist on the webinar convened by the CARICOM Digital Skills Task Force and UNESCO on March 2, 2023. The theme was: “Education: Unlocking the Potential of Every Mind.”
- The Department was also represented at the career day event at the SOS Children’s Village on May 19, 2023. Dr. Sean Miller allowed the children to witness how artificial intelligence can interpret human language to generate images, providing them hands-on experience with cutting-edge technology.
- ChatGPT has been topical, and the Department of Computing contributed to the discussion. On March 23, 2023, the Department participated in a panel discussion hosted by Science for Today on the topic, “ChatGPT and Education: Threat or Opportunity?” Prof. Daniel Coore moderated the panel, while Dr. Sean Miller and Mr. Matthew Stone, graduate student, were panellists. Prof. Coore and Mr. Stone also participated in a discussion on ChatGPT on CVM TV on March 24, 2023. Dr. Paul Gaynor shared his views at the Science Festival on March 31, 2023, in a talk titled “Chat bout, like ChatGPT.”

- The Department of Computing collaborated with First Tech Challenge (FTC) Jamaica as a sponsor for the first Lego League. This was held at the Assembly Hall on Saturday, May 27, 2023. This program is part of the work done by FTC Jamaica and included raising funds to equip schools with Lego kits, coordinating local and international volunteers to conduct workshops with teachers and students. The goal is for students to learn to build and program their own robots. Dr. Ricardo Anderson, Planning Committee Chairperson and the Tournament Director for FTC Jamaica, was responsible for the Department's engagement in this event.
- July 18–20, 2023, Dr. Busby Earle delivered a masterclass to staff of Mayberry investment Limited on the types of malicious cybersecurity activities and related risks. He looked at the possible implications of these activities and made recommendations for mitigating the effects of such activities. This masterclass, titled *The Growing Importance of Cybersecurity: Understanding Your Role in Protecting Mayberry*, was in response to a cyberattack on Mayberry's systems.
- Three students were trained by Dr. Claudine Allen and a member of the International Software Architecture Quality Board (iSAQB). The students were trained free of charge under the partnership agreement between the University of the West Indies, Mona and iSAQB. Under this program, the University is featured on the academic partnership website of the iSAQB and gained access to a network of professionals as well as training materials for software architecture. Additionally, the University can use their accredited CPSA-F training content to train our full-time students. Dr. Allen initiated this partnership as an accredited CPSA-F trainer.
- Prof. Daniel Coore was invited to participate in a consultative meeting on October 3, 2022, at the Development Bank of Jamaica (DBJ) with its prospective partnering institutions for rolling out an upcoming program to support funding patent applications in foreign jurisdictions.
- Prof. Daniel Coore presented on the IP licensing experience of the Cardiac Surgery Simulator at MORI webinar on October 13, 2022.
- Prof. Daniel Coore was an internal assessor for the quality assurance review of the computing programs at the Five Islands Campus. The assessment took place October 19–20, 2022.
- Prof. Gunjan Mansingh was an internal assessor for the quality assurance review of the Department of Computing and Information Technology, St. Augustine Campus, October 17–21, 2022.
- Prof. Daniel Coore gave a presentation entitled, "Improving the Efficiency of Intellectual Property Negotiations at the UWI" at the strategic planning meeting on September 22, 2022, for heads of centres. This presentation elaborated on a paper he co-authored for deliberation at a meeting of the BGSR earlier in 2022.

- Prof. Gunjan Mansingh, in her role as vice president for innovation and education for Jamaica Technology and Digital Alliance (JTDA), collaborated with Universal Service Fund (USF) to launch tech clubs in high schools. She was invited to speak at their launch event held on September 30, 2022, at the Medalion Hall Hotel, an event attended by school principals and teachers from 28 selected schools.

PROFESSIONAL ACTIVITIES AND BOARD MEMBERSHIPS

- Prof. Gunjan Mansingh was awarded a certificate of recognition from Jamaica Technology and Digital Alliance (JTDA) on March 30, 2023, for invaluable contribution to the Information Technology (IT) Sector.
- Prof. Daniel Coore served on the following external boards and committees: e-learning Board of Directors, Jamaica National General Insurance (JNGI) Board of Directors, Mona Geoinformatics Board, and the University Council of Jamaica (UCJ) Computing Standards Committee as Chair.
- Prof. Daniel Coore served on the following University/Faculty boards and committees: Faculty working group for establishment of the Caribbean Centre for Research in Bioscience (CCRIB), FST Entrepreneurial Faculty Committee as Chair, and Mona Entrepreneurial Campus Committee as Chair.
- Prof. Gunjan Mansingh served on the following external boards: eGov Jamaica Ltd. as Chair, Jamaica National Financial Group Ltd. as Director, Jamaica Digital and Technology Alliance (JDTA, formerly Jamaica Computer Society) as Vice President – Innovation and Education, National ICT Advisory Council (NICTAC) of the Ministry of Science, Energy, and Technology as Deputy Chair. NICTAC was converted into the Digital Transformation Advisory Council (D-TAC). Prof. Mansingh was named to the Board of D-TAC as a member with effect from July 31, 2023.
- Dr. Daniel Fokum served on the UCJ Board.

PARTNERSHIPS

- The University of the West Indies, Mona is now a partner of the International Software Architecture Quality Board (iSAQB). Under this program, the University is featured on the Academic Partnership website of the iSAQB and gains access to a network of professionals as well as training material for use in software architecture training at the University of the West Indies, Mona. In addition, the University is permitted to offer CPSA-F training (not for profit) using their accredited training content to our full-time students. There are several other benefits outlined on the iSAQB website. Dr. Claudine Allen initiated this partnership, and she is an accredited CPSA-F trainer.

- Dr. Busby-Earle was invited to the University of Leeds, School of Mechanical Engineering in the Faculty of Engineering and Physical Sciences in the UK as a visiting professor, March 12–13, 2023. The institution invited him to lead a series of cybersecurity orientation meetings to discuss future collaboration plans and to speak about his research areas of interest to academics, technical and professional services staff, and staff in the School of Mechanical Engineering.

JamCoders Summer Camp

- The second JamCoders camp was held in partnership with AddisCoder, Inc. from July 2–28, 2023. The organizers included Prof. Gunjan Mansingh (co-chair) and Dr. Daniel Fokum from the Department. The other UWI organizers included Mrs. Elecia Myers and Mrs. Terry-Ann Collins-Fray from the Faculty Office. Over 400 students in grades 9–11 representing all parishes of Jamaica applied for 50 places. Ultimately, 48 turned up for the camp. The lecturers for this year’s camp included Prof. Boaz Barak (Harvard University), Dr. Timnit Gebru (Distributed Artificial Intelligence Research Institute), Prof. Jelani Nelson (University of California – Berkeley), and Prof. Daniel Coore (UWI, Mona). The lecturers were assisted by 11 teaching assistants, including two UWI Mona students: Ms. Kerene Wright and Ms. Zaria Chen Shui. Overall, the camp was a success based on the positive comments received from the students following the camp. The camp organizers were also pleased with the organization of the camp. The organizers are in discussions to explore running the camp in 2024.

PUBLICATIONS

Book Chapters

- Ildephonc, I., **Allen, C.** (2022). An Ontological Model to Design the Specifications of Effective Educational Games. In: Kiili, K., Antti, K., de Rosa, F., Dindar, M., Kickmeier-Rust, M., Bellotti, F. (eds) Games and Learning Alliance. GALA 2022. Lecture Notes in Computer Science, vol 13647, p. 334–341. Springer, Cham. https://doi.org/10.1007/978-3-031-22124-8_35

Conference Proceedings

- Allen, C., Ildephonc, I. , “Communicability – a Software Quality Attribute Proposal,” SoutheastCon 2023, Orlando, Florida, USA, 2023, pp. 647–653, <https://doi.org/10.1109/SoutheastCon51012.2023.10115145>.

STUDENT MATTERS

Four undergraduate students from the Department of Computing received awards at the Faculty of Science and Technology Awards Ceremony on Thursday, April 6, 2023. Raheem Wilson received the Karl Robinson Award for the best final year computer science student through to the end of the first semester of 2022/23. The Ezra Mugisa Award for the best second-year software engineering student went to Brittany Morgan. The NCB Best Second-Year Information Technology Award went to Roberna Black, and the NCB Best Second-Year Computer Science Award went to Raheim Rampart.

ALIGNMENT

Academic

Attractive courses are offered to meet and develop the need of our current industry.

Internships

Numerous relationships have been formed with organizations to make the internship programme larger as the years progress. The recruitment process continues via Zoom with our local and international associates. In the 2022/23 academic year, 33 students participated in various internship activities. Fifteen (15) student interns were identified by the Department and vetted by NCB (National Commercial Bank) for The UWI-NCB Agile Lab. All 15 students from the NCB Agile Lab have received full-time offers with the bank.

A virtual meeting was held between Goldman Sachs and computing representatives from the UWI campuses in Mona, Cave Hill, and St. Augustine. The purpose of the meeting was to communicate the lessons that Goldman Sachs learned from last recruiting exercise. In 2021/22, Goldman Sachs did not hire any interns from the Mona Campus, and unfortunately, no one was hired from the Mona Campus in 2022/23.

Career Fair

The Department along with the UWI Mona Computing Society and UWI's Placement and Career Services hosted a face-to-face career fair on March 30, 2023, at the Assembly Hall. Ten (10) companies participated in the face-to-face event, namely, Vertis Technology, MC Systems, Norus, MSTECH Solutions, VM Express, Real Decoy, Particular Presence, Grid Dynamics, JAMPRO, and Star Apple Analytics. Three (3) other companies participated virtually: eGov Jamaica Ltd, Grace Kennedy Group and JNGI. The event was a huge success as 101 individuals registered for it and several students got interviews with the participating companies.

FST Science Festival

The Computing booth at the FST Science Festival held on March 31–April 1, 2023, featured several engaging games designed to challenge and entertain visitors. One game featured ChatGPT, a sophisticated chatbot, that users could interact with in order to determine if they were speaking with a human or a machine. Another popular game challenged visitors to write Python code to successfully land a spaceship, which proved to be a fun and engaging way to learn about coding. Finally, the Bing image generator game was a hit with visitors, who enjoyed the challenge of trying to generate an image that was similar to the one they were given. Overall, the Computing booth was a great success, showcasing the fun and exciting possibilities with computing.

AGILITY

The Department of Computing (DoC) continues expansion of internship programmes. There are now 12 companies participating in the internship programme.

This year, Prof. Daniel Coore taught the Analysis of Algorithms course virtually to students at the Five Islands Campus. The things developed during COVID-19 lockdown as well as the lessons learned from those course offerings allowed us to teach (and assess) effectively by distance.

Our postgraduate programmes, Summer School and the NCB-UWI Agile Lab project continue to be income generating for the department. In the 2022/23 academic year, the M.Sc. in Computer Science programme generated a surplus of \$6,918,443.81, while the Applied Data Science programme had a surplus of \$11,682,126.25. Summer School generated \$2,887,276.61 and the Consultancy fund's balance was \$3,671,949.97 at the end of the period.

CONCLUSION

The Department of Computing has made a worthwhile contribution to the University. It now serves the highest number of students across all academic units within the Faculty of Science & Technology. The Department's graduates are highly sought after by employers. The Department will need more human and space resources so that it can continue to provide students with a quality education in various computing disciplines. In the short term, the Department requires a computer lab that can seat at least 60 students. Longer term, the Department requires a new building to accommodate its students and staff. The Department also requires an academic establishment that enables it to better serve its student population without relying as much on adjunct staff.