

DEPARTMENT OF MATHEMATICS



Dr. Nagarani Ponakala, M.Sc, M.Phil & Ph.D (India)
Head of Department

As at August 2017, the teaching staff of the Department of Mathematics comprised of one Professor Emerita, three Senior Lecturers, six Lectures, and three Assistant Lectures which included Dr. Nordia Thomas who joined as full time Lecturer effective August 2018. Also the department has two tutors and several markers helping in carrying the full workload of the department. Dr. Nagarani Ponakala was appointed as Head of the Department from August 1, 2017, and Dr. Conall Kelly completed his term as Head and also resigned from UWI effective July 2017. Dr. Dmitry Malinin left office effective April 2018. Mr. Kirk Morgan was awarded his Ph.D. and graduated in November 2017. Dr. Diptiranjana Behera who was expected to join the department at the beginning of the academic did not arrive before May, 2018.

During the academic year, the Department underwent a **Quality Assurance Review** covering the period 2011-17. The review was conducted during October 23–27, 2017, by a team consisting of Prof. Desmond

Jhonston, Department of Mathematics, Heriot-Watt University, Scotland, Dr. Donna Commissiong, Senior Lecturer, Department of Mathematics, The University of the West Indies, St Augustine Campus, Trinidad & Tobago and Mr. Willard Brown, Executive Vice President & Actuary, Sagicor life Jamaica Limited. During this rigorous review process the team met different stakeholders, academic staff, administrative staff, students, administrators, members of the Industrial Advisory Committee of Department, to name a few, etc. and formulated a report. According to the report received, the department continued to maintain high quality of work, through its wide array of programmes offered, despite a reduction seen in its publications affected by the departure of active members of staff over the past few years. It was also reported as well that more publications should be seen from the Actuarial Science team. As part of the follow up, the department submitted an Action Plan to the Academic Board and is assiduously working to improve the shortcomings indicated by the Team.

Each year, the Department conducts several activities which include: Bridging Programme, Career Fair, Internship Programme and Mathematics Olympiad. The Department is also actively involved in Outreach, Research Day and club activities.

Bridging programme sets out to prepare students for the rigors of university level mathematics by reinforcing their basic mathematical skills and is currently coordinated by Mr Ajani Ausaru, with the support of highly-qualified tutors for delivery. For the academic year 2017–18, twenty three (23) students were registered for the programme, all of which are quite consistent in their attendance. The students appreciated the classes and showed keen interest. The program ran for 12 weeks.

The Department held its 5th Annual **Career fair** on Friday November 17, 2017, in Chemistry Lecture Theatre 6 (C6). A total of five (5) companies participated and a total of 42 registered students, of which 19 participated. The companies in attendance were: Victoria Mutual Building Society (VMBS), Bank of Nova Scotia, Sagicor Life Jamaica Limited, Financial Services Commission (FSC), and Jamaica National Commercial Bank (JNCB).

The Department of Mathematics has a formal **Internship Programme** done in the summer of each academic year. The programme placed suitable students with employers in various organizations within the corporate area but not limited to financial services, regulatory services and consulting services for the summer period. Launched on May 21, 2018 with an orientation seminar, the department received thirty one applications from which 27 students were placed.

Under the sponsorship of The University of the West Indies, Mona Campus, the Department of Mathematics organized **two National Mathematics Competitions** each year which is coordinated by Dr. Raymond McEachin. The **Jamaican Mathematical Olympiad** was opened to all high school students (Grades 7–11), while the **Junior Mathematical Olympiad** was open to students of the Upper primary level (Grades 4–6). For the ninth consecutive year, two members of the Department of Mathematics, Drs. Raymond McEachin and Samuel McDaniel, prepared and coached a team of high-school students for participation in the international mathematical competition. This year the students participated in the XX Mathematical Olympiad of Central America and the Caribbean, held in Havana, Cuba, from June 17–23. The Jamaican team performed well and one student received an Honourable Mention.

The Faculty **Research Day** Activities took place February 7–9, 2018. A poster was displayed in the tent by Mr. Ajani Ausaru on his work entitled “Dispersion of a solute in Casson Fluid under the influence of external body acceleration”. The Department also participated in other activities in conjunction with the Faculty to engage students of all ages in mathematics.

Dr. Kirk Morgan conducted a Mathematics clinic for students from several high schools at the Mona-Western Jamaica Campus. Many high schools participated in this event, while on October 31, 2017, the department also engaged a group consisting of Grade Six students and their teachers from Porous Primary School, who visited the department. From a Faculty combined activity, Dr. Morgan and Ms. Tashika Roach went to “National Minerals Week” hosted by Scientific Research Council,

November 23 & 24, 2017. Dr. McDaniel, Mr. Ausaru and Mr. Small participated in a paper-free CSEC Math workshop at the Overseas Examination Office to Externals. The Faculty **Outreach** team and members of the Department conducted outreach activities on January 16 & 17, 2018, held at the Mona-Western Jamaica Campus, inclusive of CAPE workshops and career counselling, to various high school students from that part of the island, which was well received. The same service was offered at the Mona Campus the following week, however the participation was poor. Dr. McDaniel, along with a few of his undergraduate students were invited to the Eltham High School February 15–16, 2018 to conduct CSEC workshops to their fifth form students.

Several members of staff and research students actively were involved in professional activities such as attending conferences, presenting papers, visiting institutes, publishing papers, reviewing articles for journals and also contributed to public service.

PROFESSIONAL ACTIVITIES

Published Journal Papers

- E. Braverman and **A. Rodkina**. Stabilisation of difference equations with noisy proportional feedback control, *Discrete and Continuous Dynamical Systems – Series B*, 22(6) (2017), 2067–2088.
- **A. Rodkina** and E. Rapoo. On almost sure asymptotic periodicity for scalar stochastic Difference equations, *Advances in Difference Equations*, 220 (2017) DOI 10.1186/s13662-017-1269-0.
- C. Kelly, **A. Rodkina** and E. M. Rapoo, Adaptive time stepping for pathwise stability and positivity of strongly discretised nonlinear stochastic differential equations. *Journal of Computational and Applied Mathematics*, 334 (2018) 39–57.
- **D. Malinin**, On the integral and globally irreducible representations of finite groups, *Journal of Algebra and its Applications*, 17(5) (2018) DOI 10.1142/S021949881850087.
- D. Batic, **K. Morgan**, M. Nowakowski and S. B. Medina, The Dirac

equation in the err-de Sitter metric, Gravitation and Cosmology 24 (3),(201) 224–244.

- D. Batic, **O. Forrest** and M Nowakowski, New indefinite integrals of Heun functions, Integral Transforms and Spec.al Functions, 29 (10) (2018) 794–804.

Institute Visits and Special talks

- **Dmitry Malinin:** visited Mathematical Steklov Institute, St. Petersburg, Russia during November 11–20, 2017 and presented a talk on the Tate-Shafarevich group, Integral representations of groups and some applications.
- 24 International Conference on Difference Equations and Applications, ICDEA2018, May 21–25, 2018, Dresden, Germany. Plenary Speaker: “Stability shaped by noise in Difference Equations”.

Seminars by visitors

Traffic Jams to Corruption: Mathematical Models of condensation by Professor Desmond Jhonston, Heriot-Watt University on 26th October, 2017.

MPhil Seminars

- Mr. Ricardo Baccas, On Cubic Difference Equations with Variable Coefficients, March 09, 2018.
- Mr. Omar Forrest, New integral identities for the Heun family of functions, April 13, 2018.
- Ajani Ausaru: Dispersion of a solute in Casson fluid flow under the influence of external body acceleration, May 11, 2018.

Special Seminars by research students

Mr. Omar Forrest, New integral identities for the Heun family of functions, March 21st, 2018, Khalifa University, Abu Dhabi, UAE.

- **Andre Small**,: “Peristaltic transport of an Ellis fluid in an inclined channel”, Department of Mathematics, November 24, 2017, Department of Mathematics, Mona, UWI Mona

CONFERENCES

Presentations

- **Yvette Johns**, attended Mona School of Business & Management, 3rd Annual Business and Management Conference “Learning, Knowing, Doing”, November 8–10, 2017, Montego Bay, Jamaica
Paper presented: “Illuminating Insolvency Risk – An empirical assessment of an emerging market”(Oral)
- **Ajani Ausaru, Nagarani Ponakala**: “Dispersion of solute in Casson fluid flow under the influence of external body acceleration”, 11th Faculty of Science and Technology Conference, Science for Society, F.I.T. (Foundation-Innovative-Transformational) for purpose, April 25–27, 2018. (Oral)
- **Andre Small, M. Narahari, P. Nagarani**: “Peristaltic transport of an Ellis fluid in an inclined channel”, 11th Faculty of Science and Technology Conference, Science for Society, F.I.T. (Foundation-Innovative-Transformational) for purpose, April 25-27, 2018. (Poster).

Participation

- **Richard Plummer**, attended the 3rd Biennial Jamaica Statistics Symposium, entitled “Statistics for Success: Ethics, Data Security and Quality, at the Knutsford Court Hotel and chaired the session: Case Studies & Hands-on Training Using Jupyter Notebook and R for Reproducible Research.
- **Ajani Ausaru**, attended the Conference “75 years of Mathematics in Mexico” at the Autonomous University of Mexico in Mexico City, December 1–7, 2017.
- **Kirk Morgan**, Critical Issues in Mathematics Education 2018:

Access to mathematics by opening doors for students currently excluded from mathematics, February 21–23, 2018 at Mathematical Sciences Research Institute (MSR), Berkeley, California.

- **Nagarani Ponakala** attended and Chaired a session: ICT & Modelling; 11th Faculty of Science and Technology conference, Science for Society, F.I.T. (Foundation-Innovative-Transformational) for purpose, April 25–27, 2018

PUBLIC SERVICE

Articles reviewed for Journals

During this year, **Alexandra Rodkina** reviewed articles for, *Journal of Computational and Applied Mathematics* and *Zentralblatt*, etc.. **Nagarani Ponakala** reviewed the articles for the journals, *Proceedings A* by Royal Society London, *Acta Mechanica*, *International Journal of Applied and Computational Mathematics*, *Indian Journal of Pure and Applied Mechanics*, *International Journal of Non-linear Mechanics* and *Journal of Applied Fluid Mechanics*, etc... **Dmitry Malinin** reviewed the articles for the journals, *Journal of Mathematical Sciences* (New York), *Journal of Algebra*, te J. “Algebra i Analiz”. **Diptiranjan Behera** reviewed articles for Neural Computing and Applications (Springer publisher), Communications in Nonlinear Science and Numerical Simulation (Elsevier publisher) and *International Journal of Fuzzy Systems* (Springer publisher) etc. Dr. Behera was awarded “certificate of reviewing” and “certificate of outstanding contribution in reviewing” for May and June, 2018 respectively by the *Communications in Nonlinear Science and Numerical Simulation Journal* published by Elsevier.

STUDENTS

The department has graduated an average of 73.8 B.Sc. students per year with a major or minor in Mathematics; Majors in Mathematics and Economics, Actuarial Science, Mathematics with Education Studies, Mathematics & Modelling Processes, along with our two new Majors: Statistical Science, and Mathematics of Finance.

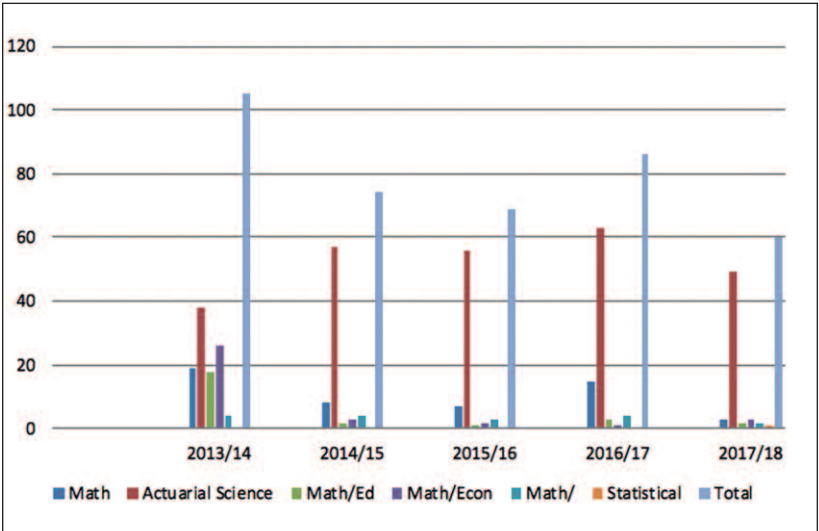
In November 2017, a total of 62 students graduated of which 12 received First Class Honours.

INFORMATION ON STUDENTS

A breakdown by programme is provided in the following table:

Year	Math	Actuarial Sci.	Math/ Ed	Math/ Econ	Math/ Modelling	Total
2013/14	19	38	18	26	4	105
2014/15	8	57	2	3	4	74
2015/16	7	56	1	2	3	69
2016/17	15	63	3	1	4	86
2017/18	3	49	2	3	1	60

A breakdown of the number of graduates by programme is provided below:



For the year 2017/18 a total of *1018* students registered for courses in the department. Within the Faculty there is a significant demand for Level I Math courses as they are core courses for most, if not all, degree programmes.

Activities conducted/participated by UWI Actuarial Society

- Talk by Nikhil Asnani, Actuary, Guardian Life, “The Journey to being an Actuary”.
- Spirit Week (incl Sports Day & Math Decathlon)
- Talk by Tanya Francis, Office of Placements, “The World of Work – Preparing for the Interview and Building Your resume”.
- Participated in the FST Wealth Symposium

SUMMER SCHOOL

The department offered 28 courses for summer 2018. Some of these courses, mainly third year, were offered as Exams Only to facilitate students who wished to graduate at the end of the year.

GRADUATE PROGRAMMES

MSc ERM

The ERM Programme in collaboration with Mona School of Business & Management now has 13 registered students for (cohort 6) and has seen a little more for the previous years. Cohort 5 has excelled and many are expected to graduate in the upcoming ceremony.

MSc Mathematics

As this programme is offered alternate years, no new cohort was admitted. Three students asked for leave of absence and two students will be continuing for year 2.

MPhil and PhD

For the academic year 2017/18, 7 students registered for the MPhil and 2 for the PhD programmes.

Kirk Morgan successfully defended his PhD on October 27, 2017 and graduated November 3, 2017. We had one new intake for the PhD programme, Mr. Andre Small which in included above. Mr. Sheagan John graduated with an MPhil degree on November 3, 2017, while Mr. Barnes was awarded his degree in January 2018. He is expected to graduate in November of this year. Two students graduated with MSc Mathematics degree with one receiving a distinction. **Omar Forrest** visited Khalifa University, Abu Dhabi, UAE for the month of March to work with the external supervisor Dr. Davide Batic, The visit was funded by the Office of Graduate Studies and Research from R& P funds, UWI, Mona. He had given a special talk at Khalifa University.