



## DEPARTMENT OF MATHEMATICS

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

### WORK OF THE DEPARTMENT

#### Staff Updates

**D**r. Mahesha Narayana joined the Department as a senior lecturer effective February 2019. Two administrative staff members, Mrs. Greta Everett – Senior Secretary and Ms Cassandra Brown Administrative Assistant were retired and Mrs. Kiwana Johnson-Robinson, Clerical Assistant had resigned effective November 2018. With the continuous recruitment process, the Senior Secretary position was filled effective June 2019 by Mrs. Marsha Jack and the other two are temporarily occupied by Ms. Tashika Roach and Ms. Kathlene Gardner, respectively.

#### Mathematics Bridging Programme

The Mathematics Bridging Programme has been a feature of the Mathematics Department since 2009. Over the past few years this programme (runs for 12 weeks in Semester I) has been coordinated by Mr Ajani Ausaru with support of highly qualified tutors, sets out to prepare students for the rigors of university level mathematics by reinforcing their basic mathematical skills. For the academic year 2018–19, a decline was seen, however, the participating students appreciated the classes and showed keen interest.

#### Annual Career fair

Our 6th Annual Career Fair was held on November 16, 2018, in the Assembly Hall. The Department of Mathematics Annual Career Fair is aimed at facilitating the engagement of the corporate sector in a mutually beneficial interaction with our students. The companies that were in attendance were: Victoria Mutual Building Society (VMBS), Bank of Nova Scotia (BNS), Sagikor Life Jamaica Limited (SLJ), Financial Services Commission (FSC), International Organization for Migration Kingston (IOM), Digicel Jamaica (DJ), Kryss Global (KG), Duggan Consulting

Limited (DCL), Bank of Jamaica (BOJ). Fifty-one (51) advanced students registered, however, only thirty-one (31) were in attendance. Mrs. Sharon Redwood, Career Banker, Scotia Bank Jamaica, was invited to give a talk to students entitled “Interview Dress for Success”, a week prior to the fair, which was well received.

### **Industry Advisory Board**

The Department held its first Industry Advisory Board meeting for this academic year on Friday, April 5, 2019 chaired by Mr. W. St. Elmo Whyte. It was well supported by Mathematics Faculty members, and included a Student Faculty Representative – Ms. Jo-Gianna Hall, the Dean of the Faculty – Professor Michael Taylor, as well as the Head of the Department of Economics – Dr. Nadine McCloud-Rose. Members from the Industry included: Ms. Camille Witter – Sagicor Bank; Mr. Dave Spiler – Concord Advice; Messrs. Geoffery Romans & Layne Aikinson – Total Rewards & Evaluations, Scotia Bank; Ms. Dayna Bishop – Grace Kennedy; Mr. Kirk Brown – Heart Trust and Ms. Angela Beckford – Financial Services. Dr. McCloud-Rose, in her final comments commended the Department for the excellent initiative taken.

### **Outreach Activities**

The Department of Mathematics has been active in organizing several outreach and internal activities throughout the year. The department organized a special orientation for Mathematics students in the second week of teaching. Mrs. Orinthia Fisher-Howe participated in an Information Session at Campion College, October 9, 2018, in which students were informed of the various programmes offered by the department. The Department participated in a faculty initiative to host sixth formers in workshops led by Mr. Omar Forrest, from which 5 schools participated. Our annual CAPE Workshop was held on January 11th and 17th 2019. Dr. Kirk Morgan led Mathematics clinic on January 25, 2018, at the Mona Western Jamaica Campus for high school students. The University’s Research Day Activities were led by Drs. Morgan and Behera February 6–8, 2019 with support from our undergraduate students.

The Mathematics Olympiad organised by the department had a successful run this year, and Dr. Raymond McEachin has been the coordinator of the programme since 2008. The participation by both the High and Junior schools increased this year. The competition had 4 rounds for both Junior and High School, including the qualifying round. The participated number of schools and the students were:

Round	Date	# Students	# Schools
Qualifying	November 30, 2018	1,736	49
First	March 9, 2019	727	45
Semifinal	March 20, 2019	419	42
Final	May 4, 2019	126	26

The Mathematics Olympiad Award Ceremony was held on Wednesday, June 12, 2019, in the Assembly Hall, UWI, where over 50 students from both High and Primary Schools from across the island were recognized. Four of the top students in the Mathematics Olympiad High School Competition were chosen to represent Jamaica at the International competition held in The Dominican Republic, June 14–22, 2019 from which two of the students won Honorable Mentions for producing perfect solutions to one of the six examination questions. This programme was supported by various sponsors such as The Office of the Principal, the Dean's Office, FST, The Caribbean Actuarial Association, The Grace Kennedy Foundation (through Professor Mona Webber), Insurance Association of Jamaica, Mr. Willard Brown, Actman International, Advanced Integrated Systems, Ms. Tamrah Brown, plus two others.

### Summer Internship Programme

The Department of Mathematics has a formal Summer Internship Programme which was piloted in the 2011/12 academic year. The programme placed suitable students with qualified employers in various institutions. 25 students were in attendance at the orientation exercise held May 20, 2019, where Ms. Monique French, (CFASJ representative) was the guest speaker. The department received 31 applications from which 21 students were placed. Companies who facilitated the students are: Financial Services Commission (FSC) (5); Port Authority (4); Grace Kennedy (4); Sagicor (2); Scotia Bank (1); Business Intelligence Holdings (BIH) (3); UWI MITS (2).

### Visitors

In keeping with the University's mandate for quality assurance, the department brought in the appointed External Examiner - Professor G. Serojamma to the island on October 9–15 to review several courses.

## PAPERS PRESENTED

### Invited Talks

- **Alexandra Rodkina** – “*Preserving Positivity in Solution of Stochastic Delay Difference Equations*”, Invited lecture at the International conference: Mathematics and Art, Aplimat 2019, BratiSLAVA in collaboration with DIBLÍK Josef and ŠMARDÁ Zdeněk, Feb 5–7, 2019.
- **Alexandra Rodkina** – “*Stability shaped by noise in difference equations*”, Department of Mathematics, Masaryk University Brno, February 25, 2019.
- **Alexandra Rodkina** – “*Stability shaped by noise in difference equations*”, Institute for Stochastics, Johannes Kepler University Linz, Austria, March 5, 2019.

- **Alexandra Rodkina**, “*Stability shaped by noise in difference equations*”, Johannes Kepler University, Linz, Austria, March 6, 2019
- **Alexandra Rodkina**, “*How the noise shapes the world*”, Department of Mathematics, Technical University Brno, March 15, 2019
- **Nagarani Ponakala**, “*Mathematical Modelling in Physiological Fluid Dynamics*” at the Faculty of Science and Technology, The University of the West Indies, St. Augustine, Trinidad, West Indies, September 19, 2019
- **Nagarani Ponakala**, “*Effect of wall movement on unsteady convective diffusion in Casson fluid flow in an annulus*” International Conference on Applications of Fluid Dynamics, December 13–15, 2018, Vellore Institute of Technology (VIT), Vellore, Tamilnadu, India
- **Nagarani Ponakala**: “*Peristaltic Transport of an Ellis Fluid in an Inclined Channel*”, International Symposium of Mathematical Modelling of nanofluid flows, VIT Amaravati, AndhraPradesh, India, December 17, 2018
- **Nagarani Ponakala**: “*Dispersion of a solute in Casson fluid flow under the influence of external body acceleration*”, 63rd Congress of Indian Society of Theoretical and Applied Mechanics (ISTAM) at Dayanand Sagar University, Bangalore, India during 20–23, December, 2018
- **Nagarani Ponakala**, “*Mathematical Modelling in Physiological Fluid Dynamics*”, Department of Mathematics, Indian Institute of Technology (IIT), Khargapur from January 3–7, 2019.

## CONFERENCE PRESENTATIONS

- Andre Small , M. Narahari and **Nagarani Ponakala** – “*Peristaltic Transport of an Ellis Fluid in an Inclined Channel*” The Caribbean Academy of Sciences, November 27–30, 2018.
- **Diptiranjana Behera** – “*Response Analysis of Fuzzy Fractionally Damped Mechanical Spring-Mass*” The Caribbean Academy of Sciences, November 27–30, 2018
- **Ajani Ausaru** and **Nagarani Ponakala** – “*Dispersion of a Solute in Casson Fluid Flow under the Influence of External Body Acceleration*” The Caribbean Academy of Sciences, November 27–30, 2018.
- **Kirk Morgan** attended a conference entitled “An Introductory Workshop: Hamiltonian systems, from topology to applications through analysis”, August 20–24, 2018, Mathematical Sciences Research Institute, Berkeley, California
- **Ajani Ausaru** attended 63rd Congress of The Indian Society of Theoretical and Applied Mechanics in Bangalore, India, December 20–23, 2018.

### Department Seminars

- **Diptiranjana Behera** – “*Uncertainty analysis of imprecisely defined structures using fuzzy and interval based approach*” October 2018
- **G. Sarojamma** – “*Mathematical Modelling of Heat Transfer in a Jeffrey Nanofluid*”, October 12, 2018
- **Nordia Thomas** – Title of the Talk: “*Benchmark Rigging in Wholesale Capital Markets*” 15 March 15, 2019.

### Public Lecture

- **H. Hines, N. Thomas, B. Hay, N. Asnani**, FST – Science for Today, “Risk is Opportunity”, April 25, 2019.

## PUBLICATIONS

### Journal Papers

- E. Braverman and **A. Rodkina**, Stochastic control stabilizing unstable or chaotic maps, published on-line in *Journal of Difference Equations and Applications*, December 2018. DOI: 10.1080/10236198.2018.1561882
- Binil Thomas Sebastian and **P. Nagarani**, Convection-diffusion in unsteady non-Newtonian fluid flow in an annulus with wall absorption, *Korea-Australia Rheology Journal*, November 2018, Volume 30, Issue 4, pp 261–271.

### Book chapters

- Baccas R., Kelly C., **Rodkina A.** (2019) On Cubic Difference Equations with Variable Coefficients and Fading Stochastic Perturbations. In: Elaydi S., Pötzsche C., Sasu A. (eds) *Difference Equations, Discrete Dynamical Systems and Applications*. ICDEA 2017. *Springer Proceedings in Mathematics & Statistics*, vol 287. Springer, Cham. Pp. 171–197. DOI: 10.1007/978-3-030-20016-9-6

### Conference proceedings

- DIBLÍK Josef (CZ), **RODKINA, Alexandra** (CZ), (JAM), ŠMARDÁ Zdeněk (CZ) Preserving positivity in solution of stochastic delay difference equations. Proceedings of APLIMAT 2019, Slovak University of Technology, Bratislava, February 2019, Pg. 233–242.

**INCOME GENERATION**

**Summer School**

The department offered 25 courses for summer 2018/19, many of which were mainly 3rd year courses that offered as exams only to facilitate students who were expected to graduate at the end of the school year. This year the earnings were marginal.

**PUBLIC SERVICE**

**Nagarani Ponakala**

- Served as an external examiner for a Ph.D thesis from St. Augustine Campus, Trinidad.
- Member of organizing committee of 21st general meeting and conference of Caribbean academy of Sciences, November 27–30, 2018.
- Reviewed articles for the journals: *International Journal of Computer Mathematics*, *International Journal of Applied and Computational Mathematics*.

**Diptiranjana Behera**

- Reviewed research papers for the journals; *Complex and Intelligent Systems Journal* (Springer), *International Journal of Fuzzy Systems* (IJFS) (Springer)
- Program committee member of 2019 International Conference on Quality, Reliability, Risk Maintenance, and Safety Engineering (QR2MSE 2019), August 6–9, 2019, Zhangjiajie, Hunan, China.
- Member of organizing committee of 21st general meeting and conference of Caribbean academy of Sciences, November 27–30, 2018.

**STUDENTS**

The department has graduated an average of 71 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.

For the past five years, a total of 375 students graduated from the department. This is broken down as follows:

2014	2015	2016	2017	2018
74	69	86	60	86

In November 2018, a total of 86 students graduated of which 10 received First Class Honours.

## Registration

For the year 2018/19 a total of 801 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. Registration based on Levels as shown in Figure 1 below:



**Figure 1:** Students Registration

## AWARDS AND RECOGNITIONS

- **Akeem Campbell, BSc. Actuarial Science** – *“The new Jamaica Flour Mills Foundation Scholarship – October 2018.*
- **Chevano Baker, BSc. Actuarial Science** – *“Jamaica Rhodes Scholar 2019” – Nov 2018.*
- **Kemari Ewen (Actuarial Student)** won the Songs of the UK in Jamaica competition in February of this year.
- Past Actuarial student **Nikhil Asnani, FSA FRM**, who is presently at Guardian Life Limited as Assistant Vice President (Actuarial) was the keynote speaker at the *Annual Faculty Awards Ceremony.*
- Recipients of the undergraduate Department awards for 2018–19, that were recognized at the Faculty award ceremony on 26th March 2019 are:  
 BASS, Xavier-Jon Mario Dyllon – Merville Campbell Prize (Level I)  
 HARRIS, Aston Emanuel – Department of Mathematics Prize (Level I)  
 KENNEDY, Morgan Brittany – Merville Campbell Prize (Level II)

NOTICE, Danielle Abigail – Henry-Aub Prize

POWELL, Kareem Maleke – Henry-Aub Prize

PRENDERGAST, Avaughn Dario – Merville Campbell Prize (Level II)

- Recipient of the MSc Bursary for outstanding academic work for 2018/19 academic year was Konor Peters.

### **Scholarships**

Two scholarships were established in 2018-19 for Actuarial students entitled “*JN Life Scholarship*”. These awards will be offered to two Actuarial Science students for 2019/2020. Additionally, a past student of the department Mr. Andrew Long has contributed a scholarship in his name entitled the “*Long Scholarship*” valued at US\$2,000 as well. Mr. Howard Hines, Director of Actuarial Science, was instrumental in both.

### **Club Activities**

The UWI Actuarial Society Club held their annual Dinner and Awards Ceremony on the 30th March 2019. There were presentations of awards for several categories such as, Top Year 1 performers, Top Year 2 performers, Top Year 3 performers, First Class Honours, Actuarial Exam Passes, Caribbean Actuarial Scholarships, club Involvement Awards, Active First Year Members, Mentors of the Year, Members of the Year.

### **Final year students meeting**

On April 17, 2019, the Department hosted a “*Final Year Students*” meeting where they were briefed on the requirements to matriculate for graduation. They also heard from Mr. Chevano Baker (2019 Rhode Scholar and former Actuarial Science student) who presented a talk entitled “*What to expect after Graduation*”. They were given opportunities to pose questions/comments that were relevant to improve the service given by the Department. The feedback received was positive.

## **GRADUATE PROGRAMMES**

### **MSc Enterprise Risk Management (ERM)**

The ERM Programme in collaboration with Mona School of Business & Management now has 9 registered students for (cohort 8) and has seen a little more for the previous years. The programme is now running smoother, as expected.



**MSc Mathematics**

As this programme is offered alternate years, a new cohort of 5 students was admitted. This year 1 student is expected to graduate with Distinction.

*MPhil and PhD*

For the academic year 2017/18, 7 students registered for the MPhil and PhD programmes as follows:

MPhil	6
PhD	1

During this year, three students Omar Forrest, Ricardo Baccas and Dominic Mills-Howell submitted their MPhil theses for examination.

**M.Phil Seminars**

- **Ricardo Baccas**, On cubic difference equations with variable coefficients and fading stochastic perturbations, September 28, 2018.
- **Omar Forrest**, Applications of the Lagrangian Method to Heun and Confluent Heun Equations, September 7, 2018.
- **Andre Small** – “Peristaltic Transport of an Ellis Fluid in an Inclined Channel” November 23, 2018.

**Conference Participation**

- Davide Batic, **Omar A. Forrest** and Marek Nowakowskic – “*Applications of the Lagrangian Method to Heun Function*” The Caribbean Academy of Sciences, November 27–30, 2018.