Message From the Editor

Dear Readers,

It seems it was just the other day, that the dean of the newly formed Faculty of Science and Technology (FST), Prof. Indar Ramnarine brainstormed the idea of a publication to educate, share and inform students, staff and the general public of the happenings in the FST. That was 2012 and the first copy of Eureka! thus came to life in 2014. Since then, it has been an annual publication. I had already written my editorial for the 2017 edition and we were all ready to go to press - only to totally scrap it and replace it with this at the last minute.

What could possibly have caused such a change of trajectory in my editorial normally celebrating the successes of science locally and abroad? The news that the founding Dean of FST was moving on to ‘greener’ pastures. I use the word ‘greener’ as a pun, because of his powerful passion for the environment and ensuring that we as a faculty would do our bit to make this world and the Caribbean a more environmentally friendly place (See Dean Ramnarine’s message in this issue).

So, such a moment as this is always bittersweet. We congratulate him and are proud that one of our own is now the Deputy Principal of the UWI, St Augustine campus. An honour indeed. However, for the greater good of the UWI - we in FST have lost our Dean prematurely. His vision for science and technology in the region, his enthusiasm, his rigour for perfection and settling for nothing but the best will be missed. In his five years at the helm, FST became a force to be reckoned with. Eureka! became a voice who we were, staff and students alike.

Thank you, Dean Ramnarine. We hope you will continue to watch over FST - always your first home and where a place always awaits you.

Dr. Shirin Haque
Editor

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FST - The Green Faculty
Prof. Indar Ramnarine

Since its inception, the FST has focused on being a green faculty. Apart from offering programmes in the environmental sciences, the FST has also initiated several important policies/practices. For example, we strongly discourage the use of plastic bottled water due to their negative environmental impacts and instead encourage the use of reusable bottles such as stainless steel and glass. We have invested in several water filling stations that provide filtered water via the reverse osmosis process. These water stations provide water of excellent quality and are strategically located around the faculty. We also discourage the use of styrofoam containers and instead promote the use of paper cups and paper food boxes. There is also collection and recycling of glass, plastic, paper, aluminium cans and cardboard.

We have attempted to cut down on electricity usage by encouraging changes in behaviour. By simply turning off office lights and air conditioners when we leave our offices can result in a 10% reduction in our electricity bills. Our new central air conditioners throttle down during the night, again reducing electricity consumption. Our taps in the bathrooms are spring type thereby saving water. We print only when we need to and double-sided/draft print is encouraged. All our e-waste is properly disposed of. Rainwater harvesting is under consideration and the FST will continue in its effort to be a green faculty. We encourage you to be part of this effort.

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On The Cover

The cover photo was taken by Dr. S. Haque in the Physics Department laboratories in the FST. It demonstrates a remarkable property of superconductors, the ability to be able to repel a magnet, known as the Meissner Effect. The apparatus is cooled with liquid nitrogen and when the temperature of the superconductor falls below its critical temperature, the magnet levitates.
Sustainable crop disease management using natural products

“Sustainable crop disease management using natural products”, co-authored by Prof. Jayaraj Jayaraman of Department of Life Sciences, focuses on crop disease management by using natural compounds derived from plants, marine organisms and microbes. Some alternative and ecologically friendly approaches for plant diseases control are also presented.

Chemical products though have been hitherto an important tool in the management of crop diseases, their use was not necessarily sustainable. There were several issues associated with constant use of chemicals including development of chemical resistance, residual toxicity, environmental pollution and long term health hazards, which all make imperative to look for more sustainable approaches. Alternative methods of disease control such as natural products and compounds derived from biological origins can help to minimize the use of chemical products, or even provide an effective alternative.

This book deals with the immediate concerns in the field of natural and alternative products for crop disease control. Presenting up-to-date information on natural products and compounds such as essential oils, industry by-products and compost, it thoroughly discusses their applicability, field use and prospects for adoption under different cropping conditions. Encompassing natural products from plant, marine and microbe origins, as well as other eco-friendly approaches, this book provides a complete resource on disease management strategies for researchers and students of plant pathology, crop disease management, crop protection, crop production and organic farming.

Deep Sea Project

FST’s very own scientist and deputy dean, Dr. Judith F. Gobin, senior lecturer from the Department of Life sciences, was aboard the exploration vessel “Nautilus” in 2013 and 2014 to study the deep waters in the Caribbean region. Eureka! covered this story in a previous issue in 2015. Her research unveiled some unique ecosystems unknown previously at a depth of over 2500 feet and specimens never before documented.

The story does not end here since in February 2017 it was announced that there was the launch of an educational outreach out of this exploration journey that Dr. Gobin had undertaken. In conjunction with NIHERST, there will be the production of educational videos and books depicting some of the fascinating adventures of Dr. Gobin into the deep blue Caribbean sea. FST’s flag flying high and deep!

Prof. Jaya awarded the Vice Chancellor’s Award for Outstanding Research accomplishments

Professor Jayaraj Jayaraman has made the faculty very proud as the recipient of the Vice Chancellor’s Award 2016 for Outstanding Research Accomplishments, and impactful contributions to the region. He joined the Department of Life Sciences (DLS) late in 2009 and since that time his research efforts have continued in both applied and basic sciences and in applying methodologies spanning the fields of plant-microbiology, biotechnology and human health. A strong advocate of sustainable farming, he is one of the pioneers in the world using bioelicitors for agriculture without chemical additives. Bioelicitors are molecules which can trigger defense mechanisms in plants and so decrease damage and bolster resistance to pests, diseases and environmental stresses. Professor Jayaraman’s work has impacted agricultural systems in the region and around the world, and the industries involved in the commercial production of bioelicitors have taken notice. His research group has attracted generous funding from NGOs as well as from the private sector in this field.

Together with his team, he is currently managing six externally-funded projects with a total outlay in excess of US$1M. He dreams big and he executes big – more submissions are pending which are in the vicinity of TT$27M.

He is currently supervising ten graduate students at MPhil or PhD level, two MSc students and one post-doctoral fellow. As part of his philosophy on the conduct of science, they have all already published some aspects of their work in peer-reviewed journals or have manuscripts in preparation. He has ninety-nine refereed research publications generated at a rate of 3.9 per year.

(Adapted from the citation for the Vice Chancellor’s Award 2016)

Dr. Judith Gobin examines undersea specimens
Professor Dave Chadee was known as the “The Mosquito Man” and was originally from Tableland, Trinidad. He always had a keen interest in academics and was a national scholarship winner in Literature from Naparima College (San Fernando), but his great interest was always in science. Apart from his PhD in Entomology from the University of Dundee, he attained other academic qualifications and scholarships such as the Wellcome Trust Scholar, a Gorgas Memorial Institute Fellow and numerous grants including two prestigious grants from: The International Atomic Energy Agency (IAEA) and The Bill and Melinda Gates Foundation.

Prof. Chadee’s passion for research always centred around Health, Epidemiology and more recently Climate Change- for which he was internationally recognised, especially for his work with the dengue, chikungunya and zika viruses. He published over 250 papers and book chapters. Prof. Chadee’s research resulted in him receiving many awards including the prestigious Anthony Sabga Caribbean Awards for Excellence in Science and Technology. One of the last was at the UWI-NGC Research Awards Ceremony on 8th June 2016, when he received the Most Outstanding Researcher award, this being the 3rd consecutive occasion at which he won this very prize! At that event, he won the Campus award for leading the Most Outstanding International Research Project. He was posthumously awarded the Chaconia Gold medal in August 2016 for his contribution to science.

Professor Chadee will also be remembered for his continued mentorship of various staff especially, early-career members and postgraduate and undergraduate students- both in Trinidad and abroad. This was achieved especially through his brainchild pet event, the Annual Department of Life Sciences Research Symposium which is now in its 7th year and due to its success has become a Faculty of Science and Technology, St. Augustine Campus- Symposium. The FST and the UWI lost a true icon and trailblazer in Prof. Dave Chadee.

A close colleague who considered him a mentor and friend, Dr. Judith Gobin reminisces “As both an FST colleague and a friend, I wish to thank Dave for some of his other virtues which have impacted some of our lives. He was: Professional- never willing to compromise his integrity and his ethics;
Humble- always cognizant of where he came from (Tableland), he was extremely proud of and thrived on his “country” upbringing;

Mentor- always willing to listen to, guide, assist and work with graduates, researchers, other academics and any other enthusiastic person;

Kind- always reaching out to others and he treated everyone with the same respect.

Apart from these fine qualities, Dave always enjoyed a good chat, a laugh especially over a cup of his office-brewed coffee. His favourite topics included: “stories of his Naps (Naparima College, his alma mater) days”, “stories from his Insect Vector days”, “his (and the West Indies) cricketing prowess (or lack thereof)”, the “Presbyterian church in Trinidad and Tobago” and more recently his “cocoa farming venture”!

I miss the coffee mornings at work with my friend and colleague but I am truly happy that our paths crossed. I and indeed others have learnt a lot from Dave, some of which continues to guide me to becoming not only a better scientist and academic but more importantly, a better person as well.”

Thank you Dave - From your FST family.

The UWI-NGC Principal’s Special Award for Outstanding Young Scholar is meant to “encourage early career talent” at the UWI and actively supports the next generation of high-value researchers. The major criteria for nomination for this Special Award are that the nominee “demonstrates highest level of research productivity and research quality” and “has extensive knowledge in a specific discipline”. Our very own Dr Michael Forde is the recipient of this award for 2016 much to his own surprise.

Dr. Michael Forde is a 33 year old Researcher and Lecturer in Chemistry, FST. He coordinates the Major in Industrial Chemistry and Industrial Internships in Chemistry for undergraduate students and currently supervises three post graduate students. He has published over twenty six (26) papers in peer reviewed journals in the field of Chemistry, particularly materials chemistry and catalysis. Many of these academic papers have featured in top tier journals such as Angewandte Chemie, Journal of the American Chemical Society, Journal of Catalysis, ACS Catalysis and ACS Nano.

He notes that, “Much of the work I’ve completed previously, particularly in the area of low temperature methane to methanol conversion, involved a number of other researchers working in truly collaborative mode. This is really the hallmark of my work as I solidly believe that collaboration leads to better science and quality is everything.”

His current research areas include bottom-up catalyst design, sustainable/renewable energy (green functionalisation of hydrocarbons and conversion of waste biomass to valuable fuels) and utilisation of waste materials in new applications.
Have no fear, the FST peers are here!

Nicole Burris

The Faculty of Science and Technology (FST) Peer Advisor’s programme which is in its fourth year continues to make strides in the FST fraternity. The programme is coordinated by the Deputy Dean of Student Matters in the Faculty of Science and Technology, Dr. Judith Gobin and Ms. Kereen Olivier, Secretary for Student Matters in the Dean’s Office. The Peer Advisors are committed to easing the burden of new and continuing undergraduates by acting as their voice to the administrative staff. Through shared experiences, Peer Advisors, are able to understand student needs, and therefore advise and direct them to the necessary resources or professionals for assistance. The group usually engages in the hosting of fund raising events, career seminars and assisting with student registration.

On November 10th, 2016, the FST Peer Advisors made history when they hosted their Christmas Village event at the FST undercroft. Described as the biggest event yet held by peer advisors, the ambience of the village was reminiscent of Christmas at the North Pole, with a Trini twist. The Christmas music and persons dressed in Christmas-themed outfits, helped to bring a sense of cheer in the hearts of many. One popular activity that was available for patrons to delve into was the Photo Booth, where persons took instant photos using awkward props such as huge funky sun glasses, Santa hats and colourful wigs among others. Available also was a Karaoke booth which was spear headed by Dr. Noel Kalicharan from the Department of Computer Science and Information Technology, and known as the “karaoke director.” Our very own Deputy Dean, Dr. Judith Gobin, sang lustily along to the lyrics of “California,” with a student at the karaoke booth. The other booths featured were the Henna Holiday where white mehndi was done, Lyrical Santa and the Christmas Galaxy booths which had fun games. Synonymous with Christmas festivities were confectionary delicacies true to the Christmas spirit.

The event was ultimately a phenomenal success. Not only was it able to generate funds, but it helped to foster comraderie among the students and administrative staff and more importantly to spread awareness of the FST peer advisors. The proceeds from the event were used to assist the ARI’s All Inclusive Learning Centre located in Curepe with school supplies, facilitate a Christmas gift distribution to the children at ARI’s and to donate to the FST Needy Student Fund.

The ARI’s All Inclusive Learning Centre is a school for students with reading and learning problems, autism and other educational delays. The Peer Advisors visited their school, armed with toys, educational learning material, treat bags, ice-cream and more. The action warmed the hearts of students, as the children danced and pranced in the classroom upon learning that they were to be given gifts from elves in yellow FST Polos. At the school, games such as “pin-the-nose-on-Rudolf” were played with the students who didn’t want their new friends to leave at the end of the day.

Semester one of Academic Year 2016/2017 was filled with various accomplishments, made possible by the efforts of the FST Peer Advisors and the staff who facilitate them behind the scenes. Their efforts have helped to bring cheer in the hearts of many and foster comraderie among students and staff in the FST while making students their top priority as we continue to build and highlight the FST Peer Advisors who are truly “students just helping students.”
The degree of variation exhibited by the human form is due to both inherent qualities; such as sex, ethnicity, age and any physical disabilities, and those changes influenced by the various lifestyle and demographic factors (Pheasant 1990). Anthropometry, the scientific study of these variations of the physical form, uses precise bodily measurements to define the physical characteristics of human beings. Measurements of physical anthropometry are referred to as anthropometric data, which encompass the categories of breaths, lengths, circumferences and skinfold measurements, inclusive of bone, muscle and adipose tissue.

Anthropometric data are a key component in several research and industrial fields as it continues to be the only source from which thorough and accurate knowledge of dimensions and physical characteristics of the human body can be attained. Hence, application of anthropometric data diversely extends to all fields that require knowledge of the sizing, topography and spatial requirements of the human body. The extent of the anthropometric variability in the ethnically diverse Trinidad and Tobago population is currently unknown. As Trinidad and Tobago has no current anthropometric database, this research can aid in determining which international anthropometric protocol may best suited to obtain the relevant anthropometric data, for that time when Trinidad and Tobago takes steps towards developing an anthropometric database.

To collect anthropometric data, one must first select an anthropometric protocol. These protocols are a standardized set of rules which guides the measurement process. Inconsistencies among international anthropometric protocols can make the comparison of data across surveys difficult and often futile. This variation among anthropometric protocols has yet to be analysed in depth.

This quantitative difference in anthropometric protocols led to the framework for this study conducted at the UWI Anthropometry Laboratory. The objective of the research was to establish if there exists a significant quantitative difference among three internationally used anthropometric protocols, namely ISAK, ISO and NHANES for similarly defined measurements by measuring Trinbagonian students of the University of the West Indies, St. Augustine Campus. Variations among anthropometric protocols involve posture and positioning of the subjects, variations in measurement definition, measurement site and the selection of equipment used to collect each set of measurements. These disparities can lead to measurable differences in collected data.

The significance of the analysis and comparison of data across protocols can be useful in determining if there is validity in comparing measurements across anthropometric surveys that utilize these different protocols. It can also enable future users to be aware of which protocol may be more beneficial to a specific need and the context in which the data is to be implemented.
In the category of the award for the most valuable employee in the FST (ATS staff), the award went to Ms. Kereen Olivier. She is the secretary for the portfolio of Student Matters in the Faculty. With the FST having the second largest number of students at the University, this is no easy portfolio. Ms. Olivier shows unstinting dedication to every student she interacts with and goes beyond the call of duty to assist them and engage them in a host of activities including assisting to coordinate the peer advisors and fund raisers for students in need and helping in the community with children with disabilities. As a former UWI graduate with an MSc in Development Statistics, she empathizes with the challenges the students face and does all she can to help them. As she puts it, “I believe that the students are the heart of this organization. They are the ones that will allow it to continue to grow in all aspects and we must be able to nurture their creativity, their desire for excellence and their academic minds.” She has certainly made a difference!

FST is proud of the caliber of its staff, who were the award winners for 2015/2016 who service
Category of “Top Researcher”, this was awarded to Dr. Arvind Kumar who is currently a Senior Lecturer in Inorganic Chemistry in the Department of Chemistry at the University of the West Indies, St. Augustine Campus. Dr. Kumar joined the Department of Chemistry in 2009 as Lecturer in Inorganic Chemistry. Dr. Kumar studied at the various universities in India and completed all his degrees. Before joining St Augustine Campus he was Robert A Welch postdoctoral fellow at Rice University, Houston, TX, USA and Academia Sinica Fellow at Academia Sinica, Taipei, Taiwan. He teaches various inorganic courses apart from being engaged in research. His research interests include the design and synthesis of compounds and materials for harvesting solar energy, conversion of CO2 to useful organic molecule and biomasses to energy efficient molecules as well as biomedical uses. He has published over 60 international journal articles and has over 800 citations. One student completed an M. Phil in chemistry under his supervision and currently pursuing Ph.D. from University of South Carolina. Recently, a co-supervised student submitted thesis for Ph. D. degree in chemistry. Dr. Kumar is certainly an inspiration to all his peers.

The third award category of “Most Outstanding Teacher”, was won by Dr. Noel Kalicharan from the Department of Computer Science and Information Technology. He is a Senior Lecturer in Computer Science at the University of the West Indies (UWI), St. Augustine, Trinidad. For more than forty years, he has taught programming courses to people at all levels, from children to senior citizens. He is always looking for innovative ways to teach logical thinking skills which go hand in hand with programming skills. His efforts resulted in two games —BrainStorm! and Not Just Luck—which won him the Prime Minister’s Award for Invention and Innovation in 2000 and 2002, respectively. He is the author of seventeen books on computer science, many of which are used for courses at several universities around the world. His tireless efforts in education earned him, in 2011, a National Award, the Public Service Medal of Merit (Gold), for his contribution to education. In 2012, he was given a life-time award for “Excellence in Education” by the Ministry of Education of Trinidad & Tobago.
Change for climate change. Trinidad & Tobago’s dependence on fossil fuels for economic viability has led to our continuing rank among the world’s top producers of carbon dioxide emissions per capita. This is a daunting position but all hope is not lost. This opportunity spells big business for investment in technology to utilize this waste material into high value products—do something good for the earth too.

In 2017, there is still climate change scepticism in major world governments but the data is hard to ignore. The year 2016 saw the warmest earth surface temperatures on record. This observation is consistent in independent analyses by NASA and the National Oceanic and Atmospheric Administration. 2016 is the third record year in a row.

There is little doubt among world scientists about a link between the amount of carbon dioxide in our atmosphere and rising temperatures across the globe. Carbon dioxide, one of several greenhouse gases is released through human activities such as deforestation and burning fossil fuels, as well as natural processes such as respiration and volcanic eruptions. Warming as greenhouse gases trap and warm the earth’s atmosphere has occurred since the beginning of time. However, increases in the atmospheric concentration of these gases have coincided with the beginning of the Industrial Revolution. Population explosion and industrialization have tripled the speed of these natural processes.

Significant financial resources are required to adapt to the adverse effects and reduce the impacts of climate change. Many low-carbon technologies are already commercially viable but mainstreaming their use is a challenge. These alternative technologies have to compete with mature technologies that are often subsidized and implemented in markets with underdeveloped infrastructure. Economies, especially those such as ours with large carbon footprints, could tap into new technologies to capture excess carbon dioxide released into the atmosphere and transform them into high value products such as methanol for fuel. This renewable fuel source would preserve our limited hydrocarbon resources and create real value from a waste pollutant.

Combining carbon from carbon dioxide and hydrogen from water to make hydrocarbons requires a lot of energy in complex reactions. Sunlight provides abundant free energy supplies to drive this process in nature. Through this process known as photosynthesis, plants use carbon dioxide and water to make carbohydrates—the fuel they need. There are some advances to transform carbon dioxide using genetically engineered bacteria, electrochemistry and high temperature reactions; but GEBS seeks to directly use sunlight to split water to obtain hydrogen and simultaneously convert carbon dioxide into valuable hydrocarbons.

Green Earth, Blue Sky (GEBS), the research project proposed by Dr Michael Forde of The UWI Department of Chemistry, seeks to develop novel catalytic material that enable revenue-generating approaches to sustainable carbon recycling. There is much room for research into catalytic material and reactor design. This project links The UWI to high-ranking research centres in the UK and involves collaborators from the University of Guyana. Success in this project means making hydrocarbons, i.e. fuels, right out of air and water—powered by sunlight.

The science is one issue, but exactly how the economic incentives for uptake of this technology will be ironed out is another big issue to explore. For example, emitters can transfer feedstock carbon dioxide to carbon recyclers for credit and/or tax breaks. Consideration must also be given to deter industries from unnecessary carbon dioxide waste for financial gain. A combination of approaches may be necessary to facilitate the transformation to sustainable energy systems.

Climate change presents big business opportunities to invest in research and technology that promotes energy efficiency. Investing in low carbon technologies makes good environmental and economic sense.
Thousands done, 
but thousands more to do...
Mike G. Rutherford

The UWI Zoology Museum (UWIZM) is home to an impressive diversity of animal specimens. Since 2010 staff have inputted thousands of specimen records into the museum’s electronic database; starting with the reptiles, amphibians, fish, birds, mammals and molluscs. However, in the last couple of years we have started to make inroads into the vast insect collections. With an estimated 60,000 pinned insects to catalogue there is a lot of work to do but with the help of additional staff (Fig. 1) the task is not so daunting. Since March 2015 Pauline Geerah has been working with us as part of the On-the-Job Training Programme (OJT) and has spent most of that time focusing on Lepidoptera (butterflies and moths). Amy Baksh started in August 2016 as an OJT for the Campus Museum Committee, for the first few months of her post she has been working in the Zoology Museum and has been cataloguing beetles. Avion Phillips started in November 2016 as an Associate Professional assigned to the UWIZM, she has also been working on beetles. All three have also been helping out with visitors to the museum and with events such as the annual Bioblitz. Here they tell more about their experiences working in the UWIZM:

**Meet the Beetles by Amy Baksh**

The Lepidoptera are the third largest insect order in the world and include those most popular of insects the butterflies, as well as the less popular moths! As a member of staff for the past two years at the UWIZM, my greatest responsibility has been cataloguing the museum’s Lepidoptera collections. The specimens belong to two groups; the UWI collection which was largely built up during the time of the Imperial College of Tropical Agriculture (ICTA) and the Centre for Agriculture Biosciences International (CABI) collection which was added to the UWIZM in 2012.

The UWI assortment comprises of roughly 4300 specimens, mostly collected by D.J. Stradling and T.W. Kirkpatrick in the late 1920s to early 1950s in St. Augustine. The oldest recorded speci- men was the moth *Natauda debella*, caught on 1st November, 1916 in Toco, Trinidad! Of the 8395 specimens in the CABI collection, approximately 95% were trapped and identified by M.J.W. Cock from the 1960s to 1980s. The majority of sampling was in the Arima Valley and around Curepe but there were also many collecting trips to less well known locations such as Gran Ravine and El Naranja, one of Trinidad’s higher peaks. Interesting finds range from wasp-mimicking moths to rare species of butterflies like the *Laertes Leafwing* (*Memphis laertes*) and the butterfly-moth family Hedyliidae. This family are neither butterflies nor moths but a combination of both. There were also many occurrences of sexual dimorphism whereby the males and females of a species look completely different such as the Grecian Shoemaker (Fig. 2). If each speci- men could tell a story, I am certain they would describe the collector’s many hours of labour and patience in the field; awaiting the right moment of capture, be it successful or not.

**The Afterlife of Bugs by Avion Phillips**

Beetles are the largest order of insects on the planet. Scarabs, which belong to the family Scarabaeidae, make up the largest and most widely dispersed family of beetles. The UWIZM has a collection of over 1,500 scarab beetles, some over 100 years old, from locations all over the world. These beetles were collected from as early as 1905 and as recently as 2016, with just over 100 beetles being collected in 1997 alone.

The genus Cyclocephala constitutes a large portion of the collection with 158 specimens present. Commonly known as June Beetles, these are small light brown beetles, sometimes with dark spots on the elytra, which you can usually find near to light bulbs in your home. The majority of these beetles were collected in Trinidad, but there are specimens from other countries such as St. Vincent, Argentina, Mexico, Peru, Colombia, Ecuador and even Sao Tome, a small island nation off the coast of West Africa.

Handling beetles big and small, most of which are older than myself is no easy task but it really gives one a unique perspective on the diversity of life. The scarab beetles in the UWIZM collection are but a tiny fraction of the actual diversity of this grand family of beetles and working with them has sparked my interest in them significantly. Within this family of beetles there is such a wide range of different colours, patterns and anatomical structures, such as horns, that one can never get bored. My favourites are perhaps the specimens of Rainbow Scarabs (Fig. 4) that were collected in Argentina in 1993 by Prof. C. Starr which are both colourful and have very prominent horns.

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**Scaly Wings and Pretty Things by Pauline Geerah**

The Insect Room itself can be used to plot the evolution of UWI as we know it today. Older specimens in the beetle collection alone date back to 1910, a full 14 years before the West Indies Agricultural College would become the Imperial College of Tropical Agriculture (ICTA). The families that I was tasked with cataloguing and photographing, Cerambycidae (Longhorn Beetles) and Chrysomelidae (Leaf Beetles), reflect the early focus on species useful to agricultural knowledge. With common names like “Cacao Beetle” and “Tobacco Flea Beetle”, insects collected in the first thirty or so years were mainly for supplementary research on the academic focal point of the time: locally grown crops like cocoa, coffee, tobacco and citrus. This was a vast range of small, dully-coloured, un-glamorous specimens, sometimes stored alongside clippings of leaves or bark which they might call home.

Once ICTA became UWI, the focus of the museum expanded exponentially. Insects were no longer the main pull for researchers and collectors (although the Insect Room still holds approximately 30,000 more specimens than the rest of the collection combined) and even within the cross-section of beetles I worked with, a difference was palpable. More ostentatious, colourful beetles joined the collection, like my personal favourite, the elaborately patterned “Target Beetle” (Fig. 3).

From tiny paper labels I was able to chart the adventures of collectors who travelled throughout Trinidad, the Caribbean and sometimes even further. But by the early 1990s, the slew of familiar names thinned to two collectors (Prof. Christopher Starr and the late Dr. Alan Hook) who, between them, contributed hundreds of Longhorns and Leaf Beetles. Apart from that, a handful of bugs from student projects seem to be the only new additions to the beetle collection. Even with a hundred years of research under our belt, there is still much work to be done on beetle diversity. Here’s hoping that some enthusiastic up-and-comers will take up the mantle and continue the story.
Crime outbreak, the spread of crime, plague of criminal activities, crime epidemic ... one might be tempted to think that we are describing an infectious disease. So why not use mathematical models describing the spread of an infectious disease to study the spread of certain types of crime and delinquent behaviour? Can these models then help us choose among the different suggestions put forward to help reduce crime? Modelling offers a means for assessing the effect of different intervention strategies but without the ethics and costs attached to experimenting on human beings. One issue of real practical concern locally, and for which mathematical modeling has much to offer, is in determining the optimal distribution of limited resources in reducing crime. These may include number of police, imprisonment rates, number of people treated by social programs etc. In one of our models for juvenile delinquency, effective control measures included limiting contact rate between delinquents and teenagers as well as increasing the proportion of delinquents treated in an intervention program.

Our ultimate goal is to understand the dynamics of certain type of crime and come up with strategies so as to mitigate the scourge of crime that is currently plaguing our nation. Models may also be used to generate estimates where data are sparse, examine possible “what if” scenarios and their creation leads to discussion and an improved insight into the phenomenon being studied. These insights may be especially helpful to those in authority who are charged with the responsibility of designing policies - often with a lack of available data.

(Donna Comissiong is a Senior Lecturer and Head of Department of Mathematics and Statistics at the UWI St Augustine. Joanna Sooknanan obtained a PhD in Mathematics from the University of the West Indies, and is currently an Assistant Professor at the Centre for Education Programmes, University of Trinidad and Tobago.)
Dr. Margaret Bernard shakes the hand of Vinton Cerf, a professor from Stanford University, widely recognized as one of the “fathers of the Internet”, is the co-designer of the TCP/IP protocol and the architect of the Internet. The occasion was the Awards ceremony of the Seed Alliance at the 2016 Internet Governance Forum in Guadalajara, Mexico. Dr. Bernard received the FRIDA award on behalf of her team for the multi-disciplinary AgriNeTT project. The award which recognizes digital innovation that furthers the development of Latin America and the Caribbean, is awarded by LACNIC, the region’s internet registry.

AgriNeTT is an e-agriculture project of the University of the West Indies that focuses on empowering the agriculture sector in the Caribbean through the use of ICT. AgriNeTT provides easy-to-use, ICT tools to the farming community and agricultural institutions to address some of the major problems and help drive economic growth of the agriculture sector and increase its competitiveness. The project aims to increase agricultural productivity and incomes of small-scale farmers, in particular women and youth and family farmers.

AgriNeTT has developed several mobile and web-based apps for farmers as well as two Open Data repositories (public online resources that collect up-to-date data on various aspects of agriculture, including topographical and soil layers). The current apps provide farmers with tools for farm financial management (AgriExpense), information on crop prices (AgriPrice), tools for automated diagnosis of plant pest and diseases (AgriDiagnose), and recommendations on which crops are most suited for the farm (AgriMaps), based on several parameters that profile the land. The apps receive data from the Open Data platforms or supply data to them and have back-end Data Analytic modules that mine the data for trends and provide agricultural information on a national level for policy makers. Collectively, AgriNeTT provides incredibly powerful tools for farmers and policy makers in the agriculture sector.

AgriNeTT project aligns very closely with the UN Sustainable Development Goals, in particular, SDG2, which aims for a world (by 2030) with zero hunger, food security and sustainable agriculture. In May 2016, AgriNeTT received international recognition as one of the ‘Champions’ (top 5) at World Summit on the Information Society WSIS 2016 in the e-agriculture category. The AgriNeTT apps are the first series of ICT applications dedicated to support the agricultural sector in the Caribbean. AgriNeTT has collaborated with several regional and international institutions, including CARDI/CTA, FAO, CABI, IICA. It also partnered with several local institutions including the Ministry of Food Production, NAMDEVCO, Agriculture Statistics Unit, Met office, Agriculture Development Bank, and Cocoa Research Unit. The team has forged regional collaborations with institutions in other Caribbean countries, including the Ministry of Agriculture in Jamaica.

The AgriNeTT project has brought together academia, public and private sector to develop systems that improve our collection and analysis of data that impacts Food security as well as to develop ICT applications that directly impact farm management and profitability. AgriNeTT uses ICT for development as a major pathway to improve the practices and competitiveness of the agriculture sector locally in Trinidad and Tobago and regionally in the Caribbean.

AgriNeTT: http://sta.uwi.edu/agrinett
When it comes to balancing studies and life...

To me, life as a student is a job. Therefore, I work a normal 8am-5pm shift, with overtime of up to five hours on certain days. When I’m not working, I spend time in the sports complex, running or in the gym, lifting weights. Very seldom would I be found out with friends liming or in a fete. Nature is more stimulating to me. So, a good time out would be a day spent at Maracas with friends or an early morning kayak with friends at Chagaramas. All work and no play will obviously make Jacqueline a dull girl. Striking a balance is important. There is no gain without pain. There has to be sacrifices. My sacrifices were sleepless nights and a very limited social life.

On running for a council position in the guild...

I have a personal passion for speaking. My twin and I would stutter very badly as infants and my mom, being an educator, knew how important it was that we not shy away from speaking even in the presence of criticism. So, at the very tender age of five, she would put my twin and I on any available platform to speak. At first, it was nerve wrenching and seemed like punishment, but then, it eventually became a passion.

Also, I wanted a greater opportunity to help other students. Although it is quite challenging to make severe changes that could impact the students positively within a reign of a mere 7 months in office, I am still not discouraged. Since I consider being a student a job, then networking in any ‘job’ is essential. Therefore, it was important to me that I learn more about this institution and the challenges faced from the perspectives of the students, staff, and other employees.

Career goals driven by personal challenges in life...

I plan to become a Forensic Toxicologist or a Genetic Toxicologist. These career goals were chosen based on my passion combined with the experiences of losing two siblings along my educational journey. In 2008, my brother was diagnosed with a pituitary brain tumor. He was hospitalized and was given an insulin shot by a nurse. Five days later, he succumbed to death. An autopsy wasn’t done due to the absence of a pathologist on island at the time, far less for a toxicology report. In addition, my sister died on the 29th of December 2016 after a yearlong battle against breast cancer. This experience led me to take a look at our environment at the toxins that surround us on a daily basis that may be carcinogenic.

Through difficulties to success...

Despite several personal challenges: financial challenges, the illness and death of a sibling, which required me to take a semester off from school, I kept pushing. There was a text in the Bible that always stood out to me: ‘As a man thinketh in his heart, so is he.’ It is important that you pay attention to the energy you emit; for what you release is what you will also attract. Regardless of the circumstances, instead of paying attention to the circumstance, pay attention to how you think; how you feel. Secondly, I learnt the secret of success and the secret is, perseverance. I love reading and sharing stories and this one motivated me to keep pushing even in the midst of challenges. A favourite inspiring story of mine comes from ‘Think and grow rich’ written by Napoleon Hill.

Words of advice to students entering FST:

I would like to let them know that University life is not like High school. You are responsible for your learning. Every single moment of idleness is a burden upon productivity. Your lecturers are not teachers. You are your own teacher. If you feel that the system has failed you, why is it that your colleague is excelling and you are failing? Go back to the drawing board. What is it that your colleague is doing that you are not? Most times, it is not that the education system has failed us but we may not have the right attitude to maneuver through the education system.

Favourite quote: "If you can't change it, change your attitude." Maya Angelou
Kyle and Vani de Freitas are both PhD students in the Department of Computer Science and Information Technology in FST who discovered that the University was not just the place where they found their passion for academia but found each other as well to become lifetime partners.

**How did you two meet?**

Kyle and Vani are both graduate students within the Department of Computing and Information Technology. However, it was in 2011 that through mutual friends they became acquainted with each other. Kyle’s motivations and persuasions captivated Vani’s heart. In 2013, through an elaborate plot involving his family, Kyle proposed following Disney’s “Wish upon a star” parade, she accepted his proposal and the coupled were married in 2014.

**Tell us a bit about your project and how you ended up there.**

Kyle: My Ph.D. focuses on forecasting final grades from information generated within learning environments. We are therefore trying to determine, at what point is the earliest we can make an acceptable prediction using historical data of students. We hope that through this research, we can develop interventions that will enable improvements for all students within our programmes. Outside of my Ph.D., I also do research with Dr. Margaret Bernard of Department of Computing and Information Technology and Dr Kim Mallalieu from the Faculty of Engineering, in ICT4Ag for farmer’s productivity and climate change resilience among fishers.

Vani: My Ph.D. research improves the process for designing games for learning mathematical content. During my MPhil in Computer Science, Dr. Mohan, the current head of department in Department of Computing and Information Technology, and I demonstrated empirically that games within mobile devices are effective. However, the process to develop the games was difficult. My research, therefore, bridges that gap so more students can receive the benefit of learning games if it is easier for instructors to design and develop.

**How do you manage to integrate your professional and personal life?**

The distinction is a greater challenge than integration because we enjoy our profession as researchers and educators. From teaching to mentoring students, from organizing internal, national and regional competitions to ICT workshops and short courses, from the DCIT Boot Camps to Trinidad and Tobago’s first Coder Dojo, from the DCIT’s Computing Forums to the Caribbean Open Data Conferences, we have seen the transformation and development of many students. Of course, there is a professional separation of the details of our research, but we share the challenges and development of many of the department related responsibilities which ultimately makes it more manageable and rewarding.

We were both tremendously blessed by the University and Faculty during our time as graduate students. However, in the context of the economic challenges, the need to complete our degrees is of utmost importance. Therefore, our highest priority personally and professional is the completion of our degrees.

We are one of the many couples who met on UWI. For us, the institution has done so much for us personally and academically that we are proud to have served and contribute our effort towards building the quality of our students and the image of our institution.
Currently pursuing MBBS at Mt. Hope, UWI after successfully completing Chemistry in the pre-science programme and being awarded “Best performance in Chemistry” prize in 2016.

Completed the pre-science programme in 2015/2016 and excited about starting the MBBS programme in 2017/2018 on having secured a place.

Was enrolled in the Pre-Science Programme in 2015/2016 studying Biology and Chemistry. She is now pursuing the B.Sc. Actuarial Science (Special) for the 2016/2017 academic year.

Completed the pre-science programme in 2015/2016 and looks forward to starting Electrical Engineering at UWI in 2017.

Completed the Pre-science Programme 2015-2016, and was accepted into the Faculty of Medical Sciences to pursue the M.B.B.S. programme to begin in September 2017.

Contact Information:

Address:  
Eureka!,  
Office of the Dean,  
Faculty of Science and Technology,  
The University of the West Indies,  
St. Augustine Campus,  
Trinidad and Tobago,  
West Indies.

Phone: +1 (868) 662-2002 Ext. 84478  
Website: sta.uwi.edu

Programmes offered at the Faculty of Science and Technology:

Pre-Science Programmes (N1):  
Mathematics, Biology, Chemistry, and Physics.

Undergraduate Programmes:  
Biology, Chemistry, Biochemistry, Chemistry and Management,  
Computer Science, Computer Science and Management, Information Technology, Biomedical Technology, Environmental Science,  
Environmental Science and Sustainable Technology, Mathematics / Actuarial Sciences / Statistics and Economics, Physics, Electronics.

Postgraduate Programmes:  
Diplomas, Masters of Science, Masters of Philosophy, and PhD in related programmes above.  
MSc in Renewable Energy Technology, MSc in Occupational and Environmental Safety and Health (OESH), MSc in Biodiversity Conservation, MSc in Biotechnology, MSc in Biomedical Physics.