



UWI MONA
RESEARCH FOR DEVELOPMENT
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One of the signal honours that I exercise as the academic and administrative leader of the UWI, Mona Campus is to introduce to you, through the medium of the Research for Development publications, a sample of the seminal research work that this Campus produces annually. This year is no exception.

As the theme of the publication and, indeed, the Research Days' activities indicate, the Campus encourages research projects that target economic and social development in our country and region. Our researchers demonstrate insight and understanding of the vulnerabilities faced by the region and are proactive and creative in exploring appropriate solutions. They are also strengthening local and international partnerships to support their research work.

Of course, our ultimate aim is for wide-scale policy adoption of, and social and economic transformation through, the research findings and recommendations. A few of the research areas that are profiled in this booklet - how our society treats its children; environmental, structural and policy interventions to address the spread of HIV/STI; the quintessential science and technology industries that are undersubscribed; methods to efficiently produce clean energy; and the analysis of Jamaica's high level of income inequality and poor economic performance in the past three decades - are impatient of policymakers' immediate attention.



There is no gainsaying that the university's research work needs to be significantly increased. This will only happen when you, the stakeholders in our national and regional development, collaborate and support academia in its execution. We are grateful to those public and private sector partners whose support enabled this ground-breaking research work and our exposure of it in these Research Days activities. We look forward to your continued support, and encourage more partners to come on board for our country and region's sustainable development.

Professor Archibald McDonald, OJ
Pro Vice-Chancellor and Principal



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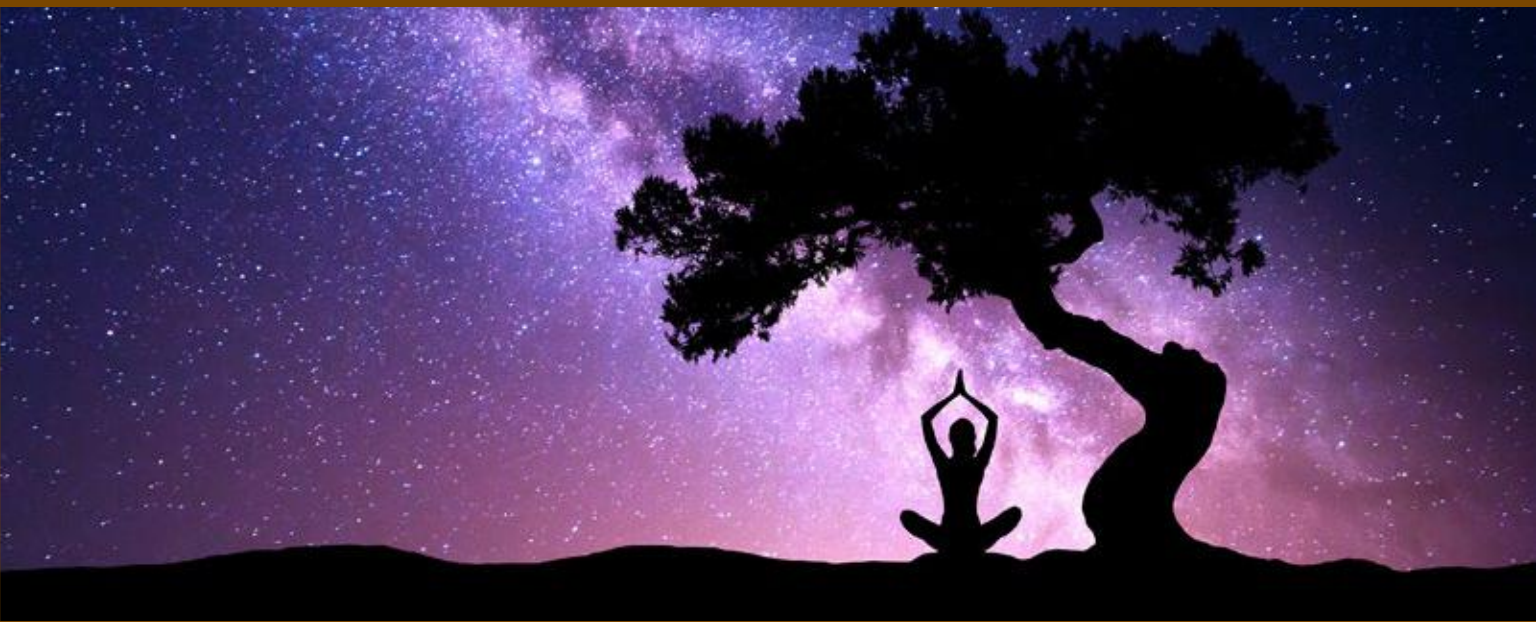
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FACULTY OF

HUMANITIES & EDUCATION



Making it Jamaican: Approaches and achievements in indigenous television programmes production in Jamaica

Dr Yvette J. Rowe Dr Livingston A. White

Caribbean School of Media and
Communication (CARIMAC)

Television emerged in Jamaica with the introduction of Jamaica Broadcasting Corporation's television service in 1963 - over fifty years ago during which much has changed in the world of television internationally and locally. It could be said that a new era has arrived in the production and consumption of local television in Jamaica. What have been the experience and the history of indigenous television programme-making in Jamaica? How has it developed and been affected by technology and the move from the public broadcasting to commercial market. How did this affect what television in the country hoped to achieve and did achieve? What can be learned from analysing and documenting the first fifty years?

This research documents the history of local television programme production in the free-to-air broadcast sector in Jamaica. In so doing the research will present a comprehensive history and record of the development and production of indigenous television. Much of the information is scattered in various publications and among the personal memories of those engaged in the field currently and during the last fifty years. The project examines the development of television in Jamaica



through in-depth interviews with those involved with its development over its fifty-year history, and through analysis of representative archival programme material.

In the last decade, digital and computer technology has revolutionised the world of television production, consumption and distribution. For countries such as Jamaica, these developments have created opportunities for indigenous television stations, and have broadened choice and accessibility to consumers. A country that for almost thirty years had only one television station now has three free-to-air stations, and these exist alongside a myriad of television viewing choices - both domestic and international - which include cable, online and mobile television.

Documenting and analysing the history of indigenous television programme-making in the Jamaican context may assist in providing an understanding of the factors that shaped the production, consumption and market of the sector during its first fifty years, as well as contribute to television studies of smaller media markets.

Through analysis of existing literature and materials as well as interviews with television industry personnel past and present, the research pulls together the various strands of information and expertise, and investigates the challenges and creative approaches that underpin the production processes. It looks at what worked and what fell short of what the medium promised.



Specific objectives

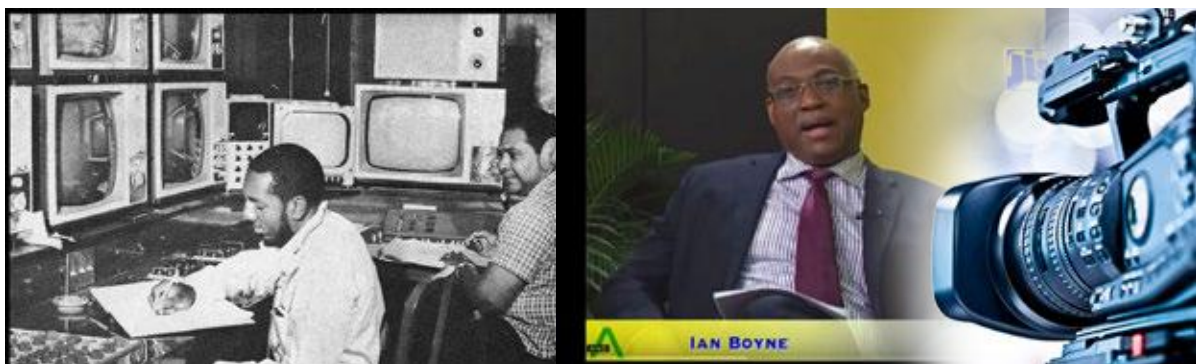
Specific objectives of the project include conducting a series of interviews with persons involved in indigenous television programme production over the past fifty years, including managers, writers, directors, crew members and talent; transcribing and editing interviews to provide archival content; doing archival searches of newspapers and audio visual libraries; documenting examples of indigenous multi-episode programmes; collecting video clips of television programme content for inclusion in a video documentary to be aired on local television, in addition to a book and research paper on the findings of the project.

Methodology

The project uses interviews and archival searches, and provides an insight into the unique challenges and opportunities inherent in the Jamaican local television programme-making process. Several key

interviews have been recorded on video for archive, transcription purposes and inclusion in a video documentary. In addition to the interviews, television content representative of eras and trends in production and programming will be analysed and described.

This research project provides a record of the history of an important aspect of the free-to-air Jamaican television industry. The project has the potential to provide teaching and research material on the management, creative experience involved in local television programme conception,



production and marketing in Jamaican television. In addition, it provides a useful written and audio-visual record of the experience elements of the history and practice, and of work in the emerging Caribbean context. It looks at successful and unsuccessful attempts to create indigenous programming in the public and commercial broadcasting environment in a monopoly and competitive market, and in the analogue and digital technological eras. The project has the potential to contribute to the understanding of the television history in Jamaica, and to create content of value beyond the project for researchers and teachers in a format that can be accessed in various ways, in keeping with modern and future engagement with the medium of television.

Bio

Yvette J. Rowe is a lecturer in Television Production and Broadcast Journalism at the Caribbean School of Media and Communication (CARIMAC) at The University of the West Indies (UWI), Mona Campus. She has extensive media production experience, including work for the Jamaica Broadcasting Corporation and the British Broadcasting Corporation.

Livingston A. White is also a lecturer at CARIMAC, The UWI, Mona Campus. Prior to working at The UWI, Dr White worked in television in various capacities ranging from producer and production assistant to presenter with organisations such as the Creative Production and Training Centre (CPTC), among others.



Underperformance in the Jamaican education system

Dr Canute Thompson

School of Education

The issue of underperforming schools in the Jamaican education system received heightened attention at the turn of the 21st century. The scope of the problem and proposed mechanisms for dealing with it were captured in the Rae Davis-led Task Force Report on Education tabled in 2004. The report notes that, “the most pressing issue was (is) the chronic under-achievement of the system in terms of the large number of students performing well below their grade level”. The report also proposed that, “accountability for performance was (is) a fundamental issue at all levels of the system”

Areas of need the study seeks to satisfy

This study seeks to explore the specific elements of leadership that were responsible for turning around the two schools under review.

New knowledge created

The study found six themes in the strategies used by the principals to realise turnaround in their schools. These themes include:

- (1) the importance of showing leadership in the analysis and interpretation of data on school performance and the communication of those interpretations to inform behaviour change towards improvement; and
- (2) the display of courage and discernment in taking risks in actions that run counter to stakeholders’ beliefs and expectations.



Specific benefits to be derived/Potential impact on society

Successful organisational turnaround is an undertaking in transformational leadership and transformational leadership risk-taking, which is often expressed through innovation, organisational restructuring, the creation of new products and services, ingenious ways of solving longstanding problems, and exploring new power-sharing models.

If, like other organisations, schools are to experience transformation, the leadership must be prepared to take risks. Piccolo (2005) seeks to establish the link among transformational leadership, innovation and risk-taking. In relying on Thomas and Velthouse, (1990) and Sitkin and Pablo, (1992), Piccolo notes that followers' feelings of a sense of empowerment about their work have the effect of encouraging innovation and risk-taking behaviour.

Therefore, transformational leaders need step out of their comfort zone and encourage their followers to do likewise (Bass & Steidlmeier, 1999).

Direct application of outcomes to industry

The study identifies four action areas that the Ministry of Education should adopt to overcome the problem of underperforming schools. These include:

- (1) Providing intensive training in turnaround strategies for persons interested in becoming the principal of an underperforming school;
- (2) Implementing a system of performance contracts for principals hired to lead schools that are underperforming, stipulating that the initial contractual period should not exceed three years.

Source: Thompson, C. S.; Burke, T.; King, K.; Wong, S. (2017). Leadership strategies for turning around under-performing schools: Lessons from two Jamaican schools. *Journal of Education and Development in the Caribbean*, 16 (2).

Available at:

<https://www.mona.uwi.edu/soe/publications/jedic/article/454>



Preparing Caribbean teachers in the 21st Century: Whither the place of ethics?

The areas of need it seeks to satisfy

The 21st century is characterised by, among other things, ever-evolving norms and values, new boundaries of individual rights and freedoms, new parameters for the role of teachers in relation to students, and the power of the institution to take decisions that students, their parents, and the wider society may view adversely. These new realities require that teachers be adequately trained in the principles and practices of ethical decision-making. According to Boon (2011), every decision that a teacher makes concerning students has potentially ethical implications. Yet the importance of ethical preparation of teachers is missing from the scientific literature on preparing teachers for the 21st

century, and this omission is one that Caribbean teacher-training institutions cannot ignore.

New knowledge created/gaps filled
Using a random sample of 144 teachers and prospective teachers drawn from all levels of the Jamaican education system, this study found that teachers had a low level of ethical awareness. The results show that between 86% and 100% of teachers are of the view that the nature of their work requires a sound knowledge of ethics; while 81% agree or strongly agree that their ethical awareness has been sharpened by ethical choices on the job. With courses not included in the teacher-training curriculum means that teachers are ill-prepared for ethical



choices that they must make. The importance of ethical preparation for the job, as perceived by teachers, is reinforced by the fact that the ANOVA was .038 for the variable, "A sound knowledge of ethics is important to the job of a teacher."

Contributions to national/regional development

The research is significant in that:

- (a) It adds a missing dimension to an important discussion occupying the minds of policy makers, teacher trainers, and teaching practitioners about the remodelling of the teaching and learning enterprise in a new era; and
- (b) It provides the basis for a review of teacher training curricula and a reordering of priority emphases in the curricula.

Possible direct application of outcomes to industry

The study recommends that:

- (a) Teachers' colleges in the Caribbean take steps to introduce courses in ethics as part of the programmes for the preparation of student-teachers.
- (b) Teacher support organisations, such as Teachers' Unions and Teaching Councils, offer short continuing professional development courses in ethics for teachers.

Source: Article # 2

Title of article: *"Preparing Caribbean teachers in the 21st Century: Whither the place of ethics"*

Bio

Dr Canute Thompson is Head of the Caribbean Centre for Educational Planning and Lecturer in Educational Policy and Planning with Leadership in the School of Education. His research interests are in strategic planning, educational policy, philosophy, leadership, and change management.



Place, nation and Identity in Jamaican Film

Dr Rachel Moseley-Wood

Department of
Literatures in English

Despite the many limitations and challenges of securing funding, filmmakers in Jamaica have succeeded in creating a relatively small, but exciting body of work. Local feature film production may be sporadic and best described as stop-and-start but, driven in part by the intensive use of reggae and dancehall music, which already have an established global following, many Jamaican films have achieved significant international circulation by distribution through diasporic channels. The iconic *The Harder They Come* (1972), *Smile Orange* (1976) and *Rockers* (1978) are well known and loved at home

and also by far-flung audiences. More recent favourites like *Better Mus' Come* (2010) and *Ghett'a Life* (2011) have garnered both critical acclaim and popular endorsement in Jamaica and abroad.

This research project explores the ways in which local films, those mentioned above as well as others, have reflected and contributed to critical debates on place and nation,



and the continuing conversation on identity formation in Jamaica. The project helps to fill a significant gap in scholarly writing on Caribbean cinema and, specifically, Jamaican film. Now at the stage of a book manuscript, the research has already yielded two published articles: "Ambivalence in the Image: The Jamaica Film Unit and the Narrative of the Emerging Nation" in *The Jamaican Historical Review* in 2013, and "The Other Jamaica: Music and the City in Jamaican Film" in *Caribbean Quarterly* in 2015.

In its exploration of what Jamaican films tell us about what it means to be a "placeling" - to use Edward Casey's term - in Jamaica at specific points in space-time, the project traces the emergence of an indigenous film practice in Jamaica in the pre-independence period of the 1950s, when production of state-sponsored documentaries and newsreels began. It also identifies a later, second wave of production that started in the early 1970s, when independently produced fictional features emerged. These two discrete modes of production indicate Jamaica's movement from what Mbye Cham describes as "a receiver/consumer of film products" originating in other countries, to a "producer/transmitter" that created and exported its own film products. These waves of production signal critical shifts in representation as local filmmakers sought to use the film text to reflect and speak to the lived experiences of Jamaicans, and their socioeconomic and existential concerns.

A primary focus of the research is local film's support of the expression of diverse subject positions that challenge the unifying and homogenising myths and narratives of nationalism. Whether inadvertently, in the case of the state produced documentaries, or more explicitly in fictional features,

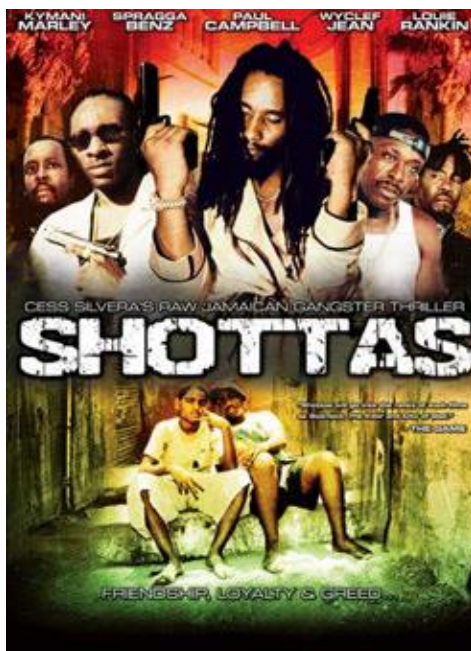


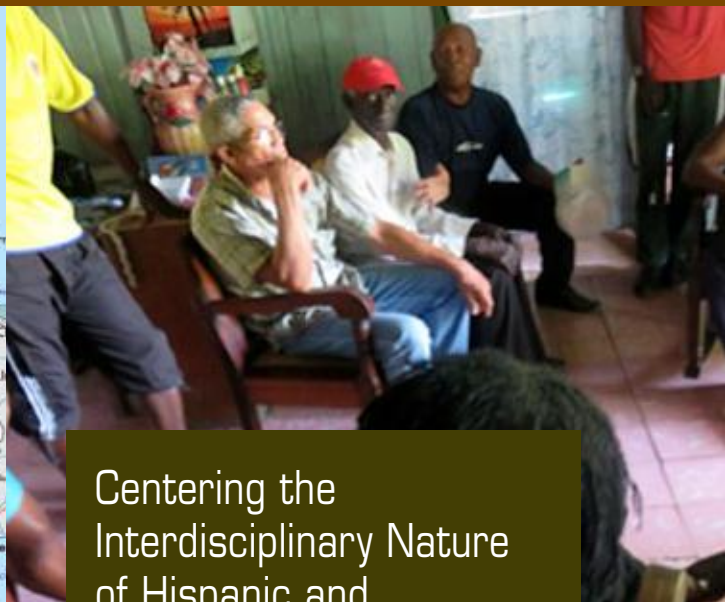
local films tend to define Jamaica as a nation marked by difference, by deep socioeconomic and cultural divides that inevitably produce widely variant perspectives. Many of the fictional films, by repeatedly reminding audiences of the gap between the 'haves and the have-nots', participate in an ongoing dialogue about what it means to be Jamaican in ways that expand our understanding of the consequences of postcolonial political arrangements that have denied the benefits of full citizenship to certain groups and individuals. With a cast of characters that includes gunmen, badmen, dons, gigolos, ghetto dwellers, baby mothers, dancehall queens, tricksters and "sufferers", Jamaican films are peopled by figures from which so-called polite society seeks to distance itself, but which undeniably exist as important, if often denigrated, facets of a national culture and identity. The manuscript then, explores the

postcolonial project of reclaiming place as it is expressed in local cinema: both the varied ways in which local films contest colonial and externally imposed conceptions of place and identity, as well as the tensions that surface in opposing local claims for authenticity.

Bio

Dr Rachel Moseley-Wood is a lecturer in the Department of Literatures in English. Her area of interest is Caribbean cinema, with a focus on Jamaican film. She may be contacted at rachel.moseleywood@uwimona.edu.jm





Centering the Interdisciplinary Nature of Hispanic and Afro-Hispanic Literatures and Cultures

Professor Paulette Ramsay

Department of Modern Languages and Literatures

Afro-Costa Ricans of West Indian descent Professor Ramsay has done extensive work on Jamaican migration to Costa Rica in the late 19th and early 20th centuries. In particular, her focus on the writings of authors Quince Duncan and Shirley Campbell explore the racial and cultural dynamics affecting Afro-Costa Ricans of West Indian descent, and contest stereotypical claims about them. The writers are both presented as promoting an Afro-centric agenda in which they claim and show their connection to the wider Caribbean and African past. Moreover, Ramsay's research seeks to advance counter-histories to Eurocentric representations about the origins and identities of people of Afro-West Indian heritage in Costa Rica.

Afro-Mexico

Afro-Mexicans reside mainly on the Costa Chica of Guerrero and the Costa Grande of Oaxaca, on the Pacific Coast. Professor Ramsay's research expands the existing critical material on Afro-Mexico, and contests Mexico's definition of itself as a homogeneous mestizo nation. Extensive critical study of their literary and cultural production which have, to date, received very little attention, has been done in her many articles and in her groundbreaking book, entitled *Afro-Mexican Constructions of Diaspora, Gender, Identity and Nation* (2016). This book is the first to probe issues related to the literary and cultural production of the forgotten Afro-Mexican people of the Costa Chica and Oaxaca in

Mexico, especially in relation to issues of identity, self-definition, nationhood, gender and their role in defining diaspora.

Afro-Ecuador

Jamaican migration to Ecuador to build the most expensive railway line in the world is recounted through the literary works of Afro-Ecuadorian female writer, Luz Argentina Chiriboga. The labour force was provided by Jamaicans at a time when Ecuador was setting ambitious economic agendas.

Afro-Cuban literature

Professor Ramsay's research on Afro-Cuban literary production has focused on two main writers, Jesús Cos Causse and Geraldo Fullea León. These writers have received insufficient attention from critics, so Professor Ramsay's research has served to bring their works to a wider international readership. Cos Causse is a poet of Haitian descent whose writing has positioned him as a central figure in bringing attention to Afro-Cuban culture. His writings, as presented in Professor Ramsay's research, celebrate the Cuban landscape, Afro-Cuban history and link to Africa, Afro-Cuban culture, family life and Cuba's interconnectivity to the rest of the Caribbean.

Fullea León is an outstanding Afro-Cuban dramatist, who has distinguished himself by bringing different aspects of Cuba's history to the fore. Professor Ramsay exposes Fullea as a strong feminist and one who believes, moreover, that his dramatic works take inspiration from, and supports the Cuban Revolution at the cultural level and also helps to create an understanding among Cubans of the need for ongoing revolution in Cuba.

Currently, Professor Ramsay is conducting research on West Indian migration to Cuba in the early 20th century. Her research has taken her to Guantanamo and towns such as Santiago de Cuba, Costa Rica (Ermita) and Jamaica, where descendants of Caribbean migrants continue to preserve a cultural identity which is deeply rooted in an Anglophone Caribbean cultural heritage. Professor Ramsay is of the view that the histories and truths about African diasporic communities must be uncovered.

Article

The Town of Costa Rica (Ermita), Cuba: A testimony of Jamaican migration to Cuba

Sometime after the triumph of the Cuban Revolution in 1959, the Revolutionary Party and Government decided to change the names of some towns in Cuba, to the names of different Latin American and Caribbean countries. This was intended to be an indication of the recognition of the countries of the region. This explains the reason some places in Cuba bear names such as Costa Rica, Trinidad, El Salvador, Jamaica, Honduras, Peru, Paraguay, among others. The name Costa Rica was used to rename a town that was previously known as Ermita, named for the wife of the manager of the sugar mill, or central, where many Jamaicans worked after being recruited to work in Cuba in the early 20th century. In 1912, the United Fruit Company was given special permission to recruit more than one thousand Haitians to work in the sugar mills or centrales in Oriente, as the demand for sugar grew. At the end of World War I, the worldwide demand for sugar became even greater because beet fields had been destroyed in Europe. Although, at the time, there were still laws that restricted the recruitment of black workers into Cuba, the prior permission granted to the United Fruit Company made it easier for sugar companies to obtain licences to recruit West Indian workers to labour in the centrales, or sugar mills, like Ermita (now Costa Rica).





Images of older
Jamaican-style houses
in Costa Rica, Cuba.



Professor Ramsay with members of the
Biggerstaff, Shaw and Williams families



A significant number of persons of Jamaican descent, such as Mr Samuels, Mr Wellesley Shaw, Mr Wilfred Wilmott, the Biggerstaff family, the Williams family, and many others who are second and third generation Cuban-Jamaicans, still reside in Costa Rica in their typical mid-20th century Jamaican-style houses, with their wooden verandahs to the front and hibiscus hedges around the yards. Some of the houses are the same, many now quite dilapidated, that were built by their Jamaican grandparents and parents in the 1930's, 1940's and 1950's.

Mr Morris, who was born in Cuba, recalls his own father's stories about being taken to England to fight for that country in the First World War at the young age of 18. He knew nothing about guns or the battlefield, and despised everyone who involved him in this war where he watched his older brother die beside him, as he was shot by enemy fire. As soon as he returned to Jamaica, still frightened, dissatisfied, and disillusioned, but happy to have survived the ordeal, he seized the opportunity to set sail for Cuba to work in the sugar mill, or central, in Ermita (now Costa Rica). He migrated to Cuba from Balaclava and

later sent for his wife, who was originally from Cross Roads in Kingston.

Jamaicans were always proud of their Jamaican heritage and culture, and relied heavily on the officers of the British Colonial Office to defend their rights and ensure their safety and well-being. Mr Morris, now 84 years old and blind, has very vivid memories of life in Ermita, now Costa Rica, with the old Jamaican folks. He proudly showed his parents' old passports, stamped by the British Colonial Office and still carrying their faded black and white photographs from the early 1900's.

He recalls the attitude of the Jamaicans who insisted on cautioning their children about mixing with Cubans. Children of Jamaican parents were not allowed to speak Spanish at home and so they ended up becoming bilingual, speaking Spanish with their friends on the playing fields,



History being recounted to Professor Paulette Ramsay by Mr Morris, a second-generation Cuban of Jamaican descent who resides in Costa Rica, Cuba

etc., and English with their families at home.

The Jamaicans tended to marry among themselves, and those who were married before leaving Jamaica later sent for their wives. Men who married their Jamaican girlfriends or brought their wives to Cuba were considered to have preserved Jamaican values better than those who did not. Jamaicans did not want their children adopting Spanish or Cuban behaviour, and insisted on teaching Jamaican values - "good manners", saying grace before meals and going to church which was either the Methodist or Anglican church that they had established. In order to preserve their Jamaican culture, they cooked Jamaican foods, such as rice and peas and ackee and saltfish, and learnt all the folk songs. They also established their own schools, where they taught their children to read English by reading the English Bible, sang Anglican hymns, studied English grammar from books that were also brought from Jamaica, and told the children Anancy stories and other folktales. Their children attended Cuban schools in the days and Jamaican (English) schools in the evenings. The Biggerstaffs explained that the Biggerstaff house was the main English school with more than 40 students at times sitting on the verandah to learn to read and write in English.

Today, many Jamaican descendants in Costa Rica dream of one day coming to Jamaica to see the birthplace of their ancestors. A scrutiny of some passports show that their ancestors travelled to Cuba on British Colonial passports from as early as 1912, 1915, 1916 and 1918. In the case of Mr Leonard Biggerstaff of Long Bay, Portland, his battered passport reveals that he was born in 1901, registered as a British-born subject, and obtained his passport in 1919 to facilitate his travel to Cuba as a labourer. This means that Mr Biggerstaff was selected to work in Cuba under the Emigrants Protection Law of 1902 and 1905, when he was a mere 18 year-old young man.

Other documents reveal a similar trend of young men who left Jamaica to seek employment in Cuba before they were 20 years old. Of course, the memories that many of them carry in their minds are painted by their forebears in fond stories of a Jamaica that no longer exists. But they themselves serve as testimony of the tremendous journey that many Jamaicans travelled in order to make a contribution to Cuba's economy, when sugar was king in Cuba.

Bio

Professor Paulette Ramsay has been Head of the Department of Modern Languages and Literatures since 2010. In addition to her research interests, she is also well known as a novelist and poet, having published a novel, three poetry anthologies and several short stories.

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Reconsidering Jamaica's urban past

Professor James Robertson

Department of History and Archaeology

Over the last six years, teaching a course on Jamaica's urban past from the Taíno up to the present, has pushed me to think about the island's urban experiences. Writing about Spanish Town, the island's former capital, I explored a town whose streets embody continuity. Of course Spanish Town has suffered demolitions, alongside changes among the people traversing its streets, their status and backgrounds and the vehicles they rode, but significant elements of Spanish Town's plan emphasise continuity. Set alongside Jamaica's other towns this appears atypical.

The island's political and economic history highlights events which played out in urban settings: invasions, executions after slave rebellions,

riots and elections, all alongside epidemics, hurricanes and fires. The lives of cohorts of townspeople were transformed by immigration, emancipation and internal migration. These all occurred alongside shifts in contemporaries' expectations about what services towns might offer. So how do we adjust our focus away from individual buildings, or merchants, or mayors, or even local crises, first to acknowledge the broader urban patterns all these occasions punctuate, and then to consider how townspeople responded to such events?

Chronologically, the island's first urban transition was the shift from Taíno



Falmouth Courthouse

population centres to Spanish colonial towns. The newcomers laid out new towns on “green field” sites. However, their settlements quickly creolised. While there was citrus in the gardens, Spanish pottery to dine off, and pork, beef or chicken in the stew pots, there were cassava graters and local pottery in the kitchens, while local peppers seasoned the stews. Once the trans-Atlantic trade in enslaved Africans established itself, okra and other African vegetables were added too.

The next major pivot is the English conquest. Spanish Town survived, but its new English settlers were confused by the townscape they had seized, while the relationships between Jamaica’s towns diverged from English norms. After the 1692 earthquake submerged Port Royal, residents of its mainland successor, Kingston, campaigned for the relocation of the Assembly to the colony’s main trading centre as its natural site. Disputes over the location of the colony’s seat of government continued for over two hundred years, prompting the construction of the House of Assembly and King’s House in Spanish Town, two of the most impressive eighteenth-century buildings on the island, to anchor the Assembly there. The ploy succeeded. So long as the Assembly survived, the island’s Seat of Government remained in Spanish Town. Nor were arguments about locating the island’s capital the only urban rivalry. The leading residents of eighteenth-century Montego Bay skirmished with Savanna-la-Mar, Lucea and Falmouth while seeking to dominate the trade of the island’s north and west.

But did these furious squabbles over status mark the most important changes in Jamaica’s urban landscape? New townships continued to develop, filling gaps in the island’s urban network as settlement patterns adjusted, with Falmouth offering a spectacular example. Established in 1770, it flourished for seventy years before waning as Trelawny’s exports slumped and the size of trans-Atlantic ships outgrew the gaps in the reef protecting its harbour.

A further group of inland trading centres that developed after Emancipation were never as spectacular as Falmouth, but reflected far broader shifts in Jamaica’s society and economy.



Downtown Kingston

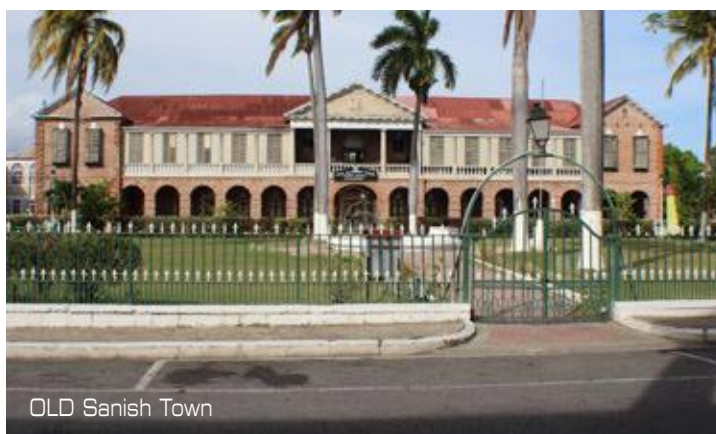


Colbeck Castle in Old Harbour

Their significance was not immediately apparent to either the opinionated visitors who wrote travel journals, or to governors touring the island. During the 1840s, the "Free Trade" campaign in Britain had removed not only the hated protectionist Corn Laws which kept English bread prices high, but also the sugar duties which privileged Empire-grown sugar. Afterwards, plantations failed across Jamaica. Ex-slaves bought or squatted on marginal or abandoned land. Their produce fed Jamaica's towns and delivered ginger, coffee and sugar for export. New inland marketing hubs grew where small farmers could sell their produce and access urban services, as can still be seen at Claremont in St Ann which, by 1900, had a market, churches - Anglican, Baptist, Methodist and Free Methodist - besides shops and a police station. The new trading settlements of the mid- and late nineteenth century also includes Linstead - where someone not finding purchasers for her ackee merited a song. Touring the island in 1854 the Governor commented that the now thriving town had developed since Emancipation.

Here we see categories blurring, with the mid-nineteenth century's major social developments reflected in shifts where produce was sold. A generation after Claremont and Linstead began to flourish, the expansion of the island's railway network to the north coast delivered stations that offered venues for local smallholders to load their produce, either to go east to Kingston or north to Montego Bay. Meanwhile new markets for rural higglers helped sustain Spanish Town's and Kingston's economies.

The post-Second World War decades saw multiple transitions in Jamaica's townscapes. When a cement factory was established just outside Kingston in 1946 it was initially considered a long-delayed example of import substitution after wartime shortages.



OLD Spanish Town

Looking back, the wide-ranging repercussions are apparent: cement blocks and reinforced concrete have replaced timber construction across Jamaica, with the new Mona campus among the earliest beneficiaries.

In defining what urban means for Caribbean people in the twenty-first century, the extension of existing towns and satellite suburbs are changing popular expectations. Up to this generation Jamaica has been a predominantly rural island, but exploring its urban pasts can illuminate how Jamaican society has developed.

Bio

Born in England, Professor James Robertson studied at Southampton University and Washington University in St. Louis, where he completed a dissertation on seventeenth-century London. Since 1995, he has been a member of the Department of History & Archaeology at the University of the West Indies - Mona, where he teaches classes on European history, on Jamaica's towns and on heritage. After research in archives in Jamaica, the UK, and the US, he wrote *"Gone is the Ancient Glory!": Spanish Town, Jamaica, 1534-2000* (Kingston: Ian Randle, 2005). In 2016, he was promoted Professor by the University of the West Indies. He has been President of the Archaeological Society of Jamaica, is President of the Jamaican Historical Society and currently serves as Editor of the *Jamaican Historical Review*. He is revising his Inaugural Lecture, *History without Historians: Listening for Stories of Jamaica's Past* for publication by Kingston's Arawak Press.



Gathering for tea
in modern Japan;
Class, culture, and
consumption in the
Meiji period.

Dr Taka Oshikiri

Department of History and Archaeology

This research project focuses on the cultural history of matcha (powdered green tea). Although much is written on the culture of powdered green tea before 1600 and present-day Japan from various disciplines, including art history, cultural history, anthropology, and sociology, few historical studies are focusing on the Tokugawa period (1603-1868) and the Meiji era (1868-1912). Thus, this project focuses on these relatively overlooked eras in the history of Japanese tea.

The project recently resulted in two publications. First, an article that explores the relationships between ritual, material culture, and political authority in early modern Japan by focusing on chanoyu - the socio-cultural practice derived from

the consumption of powdered green tea - was published from The Historical Journal in December 2016. This article analyses one of the Tokugawa Shogunate's annual processions, the so-called, 'Travelling of the Shogun's Tea Jar' - a ritual developed around the Shogunate's acquisition of its yearly stocks of tea - which the Shogunate formalised as one of the official annual events in the early seventeenth century.

The article highlights the relationships between the ceremonial practice of tea drinking and the Tokugawa administration, the topic of which previous scholarships had not studied



in depth. It argues that rituals related to tea drinking custom became a part of routine business in the Tokugawa Shogunate and continued to perform its customary roles in supporting warrior elite's political life. In turn, the practice was authorised by shoguns and domain lords through public rituals and regular consumption. Consequently, the tea ceremonial practice was institutionalised in the shogunal administrations, creating a class of tea professionals and generating networks of tea providers. Moreover, the ritual of tea drinking was embedded in everyday life of the warrior elite, both at the national and regional levels, until the final fall of the Tokugawa Shogunate in 1868.

The second publication focuses on the period after the fall of the Tokugawa Shogunate in 1868. The book is entitled *Gathering for Tea in Modern Japan: Class, Culture, and Consumption in the Meiji Period*, and will be published by Bloomsbury Publishing in the summer of 2018. By examining a variety of period sources, including maps, official records, diaries, exhibition catalogues, journals and newspaper articles, this research explores intricate relationships amongst chanoyu and its practitioners from various social groups, such as the old aristocracy, the emerging industrial elite, central and local government officials, and officials in foreign embassies in Tokyo, and their multifaceted interests in the practice. By taking chanoyu as an example, the book highlights how the fabrication of the 'Japanese tradition' went hand in hand with the making of modern spaces and institutions, the emergence of new patterns of cultural consumption, and the globalisation of Japanese economy in the Meiji period. It also underlines the significance of cultural tradition in the nation-building project of modern Japan.

This research sheds light not only on the history of powdered green tea in modern Japan, but also on our renewed understanding of the Japanese society and its cultural history. Given the close economic ties and established cultural relationship between Japan and the Government of Jamaica and the University of the West Indies, Mona, this research on the history of tea in modern Japan will contribute to the further development of the relationship between both countries by fostering a deeper understanding of Japan, its history, and culture.

Bio

Dr Taka Oshikiri is Lecturer in Asian History at the Department of History and Archaeology. She specialises in cultural history of modern Japan. (Taka.oshikiri@uwimona.edu.jm)



Tracing the discourses of accountability and equity: The case of the Grade Four Literacy Test in Jamaica

Dr Yewande Lewis-Fokum
School of Education

Dr Carolyn Colvin
University of Iowa, USA.

Tracing the discourses of accountability and equity: The case of the Grade Four Literacy Test in Jamaica was published in the British journal, *Changing English*, in March 2017. The authors sought to understand how a narrowed version of accountability in the form of high-stakes assessment can sometimes deepen inequality, rather than improve educational equity. Using Critical Discourse Analysis, the discourse around the Grade Four Literacy Test was examined to investigate two research questions:

- (1) How did each government document position the Grade Four Literacy Test?
- (2) What did that positioning signify in terms of accountability and equity?

Our analyses of three government documents revealed that the discourse of equity becomes silenced or overpowered in the presence of powerful discourses of accountability. Owing to this, a narrower version of accountability in the form of high-stakes testing serves to compound



and complicate inequities in education. A more comprehensive framework for accountability, in which teachers are supported and literacy projects are comprehensive and sustained, moves closer to achieving, over the long run, the equity that is needed in literacy at the primary level in Jamaica.

Areas of need the research seeks to satisfy

Limited accountability policies tend to sharpen existing divisions, because to gain the acceptance of stakeholders, discussions of accountability are often framed within the rhetoric of promises for overall improvement in education and narrowing achievement gaps. Yet, when the results of accountability efforts are analysed, research suggests that those who do well continue to do well, while those for whom the reforms have been initiated continue to underperform. This difference between intentions and outcomes is due to, among other factors, a narrowed focus on accountability in the form of testing, with little consideration given to the context and the socio-historical factors that affect school achievement. Limited accountability policies "exacerbate existing inequalities and create new dynamics of inequality with important implications for students...[they] sharpen existing differences in opportunities to learn and...produce segmented student identities with significant ramifications" for the work force and economy (Lipman 2002, 380).

Gaps filled by the research

The citizens of a democracy must learn to be critical consumers of government policies that impact on the education of our children. This study fills an important gap in two ways. It documents contemporary primary schooling education in Jamaica at a key moment - the change in administration of the Grade Four Literacy Test in 2009. Using Critical Discourse Analysis



allowed the researchers to critique education policies that inadvertently have the capacity to undermine the very goals they are aiming to achieve. Changing the Grade Four Literacy Test from a low-stakes classroom-based assessment to a high-stakes test certainly helped to put a national spotlight on literacy; however, this promoted literacy preparation as test-taking, and helped to inadvertently promote further inequity through the development of the under-resourced Alternative Secondary Transitional Education Programme (ASTEP).

While Jamaica has had strong enrolment in primary education for decades, all students have not received quality education. Primary school students who have a solid foundation in literacy skills are certainly better able to grasp secondary school knowledge, and are therefore better equipped to be workforce ready.

Contribution to national/regional development

This paper adds to the dialogue about how to strike the balance between accountability and equity in education without the testing that typically leads to unfair comparisons among schools. Going forward, the researchers suggest a broader definition of accountability, in which the context of each school is taken into consideration, teachers are better supported, and sustainability is included as a critical component of interventions. An example of one such literacy intervention programme at the primary school featured in the article is the regional Caribbean Centre for Excellence and Teacher Training which ended in 2006.



New partnerships being developed

Because of this research study, the first author has formed pivotal partnerships with two linguists from The UWI - Silvia Kouwenberg and Michele Kennedy. The team has worked on the Professional Development of Primary School Teachers project since 2015. In 2015, the project received funding of J\$1.3 million from the Ministry of Education to implement a pilot of the project with a cohort of 33 grades 3 and 4 teachers who conducted in-service workshops in linguistics and literacy education. The authors were also awarded a new initiative grant in 2017 to extend the pilot of the initial project.

Bio

Dr Yewande Lewis-Fokum earned a postgraduate diploma as an English Language teacher from the University of the West Indies in 1998 and a master's degree in 2001 from the Harvard Graduate School of Education in the exploration of children at risk and preventative measures to assist them. In 2010, with the support of the Fulbright Graduate Student Program, she completed her PhD in language, literacy and culture from the University of Iowa. Dr Lewis-Fokum has worked at the tertiary level since 2010 at the Mico University College and the School of Education, The UWI, in the areas of literacy and language teaching.
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Harvesting the sun's energy, learning by doing: Measuring undergraduate science students' research confidence, motivation and knowledge gains

Dr Saran Stewart

School of Education

Dr Nickeisha Stephenson

Department of Chemistry

Areas of need the research seeks to satisfy
The School of Education and the Department of Chemistry have come together to tackle a critical issue facing Jamaica and the wider Caribbean - the lack of science technology in the region. To combat this issue, in April 2017, Dr Nickeisha Stephenson (Department of Chemistry) and Dr Saran Stewart were awarded the Office of the Principal's multi-disciplinary grant to undertake research titled, Harvesting the Sun's Energy, Learning by Doing: Measuring Undergraduate Science Students' Research Confidence, Motivation and Knowledge Gains.

Science and technology are quintessential industries that are undersubscribed in Jamaica. This is evident in the declining number of patent applications and the

high percentage of raw-material exports. Former Minister of Science, Technology, Energy and Mining, the Honourable Phillip Paulwell, called for the improvement of science education in schools to increase productivity in the country (Daily Gleaner, 2012). However, students in Jamaica lag in the sciences, as shown by the recent double-digit dips in the 2015 Caribbean Secondary Examination Certificate (CSEC) results. These results extend to the tertiary level, as illustrated in the high failure rates among undergraduate students in the sciences. In some cases, there is a reported 70% of undergraduate science courses with

more than 25% of their students receiving a failing grade (Card & Lawrence, 2016). This study addresses some of these issues by examining a critical component of the science curriculum, the laboratory research experiments. In particular, the study assesses the educational benefits of new laboratory research experiments at The UWI, Mona while examining novel electrocatalysts for photochemical water oxidation. Water oxidation has been identified as an ideal process for converting solar energy into a clean and sustainable source of energy. This technology is of great value to non-oil producing countries that endure high-energy costs, such as Jamaica.

Objectives and hypotheses

The study will assess the impact of laboratory research experiments on students' science motivation, confidence and knowledge levels by testing three hypotheses:

- hypothesis 1 predicts that students who complete the HARPOON experiment will have greater science motivation in laboratory research experiments than those in the control group;
- hypothesis 2 predicts that students who complete the HARPOON experiment will have greater science knowledge in laboratory research experiments than those in the control group;
- hypothesis 3 predicts that students who complete the HARPOON experiment will have more science confidence in laboratory research experiments than those in the control group; and
- hypothesis 4 predicts that students who complete the HARPOON experiment will have more science benefits in laboratory research experiments than those in the control group.

Laboratory research experiment - HARPOON: Heterogeneous Anodes Rapidly Perused for Oxygen Overpotential Neutralisation

Originally conceived in 2011 in the Stahl Group at the University of Wisconsin, HARPOON was designed as a high-throughput method for discovering electrocatalysts for water oxidation (Stahl, et al., 2012). After its conception, it was redesigned for educational use in high schools and undergraduate Chemistry labs, and is currently funded by the National Science Foundation's Centre for Chemical Innovation (Shaner et al., 2016; The Solar Army, 2017). To date, HARPOON is being used as a pedagogical tool in high schools, colleges and universities in Puerto Rico and across the United States to strengthen students' engagement, critical thinking and interest in scientific research (The Solar Army, 2017).

Methodology

This study employs a two-group pretest-posttest recurrent institutional cycle, quasi-experimental (institutional cohort design) intervention design. This type of research design is best used to compare groups and examine the impact of intervening variables.

NR 01 X 02

.....
NR 03 X 04

The independent variable will be measured using dummy variables for the two treatment conditions (0= Control; 1 = treatment)

Procedures: The HARPOON experiment was implemented over two weeks during April 2017. In the first week of the experiment, students deposited their unique combinations



Sample (n=106)

	Male (n)	Female (n)	Mean Age	% of First Gen. Students
Control	13	40	20	40
Treatment	15	38	20	40

New knowledge created Sample (n=106)

of mixed-metal oxides. In the second week of lab, students assembled the HARPOON scan station, tested their specific combinations and analysed their data. Students were asked to complete an online survey at the end of their experience. The results were then analysed using ANCOVA, with post-test group means adjusted for co-variables.

- Hypothesis 1: After the adjustment for pre-treatment and previous education, there was no statistically significant difference in post treatment, $F(2, 106) = 2.681$; $p=.105$; $\eta^2 = 0.0201$, and the covariate-adjusted means were not in the anticipated direction ($M_{\text{control}} t= 4.71$; $M_{\text{treatment}}= 4.88$).
- Hypothesis 2: After the adjustment for pre-treatment and previous education, there was no statistically significant difference in post treatment, $F(2, 106) = 1.321$; $p = 0.253$; $\eta^2 = 0.0107$, and the covariate-adjusted means were not in the anticipated direction ($M_{\text{control}} t= 4.92$; $M_{\text{treatment}}= 4.63$).
- Hypothesis 3: After the adjustment for pre-treatment and previous education, there was a statistically significant difference in post treatment, $F(2, 106) = 11.06$; $p <.05$; $\eta^2 = 0.017$, and the covariate-adjusted means were not in the anticipated direction ($M_{\text{control}} t= 4.12$; $M_{\text{treatment}}= 4.93$).
- Hypothesis 4: After the adjustment for pre-treatment and previous education, there was a statistically significant difference in post treatment, $F(2, 106) = 2.90$; $p <.05$; $\eta^2 = 0.005$, and the covariate-adjusted means were not in the anticipated direction ($M_{\text{control}} t= 4.57$ $M_{\text{treatment}}= 4.94$).

Chemistry findings

Initial screening efforts identified a calcium, iron, and manganese metal oxide that outperformed and was twice as active as the control. The next steps involve working with the students to repeat the experiment and verify these results. If the results are reproducible, time will be spent carrying out additional

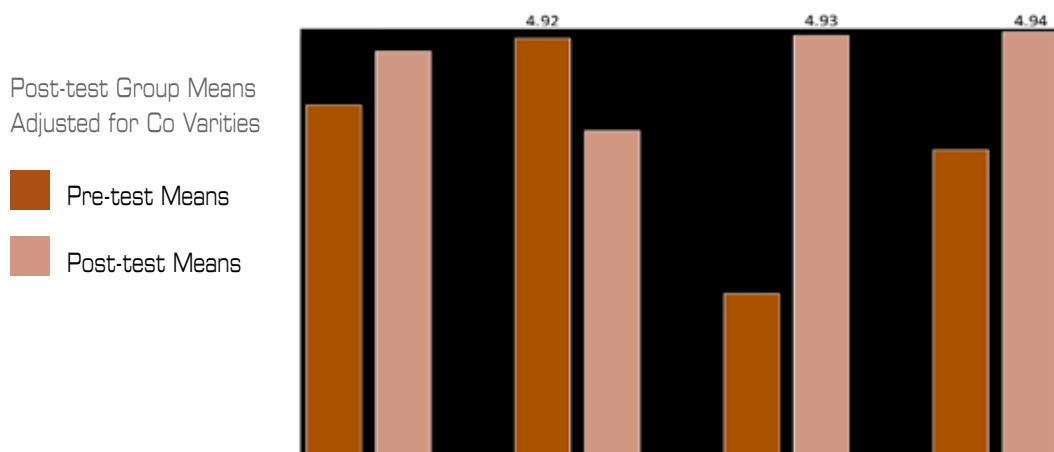
research on this material by undertaking bulk synthesis of the mixed metal oxide and characterisation, and further electrolysis of the material to quantify oxygen production. Other students were interested in repeating the HARPOON experiment and were excited to try other mixed metal combinations or the addition of other redox active elements. Future experiments will see them in the lab putting their hypothesis to the test.

Potential impact on society

The results of the study demonstrate the potential value of hands-on laboratory experiments. As noted above, the treatment lab experiment had a positive influence on science knowledge gains and science benefits, with the largest change occurring in knowledge gains. In focusing on the impact of laboratory research experiments, the study explored potential changes to the curriculum to increase the knowledge gains, motivation and confidence of undergraduate science students. Where there have been similar studies completed around the world (Lopatto, 2004, 2007; Shaner et al., 2016), there is little to no literature on the impact of laboratory research experiments in the Jamaican higher education context. Studies in chemistry have examined the development of critical thinking skills (Stephenson & Sadler-McKnight, 2016), and examined student perceptions on the socio-cultural factors in the chemistry classroom (Stephenson & Sadler-McKnight, 2010). However, there is limited literature on implementing a HARPOON-type experiment in the Jamaican higher education context to measure increased confidence, motivation and knowledge gains. This study provides the necessary baseline data to improve upon the treatment and carry out future rounds of the lab experiment at various time-intervals during the next academic year.

Contributions to national development

Water oxidation has been identified as an ideal process for converting solar energy



into a clean and sustainable source of energy. This technology is of great value to non-oil producing countries, such as Jamaica, that endure high-energy costs. Some of the contributions to national development will be to: (a) use laboratory research experiments to improve students' learning outcomes, science motivation and confidence levels; (b) introduce students to chemistry research that is of global significance and rigor to develop their research acumen; (c) develop cooperative learning structures for students to work in resource-stressed environments; and (d) to develop future scientists in the region.

Possible direct application of outcomes to industry

Possible outcomes to industry from the study are to: (a) develop environmentally sustainable energy sources; (b) increase randomisation of selection of mixed-metal oxide compositions; (c) identify the best water oxidation electrocatalysts; and (d) introduce students to multiple topics within a single experimental design, such as general chemistry, inorganic chemistry, analytical chemistry, and electrochemistry.

Bio

Saran Stewart is a lecturer of Comparative Higher Education in the School of Education at The University of the West Indies, Mona Campus. Dr Stewart is devoted to the examination and exploration of topics related to access and equity in education, and teaching and learning in developing country contexts. Most recently, she received the University of the West Indies, Principal's Awards for Most Outstanding Researcher and Best Publication (Article Category).

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Nickeisha Stephenson is a lecturer in the Department of Chemistry in the Faculty of Science and Technology at The University of the West Indies, Mona Campus. Prior to her academic position, Dr Stephenson was a senior post-doctoral associate at Harvard Medical School & Massachusetts General Hospital (USA), and a post-doctoral associate at Harvard University (USA). She earned her Ph.D. at the University of Wisconsin-Madison (USA) and her BSc in Chemistry at Ithaca College (USA). Her current research focuses on developing new methodologies for radiolabelling peptides for preclinical and clinical PET studies. Dr Stephenson's work has been published in high impact journals such as the Journal of the American Chemical Society and Nature Communications. Her work has been patented and licensed, and has been featured in the chemistry periodical, Chemical and Engineering News. Dr Stephenson's work has earned her a Young Investigator Award from the Alzheimer's Drug Discovery Foundation (ADDF).

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Talking TVET: How TVET leaders represent TVET in public discourse

**Dr Mairette
Newman**

**Dr Yewande
Lewis-Fokum**

**Dr Carmel
Roofe-Bowen**

School of Education

For a host of historical, socio-economic and cultural reasons, the term “technical and vocational education and training” (“TVET”) has had negative connotations. Research within the Jamaican context has shown that despite government policies and initiatives over the years, TVET continues to be perceived as inferior and low status, provided primarily for academically-challenged students (Eastmond, 2011; McArdle, 2004; Morris 1998). More recently, however, policymakers have moved to shift this perception by placing TVET at the forefront of educational reform. In seeking to integrate TVET as part of curricula offerings across all levels of the education system, they have moved to mainstream what has previously been marginal.

Undoubtedly, this policy emphasis on TVET gives it official status, but is it sufficient? Guided by Richardson’s (2007) argument that “journalistic discourse” shapes public perception, the researchers turned their attention to how TVET leaders in education and industry represent TVET in newspaper articles. The assumption in this study is that how they talk about TVET has served to perpetuate the perception of TVET as inferior, and that this negative perception will endure if the latest policy initiatives are not complemented by a change in discourse.

The knowledge gap: How do TVET leaders talk about TVET?

In order to understand how TVET leaders represent TVET through public discourse, the researchers used critical discourse analysis (Fairclough, 2009), to tease out ways in which those in authority might be mainstreaming or constraining the image of TVET in the public's mind. They focused their analysis on articles published in two major national newspapers between 2010 and 2016. From this analysis, it was found that the dominant discourse both enabled and constrained the idea that TVET is for everyone. This paradox is reflected through four dominant themes: TVET deserves to be respected; it is key to growth and development; TVET talk is non-academic; and is primarily focused on entry-level workers.

TVET deserves to be respected

In talking about TVET, leaders frame it such that the listener or reader associates TVET with respectability and acceptance. For example, by associating TVET with esteemed entities and institutions valued for their role in education globally (UNESCO), regionally (UWI, CXC) and locally (HEART-Trust/NTA), speakers bring a level of respectability to TVET. Repeated reference to powerful people and high-profile voices such as ministers of Education, key industry persons and TVET experts, all of whom are seen as endorsing TVET, also works to achieve acceptability and respect for TVET. The message is clear - if influential people, policies and money are committed to TVET then it must be important, valuable and worthwhile.

TVET is key to growth and development

TVET is represented as progressive and as better than what has existed in the past. The researchers came across frequent references to TVET as providing 21st century skills - the implication often being that without TVET, the country will not prosper. TVET is key to economic posterity, it provides jobs, and is an avenue to escape or avoid poverty, especially for unattached youths. This association of TVET with prosperity is further strengthened by those TVET leaders who make mention of other countries whose success is attributed to their focus on, and commitment to TVET. The researchers also identified a discourse that positions TVET as 'liberating'. Again, the message is clear: TVET is Jamaica's path to economic advancement, and the key to our remaining competitive in a global economy. However, not all of what leaders had to say about TVET is represented in positive ways:

TVET is non-academic

Each time TVET leaders compare and contrast TVET with 'academic' or 'traditional' schooling they run the risk of stigmatising TVET as non-academic, and positioning TVET curriculum and learners as non-academic. When TVET is presented as being attractive primarily to at-risk, unattached youth and those who have not succeeded



in school, it suggests that TVET is non-academic, and relegates it to being appropriate for some kinds of students but not others. References to TVET as 'skills focussed' and an 'alternative' track serve only to polarise TVET and other programmes.

TVET is primarily for entry-level workers

Absent from the discourse was a representation of the TVET learner as connected or aspiring to mid- or upper level occupations, or bound for the world of higher education. The dominant discourse was one which portrayed the TVET learner as being tied to the 'world of work' primarily at the 'entry level' and being 'job-focussed', as opposed to being profession-focussed. Similarly, TVET is presented as 'skills-based' not knowledge-based. The absence of such endorsements further cements the image of TVET as marginal.

Taken together, these findings expose how TVET leaders' talk can inadvertently undermine their

own efforts to represent TVET as mainstream and valuable for all students.

Recommendations

If TVET leaders want to change its image, and want students and their parents to see it as valuable; and if policymakers want to mainstream TVET, then the language of and about TVET must be consistent with the intention of the message. To this end, the researchers recommend sensitising TVET leaders to the importance of how they frame and talk about TVET. In particular, they should:

- Avoid comparisons that serve to dichotomise TVET and other forms of education.
- Use language that is inclusive of all learners and occupations and



avoid language that delimits or limits. For example, those talking about TVET should represent it as suitable for entry level as well as mid- and upper- level occupations. They should talk about TVET as skills-based as well as knowledge-based.

- Discuss TVET within the framework of lifelong learning by expanding the narrative such that TVET is positioned as an attractive and viable option for skills development, career advancement, professional development and higher learning.

Conclusion

While much of the discourse serves to legitimise and present TVET as attractive and valuable, a strong discourse of stigmatisation and implicit marginalisation, albeit unintentional, persists. This mismatch between policy and discourse needs to be addressed if TVET is to be accorded its deserved status in Jamaican education and development.

Bio

Dr Mairette Newman has graduate degrees in Teacher Education and Educational Leadership, and over thirty years' experience in education. Her areas of expertise include teacher education, programme design and development, curriculum review, academic management, educational leadership and preparation of programmes for teacher educators, school principals, teachers and student-teachers.

Dr Carmel Rooft-Bowen is a teacher educator whose career spans 20 years of combined service at the Secondary and Tertiary levels of the education system. She is an active education researcher and has authored and co-authored several publications in local and international journals. She currently serves as Vice President for Outreach and Public Engagement for the Institute of Educational Administration and Leadership-Jamaica and is a fellow at the Charles Darwin University in Australia.

Dr Yewande Lewis-Fokum earned a postgraduate diploma as an English language teacher from the University of the West Indies in 1998 and a master's degree in 2001 from the Harvard Graduate School of Education in the exploration of children at risk and preventative measures to assist them. In 2010, with the support of the Fulbright Graduate Student Program, she completed her PhD in language, literacy and culture from the University of Iowa. Dr Lewis-Fokum has worked at the tertiary level since 2010 in the areas of literacy and language teaching.



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FACULTY OF **MEDICAL SCIENCES**



Molecular biology applied to infectious diseases

Professor Paul Brown

Department of Basic Medical Sciences

Background and justification

Molecular biology has become a mainstay for the understanding of communicable and non-communicable diseases. Since many infections of public health importance are caused by bacteria that grow very slowly or are non-cultivable in the laboratory, techniques like the polymerase chain reaction (PCR) have allowed not only rapid detection and typing, but also understanding of the infection and disease process. Further, molecular biology can be applied to investigate aspects of non-communicable diseases and the role(s) microbes play in them.

Objective 1

Anthropozoonotic leptospirosis is caused by pathogenic *Leptospira* spirochetes. Annual cases of severe leptospirosis have reached over 1 million,

making it the world's most common zoonosis, with a mortality rate of 5-20%. The numerous serovars make the development of suitable vaccines challenging, and the lack of rodent pest control in inner-cities and overpopulated urban areas, as well as the dependency on locally produced agricultural products, leave developing countries at a disadvantage.

Since Jamaica's first reported case in 1953, the disease reached epidemic proportions in 1979, with endemic serovars Portlandvere and Jules, being responsible for more than 60% of cases. Local incidence is 6.0/100,000 population, with a peak in reported

cases during the second rainy season (between October and December). Current research has (a) identified the bacteria in post-mortem tissues, including the brain, heart and lungs; (b) assessed the ways how the bacteria attach to mammalian cells in order to cause disease; and (c) characterised virulence mechanisms of the bacteria that are regulated by environmental factors.

Objective 2

For decades, methicillin resistant *Staphylococcus aureus* (MRSA) has been thought of as the prototype of multidrug resistant pathogens. MRSA is a major hospital-acquired and emerging community pathogen that causes severe morbidity and mortality worldwide. There is growing evidence that highlights the spread of MRSA across national borders. In the Jamaican context, MRSA prevalence is <10% at the University Hospital of the West Indies, although over 20% prevalence is seen in Southern Jamaica. This means that Jamaica should share a growing concern as it relates to the health crisis that MRSA poses, and make advances to stave its increased incidence and spread. Against the background of the current antimicrobial resistance crisis, it is imperative that research be conducted to unearth new treatment modalities.

Objective 3

To date, urinary tract infections (UTIs) are among the most frequently encountered hospital- and community-acquired bacterial disease in humans, resulting in increased morbidity and healthcare expenditures. Primarily caused by *Escherichia coli* (*E. coli*), many of these bacteria express multidrug resistance and a vast array of virulence factors to now pose a threat to public health. Considering the emerging issues associated with resistance, the diminished usefulness of novel antimicrobial agents such as the fluoroquinolones as the standard therapeutic strategy are a cause for concern. Since differential DNA methylation serve as an important precursor to disease causation by many pathogenic bacteria, this study sought to determine the potential of DNA adenine methylase gene (*dam*) as a therapeutic target through its influence on gene expression in uropathogenic *E. coli* (UPEC). Prior work investigated the prevalence and molecular basis of quinolone resistance and virulence in these bacteria.

New knowledge created/gaps filled

Objective 1

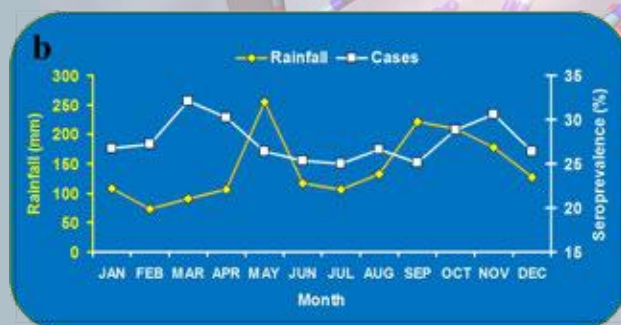
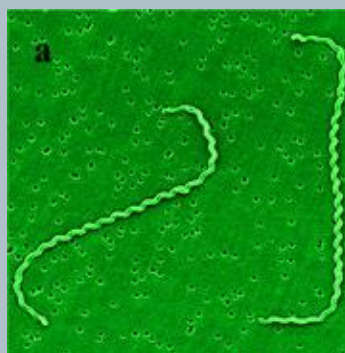
Both *Leptospira* serovars bound equally well to Hep-2 cells; however, serovar Jules showed a higher level of attachment to integrins. Both serovars showed an increase in attachment to HEp-2 cells coated with lectins PNA, UEA, SBA and ECA; in the case of ConA, Jules showed an increase, while Portlandvere showed a significant decrease in attachment. Trypsin-treated monolayers resulted in a decrease in attachment for both serovars, while when chondroitinase, neuraminidase and heparinase were used an increase in attachment was recorded. Leptospirae coated with sugars showed a decrease in attachment. These findings indicate that Jules has overall greater affinities for the mediators examined in this study when compared to Portlandvere, and may suggest that it has a greater potential for virulence.

Objective 1b

Quantitatively, temperature stress resulted in significant changes in gene expression within species or between species. Temperature changes were more influential in



Figure 1



gene expression for Jules, particularly at 30oC and upshift conditions; at 37oC, expression levels were higher for Portlandvere. However, compared to Jules, where temperature was influential in two of five genes, temperature was an essential element in four of five genes in Portlandvere exposed to oxidative stress. At both low and high oxidative stress levels, the interplay between genetic predisposition (larger genome size) and temperature was biased towards Portlandvere, particularly at 30oC and upshift conditions. There was marginally higher transcription in Portlandvere compared to Jules under iron-limitation at upshift temperature and similar transcription rates between both species grown at 30°C and 37°C. Differential gene expressions in iron-limited Jules and Portlandvere highlighted the integration of the pathogens' response to temperature and iron-limiting conditions and species differences. Overall, Portlandvere was more responsive to environmental stress.

Objective 2

Except for staphylococcal enterotoxin I, there was no significant difference in the presence of virulence determinants between MRSA and MSSA bacteria. MSSA had a significantly quicker killing time than MRSA. All groups of virulence genes were significantly associated with *agr* positive *S. aureus* and *agr* positive strains showed significantly quicker killing time in the *C. elegans* infection model. Transcriptional response and biofilm formation decreased significantly in sRNA treated strains compared to those untreated. Lifespan of worms exposed to sRNA treated bacteria was significantly longer than those exposed to untreated bacteria. We concluded that: (a) antibiotic resistance, and not virulence, is the complicating factor in treatment of *S. aureus* infections; (b) there is a strong association between the *agr* locus and the carriage of virulence genes and pathogenicity; and (c) sRNA mediate down-regulation of *agrA* and *sarA* genes and decreased virulence.

Objective 3

This work revealed a considerably high frequency of *qnr* genes (43.5 %) and class I integrons (93%). Virulence factor distribution confirmed 14

subtypes with *fimH* (97.1%) and *cnfl* (75.3%) as the main epidemiological indicators. Mutation of the *dam* gene resulted in significant differences in cell shape (elongated and filamentous mutant cells), deficiencies in cell growth and antimicrobial resistance, and attenuation or abolition of virulence gene expression. Of note, however, were the increased biofilm formation (when exposed to oxidative stress) and adherence to human kidney and bladder cells by the mutants. Phenotypic characteristics of parental strains were restored in *dam*-complemented strains. These results indicated that there were noticeable positive impacts of *dam* mutation in the bacteria.

Benefits to be derived / potential applications

First, the identification of genes involved in the leptospiral response to environmental stresses is an initial

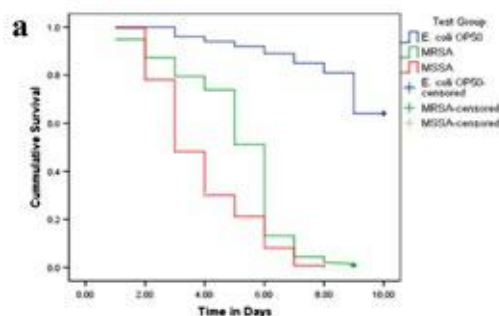


Figure 2.

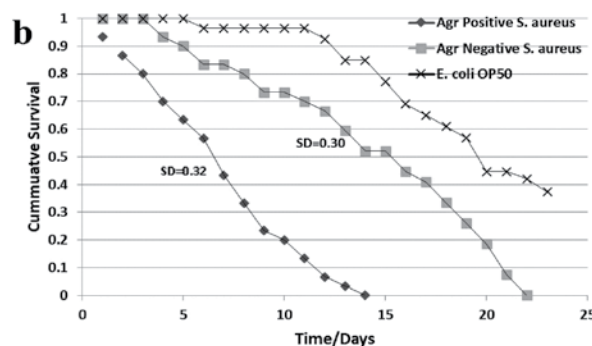
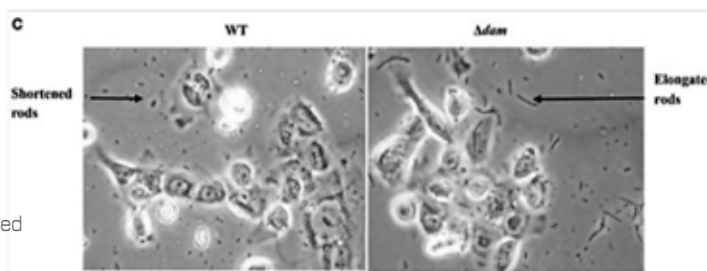


Figure 3.

Micrographs of wild-type (WT) and dam mutant (dam) UPEC strains, illustrating the occurrence of short rods and elongated (filamentous) rods, respectively



step in the global interest in approaches for a broad spectrum human vaccine. In addition, since the disease incidence is linked to avocational exposure and climatic variables, these data will provide greater insight on the factors that modulate leptospiral virulence, and assist with alleviation of symptoms.

Second, control of the emergence of resistance in Jamaica and elsewhere will depend on concerted action for prudent antibiotic use in hospitals, clinics and agriculture, de-escalation when appropriate, and on better patient compliance. Equally important will be development of new drugs with narrower spectra of activity aimed at known and potentially new targets.

Third, UTIs caused primarily by UPEC bacteria often harbour drug resistance and virulence genes. However, recommendations for UTI management are restricted to international guidelines since limited studies are available from developing countries. Within this milieu, the surveillance of antimicrobial resistance, virulence gene distribution, and development and utilisation of non-antimicrobial therapeutics are anticipated to improve preventative strategies and patient outcome.

Bio

Professor Paul D Brown, PhD is Head of the Department of Basic Medical Sciences and Coordinator of several courses for undergraduate and graduate programmes at The University of the West Indies, Mona Campus. He has been involved in research (mainly in Jamaica) for the past 25 years, particularly in infectious diseases as well as in areas of basic medical sciences in diabetes and hypertension research. An important aspect of his research has been to enhance research capacity and foster collaboration in molecular biology.

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Professor Roger Gibson

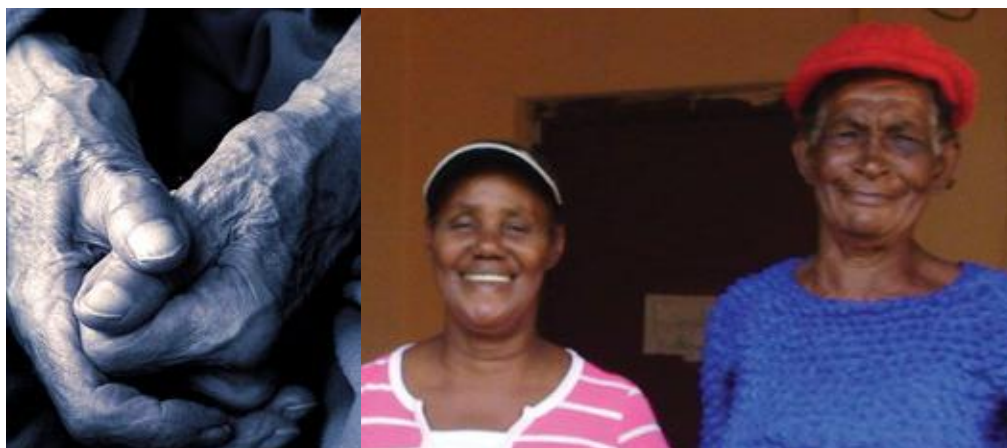
Department of Community
Health & Psychiatry

Depression among older Jamaicans

Feeling depressed, down or frustrated is a common human experience. It is normal to feel this way when we are facing challenging or unpleasant situations. Thankfully, under normal circumstances, these low feelings do not last for a long time. This is because, after a while, we are usually able to appreciate the "big picture" and recognize that although we may be facing difficulties, there are other positive experiences that are present in our lives. Feeling depressed and having depression are not the same. Depression is a medical condition in which an individual has low feelings that are present for most of the day,

almost every day. These persistent low feelings are often accompanied by a general lack of interest, low energy, poor concentration, changes in sleep and appetite, feelings of worthlessness and, in severe cases, thoughts of suicide.

Worldwide, at any given time about 5-10% of individuals are having active features of a depressive illness. Of all illnesses that exist, depression has one of the highest levels of impact on



persons' level of functioning at home, at work and in the community. If someone has depression then the quality of their family and community life and their level of productivity at work are likely to be significantly diminished.

Because the impact of depression is so far-reaching, it is important to halt its progress and reverse its effects as soon as possible. Fortunately, depression is treatable with medication, lifestyle changes (e.g. relaxation, exercise), and with therapy aimed at understanding ourselves and enhancing our coping skills. In order to treat depression, we must first be able to recognize it; and in order to recognize it, it would be useful to know where to look for it. There are a number of factors that make some individuals more vulnerable to depression than others. Women tend to develop depression more often than men. Persons with other medical illnesses are also more likely to develop depression. A history of trauma and the abuse of alcohol and other substances are some other common risk factors.

Depression affects persons of all ages, including the elderly (persons over the age of 60 years). We conducted a survey of elderly Jamaicans who were living at home. We then analysed the ways in which they experienced depression and attempted to identify factors that could be increasing their risk of having the condition. This research has shown that for older Jamaicans, depressive feelings and associated experiences (e.g. changes in appetite, low energy) are more significant if individuals are older (older elderly have more intense experiences with depression than younger elderly); are female; have a lower level of educational achievement; or have problems with memory and concentration (which may also be age-related).



We have also found that older elderly (persons of 75 years of age or older) experience depression in different ways than younger elderly. Older elderly are much more likely to have prominent feelings of worthlessness and hopelessness than younger elderly.

Our knowledge about how depression affects the elderly is potentially valuable in terms of facilitating the recognition and treatment of depression among persons in this age-group. Screening for depression is likely to be particularly valuable among older elderly and women. Probing about worthlessness and hopelessness among older elderly may aid in deciding whether or not a full assessment for depression is necessary. Once depression is identified among older elderly, interventions that seek to enhance a

self-perception of value and restore a sense of hope are likely to be of particular significance among this age group.

Professor Gibson's research collaborators include: Professors Wendel Abel and Denise Eldemire-Shearer; Drs Kamaria De Castro, Trevor Ferguson, Toni-Ann Heron, Kenneth James, Peter Johnson, Gillian Lowe, Gillian Mason, Kathryn Mitchell-Fearon, Sharmella Roopchand-Martin, Ashish Sarangi, Eulalee Thompson, and Norman Waldron; Mrs Uki Atkinson, Mr Pernell Clark, Mrs Patrice Whitehorn-Smith, and Mrs Douladel Willie-Tyndale.



Bio

Professor Roger Gibson is a consultant psychiatrist and Head of the Section of Psychiatry at The University of the West Indies Mona campus. He has focused much of his research on depression and has investigated various issues associated with the condition among diverse groups and populations. He was recently elevated to the rank of Professor.



Congenital syndrome associated with ZIKA in Jamaica, West Indian Medical Journal, 2017; 66:10-19

Emerging arboviruses - ZIKA, Chikungunya and Dengue - and their effects in pregnancy, infancy and childhood in Latin America and the Caribbean

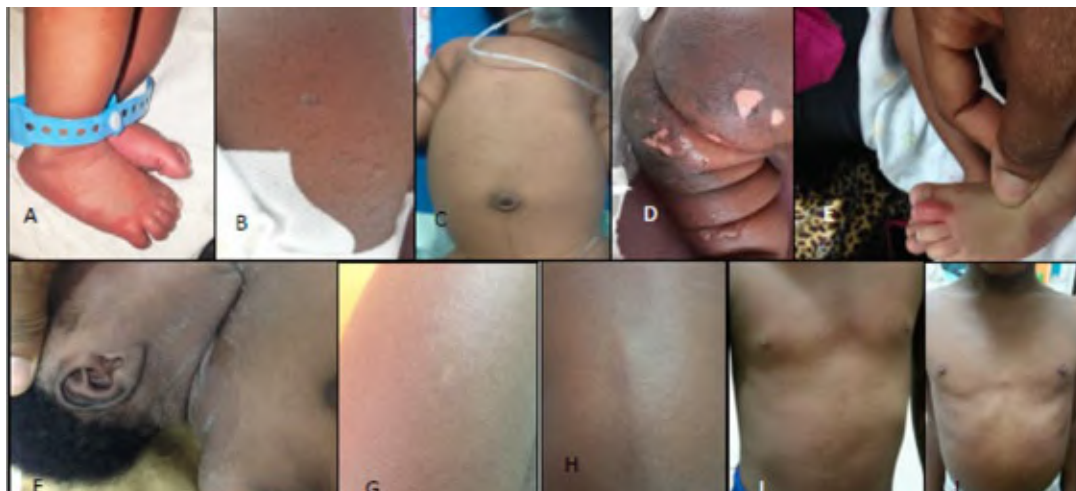
Professor Celia Christie-Samuels

Child (Paediatrics) and Adolescent Health

Background and purpose

Dengue, an arbovirus which is transmitted by the bite of the *Aedes aegypti* mosquito, is causing increased epidemics worldwide, including here in the Caribbean. In 2014, Chikungunya, a new arbovirus, entered the Caribbean. Most Jamaican households were affected by this explosive epidemic, causing widespread absenteeism from school and work, loss of productivity, economic losses of \$60 Billion and significant health sector impact. Children were acutely affected with high fever, rash and severe joint pains. New-borns had irritability and loud groaning, while older children, aged six months to six years, suffered severe convulsions and fever. In 2016, ZIKA, another new arbovirus, entered Latin America

and the Caribbean. Although it is asymptomatic in 85% of persons, ZIKA was transmitted from mother to child with complications in pregnancy. These included pregnancy losses, babies born with low birth weight, microcephaly with poor brain growth and slow development, blindness, deafness and "crooked joints." Older children are being affected with paralysis, with ZIKA probably causing inflammation of the nerves of the spine. While these three viruses are now circulating together, their complete effect on pregnant women and children is unknown.



Skin and joint manifestations of Chikungunya fever in Jamaican children, West Indian Medical Journal, 2016;65(3):431-437.

The UWI's Vice-Chancellor established a Regional UWI ZIKA Task Force shortly after the WHO declared ZIKA an "Epidemic of International Concern". Following UWI-Jamaica's published success with decreasing the mother to child transmission of HIV from 30% to 1%, decreased illnesses and deaths from HIV/AIDS in pregnant women and their children, as well as the successful international rotavirus vaccine trial, UWI's researchers were invited to collaborate with international colleagues in paediatric infectious diseases on research in the emerging arboviruses of ZIKA, Chikungunya and Dengue and their attributable effects in pregnant women and children.

Areas of need the research seeks to satisfy

In Jamaica, the project is evaluating the incidence of, and risk factors for mother to child transmission of ZIKA, Chikungunya and Dengue and their complications in pregnancy, infants and children in a prospective cohort study of symptomatic and asymptomatic women. The formal international grant protocol, for which The UWI has the lead, has been implemented at three delivery hospitals and their five feeder antenatal clinics in Greater Kingston and St Catherine. Since mid-June 2017, 290 pregnant mothers have been enrolled and 45% have delivered their babies. Jamaica is also participating with ZIKAction international sites to evaluate babies who are born with a small brain. Because there is significant cross-reactivity between these and other arboviruses, the researchers are also evaluating the accuracy of various laboratory test kits in the diagnosis of these infections.

Possible direct application of outcomes to the pharmaceutical industry

A qualitative study to assess attitudes to ZIKA virus vaccines in various groups of the society (for example, pregnant women, fathers, health workers) is in preparation for ZIKA international vaccine trials for which UWI also has the lead. Subsequently, the researchers could implement international vaccine trials for ZIKV, of which there are 40 "candidate vaccines". The clinical efficacy of several other pharmaceutical products which are already FDA-approved for other diseases can also be investigated to determine their protection from, and



ZikAction international team "Kick-Off Meeting",
UWI's Vice-Chancellery and Regional Headquarters,
Kingston, Jamaica, October 30 to November 2, 2016

among HIV-infected pregnant women and children will permit rapid scale-up of additional interventional studies, including the addition of sites and partners, to study remaining research gaps against ZIKV, chikungunya and dengue. Recognising the diversity of research questions presented by the ZIKV epidemic and the potential for future severe emerging infectious threats, this international initiative will actively collaborate with other activities, to maximise synergy and avoid duplication of efforts. Our focus on mother to child transmission of ZIKA and the health of mothers and babies in Jamaica is complementary to clinical and laboratory studies in the general population, surveillance and work in public health and prevention.

New partnerships being developed

This ZikAction Project is funded by the European Commission for five years through 2021 for approximately Euros 900,000 to UWI / Jamaica. There are many international partners, led by Professor Carlo Giaquinto and his international team from the Paediatric European Network for Treatment of AIDS (PENTA) Foundation at the University of Padua, Italy. Others include Dr Claire Thorne from the University College London and several others from research sites in England, Brazil, Haiti, Costa Rica, Spain, Argentina, Portugal, USA and Jamaica. The project also fosters diverse interdisciplinary collaboration locally and internationally with paediatricians (infectious diseases, neurology, developmental paediatrics, neonatology), obstetricians (materno-foetal specialists), research nurses, virologists, immunologists, psychologists, ophthalmologists,

treatment of ZIKA. The best laboratory test kits to identify these arboviruses can be validated and then scaled-up for international distribution and use.

New knowledge created / knowledge gaps filled

Some of the research questions, which the researchers seek to answer include: What is the full spectrum of birth defects caused by congenital ZIKA V infections? What are the risks to infants who are born to women who are exposed to ZIKA V at different time points in pregnancy? What is the contributory role of past or recent infection with dengue and/or chikungunya fevers? What are the factors that may modify pregnancy outcomes? What proportion of babies with definite ZIKA infection at birth are born normal, but subsequently develop the abnormal characteristics of ZIKA congenital syndrome? What are the best laboratory tests to identify these infections?

Specific benefits to be derived / potential impact on society

UWI's experience in conducting the rotavirus vaccine trial and observational cohort studies

radiologists, public health practitioners, anthropologists, epidemiologists, statisticians and others.

The “ZikAction Kick Off Meeting” for researchers was held at UWI’s Vice-Chancellery and Regional Head Quarters, in Kingston, Jamaica, from October 30 to November 2, 2016. There were 35 international researchers from Europe, Latin America, USA and the Caribbean - including Barbados and Trinidad - who joined 15-20 local researchers from UWI and the Jamaican Ministry of Health for this inaugural meeting. A follow-up conference with over 60 international researchers attending from 16 countries occurred at the Emerging Pathogens Institute, University of Florida, Gainesville, on Nov 1-3, 2017. Nine UWI/Jamaica researchers attended. Seven of the leading international researchers, including virologists, returned to UWI/Jamaica for site visit(s). A formal Memorandum of Understanding was completed between the UWI and the Jamaican Ministry of Health to implement the protocol(s) and promote data sharing between international and local partners. This collaborative research project is destined for success, to benefit this vulnerable international population of women and children.

Bio

Celia D.C. Christie is Professor of Paediatrics and Adolescent Health, specialising in Infectious Diseases, Epidemiology and Public Health in the Department of Child and Adolescent Health, UWI, Mona Campus. She is the principal investigator for the UWI/Jamaica component of this international ZIKAction research initiative, following her leadership and hands-on experience gained in mother and child HIV studies and international clinical trials of vaccines (rotavirus and pertussis). She can be reached at 876 399 2773, or Celia.ChristieSamuels@uwimona.edu.jm.

Other Team Members:

Prof Russell B. Pierre, Co-investigator, Professor of Paediatrics (Critical Care and HIV Medicine), UWI and UHWI, Mona

Prof John Lindo, Collaborator, Professor of Microbiology, UWI and UHWI, Mona

Dr Roxanne Melbourne-Chambers, Collaborator, Lecturer in Paediatrics (Child Neurology), UWI and UHWI, Mona

Dr Orville Morgan, Collaborator, Associate Senior Lecturer (Obstetrics and Gynaecology), UWI Mona and Senior Medical Officer, Victoria Jubilee Maternity Hospital, Jamaica

Ms Paulette Palmer, Collaborator, Research Nurse Coordinator, Jamaica Paediatric, Perinatal and Adolescent Infectious Diseases (JaPPAIDs) Programme, UWI

Dr Joshua Anzinger, Collaborator, Senior Lecturer in Microbiology (Virology), UWI and UHWI, Mona

Dr Sheree Mair, Collaborator, Post-Doctoral Fellow, Pediatrics (Infectious Diseases, Neurology and Child Development), UWI.

“This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 734857 in collaboration with the ZIKAction International Consortium”.



Oral disease in Jamaica

Dr Arvind Babu Rajendra Santosh

Faculty of Medical Sciences

The research topics of Dr A. Babu Santosh and his team are gum infections, oral cancer and oral microbiology. The team's current research topics are focused on the prevalence of gum infection (KinGing study) and the presence of the human papilloma viruses in the oral cavity (O- HPV study). The aim is to obtain a better understanding of the dental and oral disease status in Jamaica so that national dental policies may be developed from evidenced-based research studies. Preventive and dental health education programmes against dental and oral disease is the ultimate goal.

The areas of need the research seeks to satisfy Gum infection and tooth decay are the two most common oral complaints of dental patients. Gum

infections usually manifest with a change in colour and texture, and bleeding with minimal pressure, and may result in gum recession. Dental deposits such as plaque and calculus are key risk factors for initiating gum disease. Poor oral hygiene and lack of dental awareness are two contributing factors in gum disease development. This condition may be seen in any age group, and can affect any socio-economic group. The researchers' KinGing (Kingston Gingivitis) study seems to be the first of its kind in Jamaica and other Caribbean countries relating to the oral cavity.



Outreach clinical location for KinGing study at East Down Town, Kingston. Ms Sharon White, Outreach clinical coordinator at Franklyn Town, Kingston.



Clinical Examination at Kingston East (KinGing study)

Finding solutions that will reduce the incidence of gum infection is an aim of the researchers.

Oral human papilloma virus is the cause of a subset of oro-pharyngeal cancer. The association of HPV and oral and pharyngeal cancer is accepted by the International Agency for Research on Cancer. Survey studies from Jamaica have shown genital HPV prevalence of 54%, and cancer-causing type HPV of 34.9%. The HPV study seems to be the first of its kind relating to HPV oral cavity presence in Jamaica and other Caribbean countries.

New knowledge created/gaps filled

1. The KinGing study highlighted the prevalence of gum infection among adults residing in representative communities in Kingston. The study documented higher prevalence of gum infection, and more commonly, a moderate level of gum infection. This information has filled the gap in dental prevalence studies throughout the region.
2. The O-HPV study highlighted low prevalence of human papilloma virus infection in oral cavities. The most common HPV subtypes identified were HPV 81, 84, 62 and 72. The findings of the study may help in planning vaccination programmes that cover the identified sub-types in the Jamaican population.

An individual's dental and oral health is directly related to their general health because it contributes to functional and emotional well-being, expectations, satisfaction with care received, and sense of self.

Specific benefits to be derived and potential impact on society

Specific benefits to the society include:

1. Developing preventive strategies for oral health care, and addressing the gaps in oral health related quality of life.



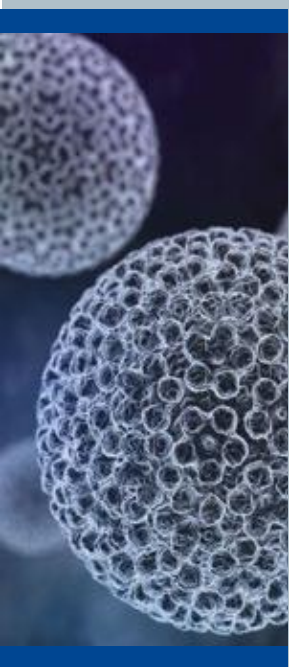
2. Research findings from the Oral HPV study may assist government vaccine policies for appropriate coverage of HPV subtypes that are more prevalent among the Jamaican population.

Contributions to national/regional development

A high prevalence of gum infection in adults residing in Kingston was observed. Most participants presented moderate level of gum infection. Dental deposits (calculus) and educational attainment were strongly associated with gum infection. The results of this study will contribute to the planning and implementation of national preventive, awareness and control programmes on gum infections.

Possible direct application of outcomes to industry
The research findings are expected to have a significant impact on national policies and training of student dentists in the School of Dentistry. The application of the research outcomes to the health industry are:

1. Policy: (a) KinGing study findings can influence the national dental policies on prevention of gum infection(s) and the planning of dental health education programme(s); (b) O-HPV study findings can influence HPV vaccine policies that cover the oral HPV strains/subtypes.
2. Outreach: Implementation of outreach programmes from School of Dentistry, UWI- Mona to serve the vulnerable population.
3. Evidence-based approach: Preparation of student dentists from evidence-based approach, and knowledgeable School of Dentistry graduates on current oral health related problems.



M. Georgia Powell, participant recruiter explaining the KinGing study objectives with resident at Kingston West.



Research meeting with members of the Caribbean Oral Health Initiative and the Latin American Oral Health Association in New Jersey during the launch of the Latin American Dental Unit.



4. Research and publications: Academic development and institutional recognition through conference presentations and publications.

New partnerships being developed

Partnerships developed were between the School of Dentistry and: the Ministry of Health, Government of Jamaica; the Caribbean Oral Health Initiative; and the International Association of Dental Research - Caribbean Section.

Research collaborations in the KinGing study, which are expected to continue to satisfy the research goals, were with the University of Puerto Rico, San Juan, Puerto Rico, Pontificia Universidad Católica Madre y Maestra, Santo Domingo, Dominican Republic.

Bio

Dr Arvind Babu Rajendra Santosh, BDS, MDS, is an oral and maxillofacial pathologist whose interest is focused on oral disease (oral cancer and oral microbiology) research. He has extensive experience in the oral disease diagnosis, investigation, and research in dentistry. Dr Santosh has published 39 peer-reviewed articles, and over 50 abstracts in various scientific conferences.



Determinants of hypertension and cardiovascular health in Afro-Caribbean populations: Identifying opportunities for intervention

Dr Trevor Ferguson

Department of Medicine

Introduction

Hypertension and cardiovascular disease are major public health problems in Jamaica and the Caribbean. In 2004, cardiovascular disease was the leading cause of death, and hypertension was the fourth leading cause of death. Data from the Jamaica Health and Lifestyle Survey 2007-2008 showed that 25% of Jamaicans between the ages of 15 and 74 years have hypertension, and 35% had prehypertension.

Given the high morbidity and mortality attributed to hypertension and cardiovascular disease, our research team at the Epidemiology Research Unit of the Caribbean Institute for Health Research (CAIHR) has been conducting research aiming to better understand the risk factors for hypertension in the Caribbean context and identify opportunities for interventions that may ameliorate the adverse consequences of these conditions. Our research has focused on behavioural, biological and social determinants. More recently, we have begun to explore the concept of ideal cardiovascular health, with a focus on primordial prevention of cardiovascular disease.



Current research

Early life predictors of blood pressure: The 1986 Birth Cohort and Vulnerable Windows Birth Cohorts

A large body of evidence has now emerged showing that experiences in early life, particularly nutrition in the intrauterine and early postnatal period can have lasting effects on adult health. We evaluated this phenomenon using data from two birth cohort studies at CAIHR.

In the first study, from the 1986 birth cohort, our research examined birth weight (a marker of intra-uterine growth) and how this was related to systolic and diastolic blood pressure at age 18-20 years. The research found that systolic blood pressure was inversely related to birth weight in both males and females. A one standard deviation unit increase in birth weight was associated with a 1.16 mmHg reduction in blood pressure in men and a 1.34 mmHg reduction in women. It was also found that participants whose mothers had lower socioeconomic circumstances (based on mother's occupation) at the time of their birth had higher systolic blood pressures.

In the second study, from the Vulnerable Windows Birth Cohort, the research investigated whether postnatal growth from birth to age 15 years influenced blood pressure among adolescents and young adults (15-21 years). It was found that both faster linear growth (gain in height) and faster increase in adiposity (measured by body mass index) were associated with higher blood pressures, but the associations were stronger and more consistent for increase in adiposity.

Risk factors for elevated blood pressure in young adults

Although risk factors for elevated blood pressure have been studied in developed countries, less is known about how these risk factors contribute



to the risk of elevated blood pressure in Afro-Caribbean youth. The research evaluated this in a cross-sectional analysis from the 1986 Birth Cohort. It was found that there were significant differences in the risk factors for elevated blood pressure among males and females. Among males, obesity and high glucose were the strongest risk factors while, among females, high triglycerides (fat) and lower socioeconomic status were positively associated with elevated blood pressure, and moderate alcohol consumption was associated with lower risk of elevated blood pressure.

Neighbourhood socioeconomic status and blood pressure

Community level geospatial and social characteristics have now been shown to be related to several health outcomes, including cardiovascular diseases and hypertension. Our research is currently evaluating the effects of

neighbourhood socio-economic status on blood pressure in Jamaican youth using data from two national surveys and the 1986 Birth Cohort. Findings from this study will help us understand how the neighbourhood context, including poverty, population density and levels of crime influence blood pressure.

Ideal cardiovascular health: Impact of community income, psychosocial stress and social support

Ideal cardiovascular health is defined as the absence of seven cardiovascular disease risk factors (current non-smoking, body mass index $<25\text{kg}/\text{m}^2$, physical activity of at least 150 minutes per week, healthy diet, normal



blood pressure, normal glucose and normal cholesterol levels). This approach focuses on primordial prevention of cardiovascular disease (preventing the development of risk factors). We are currently conducting a study, sponsored by the Bernard Lown Scholars in Cardiovascular Health Programme that will estimate the prevalence of ideal cardiovascular health, and how this varies by community income level. Innovations in this study will include the development of new indices for community socioeconomic status using property values and other community characteristics. The research will also focus on cardiovascular health in poor urban communities and how factors such as psychosocial stress, social networks and social support mediate or moderate these effects. Qualitative research methods will also be used to identify characteristics which may contribute to cardiovascular health.

Opportunities for intervention

Based on our current research findings and expected outcomes from ongoing studies, we have identified several opportunities for intervention, such as improving nutrition in infants, children and women of child-bearing age, preventing childhood obesity, and improving socioeconomic circumstances. These individual and public health interventions may help to reduce hypertension and cardiovascular disease in Jamaica and other Afro-Caribbean countries.

Bio

Dr Trevor Ferguson is Senior Lecturer in Epidemiology at the Caribbean Institute for Health Research and Honorary Consultant Physician (General Internal Medicine) in the Department of Medicine, UWI. He has also been appointed as a Bernard Lown Scholar in Cardiovascular Health at the Department of Global Health and Population of the Harvard T.H. Chan School of Public Health.

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Aqueous extract from leaf of *Artocarpus altilis* provides cardio-protection from isoproterenol induced myocardial damage in rats: Negative chronotropic and inotropic effects

Dr Chukwuemeka Nwokocho

Basic Medical Sciences

The Bioactivity, pharmacological and physiological mechanism(s) of action of some herbal remedies and possible signalling pathways and interactions with other medicinal products has been the focus of our research work here at Mona and with our collaborators abroad. The cardiovascular issues under investigation include hypertension, stroke, heart failure and diabetes, and our studies are channelled into understanding how these medicinal products can be of great use towards the amelioration of these ailments. These scientific studies at our laboratories seek to validate the use of these medicinal plants. They also seek to proffer some understanding of the possible toxicities posed by these remedies in our society.

The global market for medicinal plants and herb is expected to reach \$US250 billion by 2018. Countries, like Jamaica can benefit from the \$180 US million health and well-ness industry in the Caribbean. Plants are now known to have potent antioxidant and cholinergic activities which are relevant to management of cardiovascular disease mechanisms. Some of their therapeutic efficacy and undesirable side effects are not well documented. It may be timely to re-explore historical archives for new directions in drug development as it relates to the Caribbean region, through exploration of the activity of plant extracts using ionic and receptor channel interactions with endothelium to understand the mechanism(s) of action.



Phytochemical screening and extraction of the medicinal active components in these plants through spectroscopic techniques have suggested that these active components may have different effects. These effects were found to include endothelium and non-endothelium induced vasodilatation of the blood vessels, which involves the modulation of calcium channels, with potential therapeutic value. When extrapolated to humans, these interventional and exploratory studies can help in the management of the various disease conditions.

Research findings

Results from our studies on the plant *Artocarpus altilis* (Breadfruit) showed that it caused significant hypotensive and bradycardiac responses, it is a moderate inhibition of cytochrome P450s (CYP3A4 and CYP2D6) enzyme activities. *A. altilis* exhibits negative chronotropic and hypotensive effects through α -adrenoceptor and Ca^{2+} channel antagonism. Drug adversity effects are unlikely if the aqueous leaf extract is consumed with other medications reliant on CYP3A4 and CYP2D6 metabolism. This study thus provides scientific evidence for the use of the breadfruit in the treatment of hypertension. (Nwokocha CR, Daniel U. Owu, Michca McLaren, JeAnn Murray, Rupika Delgoda, Karen Thaxter, Garsha McCalla, Lauriann Young. (2012). "Possible mechanisms of action of the aqueous extract of *Artocarpus altilis* (breadfruit) leaves in producing hypotension in normotensive Sprague-Dawley rats". *Pharm. Biol.*; 50 (9): 1096-102).

A. altilis also significantly reduced heart/body weight ratio (49%), MI (96%), HR (27%), sympathovagal imbalance (36%) and serum cardiac biomarkers (AST, LDH, HDL, triglycerides and CCK) caused by ISO. AA decreased the beat frequency of isolated right atrium (11%) caused by Isoproterenol (ISO), an action similar to propranolol (beta-adrenergic antagonist; 20%), but showed no significant changes in the QTc intervals of the ECG (suggesting no cardio-toxic drug-herb interactions). Thirty-nine compounds were detected using high resolution LC-MS analysis (HPLC-Orbitrap-APCI-MS) in the extract. Pure compounds, as gallic acid and rutin, presented a higher negative chronotropic effect, similar to propranolol. Oral administration of aqueous extract of *Artocarpus altilis* has cardio-protective functions in myocardial injury, in part, by decreasing the HR, reduced contractility and infarct size. (Nwokocha CR, Palacios J, Simingiotis MJ, Thomas J, Nwokocha M, Young L, Thompson R, Cifuentes F, Paredes A, Delgoda R. "Aqueous extract from leaf of *Artocarpus altilis* provides cardio-protection from isoproterenol induced myocardial damage in rats: Negative chronotropic and inotropic effects". *J Ethnopharmacology*. 2017 5; 203:163-170).

The areas of need the research seeks to satisfy

Our research seeks to satisfy the use of scientific knowledge and techniques in the validation of folkloric information as it relates to medical practice. We also seek to develop and understand the mechanism of actions involved in these processes, which is an integral process necessary to drug validation and development. Our studies looked at the toxicity and drug-drug interactions of these products, which are the many reasons for the complications in their usage

New knowledge created/gaps filled

New knowledge created through our research work include: an understanding of how the active medicinal principles inherent in these plants can be best harnessed by those using them as remedies; the possible drug-drug interactions that are possible, sometimes giving rise to worse outcomes on those using these medicinal products;



and drug concentrations and levels of safety / dose regiments. The research also seeks to foster and promote an increase in the use of these natural products as a cheaper or low-cost alternative in the management and treatment of cardiovascular disease outcomes. Hopefully, these ideas will not only be patented, but improved on to create wealth and encourage an academic-industrial scale development and collaboration. This can be a source of economic and human development within the region

Specific benefits to be derived - potential impact on society

- Scientific knowledge and validation of the usefulness of these medicinal natural products, the dose regiments that can be efficacious, the toxicity and harmful possibilities of uses, drug-drug interactions in light of the fact that many users combine these products with other orthodox medications.
- Promote collaborations with laboratories within the country, the region and beyond to effectively harness, understand and tackle these

health conditions with evidence-based complementary and, or alternative medications. Hopefully, this will drive down the cost for assessing health in many low and middle income or developing countries. Our collaborations with other laboratories have also greatly improved the quality of our research, and giving us some competitive edge. This has enabled us to broaden our research into new innovative and interventional objectives. Such ideas have enabled us to attract new funding for growth and improved research outputs. This can be seen in the many publications in very high impact journals. Contributions to national/regional development

- Scientific breakthrough in research, avenue for training of students and members of staff on scientific throughput in research, collaborations



with other institutions, scientific communities, regional collaborations and National / international collaborations. These will engineer more national and regional collaborations, institutional visitations and student / staff exchanges, that further contribute to national / regional developments.

- Highlighting and showcasing the richness of the Caribbean, as a treasure store house of natural remedies. This can become a veritable source for the generation of funds for economic growth and future earnings. Hopefully we will be able to get new patents and seek newer ways of improving the University's earnings through our research work and studies.

Possible direct application of outcomes to industry

- Industry can partner with us in the separation and fractionation of the medicinal active principles for drug development, specific tissue and disease targets. Some of the medicinal plant products have already been commercialised as nutraceuticals, and the industry can take advantage of this new phenomenon to develop new drug remedies, and generate some economic dividends.
- Drug development, students / staff manpower development, scientific knowledge throughput, growth of research in our institutions and country.
- Separation, identification and characterisation of the medicinal active principles in these medicinal plants
- Currently, we are about to begin Phase one Clinical trials in humans to determine the antihypertensive and cardio-protective effects of *Artrocarpus atilis* extracts at the University Hospital of the West Indies

New partnerships being developed

Intra-faculty and Inter-faculty collaborations, institutional and national collaborations between our laboratory here at the Faculty of Medical Sciences UWI Mona, and our collaborators at two different institutions in Chile (University of Antofagasta and Artruo Prat Universidad, Iquique Chile). Our collaborations with other laboratories (here and beyond), have also provided us with some avenues to get help and training for the graduate students working with us. They have benefited from visitations to these laboratories through these collaborations in the area of research and development of their graduate studies and skills training. These knowledge, technology and skills transfer can help to promote growth, skills acquisition, research-based training, manpower training and improved knowledge in both the academia and industry.

Bio

Dr Chukwuemeka Raphael Nwokocha (PhD (Physiology), PhD (Environmental Health Biology) is a senior lecturer and researcher in the Faculty of Medical Sciences. He has published over 50 manuscripts in peer-reviewed journals. His research focus has been in the area of experimental hypertension and understanding the mechanism(s) and signal pathways involved in the development, management and maintenance of blood pressure. Currently, he leads a team from The UWI to explore the correlation, incidence and prevalence of hypertension as it relates to cadmium accumulation in the Jamaican population. He is the country co-ordinator for the International Society of Hypertension, and drives the Month of May measurement of blood pressure throughout the island, as part of an international drive for awareness of the status of hypertension worldwide.

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Professor
Marcia Roye

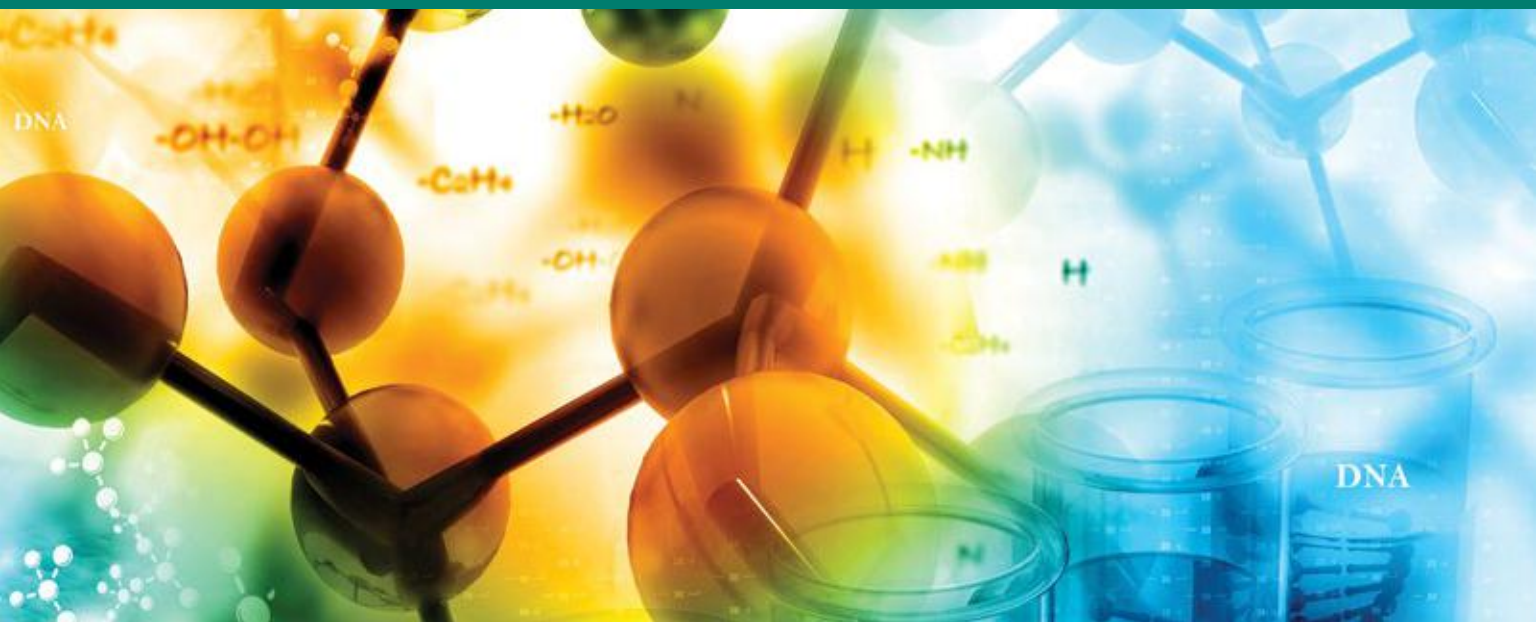


Dr Marhoun
Ferhat



Dr Sheena
Francis





FACULTY OF SCIENCES & TECHNOLOGY



Developing control strategies against geminiviruses and HIV

Professor Marcia Roye

Biotechnology Centre

Professor Roye is a virus hunter or, formally, a molecular virologist. Molecular virologists study virus genes to use the information to develop control strategies against the viruses. Professor Roye's research team study a group of plant viruses called geminiviruses and HIV which causes AIDS.

Geminivirus research

Geminiviruses belong to the largest group of plant viruses worldwide although their study only began intensively in the 1970s. Geminiviruses infect some of the most important crops globally

including corn, wheat and cassava. Geminiviruses are transmitted by insects called whiteflies when the whiteflies feed on the plants. In the Caribbean region crops such as tomato, reds peas and cabbage are affected. To date, the research team's efforts to hunt viruses have been very successful, as in Jamaica more than 24 geminiviruses have been characterised from crops, weeds and ornamental plants. The most important of these is probably Tomato



Whitefly that transmit geminivirus



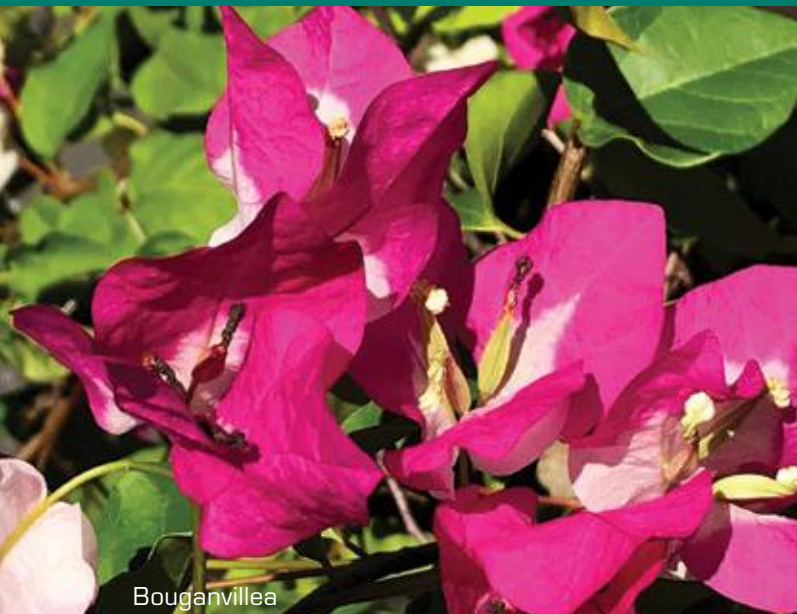
Healthy and infected papaya

yellow leaf curl virus (TYLCV) and Tomato dwarf leaf curl virus (TDLCV) which infect tomato and scotch bonnet peppers. The farmers in St Elizabeth call the disease the 'jherri curl' disease because the viruses cause the leaves of the tomato plant to curl up. TYLCV is the most severe virus affecting tomato production globally. Most of the reds peas in our Sunday rice and peas or our beloved stew peas is imported because red peas production in Jamaican was decimated by Bean golden yellow mosaic virus (BGYMV) since the early 1990s. Additionally, two viruses, Cabbage leaf curl virus (CaLCuV) and Cabbage leaf curl Jamaica virus (CaLCuJV), were discovered in cabbage. The two cabbage viruses are particularly severe on cabbage production as they prevent the formation of the compact cabbage head, leaving the farmer with no products to sell. Both TDLCV and CaLCuJV are unique to Jamaica.

More than 19 geminiviruses have been identified in many common Jamaican weeds, or 'bush'. It is important to identify if viruses in common weeds can infect economically important crops, as the viruses can move via whiteflies from the weeds to the crops. Recently geminiviruses were identified in papaya and gungo peas, and preliminary data suggest that these viruses are also present in the common weeds *Bastardia* sp. and *Rhynchosia* sp. Additionally, the common flowering plant bougainvillea which decorate many Jamaican gardens was shown to be infected with a weed virus, *Macroptilium* yellow mosaic virus, which infects the common roadside weed *Macroptilium* lathyroides.

Research impact

This research has assisted in the development of control strategies for geminiviruses that infect crops in Jamaica. For instance, through RADA, Bodles Agricultural Research Station and the Ministry Agriculture and Fisheries, farmers have been advised to plant resistant varieties of crops that do not get infected with the virus. Farmers, for example, may avoid the 'jherri curl' disease by planting tomato varieties such as Gemstar, Gempear and Gempride or Adonis, and cabbage farmers are advised to plant



Bouganvillea



cabbage field collecting samples

tolerant cabbage varieties such as Tropicana. Unfortunately, there are no virus resistant Scotch bonnet peppers and ree peas, and these continue to be devastated by geminiviruses.

Collaborators

Phillip Chung, Rural Agricultural Agency (RADA); Professor Wayne McLaughlin, Department of Basic Medical Sciences, UWI, Mona; Professor Douglas Maxwell, Department of Plant Pathology, University of Wisconsin-Madison; Professor John Stanley, Department of Disease and Stress Biology, John Innes Centre, Norwich, UK; Professor Claude Fauquet, International Laboratory for Tropical Agricultural Biotechnology, Danforth Plant Science Centre, St Louis, MO; Professor Judith Brown, School of Plant Sciences, University of Arizona, Tucson; Professor Darren Martin, Institute of Infectious Diseases and Molecular Medicine, University of Cape Town, South Africa; and Dr Jan Kreuze, International Potato Centre, Lima, Peru.

HIV research

In 2016, the UNAID reported that there are nearly 37 million people living with HIV globally, 34.5 million of whom are adults. The same year there were 1.8 million new infections and about 1 million AIDS-related deaths. Sub-Saharan Africa is most severely affected, with 64% of infections globally. The Caribbean has the second highest HIV prevalence with about 1.0% of adults living with HIV. In the Caribbean, there are about 310,000 infected persons and, in 2016, 18,000 were new infections. In Jamaica, there are 30,000 persons living with HIV and there were about 1,300 AIDS-related death. About 19% (6,000) of infected persons are unaware of their HIV status. About 34% of persons (10,200) living with



Gungo plant with yellow mosaic symptoms



HIV in Jamaica are being treated with antiretroviral drugs. Pediatric AIDS cases (children under 10) have declined over the years because pregnant mothers are treated with antiretrovirals. In 2016, there were less than 100 new infections in children. There are 31 antiretroviral drugs approved by FDA, and treatment has resulted in the decrease in the number of AIDS-related deaths and an increase in the lifespan and quality of life of persons living with HIV. The only 'fly in the ointment' is the development of antiretroviral drug resistance. This occurs when HIV is not killed by the antiretroviral drugs.

An interdisciplinary multi-institutional team, including the researcher, Dr I Amarakoon, Department of Basic Medical Sciences, Dr R. Pierre, Departments of Obstetrics Gynaecology & Paediatrics, Professor P. Figueroa, Department of Community Health & Psychiatry, Dr J. Duncan, Ministry of Health and Environment, and Ms L. Eyzaguirre & Dr J. Carr of the Institute of Human Virology, University of Maryland School of Medicine, Baltimore, set out to identify, for the first time, antiretroviral drug resistance in HIV patients in Jamaica. In one study with a cohort of 122 participants, 26 patients (28%) displayed resistance-associated with HIV drugs. In a second study of 55 HIV-infected children, in 39 of the children HIV drug resistance was detected. The HIV drug-resistance profile generated for each patient in the study is used to improve the treatment of HIV for those individuals by selecting HIV drugs to which the patient is susceptible, or drugs that will kill the HIV in that patient.

Bio

Professor Marcia Roye is a member of staff in the Biotechnology Centre and Associate Dean of Graduate Studies and Research in the Faculty of Science and Technology
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Materials for energy and nanotechnology

Dr Marhoun Ferhat

Department of Physics

Materials Science is by essence an interdisciplinary field involving the discovery and design of new materials for applications spanning the entire activities of modern society. From regular public appliances to HI-TECH products passing by specialised tools (medical, transportation, space, and the like), it is actually very hard to dismiss the "finger-print" of material research and development on all those end-users products. It is in this context that the Materials Physics Research Lab (MPRL) at the Physics Department is currently conducting multidisciplinary research topics including: a) clathrates of silicon for photovoltaic and photonic applications; b) nanoscale patterning through self-assembly using di-block copolymers for nanotechnology; c) chalcogenides materials for electronic refrigeration and thermoelectric

energy conversion; and d) Ferrites based oxides for spintronic and quantum computer applications. Some research results from topics a) and b), recently published in refereed international journals, are presented below.

Clathrates of silicon for photovoltaic and photonic applications

The need to efficiently produce energy, with the challenging constraints to be both environmentally friendly and economically viable, is certainly one of the subjects attracting the full attention of both decision makers and research scientists around the

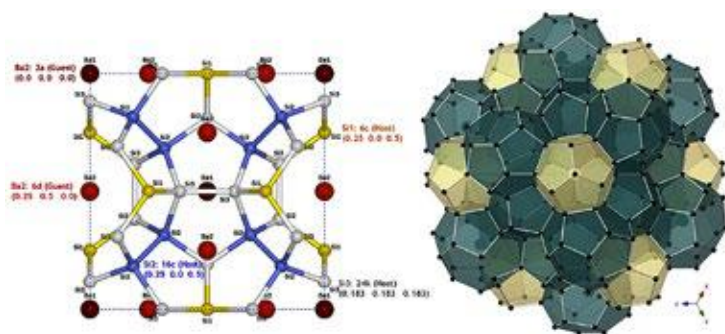


Fig.1

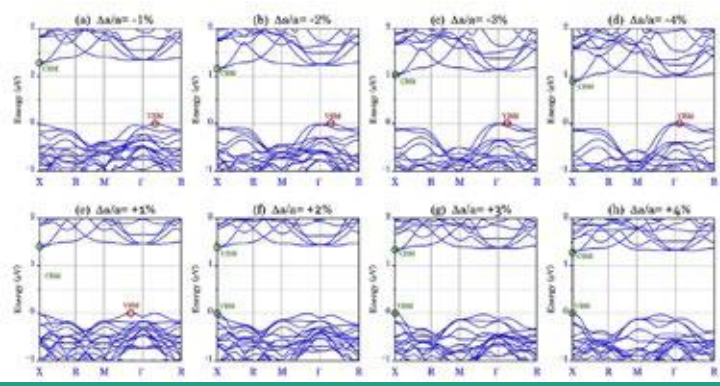


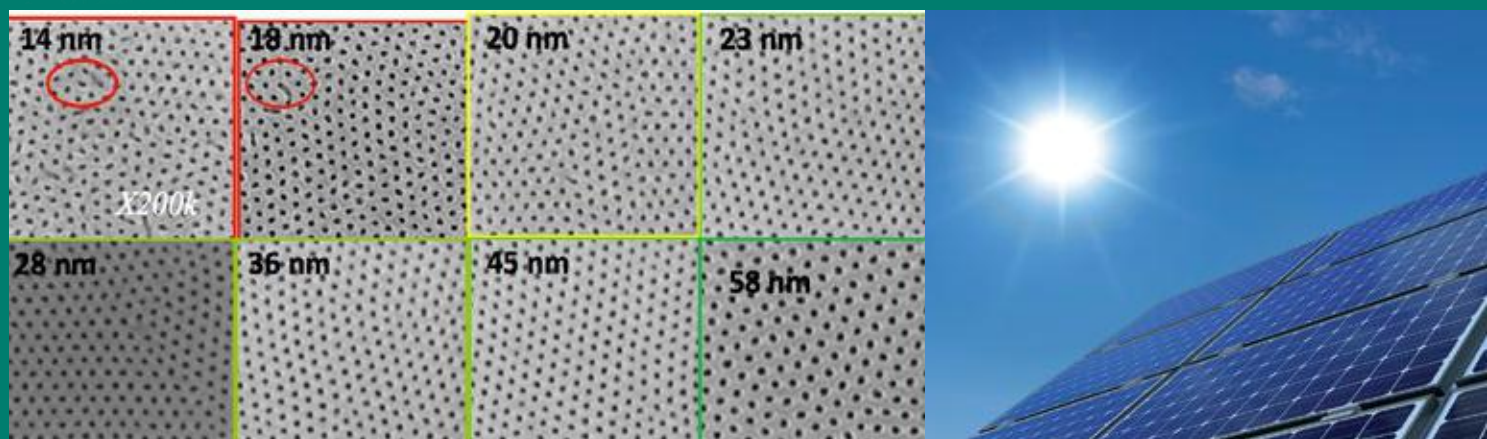
Fig.2

world. Converting the fully abundant sun light to clean energy (photovoltaic energy conversion) is among the most attractive and sustainable energy source that can be exploited to meet the standards established recently for the ongoing climatic changes. In this context, it is worth mentioning that Jamaica, in particular, and the entire Caribbean region, in general, stand at the top of the world's solar energy potential chart. Therefore, building a strong research agenda in this field, holds great promise for the sustainable eco-development of the region.

Although less efficient than its counterparts from the III-V compounds family of the periodic table (which are presently adopted for space technology with 40% efficiency), silicon remains the most attractive element for terrestrial application owing to its low cost (2nd most abundant element on earth's crust) and mature technology. However, the indirect band gap of diamond Silicon (d-Si) remains the main fundamental parameter, which severely limits the efficiency of Si-based solar cells (25% maximum efficiency) and is also a big challenge for the development of an advanced optoelectronic technology based solely on silicon. In order to solve those fundamental problems, the MPRL research team has recently proposed the all-Silicon Si₄₆ in its clathrate crystalline form (Fig1) as a highly viable alternative to the regular silicon for photovoltaic. Using state-of-the-art first principle calculation within frame of the Density Functional Theory (which has been proven to be exact) the researchers predicted the possibility of inducing an indirect to direct gap transition in this material by imposing a 4% biaxial tensile strain (Fig2). They also proposed the experimental procedure to be adopted in order to produce such a strain, which entails growing the silicon clathrate in thin film form on a substrate having 4% lattice mismatch.



Fig.3



Potential impact of the research

Among the immediate potential impact of those results, if the experimental realisation is successful, are : i) A direct band gap in silicon clathrate will increase the efficiency of solar cell to the level of being much more competitive to the existing fossil fuel technology; ii) the successful growth of silicon clathrate in thin film form (about 1 μm thickness) will bring about an appreciable reduction of the amount of silicon used in solar cell manufacturing (presently 500 μm thickness), pooling down tremendously the cost of photovoltaic modules; iii) increasing the efficiency will considerably reduce the surface area required for a particular output power, which is presently a challenge; and iv) a direct band gap in an all-silicon material is a step forward for the "dream" of the application of silicon in optoelectronics (lasers, optical detectors and the like).

For the experimental realisation of this project (PhD candidate, N.A. Mahammed), the researchers currently have an ongoing collaboration with Prof. Toyohiro Chickyow from the National Institute of Material Science (NIMS, TSUKUBA) in JAPAN.

Nanoscale patterning through self-assembly using di-block copolymers for nanotechnology

Self-assembling (S-A) soft materials have realistic potential for manufacturing nano devices at future technology nodes. Block copolymers (BCPs) are a class of self-assembling materials that segregate on nanometer length scales, making them ideal for emerging nanotechnologies. In particular, self-assembly through phase separation in BCPs thin films, represents an attractive route to create spontaneously ordered patterns at the sub-lithographic range. The cost effectiveness, the fast parallel processing time, as well as the compatibility with the standard microelectronics technologies make it among the most promising techniques to meet the ever-challenging feature size requirements in nanotechnologies.



In this work, the researchers investigate the behavior of cylinder forming poly (styrene-*b*-Methyl-Methacrylate) PS-*b*-PMMA self-assembly on a chemically neutralised 300 mm Silicon wafer. The effect Of the process paramaters such as the annealing temperature and time, the film thickness, and the BCPs periodicity on the holes' formation after PMMA removal were studied in systematic fashion using statistical analysis of the Critical Dimension-Scanning Electron Microscope (CD-SEM) images, focusing mainly on the Critical Diameter (CD) and circularity of holes. In particular, it was found that both (CD) in the narrow range of 10-15 nm and a hole circularity of (0.8-0.9) in excess of 96% can be achieved on the whole wafer under appropriate processing conditions. The obtained results were correlated to the self-assembly process, and shed some light on the dynamic of the phase separation process of BCPs. The level of reproducibility and control achieved on a 300 mm silicon wafer (Fig3) hold a promise for future applications in nanotechnology. Among the immediate potential applications of those results, is the adoption of those facile and cost-effective method in typical developing countries, like Jamaica, to perform advanced research in nanotechnology without the need for inaccessible nanofabrication facilities with applications in nanotemplating, nanolithography, catalysis, photovoltaic and numerous emerging nano devices.

The experimental work realised in this project (PhD candidate M. Loucif Seiad) was performed at IMEC (state-of-the-art nanofabrication facility) with the collaboration of Dr Roel Gronheid at LEUVEN, BELGIUM.

Ongoing collaborations

University of Georgia Athens (USA), University of Nottingham (UK), University of Besançon (France), National Institute for Material Sciences (NIMS, Japan), Central University of Venezuela (Venezuela), IMEC Leuven (Belgium)

Bio

Dr Marhoun Ferhat is a senior lecturer in the Physics Department. His research includes: the discovery of new materials for Photovoltaics, Thermoelectrics and Spintronics. He is an expert in thin films growth and characterisation, and is currently leading the Materials Physics Research Lab at The UWI, Mona Campus for research projects of both regional and international interests.

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Insecticide resistance testing and monitoring in *Aedes* mosquitoes of Jamaica: Towards developing novel control measures to limit the transmission of their diseases



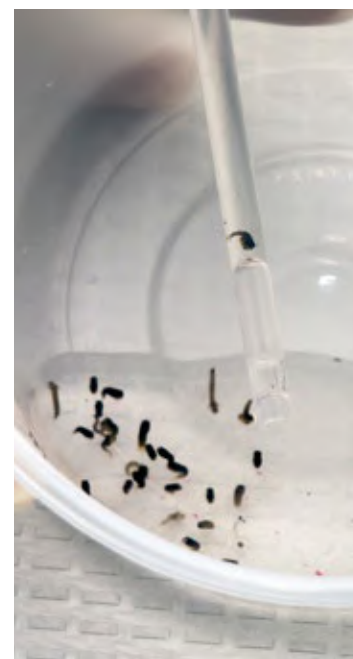
Dr Sheena Francis

Natural Products
Institute

For more than three decades, the Caribbean and Latin America have been affected by multiple infectious diseases, such as dengue, yellow fever, Mayaro and, in the recent decade, chikungunya and Zika, transmitted by the *Aedes* mosquitoes. According to the Pan-American Health Organisation, mosquito-borne illnesses in the region increased during the period 2009 – 2016. Many countries reported an increase in the number of dengue cases, a disease that is endemic to the region, and also a change in the cycle of infections. In addition to these changes, came the introduction of novel diseases to the

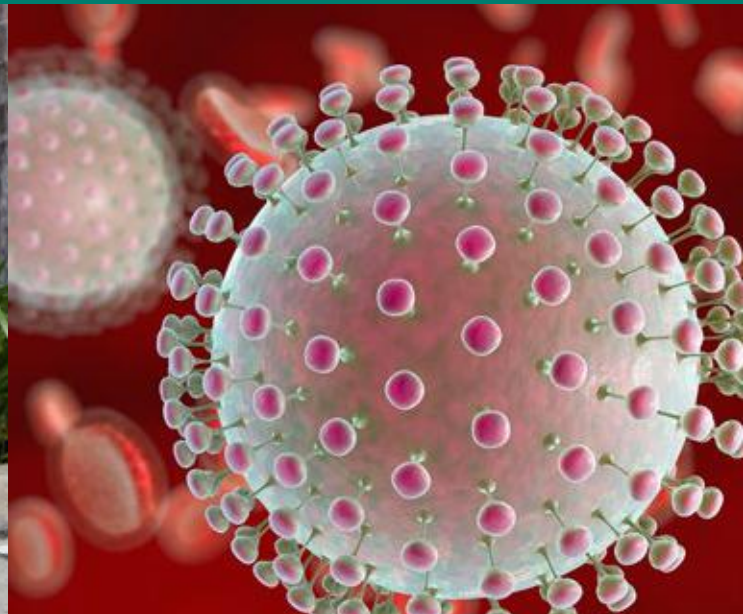
region, chikungunya and Zika, which infected many individuals throughout the Americas, and the long-term effect of these diseases are unknown (PAHO 2016, WHO 2017).

Limited by the availability of effective medicaments and vaccines to treat mosquito-borne illnesses, the control of the spread of the diseases relies heavily on the use of insecticides to control the vectors. However, this has led to many challenges primarily



owing to changes in the vector's behaviour. These challenges include altered patterns in entry and exit times to human dwelling and genetic modifications that usually result in resistance to insecticides. Also of interest is that some of these modifications have led to alterations in vector competence of pathogenic viral transmission (Hemmingway et al 2004). All these factors adversely affect vector control.

With this in mind, Dr Sheena Francis and collaborators from the Natural Products Institute in the Faculty of Science and Technology have been examining the efficacy of natural extracts from Jamaican plants that can reinstate susceptibility to commonly used insecticides in mosquitoes. With a vision to evaluate the problem at a molecular level, and with an aim of filling in the gap in knowledge of current vector status in the country, Dr Francis undertook to examine insecticide resistance in *Aedes aegypti* mosquitoes from St Andrew, Jamaica. The study was funded by the Principal's New Initiative grant and, together with collaborators at the Colorado State University, the current status of insecticide resistance in *Aedes* mosquitoes to malathion and permethrin, has been reported (Francis et al, 2017). Additional funding was secured via Seedings Lab Instrumental Access Programme to outfit the Natural Products Institute with equipment to continue the study in Jamaica. Both the Ministry of Health and the USAID, under its Zika AIRS Project, have expressed an interest in working with Dr Francis to further investigate and monitor insecticide resistance in Jamaican mosquitoes, in an effort to mitigate the spread of their diseases in the country. Continued efforts on this study play an integral part in the recently formed Mosquito Control Research Unit (MCRU), a collaborative unit among the University of the West Indies, the Ministry of Health and the Jamaica Red Cross Association.

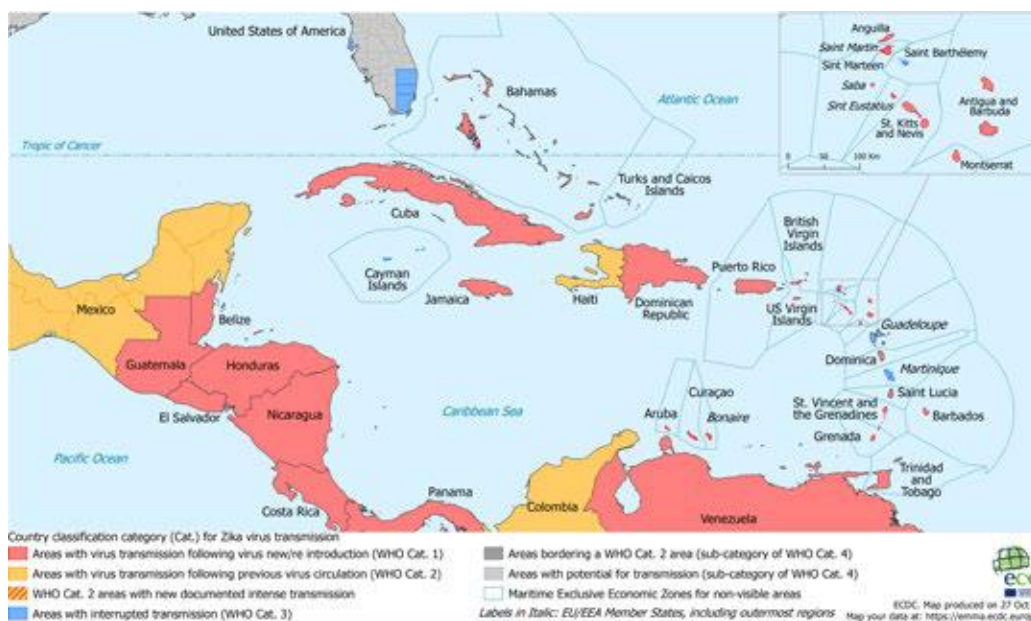


The monitoring of insecticide resistance in vectors of infectious diseases can serve as a tool to ensure that the most effective vector control measures are being used. Through effective monitoring and management strategies widespread insecticide resistance can be slowed or lessened, through the development of new and innovative entomological applications suitable for the country, to reduce the spread of endemic or novel vector-borne diseases.

Bio

Dr Sheena Francis is a research fellow at the Natural Products Institute, UWI. Her research focuses on insecticide resistance in mosquitoes, and measures of their control. She completed her PhD at The UWI, Mona Campus. Throughout the years, she has gained several postdoctoral

experiences from Loma Linda University, Liverpool School of Tropical Medicine, Colorado State University and University of Florida. With these experiences, she has grown her collaborators, not just locally but also in the UK, USA and Nairobi, with whom she works on many projects.





Dr Lawrence
Nicholson



Professor
Aldrie Henry-Lee





FACULTY OF **SOCIAL SCIENCES**



Women in family-owned business: The 'silent' but 'loud' voices needed for economic development

Dr Lawrence Nicholson

Mona School of Business and Management

The statement that women are very important players in the success of family-owned businesses (FOBs) in Jamaica could be considered the overstatement of the century. The initial findings from data collected on FOBs in Jamaica point to women playing a pivotal and anchoring role in the success and sustainability of FOBs. But they are not always given the “visibility” and “voice” for the optimisation of the family-owned businesses, which can redound to greater economic development of Jamaica.

But what is the significance of highlighting the role of women in FOBs? The answer to this question is two-fold: family-owned businesses make up more than 75% of all businesses globally, and women are assuming a greater role in family-owned business in other parts of the world. Jamaica should not be left behind. The following bold statements from research of FOBS help to underline both the



importance of FOBs and the nexus with women in the overall economic development of a country:

Family businesses are the engine that drives socio-economic development and wealth creation around the world, and entrepreneurship is a key driver of family businesses. (Pistrui et al. 2006, 460)

Without question, family firms remain a dynamic and resilient sector, even though the post-recession economic environment is proving tough, and there are continuing pressures in relation to skills shortages, innovation, and governance. This is the big picture, but when you look more closely at the detail, it is clear that there are significant shifts underway in the family business sector. There are also new challenges that these firms will need to seize and address if they are to remain as successful in the future as they have been in the past. (PWC 2014)

The number of women entrepreneurs is growing, and it is particularly noticeable in family business sector, where more and more women are taking over the reins of the family firm (Bermejo, 2011).

The revenue generated by FOBs in Jamaica is equivalent to 30-32 percent of Jamaica's GDP (Nicholson, 2010).

If we are to believe the above and many other similar citations on FOBs, then how can we justify the attempts, wittingly or unwittingly, to "silence" the "voice" of the woman in FOBs in Jamaica? This attempt is manifested in a number of ways, including the ones captured in the following real scenarios.

Scenario 1: Progress Book Publisher is a woman-owned business. This is a fact known by those in the business community, friends and family members. However, when the owner, Mrs Corbin, was asked if the business was a woman-owned or a family-owned, she responded that it was a family-owned business. Further probing revealed that two of the reasons for stating



that the business was a family-owned and not a woman-owned were: (i) she believed that it was easier to access loans from the bank, because experience taught her that having her husband (the man) as the “voice of the business” provides a “hassle-free” passage for a loan; and (ii) stating the truth (that the business was a woman-owned) could provide fodder for some form of conflict in the marriage, since the “husband’s feelings would be hurt”.

Scenario 2: In a survey of family-owned business in the English-speaking Caribbean, including Jamaica, it was found that the most commonly designated name for FOBS was “Family-name and Sons”. Examples include, “Sam Isaacs and Sons”; “Joe and Sons Wrecking Services”; “Peter and Sons International”; “Robinson and Sons Hardware”; “Lincoln Gordon and Sons” and “Hanna B.J. and Sons Ltd.”. There was no instance of “Family-name and Daughters”. This attempt to silence the voice of women in the FOBs is compounded

by the fact that a number of these businesses were named before there was a child in the family (or the couple having children).

What is the point?

Findings from the survey of family-owned and women-owned businesses in Jamaica show that women-owned businesses are the fastest growing set of businesses (Nicholson & Garvey, 2006). But women seem not to be in a “rush” to combine their resources with that of the family, because they believe that they will become “lost” and their contribution will not always be recognised. That is, the findings show that the role of women in FOBS seems to be more “invisible” than “visible”, consistent with the findings of other researchers who have explored the role of women in FOBS (Rowe & Hong,



2000). This means that the pivotal role women are playing in the success and sustainability of the family-owned business is not being adequately recognised or acknowledged, which might be fuelling the thrust of a number of women to “go it alone” in their business ventures, when they would have preferred to combine family resources to form stronger and more robust family business ventures.

The need to give women a more “visible role” and a “louder voice” in the family-owned business is underlined by the finding which shows that a number of successful FOBs in Jamaica are those in which women were not only part of the running of the businesses, but also played the role of holding the “family together”, thus reducing the chance of having a “broken family”, which could redound to the demise of the business.

One implication of the findings from the foregoing is to allow women to have a “louder voice” in family-owned businesses in Jamaica. “Allowing” means to give greater recognition to the role that women play in the overall development and sustainability of FOBs. The family has been shown to be the seat of entrepreneurship in the Caribbean and Jamaica. Women continue to be the main glue to the family in the Caribbean and Jamaica. It stands to reason that any attempt to make women “invisible” or become “silent” in the FOBs is a recipe for the demise of the long-term economic development of this important sector in the Jamaican economy.

Bio

Dr Lawrence Nicholson is a senior lecturer in the Mona School of Business and Management. His research interests include supply chain management, family-owned businesses and women-owned businesses.



Childhood and sustainable development

88

Professor Aldrie Henry-Lee

SALISES

Professor Aldrie Henry-Lee's work has spanned several areas of social policy: health, social protection, poverty, vulnerability, crime and children's rights. Increasingly, her research focusses on the place of children in the formulation and implementation of development policies in small island developing states (SIDS) and examines how various institutions in the society treat children. Some specific research areas include children's rights, child poverty, children in violent circumstances, children and climate change, children as citizens, and the impact of imprisonment on women and children.

The research shows how systemically and institutionally we "endanger childhood" in small island developing states. Using both primary and secondary data, Henry-Lee's research discusses how childhood is endangered by inadequate policy formulation and implementation, and social attitudes and practices in almost all social institutions in the society. There is unsatisfactory policy-attention on children, and it is only



since the adoption of the Convention on the Rights of the Child in 1989 that, gradually, children are receiving increased policy attention. However, there are several policy gaps and programmatic deficiencies. Daily, children face several vulnerabilities, with some groups (for example, those with disabilities, those living in violent circumstances, those infected with and affected by HIV/AIDs, those working and living on the streets and those who are deprived of familial care) needing immediate attention. There is a lack of urgency to the plight of children in SIDS, and inadequate recognition that they are the foundation for sustainable development.

Unless drastic action is taken to transform policy and social attitudes there will never be any sustainable development in these small-island developing states. If investment in children remains inadequate, then the returns from that investment will be insufficient to secure sustainable development. Caribbean countries have not yet recognised the full potential of their children. The researcher proposes policy recommendations for improvement in the provision for, the protection of, and participation of children in small-island developing states. These proposals include a paradigm-shift which facilitates the centeredness of children in development policy and the provision of child-friendly services by all our duty bearers.

Professor Henry-Lee's research is about children. Her philosophy is that we need to empower our research targets. As such, she is proud to chair the annual Caribbean Child Research Conference through the efforts of notable partners: Sir Arthur Lewis Institute of Social and Economic Studies (SALISES), UWI, Mona, the Caribbean Child Development Centre (CCDC), Mona, the Child Development Agency (CDA), the Early Childhood Commission



(ECC), the Planning Institute of Jamaica (PIOJ), the Office of the Children's Advocate (OCA), the Office of the Children's Registry (OCR), the Ministry of Education (MoE) and The United Nations Children's Fund (UNICEF) Jamaica. Through this conference, children exercise their right to participate in any discussion on matters that affect them. They attend the conference, and it is heartening to listen as they question adult researchers about their findings. Students from secondary schools also present their research and compete for the outstanding Child Researcher award. Students from primary schools in Jamaica compete in an essay competition on a child-related theme.

Much of Professor Henry-Lee's work has influenced the policy process. Her research work on social policy has been undertaken in many Caribbean countries including Jamaica, St Lucia,

St Vincent and the Grenadines, Turks and Caicos, British Virgin Islands, Belize and Grenada. She is particularly pleased to have participated in the following research activities: development of social development plans for the British Virgin Islands and the Turks and Caicos; assessment of the impact of incarceration of women on themselves and their dependants; an evaluation of the National Poverty Eradication programme, the evaluation



of the social protection system in St Lucia. Soon she will be involved in the preparation of the first Sustainable Development Report for Jamaica.

The researcher has developed partnerships with several local, regional and international agencies, such as the Planning Institute of Jamaica, UNICEF, DFID, PAHO, UNDP and the World Bank, in the conduct of her research work.

Bio

Professor Aldrie Henry-Lee is Professor of Social Policy and the Director of the Sir Arthur Lewis Institute of Social and Economic Studies (SALISES)



Dr Heather
Harewood



Dr Althea
Bailey



Dr Denneko
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GRADUATE STUDENTS



Determinants and correlates of unintended pregnancy in polyclinic patients in Barbados: patient and provider insights and the implications for health policy, service design and delivery

Dr Heather Harewood

Medical Sciences, Department of Community Health and Psychiatry

Introduction

Unintended pregnancy is a global public health concern with negative consequences identified for both mother and child. A pregnancy is called unintended if occurring sooner than desired (mistimed) or if not wanted at all (unwanted). Abortion, except where medically indicated, is a recognised proxy measure of unintended pregnancy.

The rights-based approach to reproductive health embodies the right of couples to make informed decisions about if, when, and how frequently to reproduce. Tackling unintended pregnancy requires solutions that extend beyond mere

increased contraceptive access, to evidence-based, system-wide approaches addressing key contextual factors which shape the non-physical barriers to contraceptive uptake and practice.

Very little research was found which focused specifically on unintended pregnancy in the Caribbean. This mixed methods study, by quantifying the extent of unintended pregnancy and exploring the contextual factors in an Eastern Caribbean setting, aimed to bridge knowledge gaps and provide

evidence for the development of policy and relevant services addressing unintended pregnancy.

Objective

The study estimated the prevalence of unintended pregnancy and assessed patient, social influence, health provider and contraceptive factors related to unintended pregnancy.

Methods

A piloted questionnaire was administered to a random sample of 300 women aged 15-44 years. The proportion of mistimed and unwanted pregnancies and the proportion of non-therapeutic abortions were calculated. Chi-square analysis and multivariable logistic regression were used to test associations between unintended pregnancy and various factors, and to adjust for potential confounders, respectively. Contextual factors were explored via unobtrusive clinic observations and semi-structured in-depth interviews with four patient- and three nurse provider participants purposively selected from clinics. Interviews were audio-taped, transcribed verbatim and analysed by thematic analysis with constant comparison. Data was collected between October 2013 and December 2014.

Key findings

The average age of women in the sample was 25.5 years, approximately 17% were adolescents and half were in visiting relationships.

Quantitative results

Estimates of unintended pregnancy

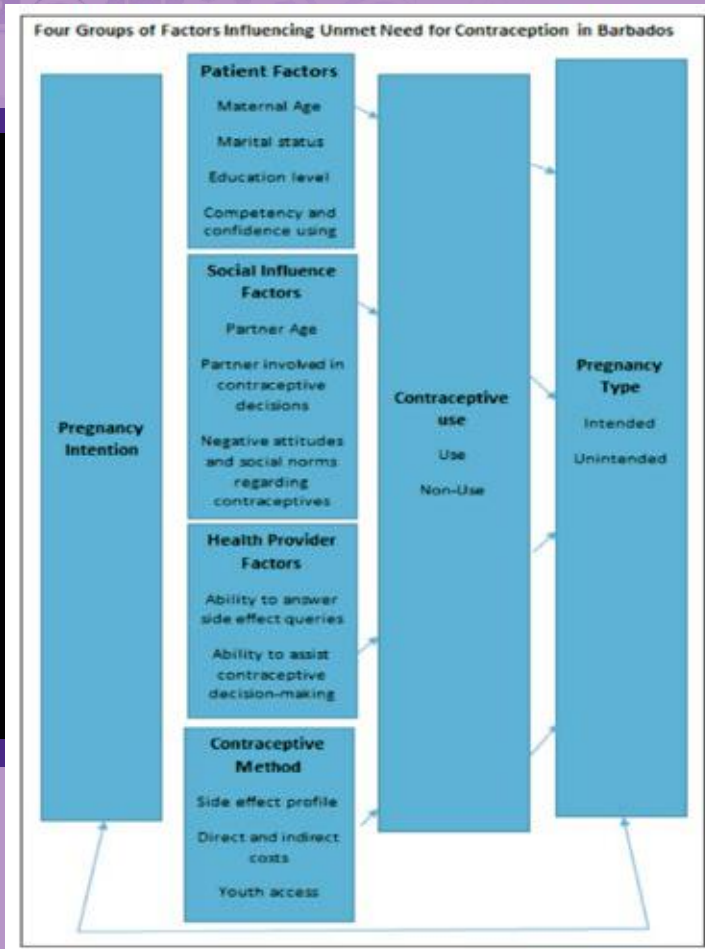
The estimated prevalence of unintended pregnancy based on direct measures was 67.7%. Of these, three quarters were mistimed. This local estimate of unintended pregnancy exceeds worldwide estimates (40%) but is comparable to the levels derived for the Caribbean (64%) based on 2012 global estimates. Overall, nearly a third of women reported at least one non-therapeutic abortion in her lifetime.

Patient, contraceptive, social influence and provider factors

Multivariable logistic regression analysis revealed that unintended pregnancy was much more likely in women of adolescent age, in visiting relationships, educated to secondary level and with partners aged between 20 and 29 years.

Contraceptives were used mainly for primary pregnancy prevention. The main methods used were the male condom and oral contraceptive pill. Approximately eight in ten women used no pre-pregnancy contraception; this was associated with a fourfold higher likelihood of unintended pregnancy. Approximately 14% of women requested tubal ligation; half of these requests were refused. Similar proportions of the remaining women were either granted sterilisation, were still on a waiting list, or experienced other outcomes including receiving alternative contraceptive methods. Unintended pregnancy was 3.5 times more likely in women who were ambivalent, compared to women who agreed that they involved the partner in contraceptive decision-making.

Figure 1: Factors associated with unintended pregnancy in Barbados



for some women. Indirect costs such as long waiting times for care led to missed opportunities for accessing contraceptive services should women chose competing alternatives such as going to work.

Fear of side-effects, misconceptions around contraceptive failure and perceived sub-fertility, especially among older women, fuelled strong negative attitudes toward contraception. However, developing personal competency and confidence and the existence of social support, especially from the partner, facilitated contraceptive use.

Providers' ability to build rapport and trusted relationships with patients and having a "listening-ear" enhanced their ability to assess individual patient need and facilitate patients' sexual and reproductive health (SRH) decision-making.

By age 35 years, one quarter of women experienced at least one non-therapeutic abortion. Higher levels of abortion were reported by women 30-34 years and those with partners over 30 years. Lower abortion levels were reported in women educated to secondary level and in unemployed women. Participant age was the main predictor of abortion risk.

Qualitative Results

The qualitative enquiry revealed that important contextual factors affecting access to contraception included the existence of legal and logistical barriers preventing independent access to sexual and reproductive services by adolescent minors, and which limit providers' contact with out-of-school youth. Although subsidised, the direct cost of contraceptives remained a deterrent



Translation of results

Unintended pregnancy is a substantial problem, but scope exists to shift the demand from abortion towards increased uptake of contraceptives, and to address the unmet need for high risk groups within a rights-based framework. Strategic stakeholders include the Ministry of Health, the lone public hospital, civil society, regional and international health agencies. Key recommendations relate to policy, design and delivery of SRH services and further research:

1. Developing risk-based approaches to address the needs of minors including policies facilitating easier access by persons aged 16 to 17 years.
2. The feasibility of introducing free rather than currently subsidised contraceptives, whether universally free or rationed via a means test, requires economic evaluation from a societal perspective to determine the more cost-effective option. Simpler measures include promoting use of the intrauterine device for its effectiveness and value for money. Indirect cost measures include reducing waiting times of patients especially at the pharmacy.
3. Training providers in behaviour-change communication and techniques to de-mystify contraceptive concerns can promote patients' self-efficacy.
4. Further qualitative enquiry is needed to capture perspectives of male partners and further elucidate access to contraceptives for working-class women. The perceptions of doctors involved in care delivery in polyclinics and at the hospital would explicate tubal ligation access pathways and outcomes.
5. A needs assessment involving users, health providers and policy makers regarding potential changes in service delivery and expanding the routine collection and use of SRH data including abortion should be undertaken.

This study provides insight (Figure1) and highlights areas for future research.

Bio

Dr Heather Harewood is currently a lecturer in Public Health & Epidemiology at the University of the West Indies, Cave Hill Campus and a recent graduate of the Dr PH programme (with high commendation), UWI, Mona. She worked for many years as a medical officer of health with the Ministry of Health, Barbados and held administrative and clinical responsibility for maternal and child health services.

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The role of sexual decision-making and risk perception in the adoption of practices to prevent HIV and sexually transmitted infections (STI) among female sex workers

Dr Althea Bailey

Department of Community Health & Psychiatry

The Jamaica National HIV/STI programme statistics (2012) reveal that 15% of adults with HIV reported having sex with a sex worker. HIV prevalence among female sex workers (FSWs) was 4.1% in 2012 compared to a 1.7% in the general population. Prevention interventions among FSW have existed in Jamaica for over 20 years; however, little research has been done on the economic, socio-cultural and personal factors affecting sexual behaviours and sexual decision making (SDM) among female sex workers.

This research was conducted to fulfill the requirement for a PhD in Public health. It was designed to explore the role of sexual decision making and risk perception in the adoption of practices to prevent HIV and sexually transmitted infections (STI) among female sex workers who operate in the Jamaican sex trade.



Qualitative research was conducted using an approach known as constructivist grounded theory where multiple perspectives of sex work and the factors that affect the sexual decision-making and risk perception of female sex workers were sought. The researcher conducted 44 in-depth interviews with the sex workers, their male clients, main male partners and facilitators of sex work such as the owner/managers of exotic clubs and massage parlours, as well as others who link or support the link between sex workers and potential clients.

The research showed that:

- The main reason the females in this study chose to enter the sex trade was poverty, particularly, inability to support themselves, their children or their families owing to incomplete education as a result of teenage pregnancy and no access to social support.
- FSWs experience physical and psychological hazards of the sex trade including violence, stigma and HIV/STI infection.
- They cope by carrying weapons, using alcohol and other drugs, through peer support and using condoms.
- There is a natural solidarity among female sex workers where they educate each other about staying viable and safe.
- Decisions about condom use were not always based on accurate risk perception. Violence and drug and alcohol use often prevented consistent condom use. However, the main barriers to consistent condom use was partner intimacy. This was consistently reported by sex workers who stated that condom use became inconsistent or non-existent with regular (paying or non-paying) partners who they regarded as providers of social, emotional and economic support. The need to self-actualise as a desirable female and not just a provider of sex affected risk perception and ultimately sexual decision-making.

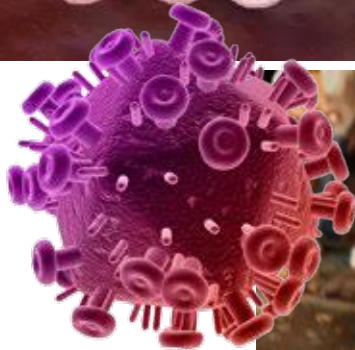


This study provides data that can fill some of the gaps in the Ministry of Health's and non-governmental organisations' response to sex work and HIV prevention, particularly in relation to what the World Health Organisation describes as "a respectful and inclusive response to marginalised and vulnerable populations, including sex workers" (WHO, 2013). The key aspect that it addresses, and which has barely been addressed in the local and international literature, is knowledge regarding the nature of sexual decision-making during commercial sex. This lack of insight into sexual decision-making may have limited health care and social service providers from being effective in meeting the needs of sex workers and their clients in order to enable them to adopt risk reduction behaviours in a consistent manner. It provides information that may be used to address prevention of vulnerable girls and women entering the sex trade; social support and HIV prevention

for sex workers, clients and partners; as well as environmental, structural and policy interventions to address the spread of HIV/STI. This includes separating human trafficking from sex work, policy decisions regarding the decriminalisation of sex work, and the implementation of systematic site-based interventions to link sex workers to health services.

Bio

Dr Althea E. Bailey BA, MPH, PhD is a lecturer in the Department of Community Health & Psychiatry. She has worked in public health for over 30 years in Health Promotion, Sexual & Reproductive Health (SRH): specifically, HIV and STI Prevention and Adolescent SRH. Dr Bailey received



a voluntary service award for leadership, commitment and outstanding contribution to HIV/AIDS Prevention from the National AIDS Committee Jamaica in 2007 as well as a merit award for being instrumental in developing strategies for vulnerable groups, especially adolescents, from the National HIV/STI Programme, Ministry of Health, Jamaica, in 2004. She is currently Vice Chair of the board of governors of the Jamaica AIDS Support for Life and an advisory board member of the Jamaica Red Cross School of Transformation for At-Risk Adolescents.
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The impact of hurricanes on tropical forests

Dr Denneko Luke

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Globally, governments are increasingly incorporating ecological perspectives into their development plans as the effects of global climate change (GCC) become more evident. As such, understanding the dynamics of the natural environment and the impact of GCC on these environments has become paramount. Of particular importance to the Caribbean is the anticipated increase in the frequency of high intensity hurricanes as a result of GCC. These storms have the potential to severely impact ecosystems, such as forests, and the services they provide (particularly carbon sequestration, which can help to mitigate GCC). Forests are of increasing economic importance as governments

of developing countries place emphasis on monetising forest ecosystem services, which target carbon sequestration through programmes such as the United Nations Reducing Emissions from Deforestation and Forest Degradation Programme (UN-REDD). Additionally, our forests are vast reservoirs of biodiversity and are critically important in everyday life by maintaining water and carbon cycles, improving water and air quality, as well as offering protection from flooding and landslides. As such, it is



important to provide a foundation for exploration of the economic value of forest ecosystem services by understanding how disturbance events such as hurricanes can affect our forests.

The aim of the research was to increase our understanding of the impact of hurricanes on tropical forests; in particular, to examine the effects of intermediate intensity hurricanes on the dynamics, structure and diversity of the wet forest of the John Crow Mountains (JCM). The forest was impacted by Hurricane Dean (category 4) in 2007. It was therefore possible to assess how Hurricane Dean (and previous hurricanes) impacted different life stages of forest tree species (seedlings and mature trees) and other plant physiognomic groups (lianas, tree ferns, palms) over a six-year period, between 2006 - 2012. The researcher was able to ascertain the effects of previous hurricanes, namely Hurricane Ivan (in 2004) and Hurricane Dennis (in 2005), on forest trees, by employing a method (which was developed during the study by research supervisor, Dr K.P. McLaren, Dept. of Life Sciences) that can be used to model the effects of hurricanes (Exposure Vulnerability) at a more localised level and across the landscape. Seedling ecophysiology, specifically, the photosynthetic traits of several species, was also assessed and used to determine the possible mechanisms that governed species responses.

One of the main effects of the hurricane was that it altered the relative importance of interactions between light, seedling density and seedling dynamics. Some interactions were not significant immediately after the hurricane, but were significant before, or two years after the hurricane, and their significance varied among the years and among the species. The post hurricane response of the species was not linked to their ecophysiological characteristics. Structural characteristics of the JCM wet forest were strongly influenced by topographic features such as aspect (the compass



direction a slope faces), and these differences were enhanced by hurricane exposure. Tree densities, tree mortality and light levels at the forest floor were highest in areas with higher hurricane exposure. Similarly, post hurricane species diversity was higher at sites that were exposed to repeated hurricanes. Lianas and trees with larger stem sizes were better able to withstand the hurricane effects (i.e. more resistant) than those of smaller stature. The other physiognomic plant groups showed no significant changes in densities in response to the hurricanes.

The study's findings lent support to the Intermediate Disturbance Hypothesis (IDH), which is one of several hypotheses that have been proffered to explain why tropical forests are so diverse. The IDH proposes that species diversity will be highest at sites that experience either intermediate levels of disturbance intensity or frequency. The study showed that there was greater species diversity at sites with exposure

to all three hurricanes. Despite a general decline in forest structural characteristics (basal area, volume, density), several species benefitted from the disturbance created at sites that experienced repeated hurricane exposure. Thus, the hurricanes that impacted the site repeatedly over a period of three years may have increased and maintained environmental heterogeneity and this facilitated greater species coexistence. However, not all species benefitted: ecologically important species like *Hernandia catalpifolia* were negatively impacted by repeated hurricanes. *Hernandia catalpifolia* plays a critical role in the life cycle of the Giant Swallowtail Butterfly (the largest butterfly in the western hemisphere) and changes in its dynamics may have 'knock-on' effects on the Giant Swallowtail Butterfly population.



The research highlighted that an expected increase in the frequency of high intensity hurricanes will have both positive and negative effects on montane forests in Jamaica. In addition, the results of this study will help to inform strategies at the national level for increasing ecosystem resilience. Several native species should be prioritised for reforestation programmes to increase climate change resilience because of their ecophysiological traits and their resistance and resilience to hurricane effects. Moreover, this research provides a foundation for the exploration of the economic value of our forests within the context of the UN-REDD programme.

Acknowledgments

The research was supported by several grants (secured by Dr Kurt McLaren and Professor Byron Wilson). These grants were obtained from the Rufford Foundation, the International Foundation for Science, the Wildlife Conservation Society and The Environmental Foundation of Jamaica, and were used to cover the cost of plot establishment and the 2006 assessments. The Jamaica Protected Area Trust (Forest Conservation Fund) provided financial assistance for the 2012 assessments. Special thanks also to Mr Kirk Lewis, the researcher's field guide/assistant.

Bio

Dr Denneko Luke is a recent graduate (with high commendation) of the UWI Mona presently working as a Teaching Assistant in the Dept. of Life Sciences, UWI Mona. His research interests are in forest ecology, climate change and predictive modelling.
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Dr Kevin Blake

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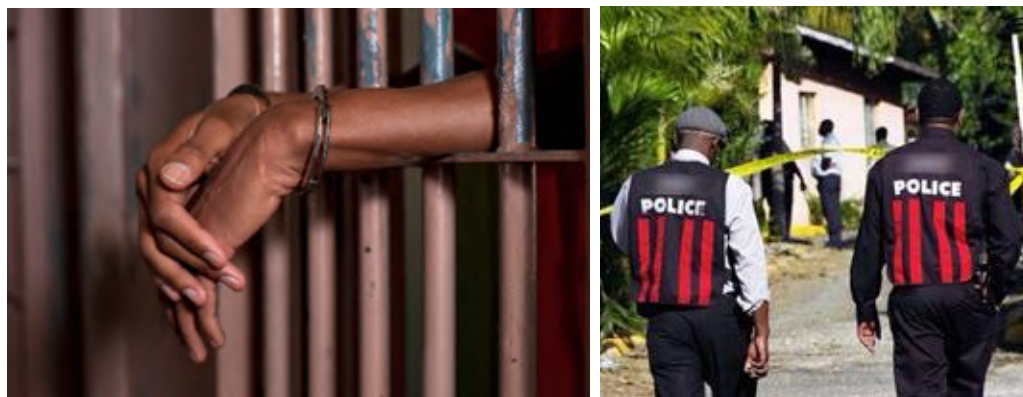
Developing and using an information system (IS) to integrate, manage and utilise Jamaica Constabulary Force data.

This was an action research project that sought to enhance the security environment in Jamaica by improving the efficiency of the JCF. The goal was to encourage more effective management of information, which involved influencing the JCF to accept and use an information system (IS) to integrate, manage and utilise their data.

The researcher sought to increase acceptance and use by developing an IS design model. This utilised elements of action research and user-centred design (specifically contextual design and co-realisation), and applied the constructs'

perceived ease of use and usefulness. This model was used to specify the functional and non-functional requirements of some components of an IS developed by the researcher.

The user activity data that the system generated over the five-year period for which it ran was then measured to rate the change of growth. To evaluate impact, the change in effectiveness in specified areas of police work, namely hits of wanted persons and persons



of interest and the management of investigation of missing persons, was documented. The contribution this makes to the reduction in crime and violence was then estimated.

Results

The results have shown that users consider the IS easy to use, and to a lesser extent, useful. The analysis of the user activity data showed a consistent rate of increase over the period. The intervention also resulted in the interception of over 250 persons, some of whom were wanted for various crimes, and others were just of interest to the police. The study was able to achieve a measured improvement in IS acceptance and use, as well as improvement in certain aspects of policing in the JCF.

Contribution to theory

The study makes several theoretical contributions to the areas of IS design, behavioural science and IS acceptance. The findings indicate that perceived ease of use and usefulness, when considered as a function of the design process, incorporated with a highly user-centred design approach and applying an ethnographic-type information-gathering technique, positively affected users' acceptance in the JCF. No prior study has utilised this approach, where perceived ease of use and perceived usefulness guided the user-centred design of the IS, while an ethnographic approach was used to obtain and interpret data on important social and organisational features; a powerful new combination to guide the requirements-gathering process.

Acceptance of the IS was found to be influenced by perceived accessibility. However, whether this broke down primarily to perceived ease of use or perceived usefulness was not investigated. This leaves scope for further research to examine the role of accessibility in user acceptance of IS. The study found that Individual Entrepreneurship (IE)/End User Development (EUD) positively influenced participants' acceptance of the IS.



One of the most encouraging findings in this study was the existence, among the participants, of a high degree of psychological attachment to the IS. The sub-construct internalisation is the most desired state of psychological attachment and was the most prominent among the participants, with an average score of 5.73 on the seven-point Likert scale. This indicates that most users of the IS do so because they believe that the use of it is aligned to their own value system.

Contribution to practice

The aim in conducting this research was not only to make significant theoretical contributions to the body of knowledge in the area of IS acceptance and use, but also to contribute to the national development of Jamaica, and to provide other small developing countries with similar challenges with a cost-effective means of addressing their challenges with violent crime and corruption. This research provides policy makers

with the necessary framework for the development of policies to address these profoundly serious problems.

The thesis made several significant contributions: to our understanding of policing in a developing country; to our understanding of the issues involved in technology uptake; and to our understanding of the way that technological change can alter the way that a rules-based organisation functions.

This research confirms that ICT had not previously been given a high priority in the policing strategy of the JCF. Prior to this study, information sharing was primarily among individual officers who may, by luck, obtain information that was relevant to their needs. There was no sense of the need



for the organisation to ensure ownership and appropriate management and use of this information. The attitude was that policing was one thing and technology - particularly IS - was something else that other people do. This research project has not only identified the problem, it has also helped to change this attitude, and has significantly improved the effectiveness of the JCF as a result.

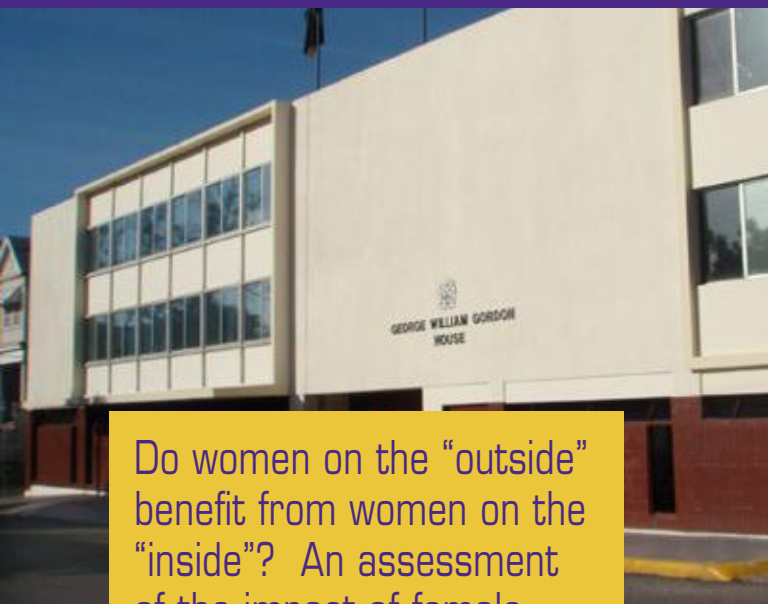
The action research methodology, the user-centeredness in the design of the IS, and the ethnographic approach to requirements-gathering provided the opportunity for users to become a part of a change in paradigm. This greatly facilitated acceptance, as ownership was shared, and the goals were jointly realised. The result of this approach has changed the way the police in Jamaica operate. The JCF High Command has now made it mandatory for the use of the IS to carry out certain functions. These include: the recording of all wanted persons and persons of interest; the search of the database for the existence of all suspects that come in the custody of the police; and the recording, monitoring and investigating of the reports of missing persons.

The management of the JCF now accepts that mission-critical ISs that would be expensive to acquire externally can be developed internally in ways that can provide far greater likelihood of acceptance and use. This study supports the conclusion that the incorporating of social practices in software design also improves the chance of the system's being regarded as familiar, hence easy to use and useful.

Bio

Dr Kevin Blake is an assistant commissioner of police in the Jamaica Constabulary Force (JCF) and holds a PhD in Sustainable Development with High Commendation from The University of the West Indies. He has worked extensively in the field of software development and systems design in the private and public sectors, as well as regionally within the Caribbean Community (CARICOM).

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Do women on the “outside” benefit from women on the “inside”? An assessment of the impact of female legislators during pro-women policy debates in the Houses of Parliament in Jamaica

Dr Jacqueline Coore-Hall

Institute of Gender and Development Studies

The “51% Coalition, Women in Partnership for Development and Empowerment through Equity”, was formed in late 2011, and the call for the implementation of gender quotas to achieve parity in politics and governance was among the first items on their agenda.

Subsequently, a motion was put forward by former senator of the People’s National Party, Imani Duncan-Price, for the convening of a special joint-select committee of the Houses of Parliament to consider a legislated 60/40 reserved seat quota system for the Senate, as well as for candidate selection by political parties. For the most part, the lobbyists have only reiterated the reported statistics that

women constitute 51% of our population and 49% of the workforce, and that gender quotas will increase the numerical presence of women and will conversely reduce the disproportion in the gender composition of the parliament.

Undoubtedly, the number of women in the House of Representatives has been dismally low (average 8.0%), but slightly higher (average 20.2%) in the Senate (Figure 1). Nonetheless, it is important that advocates for gender quotas provide evidence to support the need to have a more gender-balanced parliament, as it

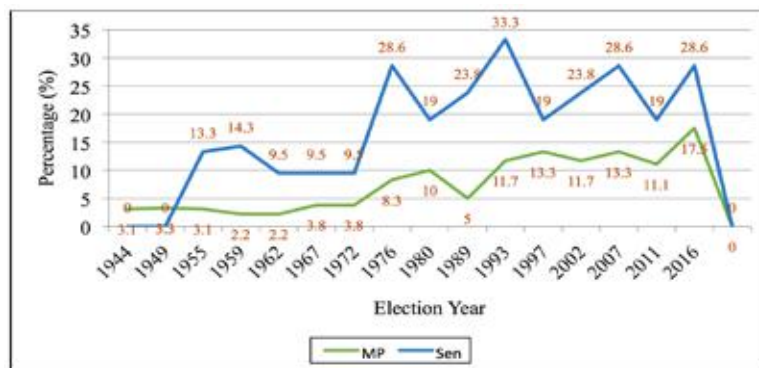


Figure 1. Percentage of female legislators, 1944 – 2016.

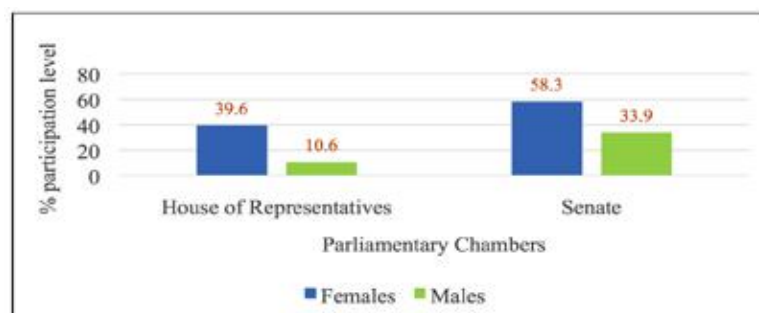


Figure 2. Participation Levels in Bill Debates, by Sex

appears that their calls are merely for symbolic purposes. There is some expectation that having more women in the legislature, at the very least, will make a significant difference to the lives of the citizens of the country, especially marginalised groups, such as women. And an examination of legislative actions, such as piloting Bills, Motions, contribution to Bill debates and voting, is one of the best ways to provide evidence of whether women in the society benefit from the presence of women inside Parliament.

The objective of this research, then, was to examine whether the presence of females in the Houses of Parliament in Jamaica has resulted in the substantive representation of the interests and concerns of women in the society. This was measured through content and discourse analyses of 17 pro-women Bills (defined as laws which seek to promote and protect women's rights and equality or address the traditional stereotypical roles and issues which are more likely to affect women than men) debated in both the House of Representatives and the Senate, and enacted over the period 1962 to 2009 (Table 1). These Bills were related to childcare, domestic violence, sexual offenses, sex discrimination and family issues.

The data analysis included: (1) identifying instances of (i) gender-framing (comments made by female parliamentarians indicating that interest in a Bill was because they believed the provisions, remedies and/or amendments will be more favourable to women than men) and (ii) feminist consciousness (evidence of participation and the demonstration of responsibility and ownership to represent, demonstrating that they saw themselves as a part of a social group which, although not a minority demographically, has been marginalised historically, and were making attempts to eliminate this injustice); and (2) using Chi-square to determine whether there was a relationship between gender and the propensity to promote women's issues during parliamentary debates.



Table 1. Pro-women Acts Passed and/or Amended, 1962 - 2009

Name of Act	Passed/Amended
Offences Against the Persons (Amendment) Act	1967
Employment (Equal Pay for Men and Women) Act	1975
Maternity Leave Act	1979
Matrimonial Causes Act	1989
Citizenship Constitutional (Amendment) Act	1993
Inheritance (Provision for Family and Dependents) Act	1993
Jamaican Nationality (Amendment) Act	1993
Married Women's Property (Amendment) Act	1995
Domestic Violence Act	1995
Family Property (Rights of Spouses) Act	2003
Incest (Punishment) (Amendment) Act	2004
Childcare and Protection Act	2004
Domestic Violence (Amendment) Act	2004
Maintenance Act	2005
Child Pornography (Prevention) Act	2009
Sexual Offences Act	2009
Trafficking in Persons (Prevention Suppression and Punishment) Act	2009

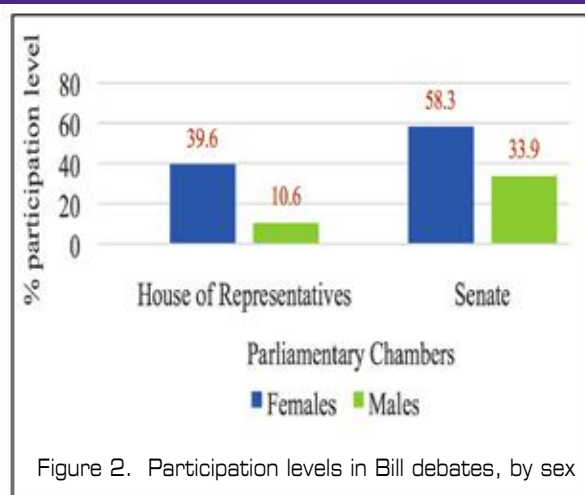


Figure 2. Participation levels in Bill debates, by sex

The extent of the gender-framing, evidence of feminist consciousness and the high participation and statistically significant results validate the conclusion that the female legislators believed they have a responsibility to devote attention to issues of particular interests to women, and that they were more likely to advocate on behalf of women, than their male colleagues (Figure 2).

While there was no evidence of feminist self-identification during these specific debates, none of the female legislators repudiated this claim either. On the contrary, they actively and consistently advocated on behalf of women, defended women's contribution to society and the home and supported policies they deemed necessary and important to women's autonomy and empowerment in the society (Table 2).

Additionally, there was no evidence of disunity among the female parliamentarians during the debates on the pro-women policies. Instead they displayed signs of "cross-party sisterhood", highlighting that a collective effort was necessary to eliminate gender inequalities.

Contribution of the research

The uniqueness of this research is that it is the only comprehensive study on the advocacy and activism of female legislators for women's liberation and rights, through their legislative actions, in Jamaica or the wider Caribbean. Therefore, this case study of Jamaica contributes to the contemporary feminist literature for the Caribbean, specifically; as well as strengthens the existing literature on representation, generally, as it supports the theoretical argument that including disadvantaged groups, such as women, in the political affairs of a state, result in more forceful and consistent advocacy for those groups

The importance of these findings should not be lost on policy makers, especially female legislators, as the clear message is that their presence, and in greater numbers, is critical to achieving gender equality in the society. Therefore, it is recommended that female legislators should form, and where they already exist, strengthen ties with women's organisations and other civil

Table 2. Examples of Gender-framed Comments Made by Female Legislators

Bill Debate	Comments
Employment (Equal Pay for Men and Women)	I support the Government wholeheartedly in this Bill to close the little gaps that remain open but always let us give the women more opportunities, more opportunities.
Domestic Violence (Amendment)	We welcome this Bill as an attempt to create at least a basic framework in which these women will have an opportunity to get help.
Family Property (Rights of Spouses)	But most importantly Mr Speaker, for the first time in our history women's unpaid and unwaged work is being recognized...on par with the financial contributions to the home, family, and society in general...Indeed, Mr Speaker, no longer can women be devalued or go unaccounted for in our society, glory to God, glory be. This is a victory for all women. Mr Speaker, women in Jamaica have been the backbone of this country, (Applause), and they have contributed tremendously to many a successful man in this country, (Applause), and they have gone unrewarded. And so today I think many of those women are saying, thank you, Jesus, thank you because finally we are equals in whatever union we may choose. She [the wife] spend her life keeping the home, looking after the husband and children, she kept no records and on the breakdown as a marriage, as we said, she gets nothing, not even the matrimonial home and the hardship has really been unfair to women.
Trafficking in Person ((Prevention, Suppression and Punishment)	What we do see, however, is man's inhumanity to woman, because in a way it has become institutionalized.....we have become so accustomed to the abuses to which our women are subjected that we take it absolutely for granted.
Sexual Offenses	Most crimes of sexual violence are committed against our women and our girls. And, Mr Speaker, we recognize, we all recognize that all forms of violence against women contribute to our women's inability to enjoy their human rights and this impacts on their ability to fully contribute to the development of the country.

society groups. Some feminists have expressed concern that women's organisations seem to have retreated in the fight for women's rights to some extent not only in Jamaica but, generally, in the Caribbean. But with the recent collaboration between the 51% Coalition and Imani Duncan-Price, resulting in her Motion being approved in May 2015, there is hope for the revival of the organised women's movement in Jamaica. Female legislators are strategically positioned to partner with these organisations to bring women's issues to the fore in parliament. Additionally, female legislators should form a cross-party women's parliamentary caucus. Despite the rivalry that is known to be a feature of partisan politics in Jamaica, the female legislators remained united over women's issues.

Therefore, an organised and officially recognised body such as a women's caucus, is likely to be more effective in the fight for gender equality.

This study is crucial to the policy research agenda as it informs the process for change at the national level. The results have provided policy-makers with never before data on the impact of women's presence in Parliament, and thus should help to support the decisions to: (1) apply measures such as gender quotas to ensure women are elected

in greater proportions, and; (2) change from the first-past-the-post (FFTP) to mixed member proportional (MMP) representation, to increase the level of inclusiveness and representativeness in the governing of the state's affairs. Added benefits to be derived from changing to the MMP system include eliminating the possibility of "false majority" in the lower house, and an increase in voter turnout.

It is only by studying the presence of women in state institutions, such as the parliament, that we can truly begin to understand how, in spite of the obstacles they encounter, women in leadership and decision-making positions are destabilising the gender hierarchy in the society, and contributing to the gender equality agenda.

Bio

Dr Jacqueline Coore-Hall completed the PhD in Gender & Development Studies (with High Commendation). She currently works in the corporate sector, however, upon her transition to academia, her future research agenda will focus on conducting further studies on women in politics, the impact of State feminism on national development, and issues relating to migration and gender. Dr Coore-Hall is a member of Sunset Optimist Club of Kingston and spends most of her free time working with her club to "save our children".



A 3-phase employee readiness model for successful corporate transformation

Dr Rickert G. Allen

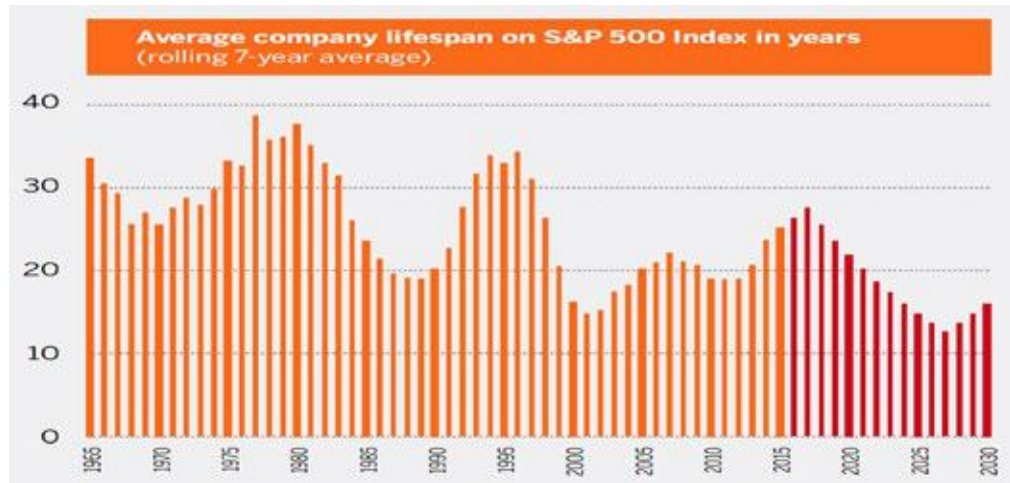
Social Sciences, Mona School of Business

The rise of emerging markets, advancement in technology, increasing competition and the repercussions of global recessions have contributed to high levels of uncertainty and disruptions in corporate business models. Firms are therefore required to transform their organisations in order to remain profitable.

Organisational change is an ongoing process which, by some account, takes place in three distinct phases: developmental, transitional and transformational. It is generally acknowledged that transformational change is the most complex of the three as it demands a quantum leap in strategy, structures, systems, processes and culture.

Researchers have found that less than 40% of transformation efforts are successful (Isern, Meaney & Wilson, 2008). Among the major reasons for this low success rate is that employees, who are considered essential for successful corporate transformation, are not ready to engage in the process. This lack of employee engagement could be attributed to fear, anxiety and the uncertainty in their minds of how these changes may impact their future.

Figure 1. Source: Innosight Executive Briefing, Spring 2016



A recent Innosight study published in 2016 indicated that the average tenure of companies on the S&P 500 was 33 years in 1965, 20 years in 1990 and is expected to decrease to 15 years in 2030 (Figure 1).

Firms will therefore have to contend with organisational change to keep afloat. Businesses operating in weaker developing economies, such as those in the Caribbean, are more vulnerable to failure than those in developed economies as they have less dynamic capabilities for handling global shocks. This is evident in countries like Grenada, Haiti and Jamaica that have sought support from the International Monetary Fund (IMF). It is therefore important for companies operating in volatile environments to mobilise both internal and external resources to meet the prevailing challenges if they are to remain sustainable. This sustainability will require that they re-invent their business models by developing new dynamic capabilities and adopt a transformation agenda to facilitate growth and improved performance.

There is consensus among researchers that employee readiness is critical for successful change within these firms (Armenakis et al., 1993; Bernerth, 2004). It has also been argued that employee commitment is the most important determinant of organisational change (Nafei, 2014). Therefore, to get an employee ready for change it is theorised that commitment, along with other antecedents of change, must be present. Against this background, this study seeks to test a model that links organisational commitment and other antecedents of change (organisational and personal factors) to readiness for corporate transformation.

Model development

The study utilised the Social Exchange Theory for model building. This theory suggests that there are reciprocal benefits between employee and employer in an environment of change and these benefits are reflected in the antecedents and consequences of change. In the development of the model, the seven antecedents of change readiness offered by Rafferty and Simons (2006) was linked to organisational commitment, and commitment



Figure 2. 3-Phase Research Model



Table 1: Results of Hypothesis Testing

Research Proposed Path	Coefficient Value	t-Value	p-Value	Enterprise Evidence
H1: TOL→ OC	0.374	6.073	0.000***	Supported
H2: TIP→ OC	-0.135	3.503	0.000***	Supported
H3: POS→ OC	0.326	5.424	0.000***	Supported
H4: FPP→ OC	-0.027	0.608	0.543	Not supported
H5: LSS→ OC	0.072	1.267	0.228	Not supported
H6: PAR→ OC	0.066	1.400	0.162	Not supported
H7: SFC→ OC	0.156	3.779	0.000***	Supported
H8: OC→ RCT	0.253	13.143	0.000***	Supported

Note: * sig. at $P \leq 0.05$ ** sig. at $P \leq 0.01$ *** sig. at $P \leq 0.001$

was further linked to employee readiness for corporate transformation. These antecedents of commitment were modelled as organisational and personal factors (See Figure 2):

- Organisational factors (trust in organisational leadership [TOL], trust in peers [TIP], perceived organisational support [POS], flexible policies and procedures [FPP], logistics and system support [LSS]).
- Personal factors (participation [PAR] and self-efficacy for change [SFC]).

Research method and results

The study employed a cross-sectional design with self-administered survey in a model of organisational and personal factors linked to organisational commitment for improving employee readiness for corporate transformation. A convenient sampling was utilised to collect data from 416 participants (executives, senior management, middle management and front line staff) employed in 23 financial institutions across four Caribbean countries (Jamaica, Barbados, Trinidad & Tobago and Grand Cayman). Inferential analysis was conducted using structural equation modeling with Smart PLS.

Notably in this study five hypotheses were supported: H1, H2, H3, H7 and H8.

The results showed that three organisational factors (trust in organisational leadership, trust in peers and perceived organisational support) and one personal factor (self-efficacy for change) had significant influence on organisational commitment. Trust in peers, however, had a negative effect on organisational commitment. Flexible policies and procedures, logistics and system support and participation did not impact organisational commitment. These results also showed that organisational commitment had a strong and significant impact on employee readiness for corporate transformation. See Table 1.

Discussion and implications

Consistent with social exchange theory, this study provided empirical support for the theorised connection among organisational and personal factors, organisational commitment and employee readiness for corporate transformation. In pursuing readiness



for corporate transformation, management should better understand the importance of organisational commitment and its associated predictors. It is also essential for managers to understand the concept of social exchange within the organisation, as coordination and cooperation are primarily the reciprocal exchange between the employee and the employer. Further, self-efficacy for change is essential for creating high readiness for change. It is therefore critical to design and implement appropriate programmes that will assist employees to develop the confidence to handle transformational changes.

Trust in peers had a negative impact on organisational commitment, which suggests that the more the employees trust their peers, the less committed they would be to the organisation. This was an unexpected finding that may be attributed to the massive downsizing during the financial crisis of 2008. Thus, employees may determine that commitment to the organisation is a better option to maintain job security than to trust their peers. However, it was not surprising that this study found no relationship between participation and organisational commitment since researchers (e.g. Kamal et al., 2009) argue that participation is not usually needed to gain commitment. Notwithstanding, managers should also give consideration to the employee involvement and participation, as previous studies have established relationships with organisational commitment (Cohen & Caspary, 2011).

Conclusion

This study has made several contributions to both research and practice. First, the study has contributed a new definition to the literature on readiness for corporate transformation. Second, the literature has now been extended, with empirical evidence of the link between organisation commitment and readiness for corporate transformation in developing states. Third, the study extended the work of Rafferty and Simons (2006) by introducing organisational commitment within the framework of social exchange theory, thereby providing further understanding of what is important to employees in the transformation process.

The implications for practice are fully explicated in this study, along with recommendations for corporate managers who have responsibilities for managing the transformation process.

Bio

Dr Rickert Allen, who recently graduated with a DBA with high commendation, is a senior general manager who leads the Group Human Resources and Facilities Division of the NCB Financial Group.
rickertallen@hotmail.com



The metabolic and morphological effects of inositol hexakisphosphate (IP6) and inositol combination on streptozotocin-induced type 2 diabetes mellitus Sprague-Dawley rats

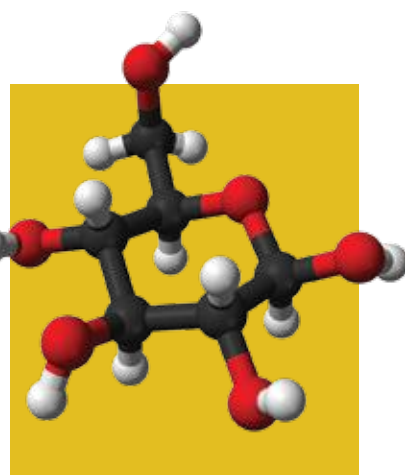
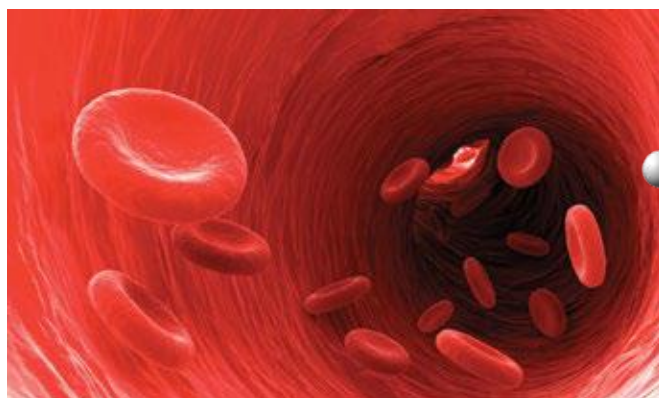
Dr Shadae Renae Foster

Biochemistry

Diabetes mellitus is a group of complex multifactorial endocrine or metabolic diseases characterised by impaired glucose utilisation that leads to chronic hyperglycaemia (abnormally elevated blood glucose levels). It is characterised by the disruption of carbohydrate, protein and fat metabolism. Type 2 diabetes mellitus is the most prominent form of diabetes affecting approximately 90% of individuals diagnosed with the disease, and is often asymptomatic. Obesity and physical inactivity are the main contributing factors associated with the development of type 2 diabetes mellitus, and deaths associated with

the disease are very high globally. This high rate of morbidity and mortality among patients with type 2 diabetes and other non-communicable diseases (NCD) represents a high cost to society and is a considerably large and growing burden to families, businesses, and individuals, especially those of working-age.

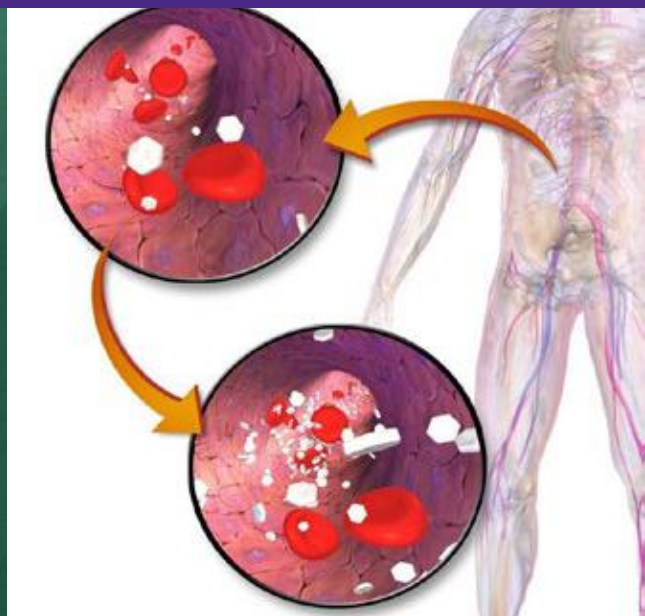
Dissertation's aim and method
Inositol, also known as myo-inositol, is a pseudovitamin, with a hexacarbon



carbohydrate structure. Inositolhexakisphosphate (IP6), also known as phytic acid, is a polyphosphorylated inositol derivative, which has long been considered an anti-nutrient. Several *in vivo* and *in vitro* studies have demonstrated the anti-tumour effects of IP6 and inositol independently. However, the best cancer inhibiting results were observed when IP6 and inositol were administered in combination. The use of this combination in the treatment of type 2 diabetes had not been previously studied. This dissertation focused on analysing the metabolic and morphological effects of combined IP6 and inositol in streptozotocin-induced type 2 diabetic rats. Type 2 diabetes was chemically induced in healthy male Sprague-Dawley rats by the administration of a single intraperitoneal injection of low dose streptozotocin (35 mg/kg body weight) after being fed a high-fat diet (Foster et al., 2017a, 2017b & 2016). The diabetic groups were treated with combined IP6 and inositol or glibenclamide for four (4) weeks. During this time, the non-fasting blood glucose concentration, food intake, fluid intake and body weight were measured, and faecal samples collected. At the end of the treatment period, blood and organs (heart, kidney, liver, pancreas and intestine) were collected and weighed. Histological studies, biochemical and haematological parameters were measured.

Summary of results

Treatment with the combination significantly reduced blood glucose concentration, food and fluid intake, insulin resistance, serum triglycerides and total cholesterol levels in diabetic rats. Serum leptin and faecal triglycerides were significantly increased and liver lipid status was normalised by the supplement. Overall, the treatment of type 2 diabetic rats with combined IP6 and inositol supplement resulted in the improvement of renal and pancreatic function with no adverse effect on the liver. The data indicated that treatment of type 2 diabetic rats with the combination was more



effective at curtailing some indices of diabetes including polyphagia, polydipsia, oxidative stress and dyslipidaemia, compared to glibenclamide (a known oral hypoglycaemic agent) treatment.

Implication and commercial potential

Studies of this nature are essential, since there is no cure for diabetes mellitus. Current drug therapies for the management of this disease have undesirable side effects and are costly, exerting a substantial economic burden on society. This study sought to develop a new natural alternative, cost effective anti-hyperglycaemic remedy with minimal to no side effects that can be commercially available. In this dissertation, several mechanisms of actions were proposed for the antidiabetic enhancing effects of the combination. Lack of awareness and conflicting reports on the health benefits of IP6 are hindrances to the widespread use of IP6 and inositol. While further clarification is needed on the effect of this combination on human health, this study further sheds light on

the health benefits of IP6 and inositol, especially when used in combination. Several studies have reported that the combination, IP6 and inositol, displays no apparent toxicity and is thus deemed safe for general consumption. This combination could provide a nutraceutical and economically viable addition to the treatment options for type 2 diabetes. It can be used for the creation of value-added functional food products such as a nutritionally balanced, antioxidant-rich and ready to drink meal beverage that can minimise glycemic index and regulate lipid metabolism. Dietary supplementation with IP6 and inositol combination in a pre-determined ratio may provide a safe, affordable natural alternative method for the prevention, management and/or possibly a cure for diabetes and related metabolic disorders.



Bio

Dr Shadae Renae Foster is a recent PhD graduate (with High Commendation) of The University of the West Indies, Faculty of Medical Science (Biochemistry section). She is interested in doing further studies that includes exploring the medical potential of natural products in treatment of diabetes and other human diseases.



Principal Professor
Archibald McDonald



Dr Patricia
Northover



Mr Stanley G.
Smellie



Professor
Anthony Clayton



Professor Emeritus
Tara Dasgupta



Principal
Archibald
McDonald



Professor
Wayne
McLaughlin



Mr Craig
Hall



Mr Devon
Smith



Ms Savannah Peridot
Ms Tina Griffiths
Professor Ian Boxill

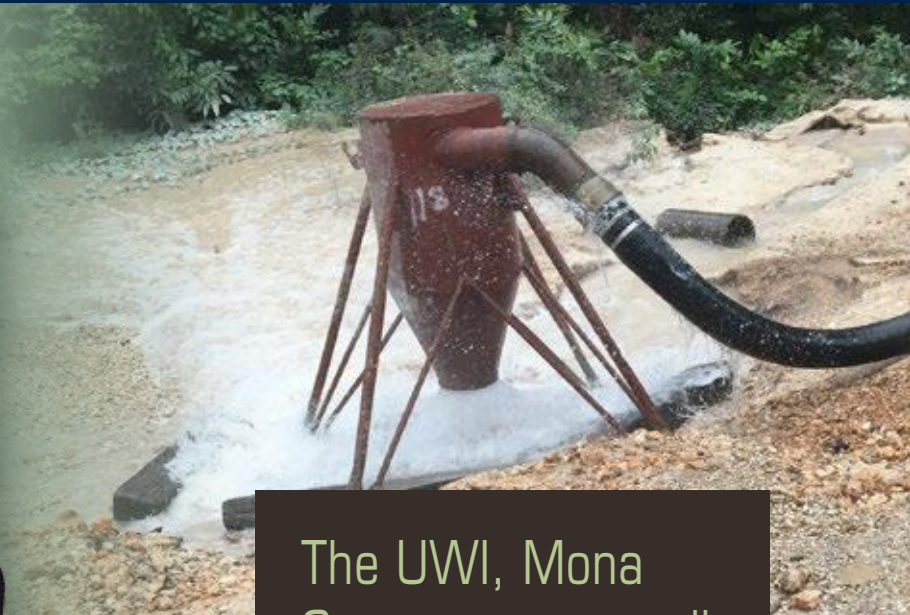
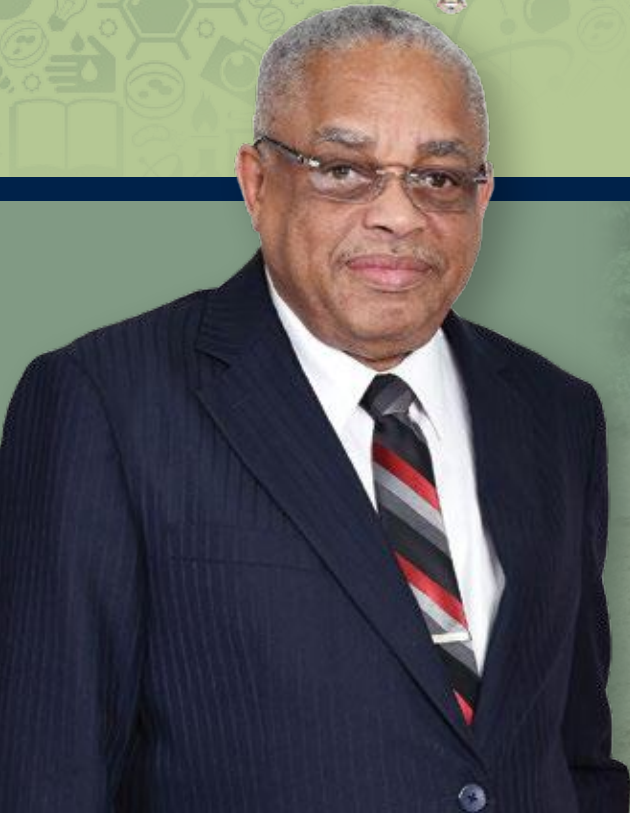


Professor Michael Taylor & the
Climate Studies Group





LEADERSHIP & DEVELOPMENT



The UWI, Mona Campus water well project: Concept to reality

Principal Professor Archibald McDonald

In 2014, an auspicious project was conceptualised in the Office of the Principal under the leadership of the Hon., Professor Archibald McDonald - a response bold in nature to the perennial water shortage and lock-offs resulting from the ongoing drought throughout the island. "Bold", because local experts - including our own - opined that there was no water to be found, despite the fact that the entire campus sits on what is known as the Mona aquifer.

It is often said that "without vision the people will perish". It was Principal McDonald's vision that emboldened his team to pursue the water well project. The Mona Campus partnered with the United States based company, North Star

Development and Industry Capital, to develop the first of two wells to supply the Mona Campus with its own potable water. North Star hired the world-famous hydrologist, Dr Skip Hoagg, to conduct the exploration, mapping and supervision of the drilling of the well.

After months of geological surveys, using some of the most modern technology available, a potential site for the drilling of the site was identified. Drilling started shortly thereafter, employing the local company Jamaica Wells as contractors, under "Skip's"



supervision. After several months and many obstacles, such as the caving in of a test drill hole and other technical glitches, water was struck at 840 feet, yielding a well that currently supplies 750,000 gallons daily, far exceeding the Campus's 350,000 gallons daily consumption. This well is controlled by state-of-the-art technology in the pump house that is controlled remotely. There are two 750,000 storage tanks, giving the Campus a redundancy of five days' supply of water.

Commissioning of the well currently saves the Campus approximately JMD\$150,000.000.00 annually. Most important, a consistent and reliable supply of water to the Mona Campus has finally been realised. Following Eppley's (a local conglomerate's) acquisition of the major shares in the Public Private Partnership agreement, the well is currently controlled by Jamaicans, and North Star Development and Industry Capital have diminished roles. The perfect story of vision, strength and courage to go where only few can think.



Jamaica 50th anniversary sugar heritage film project: Film impact overview

Dr Patricia Northover
Professor Michaeline Crichlow
Dr Daive Dunkley
Professor Patrick Bryan

Social Sciences, SALISES

The Sugar Heritage Film project, 'Raising Cane,' was undertaken under the leadership of Dr Northover, from the Sir Arthur Lewis Institute of Social and Economic Studies (SALISES), at The University of the West Indies (UWI), Mona, in collaboration with the Sugar Transformation Unit, of the Ministry of Industry, Commerce, Agriculture and Fisheries, the Ministry of Education, Information and Youth and the HEART Trust/NTA. It was supported by a grant agreement with the Ministry of Agriculture & Fisheries (based on a partnership with the European Commission) and The UWI, signed in November 2012, and by funding agreements with the Ministry of Education, Youth and Information, and the Heart

Trust/NTA, both of which were signed in September 2016. Both films were heralded during their press launch held on December 12th, 2017.

The history of sugar cultivation in Jamaica, on a large and export-oriented scale, dates back to the 17th Century under the British Empire, when sugar cane cultivation became the main agricultural produce of the island. This heritage film project was created to help celebrate 50 years of Jamaica's independence from colonial rule and is designed to:

- (i) visually document the epic narratives of struggle and achievement as it emanated through the history of the Jamaican sugar industry;
- (ii) innovatively preserve our history and remind us of the experiences in this industry that helped to shape the making of modern Jamaica within



- global processes of change and development;
- (iii) explore the progress and impact (cultural, technological, political and socio-economic) of the sugar cane industry on national development.

The Sugar Heritage Film research project, 'Raising Cane,' thus produced two (2) path-breaking film series that call for a remembering of the impact of the sugar cane industry in Jamaica and a re-imagining of its future. The first film, *Ms. Sugga*, a multi-part animated series for children (7-12 years old), takes them on a magical time travelling adventure exploring their history, culture, politics and the technological innovations that come from the use of the cane plant. This film is the first of its kind, being produced from script to screen, wholly by Jamaican talent in the film and animation industry, thus signaling Jamaica's capacity to produce good local content for children. The director/writer/producer of the children's film series was Ms Mary Wells and the animation house was Reel Rock Studios/GSW Animation Ltd. The second film, *Sugar Cane: Recycling Sweetness and Power in Modern Jamaica* is a four part adult documentary series, focused on the politics, culture, social history and economics of the industry, its impact on the nation, its development contradictions and its prospects for a future of sustainable development. The Director of the adult series was Mr. Franklyn St Juste, from the film house, Time Code Productions.

The research objective of both film series was first, to better illuminate the nature of the political, cultural and economic struggles within the four hundred (400) year history of sugar cane cultivation in Jamaica and second, to highlight the socio-political and technological conditions needed for a re-imagining of the sugar industry. This research was focused on the theme of "recycling sweetness and power." The research project examined the main economic, political and cultural factors underpinning the pivotal struggles of the workers, as well as the Jamaican State, for freedom, development and justice given the country's entanglement with major international sugar interests and the forces of globalization from colonial rule to the present. Each film was structured into four (4) episodes to better speak to these pivotal moments of struggle and change.

The adult film series, *Sugar Cane*, begins with the flashpoint of 1938, and the role of the labour struggles emanating from Frome, and explored the story of recycling sweetness and power from the vantage point of that epic moment. Given that moment, the film then explored: (a) the history of sugar in the context of global spaces and transformations, (b) the struggles for rights, freedom and justice and the emergence of the modern political system, and (c) the post-independence struggles for refashioning governance and sustainable enterprise development, which led to the present business model and its economic and technological opportunity set in the midst of a turbulent global and neo-liberal environment, as well as its social and political potential for refashioning futures.

The children's animation series features an animated cane stalk, *Ms Sugga*, a wicked storyteller who can sing and bake, one day discovers she has run out of sugar cane molasses to make her delicious bulla buns. As they are her sole source of income, she goes to a sugar factory and a village shop nearby to purchase more, but there's none. The sugar workers, our 'freedom



fighters', are all on strike. So, with the help of Tacky and his huge time travel bubble, herself, and two real-life kids with a tray of unsweetened buns, fly into the sky and over the streets of towns and cities. They float through rainbows, over a clear blue sea and glide over hills and valleys witnessing the creepy sights and sounds of screams, whips, riots, gunfire and political voices of the past, as the Jamaican history of sugar unfolds, through pivotal historical moments to 2000 something. On their exciting journey, determined to sell her bullas, and to get her molasses for the next baked batch, the kids discover something special. Not only is the bubble filled with a kind of 'gasoline' fluid made from sugar cane, which helps to transport them around, but this recycled sugar cane trash can also now make other things, lowering the costs of daily life. It goes waaay beyond their wildest dreams, making life sweeter, bubbly and more adventurous than ever before!

The research for both films highlights the cultural and political agency of the enslaved, ex-slaves as well as indentured labourers and addressed their

power to make new beginnings by inventing new power bases - (through their belief systems, creole culture and social and political organization)- as well as sustain unrelenting resistance, against the violence, violations and inherent contradictions of a system founded on brutal oppression.

The research for this project also points to two critical policy issues, first the question of reparatory justice given the negative human, social and developmental impacts of the industry and second, the nature of the development space to be exploited for "recycling sweetness and power" in light of the potential gains from value added products from the industry, such as 'green energy' (through the co-generation of electricity from biomass and the production of ethanol from a sucrose base), as well as from new cultural and educational products from



the industry, based on the potential of a commercial animation series and edutainment audio-visual products, as represented by these film series.

The developmental objectives of the film series are twofold. The first objective is to support public policy discourses and public education, and second objective is to stimulate a re-imagining of the value-added products arising from the sugarcane industry that may be capitalized upon. For example, in light of the potential commercialisation of the Ms Sugga series, a new action/adventure figure could be created much akin to Dora the explorer. Moreover, we have proven the talent and capacity of our HEART animation graduates, as they formed a sizable pool of the talent used to produce this animation by their engagement at GSW animation Ltd, the animation house contracted for the series. Therefore, the film has also contributed to the human capital development of the animation industry.

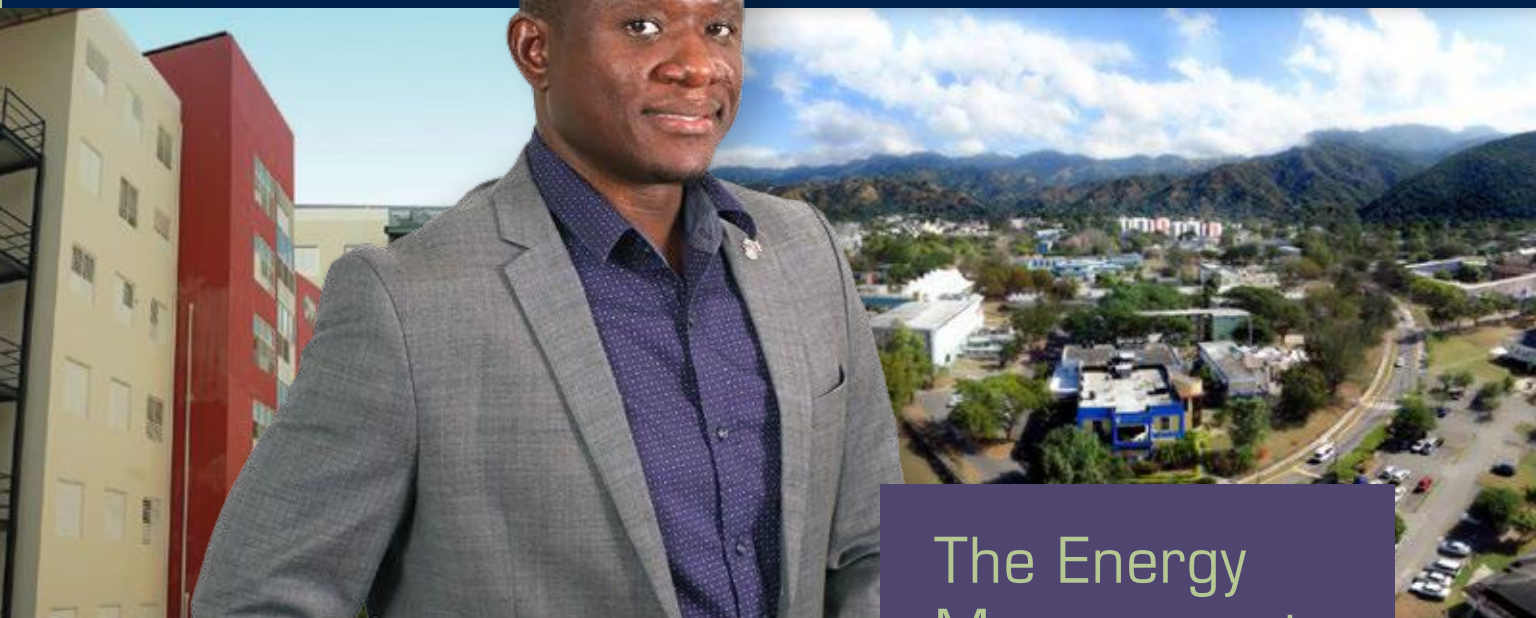
The educational significance of the children's animation film will be far reaching. This is because it will be integrated into the new curriculum development programme nationally in Jamaica, to aid more interactive forms of learning and use of on-line media to promote research of specialist topics that are implicitly or explicitly raised in the animation series. For example, the film series Ms Sugga, will be used to stimulate learning in a number of subject areas such as Social Studies, History and Geography and provide discussion material for Religious Education, the Performing Arts, Languages, Science and Technology.

Overall, the impact of the series will be felt in terms of their educational reach, human capital development and economic growth potential, especially for the Ms Sugga animation series. The films have also contributed to the cultural heritage of the nation via the creation of iconic public cultural products, namely, the first Jamaican-owned films to speak to the history of the Jamaican sugar cane industry from birth to present.

The lead research team, comprised Dr Patricia Northover, Development Economist, Co-Producer and Principal Investigator, (Senior Fellow) SALISES, UWI, Prof Michaeline Crichlow (Historical sociologist, Duke University and co-producer of the adult series), Dr Daive Dunkley, (Historian, Assistant Professor at the University of Missouri) and Prof Patrick Bryan, (Professor Emeritus of History) the project's Historical Advisor.

Bio

Dr Patricia Northover, Project Director/Principal Investigator Sugar Heritage Project (UWI-GOJ), Senior Fellow, Sir Arthur Lewis Institute for Social and Economic Studies, University of the West Indies - website: <http://www.uwi.edu/salises/> and Chair of the Sustainable Rural and Agricultural Development, (S/RAD), Research cluster (SALISES); website: <http://salises-srad.com/> Email: pat.northover@gmail.com or patricia.northover@uwimona.edu.jm



The Energy Management Unit

Mr Stanley G. Smellie

Mona School of Engineering

Overview

The Energy Management Unit (EMU) was officially formed in February 2016 having assumed all the roles of the now disbanded Energy Conservation Project Office (ECPO). The ECPO was initially part of the Office of the Campus Bursar and had been in operation since September 2005. The EMU is now a unit in the Mona School of Engineering.

The EMU aims to ensure that all campus buildings function at high energy performance. Hence, the EMU assumes the responsibility for leading the development of initiatives and recommendations regarding the efficient operation of campus buildings and facilities. It does this on behalf of the entire campus community, which includes departments,

offices, halls of residence, public spaces, lecture theatres, and works closely with relevant technical bodies, decision-makers and Campus senior management.

Aims of the EMU

The EMU is working to make all Campus buildings high-performance buildings as it relates to energy and water use. According to the United States Energy Independence and Security Act of 2007, a high-performance building is one that integrates and optimises on a life-cycle basis all



major high-performance attributes, including energy and water conservation environment, cost-benefit, productivity, sustainability, functionality, and operational considerations. This captures the EMU's increasing roles and responsibilities since inception in 2005. Indeed, the EMU aims to:

1. Develop and maintain performance criteria for maintenance of energy efficient buildings.
2. Evaluate and prequalify building technology and products.
3. Conduct related and needed investigations into issues affecting indoor air quality in buildings.
4. Assemble, store, and disseminate technical data and related information pertinent to energy conservation and efficiency projects such LED Lighting Retrofit, Solar PV and Cogeneration.
5. Implement energy conservation and efficiency projects.
6. Monitor and evaluate performance of implemented energy conservation and efficiency measures for sustainability.

Over the past academic year 2016 -2017, the EMU has worked closely with: the Office of the Campus Principal in the development of a Campus-wide light emitting diode (LED) lighting upgrade project plan as a stated objective of the campus's strategic plan; the Institute for Sustainable Development in the design and project management of the Caribbean Region's first Net-Zero Energy Building; the Department of Microbiology in the acquisition, implementation and assessment of a multi-million dollar grant funded energy conservation and efficiency project; the Campus Projects Office in the development and execution of a protocol aimed at addressing the Sir Alistair McIntyre Complex indoor air quality (IAQ) problem; and the Campus Bursary with the piloting and development of procedures for a centralisation of air condition maintenance campus-wide. These are but a few of the projects the EMU has been integrally involved in, and that have yielded significant energy and dollar savings for the campus.



Relevance to Campus

It follows that the contribution of the EMU is of vital importance to the Campus community, as it readily helps to address inefficient building and equipment operation and maintenance strategies, which can significantly degrade overall campus energy performance. The EMU's contribution is not limited to new construction and major renovations, which are only a fraction of the campus energy use. Indeed, after the building has been constructed, the operators and occupants are oftentimes left to do the heavy lifting. Hence, the EMU is currently developing a campus-wide energy awareness programme (EAP) to adequately address this issue. Here, the EAP targets energy behaviour change aimed at:

1. Achieving improvement in all areas of energy efficiency and conservation.
2. Managing energy as a controllable expense.
3. Improving Campus energy productivity by

requiring less, or a constant amount of energy to produce more graduates and realise increased revenues.

4. Galvanising the involvement of the Campus community into being more energy conscious and to practice energy conservation and efficiency in the workplace, halls of residence and homes.

Activities, research and teaching

The EMU represents a single point of contact for campus energy and power statistics, and actively disseminates results of data analysis to students and departments when needed. Indeed, the EMU's contribution helps to drive energy innovation on the Mona



campus by supporting research and development that depend on accurate and timely energy statistics. In addition, the EMU has a long history of providing internship opportunities to students who have contributed to the sustainability of installed energy conservation and efficiency measures. Some of these measures included: the occupancy sensors project where over three hundred occupancy sensors were installed on lighting and air conditioning campus-wide; power factor correction rehabilitation project; and, the energy monitoring system rehabilitation project.

The EMU continues to offer its expertise to the Jamaican Government in the development of energy efficiency standards for commercial and non-commercial buildings, and refrigerators and freezers. Additionally, the EMU has also assisted members of the local private sector through energy auditing, and continues to work closely with the CARICOM Regional Organisation for Standards and Quality (CROSQ) in the development of an energy efficiency building code application document intended for use in CARICOM member states. The EMU harnesses its expertise and acquired institutional knowledge, and contributed to curriculum development at both the undergraduate and post-graduate levels, and delivers a post-graduate taught course, Shaping Sustainable Energy Systems.

Bio

Mr Stanley G. Smellie holds a MPhil degree in Physics with high commendation from The UWI that focused on sustainable energy management. He is currently pursuing a PhD in sustainable development and his research focuses on addressing some of the technical challenges of integrating distributed energy resources, such as renewable energy technologies, into the traditional power grid, such as Jamaica's that generates power centrally and then transmits and distributes to distant customers. Resolving these challenges is crucial to the sustainable development of small-island developing states as it improves energy's security, access, affordability and efficiency.





Professor Anthony Clayton

Institute of Sustainable
Development

Professor Emeritus Tara Dasgupta

Department of
Chemistry

World energy demand is still growing strongly, driven by the rapid economic development of countries such as China and India, the increase in world population, and the unmet demand of the millions of people who still do not have reliable energy supplies. This increasing demand for energy makes it impossible to reduce carbon emissions, resolve the problems of climate change and meet the need for energy security without very significant improvements in energy efficiency and productivity.

It is particularly important to improve the energy performance of buildings, as the residential sector alone accounts for 25% of total end-use demand

and 19% of global greenhouse gas emissions, so improvements in building efficiency would reduce world demand for energy more than any other reform.

Levels of energy efficiency in most of the buildings in the Caribbean region are very low. However, this means that the building sector has a considerable potential for positive change, to become far more efficient in terms of resource use, less environmentally intensive, and less costly.



Hon. Andrew Wheatley (2nd left), Minister of Science, Energy & Technology, cuts the ribbon to formally open the Centre for Advanced Research in Renewable Energy (CARRE) at Jamaica and the Caribbean's first Net Zero Energy Building (NZEB), at The University of the West Indies, Mona, on October 25, 2017. Sharing the moment are (l-r) principal investigators of the Low Greenhouse Gas Emissions: Promoting Energy Efficiency & Renewable Energy Building in Jamaica (LGGE) Project, Professors Anthony Clayton and Tara Dasgupta and UN Environment Programme Jamaica Officer, Alexandra Karekaho.

New buildings

Net zero/energy-plus buildings represent the most advanced solution to date. These are highly efficient buildings that generate as much power as they consume. There are times when a building is busy, and has to import some additional power, and times when it is quiet, and can export power to the grid, so the 'net' in 'net zero' means that the imports and exports from each building balance each other out over the course of a year. If buildings like this became standard, many of the world's power stations would become redundant, while electricity grids would no longer be one-way transport systems, but dynamic markets in which customers were also suppliers, buying and selling power to each other.

The Institute of Sustainable Development at the University of the West Indies therefore initiated a pioneering project to research and construct an advanced prototype of a net zero/energy-plus energy building in Jamaica. The project's objective was to research and develop practical, working solutions that could transform building policies and practices, followed by the implementation of appropriate regulatory, educational and technical tools to mainstream the lessons and transform the opportunities for promoting energy efficiency and increased use of renewable energy sources.

There are various models of zero-energy and energy-plus buildings in the world, but the building at UWI is the first of its kind in the Caribbean. The research and development were done in Jamaica. The lessons will



now be disseminated across the Caribbean region and the other tropical and sub-tropical regions of the world. This project shows how countries can simultaneously improve their energy efficiency, increase levels of disposable income, reduce energy imports, minimize exposure to the risk of energy price volatility in future, and reduce the national contribution to climate change.

The NZEB building was officially opened in October 2017. The keynotes speaker at the opening ceremony, Minister Wheatley, said that “the adaptation and implementation of net zero energy buildings will go a far way in reducing the country's carbon footprint by ensuring future utility cost savings and improved use of energy from the sun.” Professor Clayton noted that the long-term benefits of the NZEB are “reduced environmental impacts, lower operating and maintenance costs, better resilience to power outages and natural disasters and improved energy security”, Professor Dasgupta said that “the

building will save approximately 50,000 kilowatts of energy annually, which translates to a reduction in carbon dioxide emission of 34.5 metric tonnes per year”, and UN Environment Officer Alexandra Karekaho said, “This is an exemplary demonstration, not only to Jamaica but the Caribbean region, on how innovative building designs and climate technologies supported by favourable national policies can eliminate dependence on fossil fuels in buildings and reduce greenhouse gas emissions.”

Once the NZEB is fully occupied and active, its energy consumption and production will be monitored for one year and the final results submitted to an international accreditation body for zero energy building certification.



Retrofitting for improved energy efficiency

It is important to ensure that all new buildings operate to far higher standards of energy efficiency. But it takes many decades for the entire building stock to be replaced, so it is very important to find ways to upgrade existing buildings as well.

This part of the project involved upgrading a well-known public building - the National Housing Trust (NHT) headquarters in Kingston, the adjoining car park and the Emancipation Park. This involved an energy audit to plan retrofit solutions to increase the energy efficiency and performance of the existing buildings.

The audit found that the NHT building (like most of the older buildings in Jamaica) had inefficient lighting, electric motors and air conditioning technology, and identified twelve actions that could reduce energy consumption by 30-40% in total. This will generate immediate cost-savings for the NHT, so that the necessary investments will pay for themselves very quickly. The main retrofit solutions were as follows:

1. Installation of solar window film
2. Improving lighting efficiency
3. Installation of roofing insulation to concrete slabs
4. Improvement of electrical motor efficiency
5. Installation of photo voltaic system
6. Instrumentation of major energy consuming components

These are now being implemented. The retrofit ideas used in the NHT buildings can all be easily adopted and used in construction projects anywhere in Jamaica.

This project was devised by Professors Anthony Clayton, CD and Tara Dasgupta, CD, and funded by the Global Environmental Facility. Technical assistance was provided by the United Nations Environment Programme. The total value of the project was US\$7,461,000.



**Principal
Archibald
McDonald**

**Professor
Wayne
McLaughlin**

**Mr Craig
Hall**

**Mr Devon
Smith**

Medical Sciences,
Basic Medical Sciences

Professor
McDonald's
creative vision
for teaching and
research at Mona

One of the most impressive buildings on the Mona Campus is the Faculty of Medical Sciences, Teaching and Research Complex. This 30,000 square metres state-of-the-art facility is home to students pursuing professional degrees in the various health and basic medical science disciplines at the University of the West Indies, Mona.

The 3.5 J\$ billion complex is the brainchild of the current Principal of the Mona Campus, Professor Archibald McDonald. Close to a decade ago, he saw the need for a proper facility for the basic medical sciences, and took the initiative to plan

and design this facility with input from faculty. The location on which it was built was fairly well vegetated with a wide variety of trees such as ackees, mangoes, guineps and an enormous cotton tree. Most of these trees were retained and the structure was built around them.

The project would open the doors for increased enrolment of medical students, thereby meeting a demand, the response of which was previously



limited to just over 100 students per annum. The old Faculty was built in 1948 and started with 33 students. Seventy years later, the facilities now cater to an intake of 280 medical students, and the Faculty has also been able to operate training programmes for other disciplines in this building. This includes physical therapy, diagnostic imaging, basic medical and applied sciences, clinical pharmacy and dentistry.

In conceptualising the structure's design, the architects factored in the influence climate would play and the positive impact of sun and rain. In the design, they maximised on the abundance of natural lighting through the use of glass, reducing the use of artificial lighting. Throughout the complex there is extensive use of glaze applied to offices, laboratories and research areas. Extensive use of glass tends to cause heat build-up, so, to reduce the build-up on the external surfaces and internal areas sunshade devices (louvres) and sunscreens were added. The blue and silver cladding on lecture theatres was added to reduce heat. The artificial lighting used throughout the complex for offices and laboratories are high-output T5 lamps, and LED lamps in the common area spaces.

Another major climate-associated feature is rain water harvesting. The water is stored in a thirty-thousand storage tank, and is used for the flushing of toilets and irrigation purposes. When the dry season comes around the tank is filled by sixteen air handler units through condensation. These air handler units, along with mechanical chilled beams provide cooling to this large complex through a chilled water system.



The complex has many other green features to note. There are gardens on sections of the roof. These gardens help to keep the building cool by acting as natural insulation. The solar panels fixed to the roof add up to approximately 15kva per day that feed back into the building's electrical grid. A solar water heating system provides hot water to labs and janitor closets.

The building itself portrays modern design features. There are five large lecture theatres, 25 tutorial rooms, 45 small research labs for staff, and 12 larger research laboratories equipped with modern multimedia technologies. The facility is the home of CARIGEN and CARITOX, a Forensic DNA Laboratory and Forensic Toxicology testing laboratories, respectively.

The multimedia technology allows for streaming of lectures to students based at the Western Jamaica Campus thereby extending the capacity and reach of training initiatives. Within the anatomy lab, there is technology such as a digital

microscope which has the capability of creating a bank of electronic slides for student use. The facility also has a well-equipped computer lab which allows for not only delivery of classes but also for examinations to be conducted online using the University's virtual learning platform.

This facility has increased UWI's reputation not only for high quality teaching but also first class research. Currently, a wide range of research is being pursued by faculty in areas such as forensic sciences, molecular biology, microbiology, new-drug development and cannabis genetics. The research agenda for the Faculty has been strengthened by collaboration with the SUNY University Systems which was forged principally with the University of Buffalo campus of SUNY, and includes five main areas of research



development - Centre for Infectious Diseases Research, Antimicrobial Resistance and Stewardship, Liver and Metabolic Disease, Cannabinoid Sciences Clinical Applications Research Programme and Cancer Research in Natural products and Nano medicine.

The Mosquito Control and Research Unit also resides within the building. This is a collaborative project with the Ministry of Health, Jamaica aimed at coordinating best practices in Integrated Vector Management and Research for the health and well-being of Jamaicans.

The evidence of good research through publications is already being seen through the work of staff resident in the building. In 2016/17, Dr Chukwemeka Nwokocha of the Department of Basic Medical Sciences received one of the Most Outstanding Faculty Researcher awards, for producing 2 book chapters and 6 articles focussing on the "Biological activity, phytochemical exploration and mechanisms of action of natural products in the management and signalling pathways of experimental hypertension".

This first-class facility driven by the vision of Professor Archibald McDonald is living up to its expectations in promoting high quality teaching and learning and delivering first class research.



Professor Michael Taylor & the Climate Studies Group

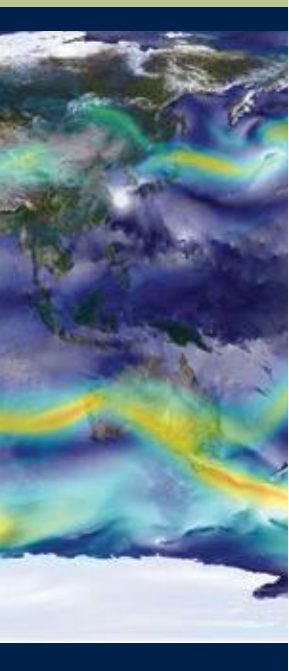
Department of Physics

Making the Caribbean climate resilient

The Climate Studies Group, Mona (CSGM) was started in 1994 by Professor A. Anthony Chen, as a means of promoting research about the drivers of Caribbean climate. Prior to that, and for a significant portion of its early history, the Department of Physics had developed expertise in upper atmospheric physics. However, Professor Chen, with pioneering foresight, saw that understanding lower atmospheric phenomena, and how they contributed to generating and maintaining the climate of the Caribbean region, was fast becoming necessary, as the region has a particular sensitivity to climatic variations (e.g. drought, temperature extremes, rainfall, tropical storms and hurricanes). The mission of the

CSGM in 1994, remains the mandate of the CSGM today namely, to:

- investigate and understand the mechanisms responsible for (i) the mean climate, and (ii) extremes in climate in both Jamaica and the wider Caribbean;
- use this understanding to predict climate on a seasonal and annual basis;
- promote awareness of global warming;
- determine how anthropogenic climate change will manifest itself in the Caribbean region;



- investigate the potential for exploiting renewable energy resources; and
- investigate and promote the advantageous uses of climate knowledge in socio-economic sectors of relevance for the Caribbean.

In the area of climate change, the CSGM has made significant contributions to the development of the regional knowledge base. The Caribbean region is among the most vulnerable to the impacts of climate change, owing to a combination of factors. These include the relative isolation of the region's territories, their small land masses, the concentration of most of the region's population and infrastructure in coastal areas, a limited economic base, and a heavy dependency on natural resources. Notwithstanding, at the time of the CSGM's inception, a detailed understanding of Caribbean climate dynamics was lacking, and there was insufficient information about the science of climate change at the scale of the small islands to drive planning and decision making. This is no longer the case, as the sustained research and scholarly activity of the CSGM and collaborators has significantly narrowed the information gap.

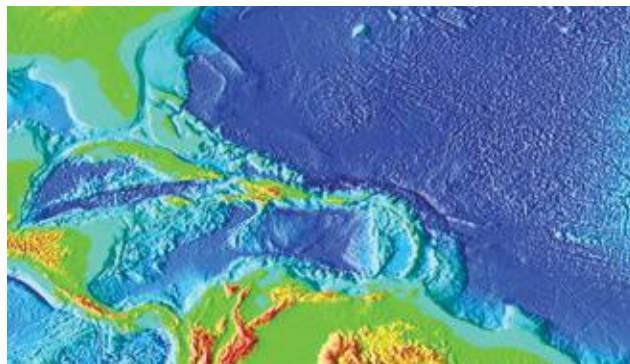
The CSGM has, on the one hand, produced numerous papers providing fundamental theories governing Caribbean climate, e.g., how the interplay between tropical Pacific and Atlantic sea surface temperatures condition the region for rainfall through the year, or how the Caribbean low-level jet contributes to the Caribbean midsummer drought. In 2000, the CSGM also began coordinating a multi-country collaborative initiative, which continues to today, and which produces dynamically downscaled climate information for the Caribbean, i.e., information at increasingly finer resolutions suitable to the island scale, through to the end of the current century (i.e., up to 2100). The availability and analysis of this modelled data have significantly altered the region's ability to articulate the future evolution of its vulnerability to climate change and to posit positions on global climate action needed for the region's future survivability.



Consequently, the CSGM's work has become the underpinning for regional policy and planning with respect to climate change. For example, the climate projections are central to CARICOM's Regional Framework for Achieving Development Resilient to Climate Change. The projections have also been used in several Caribbean countries' Second and Third National Communications to the United Nations Framework Convention on Climate Change (UNFCCC), and as design guidelines for numerous large-scale multi-lateral funded infrastructure projects in the region that require a climate resilient component. In Jamaica, The State of the Jamaican Climate 2012 and The State of the Jamaican Climate 2015 serve as guides for resilience building. The research of the CSGM has also led to numerous cross-disciplinary partnerships exploring, among other things, the economics of climate change (e.g., the European Commission on Latin American and

the Caribbean 2011 reports), and the impacts of climate on a number of sectors, including agriculture, health, water resources and tourism.

Two recent projects of note are the Pilot Programme for Climate Resilience (PPCR) - Caribbean Regional Track and the Caribbean 1.5 Project. The former is a US\$ 10.39 million project funded by the Inter-American Development Bank (IDB) through the Climate Investment Funds (CIF) and managed by The UWI, which is implementing targeted strategies to support the building of climate resilience in the region. These include enhanced climate monitoring and climate data capture, bathymetric mapping, further climate modelling using a



supercomputer installed at UWI Mona (dubbed 'SPARKS'), designing climate change communication approaches, and developing sector interventions in agriculture and health. The Caribbean 1.5 Project, funded by the IDB (through the PPCR project) and the Caribbean Development Bank (CDB) is providing the scientific basis for the Caribbean's global position captured in the slogan "1.5 to Stay Alive". The funded research is showing that, for the region, there is more than a reasonable basis for arguing that an increase of no more than 1.5 degrees Celsius above the pre-industrial temperature levels can be tolerated by 2100, if the region is to remain viable. The project is collaborative (45 regional climate scientists from 6 countries and 11 regional institutions) and coordinated by the CSGM. Results, to date, were presented at the 23rd Global Conference of the Parties (COP23) held in Germany in November 2017.

No less significant is the fact that the CSGM has been the training ground for a cadre of emerging regional climate scientists, and has attracted numerous visiting experts and international meetings to The UWI and grant funding for The University. In part, through the work of the CSGM, The University of the West Indies has been positioned as a centre of regional thought and expertise with respect to climate change science. Not surprisingly, then, the work of the CSGM has been cited in the Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report, and both the former and current Directors (Prof. Chen and Prof. Taylor, respectively) have served as authors on IPCC reports. Prof. Chen was also a part of the IPCC's Nobel Prize winning team of authors. Dr Tannecia Stephenson also serves on a special commission of the World Meteorological Organisation, and is a member of the team coordinating the Caribbean and Latin America's participation in the international CORDEX (Coordinating Regional Climate Downscaling Experiment) programme.

The work of the CSGM over the years has not only altered the way climate change is spoken of in the Caribbean context, but is also contributing significantly to making the region resilient to climate change.



UWI Community Film Project (UWICFP) & Jamaica Social Investment Fund (JSIF) collaboration

Ms Tina Griffiths
Professor Ian Boxill
Ms Savannah Peridot

Centre for Tourism and Policy and Research (CTPR)

The project began in 2011 in recognition of the need to find ways to help develop underserved communities near to the UWI and grow the burgeoning local film sector.

Over 250 persons from approximately 15 communities across Jamaica have graduated from the programme. Over 100 have participated in the now annual film festival.

POSTER # 2

UWI Community Film Project (UWICFP) & Jamaica Social Investment Fund (JSIF) Collaboration

In July 2016, the Jamaica Social Investment Fund (JSIF) partnered with the Centre for Tourism and Policy Research (CTPR) to train 19 at-risk youths from 8 vulnerable and underserved communities across Kingston and St. Andrew at



Front row, left to right: Mr Gresford Bennett (JSIF Social Officer), Mr Justin Awn (UWICFP Instructor), Ms Tina Griffiths (UWICFP Project Coordinator), Ms Eka Campbell (UWICFP Lead Instructor), Prof Archibald McDonald (Principal of UWI, Mona), Prof Ian Boxill (Director of the Centre for Tourism and Policy Research), Mr Omar Sweeney (Managing Director of JSIF), Mr Ransford Hall (UWICFP Community Liaison Officer) and graduating students.

a filmmaking and video production summer camp. The communities included: Rose Town, Maxfield Avenue, and Greenwich Town. The grant of JMD\$1.5M was funded through the World Bank's Integrated Community Development Project funding scheme.

Eighteen (18) students graduated from the programme and a tracer study conducted on the cohort showed that 28% of these students are currently employed, mostly within the film and video production sectors.

The partnership between the CTPR and JSIF shows that there was a recognition by JSIF of the importance of the UWICFP's film training programme in empowering youth from inner city communities.



