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2017



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2017





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Archibald McDonald
Professor of Surgery
Pro Vice-Chancellor and Principal



Principal's Message

Recognising and Promoting Research Excellence



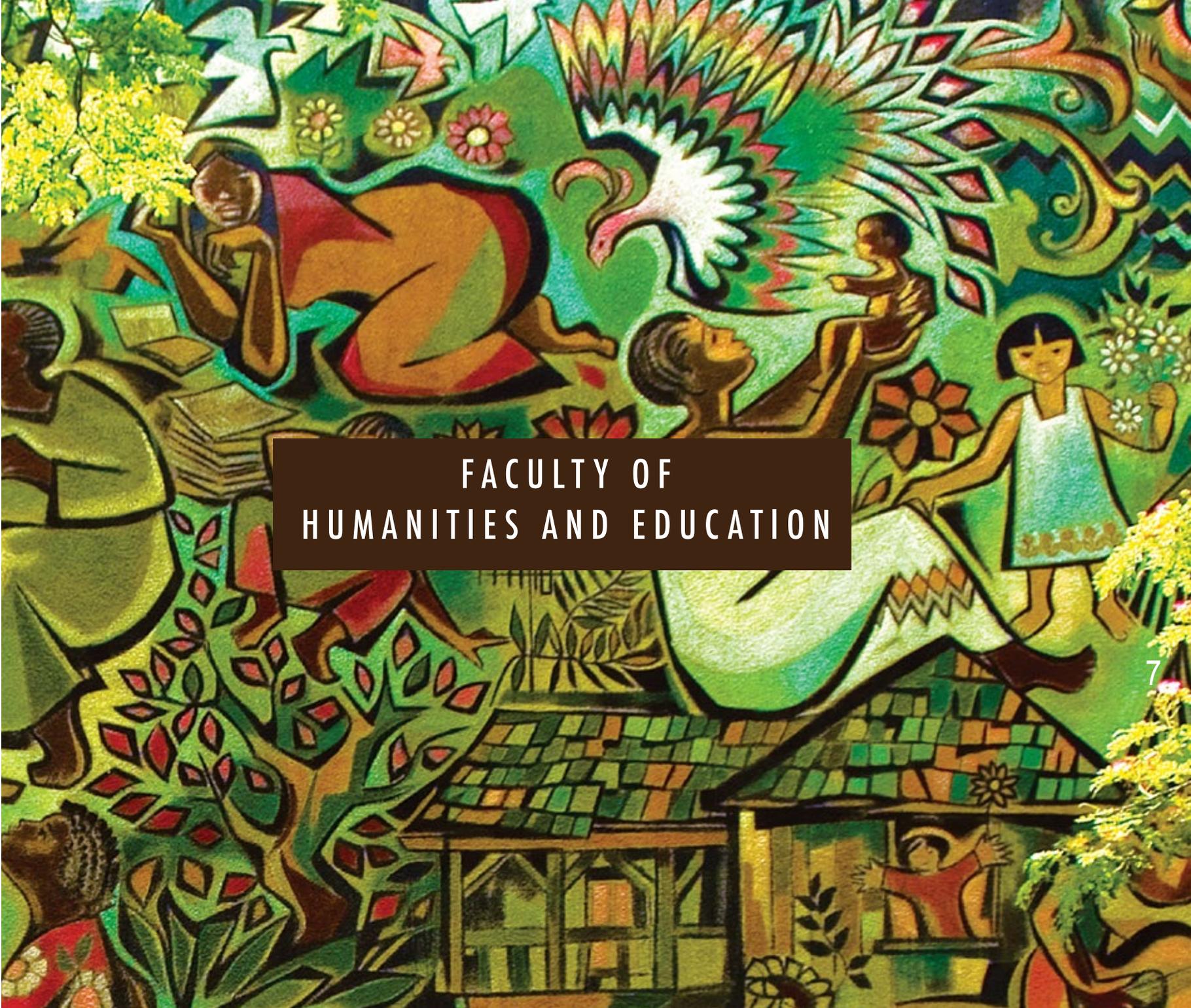
Our faculty's outputs that have qualified this year for the Principal's Outstanding Research Awards exemplify the seminal research activity to which this university is committed – research that seeks to address issues impacting socio-economic development in our region. The broad areas in the winning articles and books address practices in our educational system, the prevalence of devastating and costly medical conditions, and our governance, business, financial, agricultural, cultural and herbal medicinal behaviours, all the time providing practical recommendations for advancing solutions that will advance economic growth.

The UWI, Mona Campus is proud of our research awardees, and congratulates them on their stellar achievements. In exposing their work through this forum, we hope to encourage our faculty to continue in this noble tradition of knowledge-creation, and to urge more of our stakeholders in the public and private sectors to partner with us to ensure sustainability of the university's research enterprise.

Sincere thanks to the donors and investors who supported us over the past year. We look forward to your continued support which will allow us not only to broaden our research capacity, but also to convert our research findings into business and policy applications to grow our economy.

Again, congratulations to our 2017 best researchers. It is scholarship such as yours that enhances our reputation as a world-class university.





FACULTY OF
HUMANITIES AND EDUCATION



Dr Paulette Ramsay

Best Research Publication (Book)

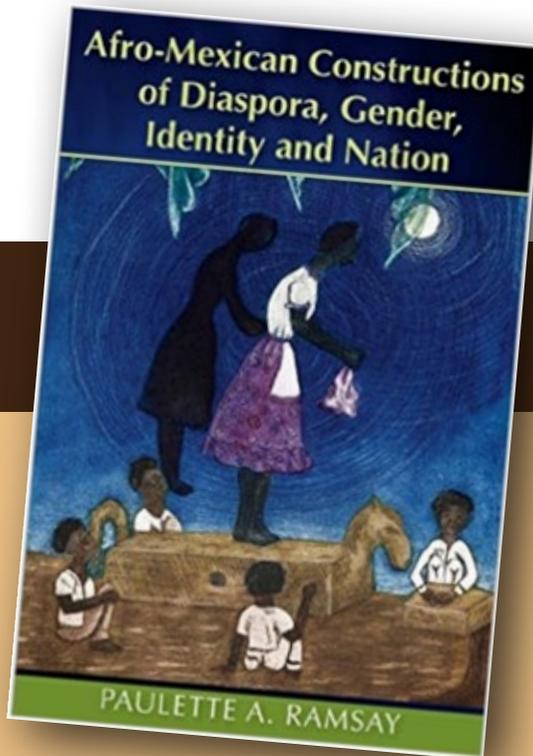
Department of Modern Languages and Literatures

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***Afro-Mexican Constructions of Diaspora,
Gender, Identity and Nation***



This book expands the small body of existing research on Afro-Mexico to contest Mexico's definition of itself as a homogeneous mestizo nation. The research focuses on a community of clearly defined people of African descent on the Costa Chica of the states of Guerrero and Oaxaca on the Pacific Coast. Even though there are other small groups of African-derived persons in the states of Yucatán and Quintana Roo, comprising mainly descendants of run-away slaves from North America, Dr Ramsay's focus is on the largest and most clearly identifiable group of Afro-descendants in Mexico. This group is dispersed in communities such as Cuajinicuilapa, San Nicolás, Montesillos, Punta Maldonado in Guerrero and in Collantes, Santo Domingo, Tapextla, Lagunillas, and El Ciruelo in Oaxaca, to name a few.



These black communities are unknown to many Mexicans, owing mainly to Mexico's official proclamation that the 'third root' has completely disappeared. So dominant is this insistence on Mexico's homogeneity that many of these individuals themselves have accepted the ideology of mestizaje and have very little or no consciousness of themselves as blacks.

The analyses of the literary and cultural production by this group, however, forcefully establish their link to a wider African diaspora and cultural heritage. Moreover, these African-influenced cultural forms serve to emphasise that cultural marronage continues to be a defining feature or characteristic of the Afro-Mexican presence in Mexico. This small body of literary and cultural material in Afro-Mexican communities has received very little attention.

This is the first book which gives detailed critical attention to the literary / cultural production of Afro-Mexico. The nature of the primary material with which the researcher engages requires the application of a variety of theoretical constructs. The interdisciplinary analyses draw, therefore, from cultural studies, gender studies, linguistic anthropology, feminism, broad post-colonial and post-modernist theories, particularly as they relate to issues of marginality, isolation, ethnicity, gender, cultural identity, self-formation, questions of place, belonging, pride in nation, statehood, individual agency and subjectivity.

An important aspect of Dr Ramsay's work is the rigorous interrogation of the Memín Pinguín comic series which, she suggests, contests arguments alleging Mexico's ethnic and racial homogeneity. Through the application of post-colonial deconstructionist theories, as well as canonical approaches to the study of visual and literary images, she argues that the comic highlights Mexico's racial and ethnic diversity, but simultaneously reveals how difference is treated as undesirable and perpetuate racist images of blacks.

Some of the patriarchal assumptions and stereotypes which underpin the ideological representations of gender and sexuality in selected Afro-Mexican oral narratives are debated. Critical interrogations include the ways in which rituals of hierarchy and power play out between the sexes and underpin the ways in which race, class and gender and even sexuality, intersect in Mexican society.

Masculinity and femininity are treated in keeping with social constructionism, as gendered ideologies that are both culturally and socially constructed; as products of various historical and cultural contexts that influence the way men and women are perceived or define themselves. The performance of masculinity by Afro-Mexican males in the Afro-Mexican corrido is shown to be complex, especially since Afro-Mexican female figures are also marginalised along with males, under the same oppressive system, and sometimes further marginalised by black men in their relationships.

The concepts of "figured world", "relational identities/positionality" and "authoring," drawn from the interdisciplinary field of cultural studies are used together to establish the analytical frame. Dr Ramsay interrogates poems which, she contends, reveal a significant level of racial consciousness and identification with the land or region occupied by Afro-Mexicans. In addition to the ways in which the field of cultural studies constructs identity and agency, broad post-colonial theories related to creative revisionism are further used to underline how the verses advance a new discourse about Afro-Mexicans and their ethnic heritage.

A focal argument advanced in this book is the extent to which oral and lyric verses establish a new literary discourse within the broader context of Mexican discourse. The researcher contends, as well, that the diversity that these poems add to Mexican culture and the definition of Mexican nation, locates them within a broader Caribbean literary and cultural aesthetics. Her hope is that this research will foster greater interest

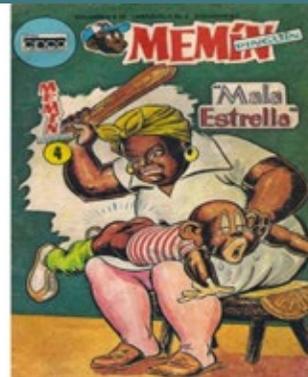
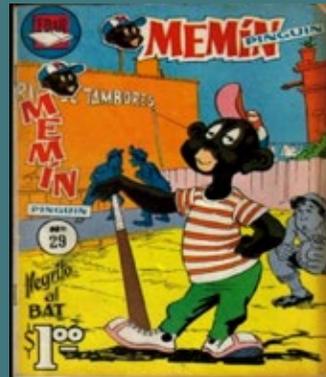


in the black presence in Mexico, along with their unique literary and cultural production, and will result in raising awareness of the need for a more inclusive definition of community, nationhood, identity and selfhood in Mexico.

Bio

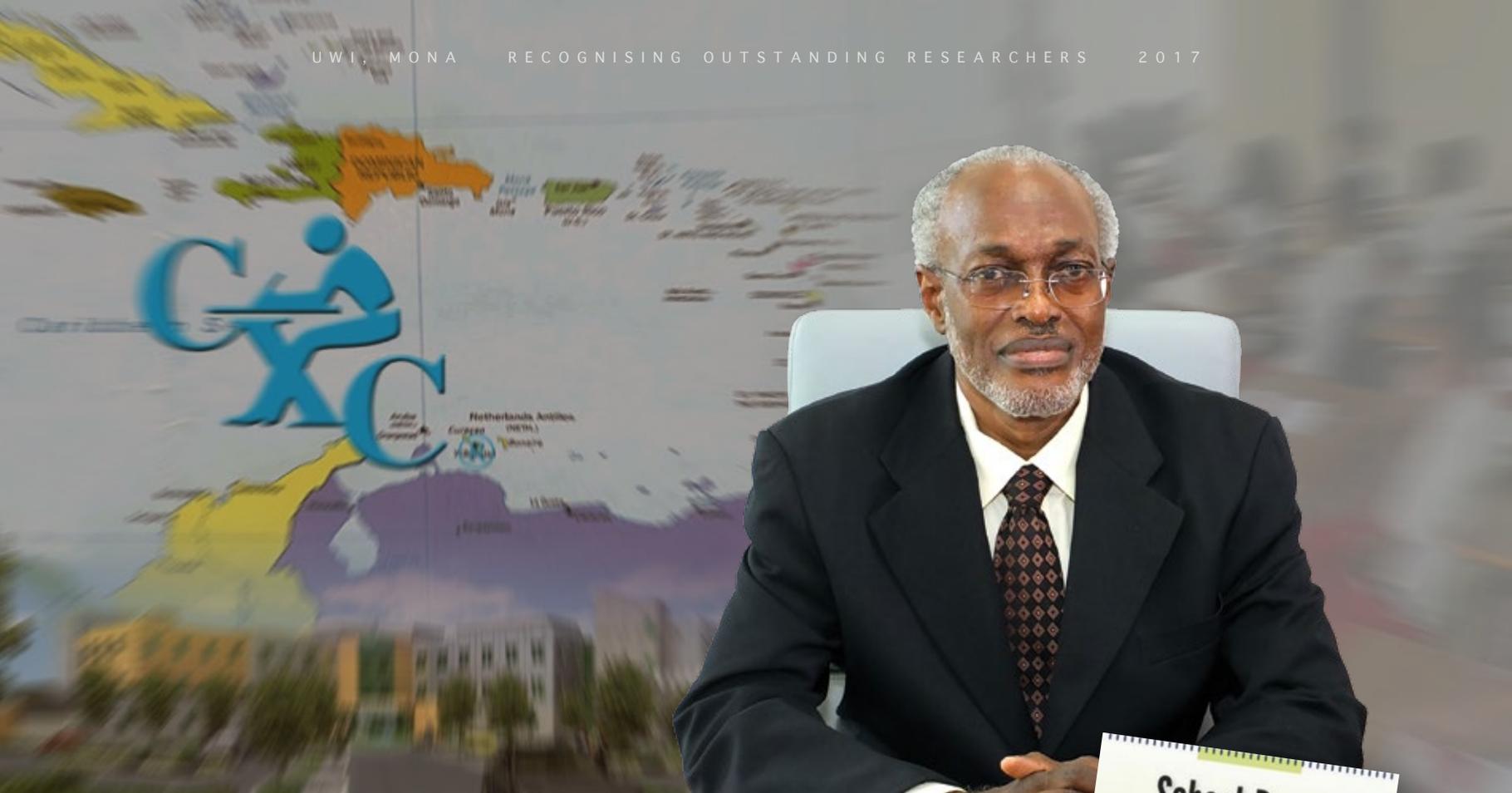
Dr Paulette Ramsay is a senior lecturer, in the Faculty of Humanities and Education. She is an interdisciplinary academic, an established writer and researcher whose interests include language pedagogy, writing theories and Afro-Hispanic literature and culture. She has published many scholarly articles, mainly in the area of Afro-Hispanic literature and culture, in international journals such as *The Afro-Hispanic Review*, *PALARA*, *Bulletin of Latin American Review*, *Latin American and Caribbean Ethnic Studies*, *The Langston Hughes Review*, and *College Language Association*.

Her research has expanded the knowledge in her interconnected disciplines by drawing on broad post-colonial and post-modernist theories, gender studies, feminist studies, masculinity theories and cultural studies, as they relate to questions of ethnicity, gender, identity and statehood.



She has also published a rhetorical reader for Caribbean tertiary students, *Blooming with the Pouis* (2009), as well as translations of a novel, poetry and short stories from Spanish into English. Her novel, *Aunt Jen*, has been translated into German and Italian, and is enjoying great popularity. She has also published two anthologies of poems entitled, *Under Basil Leaves* (2010) and *October Afternoon* (2012), respectively. She has been the recipient

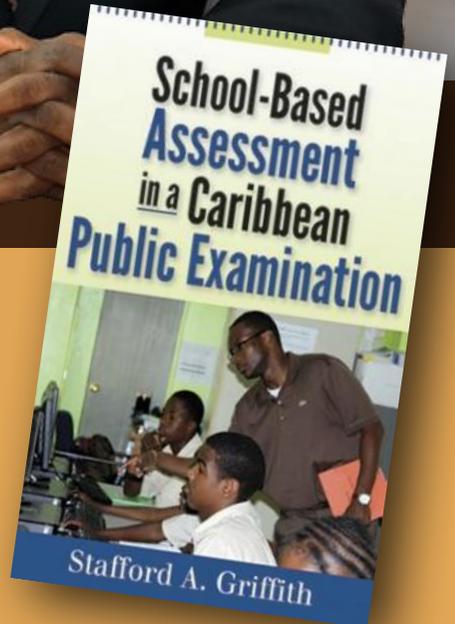
of several awards, including OAS, AECI Fellowships, and The University of the West Indies UWI 60th Anniversary Award for outstanding research. In 2014, she received the French National Award: Chevalier, Knight in the French Order of Merit (Ordre National du Mérite) from the French Government, for her work as Head of Department and her collaboration with the Embassy of France. She was the first coordinator of The UWI Writing Centre, and is currently Head of the Department of Modern Languages and Literatures..



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Professor Stafford Griffith
Best Research Publication (Book)
School of Education

School-Based Assessment in a Caribbean Public Examination



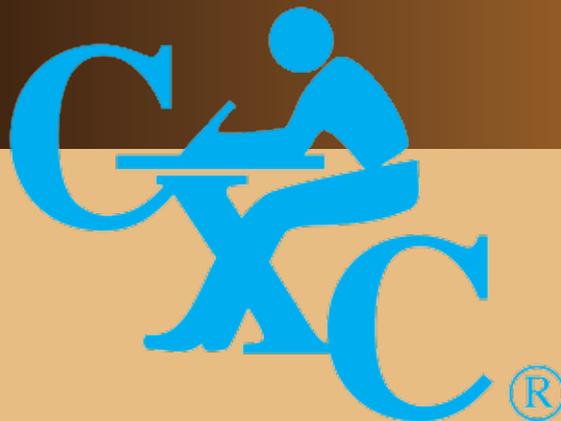


The book explores the historical, conceptual, theoretical and practical dimensions of School Based Assessment (SBA) in a public examination by considering the related literature and the writer's own experience as an educational practitioner, resource person, researcher in the field of SBA, and university faculty engaged in the teaching of a course on SBA at the graduate level. It is the only scholarly book available on the subject of SBA in a Caribbean public examination, despite over 40 years of existence of the Caribbean Examinations Council which has SBA as a central part of its examinations offered at various levels in the Caribbean education system. It therefore fills a critical void, which should impact thinking and practice in the education system in the Caribbean for several years.

The issue of SBA in a public examination has engaged the attention of the global community for several years. This is especially so in territories of the Commonwealth of Nations (formerly British Commonwealth). The book should be particularly helpful to students at the

undergraduate and graduate levels reading for courses which require a consideration of SBA in the education system. It should be a valuable guide for teachers at the primary, secondary and post-secondary levels of the education system who are required to provide guidance to students who must complete SBA as part of a public examination. It should be of equal value to personnel in Ministries of Education responsible for overseeing the proper implementation of SBA.

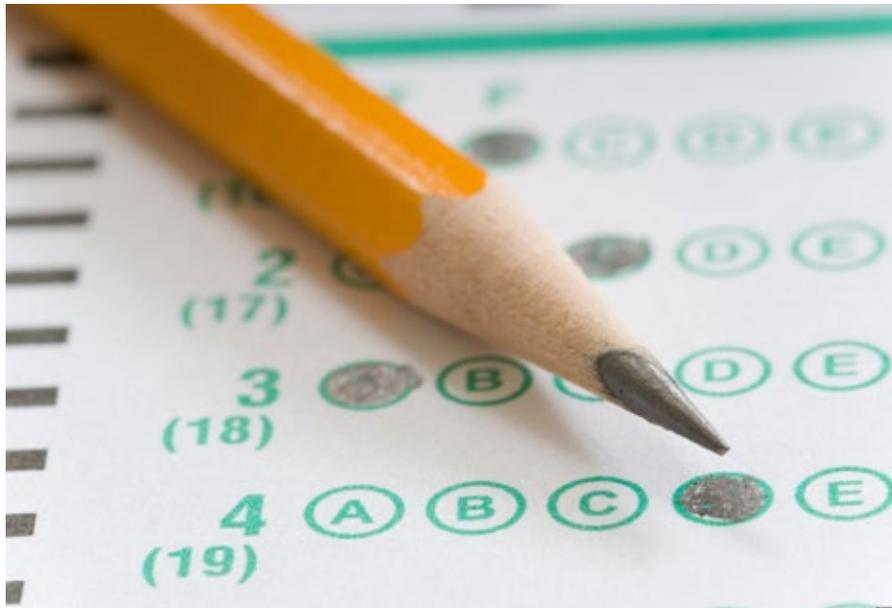
The book comprises three parts or sections, of four chapters each. Part I, provides the History and Context for the exploration of the issues of School Based Assessment (SBA) in a public examination. Chapter 1 explores the history and concept of public examinations, and helps the reader to understand that the examinations of the Caribbean Examinations Council, like those of similar Examinations Boards, are public examinations. The history, mandate and administrative arrangements of the Caribbean Examinations Council are considered so as to provide the essential foundations for a discourse of the concept, theory and practice of SBA in the context of the public examinations of the Caribbean Examinations Council. Chapters 2, 3 and 4 elaborate on critical dimensions of the history and development of the Caribbean Examinations Council as a provider of public examinations, and its impact on the education system of member countries. These three chapters help to establish a more comprehensive understanding of the role and value of SBA in the public examinations of the Council.

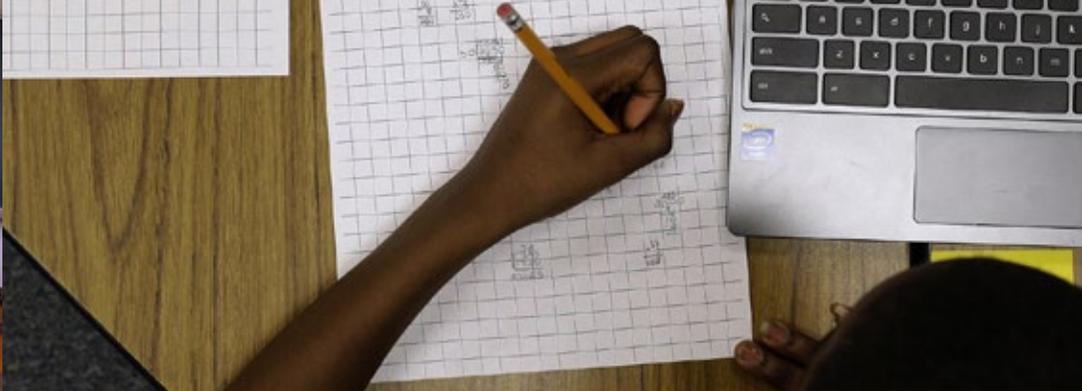


Part II examines a number of Key Issues in SBA in a public examination. The exploration of the issues in this section rests on an understanding of the concepts of a public examination and SBA, and what the Caribbean Examinations Council was seeking to accomplish by integrating SBA into its examinations. Hence, the four chapters in Part II build on the History and Context provided as critical foundations in Part I of the book. Chapter 5 explores how SBA provides for the individualisation of a part of the curriculum and assessment of a public examination. It seeks to explain and reconcile the seeming paradox of individualised assessment as part of a public examination. Chapter 6 explores the value of SBA in enhancing a public examination. Chapters 7 and 8 explore aspects of formative and summative assessment, respectively, in SBA, as part of a public examination and the issues which arise from teachers' involvement in SBA. These two chapters seek to provide some guidance on how teachers' involvement in the assessment of students can improve student learning and, at the same time, provide a fair, valid and reliable assessment of student achievement.



Part III discusses a number of New Directions or practices related to SBA in a public examination. Chapter 9 examines the concept and use of an Alternative (external) Paper to assess the same competencies developed and assessed in the SBA undertaken in schools. It examines the challenges and benefits of this Alternative Paper. Chapter 10 considers the issue of group work among students undertaking SBA in a public examination. This chapter examines the practice and benefits of group work and provides guidance in dealing with a number of challenges arising from the implementation and assessment of group work. Chapter 11 considers the use of a single project for the SBA of a cluster of subjects. It discusses the related challenges, and illustrates how these may be addressed to derive optimal benefits from this approach to SBA in a public examination. The final chapter of the book, Chapter 12, discusses ways in which the benefits of SBA in a public examination may guide practice at all levels of the education system to improve student learning and assessment.





Bio

Dr Stafford Griffith is Professor of Research, Measurement and Evaluation. He is currently Director of the School of Education & Deputy Dean of the UWI Mona Faculty of Humanities and Education.



Dr Disraeli Hutton

Best Research Publication (Article)

School of Education

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“Critical factors explaining the leadership performance of high performing principals”



Introduction

The study on the leadership performance of high performing principals focused on three outcomes— (a) determining the critical factors associated with the leadership performance of high performing principals, (b) establishing the relationships among the critical factors, and (c) presenting the implications for leadership in the school system.

Background

Leadership has been identified as the second most important factor impacting student performance behind the quality of teacher and teaching (Marzano et al., 2011). Therefore, if we are to improve the effectiveness of school leadership, especially in the Jamaican context, it is important to identify the factors that are related to, or associated with the performance of the high performing principal. This study is a follow up to an exploratory study which identified the nine factors related to the performance of high performing principals among the three categories of schools—primary, all-age and junior high; upgraded high schools; and traditional high schools (Hutton, 2011).

The selection of the high performing principals was based mainly on an assessment of the principals' performance in accordance with the areas related to the quality of effective leadership identified by Reynolds (2003).

Findings

Resulting from the Principal Component Analysis (PCA) it was determined that four components, or dimensions, of the performance factors of high performing principals had strong and consistent item loadings which explained 51.1% of the variance in the correlation matrix. The components were labelled as strongest were: Personal philosophy and abilities; leadership and management; student support systems; and school community support and relationships. The results from the Pearson product-moment correlation coefficient showed that all four components had relationships with each other. The components, personal philosophy and abilities and leadership, demonstrated a strong, positive correlation within the matrix. However, the component, leadership, demonstrated a moderate, positive correlation with the components, student support systems and community development and relationships. Moderate, positive correlations were also demonstrated among the components, personal philosophy, student support systems, and community development and relationships.



Implications for leadership in the Jamaican school system

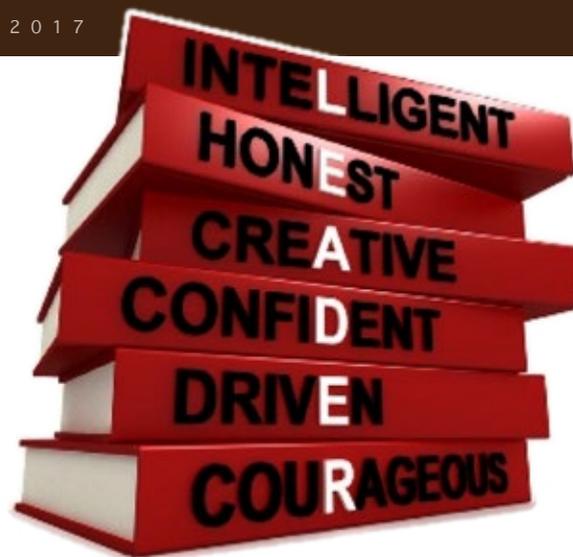
The study has demonstrated that a mix of the components, personal philosophy and abilities, and leadership and management, is at the foundation of effective leadership in the Jamaican school system. This means that in order to improve the performance of principals, greater attention must be given to incorporating these dimensions, both in the process of selecting candidates to become principals and also in the programmes designed for the training of principals. While the components, leadership and personal philosophy and abilities reveal strong positive correlation, the dimensions of components, student support systems and community development and relationships are also positively correlated, even though moderately. This means that for both effective practice and training, all four dimensions must be emphasised in order to realise maximum benefit from these findings. In fact, the element of relationship which is identified mainly in the leadership dimension and also the community development and relationships seems to be central to the performance of the high performing principals.

Some reflections

First, these findings must be viewed within the context of the school environment, which is in the process of systemic development, legally and otherwise. This means that until the changes and related policies are in place, there will be need for schools to rely significantly on principals to achieve effectiveness. In fact, so long as the level of instability and uncertainties remains a dominant feature of the school system, effective school performance has to rely more on the personal qualities, and, in general, the leadership capacity of principals. But an important question to pose at this time is, will leadership continue to be central to the performance of schools and student outcomes? And another pertinent and related question is: is there a point of diminishing returns as educators seek to improve school leadership without giving due consideration to other internal or external factors which are also critical to student outcomes and school performance? These questions will only be determined if continuous research is conducted to detect and determine new dimensions and factors that are positively and negatively affecting school performance and student outcomes.

Conclusion

The most important lesson learned from this study is the need to understand school leadership within the Jamaican context. And while there may be similarities in the performance factors of effective principals across jurisdictions, this study has



unearthed specific factors, such as facilities improvement and relationships (school and community) which are central to the performance of the effective principal in the local context. The findings presented in the article give educators an opportunity to improve the training of principals, both at the pre-service and in-service stages, by incorporating these findings in their programmes. In addition, the central ministry, and school boards in particular, could use the findings of the study in the selection of those seeking to assume the post of principal.

Bio

Dr Disraeli M. Hutton is a senior lecturer in the School of Education, teaching in the areas of educational leadership and management, leadership in technical vocational education and training (TVET) and training and development. His areas of research interests include: school leadership, funding of education, and skills development in the Caribbean.





Dr Paulette Stewart

Best Research Publication (Article)
Department of Library and Information Studies

**“Synchronous and asynchronous tools optimising
teacher immediacy in online learning
in the English-speaking Caribbean”**

**Areas of need the research seeks to satisfy**

A corpus of knowledge from the UWI, Open Campus online environment was used to present two mini case studies on teacher immediacy. These case studies were used to provide an engaging description of how synchronous and asynchronous tools such as the Black Board Collaborate and the Forum have provided teacher immediacy, teacher presence and social presence to optimise learning in this online environment. Overall, the findings indicate that both synchronous and asynchronous tools used by the UWI, Open Campus were able to provide a high level of teacher immediacy, teacher presence and social presence, which are critical components for students' success.

This indicates the need for Caribbean education policy makers to know the best practices in delivering online post-secondary education. This can satisfy a need to provide suitable tertiary educational opportunities for eligible learners who, because of various constraints, including travel cost and time, cannot access face-to-face learning in their country. Additionally, students who are fearful of pursuing online programmes because of the

fear of failure because of the absence of face-to-face teachers and students can be assured that The UWI Open Campus online environment provides academic and social support to ensure successful completion of their programmes.

Benefits to be derived: potential impact on society**Educational development**

The successful use of the synchronous and asynchronous tools in online delivery helps to promote equity in education, as the online constituents will not be in anyway disadvantaged. The tools also provide the cognitive presence of e-tutors that will lead students to develop the required employability skills to contribute to the different professions and careers within CARICOM. In addition, the increased delivery of online education will result in a larger number of eligible persons being able to access higher education across the Caribbean, thereby reducing inequalities. This will result in more educated citizens with the requisite skills and knowledge to contribute more effectively to the development of the Caribbean nations.

Social development

An important feature of the synchronous tools in the online environment is that they are suited for the support of social presence. Research has shown the potential of asynchronous communication. It enhances knowledge creation and collaborative learning. In addition, the tools in the General Forum, such as the Teacher Forum,



Tutor Student Exchange, Meet Your Fellow Students, and My Expectation, facilitate teacher presence that engages students in collaborative work. Therefore, these asynchronous tools will improve students' social skills that will help them to function effectively in the workplace and, ultimately, lead to increased production wherever students are employed.

More specifically, the Meet Your Fellow Students have been helping students from different Caribbean countries to learn about each other's culture, which will indeed lead to respect of any cultural differences. This augurs well for The University of the West Indies which is a regional university. Therefore, online learning in the Caribbean has the potential to play a transformative role in the society.

Technological development

Students' use of synchronous and asynchronous tools to access and upload content, and engage in sessions with e-tutors is a method of educating students for the knowledge-centred economy. The use of ICTs enhance learning and develop skills needed to create knowledge and career opportunities

Possible direct application of outcomes to industry

ICTs tools in the delivery of education can reduce the costs of education per student by increasing the relative economic benefit of investment in education. ICTs can deliver instruction in a more efficient, less expensive, and more accessible way. The use of ICTs can reduce some of the capital costs because there is no demand for physical facilities for students. These can result in more affordable tuition fees, and increase in the provision of scholarships, especially in areas that will directly impact the development of critical areas in the nation. Ministries of Education from across the region can partner with The UWI to provide more funds for the training of online teachers, and for providing more tools to access content that will support the curriculum. The creation of more online programmes can also engender additional job opportunities for teachers in the form of added employment. Populating the learning environment with all the required content of the courses not only creates teacher presence, but also eliminates the need for office hours, which will provide more time for staff to focus on research, especially in areas considered strategic to development of the region.



Development of new partnerships

The findings revealed the positive impact that synchronous and asynchronous tools have on students' educational, technological and social success. The UWI and Caribbean governments should, therefore, seek new partnerships which will yield resources to maintain, upgrade and introduce more synchronous and asynchronous tools that will reflect the trends and development in education. In addition, because of the success of these tools and The UWI's recent mandate to become an international university, there is the need to establish more online sites in order to expand UWI's online offerings.



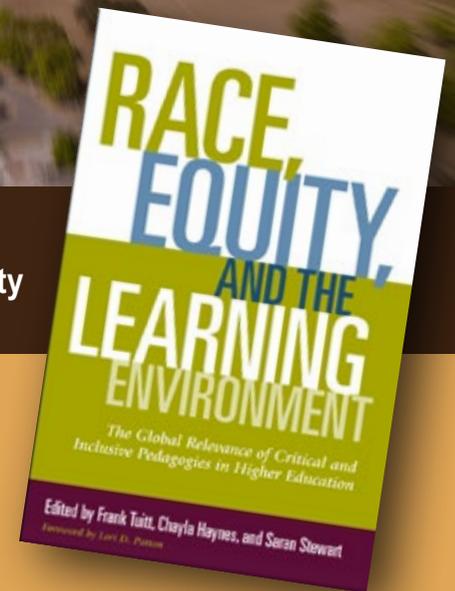
Bio

Dr Paulette Stewart is Head of the Department of Library and Information Studies in the Faculty of Humanities and Education. Her research interests are: media and information literacy, health literacy, library school education, school and academic libraries and online education.



Dr Saran Stewart

Best Research Publication (Article) and Most Outstanding Research Activity
School of Education



**A mixed-methods study of extra lessons in Jamaica:
Methodological experiences and reflections**



In alignment with The UWI's commitment to cutting edge research and innovation, Dr Stewart's scholarship has been dedicated to helping secondary and postsecondary institutions, locally, regionally and internationally, educate an increasingly diverse population by focusing on three distinct areas: the classroom, the larger institutional environment, and the impact of access and equity on the educational experiences of faculty and students. The award for Most Outstanding Researcher is as a result of the summary of publications described below.

The edited book was a collaborative project titled, *Race, Equity, and the Learning Environment: The Global Relevance of Critical and Inclusive Pedagogies in Higher Education* (Tuitt, Haynes, & Stewart, 2016). Dr Stewart served as an editor, with equal contribution to her co-editors. The book was published by the international publishing group, Stylus Publishing Inc. in Virginia, USA. The scholarship extends the work of critical pedagogy by identifying inclusive and equitable pedagogical practices and learning conditions for teaching in increasingly diverse postsecondary institutions around the globe. The

book was launched at multiple conferences and institutions in the United States, and will be launched at The UWI, Mona during the 2017 Research Days. Within the book, Dr Stewart authored a chapter titled, "Advancing Critical and Inclusive Praxis: Pedagogical and Curriculum Innovation for Social Change in the Caribbean" (Stewart, 2016), which was double, blind, peer-reviewed before its acceptance. Her chapter sought to exemplify how the utilisation of critical and inclusive pedagogies has, and continues to create transformative, affirming, and equitable learning environments for all students, but especially those in Caribbean higher education.

The following two research publications derived from extensive research collected in Dr Stewart's dissertation, which examined the macro and micro-level impacts of extra lessons on secondary level education outcomes in Jamaica. The first, a refereed book chapter, "A Mixed-Methods Study of Extra Lessons in Jamaica: Methodological Experiences and Reflections" (Stewart, 2015) was published in *Private Supplementary Tutoring: Research Horizons and Methodological Lessons from Diverse Cultures*. The second, a refereed journal article, "Schooling and Coloniality: Conditions Underlying 'Extra Lessons' in Jamaica" (Stewart, 2015) was published in *Postcolonial Directions in Education Journal*. Both research publications have broken new ground in their critical analyses of postcolonial education and the identification of transformative practices that have begun to contribute to the improvement of education for students in Jamaica.



Another strand of Saran Stewart's scholarship examines the impact of race and racism on the academic experiences of racially minoritised populations in education globally, where she employs critical race theory (CRT) as a conceptual and methodological foundation. For example, in "An Alternative Approach to Standardised Testing: A Model that Promotes Racial Equity and College Access," she and her coauthor (Stewart & Haynes, 2016) explore how standardised testing affects racial equity and college access of racially minoritised students. They problematise the use of colour-blind and meritocratic practices in order to propose a comprehensive critical education model for the assessment of racially minoritised students' scholastic aptitude. Most recently, the article, "Speaking from the Margins: The Experiences of a Special Educator's Praxis with Culturally and Linguistically Diverse Students" (Stewart & Kennedy, 2016), illustrates first-hand, the trauma of being dehumanised by racism as a Black male special educator in the United States. The article further sheds light on the experiences of culturally and linguistically diverse students and provides strategies for creating an inclusive learning environment, and working with parents from low socio-economic households.

The last publication (Paterson & Stewart, 2016) is the first of a series of three (forthcoming in 2017) that investigates how higher education institutions can create inclusive campus environments. In this area, Dr Stewart's scholarship addresses issues related to the climate and conditions under which students and faculty work and study, and includes topics concerning access and equity, climate, mentoring, professional development, and organisational transformation. Specifically, the article, "Predictors of Student Retention at the University of the West Indies, Mona Campus using Astin's I-E- O Assessment Model" adds to the literature on student retention by examining students in the Caribbean, and confirms the importance of financial aid and gender to student retention.

This body of work has had an impact across education nationally and globally, starting with reforming math education and increasing access to higher education in a non-traditional high school in Spanish Town. Further, work has started with the Netherlands Minister of Education, Culture and Science, and their Higher Education, Chief Diversity Officers to make campus environments more inclusive. This work has come as a response to the increase in Muslim, especially Syrian, refugees to the region. Overall, Dr Stewart's scholarship has afforded her the opportunity to understand the impact of organisational behavior on the experiences of racially and ethnically diverse students, faculty, and staff nationally and around the globe.



Bio

Dr Saran Stewart is currently a lecturer in comparative higher education in the School of Education at the University of the West Indies, Mona. She is also Chief Editor for the Journal of Education and Development in the Caribbean.





Dr Therese Ferguson

Research Project Attracting the Most Research Funds

School of Education

**Addressing school violence through leadership capacity-building,
in-service teacher development, and youth coaching:
Interventions of the Change from Within Programme in Jamaica**



Succinct description

The school-based Change from Within (CfW) programme began in Jamaica in 1992 under the leadership of Sir Philip Sherlock, a former Vice-Chancellor of The University of the West Indies (UWI), and has operated out of the School of Education (SoE) at UWI since 2002. Founded to address violence in society, particularly amongst inner-city youth, the programme, over the years, has been successful in transforming a culture of violence and indiscipline through change “orchestrated and managed” by school stakeholders – change from within. The CfW programme methodology encompasses eight key principles:

- (i) empowering school leaders;
- (ii) working with good practices;
- (iii) new pedagogies;
- (iv) mentoring;
- (v) the involvement of parents and the wider community;
- (vi) the involvement of children in decision-making;
- (vii) special training initiatives for staff and students; and
- (viii) a shared circle of support with other schools.

The programme initially began in four schools and, by 2007, was in 36 schools. In January 2016, the SoE commenced a new programme implementation phase, under an Education for Sustainable Development (ESD) focus, with ten schools identified and invited to participate. In response to priority areas of need identified by principals, vice-principals, and guidance counsellors who take part in monthly support meetings for school leaders in the programme, a workshop series for school staff and coaching/mentorship activities for students were conceptualised. Funding was received from the High Commission of Canada to Jamaica – Department of Foreign Affairs, Trade and Development through its Canada Fund for Local Initiatives (CFLI) - to undertake these activities over the period July 2016 to February 2017.

Members of the CfW project team will be gathering qualitative information from the monthly support meetings, anecdotes, informal conversations with school management and teaching staff, and observations, to ascertain the role of the activities in leadership and capacity-building, and in changing wider school culture.

Benefits to be derived

Project activities under the CFLI include the following:

- Development and delivery of three two-day workshops to train management and teaching staff in: duties of teachers with special responsibilities; systems and procedures; conflict management and restorative justice; safeguarding the



child; mentorship; and interpersonal relationships.

- Development and delivery of two two-day workshops to train teachers in innovative, relevant methodologies, including project-based learning, cross-curricular approaches, ESD, use of the arts, and the use of silence and meditation.
- Coaching of a small cohort of students to build self-esteem and confidence.

Potential impact on society

Violence, traditionally considered both a criminal justice and human rights issue, is increasingly being recognised as a developmental issue, as violence has a range of impacts which can hamper both social and economic development. In the Caribbean, a number of countries are plagued by high levels of violent crime and other forms of social violence. Regionally, the issue of violence against and amongst children in particular is recognised as a serious problem. Schools, typically thought to be a 'safe haven' for children, are increasingly becoming a site of violence for children. Anti-social and violent behaviour in schools is proving to be an increasing source of concern and a critical challenge in nations such as Jamaica.

Given the seriousness of the problem, the project activities build on the CfW methodology to address areas of need identified by the CfW schools. Activities also draw on past research findings which support the need for leadership development in addressing violence and indiscipline in schools; classroom methodologies which stimulate children's interest to prevent them from engaging in antisocial behaviours; and a caring school community for children.

Expected project outcomes include:

- School staff clearly oriented to middle management duties, and trained in conflict management and restorative justice skills, and innovative teaching methodologies, in order to improve management skills, foster relationships amongst all school stakeholders, resolve conflicts at all levels, and better engage students in the learning process.
- Students with increased levels of self-esteem and enhanced abilities to articulate and address concerns in a constructive, non-violent manner.



Findings and lessons learned from monitoring the project's impact will contribute to the international and regional body of research on the phenomena of school violence, violence amongst children and youth, and school leadership. The CfW methodological model also can be shared and serve as a starting point for similar interventions in other schools in Jamaica and in other regional countries.

Development of partnerships

The Ministry of Education has recognised the importance of the CfW programme over the years. Additionally, linkages are being forged with entities such as the National Education Inspectorate, the private sector, and educational institutions with similar experiences to the CfW schools, as they contribute to workshop delivery through facilitation activities or guest presentations.



Bio

Dr Therese Ferguson is a lecturer in Education for Sustainable Development (ESD) in the School of Education (SoE), The University of the West Indies, Project Leader of the Change from Within programme, and Coordinator of the SoE ESD Working Group. Her research and teaching interests lie in ESD, environmental education, and children and the environment.



A pair of ornate brass scales of justice is the central focus of the image. The scales are positioned on a dark wooden surface, likely a table. The background is a blurred, warm-toned interior, possibly a library or a courtroom, with rows of bookshelves. The lighting is soft and directional, highlighting the metallic sheen of the scales. A dark, semi-transparent rectangular box is overlaid on the left side of the image, containing the text 'FACULTY OF LAW' in a bold, yellow, sans-serif font.

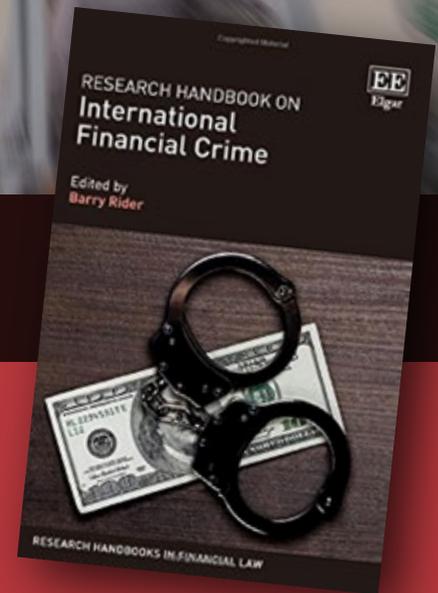
FACULTY OF LAW



Dr Shazeeda Ali

Best Research Publication (Book Chapter)
FACULTY OF LAW

**“Economic Crime and Terror:
Spinning a Web of Greed and Fear”**





Introduction

As Plato opined, “No wealth can ever make a bad man at peace with himself”. However, the profusion of criminals and illicitly obtained wealth appears to challenge this ageless philosophy. It is the latter assertion that provides the starting point for the discussion, “Economic Crime and Terror: Spinning a Web of Greed and Fear”. This chapter was written by Shazeeda Ali and is contained in the Research Handbook on International Financial Crime. The book, published at the end of 2015, was edited by Professor Barry Rider, Professorial Fellow in the Centre for Development Studies in the University of Cambridge and former Director of the Institute of Advanced Legal Studies at the University of London. The compendium comprises 60 chapters and is almost 800 pages long, with a large number of international experts as the contributing authors. Overall, the chapters cover a broad scope of issues relating to financial crimes as well as an extensive number of jurisdictions.

Ali's chapter explores a range of financial crimes, with special emphasis on money laundering, corruption, tax

evasion and terrorist financing. These crimes were selected since, in many cases, they share a common methodology. Indeed, for all these crimes, both the means of commission and the underlying objectives involve money.

Defining concepts

Money laundering refers to the methods by which money and other forms of property with an unlawful origin are made to appear to have a legitimate source by engaging them in a series of financial transactions. The process seeks to sever the links between the criminal, the crime and the proceeds of crime. Successful money laundering means that the illicit funds cannot be connected to the crime or its perpetrator. Such 'disentanglement' enables the criminal to enjoy the fruits of his criminality and develop his criminal enterprise, without fear or risk of apprehension and prosecution.

Corruption has existed from time immemorial as the opportunity for abusing one's position for personal gain is said to reside in any office that yields discretionary power. Corruption may be categorised as public sector corruption, political corruption, private sector corruption and “grand corruption”. Examples of corrupt activities include bribery, cronyism, nepotism and embezzlement.

Tax evasion is separated by a thin grey line from tax avoidance. Whilst the latter is perfectly legal, tax evasion refers to the devices invoked by taxpayers to deliberately deceive the revenue authorities. These tactics may range from under-reporting or





Bio

Dr Shazeeda Ali is a senior lecturer and a deputy dean in the Faculty of Law, UWI, Mona



Dr Celia Blake

Best Research Publication (Book Chapter)

FACULTY OF LAW

**“The legal matrix governing directors and officers
of financial supervisors:
Understanding their role in governance”**



With the move in some Commonwealth Caribbean countries to modernise the public sector, principles of corporate governance have been made applicable to government institutions via legislation and documented policy. One such policy document for Jamaica's public sector has lamented that many directors of public sector boards do not appreciate the 'rudiments of their responsibilities'. Financial supervisors, as a species of government authorities, occupy a special position in the thrust for adequate systems of governance in the public sector because they are themselves responsible for monitoring adherence by their licensees to corporate governance regulations. Arguably then, directorial appointees and officers of financial supervisors ought to bring uncompromising standards of governance to their own institutions. In view of this and the observation that many directors and officers across government institutions in general tend to under-appreciate the nature of their responsibilities, this study presents (i) a comprehensive statement of the matrix of laws informing governance in financial supervisory institutions of two Commonwealth Caribbean jurisdictions, Jamaica and Trinidad and

Tobago, and (ii) evaluates the extent to which these laws support the main tenets of financial regulatory governance – independence, accountability, transparency and integrity.

A critical governance issue for boards of financial supervisors concerns the appointment, termination and tenure of board members. Prevailing governance models favour a system of appointment/termination which curtails political interference and thereby facilitates board independence and objectivity. The power of appointment of board members in the main financial supervisors in both Jamaica and Trinidad and Tobago resides, directly or indirectly, in the relevant minister of government. While this seemingly belies the prevailing benchmark, it must be viewed within the context of legislative provisions, particularly those governing the Trinidad and Tobago Securities and Exchange Commission, which help to bridle ministerial discretion and to ensure that the boards possess some key competencies. The study argues that the tendency in Jamaican law to provide for relatively short maximum directorial tenures potentially undermines board independence and the enhancement of skill and competence of board members. Exceptionally, and reflective of the preference for fixed tenures in the legislative regimes of Trinidad and Tobago, a fairly new legislative amendment in Jamaica has provided for a minimum seven-year tenure for the governor of the Bank of Jamaica who holds the office of chairman and chief executive officer of the Bank and spearheads the supervisory function. There is, though, a new termination provision allowing for the governor to be removed from office if the government is satisfied that



he or she should be 'removed for cause'. The analysis suggests that this provision weakens the level of autonomy that a minimum moderately long fixed tenure would otherwise afford. Additionally, provisions, particularly in the enabling statutes for the Bank of Jamaica and the Financial Services Commission in Jamaica, conferring on the relevant minister a power to give general directions to the institutions compound concerns regarding openings for political interference.

The boards of the central banks, remarkably unlike the boards of the other supervisory agencies under study, exhibit an absence of separation between the chairman and chief executive functions. In Jamaica, the central bank governor is also the supervisor of the banking services licensees and the chair of the Supervisory Committee, the body conferred supervisory functions under the Banking Services Act, 2014. The power concentration in the office of the governor is perhaps supported by the fact that the majority of members of the Supervisory Committee are central bank executives, practically answerable to the governor. Such power concentration sits uneasily with notions of accountability in governance.

In Jamaica, the responsibilities and duties of board members described in the study are ostensibly shored up by duties of competence and loyalty imposed under general public sector governance legislation.³ These mimic the orthodox duties of directors found in company law. It appears, though, that there may be uncertainty as to how some of these duties operate in public sector institutions. Their value as a means of personal accountability of directors may well be diminished by this as well as by the nature of the statutory enforcement apparatus which seems deficient. The Trinidad and Tobago law avoids the use of corporate-like directors' duties and opt instead for the more easily determinable duty of attending board meetings, inherent in which is a duty of diligence.

¹ Corporate Governance Framework for Public Bodies in Jamaica (2011, Revised 2012), p. 17. Available at [http://www.ocg.gov.jm/ocg/sites/default/files/Revised%20Corporate%20Governance%20Framework%20\(Oct%202012\)_0.pdf](http://www.ocg.gov.jm/ocg/sites/default/files/Revised%20Corporate%20Governance%20Framework%20(Oct%202012)_0.pdf)

² These laws include the relevant enabling statute for the agencies studied – in Jamaica, the Bank of Jamaica Act, 1960, as amended and the Financial Services Commission Act, 2001; and in Trinidad and Tobago, the Central Bank Act, 1964, and the Securities Act, 2012. Several other pieces of legislation, however, have an impact on governance in financial supervisors.

³ The Public Bodies Management and Accountability Act, 2001.

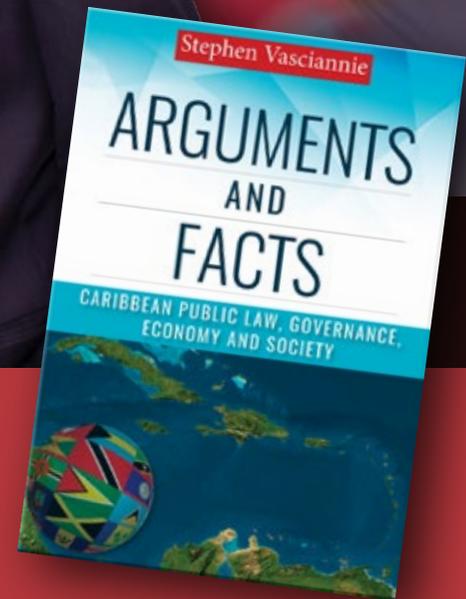


The principle of accountability and transparency may be compromised by the confidentiality requirements imposed on directors of financial supervisory institutions. The nature of supervision may indeed demand this, but in an environment of mounting social pressure for increased transparency and accountability, regulators may be wise to interrogate the breadth of the secrecy requirements and to consider how greater transparency may be achieved. Personal integrity of directors is demanded by provisions governing eligibility for appointment and bases for termination of appointments. These are augmented by extensive anti-corruption laws in both Jamaica and Trinidad and Tobago. The study shows, however, that there are factors in the scheme of the law which reduce the effectiveness of these laws and hence their support for the integrity dimension of regulatory governance.

Bio

Dr Celia Blake is a senior lecturer in the Faculty of Law, Mona.





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Professor Stephen Vasciannie**Most Outstanding Researcher**

FACULTY OF LAW

**“The Inter-American Commission on Human Rights:
Reform and the Question of Universality” | “Constitutional
Renewal in Jamaica: Republicanism?”**



Professor Vasciannie's three publications are, generally, concerned with public law issues of immediate relevance to Caribbean societies:

- "Inter-American Commission on Human Rights: Reform and the Question of Universality", *The ILSA Journal of International and Comparative Law* (USA)
- "Constitutional Renewal in Jamaica: Republicanism?", *Journal of Parliamentary and Political Law* (Canada)
- *Arguments and Facts: Caribbean Public Law, Governance, Economy and Society* (New Caribbean Publishers, Kingston)

Inter-American human rights

The publication on the Inter-American Commission on Human Rights examines elements of the continuing debate at the Organisation of American States on ways in which human rights may be improved within Latin America, the Caribbean and North America. This debate has been characterised by inter-State tension along both established and new political lines.

With regard to established lines of approach, Latin American countries have often complained that North American and Caribbean counterparts have failed to embrace fully the Inter-American human rights system. This perspective is based primarily on the fact that the United States of America, Canada and most CARICOM countries have opted not to ratify the American Convention on Human Rights. For the Latin American countries – which are substantially represented among the parties to the American Convention – this situation creates imbalance within the Organisation of American States.

Starting with this perspective, Latin American States have sought, in recent years, to encourage a new approach among North American and Caribbean States to the question of participation in the American Convention. Some of the Latin American initiatives would, however, amount to sanctions against the States targeted for encouragement. Vasciannie points out the difficulties associated with diplomatic initiatives that seek to encourage State behaviour by means of disguised sanctions. He also explores reasons which explain Caribbean reluctance to take up some of the rights and duties in the American Convention on Human Rights.

His general conclusion is that CARICOM States are not fully incorporated within the Inter-American human rights system, partly because they are relative newcomers to the Organisation of American States. And, perhaps more importantly, CARICOM States have been wary of the system because their Latin American counterparts have



not opened up the system to Caribbean participation within the Inter-American human rights bureaucracy on the basis of equality.

Constitutional renewal in Jamaica

Although Jamaica assumed independent status more than 54 years ago, and asserts its sovereignty in various international fora, it retains monarchical status within the Commonwealth. In short, Her Majesty the Queen still serves as the Head of the Jamaican Executive, the Legislature and the Judiciary. From the coming of independence, the question of whether the monarchy should be retained has been open to debate.

This debate has continued. On the one hand, various political leaders, including former Prime Ministers Michael Manley, P.J. Patterson and Portia Simpson-Miller, have argued that the time for change has come. On the other, there is evidence – particularly from the early years of independence – that the monarchy is popular among some Jamaicans, and that affinity to the Crown was part of the overall strategy to demonstrate “readiness” for independence.

Under the Jamaican Constitution, the country may change to Republican status by vote of the electorate in a referendum. Against this background, Vasciannie discusses the constitutional arrangements pertaining to the Queen of Jamaica, underlines the extent to which the Queen has been entrenched within different parts of the constitutional order, and reviews the arguments that have been relied upon both to challenge and to support the monarchical status quo. This article is intended to promote further debate on the subject from both legal and historical perspectives.

Arguments and Facts

Although the book, *Arguments and Facts*, is written primarily to introduce tertiary level students to Caribbean Public Law issues, it is built on a foundation of extensive research concerning public affairs within CARICOM. The topics explored in this 250-page book include:

- The Hierarchy of Courts in the Caribbean;
- The Caribbean Court of Justice/Privy Council Debate;
- The Westminster System in the Caribbean;
- Fundamental Human Rights;
- The Death Penalty;
- The Decriminalization of Marijuana;
- Globalisation and Foreign Investment; and
- Aspects of Caribbean Regionalism.



Several topics explored in this book have been subject to longstanding, but inconclusive discussions throughout the Caribbean. In the case, for instance, of the Caribbean Court of Justice, there is reportage on divergent opinions in Jamaica from as early as 1901. Vasciannie summarises the various arguments. Among other things, supporters of the Caribbean Court of Justice build their arguments primarily on the foundation of sovereignty; at the same time, opponents are inclined to mention the general fear that the Caribbean Court may be subject to political interference.

On this topic, as in the case of many others, Vasciannie takes an even-handed approach which reflects his years of experience in the midst of significant public exchanges in the Caribbean.



Bio
Professor Stephen Vasciannie, at the time of writing, was a professor in the Faculty of Law, UWI, Mona Campus. Between 2012 and 2015, he was Jamaica's Ambassador to the United States America and Permanent Representative to the Organization of American States. Professor Vasciannie has been Deputy Solicitor General, Jamaica, and a member of the United Nations International Law Commission. He is currently President of the University of Technology, Jamaica





FACULTY OF MEDICAL
SCIENCES



Dr Monika Asnani | Professor Marvin Reid | Dr Tamika Royal-Thomas

Best Research Publication (Article)

Caribbean Institute for Health Research (CIHR)

“Predictors of renal function progression in adults with homozygous sickle cell disease.”



The burden of sickle cell disease

Sickle cell disease (SCD) is the commonest, as well as one of the most severe, genetic disorders in Jamaica where about 250 babies are born annually with some form of the disease. About 15% of Jamaica's population carries the gene, which puts them at risk of having a baby with SCD. Globally, about 300,000 babies are born annually with SCD – almost 80% of these occurring in Sub-Saharan Africa. The disease can be potentially devastating, with numerous clinical complications throughout the lifespan of the individual. It is a chronic, relapsing disorder with a lower survival than the general population. Indeed, the disease has been declared by the World Health Organisation to be a public health problem.

SCD and kidney problems

Through advances in management of the disease over the last few decades, persons with the disease are now surviving beyond childhood and young adulthood. As persons live longer, end-organ complications emerge at the forefront of the problems that they face. Renal disease is one of the most prevalent complications, and

whereas it may begin in young ages, its prevalence in older persons may rise to as high as 85%. End stage renal disease is also one of the leading causes of death in this population. Resources for managing renal disease, especially renal failure, are limited in most Caribbean countries, and preserving kidney function is critical. Monitoring for early detection of renal problems is, therefore, recommended and should occur during routine clinic visits.

Assessments of renal function over time can also offer further understanding of not only the pathophysiological mechanisms underlying sickle nephropathy, but may also identify biological and clinical markers for early detection. The Jamaica Sickle Cell Cohort Study (JSCCS) provides longitudinal data on persons initially identified through newborn screening during 1973 to 1981. This cohort continues to be followed at least annually since then, and has provided much data to aid our understanding of the natural progression of SCD. Glomerular filtrate rate (GFR) is thought to be the most ideal marker of renal function in humans, and serum creatinine levels are used in clinical practice as a measure of renal function. In this study, we have explored the biological change across time for GFR (using both measured and estimates of GFR) and serum creatinine, as well as the factors that may predict this biological change.

What was done and what were the findings?

Data from the Jamaica Sickle Cell Cohort Study (JSCCS) were extracted, and GFR was estimated using the CKD-EPI and the SCD-specific JSCCS-GFR equations

from all adulthood serum creatinine measurements in homozygous SS patients. One hundred and ninety-one (191) persons with SS disease had 867 estimates of GFR available. Serum creatinine significantly increased from baseline, whereas estimated GFR showed a significant decline. Serum creatinine showed positive association with increasing age, male gender, body mass index and sodium levels. Haemoglobin was a significant negative predictor of estimated GFR in age and gender adjusted models. The other dataset consisted of measured GFR at two times, about 13 years apart. A total of 24 women and 17 men had repeat measurements of their GFR. The mean annual decline in GFR was found to be much greater than what is expected in normal populations. Haemoglobin was a significant positive predictor, whereas serum creatinine, systolic blood pressure and urinary albumin-creatinine ratio were negative predictors of GFR.

What did we learn?

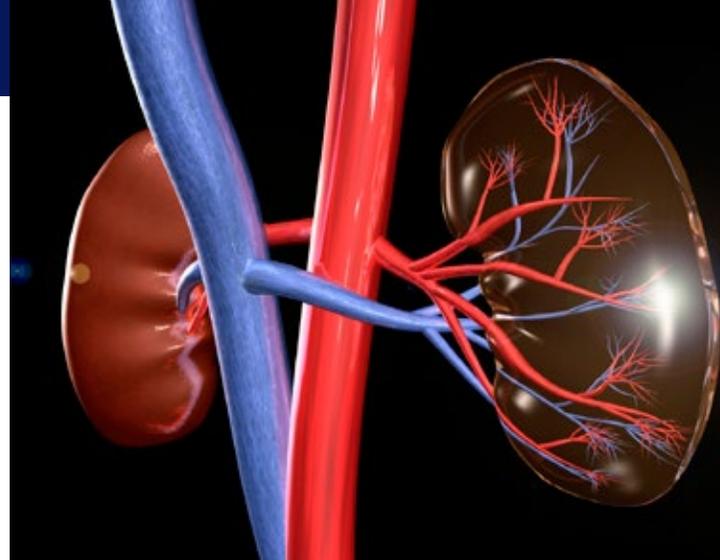
The study is one of few looking at longitudinal changes in GFR over time in persons with SCD, and has employed two different strategies for assessment of GFR and its variations over time. There is a consistent decline noted in GFR, with a corresponding incline in serum creatinine levels; and haemoglobin, serum creatinine and systolic blood pressure are likely to be significant predictors of these changes.

It is important for health care practitioners who provide care for persons with SCD to be carefully attentive to changes in these routine clinical parameters so that persons with declining kidney function may be identified early in their course. Even though well-established therapies are not available to delay this decline, steps can be taken in that direction. This study is also an important early step towards developing these therapies.

Bio

Monika Asnani is a family physician and epidemiologist. She provides clinical care to persons living with sickle cell disease. Her research focus is twofold: psychosocial determinants and outcomes in sickle cell disease; and early recognition of sickle nephropathy.

Marvin Reid is a clinical nutritionist and professor at the Caribbean Institute for Health Research. Professor Reid was one of the principal investigators for the SCATE project, and is now Acting Head of CAIHR.



Dr Tamika Royal-Thomas received from the University of the West Indies (UWI), Mona, a B.Sc. degree in Mathematics and Biochemistry (Hons.), a post graduate diploma in Mathematics Education and a Master of Science in Biostatistics. She received a MSc. and a Ph.D. in Biostatistics from Florida State University (FSU). She has vast teaching experience in the fields of Mathematics and Statistics to secondary and tertiary level students. She has also been employed in the pharmaceutical industry (at Sanofi Pasteur, a leading vaccine company worldwide), while at FSU. Since obtaining her Ph.D., she worked at Winston-Salem State University (WSSU) in North Carolina as an Assistant Professor in Statistics and is currently employed with the Caribbean Institute for Health Research as a Lecturer & Biostatistician on the UWI, Mona Campus. Dr. Royal-Thomas has received numerous awards, including the UWI Principal's Research Award for the Best Research Publication, Faculty of Medical Sciences' for 2010, Runner up of the R.A. Bradley Award 2011 at FSU, WSSU O'Kelly Scholar, Cavell Brownie Scholar at the Joint Statistical Meeting (JSM) in 2011 and she won the award for best oral presentation at the Jamaica Statistical Pre-conference workshops and Symposium (JASSYM) held in October 2015. She is the First Vice President for



the Jamaica Statistical Society (JSS) and is the chair of the planning committee for JASSYM 2017. Dr. Royal-Thomas has several research publications and has done several oral presentations at international statistical conferences, including JSM and Eastern North American Region/International Biometric Society (ENAR) meetings. Her research interests include longitudinal data analysis, early life predictors of cardiovascular disease, factor

analysis, principal component analysis, survival analysis and meta-analysis.



Ms Rochell Davis | Dr Paul Brown

Best Research Publication (Article)

Department of Basic Medical Sciences

**“Multiple antibiotic resistance, fitness and virulence potential
in respiratory isolates of *Pseudomonas aeruginosa* from
Jamaica”**



Introduction

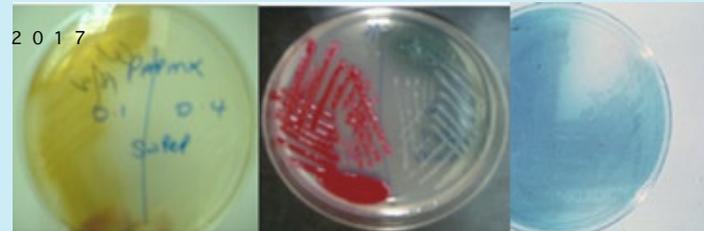
Respiratory infections are common causes of morbidity and mortality in both developed and developing countries worldwide. Increasingly, *Pseudomonas aeruginosa* is often identified as a causative agent in fatal infections, while being responsible for a significant proportion of lower respiratory tract infections (LRTIs). Further, *P. aeruginosa* is notorious for its resistance to many antibiotics, and its propensity to form biofilms in persistent lung infections. This latter feature is coordinated via the cell density dependent (or quorum sensing) regulation systems, *las* and *rhl*. In this study the researchers determined antibiotic resistance, fitness, biofilm production, oxidative stress resistance and the ability to cause disease of a collection of respiratory *P. aeruginosa*, using a plant model of pathogenesis.

Methodology

Ninety-two (92) non-duplicate *P. aeruginosa* isolates, previously isolated from sputum samples of inpatients with LRTIs, were screened (one isolate / person). Antibiotic susceptibility testing was performed against several antibiotics and the multiple antibiotic resistance (MAR) index calculated as the ratio of the number of antibiotics to

which the isolate displayed resistance, to the total number of antibiotics evaluated. An index greater than 0.2 indicates a 'high-risk' source of contamination. The ability of the bacteria to form biofilms in the presence of the broad-spectrum antibiotic ciprofloxacin was assessed, as were pigment production and the virulence factors, elastase (an enzyme important for degrading connective tissue) and rhamnolipid (a detergent or biosurfactant important for emulsifying substrates for uptake by the bacteria). The relatedness (or diversity) of the bacteria was determined using banding pattern analysis, while in vitro competition and relative fitness in the presence or absence of antibiotics were assessed pairwise, using a pigmented non-drug-resistant strain and non-pigmented multidrug resistant strains. Relative fitness (*W*) values, which assess how well one strain does in relation to another within a population, were calculated as the ratio of the number of antibiotics to which the isolate displayed resistance, to the number of antibiotics to which the isolate had been evaluated for susceptibility. Oxidative stress tolerance was analysed by exposing bacteria at 37°C to 100mM hydrogen peroxide, 40mM or 80mM tert-butyl-hydroperoxide for short periods. Finally, the researchers assessed the ability to cause disease using a Romaine lettuce leaf model, using bacteria grouped into four categories based on the presence or absence of elastase production and rhamnolipid formation. Romaine lettuce has been shown to be a suitable model system for assessment of disease as bacteria use similar virulence genes for plant and animal hosts. All tests were analysed using various statistical tests, including one-way analysis of variance, the Student *t* test, Box and Whisker plots and





2017

Figure 1: Agar plates showing *P. aeruginosa* strains with (A) pyoverdinin (yellow-green pigment); (B) no pigment production; (C) pyorubin (red pigment) and (D) pyocyanin (blue pigment).

Chi-square tests. A value of $p < 0.05$ was considered statistically significant.

Findings

Mean MAR index for bacteria was 0.34 (range, 0.17 – 0.50), which suggested that there was high levels of exposure to antibiotics in the hospitals where the bacteria were obtained. While more than 80% of the bacteria produced a pigment (considered a virulence factor; Fig. 1), there was no significant difference between pigmented and non-pigmented isolates when elastolytic activity was compared. Hydrogen peroxide exerted a greater oxidative stress than tert-butyl hydroperoxide, and as expected, biofilms were more resistant than planktonic cells (Fig. 2). While the bacteria exhibited good biofilm formation in the presence of ciprofloxacin, there was no significant difference in biofilm production over the concentration range assessed. Of note was the observation that several drug-resistant bacteria were out-competed by a susceptible strain even in the presence of antibiotic. Respiratory *P. aeruginosa* in Jamaica appears to be quite diverse, with two main groups identified, with the apparently more virulent strains clustering together (Fig. 3), which suggests that there are multiple introductions of bacteria into the hospital environment. Further, infection of the plant model by bacteria occurred whether elastase or rhamnolipid was present or absent (Fig. 4). In addition, there was no correlation between the different strains from the four rhamnolipid/elastase categories to biofilm formation. There was, however, some correlation with antibiotic resistance, where once the *rhl* gene for rhamnolipid expression was present, bacteria showed resistance to more than five of the antibiotics tested.

Conclusions

This study is the first major study on fitness and oxidative stress tolerance of respiratory pathogens in Jamaica. Taken together, these data suggest that non-pigmented *P. aeruginosa* might pose an equally significant microbiological threat as pigmented bacteria, even though pigment production appeared to be strongly associated with elastase expression. While dual expression of elastase and rhamnolipid by these bacteria would cause severe tissue damage (as seen in the plant model), non-production of either does not prevent bacteria from causing serious infection. Finally, this study also showed that during competition, a susceptible strain has the potential to benefit from being in a population that includes a resistant strain.

Relevance to theme

Acute respiratory tract infections represent a major public health challenge for clinicians worldwide, including Jamaica, resulting in increased hospitalisation and death. Owing to increasing antibiotic resistance, therapy often fails, and with the lack of new antimicrobials in the pipeline, it is critical that individual countries have a clear sense of the aetiological agents, their characteristics and epidemiology. These data will assist in the area of health and wellbeing for the population.

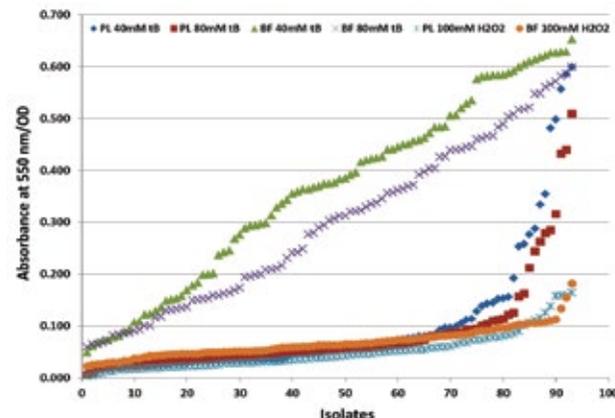


Figure 2: Absorbance readings planktonic cells (PL) and biofilms (BF) of *P. aeruginosa* strains after treatment with 100 mM hydrogen peroxide (H₂O₂) and 40 mM & 80 mM tert-butyl hydroperoxide (tB). Readings are organized in ascending order from smallest to greatest.

Potential application

This study is the first major study on fitness and oxidative stress tolerance of respiratory pathogens in Jamaica. Taken together, these data suggest that non-pigmented *P. aeruginosa* might pose an equally significant microbiological threat as pigmented bacteria, even though pigment production appeared to be strongly associated with elastase expression. While dual expression of elastase and rhamnolipid by these bacteria would cause severe tissue damage (as seen in the plant model), non-production of either does not prevent bacteria from causing serious infection. Finally, this study also showed that during competition, a susceptible strain has the potential to benefit from being in a population that includes a resistant strain. It

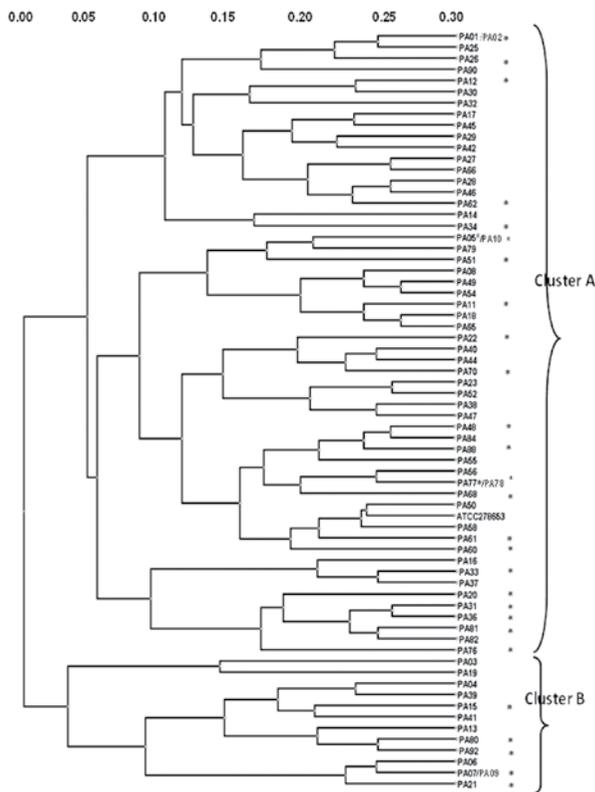


Figure 4: Dendrogram showing percentage similarity of *P. aeruginosa* strains. Asterisks indicate strains with at least two of the following: good biofilm, high elastase and

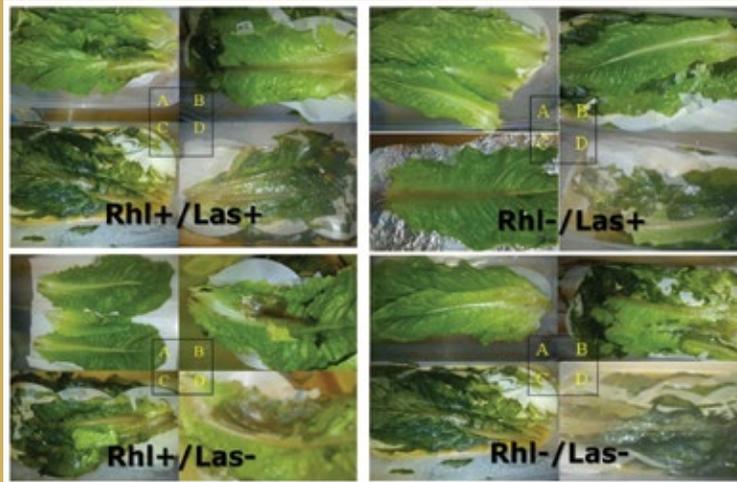


Figure 3: Photographs illustrating symptoms observed in Romaine lettuce leaves inoculated with *P. aeruginosa* strain PA91 (Rhl+/Las+), PA64 (Rhl-/Las+), PA76 (Rhl+/Las-), and PA24 (Rhl-/Las-) on (A) day 1; (B) day 3; (C) day 4; (D) day 5.

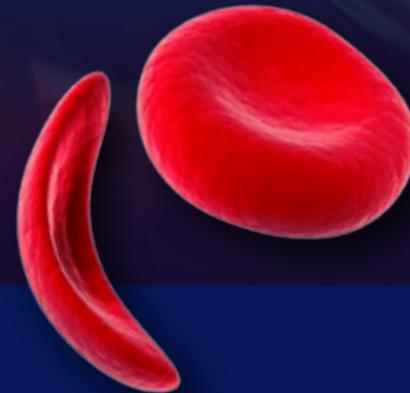
is, therefore, anticipated that the information gathered from this study will help in the antibiotic treatment regimen use by clinicians for patients with respiratory tract infections.

Bio

Dr Paul D. Brown is Senior Lecturer and Head, Department of Basic Medical Sciences. A Fulbright research scholar in 2010, he is currently the American Society for Microbiology Ambassador to Jamaica, and a Council member of the

International Society for Infectious Diseases. His research areas include antibiotic resistance and molecular pathogenesis of various bacteria of public health importance (including MRSA, *Pseudomonas aeruginosa*, and *E. coli*), and molecular diagnosis, epidemiology and pathophysiology of leptospirosis.

Dr Brown's co-author on this article is Ms Rochell Davis, PhD candidate.



56

Dr Monika Asnani**Most Outstanding Researcher**

Caribbean Institute for Health Research (CIHR)

“Understanding the psychosocial burden of sickle cell disease”

Sickle cell disease (SCD) has been declared a public health priority by the World Health Organisation. Though its prevalence is far below that of other chronic diseases such as diabetes and hypertension, the burden SCD places on the health care system is huge as the disease is lifelong, requiring higher levels of health care utilisation. The disease can result in numerous severe and potentially life-threatening acute problems, as well as chronic end-organ complications such as chronic kidney disease



and heart failure. There are also many psychological, emotional and social implications of this disease. The severe pain events, presence of leg ulcers, and frequent absences from school can all lead to a sense of isolation leading to depression, anxiety, and impaired quality of life. As populations with SCD survive longer, this burden will continue to increase.

Adolescence can be a period of great turmoil, and requires many adjustments. When a chronic disease is added to the mix, there may be even more problems adjusting. Dr Asnani and her team at the Sickle Cell Unit as well as collaborators from other areas, such as the Department of Paediatrics, UHWI and the UWI School of Nursing, have been conducting studies examining various psychosocial outcomes in adolescents with SCD.

One study published this academic year in the Pediatric Blood & Cancer journal reported that adolescents with SCD had significantly higher rates of dissatisfaction with their body image, higher rates of depression and nearly twice the rate of attempted suicide than their healthy peers. It was also noted that those participants who had more friends and were attending school had lower risk of

depression. The results underscore the need for healthcare professionals to screen for these mood disorders when they attend to their patients, and for them to encourage positive social interactions that will improve the adolescents' mental health.

Another project that has just been completed studied the effects of an educational intervention programme to improve quality of life and perception of illness among teens with SCD. A paper published in the Vulnerable Children and Youth Studies journal has examined tools that can be used to assess quality of life and illness perception in this disease population. The initial results show robust psychometric properties for both questionnaires, and improve our confidence in using them to assess SCD teens in Jamaica. Analysis is ongoing to examine the impact of the educational intervention programme on these indicators.

These current and previous works have translated into improving our understanding of psychosocial factors that influence health outcomes in persons with SCD. The revised Clinical Care Guidelines of the Sickle Cell Unit, published in October 2015, benefits from two new chapters, 'Psycho-Social Issues in SCD' and 'The Teenage Years in SCD', both of which draw much of its information from these studies.

Bio

Monika Asnani is a family physician and epidemiologist. She provides clinical care to persons living with Sickle Cell Disease. Her research focus is twofold: psychosocial determinants and outcomes in sickle cell disease; and early recognition of sickle nephropathy.





58

Dr Chukwuemeka Nwokocho

Most Outstanding Researcher

Department of Basic Medical Sciences

“Biological activity, phytochemical exploration and mechanisms of action of natural products (plants and metals) in the management and signaling pathways of experimental hypertension”



Studies in the researcher's laboratory and those of their collaborators here in Jamaica and abroad centre on the bioactivity, pharmacological and physiological mechanisms of actions of some plant products and heavy metals in our environment and region. These analyses are essential in providing a scientific basis and validation of the use of these plant products, which are effectively or erroneously used based on folkloric understanding. Through these projects, the researchers were able to provide some evidence-based analysis for complementary and alternative medications. The research into plant products and heavy metals has centred on their effects on the cardiovascular system, which is a major health issue affecting the Caribbean. These cardiovascular issues include hypertension, stroke and heart failures.

The researchers were able to report a link between cadmium (heavy metal) and hypertension in rats (Cifuentes F, Palacios J, Nwokocha CR, Pardo F, Sobrevia L. Synchronisation in the Heart Rate and the Vasomotion in Rat Aorta: Effect of Arsenic Trioxide. *Cardiovascular Toxicology*. 2016 Jan; 16 (1):79-88. and Nwokocha CR, Baker A, Douglas D, McCalla G, Nwokocha M, Brown PD. Apocynin ameliorates cadmium-induced hypertension through elevation of endothelium nitric oxide synthase. *Cardiovasc Toxicol*. 2013 Dec; 13(4):357-63.).

Their concern with / choice of this heavy metal for study is predicted on its abundance in the Jamaican soil and food. The researchers earlier published studies on this and other metals of interest have shown that it is of great abundance in the environment, and that Jamaica has the greatest soil ratio when compared with other parts of the world. This study lends credence to the health effect of this metal, and how its effects could be ameliorated by use of antioxidants and medicinal properties derived from plants.

The research team observed that apocynin, an NADPH inhibitor from the plant *Picrorhiza kurroa*, was effective in reducing cadmium-induced elevated blood pressures through elevation of eNOS. Inhibition of NADPH oxidase activity may be a useful strategy for prevention and treatment of cadmium-induced hypertension. The team's study on this NADPH inhibitor, which was successful in reducing the hypertensive effects of Cadmium, was further advanced in another paper (Francis S, Laurieri N, Nwokocha C, Delgoda R. "Treatment of Rats with Apocynin Has Considerable Inhibitory Effects on Arylamine N-Acetyltransferase Activity in the Liver", *Scientific Reports*. 2016 May 31; 6:26906. and a book chapter, S Francis, CR Nwokocha, R Delgoda, "Inhibition of cytochrome P450 1 enzymes by apocynin and other Jamaican natural products: Assessing potential for chemoprevention and drug-herb interactions". *In-vitro Bioassays and Chromatographic Analyses used to screen natural Products from Jamaica in the 21st Century*, 2015; 49-61 ISBN: 978-81-308-0562-7. Editor: Cheryl E. Green), where the team observed that chronic in vivo administration of apocynin led to significant reduction of in vitro liver NAT activity up to 93%, further highlighting its chemo-preventive properties and use in human and animal models of diseases like cancer and hypertension.

The researchers also published studies on the effects, phytochemistry and mechanism of



actions of some of some extracts of the plant, *Senecio nutans*, an endemic plant found in the Americas, used according to folklore in the management of acute mountain sickness. The research results suggest an important clinical function in hypertension therapy, as the team observed that the plant product could act as a remedy in this condition by its effect in reduction of the myocardial oxygen demand. Their actions were validated, and the effects observed to be similar to Nifedipine in its chronotropic and inotropic effects (Cifuentes F, Paredes A, Palacios J, Muñoz F, Carvajal L, Nwokocha CR, Morales G. "Hypotensive and antihypertensive effects of a hydroalcoholic extract from *Senecio nutans* Sch. Bip. (Compositae) in mice: Chronotropic and negative inotropic effect, a nifedipine-like action". *Journal of Ethnopharmacology*. 2016 Feb 17; 179:367-74).

Phytochemical screening and extraction of the medicinal active principles in this plant product, through spectroscopic techniques, also suggested that these active principles may have different effects. These effects were found to include endothelium and non-endothelium vasodilatation of the blood vessels, which involves the modulation of calcium channels, and is of potential therapeutic value (Paredes A, Palacios J, Quispe C, Nwokocha CR, Morales G, Kuzmicic J, Cifuentes F. "Hydroalcoholic extract and pure compounds from *Senecio nutans* Sch. Bip (Compositae) induce vasodilation in rat aorta through endothelium-dependent and independent mechanisms". *Journal of Ethnopharmacology*. 2016 Jul 5).

The team's studies also looked into the use of antioxidants in the management of these diseases. Their findings are in agreement with other researchers, who suggested the use of these antioxidants in the management of disease conditions like hypertension and diabetes. The researchers' publication (Owu, D. U., Nwokocha, C. R., Ikpi, D. E., & Ogar, E. I. (2016). "Effect of Vitamin C Supplementation on Platelet Aggregation and Serum Electrolytes Levels in Streptozotocin-Induced Diabetes Mellitus in Rats". *Nigerian journal of physiological sciences: official publication of the Physiological Society of Nigeria*, 31(1), 55") suggested that "oral vitamin C administration increases haemoglobin, reduced plasma glucose level, platelet count, serum sodium/potassium ion ratio and inhibits platelet aggregation in streptozotocin-induced DM in rats". The team's expectations are that these results can also be extrapolated to humans and, as such, provide other veritable intervention strategies, which are not readily observed in the management of these non-communicable diseases.

Such interactions and exploratory studies which the researchers hope, when extrapolated to humans, can help in the management of the various disease conditions, was also the objective of their studies on malaria and chloroquine. The team's observations were predicated on the assumptions that this drug caused hypoglycaemia, and could be the reason for the increased dizziness and syncope to users when taken. Their paper, Ejebe, D. E., Esume, C. O., Nwokocha, C. R., Kagbo, H. D., & Okolo, A. C. (2016), "Single Adult-human Equivalent Dose of Intramuscular Chloroquine did not Lower Blood Glucose Level in Fasted Wistar Rats", *Clin Exp Pharmacol*, 6(213), 2161-1459, suggested that the intramuscular route of exposure will

not cause further reduction in the blood glucose levels even in fasting or hypoglycaemic conditions.

The contributing book chapter wraps up the literature on the uses, bioactive principles, plant sources and the mechanism of action of the many validated medicinal plant products, with a strong proposition to their proper use and management in the treatment and management of the various disease conditions. This book chapter, A.C. Liwa, E.N. Barton, W.C. Cole and C.R. Nwokocha (Chapter 15) "Bioactive Plant Molecules, Sources and Mechanism of Action in the Treatment of Cardiovascular Disease" McCreath-1611338 978-0-12-802104-0 Elsevier Publications, highlights and reviews the usefulness of these bioactive medicinal principles (worked on, and already reported in literature) in the management of cardiovascular disease conditions, which "contribute greatly as a leading cause of morbidity, mortality and health care spending". The researchers' validation and proposal of the use of these medicinal plant products are predicated on the cost of management, especially to persons living in the low and middle income nations.

Contributions to the national and regional development

1. Validating or refuting through scientific means the principle and use of these medicinal plant products in the treatment and management of cardiovascular diseases. The researchers' studies had also looked at drug-drug interactions and toxicity of these products, which are the many reasons for the failure and complications of usage.
2. Fostering and promoting 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 industrial scale development that will be a source of economic and human development.
3. Highlighting the environmental effects of heavy metals like Cadmium, in the prognosis, initiation and promotion of hypertension and other cardiovascular diseases, and its possible management with the use of plant medicinal products. The team's research work on cadmium is still on-going. They hope to propose



- development of a policy which will help influence health and wellbeing of persons in Jamaica and the Caribbean.
- Promoting collaborations with laboratories within the country, the region and beyond, so as to effectively 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. The researchers' collaborations with other laboratories have also greatly improved the quality of the research, enabling a competitive edge, to create new innovative and interventional ideas. Such ideas have enabled the team to attract new funding for growth, and improved research outputs. This is evident as many of the researchers' papers are now published in very high-impact journals.
 - Highlighting and showcasing the richness of the Caribbean as a treasure storehouse of natural remedies,

- with a belief that if handled properly, it can become a veritable source for the generation of funds for economic growth and future earnings. The researchers hope that they will be able to get new patents and seek newer ways of improving the university's earnings by their work.
- The researchers' collaborations have also helped the region to attract some special grants, aimed at improving our human and intellectual capacity, our institutional research capacity and the equipment required to compete favourably in attracting more grants for institutional growth. The team, as principal investigators, were able to attract funding for the year from The World Academy of Sciences for the Advancement of Science in Developing Countries TWAS / UNESCO grants 13-108 RG/BIO/LA (\$19,300USD) and two million, five hundred thousand dollars (J\$2.5M) from The University of the West Indies Mona Research Fellowship Committee for a Multidisciplinary/Cross-faculty Collaboration project.
 - Their collaborations with other laboratories (here and beyond), have also provided them with some avenues to get help and training for the graduate students working with them. The collaborators have benefited from visits to these laboratories in the areas of research and development of their graduate studies, and skills training. This knowledge, technology and skills transfer can help to promote growth, skills acquisition, research-based training, manpower training, and even progress and improved knowledge in both the academia and industry.

Bio

Nwokocha Chukwuemeka R, PhD (Physiology), PhD (Environmental Health Biology) is a senior lecturer in the Department of Basic Medical Sciences, Faculty of Medical Sciences, University of The West Indies Mona.



Dr Tamara Thompson

Research Project Attracting the Most Research Funds

Department of Basic Medical Sciences

**Adherence to highly active anti-retroviral therapy (HAART):
A trans-Caribbean study**



Background for the research

The Caribbean accounts for a relatively small share of the global village, but this can be misleading if interpreted as a measure of significance to the HIV epidemic. HIV prevalence among adults in the Caribbean is about 1.0%, which is higher than in all other regions outside sub-Saharan Africa. The UNAIDS has estimated that the largest number of people living with HIV (PLHIV) is located on the island of Hispaniola, with a total of 198,000 for Haiti and the Dominican Republic combined. This accounts for approximately 80% of all PLHIV in the Caribbean. In the English-speaking Caribbean, Jamaica has the largest burden, with an estimated 29,000 PLHIV.

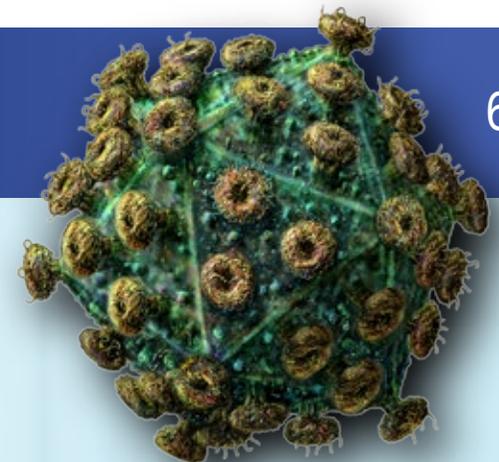
With greater access to highly active antiretroviral therapy (HAART) throughout the region, largely supported through donor funding, a significant correlated reduction in AIDS associated morbidity and mortality has been observed. Nevertheless, HIV/AIDS remains a significant cause of mortality in the Caribbean. It is the leading cause of death among men and women aged 20-59, at 15.7% and 14.5% of deaths respectively.

Adherence to HAART has been defined, in many studies, as a percentage of doses or pills taken, as a dichotomous variable (yes/no) based on a predefined percentage (95%). Adherence remains difficult for all patients, and is the strongest predictor of long-term outcome. Several important factors can be defined in relationship to adherence. These are often categorised as those factors related to the: patients (social, behavioral, education, emotional, mental health), medication regimen (pill burden, requirements for empty/full stomach, side effects) and context (access to services, distance, transportation, cost, social stigma).

Earlier studies reveal that Caribbean-descendants or migrants have the worst adherence rates when measured and defined by ethnicity. A trans-Caribbean adherence study may clarify this and provide an understanding of the factors that drive adherence across this unique region with its varied cultural nuances and similarities. Additionally, the AIDS epidemic in the Caribbean has implications for the United States because of the geographic proximity and the mobility of the populations between the two regions. Both epidemics are related, and the treatment successes or failures in one area might impact the other.

Research description

This is the first large (500 patients) cross-sectional and retrospective trans-Caribbean study of adherence to HAART carried out in HIV treatment centres in three countries:



Haiti, Jamaica and Puerto Rico. The specific aim is to determine HAART adherence rates across the sites and to determine the common or unique predictors of adherence in a region with many cultural similarities and differences. Consecutive male and female patients who qualify according to the inclusion criteria were enrolled after ethical approval and full informed consent of participation were ensured.

Adherence was measured using pill counts, and several research instruments (adherence questionnaires, adherence self-reports) administered during an interview session with the participants on the day of a single clinic visit. Medical and treatment information were abstracted from the participants' chart on that day. A blood draw for HIV viral RNA load was performed on each patient, as a proxy to HIV viral control and a marker of adherence.

Contribution to national/regional development

Research on treatment of HIV infection remains a priority in the Caribbean. It is critical to study a variety of issues in order to help care providers and government officials establish treatment programs for HIV-infected persons that are both efficacious and cost-effective. Increasing the knowledge base about issues like adherence might have an impact, and may guide towards the next steps to assure the longevity of the first and second line HAART regimens currently available in the Caribbean.

Because the study is being carried out in three clinics in three different languages (English, Spanish and Creole) it is inherently complicated to implement even if the protocol is a basic study of adherence. We anticipate difficulties that will become lessons towards the ultimate goal of developing the Caribbean region as a research-intensive area. This study may not only inform on the scientific data obtained on adherence and its associated factors, but may also present as a unique opportunity to continue developing collaborative research in the region. The investigators involved in this project are an independent, inclusive, diverse, trans-disciplinary, multicultural group of Caribbean-based HIV/AIDS researchers. Through partnering, networking, and collaborative activities, the research team strives to become a catalyst for social change in support of the enhanced public health of the Caribbean.



Bio

Dr Tamara Thompson is a consultant physician and lecturer with a specialty in infectious diseases. She is attached to the Department of Medicine, University Hospital of the West Indies, Jamaica.

Other investigators:

Carmen D. Zorrilla, MD (CEMI- Puerto Rico) Study PI
 Yasuhiro Yamamura, PhD (Ponce School of Medicine, Puerto Rico) Lab PI
 Jean William Pape, MD (GHESKIO- Haiti) PI
 Professor Brendan Bain, MD (UWI- Jamaica) Co-PI





**Dr Angela Rankine-Mullings | Dr Deanne Soares
Professor Marvin Reid | Mrs Karen Aldred**

Research Project with the Greatest Business/Economic/Development Impact
Caribbean Institute for Health Research (CaIHR)

**Socioeconomics of stroke in sickle cell disease (SCD) and the potential
impact of Sparing Conversion to Abnormal TCD Elevation (SCATE)**



Introduction

Sickle cell disease (SCD) is an important worldwide public health concern as well as in Jamaica where roughly 270 babies are affected annually. There are many different ways in which the disease impacts the lives of those affected. Painful crises and jaundice are well known, but stroke is another major medical issue. Most of the afflicted are usually children, 83% by ten years of age. While the disease is not usually fatal, the potential socioeconomic impact is significant. When a child has a stroke, hospitalisation is necessary, costing as much as J\$10,000 per day, excluding the laboratory and imaging investigations. Those with minimal physical deficits may have significant learning and attention challenges. Physical disabilities may range from loss of hand grip, a limp, to being confined to a wheelchair or bed requiring long-term nursing care. The impact on the families caring for such children can be devastating, resulting in time lost from work, with subsequent loss of income. Siblings of children with stroke are at greater risk for stroke, so more than one affected child per family can occur. The potential for some of these children to achieve independence can be significantly impaired.

Background

Adams et al in 1992, demonstrated that transcranial Doppler ultrasound (TCD) could be used to identify patients (usually children) at the highest risk for stroke. (Sickle cell disease causes stroke mainly by causing the main blood vessels in the brain to narrow, resulting in increased speed of blood flow, the ones at greatest risk having the highest flow rates.) They also demonstrated in 1998 that repeated blood transfusion prevents first stroke. Transfusion therapy remains the desired standard of care. Providing repeated blood transfusions is costly requiring not only resources to recruit an adequate pool of blood donors, but blood needs to be collected under very specific conditions, and needs to be tested to ensure safety for use in another individual. The blood then needs proper storage, including refrigeration, and reliable electricity supplies. Even when all the resources are available, repeated transfusions have potential for side effects, including iron overload, immune reactions to the blood itself owing to repeated exposure, and are costly to treat. In our clinical setting, the use of repeated transfusions for stroke prevention is not feasible, but transfusion is offered after a stroke has occurred. Because of the various constraints associated with transfusions (including refusal by parents on various grounds including religious), hydroxyurea (HU) has been used in children who have suffered a stroke and been found to reduce the recurrence of strokes. The cost effectiveness of using HU has been investigated and confirmed by Myrie et al, who showed that HU was “safe and affordable when transfusion therapy was not feasible”.



So far, the focus had been on the identification of patients with the greatest risk for stroke and the utility of Transcranial Doppler in this regard. However when using TCD, three groups of individuals are identifiable: those who are considered to be normal (i.e., at lowest risk for stroke); those who are abnormal (those at greatest risk for stroke); and an intermediate group deemed as “conditional”. To date the standard treatment for patients who are identified as conditional has been observation, meaning no kind of treatment is given. These children are observed until they convert to the abnormal group when transfusions are commenced. Unfortunately, in the interim, some of these children would have suffered strokes.

Clinical work

Here at the Sickle Cell Unit, UWI, the researchers have been involved in two clinical trials investigating the usefulness of HU in stroke prevention. The SCATE (Sparing Conversion to Abnormal TCD Elevation) trial, the first of these, involved comparing two groups of these “conditional” children. One group received HU, the other was observed, the aim being to see how the values obtained at TCD changed, and whether or not HU could prevent conditional from converting to abnormal. The researchers not only demonstrated a decrease in the conversion rate to abnormal, but also a reduction in the blood flow rate in the group on HU.

Impact

This project also provided the research team with a launching pad (including vital equipment) for the first TCD screening programme in the English speaking Caribbean, for identification of patients at increased risk for stroke. The research efforts have been facilitated by collaboration with the Cincinnati Children’s Hospital, led by Dr Russell Ware.

Also, in recognition for the high cost of treating resulting problems from sickle cell disease, in 2015 two major events occurred:

1. The acquisition of a High Performance Liquid Chromatography (HPLC) machine (resulting from intergovernmental cooperation with Brazil as well as the Pan American Health Organisation) to assist with screening for sickle cell disease in new-borns
2. The placement of hydroxyurea on the National Health Fund’s list of subsidised drugs



Bio

Karen Aldred is a senior medical technologist at the Caribbean Institute for Health Research (CAIHR) with 19 years research experience. Mrs Aldred is currently the chief Transcranial Doppler (TCD) examiner with the Institute, conducting the screening exercise for assessment of stroke risk in children with sickle cell disease.

Susanna Bortulosso-Ali is a paediatrician with a special interest in neurology. Dr Ali was formerly Head of Clinical Services at the Sickle Cell Unit (SCU) and the first certified TCD examiner at the Unit. She is currently an honorary lecturer with the SCU.

Angela E. Rankine-Mullings is a paediatrician and current Research Fellow at the Caribbean Institute for Health Research. Dr Mullings has been involved in research for almost six years, and was the coordinator for the SCATE project.



Marvin Reid is a clinical nutritionist and professor at the Caribbean Institute for Health Research. Professor Reid was one of the principal investigators for the SCATE project, and is now Acting Head of CAIHR.

Deanne P. Soares is a senior lecturer in the Faculty of Medical Sciences, having recently returned to her post as Consultant Radiologist in the Radiology Department at the UHWI after two years as a research fellow at CAIHR.

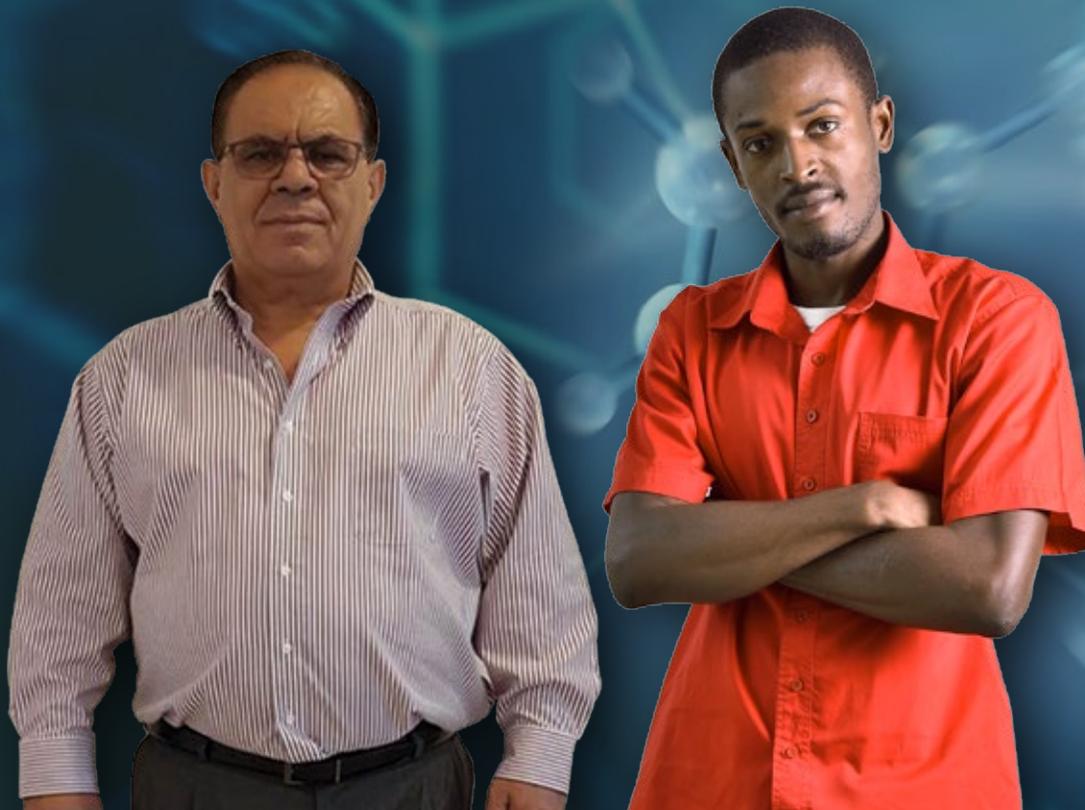
Dr Soares is a certified TCD examiner, with special interests in breast imaging and neuroimaging.

The entire group has a special interest in the prevention of neurological injury in children with sickle cell disease. Drs Ali and Soares, and Mrs Aldred were the TCD examiners on the SCATE project.





FACULTY OF SCIENCE
AND TECHNOLOGY



Professor Mohammed Bakir | Dr Peter Nelson

Best Research Publication (Article)

Department of Chemistry

“Spectroscopic and electrochemical properties of di-2-thienyl ketone thiosemicarbazone (dtkts): electrochemical reactions with electrophiles (H⁺ and CO₂)”

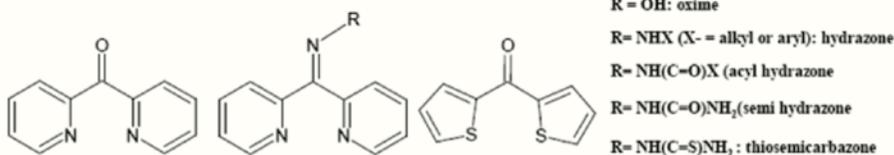


Mohammed Bakir^{1*}, Mark A. W. Lawrence¹, Peter N. Nelson¹, and Rebecca R. Conry² "Spectroscopic and electrochemical properties of di-2-thienyl ketone thiosemicarbazone (dtktsc): electrochemical reactions with electrophiles (H^+ and CO_2)" *Electrochimica Acta* 212 (2016) 1010–1020. ¹Department of Chemistry, The University of the West Indies-Mona Campus, Kingston 7-Jamaica, W. I. ²Department of Chemistry, Colby College, Waterville, ME 04901-8857, USA

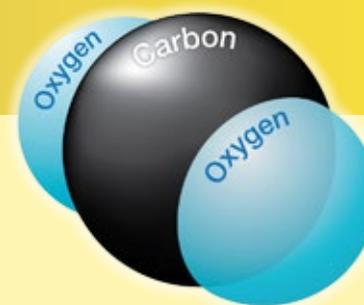
Di-2-heteroaromatic ketones such as di-2-pyridyl ketone (dpk) and di-2-thienyl ketone (dtk) and their hydrazone derivatives (dxk-d) ($x = \text{pyridyl or thienyl}$) (see Scheme 1) continue to attract research attention for their physical properties, chemical reactivity patterns and applications in several areas. Reports appeared on the applications of di-2-heteroaromatic ketone derivatives in medicine, electronic and photonic devices, catalysis, sensors, etc. For example, di-2-pyridyl ketone thiosemicarbazones (dpkts-c's) are widely used as analytical reagents for the detection and determination of trace amount of various biological and chemical substrates, such as metal ions

in drinking water. The biological activities of dpkts-c's were reported, and revealed excellent anti-tumor and anti-viral activities due in part to their excellent chelating properties and ability to bind to metal ions, depriving cells from essential nutrients leading to cell death. The authors are interested in the chemistry of di-2-heteroaromatic ketone derivatives, and reported on the development of a variety of di-2-pyridyl ketone derivatives and their catalytic and molecular sensing properties.

In contrast to the extensive reports covering the chemistry of dpk, the chemistry of dtk is scarce. The literature reports on the chemistry of dtk focused on the structural dynamics, electro-oxidation, calorimetric (nephelometric) determination of trace amounts of heavy metals, and electro-luminescence of dtk and its derivatives. Apart from those on the di-2-thienylketoxime (dtk-o) and di-2-thienyl ketone p-nitrophenylhydrazone (dtknph) there have been no other reports on hydrazone derivatives of di-2-thienyl ketone. In this publication, the synthesis, X-ray crystallographic, spectroscopic and electrochemical properties of di-2-thienyl ketone thiosemicarbazone (dtktsc) and its di-2-thienyl ketone hybrid (dtktsc-dtk) were reported. X-ray crystallographic analysis confirmed the authenticities of the isolated compounds and revealed extensive network of weak interactions between the molecules in the extended structure. Spectroscopic (nuclear magnetic resonance (NMR) and electronic spectra (UV-VIS) measurements disclosed high sensitivity of dtktsc to changes in its surroundings and possible use as molecular sensor. Electronic absorption measurements in protophilic solvents (dmsO and dmf) in the presence



Scheme 1: Representation of di-2-pyridyl ketone (dpk), di-2-pyridyl ketone derivatives (dpk-d) and di-2-thienyl ketone



and absence of a base disclosed deprotonation of the thioamide (NH) proton. Variable temperature $^1\text{H-NMR}$ measurements divulged entropy driven exchange of NH and NH_2 protons with the residual water protons in the solvent. Electrochemical measurements on dtksc in the presence and absence of an electrophile (CO_2 or H^+) revealed irreversible redox processes, pointing to electrochemical decomposition, reactions with electrophiles and electro-polymerization. On GC-electrode, electro-polymerisation of dtksc occurs in CH_3CN on oxidative scans. On reductive scans at a Pt-electrode, electro-catalytic decomposition of dtksc occurs. Plausible mechanisms for the electrochemical decomposition and reactions of dtksc with electrophiles are proposed. Highlights of the electronic absorption spectral measurements, X-ray structure of dtksc and electrochemical measurements are shown in Figure 1. The chelating behavior and biological properties of dtksc remain to be explored. Owing to the rich physico-chemical properties of di-2-thienyl ketone, thiosemicarbazone studies are in progress in the researchers' laboratory to develop the chemistry of di-2-thienyl ketone hydrazone derivatives and explore their chemical and biological applications.

Figure 1: highlights of the electronic spectra, X-ray structure of dtksc and electrochemical measurements

The isolation of di-2-thienyl ketone thiosemicarbazones (dtksc and dtksc.dtk) mark the first examples of thiosemicarbazones of di-2-thienyl ketone, and opens a new area of research exploration. The development of the chemistry of di-2-thienyl ketone hydrazone compounds has significant impact as new catalysts, molecular sensors, electronic and photonic materials, and therapeutic agents for the treatment of various diseases are in high demand. Further, the publication in this area enhances the reputation of the University of the West Indies as a research institution working on the frontier of a very important research area.

Acknowledgments

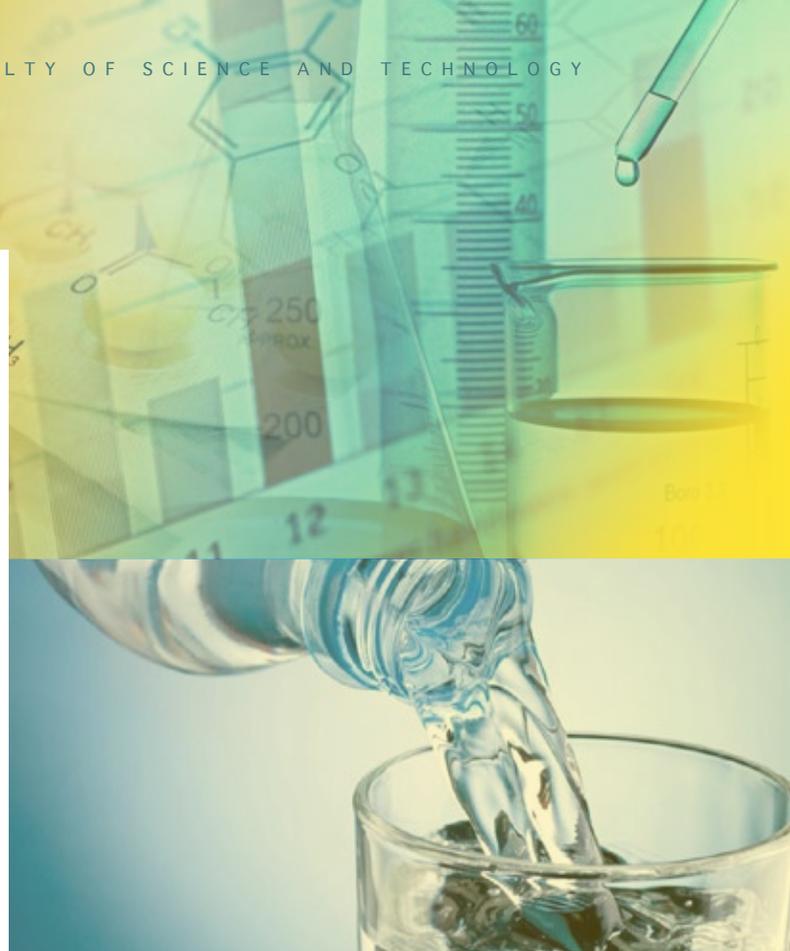
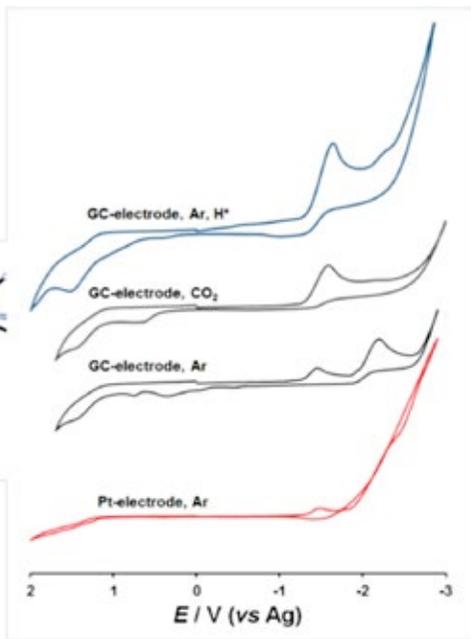
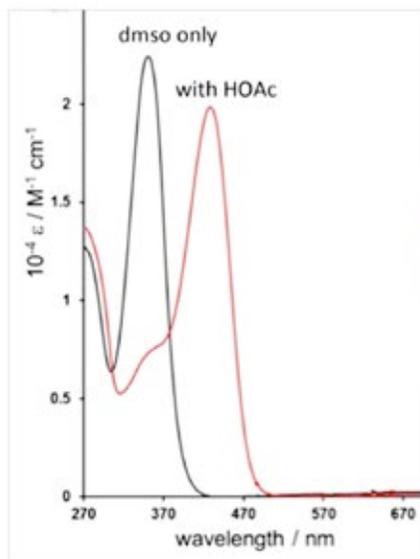
M. Bakir wishes to emphasise the outstanding work done by Dr Mark Lawrence to bring this work to light. Without his efforts, this quality publication would not have been possible. The authors would like to express gratitude to Prof. Willem Mulder (for helpful discussions), Ms Toni Johnson (for NMR studies), Mr Kenroy Wallace, and Ms Shannen Lorraine for various assistances.



Bio

M Bakir is Professor of Chemistry at the University of the West Indies – Mona Campus. After completion of his Ph.D. in 1987 from Purdue University – West Lafayette, Indian under the supervision of Professor Richard Walton in the area of Inorganic Chemistry he worked as a research associate at the University of North Carolina at Chapel Hill and Wyoming University before joining the faculty at the University of the West Indies in 1994.

Dr Peter Nelson is a lecturer in the Department of Chemistry. Completing his PhD in 2013, in under four years, he is the youngest PhD graduate from the UWI, and is currently seeking funds to initiate his research group. His main aim is to focus his research on the development of new materials for use as drugs, drug delivery systems, light harvesting and smart materials for technology applications.





Dr Rupika Delgoda | Dr Chukwuemeka Nwokocho | Dr Sheena Francis

Best Research Publication (Article)

Natural Products Institute and Department of Basic Medical Sciences

“Apocynin, a natural compound with potent inhibitory properties against Arylamine-N-acetyltransferase activity in the liver”

Apocynin is a natural extract from plants that has been used traditionally in folk medicine for the treatment of cardiovascular disease. Although its full mechanism of action is unknown, research has shown that apocynin helps to prevent vascular tissue damage, by preventing the accumulation of harmful free radicals in the tissue. In so doing, it does, indeed, assist in alleviating cardiovascular problems. Although this extract has been in use for years, little was known on its effect on certain liver enzymes.



We examined the effect of apocynin on a key liver enzyme, arylamine N-acetyltransferase (NAT), known for the metabolism of a plethora of pharmaceuticals such as isoniazid, procainamide and hydralazine. Genetic variations of this family of enzymes has also been linked with susceptibility to a number of cancers, including that of the breast and colon. Thus, information on the effect of apocynin on NAT enzyme will shed light into apocynin's use as a potential cancer preventor. This paper described the researchers' efforts in understanding the impact of apocynin on NAT enzyme activity. They fed rats apocynin for eight (8) weeks, in addition to their regular diet. The health of the animals was monitored at every stage through the experiment. At eight (8) weeks, the liver was removed from the animals and the activity of NAT activity was tested. The results showed that apocynin significantly and dramatically decreased the activity of this liver enzyme. The research team was also able to convincingly describe the possible mechanism of action used by apocynin to block the activity of the enzyme, using bench based (in-vitro) and live animal (in-vivo) experimental methods along with computer assisted enzyme modelling (in-silico).

The finding is important to both traditional and complementary medicine and western medicine. Our findings showed that along with the cardiovascular benefits of apocynin, the extract is non-toxic, safe for consumption, and can prevent the generation of harmful, cancerous agents.

Jamaica has a long history of using plants and plant extracts to treat various illnesses. Though the plant that apocynin is traditionally extracted from does not naturally grow in Jamaica, its extracts are sold commercially. Information concerning the safety of any extract is always of value for countries with long traditional ethnomedicinal practices. The research thus benefits retailers and consumers of apocynin worldwide, and also doctors who recommend apocynin to their patients with cardiovascular illnesses.

Bio

The work was conducted by a team of researchers at UWI, **Drs Rupika Delgoda** and **Sheena Francis**, who are dedicated to unveiling the safety and novel uses of herbs, as well as **Dr Chukwuemeka Nwokcha**, an animal physiologist, interested in traditional medicines with antihypertensive value. Also a part of the team was **Dr Nicola Laurieri**, a chemist from the University of Oxford, U.K.

Dr Sheena Francis is a research associate at the Natural Products Institute, Jamaica. Her research examines the medicinal properties of natural compounds and, more recently, she has focused on plants with pesticidal properties and also testing pesticide resistance in mosquitoes. Dr Francis obtained her PhD from the University of the West Indies, Jamaica (Zoology). She holds a Dip Ed In Science Education and a BSc (Honours, Zoology). She has received postdoctoral training from the University of Loma Linda (CA., USA), Liverpool School of Tropical Medicine (Liverpool, UK), Colorado State University (CO., USA) and the University of Florida (GA., USA). Her areas of interest include metabolism of natural compounds by enzymes of pharmaceutical importance, insect toxicology, specifically understanding the underlying basis of insecticide resistance, and vector control applications. In addition to research, Dr Francis has taught at the undergraduate level, and is involved in multiple outreach programmes throughout the Caribbean and the Commonwealth countries aimed at fostering the creative minds of young adults, stimulating their passion in science and technology.

Dr Rupika Delgoda is the director of the Natural Products Institute.





Professor Michael Taylor | Dr Dale Rankine | Dr André Coy | Dr Jane Cohen

Best Research Publication (Article)

Departments of Physics and Life Sciences

“Increasing the accuracy and automation of fractional vegetation cover estimation from digital photographs”



The paper* in brief

Fractional vegetation cover (FVC) is a measure of the amount of green vegetation covering the ground. This is an important index of crop development because it determines the proportion of vegetated land that is in direct contact with the atmosphere. Thus, FVC can be used as a primary input to crop models or as a predictor of crop yield, above-ground biomass, plant nutritional status, weed infestation and crop identification. The calculation of other comparable indices, such as leaf area index (LAI), can be very time consuming, and involve the use of expensive equipment, which is cost prohibitive, especially for agricultural applications. In contrast, FVC can be estimated by analysing digital photographs. This holds the potential for a simple, low cost, approach to measuring crop development.

Accurate, timely and versatile segmentation of digital photographs is essential for efficient measurement of fractional vegetation cover. While a number of segmentation approaches (threshold-based and machine learning) predated the one developed by this research,

there were several limitations. Included in these are the following:

- An underperformance of the segmentation algorithm when the canopy is nearly bare or close to closure
- Reduced accuracy of results in varying illumination and shadow
- The need for varying levels of intervention or supervision by the operator, both for model training and for testing
- Computationally intensive processes, which limit the scope of their use.

This work introduced a novel technique, the Automated Canopy Estimator (ACE) that overcomes many of these challenges to produce accurate estimates of fractional vegetation cover, using an unsupervised segmentation process. ACE is shown to outperform nine other segmentation algorithms, consisting of both threshold-based and machine learning approaches. The experiments involved the segmentation of photographs from a challenging database of four different crops (oat, corn, rapeseed and flax) captured using hand-held digital cameras. The overall segmentation accuracy was 89.6% (s.d. 4.5%). This compares with the next best accuracy of 86.1% (s.d. 7.0%), showing ACE to be more accurate and more consistent across the dataset. The FVC estimates produced were very strongly correlated with ground truth values - RMSE 0.050 (s.d. 0.049) compared with 0.057 (s.d. 0.056) for the next best performing algorithm. ACE is similarly accurate (88.7% - s.d 5.4%) when applied to fields of corn photographed from an elevated platform. The next best performing algorithm had an accuracy of 81.1% (s.d. 11.4%).

Contribution to national, regional and international community

National

The ACE software has been presented to a number of national institutions and agencies, including, but not limited to, RADA (Ministry of Agriculture), The Meteorological Service, and the Forestry Department. Keen interests have been expressed in its usefulness and accuracy. Efforts are on-going to expand its application for data capture in agriculture (crop development), meteorology (cloud cover measurement) and remote sensing (forest canopy estimation).

Regional

The FAO AquaCrop Model has been successfully parameterised for Caribbean varieties of sweet potato through measures of FVC by the ACE software. This made an original contribution of crop simulation modeling. It has sparked interest in crop modelling in the region and was used as a case study for two regional projects, the GoloCarSce and CariWIG (collaboration between UWI, University of Newcastle and University of East Anglia, UK).

International

The accuracy of the ACE software and its compatibility with this very useful crop model (AquaCrop) will enhance use of the model globally, and its application to new crops. This has been commended by the Food and Agriculture Organisation of the United Nations (FAO) and the International Atomic Energy Agency (Soil and Water Management and Crop Nutrition Section). The software is freely available online (<http://173.230.158.211/>) and has been used by interested parties worldwide.

(*Published in Remote Sens. 2016, 8(7), 474 – July 2016
doi:10.3390/rs8070474)



Bio

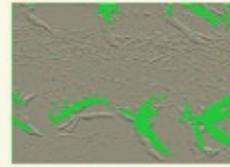
Dr André Coy is a lecturer in the Department of Physics at the University of the West Indies, Mona.

Professor Michael Taylor is a senior lecturer in the Department of Physics at the University of the West Indies and the director of the Climate Studies Group, Mona (CSGM). In the latter capacity he coordinates research on the science of Caribbean climate variability and change. Prof. Taylor also serves as Deputy Dean of the Faculty of Science and Technology.

Dr Jane Cohen, a lecturer in the Department of Life Sciences, researches in crop science: crop physiology, management of weeds and soil fertility. She has supervised post-graduate projects with application to Jamaican agriculture, as well as projects on natural plant communities with conservation significance. She worked with the UWI Climate Studies Group on modelling the response of sweet potato to soil water in a changing climate, which had several important outputs including the research in the featured article. She collaborates with the Agriculture Ministry's R&D unit and serves as vice-chair of the Jamaican Scientific Authority.



(a)



(b)



(c)



(d)



(e)



(f)



(g)



(h)





Dr Rupika Delgoda | Dr David Picking
Research Project with the Greatest Business
Economic/Development Impact

Natural Products Institute

**Bringing awareness to herb-drug interactions:
An international public health challenge**



The use of medicinal plants in developing and middle income countries continues to be high, with an estimated 80% prevalence reported by the World Health Organisation (WHO). Prevalence figures for developed countries are lower, but are reported to be on the rise.

Whilst issues relating to potential drug-drug interactions are well documented, those relating to potential herb-drug interactions are generally not well researched. In addition, most of the current herb-drug interaction research relates to those plants and foods that are available and extensively used in developed countries.

Two well documented examples of drug interactions involve those of St John's wort (*Hypericum perforatum*), and its significant clinical impact on antiretrovirals, immunosuppressants, and oral contraceptives, and grapefruit, and its impact on antihypertensive medications, cholesterol lowering drugs and immunosuppressants.

The Jamaican situation

Two field surveys conducted in pharmacies around Jamaica, and one house-to-house survey have provided

indicators that the concomitant use of medicinal plants with prescription drugs crosses educational, economic and residential barriers. These studies reveal that 72% of Jamaicans self-medicate with medicinal plants. The surveys indicate that potential herb-drug interactions are an important public health care issue, with over 80% of Jamaican prescription users also using medicinal plant remedies concomitantly, and only 18% of physicians being aware of such practices.

Research

With information gathered during surveys on commonly consumed medicinal plants, the researchers have undertaken laboratory investigations that can provide guidance on medicinal plants likely to yield potential interactions with prescription medicines. Such guidance then provides support for undertaking further clinical evaluations which provides a key experimental tool for conclusive observations.

Programme outcomes

The successful launch of the handbook and website, and development of an app, aim to highlight the importance of this public health issue, and summarise a decade of research conducted at the Natural Products Institute. This body of work, highlighting the results of field surveys and laboratory investigations in Jamaica, and laboratory investigations and clinical research from around the world, provides a practical guide to avoiding adverse drug reactions, and is intended for use by physicians, pharmacists, other health care professionals, and patients alike. It documents, approximately, 70



potential interactions by 30 medicinal plants and foods commonly used in Jamaica. Examples of specific content includes monitoring guidelines for local medicinal plants such as cerasee (with hypoglycemic drugs), breadfruit leaf (with ACE inhibitors), leaf of life and ackee leaf (when used with multiple medications), and international research and guidelines for known clinically relevant drug interactions for grapefruit juice (with antihypertensive medications, cholesterol lowering drugs, immunosuppressants, etc.), St John's wort (with antiretrovirals, immunosuppressants, oral contraceptives etc.), ginger (with anticoagulants, antihypertensives) and garlic (with anticoagulants). The findings from this programme have been presented at international, regional and national conferences and public forums in Jamaica, USA, China, Colombia, Guyana, Mexico, Saint Lucia and South Africa.

Potential impact and applications

The authors' hope is that the handbook, website and app will help increase awareness of this public health issue, and mitigate potential adverse drug reactions in the country. It provides careful guidelines for monitoring, and highlights the fact that further clinical evaluations are needed for more conclusive determinations for some local plants. On-going work at the Natural Products Institute is expected to clarify the laboratory (in-vitro based) evaluations prior to issuing public warnings. The hope is that the handbook, website and app will be of use to the Ministry of Health when making and implementing pharmacovigilance policy. The handbook is also positioned to support the development of the country's nutraceutical industry (medicinal plants products) with herb-drug interactions being a key aspect of medicinal plant safety.

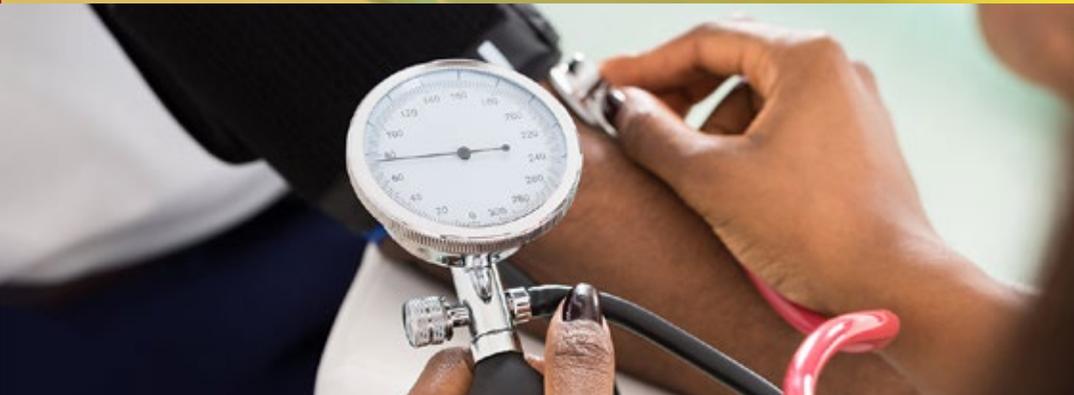
Handbook, website and app have been compiled by Dr Rupika Delgoda, Head, Natural Products Institute and Dr David Picking, Research Fellow, Natural Products Institute, UWI, Mona.

Bio

Dr David Picking, a research fellow at the Natural Products Institute, UWI, is engaged in research on safety and efficacy of natural products.

Dr Rupika Delgoda is the director of the Natural Products Institute.







Professor Mohammed Bakir

Most Outstanding Researcher

Department of Chemistry

Electro-catalytic, molecular sensing and biological properties of polypyridyl-like compounds and their metal complexes



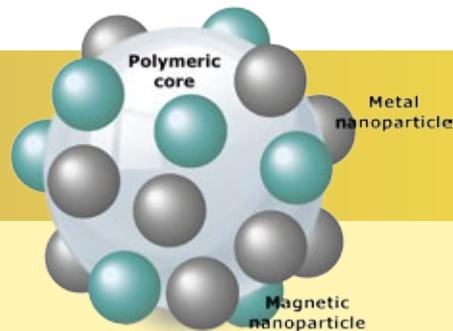
Research in Dr Bakir's laboratory focuses on the development of novel materials for environmental, biological (medicinal) and chemical (catalytic and molecular sensing) applications. The bottom-up approach in research is utilised as the research team develops multi-functional reagents containing electron-rich, electron-poor and acidic sites for various applications. The driving force of this research is to explore how slight variations in the composition of materials affect their reactivity patterns, physical properties and applications. A variety of spectroscopic, electrochemical, and X-ray crystallographic techniques are used to characterise the newly developed materials. Postgraduate and undergraduate researchers, along with various research collaborators participate in Dr Bakir's research. Over one hundred publications and research presentations have resulted from experiments conducted in his laboratory, as highlighted in the following areas:

1. Electro-catalysis: Mechanistic pathways for the electrochemical reduction and reactions of carbon dioxide (CO₂) with a variety of reagents that include mononuclear

and poly-nuclear compounds, as well as nanoparticles of various metals deposited on polymeric materials were explored to develop electro-catalysts for the conversion of CO₂ to useful chemicals and fuels. CO₂ is abundant in nature as part of the Earth's carbon cycle, i.e. circulation of carbon among the plants, animals, atmosphere, soil and ocean, etc., and accounts for over 80% of greenhouse gases (gases that trap heat in the atmosphere and cause global warming). Although a variety of chemical procedures are in use to utilise (sequester) CO₂, the conversion of CO₂ to useful fuels is energy demanding, hence a catalyst is required to lower the energy demand. In the laboratory, the researchers developed a variety of electro-catalysts for CO₂ reduction, and in collaboration with international researchers the team developed synergic CO₂ electro-catalysts based on nanoparticles of various metals dispersed on polymeric surfaces for clean conversion of CO₂ to useful fuels (see Scheme 1).

Scheme 1: A representation of the electro-catalytic conversion of CO₂ to methane (CH₄) on metal particles dispersed on thin films

2. Molecular sensors: Spectroscopic measurements on a series of poly-functional molecules (materials) containing electron-rich (electron-donor) and electron-poor (electron-acceptor) sites show high sensitivity to changes in their surrounding and use as molecular sensors for the detection and determination of trace amounts of substrates that include environmentally hazardous metal ions such as copper ions



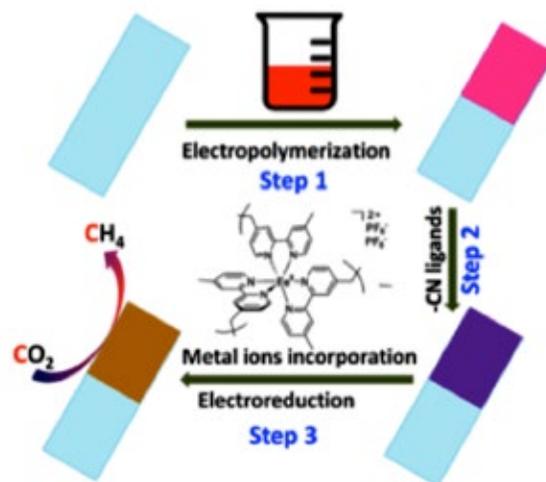
in drinking water and cadmium ions in soil. Variations in the donor-acceptor sites allow for the development of naked-eye sensors (colorimetric sensors) for real-time detection of hazardous and biological substrates (see Scheme 2).

3. Chelating agents: Multifunctional materials have the ability to bind to metal ions and hence have a wide range of applications that include water treatment, removing toxic metals from soil, providing nutritional supplements, etc. In chelating therapy, the use of chemical reagents to abstract metal ions from living organisms is widely used for the treatment of various diseases that include iron overload and cancer. For example, di-2-pyridylketone thiosemicarbazones and related species are novel, highly potent and selective anti-tumor and anti-metastatic agents. Studies in the laboratory focus on the development of chelating agents that include di-2-pyridylketone hydrazonic derivatives such as thiosemicarbazone for facile binding to metal moieties. Although di-2-pyridyl ketone hydrazonic reagents are widely used in many hospitals there has been no reports on the development of other heteroaromatic ketone hydrazonic reagents. Studies are in progress in Dr. Bakir's laboratory to develop the chemistry of heteroaromatic ketone hydrazonic ligands for biological and chemical applications.

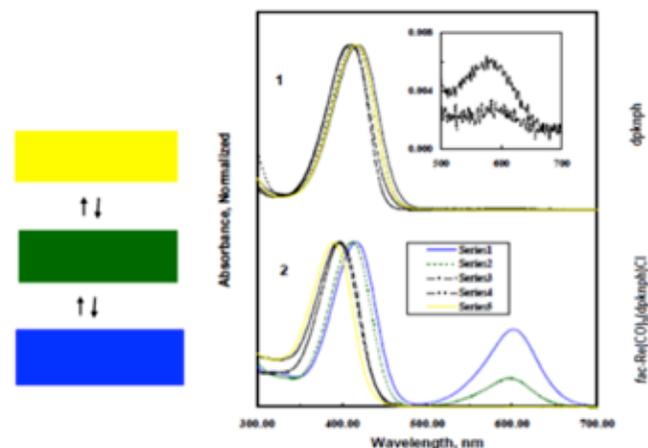
4. Surface modification: Electrochemical techniques are employed to incorporate electro-active materials (polymers) at solid surfaces for molecular sensing and the conversion of highly abundant chemicals such as CO₂ and (nitrogen) N₂ to useful fuels and fine chemicals (see Scheme 1 for electro-catalytic and molecular sensing properties of modified glass electrodes).

Acknowledgments

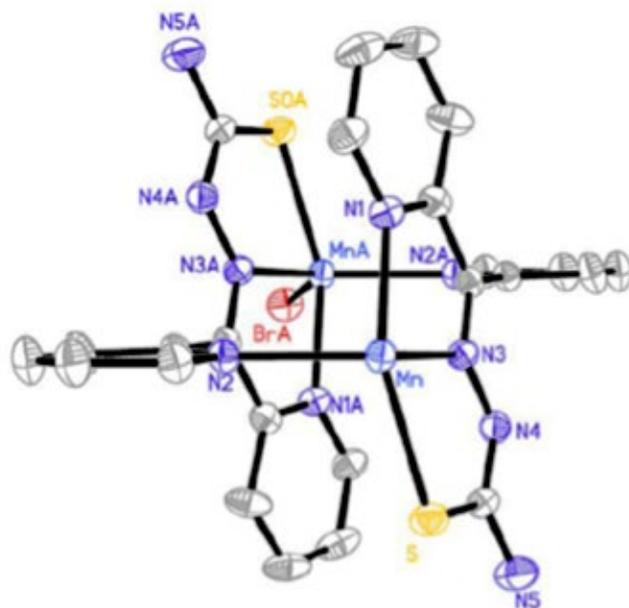
Dr Bakir expresses his sincere gratitude to many individuals who made this research possible, most notably: Dr Mark Lawrence (Lecturer at the University of Technology – Jamaica) for continued research collaboration, enthusiasm and dedication to research, Prof. Colin Gyles (Acting Principal, University of Technology- Jamaica), Dr Ordel Brown (Lecturer – University of West Virginia), Dr Orville Green (Ministry of Agriculture- Kingston Jamaica) for work on the development of chelating agents and molecular sensors, Prof. Willem Mulder for helpful discussions, Dr Ishmael Hassan, Prof. Rebecca R. Conry and Prof. M. Bohari Yamin for X-ray crystallographic analysis, Ms Toni Johnson for NMR studies, current postgraduate and undergraduate students, and research collaborators for various assistances.



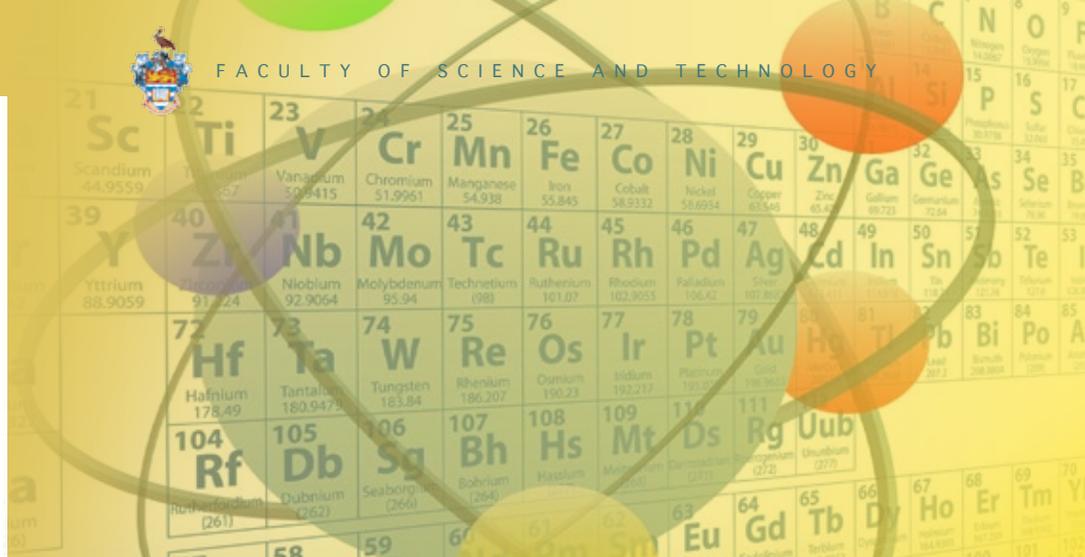
Scheme 1: A representation of the electro-catalytic conversion of CO₂ to methane (CH₄) on metal particles dispersed on thin films



Scheme 2. Electronic spectral and color changes of (1) dpknpH and (2) fac-Re(CO)₃(dpknpH)Cl in different solvents: DMF (series 1), DMSO (series 2), CH₃CN (series 3), dioxane (series 4) and CH₂Cl₂ (series 5).



Scheme 3: A view showing multi-chelating properties of di-2-thienylketone thiosemicarbazone



Publications:

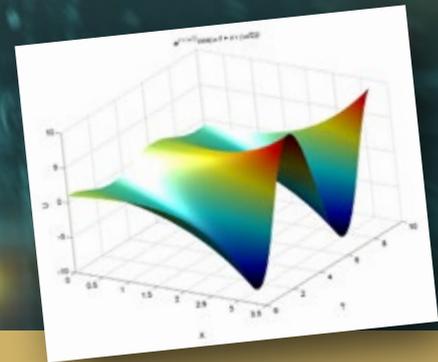
For selected publications and research presentations see:
1. <https://scholar.google.com/citations?user=kMEmxzQAAAAJ>
2. https://www.researchgate.net/profile/Mohammed_Bakir

Bio

M. Bakir is Professor of Chemistry at the University of the West Indies – Mona Campus. After completion of his PhD in 1987 from Purdue University – West Lafayette, Indian under the supervision of Professor Richard Walton in the area of Inorganic Chemistry. He worked as a research associate at the University of North Carolina at Chapel Hill and Wyoming University before joining the faculty at the University of the West Indies in 1994.



$$P(y) = \int_0^{\infty} P(x) \frac{x^y e^{-x}}{\Gamma(y)} dx$$



Dr Cónall Kelly

Most Outstanding Researcher

Department of Mathematics

The benefits of randomness in natural systems



Area of research

Dr Conall Kelly conducts research into the behaviour of stochastic systems, which describe the evolution of feedback systems that are subject to random effects — examples include ecological systems and financial markets. The focus of this research has been on the development and analysis of simulation techniques for such equations, and in areas of application that have recently included problems in ecology (the robustness of certain harvesting techniques in ensuring the sustainability of an ecosystem) and fluid dynamics (the effects of turbulent plasma flow in spiral galaxies).

Overview: What is a stochastic system?

Feedback governs many real-world systems. For example, predator-prey dynamics are heavily influenced by biomass of each species at any given moment. These dynamics find their mathematical expression in systems of differential or difference equations. However, inherently unpredictable phenomena like disease and weather will also have an effect. Therefore, it is necessary to include in our equations special “stochastic” terms that inject randomness. What results is a system of stochastic differential or difference equations, and such equations are widely used to model problems in the physical sciences, finance, and engineering.

The importance of equilibria and stability

If a system has one or more steady-states, for example, states representing the coexistence or extinction of one or more species in an ecological model, then the stability of those equilibria will tell us about the long-term dynamics of that model. Stability is an asymptotic (or long-run) property of an equilibrium, and says that if the system is perturbed away from the equilibrium, it will eventually return to its vicinity.

An unstable coexistence equilibrium, including the possibility of chaos, leads ultimately to extinction; a stable coexistence equilibrium represents sustainability for the ecosystem. Therefore, an understanding of the effects of randomness and feedback on stability is essential for the design of effective management strategies for ecological systems, for example, fisheries or wildlife preserves.

Relevance of recently published work in mathematical ecology

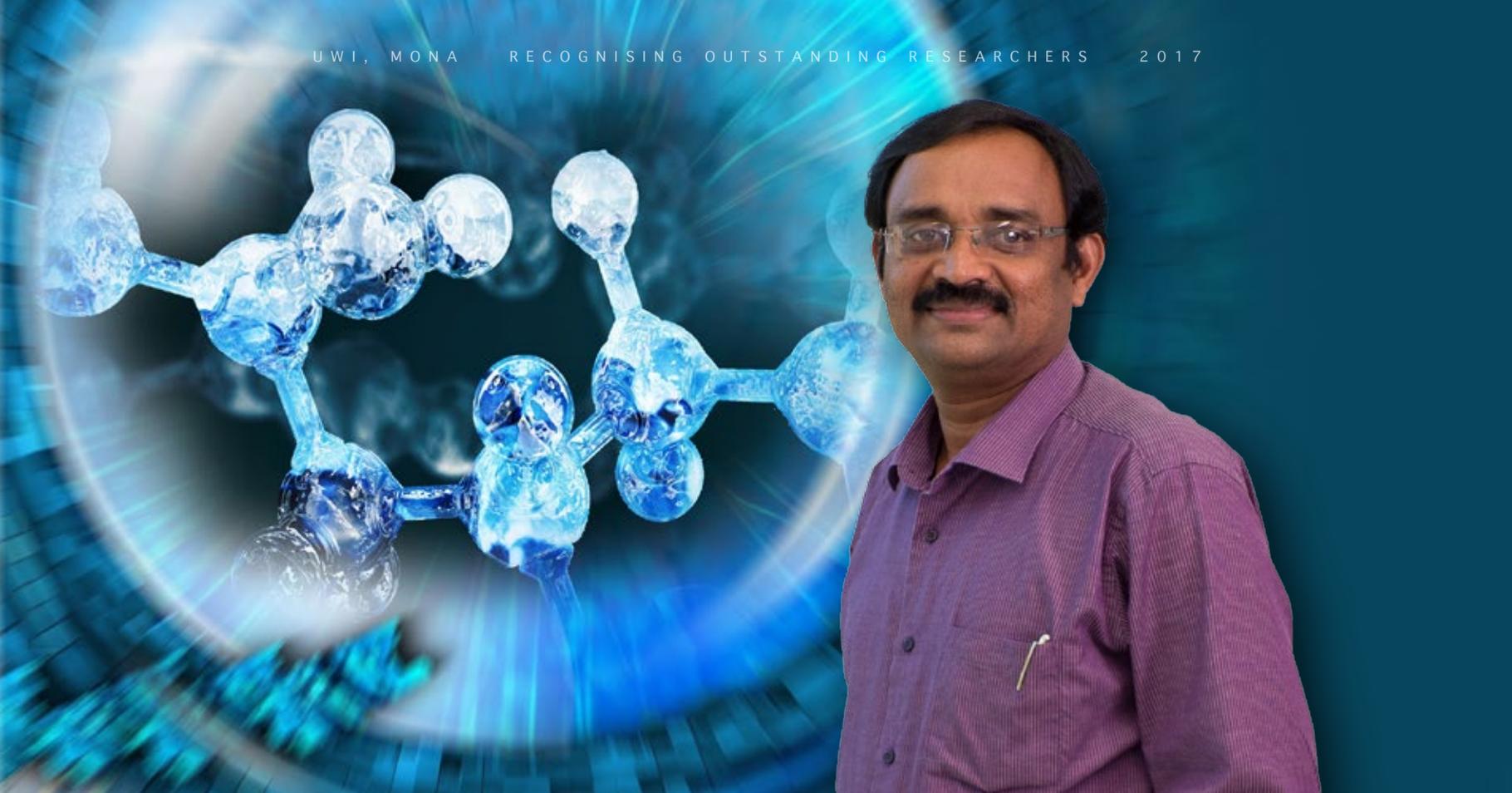
Many commonly used population models have a positive equilibrium that corresponds to the long term persistence of the species. However, if that equilibrium is unstable, and especially if the system is chaotic, extinction will be the likely long-term outcome. Harvesting or culling can be used to control the unchecked growth of a species; it is known for a wide variety of population models that harvesting strategies exist that will ensure the stability of the positive equilibrium.

One such strategy is Prediction Based Control (PBC), which uses the expected change in population over a period of time in the future, assuming an absence of external interference, to set harvesting targets that will ensure stability. However, in practice, such targets will generally not be achieved precisely. Consider, for example, a wildlife reservation where hunters are used to cull a target of 30% of a population in a season. The actual percentage of animals culled will, in fact, vary randomly around 30%, owing to factors which are inherently uncontrollable and unpredictable.

In a recently published article, Dr Kelly shows that random variation of the target can actually improve the effectiveness of PBC-based management strategies, in the sense that the range of target proportions that can be proven to lead to stability (and, hence, the persistence of the population) is expanded by the presence of some uncertainty. The significance of this result is that it demonstrates that PBC-based management strategies designed on the basis of theoretical models are robust to some of the uncertainties associated with practical implementation.

Bio

Dr Conall Kelly has been a member of the Department of Mathematics at UWI, Mona, since 2006. He is currently Senior Lecturer and Head of the Department



92

Dr Venkateswara Rao Penugonda

Most Outstanding Researcher

Department of Physics

**Glass materials enabling today's most
powerful trends**



Introduction

Glass has become an essential material in human life. Glass materials play an essential role in our daily life and in modern scientific technology. Most of the glasses are eco-friendly. Glass is an inorganic amorphous disordered solid material that is usually clear or translucent with different colors. It is hard, brittle and stands up to the effects of wind, rain, or sun. The nature of the glass formation depends on the mixture of the different chemical powders known as glass composition. Glass composition mainly contains three types of components, network/glass formers, intermediates, and modifiers. Glass formers, form the network by means of the cations that bond to bridging oxygens. Network formers are two types, chalcogenide, and oxide network formers. Network modifiers disrupt the network and produce non-bridging oxygens. Intermediates can act as both network formers and modifiers, depending on the glass composition. Glass formation of glass composition follows the W.H. Zachariasen rules.

Different techniques have been used to prepare glassy materials in various forms, like bulk, sheet, powder,

thin films, etc. Melt quenching is the oldest established, widely used method for the preparation of glassy materials because glass preparation and handling are very easy. The distinguishing feature of the melt-quenching process of producing amorphous material is that the amorphous solid is formed by the continuous hardening (i.e. increase in viscosity) of the melt.

Types of glasses

Naturally formed glasses are obsidian (occurring from volcanic) and moldavite (formed by a meteorite impact). Obsidian is used for ornamental purposes and as a gemstone, and used by some surgeons for scalpel blades. Moldavite is used for ornamental purposes. Soda-lime-silica glass is used for windows, containers, light bulbs, tableware. Borosilicate glass is used for chemical glassware, cooking glass, car headlamps, reagent bottles, optical components, etc. Lead-oxide glass has a high refractive index, making the look of glassware more brilliant (crystal glass). Aluminosilicate glass acts like fiberglass, making glass-reinforced plastics (boats, fishing rods, etc.) and is also used for halogen bulb glass. Bismuth based glasses have potential applications in optical and optoelectronic devices such as ultrafast switches, infrared windows, and optical Isolators.

A novel approach

In three articles, the researcher present the synthesis, physical properties (density, molar volume, oxygen molar volume and oxygen packing density) and spectroscopic properties (optical absorption spectra, Fourier Transform infrared spectra and Raman



spectra) of the glass samples. X-ray diffraction (XRD) patterns confirm the amorphous nature of the glass samples and Differential thermal analysis (DTA) confirms the thermal stability of the samples. Some characteristics of the new materials are:

1. Enhancement of orange emission of cobalt ions with bismuth ions.
2. High linear and nonlinear refractive indices.
3. Low melting temperature, high thermal and chemical stability.
4. Low phonon energy.

Significance

These research efforts are significant, as each glass composition has a unique application in different fields like telecommunications, medical, lasers, etc. Orange emission of cobalt ions with bismuth ions in lead silicate glasses is useful in ophthalmology, especially for the treatment of retinal chaos, removal of vascular abrasions, and in the treatment of skin diseases. Bi₂O₃ mixed lead silicate glasses find potential applications in non-linear optical devices such as ultra-fast switches, infrared windows, optical isolators, and thermal and mechanical sensors. Borophosphate glasses doped with nickel ions have received attention for their use in various applications for fast ionic conductors and biomedical applications. Tellurite based glasses are significant owing to their potential applications in designing materials for optical communication systems, lasers, nonlinear optical, sensors and optoelectronic devices.

Current research projects

The researcher is currently working on two research projects. The first one is calcium phosphate based bioactive glasses. The bone bonding capability of a bio-material to host bone is associated with the formation of a carbonated hydroxyapatite (HA) layer on the surface of the material, either when implanted or placed in contact with biological fluids. The ability to bond with bone can be preliminarily assessed in vitro in simulated body fluid (SBF) by monitoring the formation of HA on its surface. With the increase of immersion time in SBF, the quantity and size of the apatite particles increase gradually. XRD studies and SEM morphologies confirm the presence of a crystalline HA layer on the surface of glass. Calcium phosphate glasses are widely used as a bone substitute in the field of dentistry, orthopedic and reconstructive surgery.

The second research project is on tellurite glasses. This research is significant because of their potential applications in designing materials for optical communication systems,



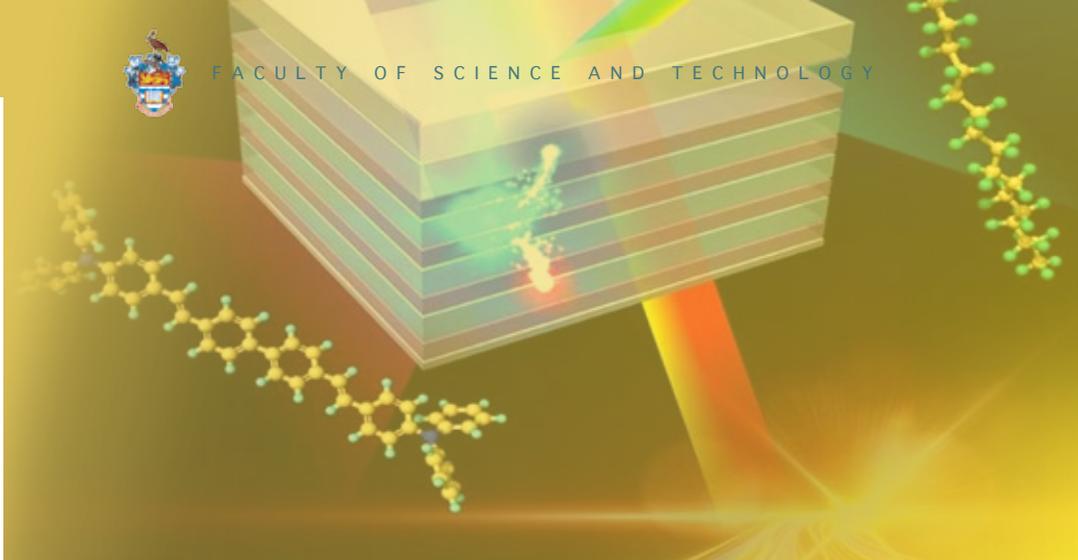
lasers, non-linear optical and optoelectronic devices. Several telecommunication companies, such as Bell Communications Research, Inc., Corning Incorporated, Nippon Telegraph and Telephone Corporation, have used tellurite glasses in different applications as optical amplifier, fiber amplifier and light source. The possibility exists for our Caribbean regional telecommunication providers to do the same with this newly synthesised material.

Future Work

Future work towards the borosilicate glasses has been the most widely adopted material for the immobilisation of both low-level waste (LLW) and high-level waste (HLW) generated from the dismantling of nuclear weapons. The number of possible compositions is practically infinite, so there exists great potential for research on new glasses.

Collaborations

The researcher has collaborated with the: Rutgers University -USA, University of Trenčín -Slovakia, University Putra - Malaysia, Université Mohamed Khider Biskra - Algeria, The university of the Dodoma -Tanzania, National Institute of Technology, Warangal - India, and Acharya Nagarjuna University - India.



Acknowledgments

The researcher acknowledges the supervision provided by Prof. N. Veeraiah, and collaborators Dr P. Syam Prasad, Dr G. Naga Raju, Dr M. Srinivasa Reddy, and Dr C. Laxmikanth for their encouragement and timely guidance.

Bio

Dr Venkateswara Rao Penugonda, Lecturer, Physics Department, has been working in the field of Glass Science since 2000. He has several publications in reputed international journals and conference proceedings, and is also a reviewer.



Professor Michael Taylor | Dr Georgiana Gordon-Strachan

Research Project Attracting the Most Research Funds

Department of Physics / Mona Office for Research and Innovation

The Caribbean Pilot Programme for Climate Resilience (PPCR)

The Caribbean Pilot Programme for Climate Resilience (PPCR) is a climate change adaptation initiative of the global PPCR, supported by the Climate Investment Funds. The Caribbean PPCR is a regional programme that consists of six individual country pilots in Dominica, Grenada, Haiti, Jamaica, St Lucia and St Vincent and the Grenadines, and a regional track of activities which supports resilience building in these countries, and will also provide benefits to the wider Caribbean.



Professor Michael Taylor supported the development of the project document for the Regional Track and through his efforts, alongside those of the University of the West Indies, Mona Office of Research and Innovation (UWI MORI), the Regional Track of the PPCR in the Caribbean is being coordinated by the University of the West Indies, through UWI MORI. The programme is supported by the Inter-American Development Bank which has provided USD10.39 million in grant funding for the regional track.

The objectives of the Caribbean Regional Track of the PPCR are:

1. To improve regional processes to acquire, store, analyse, access and disseminate climate relevant information
2. To pilot and scale up innovative climate resilient initiatives in the region.

The programme is working to realise these objectives through activities which are spread across four components being co-complemented by five regional institutions:

- the Climate Change Studies Group at UWI, Mona
- the Caribbean Institute for Meteorology and Hydrology
- the Caribbean Regional Fisheries Mechanisms
- the Caribbean Agricultural Research and Development Institute
- the Caribbean Public Health Agency

Data generated and information products developed under the regional track will be used at both national and regional levels to support planning and decision making.

The Climate Studies Group, headed by Professor Taylor, is the co-implementing partner for Component Three of the Regional Track - *Providing Regional and Country-level Climate Projection Models and High Resolution Maps*.

As a part of its efforts to improve climate information in the region, this component has acquired a high performance computing and storage system – the Scientific Platform for Applied Research and Knowledge Sharing (SPARKS). Led by the Climate Studies Group, SPARKS will provide regional and country level climate projections and high resolution maps for the Caribbean. Component three will improve the availability of downscaled climate projections for the region to support adaptation planning, decision making and sectoral modelling and projections.

SPARKS was officially launched on November 29, 2016 at the Regional Headquarters of the University of the West Indies, Mona. At the launch, Professor Taylor made a presentation which highlighted SPARKS' potential to be a game changer for regional climate modelling.

The other components of the Caribbean Regional Track of the PPCR are:

Component One which is working to improve access to high quality and up-to-date data to support climate change analysis related to sea-level rise, storm surge, flooding and ongoing adaptation planning;

Component Two which supports the strengthening and expansion of the Regional Climate Network and Global Platform Linkages through strengthening regional and national structures and mechanisms to deliver climate products and services; and Component Four which sees the programme supporting applied adaptation initiatives in the health, agricultural, marine and water sectors and in climate change mainstreaming in specific PPCR countries in the region. Activities in this component range from rainwater harvesting and measures to control the spread of mosquito borne diseases, to the development of climate resilient agricultural systems and crops and establishing early warning systems for the region's fisheries sector.

Bio

Professor Michael Taylor is the director of the Climate Studies Group, Mona (CSGM). In this capacity he coordinates research on the science of Caribbean climate variability and change. Prof. Taylor also serves as Deputy Dean of the Faculty of Science and Technology.





FACULTY OF
SOCIAL SCIENCES



Dr Lawrence Nicholson

Best Research Publication (Book)

Mona School of Business and Management

***Understanding the Caribbean Enterprise:
Insights from MSMEs and Family Owned Businesses***



Description of the research project

The research project is grounded in both the relevant theory on micro, small and medium enterprises (MSMEs) and family-owned businesses (FOBs), and the practical experiences of the Caribbean. MSMEs and FOBs account for up to 70% of private sector employment in the Caribbean. Therefore, it was both relevant and practical to gain insights from these two categories of businesses towards an understanding of the Caribbean enterprise. The book, *Understanding the Caribbean Enterprise: Insights from MSMEs and Family-owned Businesses*, provides context-specific lessons from a historical perspective of business and entrepreneurship, which, in turn, provide an understanding of the current issues facing MSMEs and FOBs in the Caribbean. Most of the context-specific lessons are informed by two main data sets: (1) data collected from Barbados, Jamaica and Trinidad and Tobago through questionnaires and focus groups; and (2) data from an Inter-American Development Bank (IDB)-funded survey on firm level information, covering countries in the Caribbean, including those in the English-speaking Caribbean.

The research is grounded in the Caribbean, but has a global reach, as the authors compare and contrast the experiences of MSMEs and FOBs with those in developed countries, focusing especially on areas such as family business succession, business financing and marketing. In particular, Chapter 1 sets the rationale for the book, and gives the broad picture of what is meant by MSMEs and FOBs. Chapter 2 provides the historical context that helps to inform the discussion of the Caribbean's approach to family business succession, given in Chapter 3; the financial reality and the challenges of financing the Caribbean enterprise in Chapter 4; and an exploration of the market orientation of the Caribbean enterprise in Chapter 5. Chapter 6, in addition to giving a summary of the critical issues covered in the book, teases the appetite of the reader, as it points to the need for a deeper exploration of FOBs and their linkages with entrepreneurship, religion, productivity and competitiveness.

Filling the research gap – relevance and context

It is widely accepted that family-owned businesses form the bedrock of many economies, including those in the Caribbean. However, developed countries have been the context and points of reference for most of the research found in the literature, with little attention given to the context and nuances of the Caribbean region. But researchers agree that context matters. This book is, therefore, an attempt to fill a substantial gap in the understanding of Caribbean enterprises, especially given the pivotal role of MSMEs and FOBs in the Caribbean economy. The body of research



is the first extensive, firm-level analysis of MSMEs and FOBs in the region. The following quote, attributed to a government minister from Barbados, and applicable across the Caribbean, captures the symbiotic relationship between MSMEs and FOBs, and their importance to the Caribbean economy:

“Big business” is no longer being seen as the main driver of the Barbadian economy, as more family-owned enterprises are emerging as the “main plank on which the modern economy hinges. (Blackman, Theresa. 2013. Family-owned businesses vital to economy. BGIS Media, May 29. http://gisbarbados.gov.bb/index.php?categoryid=9&p2_articleid=10690. Accessed 18 Nov 2015) The contents of the book is, therefore, both relevant and timely in addressing many of the critical issues facing MSMEs and FOBs in the Caribbean region.

Target and potential impact

Part of the motivation for the research that led to the writing of this book was to provide context-specific material on the Caribbean enterprise for students in Business Schools. Therefore, the main target audience is students of enterprise development -- at the undergraduate, graduate, or professional level, or further afield. However, the research journey involved persons from all sectors of the business landscape, therefore, it was important to expand the reach to include a variety of audiences concerned with the growth and development of Caribbean MSMEs and FOBs. Additionally, international agencies, regional bodies, and governments across the region that seek to support economic growth and development can draw insights from the reality of these businesses in their design of programmes and policies, while academia can draw, not only from the findings, but also on the noted gaps, as they seek to develop and pursue other research streams. The book also seeks to inform enterprise support professionals, such as accountants, management consultants, trainers, mentors, and finance providers, and engage enterprise owners to pursue best practices. It is anticipated that the contents of this book will help to inform private and public sector frameworks across the Caribbean region.



Bio

Lawrence A. Nicholson, PhD -- Lecturer, Mona School of Business & Management, UWI, Mona. Research focus include family-owned businesses, yield management and supply chain management.

Jonathan G. Lashley, PhD -- Fellow, Sir Arthur Lewis Institute of Social and Economic Studies, UWI, Cave Hill. Research focus: issues related to sustainable socio-economic development.



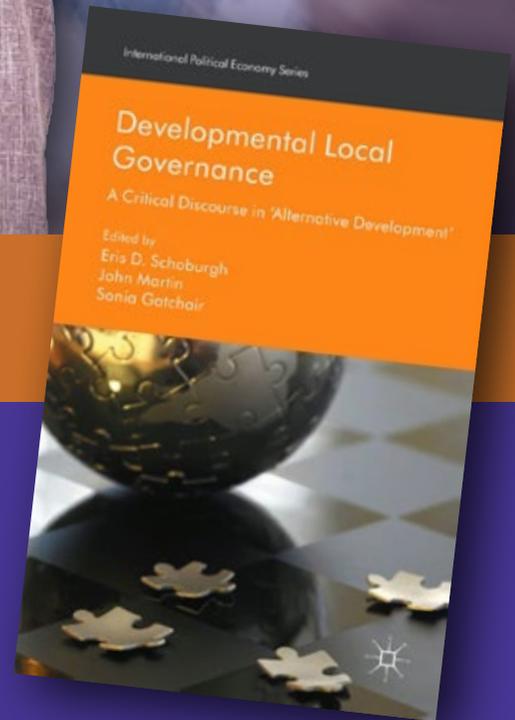


Dr Eris Schoburgh | Dr Sonia Gatchair

Best Research Publication (Edited Collection)

Department of Government

***Developmental Local Governance:
A Critical Discourse in 'Alternative Development'***



**About the book**

The book, *Developmental Local Governance: A Critical Discourse in 'Alternative Development'* is a timely contribution to the post-development debate. In particular, it brings into focus the question of 'alternatives' in which subnational political institutions and policy strategies are evaluated. Development is increasingly being associated with the local – local spaces, local institutions, and local people. The decentring of development strategies is driven, first, by the uneven impact of globalisation on countries and geographic areas within countries and, second, by an acknowledgement that the opportunities and risks that come with globalisation have different implications for territories as well as the groups that inhabit them. Further, there is an emerging consensus linked to the mantra, “think globally act locally” that sustainable development efforts must, of necessity, link institutions like local government with a local economic development strategy as a basis for enhancing economic prosperity, arresting growing unemployment levels, and improving standard of living and general welfare.

Considering these issues, this book, that is composed of a collection of essays from authors that are experienced researchers and policy practitioners in the field and who are from varied socio-economic and political contexts, sought to answer one principal research question: How might local government contribute to national economic development? From the perspectives presented in this book, it is obvious that the post development era demands a new epistemology. This is where the book makes its most innovative contribution in its introduction of the concept of developmental local governance that has seized the attention of scholars. The array of domestic policies aimed at the betterment of humanity requires, as well, new political and policy tools. In this regard, the analytic framework of the book – post development theory – offers useful conceptual tools, one of which is power transfer, as effective means towards social transformation. Thus, the book interprets the call for an 'end to development' as a call for a search for new possibilities that starts at the level of the people: A position that coincides with neo-institutionalist thought that makes a connection between the positive role of institutions and a country's quest for economic prosperity.

The book's cross-border focus is strategic, given the fact that failed development efforts of governments are not confined entirely to developing countries. The common agenda of states North and South of the equator is finding the most appropriate means for placing and keeping countries on a sustained economic growth path. The essays throughout the book are informed by three sub-questions:







Professor Evan Duggan | Mr Stanford Moore | Dr Delroy Chevers

Best Research Publication (Article)

Mona School of Business and Management



**“An evaluation of software development practices
among small firms in developing countries –
A Test of a simplified software process improvement model”**



Research objectives

Large software development organisations normally adopt well established process improvement (SPI) protocols (comprising processes and practices) to increase the likelihood of producing higher quality information systems (IS). However, smaller firms in this industry typically find these programmes too costly and cumbersome to adopt and usually don't - to their own competitive disadvantage. The major objective of this research undertaking, therefore, was to develop and validate a simplified SPI framework to assist smaller firms (in the English-speaking Caribbean) approximate the capability of their larger competitors. The literature also identifies the complementary influences of people and technology as pivotal determinants of the delivery of high-quality software systems. These constructs and their relationships are depicted in the research model (Figure 1) that the researchers developed to test the effectiveness of this concept.

Introduction

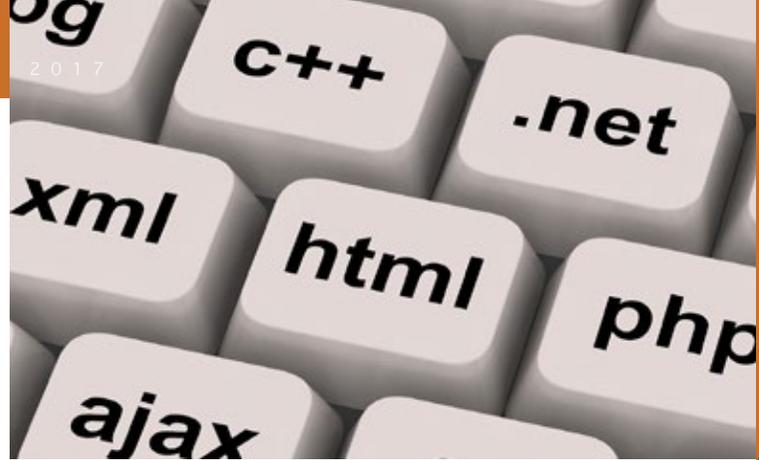
The scholarly community is unified in its agreement that one of the pivotal elements of the survival of both large

and small firms in the software development industry is their ability to deliver high-quality systems. One approach to achieving this goal is to employ existing software process improvement (SPI) initiatives that have demonstrated the capability to improve the quality and performance of the software product and, ultimately, customer satisfaction. Such an arrangement is particularly important to the survival of firms in this industry against the backdrop of successive annual CHAOS reports produced by the Standish Group International Inc., that have indicated extremely high failure rates of software development projects over the last two decades or so.

Both scholars and practitioners have agreed that SPI's have influenced effective software production outcomes. The gold standard of these (SPI) initiatives is the capability maturity model integration (CMMI), which was developed by the Software Engineering Institute of Carnegie Mellon University. CMMI recognises a capability maturity continuum along which firms engage in a set of practices that identify their proficiency in software development (in progressive stages of competence).

While larger organisations have benefitted from the implementation of such practices and processes, and have long adopted formal SPI arrangements to increase their capability to deliver high-quality software products, smaller firms in developing countries, typically find themselves in a catch-22 situation: They do not have the capacity to absorb software development failures and the associated impact on their competitiveness – and many have folded – but they find the learning curve for using sophisticated SPI techniques quite steep, the adoption cost prohibitive, and the implementation cumbersome.





Research method

In this research undertaking the team attempted to provide a solution to this problem for small software development firms in the English-speaking Caribbean that need improved software process management capabilities to approximate the potential quality outcomes of their larger and wealthier counterparts.

The researchers conducted this study in three stages:

- (1) They engaged knowledgeable software developers in the English-speaking Caribbean (in four focus group sessions involving 30 participants) to identify and rank critical SPI practices that must be retained in a simplified CMMI model (with a less complex and more manageable set of protocols) to ensure their revised version retained the validity of the more extensive one. The groups identified 10 practices indicated in Figure 1 below).
- (2) The researchers then developed a research model that combined the SPI practices identified in stage one, with the two other variables (Technology and People) that have long been identified in the literature as determinants of Software Quality (Figure 1).
- (3) Finally, they validated the model with data collected in a survey (administered online) targeting 360 organisations (31% response rate) in the four countries that were engaged for the focus group sessions.

Results and conclusion

The study accomplished the following key objectives: (1) The research model was validated and can now be offered to researchers for use with or without modification in other research efforts and software development domains. (2) The results offer practitioners a useful guide as to which SPI practices and processes should be employed and prioritised for improving the quality of their delivered software products that can assist them in closing the quality and competitive gaps between themselves and their larger and wealthier counterparts. The study also made an assessment of the current SPI practices in small firms in the Caribbean, and confirmed that most are operating at low levels on the CMMI continuum.

It bears repetition that too many software projects fail to deliver intended outcomes, often with less than the requisite quality – more so in small firms in developing countries. This study indicates that these firms can improve their software process quality and competitiveness in this industry, by focusing on fewer and a more manageable set of SPI practices, such as those suggested in this study.

Bio

Dr Delroy Chevers is a lecturer of Operations Management and Information Systems at the University of the West Indies. He holds a PhD in Information Systems from the University of the West Indies (2010). His research interests are Information Systems Quality and Success, IT Adoption and Project Management. He is currently conducting research on a simplified process assessment framework for developing countries and the adoption of software process improvement initiatives in the English-speaking Caribbean.

Professor Evan Duggan is now visiting Professor of Management Information Systems (MIS) at the Collat School of Business, University of Alabama at Birmingham. He is a former dean of the Faculty of Social Sciences, former Executive Director of the Mona School of Business and Professor of MIS at UWI, Mona. He obtained the PhD and MBA degrees from Georgia State University with concentrations in Decision Sciences and Computer Information Systems and the BSc from the University of the West Indies, Mona. His research interests include the management of information systems (IS) in corporations, with particular reference to IS success factors and quality and systems delivery methodologies. He has published extensively in refereed information systems (IS) and allied journals such as Information Technology & Management, Journal of End User Computing, Information Resources Management Journal, Human-Computer Interactions,

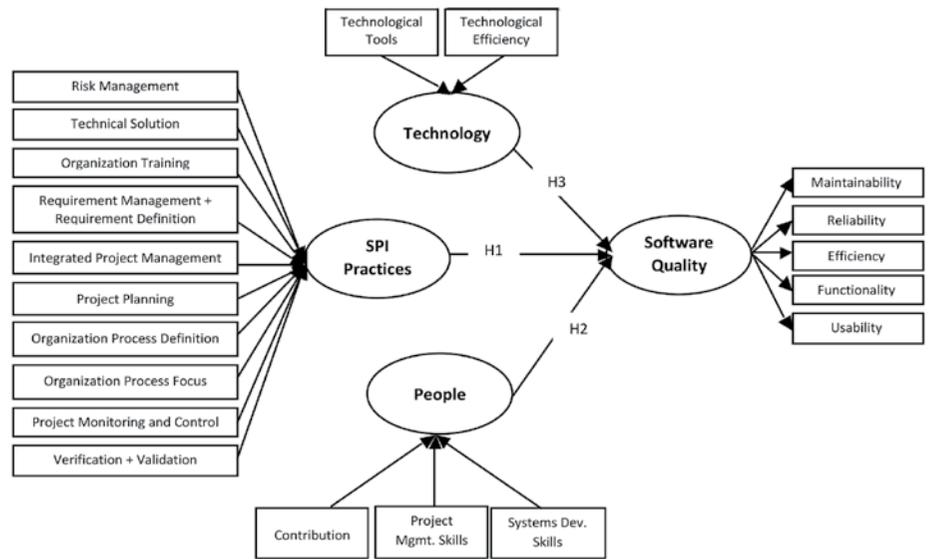


Figure 1. The Research Model (identifying the variables of interest)

Information & Management, and Communications of the Association of Information Systems, Electronic Journal of Information Systems in Developing Countries. Professor Duggan has also written papers for edited books, and major conference proceedings as well as other scholarly outlets. He was a section editor for the African Journal of Information Systems, Associate Editor for Communications of the Association for Information System, and he is on the

editorial boards of several international journals, scholarly publishing companies and book series.

Stanford Moore is Deputy Dean in the Faculty of Social Sciences at the University of the West Indies. He holds a BSc in Mechanical Engineering from the University of the West Indies, a Masters in Petroleum Engineering from Heriot Watt University and Masters in Manufacturing Management from Northwestern University. His research interests are Healthcare Informatics, Mixed Methods Research and Project Management.



Dr Trevor Smith

Best Research Publication (Article)

Mona School of Business and Management

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“Customer value proposition, corporate transformation and growth in Caribbean financial firms”



Background

In a competitive marketplace, delivery of a superior customer value is essential to the operations of financial firms. In this context, the firms must create the business experience that satisfies and often exceeds the customer's expectation. A firm delivers value through its value proposition. This is a promise offered by the firm that value will be delivered to the customer and supported by the customer's belief that this value will be received.

The corporate transformation of financial firms for delivering customer value is absolutely necessary when the firm seeks to grow regionally or internationally. This linkage between transforming value and growth is supported by the product life cycle (PLC) theory which suggests that at the stages of maturity and decline of the product/industry, the firms must transform (corporate transformation) for delivering value to the customer through its customer value proposition; thus extending the life of the product/industry for generating further growth. Indeed, the transforming of customer value for generating growth is in no way peculiar to Caribbean firms. However, with the paucity of scholarly work on customer value

models for driving growth, particularly within Caribbean context (small island states with weak economies, vulnerability to natural disaster and external economic shocks, high and rising public debt), research is required for assisting Caribbean financial institutions to better understand the superior customer value proposition that is necessary for growing businesses across borders. After all, financial institutions cannot continue to operate only in their domestic markets if they are to grow and remain sustainable.

Thus, the objective of this study is to establish what customer value propositions are influenced by corporate transformation and simultaneously drive regional expansion and growth of Caribbean-based financial firms.

Method

The study utilizes a cross-sectional design. Telephone surveys were used to collect data from 80 financial firms and 243 customers across 10 Caribbean countries with SPSS version 21 employed for descriptive analysis. Structural equations modelling with SmartPLS 3 was then utilized for inferential analyses. See Figure 1 for research model.

Results

Six value-added dimensions (customer orientation, consumer confidence, quality, flexibility, branding, and firm capability) along with price were identified as the superior customer value proposition of financial firms. Further, corporate transformation of financial firms had a significant influence on customer orientation, consumer



confidence, quality, flexibility, branding and firm capability while lowering of prices (such as interest rates, fees and charges), consumer confidence and branding were key drivers of regional expansion and growth.

Discussion and Implications

Consistent with the implications of the PLC, the study found strong support for linking corporate transformation, value dimensions and growth. These seven value dimensions should be incorporated in the business model for transformation and growth of these firms. Business modelling on customer value proposition should also take into consideration the various stages of the product (industry) life cycle. Some elements of the customer value proposition may be more applicable at one stage of the life cycle than the others and consequently it becomes a management decision on the elements to accentuate. A guideline for this decision follows:

1. Products at the introductory stage of the life cycle should include branding, at a minimum, in its customer value proposition, with emphasis placed on brand awareness and educating consumers about the brand.
2. Products at the growth stage of the life cycle need to sustain customer appeal through consumer confidence. To further capitalize on sales and profitable growth, flexibility through channels of distribution and diversification of options could also be highlighted.
3. Products at the mature stage of the life cycle should highlight reduced prices, particularly if the competition is fierce and should focus on market share by further differentiating on those elements of value where the firm has a competitive advantage. At a minimum attractive prices, brand appeal and consumer confidence should be highlighted.
4. Product at the declining stage of the life cycle could focus on price (reduced or maintained) dependent on the critical mass of loyal customers and possibilities of new markets. The options of rejuvenating versus dropping the product should also be assessed. Importantly, if the decision is to rejuvenate, the firm may want to differentiate on those value propositional elements within its sphere of influence; and doing so at reduced costs.

Conclusion

The gap in the literature on the sought-after link between transformation, customer value and firm growth within the exigencies of Caribbean reality was filled by this study. Importantly, this reflects an extension to the literature through development of a



customer value proposition model that was primarily built on Levitt's (1965) product life cycle conceptualization and augmented by Porter's generic strategies of price versus value-added differentiation. Implications for practice are also well documented in this study vis-à-vis transforming financial products at varying stages of their life cycle for value delivery and growth.

Bio

Dr Trevor Smith is a senior lecturer in Marketing and Research Methods at Mona School of Business and Management, University of the West Indies. His research interest is in marketing, with emphasis on customer knowledge management. He has published in a number of rated international journals and is considered an accomplished methodologist with structural equations modelling. Dr Smith is also a consultant in the areas of marketing, marketing research and strategy.



Corporate Transformation

Elements of Customer Value Proposition	
Customer Orientation	<ul style="list-style-type: none">• Customer Intimacy• Sympathy• Friendship• Customer Orientation• Customer – Employee Relationship
Consumer Confidence	<ul style="list-style-type: none">• Trust• Confidence• Comfort level for doing business• Safety• Openness• Honesty
Price	<ul style="list-style-type: none">• Price, Fees and Charges• Rewards
Quality	<ul style="list-style-type: none">• Product Quality• Service Quality• Product Leadership• Operational Excellence
Flexibility	<ul style="list-style-type: none">• Convenience• Customization• Diversification of Opportunities• Distribution Channels (options to conduct business)
Branding	<ul style="list-style-type: none">• Brand• Image• Exclusivity (special)
Firm Capability	<ul style="list-style-type: none">• How-to (getting things done)• Competence• Educated/Intellectual Staff

Regional Expansion & Growth

Figure 1:
Research Model



Dr Clinton Hutton

Most Outstanding Researcher/Research Activity

Department of Government

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**The creative, philosophical and cultural DNA of Post-slavery:
Critical tools for decolonisation and
development in the 21st century**



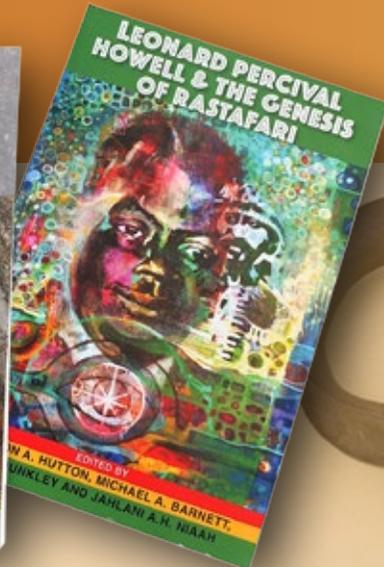
Clinton Hutton's *Colour for Colour Skin for Skin: Marching with the Ancestral Spirits into War Oh at Morant Bay* (259 pages) (Ian Randle Publishers, 2015), is a post-emancipation study focussing on the first thirty years after the abolition of slavery in Jamaica. The study focuses on the social, cultural/spiritual, philosophical, political and economic bases of the movement of formerly enslaved Africans and their descendants, led by Paul Bogle which clashed with the former plantocratic slaveholding-elites, and their militia on October 11, 1865, in Morant Bay, St. Thomas- in-the-East, Jamaica, over the definition and tenor of Jamaican society, post-slavery.

This clash publicly marked the beginning of the long march for freedom (nay, giving freedom flesh), justice, sovereignty and identity which culminated in independence in 1962. No other group of persons in Jamaica or in all of the British Caribbean, has paid so dearly, or sacrificed so much, for our independence as the people of St. Thomas-in-the-East and their descendants. This study unearths, discusses and applies the inner logic of the world view, culture and praxis of the people of St. Thomas-in-the-East/Jamaica in recreating their world after slavery.

In advancing the slogan 'Liberty of person liberty of land', the black people of St. Thomas-in-the-East and Jamaica generally, were indicating that emancipation never broke the chains of the poverty of enslavement but preserved them in post-slavery; thus, a strategic goal of post-slavery, was the equalisation of the liberty of person with the liberty of the means of livelihood (especially land). The philosophical model for explaining and measuring the extent of freedom and justice was developed in the early period of post-slavery and continues in post-colonial society especially in Jamaican popular music of the 1960s and 1970s. In this model, freedom and justice are explained and measured by the extent to which the culture, mentality and philosophy of slavery exist in post-slavery and post-colonial society.

This multi-disciplinary study has broken new ground on the Morant Bay uprising and early post-slavery society in Jamaica. Of special importance in this respect is chapter 8, 'Baccra Can't Catch Duppy, No, No': Marching into War Oh with the Spirits at Morant Bay.' This anchor chapter examines the cosmological roots of freedom, justice, sovereignty and identity and the creative ethos which framed the conceptual and agential complex of the world of the living and the world of the ancestors mutually composed into the evolving culture of the African-Jamaican folk.

Clinton Hutton, Michael Barnett, D.A. Dunkley and Jahlani Niaah, eds. *Leonard Percival Howell & the Genesis of Rastafari* (274 pages) (The University of the West Indies Press, 2015), is the first comprehensive book about Leonard Howell and the



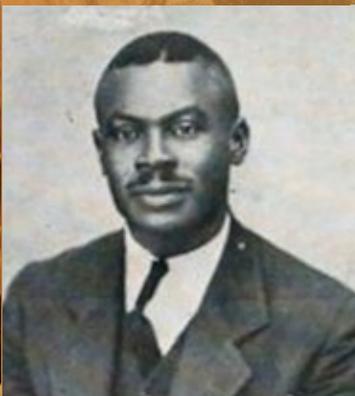
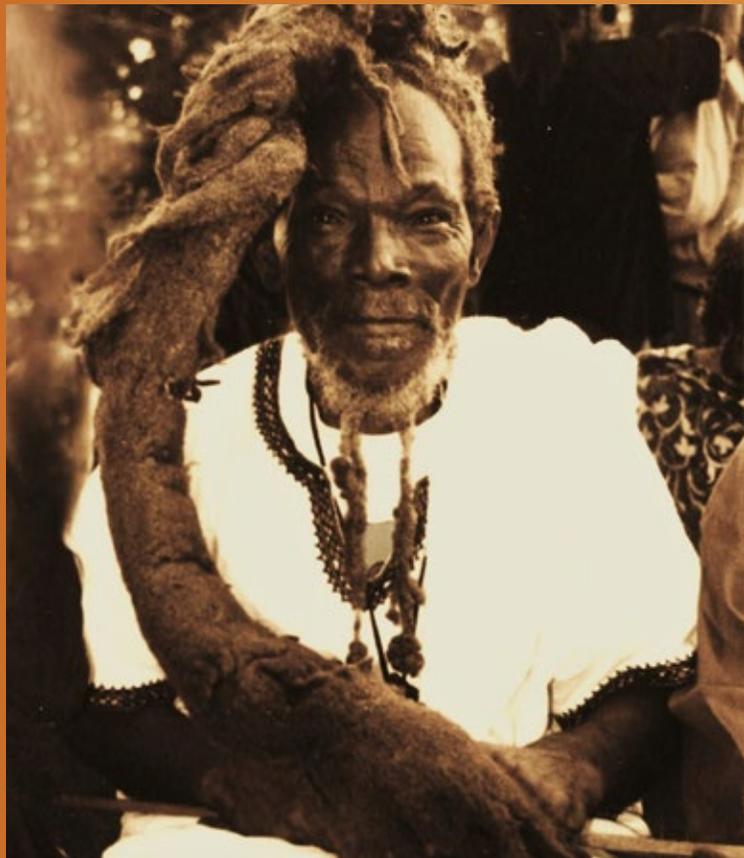
beginnings of Rastafari. It is a multi-disciplinary study with contributions from Petrine Archer, Michael Barnett, Allan Bernard, Christopher Charles, Edward Dixon, D.A. Dunkley, Clinton Hutton, I-Nation (Kirk Scarlett), K'adamawe K'nife, Miguel Lorne, Louis Moyston, Jahlani Niaah and James Robertson.

Among the topics discussed are: Interrogating Leonard Howell as the "First Rasta"; "That Vagabond George Stewart of England": Leonard Howell's Seditious Sermons, 1933-1941; Reorienting Rasta: Tracing Rastafari's Visual Roots; Social Entrepreneurship and Rastafari "Livivity": Pinnacle as a Successful Social Enterprise. The lead essay in this volume is Clinton Hutton – Leonard Howell Announcing God: The Conditions That Gave Birth to Rastafari in Jamaica (pp 9-52). It links Leonard Howell and the birth of Rastafari to a process similar to the spiritual upsurge that led the birth of Zion and Poko Revival in the early 1860s and the development of the condition which led to the Morant Bay uprising in 1865. The cosmological/spiritual DNA and the creative process identified with the creation and development of the social political movement in early post-slavery, were traceable to the emergence of the Rastafari movement in the later post-slavery period in the late 1920s and early 1930s. Here, a Zion/Poko Revival and Kumina upsurge framed in Garveyite consciousness and the coronation of Ethiopian Regent, Ras Tafari, as Haile Selassie 1st, gave birth to Rastafari. And it was St. Thomas the birthplace of Rastafari that the 1938 labour uprising in Jamaica began.

Bio

Dr Clinton Hutton lectures in Political Philosophy and Culture in the Department of Government, UWI, Mona. He is author of two books; *Colour for Colour Skin for Skin: Marching with the Ancestral Spirits into War Oh at Morant Bay* and *The Logic & Historical Significance of the Haitian Revolution & the Cosmological Roots Haitian Freedom* and lead author and editor of another; *Leonard Percival Howell and the Genesis of Rastafari*. Hutton has also published 17 book chapters and 18 journal articles and scores of works of an artistic nature. His forthcoming book (edited with Jermaine McCalpin and Maziki Thame), *Rupert Lewis and the Black Radical Intellectual Tradition*, is due out this year.







Ms Shinique Walters | Dr Lloyd Waller | Ms Nicola Satchell | Mr Stephen Johnson

Research Project Attracting the Most Research Funds

Department of Government

**Jamaica Social Investment Fund Poverty Reduction Programme –
baseline study of desk research and analysis**

**Scope**

The overarching goal of the consultancy was to produce baseline data to inform an ex post evaluation of the Poverty Reduction Programme III (PRP III). The data will be used as a basis to measure the PRP's progress towards achieving the project's objectives of empowering citizens of beneficiary communities to achieve their fullest potential and contribute to the attainment of a secure, cohesive, and just Jamaican society as outlined in Goals 1 and 2 of Vision 2030.

Method

A desk study was used to review, sort, classify, and analyse secondary data sources. It involved the use of documents such as background documents, situational analysis, past reports and studies done on the relevant communities, crime statistics, and surveys of living conditions, censuses, labour force surveys, and SDC community profiles.

Secondary data was collected for the period 2009-2011. Of the 40 communities, community profiles were generated for Adelphi, Campbell Town, Central Village, Penwood, East Downtown, Spanish Town Central, and Lilliput. Arnett

Gardens was treated as a part of Fletchers Land and Campbell Town as a district of Allman Town. Cross, York Town, Barnett Town, Flanker, Granville, Lilliput, Norwood, Retirement, and Tucker.

Findings

From the data gathered it was observed: that the predominant family structure is the single-headed household or the extended family. The extended family was more likely to be found in peri-urban areas. The population density for the communities under study was all above the national average of 3.04. The average income per household was between JAD \$6,000 - \$20,000 per month. The primary construction material utilised was concrete, and in some cases, a mixture of wood and concrete; wood was the next dominant material used. The habitable room per person was less than one for (Central Village, Flanker, Granville, Tucker, Trench Town, Retirement, Tivoli Gardens, Campbell Town, Waterhouse, York Town, Arnett Gardens, Whitfield Town, Allman Town (Proper), Fletchers Land, Rose Town, Hannah Town/Craig Town, Central Downtown, East Downtown, Denham Town, and Jones Town) most of the population, indicating that many of the houses are densely populated.

A significant disparity between land ownership and home ownership was observed in four communities: Retirement (94.4% owned house, 52.8% were on "captured lands"); Granville, (73.4% owned house and 77% did not own land); Greenwich/Newport West (53.8% owned the house, 28.6% owned that land) and Lionel Town (60.7% owned house and 3.6% owned land). Households were generally concerned about the state

of the parochial roads or minor roads within the community. For all communities, there were areas in need of better drainage and sewerage systems; and arterial roads needed repair. Households in Jones Town (67%) Rae Town (49.1%), Delacree Pen (48.9%), York Town (46%), Denham Town (50%), Waterhouse (54%), and Greenwich Town (56%) had water piped to their yards. Water shortages were a concern. Households have electricity; the prevalence of electricity within the communities is represented by approximately 90% of households. The concern raised by the Jamaica Public Service Company is that much of this access in the inner city and unstructured communities is unsafe and illegal. The most prevalent toilet facility utilised by all of the communities under study was the water closet linked to sewer. Concerns highlighted in Bog Walk and Lionel Town were that 43% and 42% respectively of households were using pit latrines. In Granville (24%), Retirement (24.2%) and Old Harbour (35.2%) relatively high numbers of household were using pit latrines.

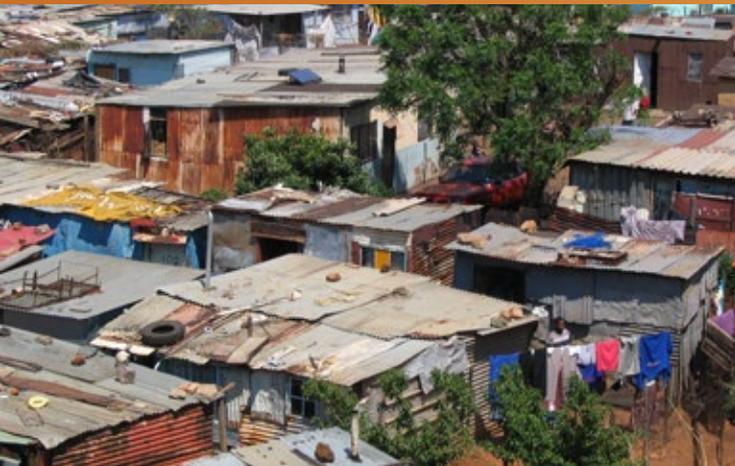
The communities' infrastructural assets were inclusive of: churches, health centres, community centres, schools, commercial centres, farms, restaurants, police stations. Communities in Kingston, St Andrew and Clarendon tend to have more community assets. For persons in the Kingston Metropolitan Region and Montego Bay, the Jamaica Urban Transit Company is readily accessible. For some communities, this has to be used along with unlicensed route taxis as the communities are not located along the main bus routes. Those in peri-urban and rural areas used unlicensed and licensed taxis for their transportation, while a very small number had access to a motor vehicle. The primary source of fuel for residents of these communities was liquid petroleum gas. Households in Retirement, Greenwich Town/New Port, Lionel Town, Tivoli Gardens and Fletchers Land were using charcoal. More than half the communities' residents have access to telephones services. In addition, the use of mobile phones is prevalent among residents. On the other hand, only a small percentage of the communities had access to the Internet; this was as low as 2% in some areas.

Poverty levels in the communities where data is available were generally above the national average of 16.9% (ESSJ, 2009). Levels in Flanker, Tivoli Gardens and Campbell Town (see Appendix 4, page 229) are below the national average. At the primary school level, the communities had a standard enrolment of between 30% and 40%, with more females enrolled than males. The national average was 36.8%. The presence of gangs in their communities and gang warfare, overgrown lots, and poor street lighting were seen as the main threats to public safety. Residents also were not readily using the criminal justice system



Conclusion

There needs to be a harmonisation process to clarify community boundaries amongst the major agencies: the Planning Institute of Jamaica, the Social Development Commission, the Statistical Institute of Jamaica, and the Ministry of National Security. For the SDC profiles, there seems to be no established convention for analysing and reporting the data. Some information also seem inconsistent with the Jamaica Population and Housing Census and the Survey of Living Conditions. Greater effort must be made to have gender issues highlighted in the community profiles. The goals of the PRP III are aligned with that of Vision 2030 and more specifically the Community Renewal Programme (CRP), which facilitates the development of community infrastructure, improves opportunity structures and life chances, and creates an environment of good governance. A harmonisation process is essential among government agencies to ensure that communities are properly defined without ambiguity. Geographical information system (GIS) could be used to aid this process.



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