

***WINDWARD  
ISLANDS  
RESEARCH  
& EDUCATION  
FOUNDATION***



***25<sup>th</sup>***

***Anniversary***

***2019 Annual Report***



### **Mission Statement**

WINDREF seeks to advance health and sustainable environmental development through multi-disciplinary research and education programs. WINDREF strives for program excellence by promoting collaborative relationships between internationally recognized scholars and regional scientists, and by adhering to the highest ethical and academic standards in the design and conduct of research.

### **Goals**

- To provide a scientific resource centre capable of coordinating international collaborative research of the highest caliber in the areas of medicine, medical and veterinary public health, environmental health, anthropology, sociology, ecology, marine and terrestrial biology, and ethics.
- To provide a first rate academic opportunity to scientists from the Caribbean and around the world through unique research opportunities that enhances the knowledge and welfare of local and international communities.
- To conduct applied scientific research for the benefit of community and health development at the local, national and international levels.
- To share relevant scientific information with local and international communities in the pursuit of evidence-based policies.

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## Director's Report on WINDREF Activities in 2019

2019 witnessed our 25<sup>th</sup> year of implementing research and educational programs providing a milestone to not only reflect on the accomplishments achieved during the year, but also on the outcomes recorded during the first quarter of a century of activity. In this report, there will be a review of all the influential speakers who have contributed to our lecture series, a complete list of the recipients of the Mike Fisher Memorial Award, and an acknowledgement to all the donors that we are grateful to for their contributions over the last 25 years.

WINDREF has had the great fortune to have had the leadership of 3 presidents, Keith B. Taylor, Lord Soulsby, and Baroness Howells. We have also been well served by the members of the WINDREF Board of Trustees (UK) and WINDREF Board of Directors (USA and Grenada), the Scientific Advisory Board, more than 20 Senior Research Fellows, 30 Research Fellows, and over 100 Research Scientists, who have all contributed to the evolution of the Foundation. It is gratifying to know that many of the programs have run continuously for more than a decade, and have been sustained through the dedication of the PI's and their teams. The outcomes of these programs have been published in over 1,000 publications in international peer reviewed journals, and the work has been presented at more than 450 international conferences. During the last 25 years, the Foundation has raised more than 10 million US dollars in external funding, and we thank all of these donors who have contributed to our programs. Hosting the United Nations Framework Convention on Climate Change

(UNFCCC) Regional Collaborating Center (RCC) and the Global Water Partnership (GWP), has greatly enhanced the original mission of the Foundation. Over the years, significant contributions have been made in partnership with many collaborating institutions and organizations in the fields of Bioethics, Conservation and the Environment and the epidemiology and public health significance of infectious diseases, non-communicable diseases, and examined cost effective practical ways to mitigate the impact of these maladies. The excellence of the programs has fostered the development and enhanced the careers of many Research Scientists and Fellows who now work in their home countries around the world where a number have gone on to have incredibly successful careers.

## WINDREF Activities in 2019

2019 witnessed a year whereby the large number of grants that were obtained in 2017 and 2018 were continued and importantly, the work conducted during the year has laid the foundation for the further growth and development of our existing programs. The financial growth of WINDREF over the last few years resulted in the need for the appointment of a full-time accountant and Mrs. Nakita Francis was appointed. Nakita reports to WINDREF's Program Manager, Mr. Hayden Redhead, and plays an essential role in the accounts, drafting reports to donors and providing the accounts for review by WINDREF's auditors.



Mrs. Nakita Francis

New grants were obtained through a philanthropic gift to Dr. Desiree LaBeaud at Stanford University, which supported the additional years of follow-up of the effects of the Zika virus on child development, with Ms. Roberta Evans serving as the Project Manager. This grant also supports a new innovative project to look at an experiential citizen science teaching module entitled “Our Voice” into a country-wide Grenadian primary school intervention, in order to test the multi-level impacts of engaging youth as agents of change. This project is also expected to increase the knowledge and healthy behaviours among students and, by extension, the community as it relates to the reduction of mosquito borne diseases and feco-orally transmitted protozoan diseases. Mr. Jeffon Telesford serves as the Project Manager for this project, and is ably supported by Mr. Victor Ashby Jr.



Mr. Victor Ashby Jr.

The National Institutes of Health-Fogarty International Center renewed the grant for the Caribbean Research Ethics Education Initiative (CREEi) program for an additional 5 years, and this program will now run through 2024 with Dr. Cheryl Cox Macpherson serving as the PI. During this time, the grant will support trainees from Low and Middle Income Countries (LMIC’s) in completing a masters degree in bioethics with a specialization in research ethics. This will be a bilingual program (Spanish and English) and is in partnership with The Unidad de Bioética in Mexico, Clarkson University in the USA, WINDREF, and the Division of Bioethics at SGU.

The Baroness Howells Sports for Health Program continued in 2019. A project focusing on the physical, social and mental well-being of the ageing population in Grenada, and the impacts exercise on this population was completed in 2019. WINDREF congratulates Mr. Anderson Peters, who won Grenada’s 2<sup>nd</sup> Gold Medal at the World Championships in Doha, Qatar in the Javelin event. He, and his Coach, Paul Phillip, visited WINDREF in December to hold discussions on how he may participate in the Sports for Health Program. He is currently training for the 2020 Olympic Games in Tokyo.



Ms. Roberta Evans



Mr. Jeffon Telesford



Anderson Peters and Paul Phillip visit to WINDREF on Friday, December 20th, 2019 to discuss the Baroness Howells' Sports for Health Program.



Dr. Tracy Pennylight



Mr. Matthew Carswell

A Center for Research on Storytelling in Education (CRSE) was formed during 2019. Its aim will focus on investigating and understanding how creating, sharing, listening to, and analyzing stories can help educators and educational leaders improve their practice. The CRSE will look for funding to facilitate its activities going forward.

Funding from Janssens for the Dengue Project ended in 2019, and the SUNY Institute for Global Health and Translational Science provided generous additional funding to continue the Dengue project through October 2020 with Ms. Nikita Cudjoe serving as the Project Manager, with Mrs. Sherice Phillip, Nurse and Mrs. Elsa Chitan, Lab Technician.



Dr. Laura Colket



Ms. Nikita Cudjoe



Mrs. Sherice Phillip



Mrs. Elsa Chitan

Mrs. Stephanie Holmes continued as the Project Manager for the Saving Brains Project.



Mrs. Stephanie Holmes

Dr. Joy St. John, MD/MPH, became the 2nd Executive Director of the Caribbean Public Health Agency (CARPHA) on July 1st, 2019. Prior to joining CARPHA, Dr. St. John held the post of Assistant Director-General at the World Health Organization (WHO), with direct

responsibility for Climate and other Determinants of Health. She was also the first Caribbean person to Chair the Executive Board of WHO from 2012 – 2013. Over a period spanning more than ten years, Dr. St. John served as Chief Medical Officer at the Ministry of Health and Wellness in her home country of Barbados. During her visit to Grenada she accepted our invitation to serve on the WINDREF Scientific Advisory Board, and we are delighted to have someone with her regional and global experience serve on the Board.



Dr. Joy St. John

Drs. Macpherson and Noël were invited to be members of the Grenada Delegation to attend both the 72nd World Health Assembly (WHA) Meeting in Geneva in May, and the 57th Directing Council of the Pan American Health Organization (PAHO) Meeting held in Washington DC in September/October 2019. At the 72nd WHA meeting Argentina, Guyana and Grenada were elected to the Executive Board of the World Health Assembly.

The 57th PAHO meeting approved seven new regional initiatives, including a joint initiative to eliminate more than 30 diseases and conditions from the hemisphere by 2030 and a strategy to improve the quality of health care as part of PAHO member countries' efforts to achieve "universal health."





Grenada Delegation to the 57th Annual Directing Council of PAHO. Hon. Nickolas Steele, Minister of Health, Dr. George Mitchell, Chief Medical Officer, Dr. Calum Macpherson and Dr. Trevor Noël. The delegation is standing in front of a poster commemorating the 25th Anniversary of the elimination of Polio from the Western Hemisphere.



Members of the WINDREF Team in front of the WINDREF Building, November 2019.



Dr Cal Macpherson, Dr Tedros Adhanom Ghebreyesus, Director-General, World Health Organization (WHO), Hon. Nickolas Steele, MP, Minister of Health, Grenada, Dr. Trevor Noël.

On behalf of the members of the Grenada, United Kingdom, and United States Boards of Trustees and Directors, I would like to thank our members, partners and donors for making 2019 a very productive year closing out our first quarter of a century of research and education activities. We thank all of our donors for supporting the work of WINDREF over the past 25 years, and look forward to the start of a new phase of the Foundation’s work in the 2020 decade.

**Calum N.L. Macpherson**  
Director, WINDREF

**WINDREF Organization**

**Board of Directors**

- Baroness Howells of St. David’s, OBE (President)
- Calum N. L. Macpherson, PhD, DIC, FRSPH (Vice President & Director)
- Trevor P. Noel, MPH, PhD, FRSPH (Deputy

- Director)
- Margaret Lambert, MA, (Secretary Treasurer)
- Mary Jeanne Kreek, MD, PharmD (Hon), PhD (Hon)
- Karen Lawson, PhD
- Ellen Ratner, MEd, LLD
- Joseph Feldman, MD
- Esperance Schaefer, MD, MPH
- Kirani James, BSc
- George McGuire, MSc

#### **Board of Trustees (United Kingdom)**

- Baroness Howells of St. David, OBE
- Sir Kenneth Calman, KCB, FRCSE
- Lord Stevens of Kirkwhelpington, KStJ, QPM, DL, FRSA,
- Lord Trees of The Ross, DVM, PhD
- Neil Poulter, MD
- Patrick Orr
- Margaret Lambert, MA (Ex Officio)
- Calum Macpherson, PhD, DIC, FRSPH (Ex Officio)

#### **Scientific Advisory Board**

- Sir Frederick Ballantyne, MD
- John R. David, MD
- Malcolm A. Ferguson-Smith, MBChB, FRCP, FRCPath
- Edmond Fischer, DSc
- Calum Macpherson, PhD, DIC
- Anselm Hennis, MBBS, PhD, FRCP, FACP
- Mary Jeanne Kreek, MD, PharmD (Hon), PhD (Hon)
- Ian McConnell, BVMS, FRSE, F. Med. Sci.
- Hugh Montgomery, MD
- Baron Peter Piot, MD, PhD, CMG, FRCP
- Neil Poulter, MD, PhD
- Melinda S. Sothorn, PhD, CEP
- Richard Scribner, MD, MPH
- Lord Trees of The Ross, DVM, PhD
- Joy St. John, BSc, MBBS, MPH
- Thomas Meade, CBE, DM, FRCP, FRS

- Graham Serjeant, MD, FRCP, CMG
- M.S Swaminathan, MBBS
- John Ferguson, MBChB, FRCGP

#### **Administration—Grenada**

- Dr. Randall Waechter, Grants Coordinator
- Mr. Kareem Coomansingh, Assistant Grants Coordinator
- Ms. Isha English, Assistant Administrator
- Mrs. Naomi Whyte, Executive Secretary
- Mrs. Yvette Simon, Secretary
- Ms. Celia Clyne Edwards, Legal Support
- Mr. Hayden Redhead, Program Manager
- Mrs. Ramona Otway, Accountant
- Mr. Michael Cahill, Legal Support, USA
- Mrs. Nakita Francis, Grants and Finance Officer
- Ms. Nikita Cudjoe, Dengue Project Manager
- Ms. Roberta Evans, Zika and Neurodevelopment Project Manager
- Mrs. Stephanie Holmes, Saving Brains Project Manager
- Mrs. Elsa Chitan, Lab Technician
- Mrs. Sherice Phillip, Project Nurse
- Ms. Calisha Daniel, Life Seasons Project

#### **Administration—United States**

WINDREF (USA) was established as a 501(c)3 non-profit organization to facilitate coordination of the USA activities and to administer charitable donations from the United States and worldwide. Its goal is to enhance the development of WINDREF's research and educational programs. The offices are located in Great River, New York. Ms. Stephanie Stafford provides administrative and logistical support, and Mr. Michael Cahill provides legal support.

#### **Administration—United Kingdom**

WINDREF (UK) was set-up as a charitable trust in Winchester, England in 1999 to promote collaboration between WINDREF scientists

and academic centers of research in the United Kingdom and the European community. A Board of Trustees was appointed in 1999 to oversee the activities of WINDREF (UK). The office is located in London. Mr. Patrick Orr serves as the WINDREF (UK) accountant, along with Mr. Stan Lee serves as the treasurer, provide oversight of the financial operation and charitable status of WINDREF (UK).

### Senior Research Fellows

- Hugh W. Ferguson, BVM&S, PhD, Dipl. ACVP, MRCVS, FRCP
- Paul Fields, PhD
- Paul Garner, MBBS, MD
- Mary Glenn, PhD
- Duane Gubler, ScD
- Stephen Morse, PhD
- Leslie Ramsamy, PhD, DSc (Hon)
- Douglas Slater, MD, MPH
- Stanley Weiss, MD
- Melinda Southern, PhD
- Richard Schribner, MD, PhD
- Cheryl Cox-Macpherson, PhD
- Marios Loukas, MD, PhD
- A. Desiree LaBeaud, MD, MSc
- Hugh Sealy, PhD, P. Eng
- Timothy Endy, MD, MPH
- Roger Radix, MD, MPH, MIB, FRSPH
- Jonathan Ashcroft, MD, MSc
- Anselm Hennis, MBBS, PhD, FRCP, FACP
- Neil Poulter, MD, PhD

### Research Fellows

- John Adamski, MD, MSc, MPH
- Muge Akpınar-Elci, MD, MPH
- Glennis Andall, PhD
- Charles Avgeris, MD, MSc
- Satesh Bidaisee, DVM, MSPH, MSB, FRSPH, EdD
- Grant Burgess, PhD
- Reccia Charles, PhD
- Sonia Chehil, MD, FRCPC

- Andrea Easter-Pilcher, PhD
- Martin Forde, ScD
- Mark Gibson, MA
- Orazio Giliberti, MD
- Richard Kabuusu, DVM, MPH
- Victoria Kimotho, MPH
- Svetlana Kotelnikova, PhD
- Barbara Landon, PsyD
- Clare Morrall, PhD
- Shamdeo Persaud, MD, MPH
- Christine Richards, PhD, MPH
- Bonnie Rusk, MSc
- Karen Schioler, PhD
- Shanti Singh, MD, MPH
- Kamilah Thomas-Purcell, PhD, MPH
- Randall Waechter, BBA, PhD
- Trevor Noel, PhD, MPH
- Laura Colket, PhD
- Tracy Penny-Light, PhD
- Carlene Radix, MD, MPH
- Vishaka Vasuki, BVSc, MSc
- Dirk Burkhardt, MD, MSc, PhD
- Michelle Fernandes, MRCPCH, DPhil
- Samina Rutrecht, PhD
- Mathias Lorenz, PhD
- Craig McCarty, PhD
- Karen Blackmon, PhD

### Research Scientists

Sadiq Al-Tamini, Sumita Asthana, Yitzhack Asulin, Bishara Baddour, Jean-Pierre Barakat, Matthew Beeson, Matthew Boles, William Brown, Ella Cameron, Nicholas Caputo, Rae Connolly, Abraham El-Sedfy, Daniel Firer, Kristy Fisher, Scott Forman, Brandon Francis, Vamsi Guntur, François Hallé, Anthony Junck, Megan Kaminskyj, Sebastian Kreitzschitz, Erik Lacy, Ede Tyrell, Richard Lehman, Jason Lowther, Setshidi Makwinja, Paul Mancuso, Baher Maximos, John McCormack, David Melamed, Kirk Minkus, Jerry Mitchell, Jessica Morlok, Kevin Neill, Bayela Nfila, Yolanda

Ng, Michael Nillas, Andre Panagos, Barry Politi, Sandeep Pulim, Sean Ramsammy, Justin Rebo, Laura Robinson, Corey Schwartz, Sarah Scott, Christopher Skaff, Nadia Solomon, David Steinberg, Derrick Tlhoiwe, Sarah Treter, Nghia Truong, James Tsai, Dan Twyan, Frank Van Natta, Ru-Amir Walker, Juliette Williams, David Winokur, Colleen Wunderlich, Elliot Yung, Regan Schwartz, Katherine Brigman, Mmakgomo Coangae, Felicity Lillingston, Keith Bensen, Sadik Uddin, Rakesh Patel, Mathew Browne, Jessica Clayton, John Hollerman, Alan Rhoades, Nikita Cudjoe, Karen Brennan, Stephanie Holmes, Roberta Evans, Victor Ashby, Jeffon Telesford, Karla Farmer, Molly Ziegler, Christopher Gibson, Shanice McKain, Steve Nimrod.

## WINDREF Lectures

### Research Lecture Series:

- 1994: Stephen Morse- "Emerging and Re-emerging Viruses"
- 1995: Stanley Weiss- "The HIV Pandemic"
- 1996: Duane Gubler- "Dengue: A global problem of increasing importance"
- 1997: Graham Sergeant- "Sickle Cell Disease"
- 1997: David C Clyde- "Health and Disease in Grenada: A historical perspective"
- 1998: Leslie Ramsammy- "Tackling our Agricultural and Medical Problems through One Health One Medicine Approach"
- 1998: Robert Redfield- "The Epidemiology of HIV/Aids"
- 1999: MS Swaminathan- "The Green Revolution"

### WINDREF Lecture Series:

- 2000: Sir Kenneth Stuart, MD, DSc (Hon)- "Caribbean Health Research Needs"
- 2001: Professor Adedokumbo Lucas, MD,

DPH, DSc (Hon)- "International Collaboration for Health Research"

- 2002: Lord Walton of Detchant, MBBS, MD, DSc, MA (Oxon), FRCP- "A Doctor in the House"
- 2003: Professor David Molyneux, MA, PhD, DSc, FIBiol- "Success and Failure in Parasitic Disease Control: Lessons Learnt?"
- 2004: Lord Soulsby of Swaffham of Prior, MRCVS, DVSM, MA, C.Biol., F.I. Biol., DSc (Hon)- "Zoonoses, Old and New. . . the Price of Freedom is Eternal Vigilance"
- 2005: Mary-Jeanne Kreek, MD- "Drug Abuse and Addictions: Some Scientific Approaches to a Global Health Problem"
- 2006: Eric Ottesen, MD- "Understanding the Science, Attacking the Problem: Lymphatic Filariasis and Beyond"
- 2007: John Rouben David, MD- "Leishmaniasis: A novel approach to control visceral leishmaniasis and another to treat cutaneous leishmaniasis"
- 2008: Professor Sir Andrew Haines, MBBS MD FRCGP FFPHM FRCP FMedSci- "Climate Change, Energy Use and Health in the 21<sup>st</sup> Century"
- 2009: Yvette Sheline, MD- "Brain Imaging: New Insights into Neuropsychiatric Disorders"
- 2010: Valentin Fuster, MD, PhD- "The worldwide challenge of cardiovascular disease"
- 2012: Baron Peter Piot, MD- "Global health in a changing world"
- 2013: Robert Gallo, MD- "Viruses and Epidemics: Our attempts to control them with an emphasis on HIV and AIDS"
- 2014: John Strasswimmer, MD, PhD- "Dr Albert Schweitzer, his life, legacy and the future: A celebration of his centenary"
- 2014: Desiree LaBeaud, MD, MS- "Chikungunya and Dengue in Grenada and the Americas: What are we in for?"

- 2015: Ruth Macklin, PhD- “Ethical Challenges in Confronting Disasters: Some Lessons Learned”
- 2016: Ian McConnell, BVMS, PhD, MA, FRSE- “One Health: Lessons from the Past, and Future Opportunities”
- 2017: Kenneth R. Bridges, MD- “Rise of Sickle Cell Disease and Novel Approaches to its Treatment”
- 2018: Timothy Endy, MD, MPH- “Understanding Dengue Pathogenesis and Essential Areas for Research”
- 2019: Timothy Endy, MD, MPH- “Overview of Dengue disease research at SUNY Upstate Medical University and prospective primary dengue study with St George’s University/ WINDREF”

**Distinguished speakers at the House of Lords WINDREF dinners**

- 1999: Lord Walton of Detchant “A Doctor in the House”
- 2001: Lord Rix “A Wonderful World”
- 2008: Prof David Molyneux “The elimination of the neglected tropical diseases”
- 2010: Lord Sebastian Coe “Sport for Health in the Caribbean: The Inspiration of the Olympics” and Professor Alan Fenwick “The Changing face of the neglected tropical diseases”.
- 2014: Prof Gareth Williams “The Global Challenge of Diabetes” and Professor Harry Rutter “Where next for obesity”
- 2017: Prof David Heymann “Global Health Looking for the Future”
- 2018: Dr Richard Horton “Global Health in a wounded World” and Kirani James “Sports for Health”

**Mike Fisher Memorial Award Recipients**

Mike Fisher graduated from King’s College, London with a PhD in chemistry/ pharmacology. He joined Merck in 1957 and worked with

them as vice president of research and headed a lab of 60 research scientists until 2004.

It was his scientific intellect and observational scholarship which led to perhaps his most profound discovery: that of the fungus, *Streptomyces avermillois* from which the drug ivermectin was derived. In the 1970’s his lab was receiving thousands of soil and plant samples from all over the world which he was screening for their effects on a number of organisms. One sample sent to Mike Fisher from Dr. Satoshi Omura from a golf course bunker in Japan, contained *S. avermillois* which was lethal to Mike’s lab mice and when others may have discarded the compound Mike persevered and tested ever more minute doses of the substance. He thus discovered a new powerful drug which was discovered to be effective against roundworm parasites. Mike received the Thomas Edison award for creative discovery and the veterinary and medical world received a compound that revolutionized the treatment and cure of a myriad of infectious diseases. Today as a result of the discovery of ivermectin over 35 million people no longer live under the threat of inevitably going blind from onchocerciasis (river blindness), millions more have been spared the gross disfigurement from lymphatic filariasis (elephantiasis and hydrocoele) and dogs and cats (heartworm), pigs, cattle, sheep, goats and horses live a healthier life because of ivermectin. Mike passed away at his Bel Air plantation home in Grenada on 20<sup>th</sup> April 2005. So many people and animals have benefited from Mike’s work. In 2015, the Nobel Prize for Physiology or Medicine was awarded jointly to Drs. William C. Campbell and Satoshi Omura for their role in the discovery of ivermectin.

**The Mike Fisher Memorial Award Recipients**

2006 – Lord Lawson Soulsby

2007 – Dr. Keith B. Taylor  
2008 – Lord May of Oxford  
2009 – Dr. John David  
2010 – Lord John Walton  
2011 – Prof Ade Lucas  
2012 – Dr. Donald Hopkins  
2013 – Prof R.C. Andrew Thompson  
2014 – Prof Alan Fenwick  
2016 – Sir Gordon Conway  
2017 – Dr. Charles R. Modica  
2018 – Prof Sarah Cleaveland  
2019 – Prof Janet Hemingway

in related knowledge and healthy behaviours which can lead to a decreased incidence of disease across communities in Grenada, Carriacou and Petite Martinique.

We will be collaborating with the Ministry of Education (Grenada) and Ministry of Health (Grenada) to achieve our aim of designing, implementing and evaluating a school-based educational intervention to decrease vector-borne disease and feco-orally transmitted protozoan disease risks in Grenadian school children.

### Current Research Projects

#### **Engaging Young People as Agents of Change (Grenada)...a primary school-based educational intervention to decrease feco-orally transmitted protozoan and arboviral disease risk in Grenadian children**

Two previous school-based health behaviour studies involving both Principal Investigators, one in Grenada (Noel et al.) and another in Kenya (LaBeaud et al.) have had an impact in primary school children populations. They have played a role in moving the child health agenda in a direction that provides evidence needed for both credible and effective governmental decisions affecting young people and informed social choices. This study is in keeping with that philosophy.

Engaging Young People as Agents of Change (Grenada) is within the planning stages, with a proposed start date of Michaelmas term, 2020. Our hypothesis is that through the usage of a school-based educational intervention on vector-borne diseases and feco-orally transmitted protozoan diseases, (*Giardia lamblia*, *Cryptosporidium parvum*, *Entamoeba histolytica*) we can effectively engage children to promote healthy long-lasting improvements

Preliminary planning discussions were held with the Chief Education Officer (Grenada), Mrs. Angella Finlay and Chief Medical Officer, (Ag) Dr. Shawn Charles. In discussion, with the representatives from the Ministry of Education and Health our proposed plan was defined in principle; the study participants will be grade 4 students at government registered primary schools across the tri-island state of Grenada. Fifty-four (54) government registered primary schools will be targeted for this case / control study. All grade 4 students from these schools will be eligible for participation. The grade 4 students will be targeted for both their appropriate cognitive ability and the ease to allow follow up into Grade 5, at the completion of the study. Twenty seven (27) randomly selected schools will be case schools and the other twenty seven (27) will be control schools.



From left to right: Mr. Jeffon Telesford (Project Manager), Dr. Trevor Noël (Co-Principal Investigator), Mrs. Angella Finlay (Chief Education Officer) at Ministry of Education Ministerial building.

The case and control school participants will be asked to answer questions, relevant to their knowledge, attitudes, and practices. The case school participants will be expected to also participate in a didactic and active preventative teaching intervention. This intervention will comprise of a PowerPoint sensitization presentation, two erected posters and demonstrations on vector-borne disease (e.g. mosquito larval identification), and feco-orally transmitted protozoan disease reduction through processes (e.g. filtering water, proper sanitation and safe handwashing procedures). Case schools will receive the surveys and interventions; however control schools will receive the intervention after surveys are completed at the end of the study.



Preliminary discussions with members of the vector control team, Ministry of Health, Grenada. From Left to Right: Mrs. Patricia Brathwaite, Dr. Trevor Noël (Co-Principal Investigator), Ms. Rachael Smith, Mr. Jeffon Telesford (Project Manager), Mr. Kelron Brathwaite

The study is scheduled to take place within the fifty-four (54) government registered primary schools between January – December 2020, and the initial intervention will commence in February 2020 to March 2020.

An information sheet will be provided to each grade four (4) student attending a government registered primary school (54). The recruitment process will begin at primary schools by using information sheets in January 2020. All potential participants will be informed of the goals and objectives of this study and will also be told of the voluntary nature of their participation and their freedom in declining to participate. One (1) week before the start of the first administered survey, class teachers will provide all grade four (4) students with the information sheet to be delivered to the child's parents or guardian.

In all the schools, a knowledge, attitudes, and practice (KAP) survey will be administered four (4) times with the same questions each time. However, an additional educational PowerPoint presentation will be administered in case schools after the first survey. Immediately following the PowerPoint presentation, the second survey will be administered. Two (2) educational posters will be placed at high visibility points in the schools after the second survey. These posters will be used to sensitize participants in between surveys (third and fourth surveys).

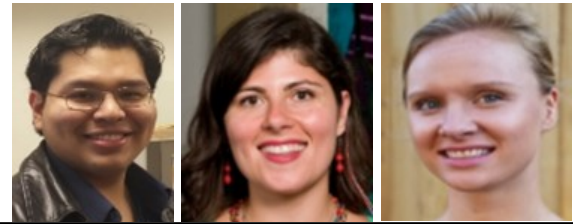
The third survey will take place in May-June 2020 to assess short term knowledge. This survey will be paired with an active teaching demonstration on methods to reduce both feco-oral disease transmission (e.g. safe handwashing procedures) and arboviral diseases (e.g. mosquito larval identification). A fourth survey will be administered between Septem-

ber 2020 and October 2020 to assess long-term knowledge.

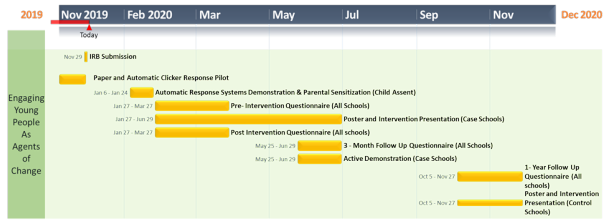
Participants' health practices regarding these diseases will be sought during the initial intervention and during the follow-up interventions. The participants' knowledge of the initially presented information will be recorded for comparison. All survey responses will be collected using automated response clickers.

The study proposal has been submitted to the St. George's University Institutional Review Board. Upon review, the proposal will then be submitted to the Ministry of Education and Health (Grenada) for subsequent review/ approval.

This study is a collaborative project involving; WINDREF at St. George's University, Stanford University and the Government of Grenada. The completion date of this study is expected to be December, 2020.



Stanford University team: Mr. Jonathan Altamirano (Data Manager), Dr. Desiree LaBeaud (Co-Principal Investigator), Dr Amy Krystosik (Post-doctoral Fellow)



Submitted by Trevor Noël

**Global Water Partnership**

**GWP-C Supports Review of Grenada National Water Policy**



Team Photo - From left to right: Mr. Jeffon Telesford (Project Manager), Dr. Trevor Noël (Co-Principal Investigator, St. George's University/WINDREF), Dr. Calum Macpherson (Director of WINDREF), Dr. Paul Fields (Biostatistician, WINDREF), Mr. Victor Ashby (Assistant Project Manager)





At the start of 2019, the Global Water Partnership-Caribbean (GWP-C) supported the hosting of a focus group discussion on the 2007 National Water Policy of Grenada. GWP-C was approached to be part of the activity by long-standing Partners in Grenada who were conducting an assignment on the Water Policy for the GIZ. The feedback obtained is intended to contribute to the revision of Grenada's National Water Policy. A final workshop will be held to review the Draft 2019 Policy, developed for Grenada.

### **GWP-C Participates in National Water Policy Review Workshop for Grenada**



At the invitation of the Ministry of Climate Resilience, the Environment, Forestry, Fisheries, Disaster Management and Information of Grenada, GWP-C took part in a national consultation workshop to review the 2019 Draft National Water Policy for Grenada. The workshop which took place in February, saw the

participation of GWP-C along with other key stakeholders (including various GWP-C Partners) from water and related sectors of the country.

### **GWP-C Commemorates International Women's Day with #BalanceforBetter in Water Management Campaign**

Each year on March 8th, GWP-C joins the world in commemorating International Women's Day (IWD); a global day celebrating the social, economic, cultural and political achievements of women. For IWD 2019, GWP-C along with the rest of the Global Water Partnership (GWP) network, joined the global #BalanceforBetter campaign which reflected the GWP network's commitment to gender equality.



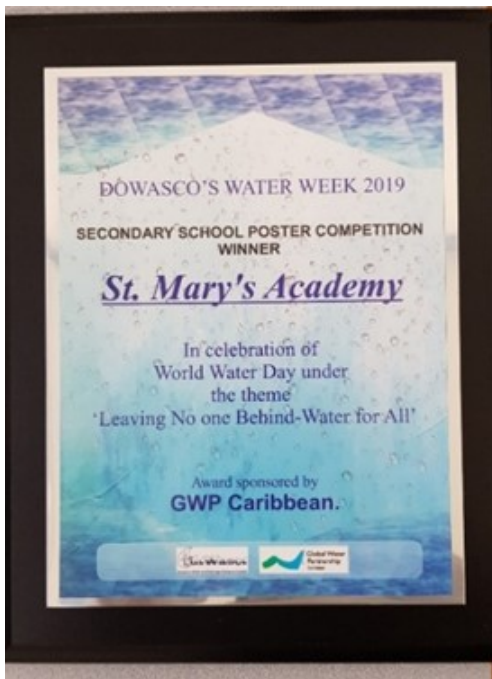
Through the campaign, GWP-C sought to spotlight the importance of gender equality in water management. The campaign enabled GWP-C to mobilise the support of its Secretariat and Partners by showcasing both women and men from its network, all striking a pose for gender balance in the Caribbean water sector.

### **GWP-C Supports Water Week by Long-Standing Partner from Dominica, DOWASCO**

The Dominica Water and Sewerage Company (DOWASCO) is a long-standing Partner of

GWP-C. To commemorate World Water Day (WWD) 2019, DOWASCO hosted a Water Week from March 18<sup>th</sup> – 22<sup>nd</sup>, 2019 under the theme “Leaving No One Behind.”

The Week was filled with events focused on public awareness with special emphasis on students at the primary, secondary and tertiary level. This year also represents DOWASCO’s 30<sup>th</sup> anniversary. GWP-C was pleased to support DOWASCO’s Water Week, by covering the cost of five (5) plaques that were awarded to the winners of the essay, poster and debate competitions.



**GWP-C and CCCCC Partner with Caribbean Water Sector Stakeholders to Develop Green Climate Fund Projects**

GWP-C and the Caribbean Community Climate Change Centre (CCCCC), hosted and facilitated a three-day Regional Green Climate Fund (GCF) Project Development Workshop on May

27<sup>th</sup> – 29<sup>th</sup>, 2019. The workshop was held at GWP-C’s Host Institution, the Windward Islands Research and Education Foundation (WINDREF) at St. George’s University in Grenada. The workshop was titled “An Approach to Develop a Regional Water Sector Programme for Building Resilience to Climate Change.”

Its focus was to strengthen the capacity of Caribbean Water Utilities and Government Ministries with responsibility for Water Resources Management, in developing climate resilient water proposals, with the objective of preparing a Regional Water Sector Programme for the submission to the Green Climate Fund (GCF).



More than twenty (20) representatives from ten (10) Caribbean countries participated in the regional workshop. A major outcome of the workshop was that over twenty (20) of its participants, submitted a completed country specific project idea and log frame. GWP-C together with the CCCCC, will work together to ensure that follow-up is done with the participants on the log frames, so that they are turned into submissions to the GCF.

**GWP-C Partners with Cap-Net UNDP and The Faculty of Food and Agriculture (UWI St. Augustine) to Build Drought Management Capacity**

GWP-C, Cap-Net UNDP (Caribbean WaterNet) and The Faculty of Food and Agriculture of The University of the West Indies (UWI), St. Augustine organised three (3) National Drought Risk Management Workshops in May and June 2019. The workshops were carried out in the following countries:

1. Antigua and Barbuda (May 22<sup>nd</sup> – 24<sup>th</sup>, 2019)
2. St. Vincent and The Grenadines (May 29<sup>th</sup> – 31<sup>st</sup>, 2019)
3. St. Kitts and Nevis from June 5<sup>th</sup> – 7<sup>th</sup>, 2019



Each of the workshops targeted specific agencies at the national level who are directly involved in water resource management in their respective countries.

The workshops sought to increase the understanding of participants regarding droughts and the associated risks, as well as inform management and mitigation plans and policies. GWP-C intends to continue its collaboration with Cap-Net UNDP (Caribbean Water-

Net) in the area of capacity building on drought risk management and reduction and other areas related to Integrated Water Resources Management (IWRM) for the benefit of the Caribbean region.

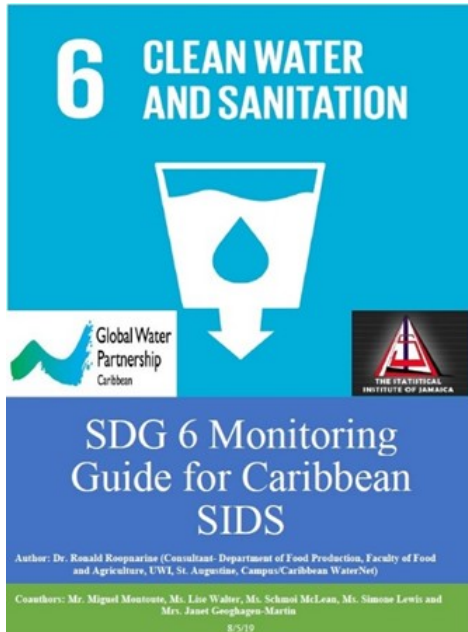
### GWP-C Launches Young Caribbean Water Entrepreneurs Shark Tank Competition



GWP-C launched its “Young Caribbean Water Entrepreneurs Shark Tank Competition” on August 2<sup>nd</sup>, 2019. The competition provided a unique opportunity for young persons from the Caribbean between the ages of 18 to 34 years, to pitch innovative and impactful water project ideas to support better water resource management in their respective communities, country or the Caribbean region.

The winner was awarded seed funding of 4,000 Euros to further develop their innovative water project idea. More about the Shark Tank Competition can be found here: <https://bit.ly/2yBKamM>.

### GWP-C in Partnership with the Statistical Institute of Jamaica Develop SDG 6 Monitoring Guide for the Caribbean



In continuation of Jamaica's work on the monitoring of the Sustainable Development Goals (SDGs), the Statistical Institute of Jamaica (STATIN), in collaboration with GWP-C hosted a four-day training workshop titled **“Improving Sustainable Development Goal (SDG) 6 Monitoring in Jamaica.”**

The workshop targeted various stakeholders including GWP-C partners in Jamaica within water and related sectors and persons engaged in the production of statistics relating to water and sanitation. Its objective was to increase participants' knowledge on the SDG 6 indicators and update and expand on the monitoring initiative already undertaken by Jamaica. Inputs from the workshop also contributed to the development of an **SDG 6 Monitoring Guide for the Caribbean.**

Download the Guide here: <https://bit.ly/2P4DBVg>.

### **Partnership Launched in Latin America and the Caribbean to Improve Climate Resilient Water Projects for the Green Climate Fund (GCF)**

A Technical Workshop on **Project Preparation for Transformational Climate Resilient Water Project Concepts** in Latin America and the Caribbean (LAC) for the Green Climate Fund (GCF), was held with 95 participants in Panama City, Panama – comprised of GCF National Designated Authorities (NDAs), GCF Direct Access Entities (DAEs), representatives from Water Ministries and agencies, as well as academia – from 23 LAC countries.

The workshop was organised by GWP in collaboration with the Inter-American Development Bank (IDB) and the Caribbean Community Climate Change Centre (CCCCC), with technical inputs from the GCF Secretariat and the World Meteorological Organisation (WMO). The workshop responded to countries' needs for support to strengthen the capacity of NDAs, DAEs, and Water Ministries and agencies to prepare climate resilient water projects that meet GCF investment criteria.

The Partnership will work with active and relevant financing partners for project preparation to appropriately structure financing for climate resilient GCF water projects in Latin America and the Caribbean.

**GWP-C Engages Young People on IWRM and the GWP Youth Strategy at 13<sup>th</sup> Caribbean Youth Environment Network (CYEN) Congress**

GWP-C was invited to deliver a presentation at the 13<sup>th</sup> Congress of the Caribbean Youth Environment Network (CYEN) held from August 9<sup>th</sup> – 13<sup>th</sup>, 2019 in Guyana. The theme of the Conference was **“Building the resilience of the Caribbean through effective youth engagement and participation.”** Ms. Gabrielle Lee Look, GWP-C’s Communications Officer, delivered the presentation to over 30 youth leaders from across the Caribbean on **“Integrated Water Resources Management (IWRM) and the Global Water Partnership (GWP) Youth Engagement Strategy.”** GWP-C plans to use the insights from the interactive session, to support its continued efforts to engage young people in its work.

**Other GWP-C Activities**

- GWP-C Regional Coordinator Attends Water Management and Irrigation Technologies Training in Israel
- Every Step Counts in Raising Awareness on Our Global Water Crisis – #RunningDry
- GWP-C Participates in National Workshop in Grenada on Strengthening the National Adaptation Plan Process and Nationally Determined Contributions
- GWP-C Contributes to National Water Vulnerability Methodology Workshop in Grenada
- GWP-C and CWWA Challenge Caribbean Nationals to Tell Water Stories in 1-Minute Videos for World Water Day 2019
- GWP-C is 1 of 15 Regional Agencies to Participate in IWeco’s First Governance Meeting
- 18th St. George’s University (SGU) Research Day

- GWP-C Partners Contribute to New Publication – Water Quality in the Americas
- GWP-C Formed Part of the GWP Team at the NAP Expo within the 2019 Korea Global Adaptation Week
- GWP-C among Stakeholders to Provide Inputs on NDC Partnership Plan for Grenada
- GWP-C Contributes to Inputs on Advancing Roadmap and Plan of Action for Climate Services in the Caribbean at CariCOF
- GWP Regional Days 2019 Focus on Common Understanding of New Strategy for 2020 – 2025
- GWP-C Supports its Partner CAWASA’s 6th Caribbean Water Operators Conference
- GWP-C Partners Give Valuable Inputs on Addressing Water Challenges in the Caribbean
- GWP-C Participates in Capacity Building Workshop on NAP M&E System for Grenada
- YOUTH HIGHLIGHT: Trinidadian Khadija Stewart’s Journey as a Peace Boat Ocean and Climate Change Youth Ambassador
- GWP-C Gains Two Partners in the Countries of Grenada and St. Vincent and the Grenadines
- GWP-C Connects with Partners on Facebook for 12th Annual General Meeting
- GWP Patron Dr. Letitia Obeng Gives Address at High Level Forum of Caribbean Water Ministers
- GWP-C Plans for Impact with the Development of Its 3-Year Strategic Plan and 2020 Work Plan
- GWP-C Gains New Partner in Barbados
- CCCCC Launches EU Funded Project to Enhance Climate Resilience in CARIFORUM Countries

- Japan-Caribbean Climate Change Partnership Knowledge-Sharing and Project Wrap-Up
- Enhancing the Climate Science Basis of GCF Funded Activities in St. Lucia

*Submitted by Global Water Partnership*

**A Consumer Behavior Change Campaign and Intelligence-Led Conservation Capacity Training to Address the Illegal Wildlife Trade in Trinidad and Tobago**

The project titled “A Consumer Behavior Change Campaign and Intelligence-Led Conservation Capacity Training to Address the Illegal Wildlife Trade in Trinidad and Tobago” has achieved a wide range of objectives, and produced a wide range of outputs, over the past calendar year. Some of our highlights include:

- Conduct of 40 market interviews and 9 focus groups with pet owners of illegally-sourced and unpermitted wild animals;
- Development of a survey instrument for the conduct of the country’s first “Survey on Pet Ownership and Nature Experiences” with the support of Oxford University and Michigan State University;
- Execution of 80% of a 2,000 household survey, with final completion expected in January 2020;
- Photographic documentation and review of eco-tourism educational signage across the country; and
- Sign on of 10 NGOs, including 8 NGOs that are new to the project, to a coalition to launch a behavior change reducing illegal ownership of pet wildlife.

Other activities will continue as the project ends Feb. 29, 2020.

Research participants are engaged anony-

mously, so research activities are not documented with photographs. However, photos of wildlife in captivity and in the wild have been documented widely.

*Submitted by Mark Gibson*

**Caribbean Corporative Measurement Reporting and Verification Hub Project (MRV Hub)**

WINDREF continues to contribute to the fight to combat Climate Change/Global Warming through its collaboration on the Caribbean Corporative Measurement Reporting and Verification Hub Project (MRV Hub). The MRV Hub is a 5-Year project funded by the International Climate Initiative (IKI) of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) of Germany, with additional resources and technical support provided by the UNDP Global Support Programme.

12 English-Speaking CARICOM countries are being supported by the implementing Partners: Greenhouse Gas Management Institute (GHGMI), Regional Collaboration Centre of the UNFCCC, St. George’s University and their Department of Public Health & Preventative Medicine, Grenada (STG-RCC) UNDP Global Support Programme (GSP) with WINDREF taking on the pivotal role of institutional host. Participating countries include Antigua & Barbuda, Barbados, The Bahamas, Belize, Dominica, Grenada, Guyana, Jamaica, Saint Lucia, St. Kitts & Nevis, St. Vincent & the Grenadines, and Trinidad & Tobago.

Since its official launch, The MRV Hub has been actively involved with its member countries- implementing the proposed workplan agreed to during their 1<sup>st</sup> Annual meeting.

The following is a snapshot of the activities and work achieved during 2019.



Participant Group Photo (CCMRVH 1<sup>st</sup> Annual Meeting- Feb 2019-Grenada)  
**CCMRV Hub 1<sup>st</sup> Annual Meeting (February 2019-Grenada)**

10 countries from the English-speaking Caribbean region convened at St. George's University on 5<sup>th</sup>-6<sup>th</sup> February 2019 to discuss a new model of cooperation for measuring, reporting and verifying climate action. This meeting marked the formal launch of the MRV Hub, a unique collaborative technical institution where countries in the region can share expertise to foster regional excellence and generate stronger policy-relevant carbon accounting. The MRV Hub provides a mechanism through which country experts will function as a true learning, mentoring and resource-sharing technical cooperative.

### **Establishing the MRV Hub in the Region**

One of our project's primary objectives is to establish the MRV Hub as an institution in the region through outreach, dialogue, and becoming recognized by participating national governments. The project's program of outreach and MRV assessment scoping visits to

member countries continues to advance as planned. Based on the interviews we conducted with government officials and private sector stakeholders, we have completed Capacity Building Reports for each country to establish baseline conditions and document areas prioritized for support and technical interventions.

We are happy to report that ten out of our twelve member countries have entered into a formal Memorandum of Understanding with the MRV Hub and the remaining two are in line for execution in early 2020. The ten member countries with fully executed MOU's are Antigua & Barbuda, The Bahamas, Barbados, Belize, Grenada, Guyana, Jamaica, Saint Lucia, St. Kitts & Nevis, and St. Vincent & the Grenadines. We congratulate our team and our committed country representatives for this achievement.

### **First Hub Training Session held as part of Grenada's Climate Week 2019**

The first Working Session of the MRV Hub was held in the WINDREF conference facility and was delivered as part of "Grenada Climate Week 2019." The training provided in-person presentations centered on an introduction to the "2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories" (IPCC Guidelines). Attending the training were nine individuals representing Antigua & Barbuda, The Bahamas, Belize, Grenada, Guyana, Jamaica, St. Kitts & Nevis, Saint Lucia, and Trinidad & Tobago, along with 4 additional individuals from the broader Caribbean region. The training was designed to equip participants with the basic knowledge and skills to improve the overall quality of measuring and reporting greenhouse gas emissions.

### **MRV Hub Working Sessions in Jamaica**

The MRV Hub was pleased to work with Jamaica's Climate Change Division and the local Jamaica UNDP Office to participate in a stakeholder workshop in Jamaica in January, and later hosting a Working Session in Jamaica on May 20-23, 2019, on national greenhouse gas (GHG) emission inventories. The Working Session featured training on the 2006 IPCC Guidelines for National GHG Inventories, including interactive hands-on exercises using the IPCC software, and covering Jamaica's ongoing work on a GHG data management system. The Working Session was attended by over 20 Jamaican technical officers who collect and analyze climate-change related data and information in each of the inventory sectors; Energy, waste, industrial processes, agriculture, and land use and forestry. Along with government stakeholders, participants from tertiary institutions including academic faculty were included in the training cohort.

### **MRV Hub Steering Committee in Bonn, Germany**

The MRV Hub Provisional Steering Committee held its first meeting on June 21, 2019 in Bonn Germany during the UNFCCC SB meetings. The Provisional Steering Committee (SC) adopted terms of reference (TOR) or formal guidelines for how the SC will operate, including who serves on the SC and when meetings will take place. Finalizing the TOR was another important step in the MRV Hub's maturation into a permanent regional institution.

The meeting was attended by all 8 members of the SC as well as 6 other observers. The SC took a number of actions including directing The MRV Hub Secretariat to do the following:

- Develop Standard Operating Procedure

(SOP) materials for use by The MRV Hub that will incorporate provisions to address conflicts of interest (COI),

- Begin building a regional roster of experts,
- Follow up on modelling work done by CCREEE, with the assistance of the 5C's.

### **MRV Hub Working Sessions in Grenada - Data management for Transparency**

On 8<sup>th</sup> and 9<sup>th</sup> July 2019, The MRV Hub held a two-day workshop on data collection and data management systems. The sessions were attended by representatives from various persons in the Caribbean region. The first day of the workshop focused on planning and designing a data management system for the CCMRVH, while the second day focused on providing participants with the tools and strategies they need to collect and document greenhouse gas and climate data. On both days, participants were given group exercises to further cement the information discussed throughout the different presentations. These workshops are part of the MRV Hub's activities to build capacity and improve knowledge among climate experts in the region.

### **CCMRV Hub Expert Work Crews**

Initial consultations with country partners during The MRV Hub's annual meeting (Grenada, February 2019), in-country visits by The MRV Hub team and through the country assessment process, has unambiguously identified high priority needs and gaps for almost all participating countries to support MRV. Some of these gaps include - Data Management Systems (DMS), Maritime Bunker Fuel emission estimates, On-Road Mobile Sources and emission estimates for the AFOLU sector. The MRV Hub aims to address these needs/



gaps through the formation of expert working crews with the task of addressing these concerns. The DMS, Data Collection, Maritime Bunker Fuels and On-Road Mobile Source work crews have all been formally launched with phase 1 and 2 of their respective workplans expected to be completed by the end of 2020. The launch of the Agriculture and Forestry and Other Land Use work crew is planned for the first half of 2020.

### Networking/Outreach

Networking efforts of the MRV Hub included outreach to other organizations operating in the region including GIZ, NDC Partnership, GGGI, CARICOM, IRENA, to open lines of communications, avoid duplication of effort or schedule conflicts, and to coordinate to ensure countries are well served. The MRV Hub has also established a dialogue with Faculty at the University of West Indies (UWI), visiting the Mona Campus in Jamaica in October, and the MRV Hub provided a Research Fellowship in Data Management to a UWI Open Campus PhD candidate. We are also working with Faculty at the University of Trinidad & Tobago, and with the Statistics Department at Bahamas Technical and Vocational School.

The MRV Hub is also pleased to have issued 5 editions of their periodic Newsletter. With our ever growing network this medium has become critical to communicating our progress (to member countries, key stakeholders and an ever-growing audience) as well as signal upcoming meetings and events. Look out for our 6th edition in early 2020.

### MRV Hub at COP25, Madrid Spain

Members of the MRV Hub team attended

and participated in the meetings of COP25 in Madrid between the 2nd and 13th December 2019. Events included but were not limited to:

- 2nd Meeting of the MRV Hub Provisional Steering Committee,



L-R: Omar Alcock, Anaitee Mills (Jamaica), Hayden Redhead (MRV Hub Secretariat), Brittany Meighan, Lennox Gladden (Belize), Roxie Hutchinson (Grenada), Michael Gillenwater (GHGMI), attending but not in photo was Damiano Borgogno (UNDP), Unamay Gordon (Jamaica), Danielle Vaughan (MRV Hub Secretariat).

- CARICOM-AOSIS Pavilion: Caribbean Co-operative MRV Hub Presentation and Briefing,
- Enhancing the Transparency Framework by Policy-Relevant MRV Systems,
- Joint exhibiting with GHGMI,
- As well as multiple other opportunities for networking.

*Submitted by CCMRV Hub Team*

### Saving Brains Grenada Intervention

The Saving Brain Grenada project received approval from Canada Grand Challenges for additional funding in July 2018 for a Transition to Scale (TTS) project.

## COMMUNITY

Once TTS approval was obtained, the first task was to prepare the mobile resource unit (the Saving Brains bus) for its next set of journeys throughout the island. In November and December 2018, the Saving Brains bus had a major overhaul, Mr. Troy Nelson was hired as the Saving Brains bus driver.

Following a two-day Conscious Discipline (CD) refresher training, in January 2019 the Gren-case Roving Caregivers continued to deliver their weekly home visits to the families in the program. New materials were made for the Saving Brains bus. The Gren-case supervisors helped to identify 40 Roving Caregivers ideally suited to teach from the bus, and this group received additional training.

The bus was back on the road in February 2019 with the first stop being Tivoli/La Potrie followed by Mt. Fann. Since then the bus has visited 34 locations serving 249 families with 265 children.

Approximately 20 of the 40 trained caregivers have been involved in delivering the 136 classes that took place between February and July 2019. Monthly top up trainings and practice sessions were held on the St. George's University (SGU) campus. After these training sessions, observations by the parent liaison officer Felisha Mitchell and consultations with the supervisors, a core group of 23 teachers have taken over the bus classes. In order for the program to be sustainable a schedule that complimented the Roving Caregiver's regular commitments had to be agreed upon and the bus classes were suspended between the months of August and December 2019. In this period 25 new caregivers were trained in a 3-day intensive CD foundation Course.

August is school break and Roving Caregiver vacation month. In September the Roving Caregivers were allocated to schools to assist the children from the program transition into their new Pre-schools. In October the Roving Caregivers reconnected with their existing families and recruited new families into the program. Four to six weeks is the ideal time to build these strong relationships before re-introducing the bus component. The Saving Brains bus is therefore due to be back on the road in January 2020.

## SCHOOLS

In January 2019 twenty-four pre-primary schools were notified by the Ministry of Education of their inclusion in the Saving Brains Grenada scale-up and the 12 intervention schools and 12 waitlist control schools were identified. The Limes Pre-School declined to be in the program and was replaced by Happy Hill Pre Primary School.

The principals for each school were contacted by their assigned coach and initial meetings were held in January 2019. These were followed by meetings with the staff in which the coaches administered a readiness questionnaire in order to determine which staff members they would begin to work with, focusing on those closest to the CD model. There were some unforeseen delays within the Ministry of Education and resistance from the teachers due to industrial action and a continued work to rule. This resulted in the coaching team not gaining permission to enter schools until June 2019. That month, meetings were scheduled with parents to explain the project, assess procedures and hand out parent consent forms. Gaining the trust of the staff and rapport building was essential at this time and coaches were cautious, limiting

their input to assisting teachers, rapport building and classroom observations within school hours only.

Coaching began in schools in September 2019 following the summer break. Coaches are currently working in the classrooms of one or two selected teachers, whilst being available for consultation with all teachers who express a need or interest. The focus over the first 3 months was to continue rapport building and to begin to work on the CD Powers of Perception and Attention with the staff. Teachers are being exposed to CD first-hand with Greetings, Breathing Techniques, Wishing Well and I love You Rituals being taught by the coaches. This first-hand experience is necessary in order for teachers to begin to develop a mind shift from traditional discipline methods to a more open approach and for them to be willing to try these methods with the children.

All schools have started to read the Sophie books, a series of books designed to build character through conflict for children by using relatable stories while also modelling the use of CD for adults. Additional CD information is delivered through a series of E videos made available to all staff at the children's rest time.

Some teachers are beginning to experience small shifts in their perspectives as they begin to use their newly acquired skills.

Success story 1 - A boy was asked several times by his teacher to put a block back on the shelf that he had taken. The child refused and held on to it tighter. The assistant teacher also asked him several times and he refused. The coach got down to the child's level, gave him eye contact and said "you have a

choice, you may put the block in my hand or you may put it on the shelf, which is better for you?" the boy pointed to the self and immediately put the block back. Conflict was avoided and the teacher was able to continue with the class.

Success story 2 - A teacher recounted how one of the boys in her class was starting to get upset (he often gets angry and this can lead to him screaming, running out of class etc.). She said that firstly she took some deep breaths to keep herself calm then decided to 'give it a try' and ask the class to Wish him Well. The whole class Wished him Well and she was amazed that he "just seemed to relax and calm down".

The coaching team members have been subject to a fidelity observation in school and received feedback from the project manager. Weekly meetings are held to discuss progress made and plans for the upcoming week. They receive a biweekly 1-hour coaching guidance session from Kim Jackson (Conscious Discipline Master Trainer) via Skype call. Teacher fidelity checks will be conducted in all schools in December 2019 and early January 2020.

## ZIKA

In this NIH-funded component of the Saving Brains Grenada project a 12-session CD/US Aid training is provided to parents/caregivers of Grenadian children exposed to the Zika virus in utero. In-home visits have been implemented by two Master Roving Caregivers, Hailey-Ann Green and Curlyn Jeffrey, throughout the year. After several sessions were observed and caregiver fidelity measures applied the initial CD manual was amended slightly to increase the connection activities between parent and child. To date, 143 fami-

lies have been contacted to receive the intervention; 20 families declined to take part; 39 families have completed all 12 sessions; and 33 families dropped out after completing between 1 and 11 sessions. Reasons given for drop out were “no time”, “no longer interested” or in some cases not being at home or contactable via phone and the child aged out. Follow up calls to confirm reasons for drop out and post fidelity measures are continuing. 37 families are currently receiving the intervention. Pre- and post- intervention assessment of neurodevelopment in the children using the InterNDA is ongoing.

*Submitted by Stephanie Holmes*

### **Sports for Health Program**

WINDREF's Sports for Health Program in 2019 maintained its local and regional community exercise program, touch toe test intervention on diabetic management and regional training and implementation on the program across the Eastern Caribbean. WINDREF in 2019 also specifically focused on engaging the elderly community with its activities as ageing is increasingly becoming a significant demographic in Grenada. The World Health Organization (WHO) has declared the decade 2020-2030 as the international decade for healthy aging (<https://www.who.int/ageing/decade-of-healthy-ageing>, 2019) which has required for countries including Grenada to prioritize. In 2010, the Windward Islands Research and Education Foundation (WINDREF), partnered with the Royal Grenada Police Force to help participation and continued attendance in a community environmental exercise program, which was made available to everyone at no cost. This program aimed to help the local population participate in an exercise program to help combat obesity and its associated

chronic diseases of diabetes, hypertension and cardiovascular disease. It brought together peoples of all ages, and in 2019, we examine the benefits to the elderly group. The goal of the Sports for Health program is to improve the quality of health among participants and the objective for this study is to assess physical parameters for health and quality of life based on program participation. The study also assessed whether the community-based exercise intervention, Sports for Health program, improved the physical, mental and social well-being of the participants (aged 65 years and older) after having completed 12 months in the program. The study also assessed the quality of life scales that are most effected by the community-based exercise intervention. An adapted version of the RAND Health Survey was applied among the elderly participants. For the year of participation in the program, 56.5% were active by attending 3-5 exercise sections per week. The average age of the participants was 67.6 (range 65-73), with a standard deviation of 1.9. A statistically significant correlation was assumed to exist between the following quality of life scales among participant's: health vs. pain ( $p=0.013$ ), emotion vs. pain ( $p=0.009$ ), emotion vs. health ( $p=0.008$ ) and emotion vs. energy ( $p=0.022$ ). Community-based exercise interventions have become a growing theme for helping elderly persons improve their health. WINDREF's Sports for Health program has demonstrated that the quality of life characteristics for the aging population is improved with a community-based exercise intervention. This should improve the overall well-being of the communities in which the participants live. The 2019 study suggests that the Sports for Health program should be expanded which will be the priority for the Sports for Health program for 2020 which aligns with the WHO priority from 2020-2030.

### Acknowledgements

WINDREF Sports for Health program would like to thank the Royal Grenada Police Force for implementing this community-based service, and the participants who facilitated this study. The name for the WINDREF Sports for Health Program was changed to the Baroness Howells Sports for Health Program in 2018 in honor of Baroness Howells, the President of WINDREF, who has a great interest in this program and its outcomes. Funding for this program comes from the Baroness Howells Sports for Health Fund.

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*Submitted by Satesh Bidaisee*

### Zika and Neurodevelopment Among Infants in Grenada

The physical effects of the Zika Virus (ZIKV) on infant development, such as microcephaly, are well-known. However, the neurodevelopmental impacts of ZIKV are not as obvious. This study continues to investigate the effects that the ZIKV has on infant neurodevelopment in a cohort of children spanning the first three years of life.

The ZIKV outbreak in Grenada (April 2016 – January 2017) affected more than 60% of the population. A portion of the affected moth-

ers were recruited to this study to investigate the impact of the ZIKV on their children. A final sample of 384 mothers and 388 infants encompassed this study cohort. For the last two years, (May 2017 – present) enrolled participants have provided both serum and buccal swab samples and have attended scheduled visits to their health centers for follow-up assessments. Data collection is still ongoing at this time.

### Serum Results

Serum was collected from 384 mothers and 388 infants throughout this study. Samples were sent to the LaBeaud Laboratory at Stanford University for nanoscale plasmonic gold (IgG) antigen array (pGOLD) testing to determine Zika virus (ZIKV) and dengue virus (DENV) infection status of the cohort.

Results from 379 maternal serum samples show high infection rates of ZIKV and DENV (Fig. 1).

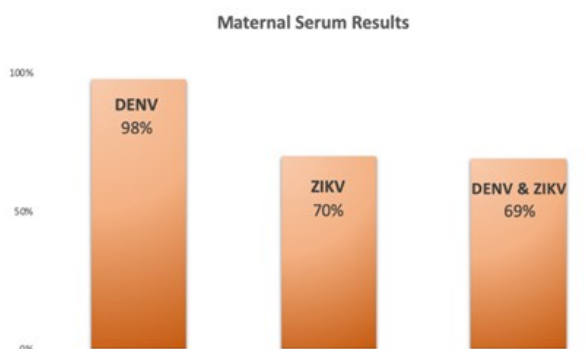
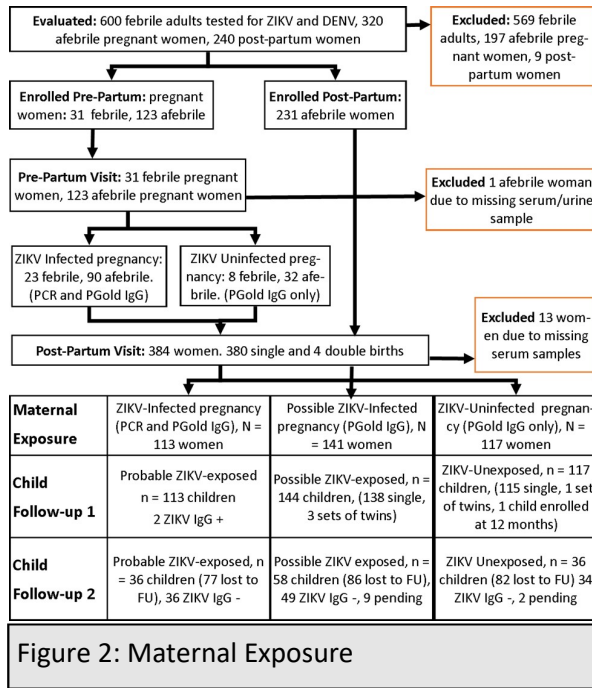


Figure 1: Percent of pGOLD IgG+ Mothers

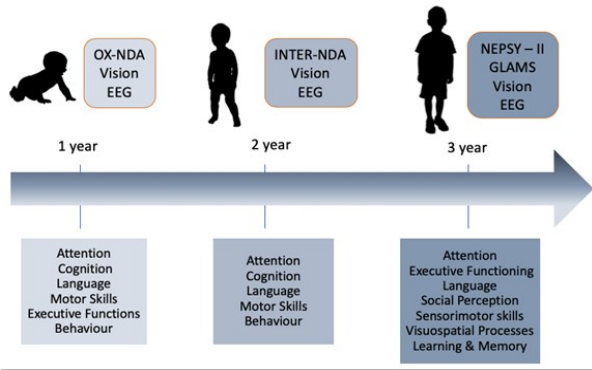
Serum samples from 388 infants in the cohort were tested for both ZIKV and DENV. Only two infants were found to be ZIKV+, while 7% of the cohort tested positive for DENV. Maternal sample results indicate that 70% of infants in the cohort are Zika exposed.

### Maternal Exposure

Based on serum results, maternal exposure was categorized as probable, possible, or unexposed during pregnancy (Figure 2).



### Assessment



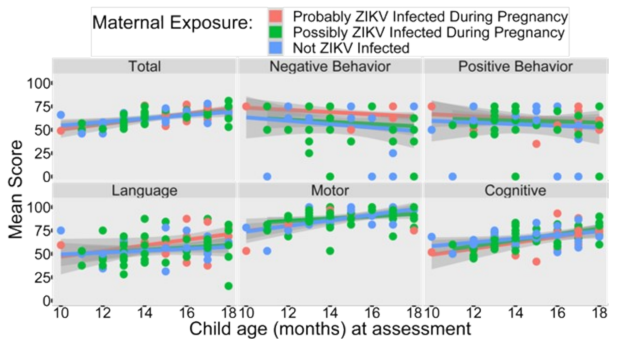
To determine the impact, if any, of the ZIKV on infant neurodevelopment, all infants enrolled in this study complete a longitudinal series of neurodevelopmental assessments,

including a vision test, (Fig. 2) at ages one, two and three. In addition to these neurodevelopmental assessments, infants undergo a complete physical examination by a registered nurse and the mother is interviewed about the child’s home environment. An electroencephalography EEG is also administered by a trained neuropsychologist and the results are sent to epileptologists in the US for interpretation.

Data collection at the one-year time point is now complete, whilst data for the second year is still being collected and should be completed by May 2020. The study has received philanthropic funding through Stanford University to continue the assessment of the infants in this cohort for year three. Data collection is scheduled for completion in November 2020.

### OX-NDA Results

Preliminary reports for the one-year timepoint indicate infants exposed to the ZIKV in-utero appear to be growing and developing on par with their peers despite differences found in birth weight by gestational age. No significant differences were found between ZIKV exposed children (ZEC) versus their unexposed peers (UC) on the OX-NDA developmental assessment (Figure 4).



### Anthropometrics Results

Comparing child birthweight (z-score) to Inter-growth 21st standards, we found no differences by maternal exposure category (Figure 6). However, significant interaction between birth weight and maternal exposure (ANOVA,  $p = 0.005$ ) suggests differences in growth trajectories by maternal ZIKV exposure controlling for sex (Figure 5).

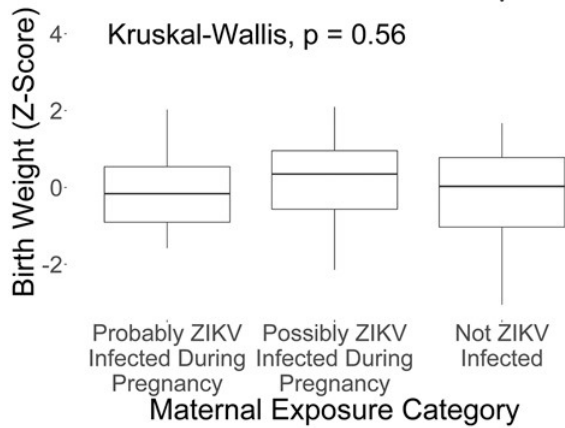


Figure 6: Birth Weight Z-Score compared to Inter-growth 21st

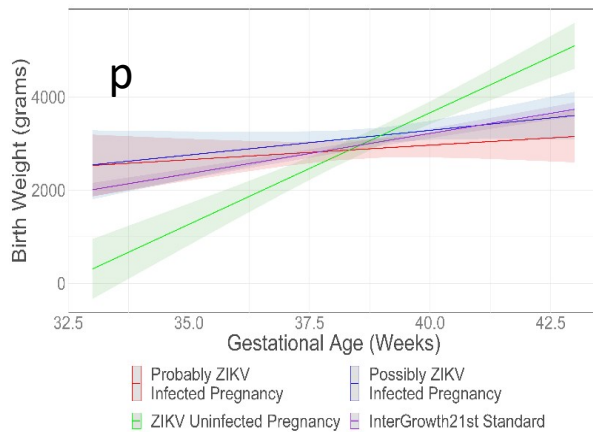


Figure 5: Predicted birth weight vs. gestational age controlling for sex

Child anthropometric z-scores were normalized by WHO standards for age and sex at the first and second follow up visits by maternal

exposure categories. We observed no statistically significant differences in abnormal growth outcomes by maternal exposure category. Overall, 21.2% and 12.8% of children had abnormal BMI at 1st and 2nd visits respectively. 19.5% and 12.8% of children had abnormal head circumference; 18.1% and 11.0% had abnormal length; 9.3% and 6.4% had abnormal weight; and 22.1% and 11.0% had abnormal weight for length z-scores at the 1st and 2nd visits respectively (Figure 7).

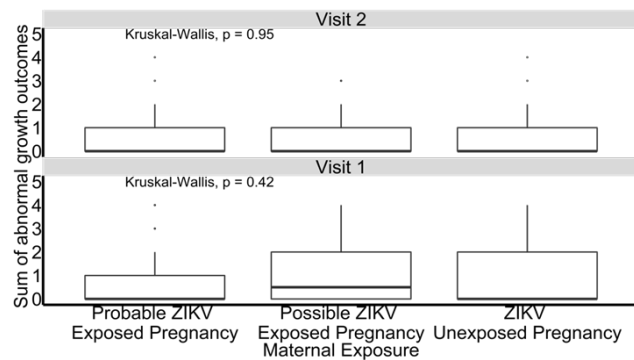


Figure 7: Anthropometrics by visit

### Vision Results

We observed no statistically significant differences in Cardiff Visual Acuity test score (LogMAR at 50 cm) by maternal exposure category (Figure 8).

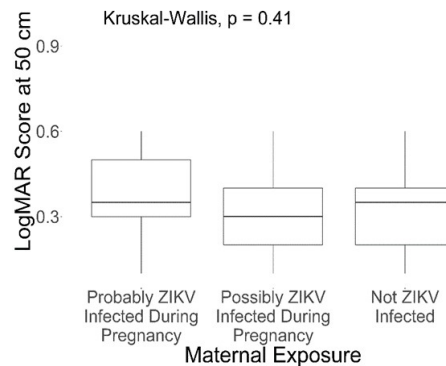


Figure 8: Visual acuity

## EEG Results

Epilepsy surveillance consisted of a pediatric epilepsy screening questionnaire and EEG. The pediatric epilepsy screening questionnaire was administered to 72 Zika-exposed children (ZEC) and 68 Unexposed children (UC). Within the ZEC group, 3/72 screened positively for epilepsy (IR: 0.042; 95% CI: 0.009-0.117), with seizures occurring in the first year of life. Within the UC group 1/68 (IR: 0.015; 95% CI: 0.000-0.079) screened positively for epilepsy. EEG was collected in 49 ZEC and 22 UC using a multi-channel, wireless microEEG® system (www.biosignalgroup.com), with a standard 10-20 electrode configuration for a minimum of 20 minutes along with video recording of participant behavior time-locked to the EEG. EEGs were interpreted independently by two board certified epileptologists, blinded to ZIKV status, via a remote telemedicine platform. The quality of EEG recordings was high: 72% of the recordings were classified as interpretable; 21% as technically limited but interpretable; and 7% as uninterpretable. Inter-rater reliability for absolute agreement of EEGs as normal versus abnormal on blinded review was moderate (Fleiss' Multirater Kappa: 0.47, 95% CI = 0.46-0.48; p=0.0001). Abnormalities such as focal slowing and focal epileptiform discharges were found in 5/46 ZEC (10.9%) and 1/20 UC (5%). All children with positive epilepsy screens or abnormal findings on EEG are being followed by Dr. Tyheisia Donald for ongoing monitoring of health status. These results suggest an elevated epilepsy incidence rate in ZEC, relative to the global incidence rate of 0.001 in the first year of life, and focal,

rather than generalized abnormalities on EEG.

## Intervention

The intervention arm of this study that aims to “rescue neurodevelopment” in infants in this study is currently underway. The intervention, a clinical trial funded by NIH, trains parents in Conscious Discipline (CD) techniques which are designed to foster better emotional connections between parents and their children. We expect these connections to increase cognitive, attentional and behavioural outcomes in the infants exposed to CD at home. So far, 39 families have completed the intervention, 37 are currently enrolled and 33 have completed a portion of the intervention.

## Outcomes

It is expected that the ZIKV will have some subtle impacts on infant neurodevelopment function and on infant neurological function which can lead to lower performance on measures of neurodevelopment. We anticipate that the intervention should result in higher neurocognitive scores, as measured by the Intergrowth 21<sup>st</sup> Neurodevelopmental Assessment (INTER-NDA) scores.

*Submitted by Roberta Evans, Nikita Cudjoe, Trevor Noël, Amy Krystosik, Randall Waechter, Barbara Landon, Michelle Fernandes, Karen Blackmon, Elyse Noel Grossi-Soyster, Jonathan Altamirano, Benjamin Pinsky, Veronica Mapp-Alexander, Elsa Chitan, George Mitchell, Shawn Charles, Calum Macpherson, A. Desiree LaBeaud*



## Center for Research on Storytelling in Education

In November 2019, the Center for Research on Storytelling in Education (CRSE) was established in partnership with WINDREF. CRSE is a research organization dedicated to building a community of educational scholars focused on investigating and understanding how creating, sharing, listening to, and analyzing stories can help educators and educational leaders improve their practice. CRSE's vision is to advance research on storytelling in education in order to develop more responsive and inclusive practices in teaching and leadership. Since starting the research center, we have submitted two grant applications. The first was for a small research grant (5K) through SGU and the second was for a larger grant (50K) through the Spencer Foundation (both grants are currently in the review process). The smaller grant is focused on supporting our first research project and the larger grant is for supporting a small conference/think tank to be hosted at SGU in May 2021. The overall focus of the conference is exploring the opportunities that storytelling can bring to educational research and pedagogical practices that foster learning across the lifespan in different cultural and community contexts. We have also submitted an IRB application (which has been approved) for our first research project related to collecting a diverse range of stories of learning. Finally, we have sent out a call for chapters for a book project focused on examining connections between educators' stories of learning and their teaching philosophies. The center was started by Dr. Tracy Penny Light, Dr. Laura Colket, and Dr. Adam Carswell, all of whom are faculty in the Department of Educational Services at SGU.

*Submitted by Tracy Penny Light, Laura Colket, Adam Carswell*

## Dengue in a Travel Population: Prospective Cohort Study of Primary Dengue Infection

Dengue is a mosquito borne virus transmitted by the *Aedes spp.* mosquito. Persons with a primary infection are 80% asymptomatic or experience nonspecific mild symptoms such as fever, headache, and retro-orbital pain – hence primary infection can go undetected and undiagnosed. Dengue is endemic to Grenada. DENV-1, DENV-2, DENV-3 and DENV-4 have been circulating in Grenada since 2002. There is estimation of 390 million dengue infections annually worldwide. There has been a rise in the number of annual documented cases of dengue in Grenada over the last three years as reported by the Ministry of Health Epidemiological unit, summarized in the table below:

Researchers from the State University of New York (SUNY) Upstate Medical University have collaborated with WINDREF researchers to conduct a prospective population-based study of dengue infection on SGU campus. The study consists of three different objectives;

### Primary:

- Determine the incidence of DENV infection in the SGU student and significant others population

### Secondary:

- Determine the feasibility to support a prophylactic dengue efficacy trial
- Characterize DENV viral kinetics for febrile subjects
- Determine the incidence of ZIKV infection

### Exploratory:

- Characterize the immunology, virus genetics and pathogenesis of primary DENV infection

- Evaluate febrile illness that is DENV or ZIKV negative



Collaborative representatives from SUNY, Janssen and WINDREF following the initial planning meeting in Grenada

**Inclusion criteria:**

- Male or female, age 18 or greater at time of enrollment
- Signed informed consent

**Exclusion criteria:**

- Planned extended absence away from Grenada during the school year (absence of > 4 weeks outside of breaks).
- In the opinion of the investigator, subject will not comply with study requirements.

The participants of this study will complete a short survey on demographics, vaccination and arboviral exposure history. Participants will have their blood drawn via venipuncture by qualified Grenadian registered nurses and will be required to schedule an appointment at WINDREF for their blood draw at the beginning of every term. If the participant is visiting a dengue endemic country during winter or summer break; an additional blood draw is required prior to leaving Grenada.

Participants that are experiencing dengue-like symptoms will visit WINDREF where a

Dengue NS1 Rapid test will be performed. The participant will then be referred to the SGU clinic for further observation. The InBios Dengue NS1 rapid test has a specificity of 100% and clinical sensitivity of 65.5%. Febrile participants will be followed for a 28-day period to investigate their immunological responses to possible arboviral infection.

In accordance with SGU and SUNY IRB approved Informed Consent Form (ICF) V8.0 14July2019, the study includes a random selection of participants for:

1. 6 Kaplan USMLE Step 1 On Site Prep Courses (SOM)
2. 4 Practical Experiences in Tropical Medicine in Eastern Africa (SVM)

This study consists of 3 cohorts of incoming SGU students and their significant others: August 2018, January 2019 and August 2019. Each cohort will be followed for two years. The expected completion date of the study is May 2021.

**Results**

Cohort 1 January 2019 samples were sent to SUNY for ELISA (IgG/IgM) and RT-PCR testing.

- Twenty-six (26) students from Cohort 1 had dengue prior to coming to Grenada (Aug 2018).
- Two hundred and sixty – eight participants (268) had no previous dengue exposure.
- One (1) participant was infected with suspected dengue serotype-2 during their stay in Grenada from Aug 2018- Dec 2018.

## Incentives



(Image of SVM of Cohort 1 & 2)  
Image showing winners from the School of Veterinary Medicine; Courtney Cobb (Cohort 1) and Alexandra Rogers (Cohort 2) for Practical Experience in Tropical Medicine in Eastern Africa with Dr. Macpherson (PI), Dr. Noël (Co-PI), Dr. Waechter (Co-PI) and Ms. Nikita Cudjoe (Project Manager)



(Image of SOM of Cohort 1 & 2)  
Image showing winners from the School of Medicine; Hana Nadeem (left - Cohort 1) and Sara Seedat (right- Cohort 2) for Kaplan USMLE Step 1 On Site Prep Course with Dr. Noël (Co-PI), Dr. Waechter (Co-PI) and Ms. Nikita Cudjoe (Project Manager).



(Image of SVM of Cohort 1 & 2)  
Image showing winners from the School of Veterinary Medicine; Courtney Cobb (Cohort 1) and Alexandra Rogers (Cohort 2) for Practical Experience in Tropical Medicine in Eastern Africa with Dr. Macpherson (PI), Dr. Noël (Co-PI), Dr. Waechter (Co-PI) and Ms. Nikita Cudjoe (Project Manager)

## Future

Baseline blood draws have been collected for all cohorts. Cohort 1 will be terminated in May 2020, Cohort 2 in August 2020 and Cohort 3 in May 2021.

We predict an increase of seroconversion due to heavy rainfalls resulting in the increase of mosquito breeding sites.

Participants of Cohort 1 and 2 will be receiving their dengue status in mid – February.

## Acknowledgements

- WINDREF Staff
- Registered Nurse- Sherice Phillip
- Lab Manager – Elsa Chitan
- To our collaborators
  - ◊ SUNY

This study was funded by Janssen Global Public Health, a division of Janssen Pharmaceuti-

ca N.V (July 2018 – May 2019) and SUNY (June 2019 – present)

*Submitted by Dengue Study Team (Dr. Calum Macpherson , Dr. Timothy Endy, Dr. Trevor Noël, Dr. Randall Waechter, Nikita Cudjoe MPH, Lisa Ware MS, Dr. Paul Fields)*

### **Diabetes Project**

The Diabetes project is implemented as a partnership with WINDREF, Organization of Eastern Caribbean States (OECS), Caribbean Public Health Agency (CARPHA) with funding from the World Diabetes Federation (WDF). For 2019, the project focused on finalizing and publishing revised guidelines for management of diabetes for the region and continuation of the regional train the trainer program for healthcare providers, civil society organizations and patient advocate groups. The revised guidelines for management of diabetes for the Caribbean was officially launched and published at the June 2019 CARPHA Annual Research Conference at Port of Spain, Trinidad. Through the CARPHA conference and subsequently through dissemination across the regional ministries of health, regional and international health organizations and train the trainer program, the guidelines are now in practice towards informing an more efficient and regionally contextual clinical, behavioral and nutritional regime for managing diabetes. The train the trainer program for 2019 involved trained trainers from 2018 conducting training within their respective island nations which was monitored and evaluated for the health education and health promotion standards for the project. The overall diabetes project which was funded for the period 2018-2019 ended with the objectives being met and all fiduciary obligations completed. WINDREF will continue its partnership with OECS,

CARPHA and WDF in 2020 with a new focus and grant for diabetes managed in pre-during and post disaster phases.

*Submitted by Satesh Bidaisee*

### **Dietary Supplement Studies**

LifeSeasons, Ins., located in Dallas, Texas, produces 35 dietary supplements sold through retail outlets in the USA as well as internationally. Over the past two years, WINDREF conducted a large study of one LifeSeasons product: Glucose Stabili-T, which is marketed to “support healthy blood glucose levels.” The study found some evidence mildly in support of the manufacturer’s claim.

Extending this line of research, WINDREF will be conducting six additional dietary supplement studies in 2020. The results of the studies will contribute to the limited about of scientific evidence documenting the effectiveness of dietary supplements.

#### **Study One Description**

The Effectiveness of a Glucose-stabilizing Dietary Supplement in Diabetics

Diabetes is one of the most challenging health problems in the 21st century. Worldwide estimates show that there are over 450 million adults with diabetes, 5 million diabetes-related deaths, and \$850 billion spent annually on healthcare for people with diabetes. Dietary supplements are claimed to be able to contribute to managing diabetes, but there is limited clinical data to substantiate their effectiveness.

The objective of this study is to determine the effect of a specific dietary supplement com-

pared to a placebo on blood glucose levels in diabetics over a six-month treatment period. The dietary supplement contains the following natural ingredients: chromium, fenugreek, gymnema, cinnamon bark, butcher's broom, gotu kola, bilberry fruit, alpha lipoic acid, bitter melon fruit, banana leaf, holy basil, vanadium, and trace minerals. It is claimed that this formulation helps "maintain healthy blood sugar, circulation, and vision."

This study is a randomized, placebo-controlled, double-blind, crossover trial with two groups of participants who will receive the dietary supplement and an inert placebo in alternating order. Subjects (n = 100) will be 65 years of age or older, diabetic as evidenced by HbA1c  $\geq$  6.5%, but otherwise healthy.

### **Study Two Description**

The Effectiveness of a Glucose-stabilizing Dietary Supplement in Prediabetics

Impaired glucose tolerance (IGT) – the condition in which blood glucose is higher than normal but lower than diabetes thresholds – is a major public health problem. According to the International Diabetes Federation, one in 14 adults has IGT, which amounts to 350 million people worldwide. Although dietary supplements are claimed to be helpful in preventing diabetes, but there is a lack of clinical data to substantiate this view.

The objective of this study is to determine the effect of a specific dietary supplement compared to a placebo on blood glucose levels in prediabetics over six months. The dietary supplement will be the same as in study one.

As in study one, this study will also be a randomized, placebo-controlled, double-blind,

crossover trial with two groups of participants who will alternately receive the dietary supplement and an inert placebo. Subjects (n = 100) will be 65 years of age or older, prediabetic as evidenced by HbA1c between 5.7% to 6.4%.

### **Study Three Description**

The Effectiveness of a Glucose-stabilizing Dietary Supplement in At-Risk Individuals

Five risk factors have been identified as indicators a person may be at-risk for developing type 2 diabetes: high fasting glucose, high blood pressure, hypertriglyceridemia, low HDL cholesterol, and abdominal obesity. Since it is claimed that dietary supplements could play a viable role in preventing diabetes, data to substantiate their effectiveness could be clinically meaningful.

The objective of this study is to determine the effect of a specific dietary supplement compared to a placebo on blood glucose levels in individuals at-risk for developing type 2 diabetes. The dietary supplement for this study is the same supplement as studied in studies one and two.

Similar to the other two studies, this study is a randomized, placebo-controlled, double-blind, crossover trial with two groups of participants who will receive the dietary supplement and an inert placebo. Subjects (n = 100) will be between the ages of 18 and 65, must display at least one of the risk factors, but must not be pregnant nor have any liver or kidney diseases.

### **Study Four Description**

The Effectiveness of a Glucose-stabilizing Die-

### tary Supplement in Healthy Individuals

There is almost no clinical documentation on the transient effect of dietary supplements on blood glucose levels. The questions are, “If there is an effect, how quickly can it be detected?” and “How quickly does the effect reach a clinically useful level?”

The objective of this study is to determine the transient effect on blood glucose levels in adults with normal blood glucose levels. The dietary supplement is the same one studied previously by WINDREF in 2018 and 2019.

Here again, this study is a double-blind, repeated-measures, randomized placebo-controlled, crossover trial with two subsets of participants (A and B). In subset A (n = 9), subjects’ blood glucose level will be tested daily in a laboratory setting for five days when using one treatment and then after a one-week washout period, the subjects will be tested daily for five more days on the alternate treatment. In subset B (n = 9), the subjects will be tested similarly, but for 15-day periods. Subjects will be given a prescribed diet to control for possible confounding dietary effects.

All study participants will be over the age of 18 years, in good general health, and have normal blood glucose levels.

### Study Five Description

The Effectiveness of a Stress Support Dietary Supplement in Medical Students

The rates of anxiety and depression among medical students surpass the levels of overall psychological distress in the general population. Dietary supplements are claimed to play

a viable role in combating stress or relieving anxiety, but there is a lack of clinical data to substantiate their effectiveness.

The objective of this study is to determine the effect of a specific dietary supplement compared to a placebo on stress levels in medical students at St. George’s University. The dietary supplement contains the following natural ingredients: magnesium, l-theanine, ashwagandha, cocoa, gamma-aminobutyric acid, kava kava, and theobromine. It is claimed that this formulation supports “the body’s natural ability to deal with common symptoms of stress, including nervousness and nervous exhaustion, stress-related muscle tension, anxious fearfulness, and stress-related sleep problems.”

Like the other studies described above, this study is a randomized, placebo-controlled, double-blind, crossover trial with four groups of participants who will receive alternately the dietary supplement and an inert placebo. The study will have two four-week treatment periods separated by a one-week washout period. A total of 160 subjects complete an online stress-level survey at the beginning and end of each four-week period. In addition, half of the study participants will engage in alternative stress-relieving activities, such as yoga. A four-way comparison will be made between the participants using the supplement, the placebo, and with or without other stress-management. In order to be eligible to participate in this study, students must be in good general health and must not be using any medication or other dietary supplement.

### Study Six Description

The Effectiveness of a Cognitive-enhancing Dietary Supplement in Medical Students

Medical training is inherently stressful. Medical school is known for a grueling academic curriculum characterized by heavy course load and frequent high-stakes examinations. Dietary supplements may play a role in enhancing cognitive functions, but there is limited clinically-documented data to substantiate this possibility.



The objective of this study is to determine the effect of a specific dietary supplement compared to a placebo on cognitive function in medical students at St. George’s University. The dietary supplement contains the following natural ingredients: vitamin B6, vitamin B12, l-theanine, kava kava, bacopa monnieri, yerba mate, caffeine, holy basil, ginkgo biloba, and huperzine A. It is claimed that this formulation “promotes the ability to concentrate and enhances mental performance and focus.”

This study is a randomized, placebo-controlled, double-blind, crossover trial with two groups of participants who will receive the dietary supplement and an inert placebo in alternate order. The study will have two four-week treatment periods separated by a one-week washout period. A total of 150 subjects will take two capsules every day and complete an online cognitive function survey at the beginning and end of each four-week period. In order to be eligible to participate in this study, students must be in good general health and must not be using any medication or other dietary supplement.



*Submitted by Paul Fields*

### **World Health Organization (WHO) ZIKV IPD-MA Consortium Meeting 2019**

The Zika-virus Individual Participant Data Meta-analysis of Zika-virus Consortium (ZIKV IPD - MA) is a global collaboration intended to synergistically and efficiently improve international and national responses to the ZIKV. This consortium consists of the pooling data from various cohort studies of pregnant women and children affected by Zika in a large-scale.

The WHO ZIKV IPD- MA Consortium, was held in Campinas, Brazil on 5th – 6th December, 2019. The project, The Spectrum of Zika Disease in Grenada was presented to the consortia by Dr. Trevor Paul Noël.

The take away thoughts from the presentations were as follows:

#### **Objectives**

1. Estimate the absolute and relative risk of fetal infection; miscarriage (>20 weeks), fetal loss (>20 weeks gestation, microcephaly and other manifestations of Congenital Zika Syndrome (CZS) and later developmental delays for women who do not experience ZIKV infection during pregnancy
2. Identify factors that modify women’s risk of adverse ZIKV-related fetal, infant and child outcomes and infants’ risk of infection

3. Use information on the relative important of different effect measure modifiers identified in Obj.2 to decompose the total effect of ZIKV infection during pregnancy on adverse fetal, infant and child outcomes into (1) the direct effect of ZIKV; (2) the indirect effect of ZIKV as mediated by the effect measure modifier of interest (eg. DENV, CHIKV or STORCH pathogens) and the effect of the interaction between ZIKV and the mediator of interest.

4. Develop and validate the risk prediction to identify pregnant women at a high risk of an adverse ZIKV-related outcome and to inform couples planning a pregnancy, health care provider and/or resource mobilization.

- Difficulty in obtaining samples from deliveries
- Economic issues
- Little enrollment at the first trimester
- Low ZIKV circulation
- Lack of engagement of local collaborators after no ZIKV cases recorded in the country

The Meta-analysis of individual participant data(IPD) had various advantages and disadvantages

**Advantages**

- Development of better predication models
  - ⇒ Ability to address wider spectrum of patients
  - ⇒ Ability to estimate more complex association
- More extensive testing of model performance, as to establish whether model performance is:
  - ⇒ Satisfactory on average
  - ⇒ Consistently good across different settings and (sub) populations

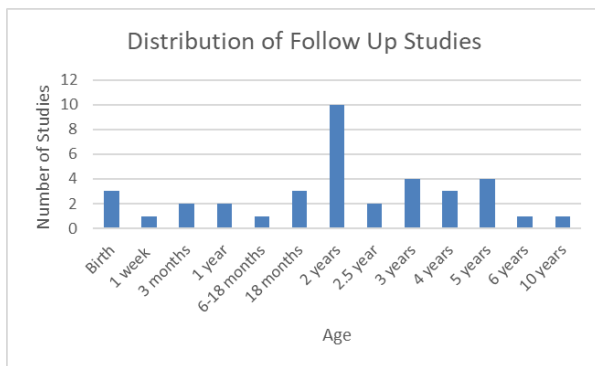
**General Recruitment**

- 40 cohorts of multisite consortia, representing longitudinal data on 30K pregnant women and their children
- 28 studies have returned a signed Letter of agreement (LoA) for data sharing and authorship
- 6 sites have uploaded de - identified, participant level data to the HRP e- Archive System

**Disadvantages**

- Differences in study quality, measurement methods, participant eligibility criteria, variable definitions, missing data, sample size of individual studies and unavailability of IPD

**Distribution of Follow up Cohorts**



**The date dissemination and sharing had several barriers;**

a. Technical Barriers

- Expensive – who will pay for it?
- Data needs a cleaning, harmonization and curation
- Career path poor for data management
- Standard need to compare across data sets
- Need machine readable data to com large data sets

**The Common Limitations among Cohorts**

- Loss due to follow up due to emigration
- Difficulties and reliability of serological and molecular testing



**b. Legal and Ethical Barriers**

- Privacy and confidentiality
- Differences in legal framework across country
- Who has access to the data?
- Who authorizes accessibility to data?

The current funding sources for the ZIKV IPD-MA are noted below:

Year	Funders	Amount
2016-2018	Wellcome Trust USAID	200K
2019-2020	Wellcome Trust	687K



Image 1: Attendees of the World Health Organization ZIKV IPD-MA Consortium Meeting 2019.

*Submitted by Trevor Noël on behalf of Roberta Evans, Nikita Cudjoe, Amy Krystosik, Randall Waechter, Barbara Landon, Michelle Fernandes, Karen Blackmon, Elyse Noel Grossi-Soyster, Jonathan Altamirano, Benjamin Pinsky, Veronica Mapp-Alexander, Elsa Chitan, George Mitchell, Shawn Charles, Calum Macpherson, A. Desiree LaBeaud.*

**Reachwithin**

Reachwithin, based in Grenada, West Indies, provides caregiver training and therapeutic programs for children and adolescents who have experienced abuse and neglect. Child maltreatment is problematic in the Caribbean: Data from UNICEF (2019) indicates that 39% of boys and girls in the Region are affected by sexual abuse. Such trauma can result in brain changes that increase the risk of mental and physical disease, crime, violence, under or unemployment and delinquency.

Child nervous system balance + trauma-informed adults fosters positive relationships through healthy attachment. Research shows this to be the single most common factor in cultivating resiliency (Child Trauma Academy, 2019).

Reach Within provides outreach services to four residential care homes on the island of Grenada, West Indies, a drop-in centre in the capital city of St. George’s and public awareness campaigns throughout all six parishes and on the island of Carriacou. Reach Within also liaises with UNICEF Eastern Caribbean Division as it works to establish best practice protocols for child abuse treatment and prevention in the region.

Our work in 2019 involved Reach Within’s multi-disciplinary professionals providing quarterly training on trauma-informed care, monthly clinical supervision, and stress reduction sessions for caregivers. In 2019, Reach Within trained 115 caregivers, who in turn work with approximately 1,100 children.

Reach Within provides low cost, high impact sessions of therapeutic yoga, drumming, swimming and other rhythmic sports to pro-

mote nervous system regulation. Mentoring and group activity promote cognitive reframing and instill healthy behaviors. In 2019 Reach Within worked with 89 children who each received a minimum of 100 hours of nervous system regulation sessions and mentoring.

Reach Within's Transitional Living Program provides job and life skills training along with mentoring to support progression to higher education and/or employment. In 2019 Reach Within served 37 adolescents who each received a minimum of 100 hours of mentoring support throughout the year.

Reach Within provides community-based child abuse awareness campaigns and trauma-informed care workshops. This year, Reach Within provided training and education access to 400 individuals.

### Impact to Date

Reach Within has spent 10+ years developing a model of care for child abuse and neglect:

- Therapeutic Intervention for 425 infants, children, and teens
- Training in Healthy Attachment Parenting for 3,000+ caregivers, social workers, nurses, and Child Protection Authority staff
- Facilitation into independence for 42 young adults through our Transitional Living Program
- Community based education on the deleterious psychological and physical effects of child abuse and neglect for 1,500+ people

### Growth in 2020

Our work is currently provided by a mobile

team that visits children in care homes or in Reach Within's drop-in center for street-connected kids. Caregiver training takes place in care homes or educational centers as available.

We aim to centralize our work in a freestanding facility in Mirabeau, located in central Grenada. Children and caregivers will be able to attend intensive and individualized or small group sessions in a serene environment. This facility will have the capacity to train participants from the fields of education, nursing, and social work as well as foster parents and at-risk biological parents.

We will provide: Therapeutic programs, caregiver retreats and a community learning center. With a capital investment of \$323,000 and an ongoing annual expenditure of \$175,000, Reach Within will be positioned to provide annual services for 24,000 people.

### Our Network

Reach Within is a primary research project for the Windward Islands Research and Education Foundation, a 501(c)(3) founded in the United States in 1994 and working internationally.

Reach Within is also the principal program of The Bartholomew J. Lawson Foundation for Children, a 501(c)(3) established in the United States and working in the Caribbean since 2003.

- UNICEF/Eastern Caribbean
- Centre for Social Innovation
- Consortium for Street Children
- Brazelton Touchpoints Center
- Child Trauma Academy

- St. George's University
- Supporting Child Caregivers
- UMass/Boston Child Development Unit
- Harvard Humanitarian Initiative
- NYS Association for Infant Mental Health
- World Association for Infant Mental Health
- Clinton Foundation

*Submitted by Karen Lawson*

### **Caribbean Research Ethics Education Initiative (CREEi)**

NIH-Fogarty International Center (Grant # R25 TW007085) funding for the five year Caribbean Research Ethics Education Initiative (CREEi) was renewed on April 15, 2019. The grant trained 80 professionals from 17 different low and middle income countries (LMICs) of the Caribbean basin in advanced research ethics. CREEi alumni completed a certificate program over one year in onsite and online courses. Several went on to complete a masters in bioethics. These alumni are using their training to develop courses, policies, and research involving research ethics in their own institutions and countries, thereby developing LMIC infrastructure and capacity to advance research and research ethics in their countries.

During CREEi's renewal, all trainees will complete a masters degree in bioethics with a specialization in research ethics. This training will be conducted in English and Spanish to develop and enrich cross-cultural partnerships and networks for research and capacity building. The Unidad de Bioética (established as a center of excellence at UAQ for Spanish speakers) and SGU's Center for Global Bioethics (to be launched in 2020 as a center of excellence for English speakers) will help to

advance and sustain the masters in bioethics programs at these institutions once the grant period is completed.

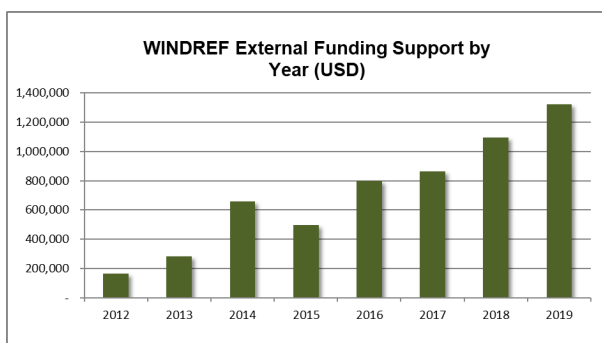
As a partnership between SGU, UAQ, and Clarkson University, year one of CREEi's renewal period was altered by significant changes at Clarkson University. This led Clarkson to formally relinquish the grant in January 2020, with Cheryl Macpherson becoming the new Principle Investigator (PI) and WINDREF becoming the new recipient of the grant. Dr Macpherson is the Head of SGU's Bioethics Division and Professor in its Department of Clinical Skills, and had been the Co-PI for CREEi's initial five years.

*Submitted by Cheryl Cox Macpherson*

### **External Grants and Funding**

We thank all of the donors who have made WINDREF's work possible in 2019:

- Bartholomew J. Lawson Foundation
- Eunice Kennedy Shriver National Institute of Child Health and Human Development - National Institutes of Health (NIH)
- Grand Challenges Canada
- German Government's Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (via Greenhouse Gas Management Institute)
- Global Water Partnership (GWP)
- Janssen Pharmaceutical (via State University of New York, Upstate Medical University)
- UNICEF
- United Nations Framework Convention on Climate Change (UNFCCC) Secretariat
- United States Fish and Wildlife Service (USFWS)



### 2019 Grant Applications

Ten grant applications were submitted to external funding agencies in 2019. The total potential value of these grant applications was \$8.06 million USD. To date, 4 of these applications were successful, 2 were not successful, and decisions on the other 4 are outstanding. The grant applications are listed below (green: funded, red: not funded, black: waiting to hear back).

- LaBeaud, Waechter, Blackmon, Noël, Landon, & Macpherson. Zika and Neurodevelopment among Infants in Grenada: 36-month Assessment. Stanford University
- LaBeaud, Noël, & Macpherson. Engaging Young People as Agents of Change. Stanford University.
- Cox Macpherson, Waechter & Macpherson. Caribbean Research Ethics Education Initiative. NIH-Fogarty International Center.
- McGlade, Gibb, Temmerman, Okello-Oriale, Michieka, Forrester, & Macpherson. Health, Polluted Water and Soils: Pathways to Impact. UK Research and Innovation, Global Challenges Research Fund, Global Engagement Networks.
- Landon, Waechter, Burgen, & Narine Parental Experience of Disabilities in Children. Organization of Eastern Caribbean States.

- Blackmon, Waechter, Noël, Macpherson, Thesen, Baki, Dlugos, Chari, & Patel. Epilepsy Surveillance in Children with Prenatal Zika Virus Exposure. NIH.
- Edwards. Bamboo: A sustainable resource for Charcoal Production - Addressing deforestation and land degradation in Grenada. GEF Small Grants Programme.
- Penny Light & Colket. The Center for Research on Storytelling in Education - Spring 2021 Research Conference. Spencer Foundation
- McDonald, Ragin, Imamura, Wang, Walter, Andall-Brereton, Glasgow, Gabriel, & Dyer. Evaluation of Direct and Indirect Effects of Pesticide Exposures among Farmers in the Windward Islands. NIH.
- Yanik, Lee, LaBeaud, Pinsky, Noël, Macpherson, & Waechter. Rapid, Multiplexed, and PCR-Free Detection of Arboviral Fever Syndromes in Resource Limited Settings. NIH.

### Past Research Projects

#### Non-communicable Diseases

- The Elimination of the Soil Transmitted Helminths from Grenada and Beyond
- Perspectives on the Uptake of Breast and Cervical Cancer Screening in the English Speaking Windward Islands: A Collaborative Approach
- Woman to Woman: A Cervical Cancer Education Program for Grenadian Women
- Genetic Correlates of the Addictive Diseases: Cocaine, Alcohol and Marijuana Addiction -Grenada, WI, Dr. Mary-Jeanne Kreek, Kreek Laboratory, Rockefeller University. \$60,000.
- The Effectiveness of Life Seasons' Diabet-X in reducing HbA1c among Grenadians with Metabolic Syndrome. LifeSeasons. \$100,000.

- Neglected Tropical Diseases (NTDs) and Rheumatic Fever in Grenada: a project to prevent/eliminate helminthic and rheumatic fever infections among children (5-15 years of age). Bartholomew J. Lawson Foundation. \$41,903.
- Angiotensin converting enzyme and angiotensinogen gene polymorphisms in the Grenadian population: relation to hypertension
- Development of a decision rule for screening Obstructive Sleep Apnea and its epidemiologic relevance to the people of Grenada
- Prevalence and associated risk factors of hypertension in a sample population of native Caribbean's in Grenada, West Indies
- Assessing the prevalence of diabetic complications by examining type I and type II adult diabetics for signs of retinopathy, neuropathy, nephropathy and dermatological changes associated with poor glucose control within the native Caribbean population of Grenada
- Hypertension management and control in two Caribbean countries
- Assessment of the effectiveness of broad-spectrum treatment to children with protozoan and nemathelminthic parasitic infections on diarrhea and school attendance
- The effects of iron-deficiency anemia on cognition and behavior in infants
- Diurnal variation of urinary endothelin-I and blood pressure: related hypertension
- Alcohol consumption in Grenada
- The incidence and mortality of cancer in Grenada over the ten year period: 1990-1999
- The prevalence of abnormal haemoglobin traits in Grenadian secondary school adolescents
- Knowledge, attitudes, beliefs and practices of sickle cell anemia in Grenadian primary and secondary school children
- Decompression sickness among the indigenous fishing population in Grenada: Assessing the burden of disease
- WINDREF / SGU Hurricane Relief
- Spice Research Program
- Sulfate-reducing bacteria in oxidized freshwater of tropical mangroves
- Novel antibiotics from tropical marine environments: drug development in Grenada
- Study of the mutacin C-7A
- Gram-negative bacteria isolated from aquatic environments of Grenada (61.4° W, 12.0°N), West Indies
- Identification of bacteria producing antibiotics isolated from deep marine biofilms of Grenada
- SGU Environmental Testing Unit (ETU)
- Post-hurricane water surveillance in problematic areas of Grenada
- Evaluation of the relocation potential for villagers residing in Queen Elizabeth National Park, Uganda
- Study of the calls of the spotted hyena at feeding
- Survey on the attitude of villagers in Queen Elizabeth National Park, Uganda towards the threat of lions, leopards and hyenas
- Epidemiology of human injuries resulting from wildlife in ten villages within Queen Elizabeth National Park, Uganda
- Rural Ugandan village perspective on lion, leopard and hyena conservation
- Epidemiology of human injuries by wildlife in six villages within Queen Elizabeth National Park, Uganda
- Prevalence of *Campylobacter fetus* subspecies *venerealis* and other microor-

ganisms in the reproductive tracts of cattle from the southern region of Santo Domingo, Dominican Republic

- Antimicrobial properties of skin secretions from *Eleutherodactylus johnstonei* on bacteriological isolates
- Examination and analysis of prostate cancer in Grenada
- A Church-based intervention to improve hypertension prevention and control among women in Grenada
- Occupational Health Problems among Nutmeg Factories Workers, SGU Small Research Grant Initiative
- Sport for Health Programme
- Grenada School Nutrition Study: Evidence to Inform Policy
- Genetic Correlates of the Addictive Diseases: Cocaine, Alcohol and Marijuana Addiction -Grenada
- Promoting Resilience Among Medical Students: A Comparison of Mindfulness, Yoga, and Exercise

### **Infectious Diseases**

- Neurodevelopment and Vector-borne Diseases: Building Research Capacity in the Tropics. National Institutes of Health -Fogarty International Center. \$298,938.
- Assessment of Neurocognitive Functioning in 2-year-old ZIKV-exposed Children. USAID via jhpiego. \$63,867.
- The Spectrum of Zika Disease in Grenada. Stanford University. \$13,601.
- The Spectrum of Zika Disease in Grenada. Stanford University. \$34,992.
- Zika Surveillance in the Southern Caribbean and Reference Lab Support. Naval Medical Research Center. \$80,000.
- Investigation of the prevalence of SIV in the mona monkey (*Cercopithecus mona*) in Grenada
- Seroprevalence of HIV-I and HIV-II in pregnant women in Grenada, W.I. –their knowledge of AIDS and their exposure hazards to the virus
- A cross sectional study of the current status of *Schistosoma mansoni* in St. Lucia by field surveys and supplementary data collection
- Identification and characterization of hantaviruses among the mammal population of Grenada
- HIV/AIDS health education and evaluation program in Grenada
- The seroprevalence of *Toxoplasma gondii* in a population of pregnant women and cats in Grenada, West Indies
- The efficiency of diagnosing women of *Toxoplasma gondii* using PCR techniques in comparison with ELISA
- Dengue virus in Grenada: seroprevalence and associated risk factors
- A current appraisal of dengue virus in Grenada –serotype analysis and vector assessment
- A site receptivity study determining the threat of reintroduction of malaria into Grenada through the study of *Anopheles* spp. mosquito vectors
- Chlamydial infection among STD clinic attenders in Grenada
- Fever in Grenada
- Mosquitoes and tourism in Grenada
- Effectiveness of a formula feeding/weaning intervention program in preventing transmission of HTLV-1 from seropositive mothers to newborns in Grenada
- A multi-center longitudinal research study of the behavioral significance of the prevalence of HIV-1 infection in pregnant women and their babies on the islands of Grenada and St. Vincent
- A multi-center longitudinal research study of the ethical analysis of informed

- consent of the prevalence of HIV-1 infection in pregnant women and their babies on the islands of Grenada and St. Vincent
- Determining the role of IL-15 in mediating function of viral-specific CD8+ T cells in the myelopathogenesis of HTLV-1: symptomatic versus asymptomatic patients
- Intestinal protozoan infections in 6-12 year old children in Grenada
- Intestinal helminth infections in 6-12 year old children in Grenada
- The prevalence of intestinal parasites in school children in rural Guyana
- The prevalence of filariasis and its effects on children aged 8-14 in the central corentyne region of rural Guyana
- The prevalence of streptococcal infection in school children aged 5 –15 years in Grenada, Carriacou and Petit Martinique
- Studies examining the elimination of lymphatic filariasis as a public health problem in Guyana
- Seroprevalence of heartworm infection in dogs in Grenada
- Dengue in Grenada
- Assessing the potential risk factors of dengue and dengue hemorrhagic fever in the tri-island state of Grenada, Carriacou and Petit Martinique
- A comparative study to find out if there is an association between sexual practices and knowledge in adult populations of Botswana and Grenada with the prevalence of HIV/AIDS
- HIV/AIDS in rural Botswana differentiating between informing and educating
- Evaluating the level of perceived fear and desensitization towards HIV/AIDS in Botswana
- Rheumatic Fever in Grenada
- Streptococcal program in St. Vincent
- Isolating T cells from Rheumatic Fever positive blood: immunofluorescent assay of T lymphocytes via fluorescently labeled monoclonal antibodies
- Possible genetic predisposition to Rheumatic Fever: demonstrating the inheritance fashion of non-HLA B lymphocyte alloantigen D8/17, a marker for Rheumatic Fever
- ELISA antibody titres against group A streptococcal M protein moiety and cell wall N-Acetyl-D-Glucosamine in Grenadian Rheumatic Fever patients
- Evaluating the effectiveness of educational methods in the prevention of Rheumatic Fever and knowledge, awareness and practices
- Prevalence of intestinal helminth infections in rural Grenadian school children
- Cystic echinococcosis in Morocco and Uganda
- Elimination of Lymphatic Filariasis in Guyana Program
- Neglected Tropical Diseases and Rheumatic Fever in Grenada: A project to prevent/eliminate helminthic and rheumatic fever infections among children (5-15 years of age)
- Ferguson, H. (2011-2014). Investigation of Disease in Pre-growout Fish in a Commercial Aquaculture Operation in Ecuador. Produmar, S. A.
- Heath, C., LaBeaud, D., Macpherson, C., & Noël, T. (2016). Characterization of Immune Factors of Chronic Chikungunya Disease. American Society for Tropical Medicine & Hygiene Robert E. Shope International Fellowship.

**Unique Projects**

- Caribbean Research Ethics Education Initiative (CREEi)
- Knowledge, Attitudes, and Practices Re-

- guarding Rabies in Grenada: A Cross Sectional Study. Pan-American Health Organization/Government of Grenada. \$10,007.
- Building Climate Resilient Health Systems in the Caribbean: A One Health Approach. Pan-American Health Organization (PAHO). \$20,380.
- Janicke, H., & Stone, D. (2018). Microgrant Award - Council on International Veterinary Medical Education. \$9,500.
- In-country Project Coordinator for the Eastern Caribbean Marine Managed Areas Network (ECMMAN) Project. The Nature Conservancy. \$68,109.
- Caribbean Research Ethics Education Initiative (CREEi). Fogarty International Center –National Institutes of Health. \$1,100,000
- Conservation Leadership in the Caribbean (CLiC). U.S. Fish and Wildlife Service, Division of International Affairs, via the International Fund for Animal Welfare (IFAW). \$325,205.
- Characterization of five amphibians inhabiting Grenada and subsequent isolation and antimicrobial assay of potential antibiotics derived from their skin
- Mona monkey studies in West Africa
- Investigation of medicinal plants in Grenada
- Use of medicinal plants in Grenada
- Medicinal drugs from the sea: what do Grenada's waters have to offer?
- Beekeeping in Grenada: effects of the mite *Varroa jacobsoni* and its control
- Effects of Grenadian medicinal plants on endemic microbial causes of diarrhoeal diseases
- The neurobiological basis of hypoglycemia-associated autonomic failure
- Stimulation of angiotensin 4 in cardiac fibroblasts activates matrix metalloproteinases through MAP kinases pathways: A model for astrocytes
- REM sleep and memory
- End of life care in Grenada
- Novel antibiotics from tropical marine environments
- Genetic correlates of the addictive diseases: cocaine, alcohol, and marijuana addiction—Grenada
- An investigation of pediatric botanical medicine for acute respiratory infections
- Efficacy of phage therapy using an in vitro biofilm wound model system
- Degradation of 7 keto cholesterol by Xenohydrolases
- Ecological survival properties of pelagic and benthic indicator microorganisms from the St. John's river outflow in Grenada
- The public health importance of dogs, Grand Anse, Grenada
- Greater occipital nerve zones for treatment of occipital neuralgia
- Photovoltaic power generation program
- Review of current biomedical waste management practices in the Organization of Eastern Caribbean States (O ECS) Countries
- Microbial diversity in the iron-oxidizing biofilms of soda springs in Grenada
- Circadian cycle of iron-oxidation in warm soda springs in St. Andrew's, Grenada, West Indies
- Do the microorganisms in the soda spring water derive energy from the oxidation of manganese?
- Novel marine bacteria and their antagonistic properties against medically relevant biofilms
- Physiological characterization of novel marine bacterial species isolated off Grenada
- Characterization of marine sponge-associated bacteria and cytotoxic activity



- of sponge extracts towards human cancer cells
- Examining HIV/AIDS provider stigma: assessing regional concerns in the islands of the Eastern Caribbean
- Knowledge, attitudes and practice survey for women (baseline survey)
- Caribbean EcoHealth Programme: public and environmental health interactions in food and water-borne illnesses (CEHP)
- Persistent Organic Pollutants
- Implementing Renewable Energy and Preventing Land Degradation: An Intervention in the Nutmeg Industry in Grenada
- Effects of prenatal ethanol exposure on the role of matrix-metalloproteinase mediated neural crest cells in an avian model
- Assessing Medical Students' Behavior, Perception, and Knowledge of UV Exposure and Sunscreen Application in the Caribbean (Grenada)
- Basic Life Support Knowledge and Skill Retention in Pre-Clinical Undergraduate Medical Students
- Student Satisfaction, Comfort and Self-confidence in a Simulation Lab Practice Session
- Reducing marine Litter in the Wider Caribbean: Developing and Implementing Best Waste Management Practices
- Ethical Issues and Challenges in Global Population Health Research Partnerships
- Disaster Management in Grenada: Northumbria University Student Research
- Baseline Coral Reef Monitoring Program for Sandy Island Oyster Bed Marine Protected Area Mooring Buoy Installation Project
- Genome annotation in microorganisms and metagenomic libraries as a part of an undergraduate curriculum
- Molecular identification of marine Vibrio isolated in Grenada
- Occurrence of Antibiotic-resistant Fecal Indicators in Coastal waters of Southern Grenada
- Investigation of disease in pre-growout fish in a commercial aquaculture operation in Ecuador
- Revitalizing the Nutmeg Industry in Grenada.
- Drug Demand Reduction: A Caribbean University Interdisciplinary and Integrated Proposal.
- The Bioethics of Health and Climate Change in the Caribbean
- Reach Institute for Children at SGU
- Outreach Activities in South Sudan
- UNFCCC Clean Development Mechanism (CDM) Caribbean Regional Collaborating Centre (RCC) at St. George's University.
- Student Fellow Stipend Agreement -American Humane Association (A. Werners) \$4,000
- Forde, M., Tomsons, S., Gomez, A. & Morrison, K. (2014). Ethical Issues and Challenges in Global Population Health Research Partnerships. International Development Research Centre. \$15,000.
- Sealy, H., Solis-Garcia, K. & Waechter, R. (2014). Capacity Building on Carbon Accounting and Clean Technologies Internship for Renewable Energy Post Graduate Students. GIZ Renewable Energies and Energy Efficiency in the Caribbean (REETA). \$5,500.
- Thomas-Purcell, K. & Richards, C. (2014-2015). Grenadian Women's Perspectives on Screening for Breast and Cervical Cancer. Nova Southeastern University – Ken-yon Award
- Ferguson, H. (2011-2014). Investigation of Disease in Pre-growout Fish in a Com-

- mercial Aquaculture Operation in Ecuador. Produmar, S. A.
- Gibson, K. (2015). Student Chapter Student Associate AVMA Faculty Advisor Program. American Veterinary Medical Association.
  - Kotelnikova, S., Morrall, C., Sealy, H., & Waechter, R. (2015-16). Woburn Clarke's Court Bay Water Quality Improvement Demonstration Site Concept. The Nature Conservancy.
  - Morrall, C., Waechter, R., Campbell, E., & Nimrod, S. (2014-). In-country Project Coordinator for the Eastern Caribbean marine Managed Areas Network (ECMMAN) Project. The Nature Conservancy.
  - Noël, T. (2016). Inter-American Institute for Cooperation on Agriculture.
  - Radix, R. (2012-2015). Grenada School Nutrition Study. International Development Research Centre.
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  - Waechter, R., Mitchell, D. & Aire, T. (2014-2015). Restoration and Community Co-Management of Mangroves (RECCOMM) in the Northern Telescope Coastal Area. GIZ Integrated Climate Change Adaptation Strategies (ICCAS) Grenadapts.
  - Zap, A. & Rush, M. (2015). Thyroid Hormone Concentrations in Galapagos Giant Tortoises. Morris Animal Foundation -Veterinary Students Scholar Program.
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- Altafulla J., Bordes S., Jenkins S., Litvack Z., Iwanaga J., Loukas M., Tubbs R.S (2019). The Basal Subarachnoid Cisterns: Surgical and Anatomical Considerations. *World Neurosurgery*, 129, 190-199
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- Ashcroft J.W., Macpherson C.C (2019). The complex ethical landscape of biobanking. *The Lancet Public Health*, 4(6), e274-e275
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- Bordes S., Jenkins S., Loukas M., Iwanaga J., Curé J., Tubbs R.S (2019). Drainage of the basal vein of Rosenthal into the confluence of sinuses, *Anatomy and Cell Biology*, 52 (2),214-216
- Boscolo-Berto, R., Emmi, A., Macchi, V., Stecco, C., Loukas, M., Tubbs, R. S., Porzionato, A., & De Caro, R. (2019). Brunetti's chisels in anterior and posterior rachiotomy. *Clinical Anatomy (New York, N.Y.)*. <https://doi.org/10.1002/ca.23480>
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## Publications

### Journal Articles (53)

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- Chitterman A., Warner T., Mehta K., Iwanaga J., Loukas M., Tubbs R.S (2019). Ectopic arachnoid granulations: A review. *Translational Research in Anatomy*, 17, 100050
- D'Antoni, A. V., Mtui, E. P., Loukas, M., Tubbs, R. S., Zipp, G. P., & Dunlosky, J. (2019). An evidence-based approach to learning clinical anatomy: A guide for medical students, educators, and administrators. *Clinical Anatomy (New York, N.Y.)*, 32(1), 156–163. <https://doi.org/10.1002/ca.23298>
- Davis M., Jenkins S., Bordes S., Iwanaga J., Loukas M., Uribe J., Hynes R.A., Tubbs R.S. (2019). Iliolumbar Vein: Anatomy and Surgical Importance During Lateral Transpsoas and Oblique Approaches to Lumbar Spine. *World Neurosurgery*, 128, e768-e772
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- Glasgow, L., Worme, A., Keku, E., & Forde, M. (2019). Knowledge, attitudes, and practices regarding rabies in Grenada. *PLoS Neglected Tropical Diseases*, 13(1), e0007079. <https://doi.org/10.1371/journal.pntd.0007079>
- Inhoff M.C., Heusser A.C., Tambini A., Martin C.B., O'Neil E.B., Köhler S., Meager M.R., Blackmon K., Vazquez B., Devinsky O., Davachi L. (2019). Understanding perirhinal contributions to perception and memory: Evidence through the lens of selective perirhinal damage. *Neuropsychologia*, 124,9,18
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- Abstracts/Presentations at International Conferences (10)**
- Bidaisee, S (2019). Kasersart University, Faculty of Sports Science, Sports Meeting, Thailand, April 23-30, 2019
- Bidaisee, S (2019). Kasetsart University, Community Based Participatory Research, Community Health Assessment, Thailand, November 25-29, 2019
- Charles, R (2019). Academy of International Business Chapter Southeast, Texas, USA, October 17-19,2019
- Colket, L (2019). American Educational Research Association Annual Meeting, Canada, April 5-9, 2019
- Cox Macpherson, C (2019) 28th Annual Meeting of APPE, Baltimore, USA, February 28 - March 3, 2019
- Forde, M (2019). ASPPH Academic Meeting in

- Asia: Global Conference on Public Health Education in the 21st Century, Taiwan, September 24-26, 2019
- Kabuusu, R (2019). International Scientific Conference 2019, Uganda, June 1-July 1, 2019.
- McGill, F, Burbank G, Edwards T, Blackmon, K, Nicholson, M, Warwick, P (2019). Understanding student communication skills to enhance success: a comparison of business and medical students. Presented at the Durham University Learning and Teaching Conference. September 9, 2019. Durham, United Kingdom
- Morrall, C (2019). 72nd Annual Conference of the Gulf and Caribbean Fisheries Institute, Dominican Republic, November 4-8, 2019
- Richards, C (2019). APHA Annual Meeting and Expo 2019, USA, November 2-6, 2019
- conservation in school children in Grenada, West Indies" 20th February 2019
- Vijay Bhoj: "Reprogramming the immune system to fight cancer" 21st February 2019
- Katherine Brigman: "Human gut microbiome in health: Fecal transplantation" 6th March 2019
- Lindonne Glasgow: "Agrochemical Use and Health Risks in Grenada and the Caribbean Region" 13th March 2019
- Bhumika Sharma: "Development of an oligonucleotide bead based 6-plex assay for detection of vector-borne diseases in animals in Grenada, West Indies" 20th March 2019
- Emily Turitto: "Lionfish (*Pterois* spp.) as a source of common seafood-associated zoonotic bacteria and contaminants in Grenada, West Indies" 27th March 2019
- Threshni Chetty: "Animal Husbandry and Welfare" 10th April 2019
- Dexton St. Bernard: "Varroa destructor mite, vector and parasite of Grenadas honey bees" 12th April 2019
- Cristina Mastromonaco: "Prevalence and transmission of *Staphylococcus pseudintermedius*, and the emergence of methicillin-resistance in the Grenadian dog population" 15th April 2019
- Michael Snosek: "The fascial anatomy of the retropharyngeal region and its clinical relevance" 15th April 2019
- Jennifer Rooney: "Bedside Teaching Sessions in the second year of medical school: The Students' Perspective" 17th April 2019
- Katherine Brigman: "Genetically Modified mosquitoes: to be or not to be?" 17th April 2019
- Amanda James: "Prevalence of herpesvirus and herpesvirus-associated disease in sea turtles in Grenada, West Indies" 18th April 2019
- Arend Werners: "Veterinary Students' Type

#### Graduate Seminars (44)

- Sean Philpott: "Building Research Ethics Capacity in the Caribbean" 23rd January 2019
- Crissy-Ann Harrylal : "The influence of the climatic season and photoperiodism on the reproductive tract of the sexually mature female green iguana (*Iguana iguana*) in Grenada" 30th January 2019
- Timothy Endy: "Understanding dengue pathogenesis and essential areas of research" 6th February 2019
- Kate Charles: "Temperature and humidity impacts on the Atlantic leatherback sea turtle (*Dermochelys coriacea*) hatchling and embryonic success rates in Grenada, West Indies" 13th February 2019
- Joseph R. Masci: "Climate Change and You: The Infectious Disease Physician's Point of View" 15th February 2019
- Joseph Frame: "The effects of a conservation education curriculum on marine turtle

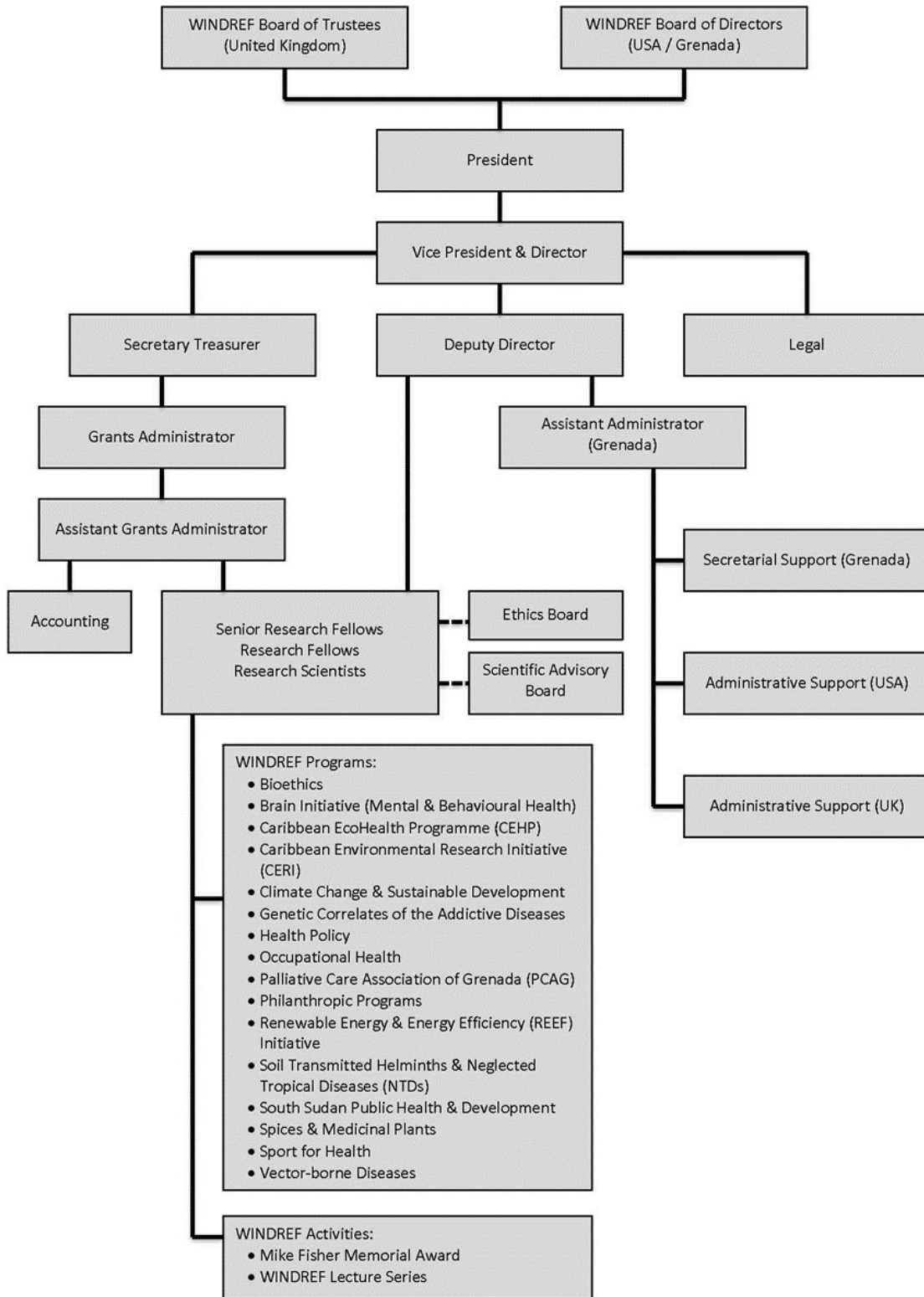
- and Strength of Motivation at a Private, For-Profit Caribbean Veterinary School" 24th April, 2019
- Keith Kalasi: "Grenada feral cats as a potential reservoir for zoonotic *Leptospira*" 3rd May 2019
- Bevalin Alexander: "The Impact of mandated use of academic support services on voluntary help-seeking and academic Performance" 3rd May 2019
- Pricilla Blackett: "The relationship between students' performance in the Minimum Competency Test (MCT) in Grade 2 and in Grade 5 in a school district in Grenada" 7th May 2019
- Mondell George: "Investigating sleep patterns and effects on medical students at a private, for profit medical school in the Caribbean" 7th May 2019
- Amber Lee: "DNA detection of the bacterial pathogens *Campylobacter jejuni*, *Salmonella enterica* serovars, and *Neorickettsia risticii* in Grenadian bats" 8th May 2019
- Phenyo Phuu: "Arthropod Borne Diseases in Botswana" 14th May 2019
- Katherine Brigman: "Yellow Fever: Historical to present Day" 15th May 2019
- Shamin Renwick: "Enhancing Academic Support with Innovative Library Services at SGU" 17th May 2019
- Victor Amadi: "Occurrence and properties of *Salmonella*, *Campylobacter*, *Escherichia coli*, and other potential human pathogens in the feces of non-diarrheic dogs" 28th August 2019
- Christopher Gibson: "A Proposed Model for ZIKV Persistence In Human Immune Cells" 4th September 2019
- Dr François Hallé: "Current therapeutic uses of medicinal cannabis" 6th September 2019
- Shamin Renwick: " Enhancing Academic Support with Innovative Library Services at SGU" 11th September 2019
- Sarah Elsea: "Clinical metabolomics improves diagnosis of inborn errors of metabolism" 24th September 2019
- Laurie Taylor: "Partners, Platforms, and Practices for Studies of the Caribbean in the Digital Age with the Digital Library of the Caribbean (dLOC)" 26th September 2019
- India Paharsingh: "Establishing and Comparing Hematology and Biochemical Reference Intervals in Community Owned and Adopted Grenadian Dogs" 27th September 2019
- Paul Garner: "Egg white, refugees and trials in global health: the story of iron in malaria" 16th October 2019
- Desirée La Beaud: "The Impact of Climate change on Vector Borne diseases" 23rd October 2019
- Adara Jaggernauth, Kate Charles, Claire Morrall: "Impact of marine debris in Grenada"....."Sea Turtles in Grenada"....."Microplastics in the environment and marine litter on Grenada shores" 28th October 2019
- Joav Merrick: "Public Health Israel" 30th October 2019
- John Macri: "2019 Bat Survey in Grenada, West Indies and Continuation of Virus Surveillance on these Species" 11th November 2019
- Katherine Brigeman: "Dengue in Grenada 2018-2020" 13th November 2019
- Jonnell Edwards: "Prevalence and phenotypic characterization of *Salmonella enterica* in the cloacal carriage of marine turtles in Grenada" 25th November 2019
- Joseph Frame: "Development of a marine turtle conservation education curriculum and assessment of its effects on the knowledge and attitudes of school children in Carriacou, Grenada, West Indies" 29th November 2019



Vishaka Vasuki: “ Gastrointestinal Helminth Parasites of Habituated and Wild Mountain Gorillas In Bwindi Impenetrable National Park, Uganda” 4th December 2019

Royal Grenada Police Force: “Animal Laws and Regulations in Grenada” 6th December 2019

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