

# FACULTY OF EARTH & ENVIRONMENTAL SCIENCES (FEES)

## Annual Report

[September 1, 2019 – October 31, 2020]



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## 1.0 INTRODUCTION

The Faculty of Earth and Environmental Sciences (FEES) is a relatively small, but very visible and visionary Unit that was designated to its current academic status (from the School of Earth and Environmental Sciences to FEES) in recognition of its outputs with respect to teaching and research, as well as the potential for accessing more grants and consultancy contracts.

### **Vision Statement**

The vision statement of FEES is the following: *A community of students and staff dedicated to the provision of an exciting learning experience characterised by high-quality teaching and research that positively impact the development of the society.*

### **Mission Statement**

*A highly visible and stimulating intellectual environment in which innovative and multidisciplinary teaching and research produce graduates with the technical skills, knowledge, and attitude required to support national development while enhancing the viability and reputation of the Faculty.*

## 2.0 FACULTY ADMINISTRATORS

### **Faculty Coordinating Committee Member**

*Temitope D. Timothy OYEDOTUN, PhD in Physical Geography, MSc in GIS, MSc in Geography (Hydrology Option), BSc (First Class Hons) in Geography/ Dean*

*Seon Hamer; MSc. Natural Resource & Environmental Management (Climate Change), BSc. in Forestry, Lecturer and Assistant Dean, Department of Environmental Studies, Assistant Dean*

*Shanomae Rose, MSc.; MPH, BSc; Dip. in Med. Tech; /Lecturer II / Head, Department of Environmental Studies*

*Linda Johnson-Bhola, MSc. (Urban & Regional Planning – Research), BA (Geography); Lecturer II, Head, Department of Geography*

*Keshawna Garnett-Adams, CMBA, BSc. in Business Management, Administrative Officer II*

### **Programme Coordinators**

*Judith Rosales, PhD, MSc., Lic. Professor, Coordinator, PhD in Biodiversity Programme*

*Ramona Dabee-Johnson, BA Geography, DipEd. Social Studies, Coordinator - Diploma in Valuation Special Programme*

## 3.0 Names of Academic Staff during Academic Year 2019-2020

### 3.1 Full-time

The highlighted name of full time staff indicate that the Staff joined the Faculty in 2019/2020.

*Temitope D. Timothy OYEDOTUN, PhD, MSc, BSc*

*Seon Hamer; MSc., BSc,*

*Judith Rosales, PhD, MSc., Lic. Professor*

*Shanomae Rose, Dip. in Med. Tech; BSc; MSc.; MPH*

*Stephan Moonsammy, MSc, BSc*

*Linda Johnson-Bhola, MSc, BSc*

*Dina Khadija Benn, MSc, BA*

*Ramona Dabee-Johnson, DipEd, BA*

*Rawle Edinboro, MSc, BA*

***Ms. Chamique Steele, BSc.***

### 3.2 On Sabbatical Leave

*Paulette Bynoe, PhD; MPhil; BA; AA;*

*Denise Simmons, MSc.; Postgraduate Diploma in Education (Science); BSc. (*

### 3.3 Major Awards Received by Staff in 2019/2020

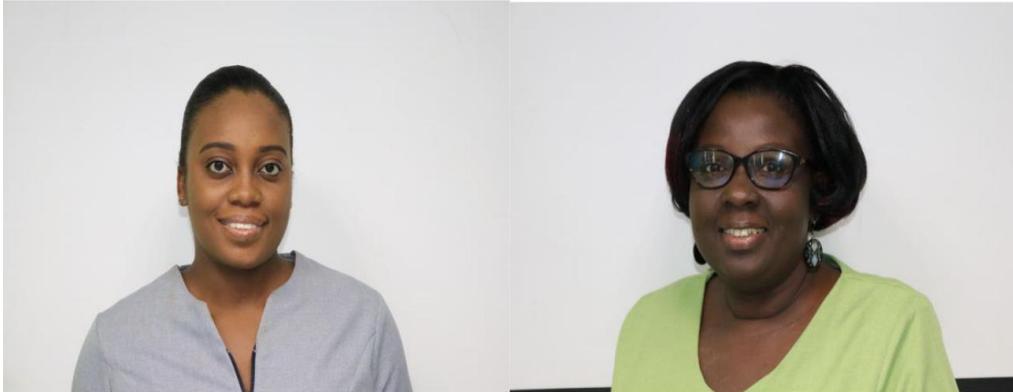
WWF French Guiana granted the full sponsorship of the participation of **Dr Temitope Oyedotun** in Ecosystem Observatory of the Guiana Shield (ECOSEO) workshop in Paramaribo, Suriname from Jan 27 to Jan 31, 2020

### 3.4 Part-Time Lecturers 2019/2020

- Ms. Claudette Foo
- Dr Patrick Williams
- Dr Evangeline Inniss Springer

- Dr Marlyn Morris
- Mr Patrick Thompson
- Mr Forrest Smartt
- Dr Anna Perreira
- Ms Onika Stellingburg
- Ms Odessa Shako
- Ms Linda Francois
- Ms. Makeel Maison
- Ms. Jennifer Ayana McCalman
- Ms. Sharon Jackson
- Ms. Sandra Britton
- Mr. Leslie Sobers
- Mr. Alston Alleyne
- Mr. Phillip DaSilva
- Ms. Tamara Gilhuys
- Ms. Michelle Astwood
- Mr. Rapheal Singh
- Ms. Nelanie LaCruz
- Mr. Orville Crichlow
- Ms. Raeanna Clarke
- Dr. Vincent Raja
- Ms. Melinda Franklyn
- Ms. A. Bernard
- Lt. Col. Kester Craig
- Ms. Anita Wilson-Layne
- Mr. Owen Bovell
- Dr. Daren Shako
- Ms. Diana Gobin

### 3.5 Names of Non-Academic Staff



**Keshawna Garnett-Adams, Administrative Officer 11**

**Lavern Simon-Green  
FEES Personal Assistant (ag)**



Esther Benn, Clerk Typist 11



Nickeshia Sampson, Clerk Typist 11



Oswald Washington, Office Attendant

## 4.0 NOTABLE VISITORS

Professor Mark Leipnik of Sam Houston State University, Huntsville, Texas, USA visited the Faculty's Department of Geography as Guest Lecturer and presented the following lectures:

- **Spatial Analysis as a Decision-making Tool for Regional Development Methods and Case Studies** – lecture delivered on January 11, 2020 to the MSc in Urban & Regional Planning students.
- **The Role of GIS in Land Resources Valuation and Land Management (with focus on Guyana)** – lecture delivered on January 13, 2020 to the Diploma in Valuation students.

## 5.0 PUBLIC AND PROFESSIONAL SERVICE

*Members of Staff of FEES provided various public and professional services at national, regional and international levels, as highlighted below.*

***TEMITOPE D. TIMOTHY OYEDOTUN, READER***

- Member of Guyana National Hydrographic Coordinating Committee;
- served as University of Guyana’s Alternate Representative at the ongoing Multi-Stakeholder Committee on Natural Resources for the Ministry of Natural Resources, Government of the Cooperative Republic of Guyana;
- Currently serving as Writing Team and Peer Review Member of United Nations Pool of Experts for Global Reporting and Assessment of the State of the Marine Environment;
- Served as Chair of Guyana’s Environmental Assessment Board (01 Jul 2019 - 01 Apr 2020)
- 14 Jun 2018 - to date - American Association of University Administrators – Member
- 15 May 2018 – to date - The International Research and Training Centre on Erosion and Sedimentation/The World Association for Sedimentation and Erosion Research - Journal Reviewer for International Journal of Sediment Research
- 01 Apr 2018 – to date - International Water, Air and Soil Conservation Society (INWASCON) - Journal Reviewer for Geology, Ecology and Landscape
- 01 Jun 2016 – 2020 European Water Resources Association (EWRA) - Journal Reviewer for Environmental Processes.

***SHANOMAE ROSE, LECTURER II***

- Shanomae Rose/Director, Protected Areas Commission Board

***LINDA JOHNSON-BHOLA, LECTURER II***

- Reviewed the “Rural and Urban Settlements” Course Outline for Sir Arthur Lewis Community College (SALCC), Office of Institute of Institutional Effectiveness, St Lucia (December 2019)
- Served as Member, International Geoscience Education Organisation
- Served as Member of the Caribbean Association of Planners
- Panellist- Geography Syllabus Review Panel, CSEC/CXC provided support to Geography Teachers (SBAs and Map Reading) in various Regions

***STEPHAN MOONSAMMY, LECTURER II***

- Stephan Moonsammy; Lecturer II; Expert Panelist for *In Focus: Guyana’s Ecosystems* on Room 592 hosted by Kaieteur Radio 99.1 FM.

***DINA KHADIJA BENN, LECTURER II***

- Reviewer, IConETech Conference, University of the West Indies (2020)
- Co-organiser, GIS Day 2019 Planning Committee (2019)
- Conducted one-to-one training in spatial statistical analysis, database design, and cartography with requesting officers of government institutions and NGOs (2019–2020)
- Provided geospatial services to public and private companies (2019-2020)
- Produced maps and diagrams for technical reports, academic publications, and conference presentations (2019–2020)
- Provided design and editorial services for technical reports and academic publications (2019–2020)

***RAMONA DABEE-JOHNSON, LECTURE I***

- Lead in the development and implementation of Diploma in Valuation Programme at the request of the Guyana Lands and Survey Commission
- Developed Course outline “VAL 2101 Capstone Project/Professional Project Report”

***RAWLE EDINBORO, SENIOR LECTURER***

- Chairman of the Local Organising Committee and lead University of Guyana representative for the organisation of the Caribbean Urban Forum 2020 (postponed).
- Project Coordinator, CityLab Car Project
- Advisor (Land Policy and Planning), Guyana Lands and Surveys Commission
- Provided advisory services to the Central Housing and Planning Authority for the development of a Planning Scheme for the Houston-Rome, Greater Georgetown area.

## 6.0 PUBLICATIONS

### 6.1 Journal Publications

- i. **Oyedotun, T. D. T. & Moonsammy, S.** (2020). *Spatio-temporal variation of COVID-19 and its spread in South America: A Rapid Assessment*, **Annals of the American Association of Geographers**; <https://doi.org/10.1080/24694452.2020.1830024>  
<https://www.tandfonline.com/doi/full/10.1080/24694452.2020.1830024>
- ii. **Oyedotun, T. D. T.** (2020) *Quantitative assessment of the drainage morphometric characteristics of Chaohu Lake Basin from SRTM DEM Data: a GIS-based approach*, **Geology, Ecology, and Landscapes**, <https://doi.org/10.1080/24749508.2020.1812147>
- iii. **Oyedotun, T. D. T.** (2020) *Compositional and multivariate statistical analyses for grain-size characterisation of intertidal sedimentary facies in an estuarine environment*, **Geology, Ecology, and Landscapes**, <https://doi.org/10.1080/24749508.2020.1814186>
- iv. **Babajide, S. O., Oyedotun, T. D. T., Oderinde, O., Oguntoke, O., and Babajide, E.** (2020) *Evaluation of the Impacts of Metals on Soil Samples, Serum Creatinine and Blood Urea Nitrogen of Residents in Selected Industrial Communities in a Developing Country*, **Environmental Contaminants Reviews**, Pages 40 – 47.  
<http://doi.org/10.26480/ecr.01.2020.40.47>  
(<https://contaminantsreviews.com/paper/1ecr2020/1ecr2020-40-47.pdf>)
- v. **Moonsammy, S.** (2020) *Social Media Application in Agriculture Extension Programming for Small Scale Rural Farmers: Is Knowledge Impeding the Lack of Adoption?* **Journal of International Agricultural & Extension Education**;
- vi. **Narayan, A., Mora, A., Sanchez, L. and Rosales, J.** 2020. *Temporal and spatial variability of heavy metals in bottom sediments and the aquatic macrophyte Paspalum repens of the Orinoco River floodplain lagoons impacted by industrial activities*. **Environmental Science and Pollution Research** 27: 37074–37086. DOI: 10.1007/s11356-020-09623-1
- vii. **Rodríguez, M., J. Steiger, J. Rosales, et al.** 2019. *Multi-annual contemporary flood event overbank sedimentation within the vegetated lower Orinoco floodplain, Venezuela*. **River Research and Applications**. DOI: 10.1002/rra.3510
- viii. **Boston, C., J. Singh, J. Rosales, R. Kurup.** 2019. *Phytochemical Analysis and Anti-diabetic Potential of Annona muricata L., Persea americana Mill. and Montrichardia arborescens L. Schott Utilized by the Residents of Pakuri (St. Cuthbert's Mission) in Guyana*. **Journal of Alternative Medical Research**. DOI: 10.9734/JOCAMR/2019/v8i430130

- ix. Boston, C., J. Singh, **J. Rosales**, R. Kurup 2019. *Comparison and Effectiveness of Complementary and Alternative Medicine as against Conventional and Alternative Medical. Pakuri (St. Cuthbert's Mission) in Guyana. Journal of Complementary and Alternative Research. DOI:10.9734/JOCAMR/2019/v7i230097*
- x. Boston C., **J. Rosales**, Jaipaul Singh, R. Kurup 2019. *Knowledge and Complementary Utilization of Traditional Medicine for Type 2 Diabetes Mellitus among Residents of Medicine in the Treatment and Management of Type 2 Diabetes. Journal of Medical Research DOI: 10.9734/jocamr/2019/v7i330100.*
- xi. **Oyedotun, T. D. T.**, Kasim, O. F., Famewo, A., Oyedotun, T. D., **Moonsammy, S.**, Ally, N. & Renn-Moonsammy, D-M (2020) *Municipal waste management in the era of COVID-19: Perceptions, practices, and potentials for research in Developing Countries. Research in Globalization. <https://doi.org/10.1016/j.resglo.2020.100033>*
- xii. **Oyedotun, T. D. T.** (2021) *Impacts of COVID-10 on geomorphological fieldwork: Exploration of new initiatives and dimensions. Geological Behavior, 5(1): 01-03. <http://doi.org/10.26480/gbr.01.2021.01.03> - In Press*
- xiii. **Oyedotun, T. D. T.** and Burningham, H. (2019) *Comparable short-term morphodynamics of three estuary-coastal systems in southwest England, Regional Studies in Marine Science Volume 31, <https://doi.org/10.1016/j.rsma.2019.100749>*
- xiv. Liang, T. and **Moonsammy, S.** (2021). *Evaluating the impact of small-scale mining on the achievement of the Sustainable Development Goals in Guyana. Environmental Science and Policy (Elsevier).*
- xv. **Moonsammy, S.**, **Oyedotun, T. D. T.**, Oderinde, O., Durojaiye, M. and Durojaiye, A. (Under Review) *Policy compliance and exhaust determination of End-of-Life vehicles in a Developing African country: A case study of Nigeria. Transportation Research Part D. (Elsevier).*
- xvi. **Moonsammy, S.**, **Oyedotun, T. D. T.**, Renn-Moonsammy, D-M, & Oyedotun, T. D. (Under Review) *COVID-19 Modelling in the Caribbean: Spatial and statistical assessments. Spatial and Spatio-temporal Epidemiology. (Elsevier).*
- xvii. **Moonsammy, S.**, **Oyedotun, T. D. T.**, Renn-Moonsammy, D-M, Oyedotun, T. D., Ally, N., Kasim, O. F., Famewo, A. (under review) *COVID-19 Effects on Municipal Waste Collection Services for Households: Statistical modelling of perspectives from Guyana and Nigeria, Journal of Material Cycles and Waste Management, (Springer).*
- xviii. Kasim, O. F., **Oyedotun, T. D. T.**, Famewo, A., Oyedotun, T. D., **Moonsammy, S.**, Ally, N., Renn-Moonsammy, D-M. (under review) *"Household Waste Generation and Exposure of Waste Managers to COVID-19 in Guyana and Nigeria", Waste Management & Research (SAGE)*

## 6.2 Book Chapters

- xix.** **Johnson-Bhola, L.** (2020) *Effects of Rural Land Tenure System on Mangroves Management in Corentyne, Guyana, Land Use Change and Sustainability*, Seth Appiah-Opoku, IntechOpen, DOI: 10.5772/intechopen.89610.
- xx.** **Benn, D.K.** (2020). *Those Who Remain: Portraits of Amerindian Women*. In G.A. Ali (Ed.), *Liminal Spaces: Migration and Women of the Guyanese Diaspora*. Open Book Publishers.

## 6.3 Conference Proceedings

- i.** **Bonita Bernard & Shanomae Rose** (in press) *Batavia Residents' Knowledge and Perception of the Potential Health and Environmental Risks of an Upstream Cyanide Spill from Gold Mining/Proceedings of the National Conference On Undergraduate Research (NCUR) 2020/In Press*
- ii.** **Rila Harlequin, Shanomae Rose, & Paul Cheddie** (in press) *An Investigation on the Indoor Air Quality in 2 Nursery Schools/Proceedings of the National Conference On Undergraduate Research (NCUR) 2020/In Press*

## 6.4 Project Reports

- i.** **Stephan Moonsammy**; Rapid Economic Assessment of Mangrove Ecosystems in Guyana; Casing the Barima-Mora Passage and West Berbice Mangrove Systems; Landell Mills International; 2020.
- ii.** **Linda Johnson-Bhola**, *Chapter Six* (Education and Public Awareness) of Guyana's Third National Communication (TNC) to the United Nations Framework Convention on Climate Change. Office of Climate Change, Ministry of Presidency, Cooperative Republic of Guyana, 2020
- iii.** **Johnson-Bhola, L., Simmons, D., Hamer, S., & Oyedotun, T. D. T.** (Collaborative) - *Chapters One and Three* of Guyana's Third National Communication (TNC) to the United Nations Framework Convention on Climate Change. Office of Climate Change, Ministry of Presidency, Cooperative Republic of Guyana, 2020
- iv.** **Benn, D.K.** Crop and Spatial Modeling Report for Guyana. International Center for Tropical Agriculture, 2020
- v.** **Benn, D.K.** Geospatial Suitability Assessment Crop Modeling for Guyana: Technical Report. University of Guyana Library, 2019

- vi. **Oyedotun, T. D. T.** and **Hamer, S.** State of the Wellington Park Mangrove Forest. Report on Data Collected and Analysed for Wellington Park, East Berbice – Corentyne, Guyana, submitted to Guyana’s Environmental Protection Agency. p.94 (April 2020)

## 6.5 Books

- i. Remington, C., **Benn, D.K.** & **Rose, S.** (Eds.) (2020). Department of Environmental Studies Book of Abstracts – Student Research. Journal of Academic Research and Essays.
- ii. **Simmons, D.A., Rose, S., & Benn, D.K.** (2019). The Rio Conventions Training Manual for Teachers. Ministry of the Presidency, Department of Environment.
- iii. **Oyedotun, T. D. T.** (2020) **Guide Rock**. Amazon. ISBN-13: 979-8683534202. ASIN: B08HRV86FM <https://www.amazon.com/dp/B08HRV86FM> (Hardcopy - 472 pages); Kindle Version: <https://www.amazon.com/dp/B08HLJQ5TJ> (691 pages)
- iv. **Rosales J.** (2019). **Contemporary Environmental Issues**. ISBN-10:1774073072. Society Publishing.
- v. **Rosales J.** (2019). **Altered Ecosystems**. 261 pp. Delve Publishing. ISBN-13: 978-1774071694.
- vi. **Johnson-Bhola, L.** A Guide to the Principles and Practices of the Geography School-Based Assessment (In Press).

## 6.6 Abstracts

- i. *Bernard, B., Rose, S., & Boston, C. (2020). Batavia Residents’ Knowledge and Perception of the Potential Health and Environmental Risks of an Upstream Cyanide Spill from Gold Mining. In C. Remington, D.K. Benn, & S. Rose (Eds.), Department of Environmental Studies Book of Abstracts – Student Research. Journal of Academic Research and Essays.*
- ii. *Braithwaite, T., & Rose, S. (2020). Psychosocial Hazards Faced by Healthcare Workers at a Public Hospital. In C. Remington, D.K. Benn, & S. Rose (Eds.), Department of Environmental Studies Book of Abstracts – Student Research. Journal of Academic Research and Essays.*
- iii. *Harlequin, R., Rose, S., & Cheddie, P. (2020). An Investigation of the Indoor Air Quality in Two Nursery Schools. In C. Remington, D.K. Benn, & S. Rose (Eds.),*

- Department of Environmental Studies Book of Abstracts – Student Research. Journal of Academic Research and Essays.*
- iv. *Morrison, M. & Rose, S. (2020). An Assessment of Occupational Safety & Health Hazards, Health Problems & Safety Practices in the Operational Environment of Petrol Stations in Region 4, Guyana. In C. Remington, D.K. Benn, & S. Rose (Eds.), Department of Environmental Studies Book of Abstracts – Student Research. Journal of Academic Research and Essays.*
  - v. *Higgins, S., Benn, D.K., & Bovell, O. (2020). A Participatory Mapping Approach to Environmental Planning for Sustainable Community Development. In C. Remington, D.K. Benn, & S. Rose (Eds.), Department of Environmental Studies Book of Abstracts – Student Research. Journal of Academic Research and Essays.*
  - vi. *Percival, A., Benn, D.K., & Simmons, D.A. (2020). Application of Geospatial Methods to support water quality assessment in Guyana. In C. Remington, D.K. Benn, & S. Rose (Eds.), Department of Environmental Studies Book of Abstracts – Student Research. Journal of Academic Research and Essays.*
  - vii. *Wilson, S., Benn, D.K., & Edinboro, R. (2020). Environmental Problems at Government Housing Schemes: The Case of Five-Miles, Bartica. In C. Remington, D.K. Benn, & S. Rose (Eds.), Department of Environmental Studies Book of Abstracts – Student Research. Journal of Academic Research and Essays.*
  - viii. *Davies, B., Oyedotun, T. D. T., Simmons, D. A (2020). An examination of selected physicochemical water quality parameteres of the Rivers near Kaiteur National Park. In C. Remington, D.K. Benn, & S. Rose (Eds.), Department of Environmental Studies Book of Abstracts – Student Research. Journal of Academic Research and Essays. Page 44.*

## 7.0 TECHNICAL PRESENTATIONS BY FEES STAFF, 2019/2020

- i. **Johnson-Bhola, Linda.** *Policy Analysis-NBS Mangrove Study, Setting The Foundations for Zero Net Loss of the Mangroves that Underpin Human Wellbeing in the North Brazil Shelf LME (NBS-LME), CI-WWF Guianas (November 2019).*
- ii. **Stephan Moonsammy;** *An Alternative Approach in Curriculum Development for University Programs: A Case Study with the Agribusiness Program of the University of the West Indies. Inaugural Teaching Conference; Georgetown Guyana; November 2019.*

**iii. Stephan Moonsammy;** *The Potential Incentives in Eliminating Examinations from University Courses: A Perspective from the University of the West Indies. Inaugural Teaching Conference; Georgetown Guyana; November 2019.*

**iv. Oyedotun, Temitope D. Timothy** “Geospatial Data: Critical for National Development” – *Featured speaker at Guyana GIS Day 2019 (November 2019)*  
<https://guyanachronicle.com/2019/11/14/guyana-observes-geographic-information-systems-day/>

**v. Dina Khadija Benn,** *Enhancing Spatial Data Acquisition for Disaster Risk Management in Rural Guyana, Urban and Regional Information Systems Association 2019 Caribbean GIS Conference, Trinidad and Tobago, 2019.*

**vi. Dina Khadija Benn (Collaborative),** *Co-designing Climate-Smart Investment Portfolios and Practices of Practices and Technologies in Guyana, Lethem (Region Nine), 2019.*

**vii. Wrazidlo, M. & J. Rosales. 2019.** *TEPUI-SAT: Autonomous environmental monitoring and simulation system for cultivation of vulnerable tropical montane wetlands flora species. International Symposium – Mountains our Future international Symposium - Las Montañas Nuestro Futuro in Cusco, Peru.*

**viii. Oyedotun, T. D. T. (2020)** *Participated at, and was one of the panellists at the University of Guyana’s Turkeyen and Tain Talks 20, with the theme “Cooling Down: Replacing Harmful Gases in Air Conditioners and Refrigerators”, held on September 19, 2019.*

## 8.0 Training Workshops Conducted by FEES staff 2019/2020

- i. Linda Johnson-Bhola.** *Map Work for CSEC (CXC) Geography Teachers – Department of Education, Region 6 (February 2020)*
- ii. Linda Johnson-Bhola.** *School-Based Assessment Training Workshop for CSEC (CXC) Geography Teachers Part 1- Trainer/Facilitator, Bartica Research Institute for Educational Empowerment (BRIEE) (August 2020)*
- iii. Linda Johnson-Bhola,** *Learning-by-Doing Training Workshop on Writing Environmental Articles – Department of Environment, Ministry of the Presidency (Region 10 - November 2019)*
- iv. Simmons, D., Benn, D. K., Rose, S. (Collaborative),** *Training of Trainers Workshop, Mainstreaming of the Rio Conventions: Civil Service Institutes – Department of Environment, Ministry of the Presidency (July 2020)*

- v. **Simmons, D., Benn, D. K., Rose, S.** (Collaborative), *Training of Trainers Workshop, Mainstreaming of the Rio Conventions: Secondary Schools and Universities – Department of Environment, Ministry of the Presidency (July 2020)*
- vi. **Oyedotun, T. D. T.** *Spatial Data Analysis using Remote Sensing and GIS Tools. Training delivered at Spatial Data Analysis Workshop organised by the Department of Environment, Ministry of Presidency, (November 2019)*

## 9.0 MAJOR RESEARCH PROJECTS COMPLETED DURING 2019/2020

### 9.1 Staff Research

- i. **Oyedotun, T. D. T., Simmons, D., Rose, S., Benn, D. K., Garnet-Adams, K.** Faculty Team Members on the project Strengthening Technical Capacities to mainstream and monitor Rio Convention implementation through policy coordination – Ministry of the Presidency, Department of Environment, 2020.
- ii. **Oyedotun, T. D. T.,** Kasim, O. F., Famewo, A., Oyedotun, T. D., **Moonsammy, S.,** Ally, N. & Renn-Moonsammy, D-M., *Municipal waste management in the era of COVID-19: Perceptions, practices, and potentials for research in Developing Countries, 2020*
- iii. **Oyedotun, T. D. T.** *Quantitative Assessment of the drainage morphometric characteristics of Chaohu Lake Basin from SRTM DEM Data: A GIS-based Approach, 2019/2020*
- iv. **Moonsammy, S., Oyedotun, T. D. T.,** Renn-Moonsammy, D-M, & Oyedotun, T. D. *COVID-19 Modelling in the Caribbean: Spatial and statistical assessments, 2020*
- v. **Oyedotun, T. D. T.** (Collaborative)- *Evaluation of the Impacts of Metal(loids) on Soil Samples, Serum Creatinine and Blood Urea Nitrogen of Residents in Selected Industrial Communities in a Developing Country – Collaborative Research (with Samuel Oluwole Babajide (Principal Investigator) – others as co-Investigators, Temitope D. Timothy Oyedotun, Olayinka Oderinde, Babajide Emmanuel - Collaborative Research, 2020*
- vi. **Oyedotun, T. D. T. & Moonsammy, S.** *Spatio-temporal variation of COVID-19 and its spread in South America: A Rapid Assessment, 2020*
- vii. **Dina Khadija Benn,** Visiting Researcher (Geospatial Modeling) on the project *Development of an Evidence-Based, Gender-Equitable Framework for Climate Smart Agricultural Interventions – Ministry of Agriculture, University of Guyana, and International Center for Tropical Agriculture, 2020.*
- viii. **Oyedotun, T. D. T. & Hamer, S.** *State of the Wellington Park Mangrove Forest. Report on Data Collected and Analysed for Wellington Park, East Berbice – Corentyne, Guyana, submitted to Guyana’s Environmental Protection Agency. p.94 (April 2020)*

- ix. **Linda Johnson-Bhola and Patrick Williams.** Regional Planning and Development in Guyana: Patterns, Challenges and Proposed Solutions, 2019
- x. **Linda Johnson-Bhola.** Factors influencing crime in Georgetown: A Geographical Perspective, 2020
- xi. **Johnson-Bhola, L., Simmons, D., Hamer, S., & Oyedotun, T. D. T.** - Chapters One and Three of Guyana's Third National Communication (TNC) to the United Nations Framework Convention on Climate Change. Office of Climate Change, Ministry of Presidency, Cooperative Republic of Guyana, 2020

## 9.2. Major Research Projects Completed by Undergraduate and Post-Graduate Students during 2019/2020

Below is a list of selected undergraduate research projects that have been conducted by students of FEES.

### **ENV Undergraduate Research Projects**

- i. An assessment on the water quality of the Dakoura Creek Watershed using assemblages of aquatic macroinvertebrates.
- ii. An Assessment of ambient air quality of sawmills along Linden Soesdyke Highway.
- iii. An investigation of the level of mercury internal and external to the workshops of gold dealers in Georgetown and the awareness of their employees regarding mercury.
- iv. Flacourtiaceae as a potential to be used as a bio-indicator for Gold Mineralization in the Essequibo Basin of Guyana.
- v. Batavia Resident's Knowledge and Perception of the Potential Health and Environmental Risks of an Upstream Cyanide Spill from Gold Mining.
- vi. An assessment of Guyana's hazardous waste management capacity in preparation for the oil and gas sector.
- vii. Psychosocial Hazards faced by Nurses at a Public Hospital.
- viii. An assessment of Public Acceptance of the Proposed Ban on Single-use Plastic in Linden Guyana.
- ix. An Assessment of Secondary School Students' (Levels 9 & 11) Knowledge And Attitude Regarding Single-Use Plastics And its Effects on the Environment

- x. A Comparative Study of the concentration of ambient particulate matter of Size 2.5 microns in the two roads in Georgetown
- xi. An investigation on the Indoor Air Quality in 2 Nursery School
- xii. Management Practice of Infectious Waste at a District Hospital in Region 5 (Mahaica-Berbice), Guyana.
- xiii. Assessing the ability of the *Perionyx excavatus* to recycle different combinations of organic waste.
- xiv. Climate Change & Biodiversity: The effects of rising water temperature on *Poecilia reticulata* native to Guyana.
- xv. An evaluation of the efficiency of three species (*Eicchornia Crassipes*, *Pistia Stratiotes*, *Salvinia Molesta*) for the phytoremediation of wastewater generated by Banks DIH Beverage Plant.
- xvi. An assessment of the Knowledge, attitude and practice towards home composting within the community of Cummings Lodge, Georgetown
- xvii. An assessment of the significance of wildlife trade on the livelihood of Trappers in White Water, Mabaruma Region 1.
- xviii. The effectiveness of the leachate treatment system at the Haags Bosch Sanitary Landfill.
- xix. An investigation of the Awareness, attitudes and challenges professionals in the Architecture, Engineering and Construction industry have towards Green Buildings: A Guyanese Perspective.
- xx. Consumers' perceptions on the implementation of policy instruments to reduce the environmental impacts on the consumption of single use plastic bags (PSB).
- xxi. Application of Geospatial methods support Water Quality Assessment in Guyana.
- xxii. To evaluate how ammonium influences the growth and development of mangroves stands in the East coast Region of Guyana.
- xxiii. An assessment of health hazards to which healthcare workers (HCW) are exposed to in Accident and Emergency Unit at Georgetown Public Hospital Corporation (GPHC).
- xxiv. An investigation into the Heavy Metal Content of Lettuce in Region 4.
- xxv. Investigating the use of water hyacinth and rice hull Biochars to improve the growth of *Vigna unguiculata* in Cadmium contaminated soil.

- xxvi. Environmental Problems in Planned Housing Scheme Developments: A case study of Five Miles Bartica.
  - xxvii. An Assessment of soil characterization of the Acacia mangium plantation after two years at Lucky Spot.
- MSc. in Environmental Management Research Thesis**
- xxviii. Assess the impacts of poultry processing effluent on the aquatic environments
  - xxix. Soil Ecosystem Services: Investigating the Response of Vegetable Crops to Forest Soil Inoculant
  - xxx. An Assessment of the Surface Water Quality Of Selected Rice Farming Areas in Guyana
  - xxxi. The Capabilities of the Guyana Defence Force Coast Guard to Respond to Marine Disasters
  - xxxii. A study of risk perception and its influence on disaster preparedness. A case study of risk perception on disaster preparedness to flooding within two (2) wards of Georgetown
  - xxxiii. Assessing the Feasibility of Introducing an Environmental Tax for the Oil & Gas Industry with Respect to Potential Oil Spill Damages to the Shell Beach Protected Area
  - xxxiv. An Assessment of Hybrid Technology in the aid of addressing energy crisis in Guyana specifically on the Essequibo Coast grid
  - xxxv. Environmental Management at Bauxite Mining Company
  - xxxvi. An Assessment of Water Governance Policies in Guyana
  - xxxvii. An Environmental and Feasibility Assessment of the Waste Management Practices by Coconut Farmers along the Pomeroon River.
  - xxxviii. Dutch Disease in Guyana: Potential Implications of the Coming Oil Boom.
  - xxxix. Design of a Laboratory Scale Technology to Sequester Carbon Dioxide from Ambient Air
  - xl. A Situational Analysis on the Sustainable Development Pathway of Guyana
  - xli. State of the art economic valuation of ecosystem services for the Pomeroon mangrove habitat
  - xlii. A comparative analysis of the use of liquid fish silage fertilizer Vs. urea on the growth of Pak Choi (*Brassica rapa* subsp. *Chinensis*)
  - xliii. The Cultivation of *Pleurotus Ostreatus* to Reduce Organophosphates in Farmland Soils
  - xliv. Baseline study on the current status and factors affecting the ecological health of Mangrove Forests

- xlv. An Assessment of the Participatory Integrated Climate Services for Agriculture (PICSA) Approach in Guyana: A Case Study within the Rupununi Region

**GEO Undergraduate Research Projects**

- xlvi. Potential impact of a probable oil spill on Guyana's coast: A case study of three Mangrove
- xlvii. Preliminary Seasonal Flood Impact Assessment at Aishalton, Southern Rupununi
- xlviii. An Analysis of Impacts of Rainfall and Temperature Variability on the livelihoods of Coastal Communities
- xlix. A spatio-temporal study of the hydrodynamics and flood vulnerabilities in the lower Canje River, Berbice
- l. An evaluation of the morphological changes in the lower course of the Demerara River using Remote Sensing and GIS
- li. Impacts of Drought on the Crop Production Systems of Farmers in Moco-Moco Village, Central Rupununi, Region Nine
- lii. Shoreline dynamics due to canal construction at Hope, East Coast Demerara
- liii. Impact of Low-Income Housing Development in Sophia on the Neighboring Community of Lamaha Gardens
- liv. Farming Adaptation for Rainfall Variability (2011-2019) in Region Five, Guyana

**MSc. in Urban and Regional Planning Research Thesis**

- lv. Crime in Belize City: Creating a solution template for The Mayflower area
- lvi. Management of Urban Storm water Runoff: Design of Green Infrastructure Retrofit for Robbstown, Georgetown
- lvii. An evaluation of commercial recreational activities – liquor restaurants. Case study of Tuschen, Guyana.

## 10.0 ACADEMIC PROGRAMMES OFFERED AND STUDENT ENROLMENT

### 10.1 Teaching programme

The academic programme offered during the 2019/2020 Academic Year are:

- Bachelor of Science in Environmental Studies
- Bachelor of Science in Environmental Science
- Master of Science in Environmental Management
- Doctor of Philosophy in Biodiversity (Tripartite programme)

- Master of Science in Urban & Regional Planning
- Bachelor of Science in Geography
- Diploma in Valuation

## 10.2 Student enrolment

During academic year 2019-2020 students' enrolment for the undergraduate Diploma/Degree programmes was 130, for the MSc. programmes 39, and the PhD in Biodiversity Programme 3, giving a total of 172 in comparison with 208, 202, 230 in the academic years 2016-2017, 2017-2018 and 2018 - 2019 respectively. It is noteworthy that there was a decrease in student enrolment by 36, using the last academic year 2016-2017 as the reference point. The decrease may be due to non-admission to the Diploma in Land Administration and Management programme for the year. See Table below.

<b>Programmes</b>	<b>2016-2017 Enrolment</b>	<b>2017-2018 Enrolment</b>	<b>2018-2019 Enrolment</b>	<b>2019-2020 Enrolment</b>
<b>UNDERGRADUATE PROGRAMMES</b>				
<i>Diploma in Land Administration and Management</i>	Not Offered	31	28	2
<i>Diploma in Valuation</i>	Not Offered	Not Offered	Not Offered	28
<i>BA in Geo-Economics</i>	1	Not Offered	Not Offered	Not Offered
<i>BA in Geography</i>	26	6	6	3
<i>BSc. in Geography</i>	Not Offered	31	42	57
<i>BSc. in Environmental Studies</i>	154	142	116	49
<i>BSc. - Environmental Sciences</i>	Not Offered	7	39	32
<b>GRADUATE PROGRAMMES</b>				
<i>MSc – Environmental Management</i>	14	17	32	22

<i>MSc-Urban Planning and Management</i>	7	16	9	4
<i>MSc-Urban and Regional Planning</i>	Not Offered	Not Offered	Not Offered	20
<i>Doctor of Philosophy (Ph.D.)</i>	9	7	4	3
<b>TOTAL</b>	<b>208</b>	<b>202</b>	<b>230</b>	<b>172</b>

During the academic year under review the FEES graduated a total of 46 persons. The table below provides the dis-aggregated data.

<b>Programme</b>	<b>2018 Graduates</b>	<b>2019 Graduates</b>
Diploma in Land Administration and Management	-	26
B.A. (Geography)	1	2
B.A. (Geography/Economics)	-	-
B.Sc.(Environmental Studies)	30	15
Post-Graduate Diploma in Environmental Management	1	
Master of Science in Environmental Management	-	2
MSc-Urban and Regional Planning		1

## 11.0 OTHER IMPORTANT MATTERS

### 11.1 Geography Awareness Week (GAW) activities - Nov 10-16, 2019

With support from the FEES Department of Geography, the University of Guyana Geographical Society undertook following five (5) activities in observance of GAW:

11.1.1 Preparation and display of one online article on the Society's Website and other social media platforms

On November 10, 2019, an article for Geography Week was published on its website (<https://geographicalociety.weebly.com/news--activities>). The article focused on the theme:

“THINK GEOGRAPHY: DEVELOP WISELY!” It highlighted the nature of Geography, career opportunities, and how it aids national development. The Article received more than 100 reads.

#### 11.1.2 The On-Campus Geography Day:

Theme: ‘On-Campus Sensitization Project’. This grand event, which took place in the GWLT Parking Lot on November 12, 2019 from 11:00 h to 16:00 h, showcased a number of booths. The Society collaborated with many governmental organizations for the execution of the activity. The booths showcased various aspects of the following: - Medical Geography; - Mapping Instruments; -Research Project; and -Careers in Geography.



Figure 1. On-campus Geography Day

#### 11.1.3 GIS Day activities

On November 13, 2019 (designated GIS DAY internationally), the UGGS, in collaboration with the Geology and Mines Commission (GGMC), Environmental Protection Agency (EPA), Central Housing & Planning Authority (CHPA), Conservation International Guyana Inc. (CI), World Wildlife Fund - Guyana (WWF), among others agencies, hosted the GIS Day event. This event, overseen by Ms Dina Benn, emphasized the branch of Geography known as Geo-informatics. The event was held at the Arthur Chung Conference Centre from 9:00 h to 12:00 h. Presentations were made by the then Minister of Telecommunications - the Honourable Cathrine Huges, Dean of FEES, Dr Temitope Oyedotun; Executive Director- CI, Mr Damian Fernandes; and the then UGGS Vice President - Jillyne Bell. Three separate activities were executed on that day. and these were: Open street mapping; Careers in Geography; Open-space discussion



Figure 2: GIS Day activities

#### 11.1.4 School Outreach Sessions

On November 15, 2019, UGGS engaged in Geography awareness sessions at Friendship Secondary School and Cumming Lodge Secondary School. Fourth and fifth form students studying Geography at CSEC level were taught Map Reading by UG Geography Students: Alana Norville, Angela Benn, and Ariella Azaire. Other topics emphasized include: grid referencing, importance of Geography in nation building, and careers in Geography. Students were also engaged in practical activities that utilized map work. Prizes were given to students who successfully completed their task.



Figure 3: Geography Awareness Sessions conducted at Cumming Lodge Secondary School

#### 11.1.5 Public awareness project

This project was undertaken at the Giftland Mall where many individuals were engaged in discussions centred on Geography. The discussions highlighted the work of the UGGS, its achievements thus far, and plans for the next year.

#### 11.2 Launch of the Diploma in Valuation Programme

The University of Guyana Faculty of Earth and Environmental Sciences in collaboration with the Guyana Lands and Surveys Commission (GLSC) launched a Diploma in Valuation Programme on February 6, 2020. The eighteen-month programme is being delivered to 28 registered students within the Faculty of Earth and Environmental Sciences, Department of Geography. Students registered are representatives from the, Guyana Lands and Survey Commission, Central Housing and Planning Authority, Guyana Geology and Mines Commission, Lands Registry and Deed Registry and Guyana Forestry Commission.



Figure 4 Cross-section of attendees at the launching of the programme

The Programme commenced at 13:00 hrs. with the welcome and opening remarks by the Dean, Faculty of Earth and Environmental Sciences, Dr Temitope D. Timothy Oyedotun. The Dean, congratulated the students on their decision to pursue this programme and ecstatically welcomed them to the Faculty of Earth and Environmental Sciences. Dean Oyedotun thanked the Guyana Lands and Surveys Commission for their collaboration and support in the development of this programme.

Former Minister of State Hon. Dawn Hastings-Williams in her keynote address highlighted the crucial role of land and its increasing value as Guyana emerges as an oil and gas economy. She emphasized the importance of improving land administration and management systems, techniques and technologies to address existing issues and alleviate their proliferation.

Minister Hasting-Williams opined that “Valuation is a critical pillar in effective land administration. It is the basis of negotiation between buyers and sellers for land rent, land taxation, compensation, mortgages, secured borrowing, future investment, land use planning and identifying the value of an organisation’s assets.”

The Minister, applauded the University of Guyana, Faculty of Earth and Environmental Sciences and the GLSC on this commendable initiative. She also encouraged the students to recognize this as a step in your personal growth, as well as the strengthening of their respective organisations. “Take this opportunity and continue to build on it. In this case, your organisation has showed initiative to invest in you but you also have a responsibility to put in the necessary work to ensure that you are successful,” she advised.



Figure 5 Minister Hasting-Williams and Commissioner Trevor Benn delivering remarks at the event.

Speaking on behalf of the Guyana Lands and Survey Commission, former Commissioner Trevor Benn posited that the importance of training and education within the workplace. The Commissioner emphasized that the programme is crucial since properties in Guyana has not been re-valued since the 1990s which creates a need for valuers in Guyana. He reiterated that “this programme will help us to be able to fill that vacuum and to enable the country to earn its full and right share from properties in the country”.

Then Chair of the Transitional Management Committee of the University, and current Vice Chancellor, Professor Paloma Mohamed, in brief remarks, lauded the step that has been taken by the Commission to ensure that its staff are properly trained to carry out their functions. She commended the Guyana Lands and Surveys Commission for efforts made in pursuing this project, endorsing and funding so many of students. She noted that it is something that is largely laudable and she congratulated and thanked the team for doing this accomplishment. Also speaking on behalf of the University of Guyana, the Registrar Dr. Nigel Gravesande, noted that the institution fashioned a programme that will meet industry needs but satisfies the prescribed academic best

practices and standards. The University of Guyana welcomes this collaboration and looks forward for more collaboration from its stakeholders.



Figure 6. The Vice-Chancellor (then Chair of Transition Management Committee, TMC; and the Dean of the Faculty delivering remarks at the launching of the programme.

### 11.3 FEES hosts series of SARS Workshop and Training on Mangrove Forest

#### Monitoring

The University of Guyana’s Faculty of Earth and Environment Sciences (FEES) in collaboration with SERVIR-Amazonia, National Aeronautics and Space Administration (NASA), United States Agency for International Development (USAID), Spatial Information Group (SIG), and CIAT (International Center for Tropical Agriculture) hosted three series of International Course (workshops/training) in year 2020 as follows:

- From **January 20 to January 24, 2020**, at the Center for Information Technology (CIT) of the University’s Turkeyen Campus. The training workshop/course was titled “**Using Synthetic Aperture Radar (SAR) to monitor mangrove forests in Guyana**”.
- From **May 14 to June 08, 2020** held virtually. The training workshop/course was titled “**Mapping and monitoring changes in mangrove forests using Python and more**”

- From **September 14 to September 23, 2020** held virtually. This training workshop/course was titled “**Mapping and monitoring mangrove forests using Google Earth Engine**”

At the Opening Ceremonies of the workshops, Professor Paloma Mohamed-Martin, Vice-Chancellor of the University, noted the importance of such an endeavour when she stated that “this initiative is not just important for the University of Guyana, but for you the participants to acquire knowledge about the technology. On the grand scheme of things this technology will have a macro effect on Guyana,” she explained. The course brought remote-sensing resources, primarily Synthetic Aperture Radar (SAR), to bear on mapping the extent and structure of mangrove forests along the coast of Guyana. Outputs of the training by participants included, but not limited to: (1) mapping of mangrove extent, (2) evaluation of mangrove health, (3) generation of information that can be used for greenhouse gas reporting (4) availability of data that can be used for assessing land-use changes that contribute to the loss of mangroves, (5) analysis of the performance of mangrove restoration efforts, (6) full documentation on analysis methods, (7) exposure to open-source algorithms for processing remote-sensing data, (8) all data associated with the project, (9) extensive training on how to use remote sensing techniques for mangrove monitoring and on operating a mangrove monitoring programme.



Figure 7. Participants of the workshop series with NASA Team and the University Vice Chancellor.

Participants were drawn from the University of Guyana (UG), Hydromet, National Agricultural Research and Extension Institute (NAREI); Conservation International – Guyana; Guyana Forestry Commission (GFC); Guyana Lands and Surveys Commission (GLSC); Environmental Protection Agency (EPA); National Drainage and Irrigation Authority (NDIA); World Wildlife Fund (WWF) Guyana Office; Ministry of Public Infrastructure – Sea and River Defence Division; Amerindian Peoples Association (APA); Department of Environment; and Ministry of Natural Resources.



Figure 8. Dr Marc Simard, Principal Scientists, NASA Jet Propulsion Laboratory, anchoring the training.

The main trainers were Dr. Mark Simard from NASA and Ms. Abigal Barenblitt from University of Maryland/NASA Goddard Space Flight Center. Other scientists who were involved in some other aspects of the training include Dr. Glenn Hyman from Spatial Informatics Group (SIG), Dr Lola Fatoyinbo, Ms. Andrea Nicolau and Ms. Kelsey Herndon from NASA. Dr Temitope Oyedotun, the Dean of the Faculty who initiated and facilitated the workshop stated that the ultimate objective of the initiative is for Governmental agencies and civil society (decision-makers) to have access to up-to-date maps of mangrove extent and health. Such information can be useful for land-use planning and climate change mitigation efforts. The workshop was an enriching experience for participants.



Figure 9. Cross-sections of the participants at the closing ceremonies of the January workshop.

11.4 A Special Meeting of Head of Agencies

On Wednesday January 22, 2020, there was a special meeting of the Head of Organisations and Agencies that have their representatives that participated in the workshop. The special meeting was initiated: to share the objectives and goals of bringing Earth Observation (EO) and Geospatial Technologies to sustainable development challenges in Guyana; to deliberate on how developmental challenges of the agencies can be addressed by these technologies; and, to explore collaborations of the agencies with SERVIR-Amazonia.



Figure 10. Participants at the meeting with the Head of Agencies and/or their representatives.

### 11.5 The CityLab Car Project

The CityLab Car project is a collaboration between fifteen (15) European and Caribbean Higher Education Institutes: *University of Antwerp, Aalborg Universitet, Universidad Politecnica de Madrid, Politecnico di Torino, Vrije Universiteit Brussel, the University of the West Indies, University of Trinidad and Tobago , University of Guyana, Government Technical Institute - Ministry of Education, Anton de Kom Universiteit van Suriname, Polytechnic College Suriname, Universidad Iberoamericana, Pontificia Universidad Católica Madre y Maestra, University of Technology and Caribbean Maritime University.*

The project aims to stimulate innovation in teaching in higher education through problem-based learning (PBL) in the Caribbean, to make higher education institutes and students better prepared to deal with contemporary urban problems and challenges.

During academic year 2019/2020, the Faculty of Earth and Environment continued to participate in several activities under this collaborative project.

Key highlights during the period under review were:

- The attendance of two Faculty members at an international CityLab conference/workshop held in Copenhagen, Denmark.
- The implementation of PBL teaching approach through the method of infusion with current courses being delivered – the focus was on the Urban Geography course (GEO 3112).
- The organization of students' work to allow for participation of students of the Geography Department in a CityLab Car students' competition. This competition held on October 1, 2020 and was a part of the final CityLab project conference held during October 1 -2, 2020, and students from the Faculty were part of the competition and the conference.
- Participation at the final CityLab project conference for project partners held on October 2, 2020. This final conference session also included a special Guyana National Seminar session which involved the participation of local CityLab educational institutes (the University of Guyana and the Government Technical Institute), along with several other local stakeholders.

### 11.6 Capacity Building

The Faculty of Earth and Environmental Sciences' Department of Environmental Studies facilitated the building of human capital and institutional capacity in the Environmental Protection Agency (**13 persons**) and the Central Housing and Planning Authority (**2 persons**), in addition to the undergraduate students of the Department in equipping them with the knowledge, skills and technical expertise to engage in the **environmental management of oil and gas**. The one-week training course was hosted at the University of Guyana between 6 - 11 January, 2020 and delivered by Prof. David Alexander, an oil and gas expert from Trinidad and Tobago. The one-week course included guest lectures delivered by Mrs. Marissa Foster-Gordon, the Petroleum Geologist within the Department of Energy and Dr. Vincent Adams, former Executive Director, Environmental

Protection Agency. A field exercise to SOL Guyana's Providence location completed the week long training course.



Figure 11 Participants at the closing of the training with the Head of Department, Ms. Shanomae Rose, Professor David Alexander – the trainer, Dr Nigel Gravesande – University Registrar, Professor Paloma Mohamed-Martin – the University's Vice Chancellor, Ms. Denise Simmons (Faculty Staff), Ms. Kristie Duff (Eco-Trust Students Society president) on the front row (sitting position).

### 11.7 NCUR 2020

The Faculty had eight (8) of her students' abstracts accepted for presentation and two were submitted for publication at the US National Conference for Undergraduate research (NCUR). The students whose abstracts were accepted are: Annthea Percival, Bonita Bernard, Sona Huntley, Jonathan Jaipaul (Poster), Nyckelle Yearwood, Michael Morrison, Rila Harlequin, Timothy Williams. The conference was cancelled due to the COVID-19 pandemic.

### 11.8 MSc. in Environmental Management Review

In light of the new national development trajectory, the Faculty's Department of Environmental Studies engaged in an internal review of the Master of Science in Environmental Management with the assistance of Mr. Stephan Moonsammy, Professor Mattias Boman, Faculty of Food and Agriculture, University of the West Indies, and Dr. Rahana Juman, Institute of Marine Affairs (IMA), Trinidad and Tobago. The review is currently in the final stages before submission to Academic Policy and Planning. The revised programme is expected to be implemented in the academic year 2021/2022.

### 11.9 Book of Abstracts

In recognition of the 25th anniversary of the Bachelor of Science in Environmental Studies (1993-2018), the FEES' Department of Environmental Studies organised the publication of a collection of twenty-eight (28) abstracts of research conducted by students over the years. The collection of abstracts is a demonstration of the quality and diversity of research pursued by our students during this period. The topics cover mainstream research as well as innovative research that sought to find answers to challenges facing the nation as we attempt to accomplish the sustainable development goals (4, 6, 7, 12, 13, 14, and 15). The collection was published as an eBook via the Journal for Academic Research and Essays. This was the first of many and a call for abstracts for a second volume will be circulated across the campus shortly.

### 11.10 Report from the Eco-Trust Society

The Eco-Trust Society established in 1992, is the main Environmental Club at the University of Guyana based in the Faculty of Earth and Environmental Science which focuses on Environmental Education, Awareness and Advocacy through various voluntary acts. For the 2019-2020 academic year the society planned several activities that corresponded with the global environmental calendar. The activities were however physically restricted with the emergence of the COVID-19 pandemic. However, with the pandemic in full swing, the Society embarked on a new chapter, transitioning to virtual initiatives in hopes to continue to sensitize members and the general public on environmental issues affecting society today. For the 2019-2020 academic year the Eco-Trust Society conducted several activities inclusive of:

### ***1) Inauguration & Picnic, 2019***

The inauguration of the Eco-Trust Society's 2019-2020 executive body took place on a Sunday afternoon at the botanical gardens. After the new executive body pledged their allegiance to the club, members recreated a resurfaced Eco-Trust Society picture taken in the earlier days and socialized, picnic style.

### ***2) International Coastal Cleanup, 2019***

This activity was in collaboration with the Caribbean Youth and Environment Network (CYEN) and the International Cricket Committee (ICC). Volunteers from the Eco-Trust Society participated in the annual coastal clean-up along the Kingston Seawall on September, 21, 2019. This highly anticipated event required club members to clear accumulated trash that had washed ashore and complete a tally-sheet which aided in record keeping of waste. At the end of the clean-up CYEN reported that approximately 36,494 pieces of trash was removed from the site.

### ***3) School Outreach Program, 2019***

On September 13, 2020, the University of Guyana's Rotaract Club collaborated with the Eco-Trust Society to conduct a school outreach program on anti-littering at Graham's Hall Primary School. The session was facilitated by the president of the Society, Kristie Duff who educated the young students in an assembly like setting on the importance of disposing their waste in a safe and sustainable manner.



Figure 12 Eco-Trust President educating pupils on anti-littering during the school outreach.

#### ***4) Recycle Day, 2019***

In observance of Recycle Day on November 15<sup>th</sup>, 2019, the Eco-Trust Society took to the catwalk of the University of Guyana's Turkeyen Campus to display beautiful and unique craft made from various recycled materials such as plastic, leather and glass.



Figure 13 Display of artefacts and crafts from recycled materials

### ***5) World Soil Day, 2019***

On December 5th, 2019, members of the Eco-Trust Society visited the University of Guyana's John Science's Campus in Berbice, to raise awareness of World Soil Day. Students from various schools across Berbice were treated to a variety of presentations on topics such as Soil Erosion, Profiling and Composting, which served to emphasize the importance of maintaining nutrient-rich soil. At the end of the event, composting bins were donated to the Soil and Plant Testing Laboratory at the Tain Campus.



Figure 14 Eco-Trust Society at University of Guyana Berbice Campus on the World Soil Day

**6) *Annual Christmas Drive, 2019***

On December 21, 2019, volunteers from the Eco-Trust Society visited the St. Vincent De Paul Care Centre on Princess St., Charlestown to bring cheer to the elderly women who resided there. In light of the Christmas season members entertained 11 elderly women by performing carols, spoken words and story-telling. Self-care packages and food items were donated to the home upon departure. This effort was done in collaboration with the Ruimveldt Leo's Club.

**7) *World Wildlife Day, 2020.***

On February 16, 2020 the Guyana Wildlife Conservation & Management Commission hosted a wildlife fair at the zoological park. Members of the Eco Trust Society volunteered their time and participated in a myriad of activities geared towards educating both children and adults about the importance of protecting and maintaining Guyana's diverse wild-life. Such activities included the scavenger hunt, cage talks, face painting and football.

**8) *World Bee Day, 2020***

On May 19, 2020, members of the Eco-Trust Society visited an apiary to film the Club's first documentary entitled 'Sustainable Honey Harvesting in Guyana' with Mr. Francis Bailey, a local bee keeper. Mr. Bailey is an advocate for sustainable honey harvesting in Guyana and spoke extensively about the bee's importance to the environment. The documentary can be found on all of the Eco-Trust Society's social media platforms.



Figure 15 Eco-Trust visitation apiary for a film documentary

#### ***9) International Day for Biodiversity, 2020***

Inspired by the knowledge learnt in his aquatic science class. Secretary Mr. Jermine Hookumchand recorded a video to educate the public on the diverse fish species found along West Coast Berbice. The video was posted on all Eco-Trust social media platforms and was well received.

#### ***10) Launch of YouTube Page, 2020***

The Society launched its own YouTube page in an attempt to increase its social media presence and reach a wider audience.

#### ***11) Mangrove Cleanup, 2020***

Mangroves are known to play an integral role in protecting coastal communities by providing sea defence. As such when a picture circulated of a mangrove site flooded in plastic, members of the Eco-Trust Society teamed up with a few like-minded youths to take action. Without any prompting or planning volunteers gathered on Friday, the September 11, 2020, to clean up the mangrove site. Within an hour approximately 50 garbage bags were filled with tons of plastic. Volunteers later

returned to the site to set up physical barriers to protect the mangroves from future build-up of garbage. The Society hopes to continue this initiative until all accumulated trash is cleared and replanting commences.

### ***12) Hydroponics Session, 2020***

On October 22, 2020, the Eco-Trust Society held its first virtual Hydroponics program. The session aimed to equip home dwellers with a viable gardening alternative while highlighting the importance of hydroponics as an ecologically sustainable agricultural practice. Mr. Dwayne Lanferman conducted the informative session to 25 participating guests and touched on construction, nutrients and fertilizers, pest control and the overall advantages of using a hydroponics system compared to traditional gardening practices.

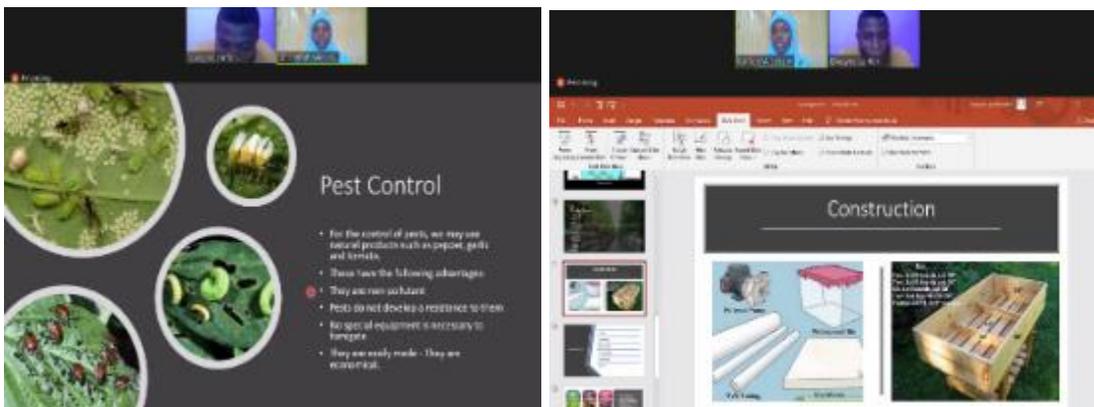


Figure 16 Virtual hydroponics session organised by Eco-Trust Society

### ***13) Virtual Environmental Workshop, 2020***

In an effort to continue to raise environmental awareness while abiding to COVID-19 regulations, Eco-Trust Society conducted a virtual environmental workshop with the Queen College's environmental club. Using the newly popularized Zoom platform combined with the help from GYEN presenters, the 3 weekend workshop touched on three pivotal topics; Climate Change (October 17), Solid Waste Management (October 24) and Environmental Advocacy (October 31). Upon completion of the workshop 25 students received certificates of participation.



Figure 17 Virtual Environmental Workshop 2020 organised by Eco-Trust Society

#### ***14) Solid Waste Sundays, 2020***

The Eco-Trust Society launched a social media campaign entitled 'Solid Waste Sundays' to encourage members and the general public to reduce, reuse and recycle their waste. This initiative came in the wake of the deadly Coronavirus pandemic, which was anticipated to result in an increase in household waste. As such a flyer was posted online encouraging viewers to submit photographic evidence of items being reused or recycled. The club received 7 submissions which were all featured on the club's social media pages.

Amidst several challenges the Eco-Trust Society's 2019 to 2020 executive body did its best to deliver and continue to make environmental impact during an unprecedented pandemic, and has now handed the baton into capable hands who will continue the diligent work of the Society.

#### **11.10 Education in Environment and Social Justice**

The Faculty of Earth and Environmental Sciences (FEES) is one the University of Guyana (UG)'s three Faculties that partnered with World Wildlife Fund (WWF) in integrating the concepts and skills relating to Environment and Social Justice in her curriculum. WWF in recognising the significant of the advancement of knowledge of environmental ethics and social justice in Guyana, partnered with the three Faculties (Faculties of Earth and Environmental Sciences, Natural Sciences, and Social Sciences) in advancing the education along this concept. This partnership led to the contribution/donation of thirteen titles of books (with three copies per title, totalling thirty-nine books) to the University's library. The books were officially handed over via an online ceremony on June 30, 2020, which was attended by the Vice-Chancellor of the University,

Professor Paloma Mohamed-Martin, Professor Michael Scott, Deputy Vice-Chancellor, Academic Engagement, Dr. Troy Thomas, Dean, Faculty of Natural Sciences, Dr. Temitope Oyedotun, Dean, Faculty of Earth and Environmental Sciences and Mr. Calvin Bernard, Senior Lecturer, Faculty of Natural Sciences, WWF-Guianas' Country Manager, Guyana, Ms. Aiesha Williams, other Faculty and WWF partners.

The titles donated include: *Sustainability: Approaches to Environmental Justice and Social Power*; *Environmental Justice as Social Work Practice*; *Mountains of Injustice: Social and Environmental Justice in Appalachia*; *Environmental Justice in a Moment of Danger (Volume 11)*; *American Studies Now: Critical Histories of the Present, First Edition*; *Environmental Justice, 1st Edition*; *The Urban Struggle for Economic, Environmental and Social Justice, 1st Edition*; *Garbage Wars (Urban and Industrial Environments)*; *The Struggle for Environmental Justice in Chicago*; *Flint Fights Back: Environmental Justice and Democracy in the Flint Water Crisis (Urban and Industrial Environments)*; *What is Critical Environmental Justice? 1st Edition*; *Sustainable Communities and the Challenge of Environmental Justice*; *Ethics and the Environment: An Introduction*; *The Monkey Wrench Gang*; and, *Environmental Ethics: An introduction to environmental philosophy 5<sup>th</sup> Edition*.

## 12.0 GENERAL CONCLUSION

Against all odds and challenges of 2019/2020 Academic Year, the Faculty of Earth and Environmental Sciences (FEES) made significant progress and achievements. With God on our side, the Faculty hopes to build on the successes of the past years as we take giant steps in the accomplishments of our strategic plans and the University 2040 Blueprint agenda. The overall Plan of the Faculty (FEES) as we step into the new academic year is to develop and streamline activities that will define the pathways for the FEES' infrastructure, academic programmes, and collaboration over the next five (5) years starting with 2021. These are outlined in the recently prepared FEES Strategic Plan 2021-2025. More specifically the Faculty will place emphasis on:

- Broadening the types and quality of programme delivery;
- Improving the technical capability of staff and students; and

- Providing opportunities for staff and students to contribute to national development initiatives through research and innovation.

The Faculty's plan will be achieved through three Transformational Strategies (TSTs), which are summarily stated below:

TST 1: A modern, up-to-date, and well-equipped facilities to facilitate teaching and scientific research in support of new and advanced programmes and increased student intake to enhance the Faculty's teaching-learning environment

TST 2 – An innovative problem-solving Faculty with programmes offered face-to-face, online and blended oriented towards students' needs and aspirations and fulfilling the demands of national development policies, plans, and programmes

TST 3: A well-connected and highly recognized Faculty capable of attaining pedagogical standards comparable with those of similar-sized tertiary institutions internationally.

The FEES will continue to explore diverse means of engagement with our local, regional, and international communities. The Faculty appreciates the consistent and ever-increasing unquantifiable support of the staff, students, alumni and the wider University community. We strongly believe in the Faculty as we advance in our calling of making the FEES a quality-driven, sustainable and comprehensive Faculty, both locally and internationally.