

22nd Meeting of COMSATS Coordinating Council

Recent Research Activities at ICENS

Charles Grant & Sandra Hunter

International Centre for Environmental
Nuclear Sciences (ICENS)



ICENS

INTERNATIONAL CENTRE
FOR
ENVIRONMENTAL AND NUCLEAR SCIENCES



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CNS/ICENS History

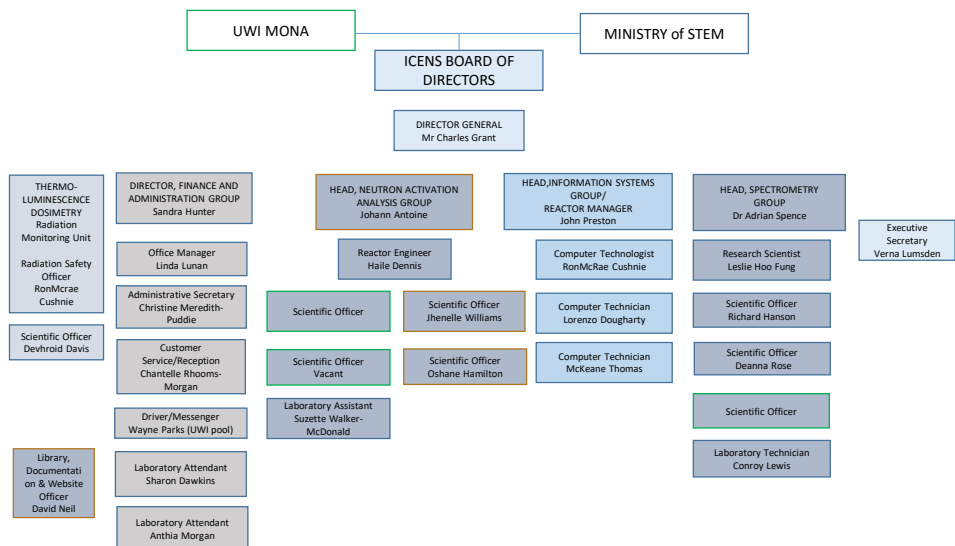
- Originally the Centre for Nuclear Sciences, opened formally in June 1984 as a brainchild of Professor Gerald Lalor- only research nuclear reactor in the English-speaking Caribbean
- Located on the campus of the University of the West Indies, ICENS occupies modern purpose-built air-conditioned premises 946 m2 in area



- Acceptance into the COMSATS network in 1994 encouraged the name change to the International Centre for Environmental and Nuclear Sciences (ICENS)
- Agency of the Ministry of Science and Technology
- Our Main National Objective is to apply high quality science, utilizing nuclear technology to contribute to the country's development as directed by our Vision 2030 **to Make Jamaica the Place of Choice to Live, Work , Raise families and Retire.**
- We are the regional hub for the IAEA for nuclear related research activities. We offer TLD services as part of our contribution to regional Sustainable Development.



Present Organizational Structure



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Complementary Techniques

Spectro-analytical



X-ray Fluorescence



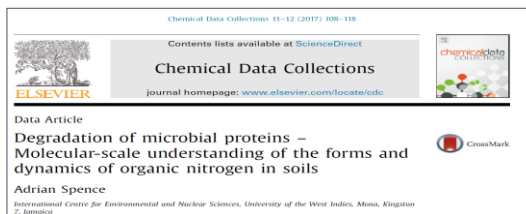
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Climate Change and Biogeochemistry



Dr. Adrian Spence – Intergovernmental Panel on Climate Change (IPCC) nominated Lead Author: Climate Change and Land attended his 4th meeting in Feb 2019.



A digital mapping and estimation of the national soil carbon stock was just completed under a UN global project. We await their response

Dr. Spence and team continues their project to collect data on Green-house gas emission from soils to atmosphere. To identify sinks and sources of carbon across the agri. landscape. This will inform adaptation and mitigation practices as well as climate smart agriculture.

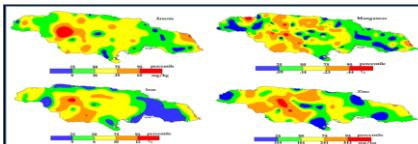
Inorganic chemical analysis of Jamaican foods, soils, products and waste

Currently working with Min. of Education to identify possible environmental factors at play in cluster of children performing well below acceptable standards

During July – December 2018 ICENS coordinated and supervised the National Hazardous Waste Committee to implement a central repository that identifies, quantifies and document the type and volume of laboratory wastes. Efforts are now underway to have these waste incinerated.

ICENS completed a 6 mths project in August 2018 funded by Pure Earth to identify, inspect and analyse toxic sites in Jamaica. The scope was then expanded by the funders to also include analysis of lead in Jamaican paints and aluminum pots. Reports done in Feb 2019 have been approved by Pure Earth for use in their global statistics .

Our development of Food Composition Tables continues as well as sample analysis of food inclusive of cocoa and chocolate products given the lowering of cadmium limits by the EU. We recently acquired a Direct mercury Analyser to assist with our analysis of Jamaican sea fish.



Assessment of the Jamaican Marine Environment



- Sample collection under World bank project to assess the current state of the marine ecosystem and formalize baseline assessment for sediments, seagrass, mangroves and corals now completed.
- Key interest in heavy metal accumulation and uptake within marine ecosystem.
- One Staff member got training in Monaco in 2018 on Determination of Trace Elements in Environmental Samples. Paper should be submitted for publishing by end of month.
- A Micro Plastics paper was published in January 2019 from this project.



Radiation Protection, Monitoring & Measurement



- Principal radiation dosimeter instrument at ICENS is an Automated HARSHAW Model 6600 reader with an in built ^{90}Sr irradiator for the purposes of calibration.
- Quality assurance is ensured by frequent test readings using the internal irradiator; participation in inter-laboratory comparison studies.
- Routine monitoring of health workers and environmental surveying at the Ports of entry and across the Island is done daily.

Latest News

House passes Bill to regulate nuclear technology

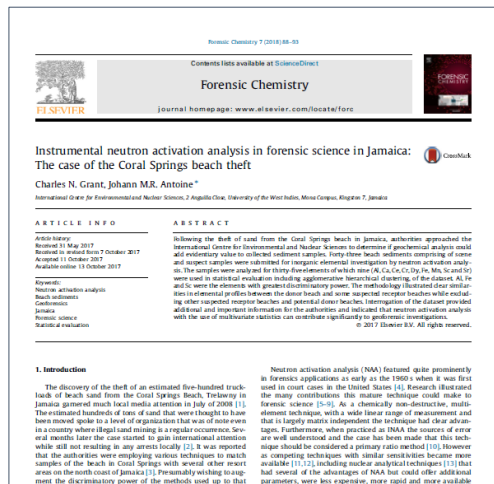


Number of personnel monitored now at 1500 and growing since legislature is enforced by regulatory authority . Income up by 40% since 2015.



Coordinated Research Project - Enhancing Nuclear Analytical Techniques to Meet the Needs of Forensic Science

- Project funded by the IAEA
- Three-year project (mid-2017 to mid 2020)
- Using and optimizing nuclear analytical techniques and associated techniques to fingerprint environmental, plant and food samples.
- Elemental data generated can be used to determine provenance for forensic applications such as illegal sand mining or food fraud.
- Project is in collaboration with the Institute of Forensic Science and Legal Medicine.
- an e-learning module was prepared by Mr. Johann Antoine in mid-December 2018 for the IAEA's Learning Management System on NAA use in Forensic Science as part of the IAEA's efforts to enhance utilization of nuclear analytical techniques in forensic sciences.



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Air Quality Monitoring- Trace Elements & Particulate Matter

Study of Total Suspended Particles (TSP), PM₁₀ (coarse inhalable particles) and PM_{2.5} (fine inhalable particles).

Use of Nuclear Analytical Techniques (INAA and XRF) for the study of the emission and reception of atmospheric particulate matter and determining source apportionment

ARCA Project RLA7023: Joint Regional project with 13 countries to assess atmospheric aerosol components in urban areas to improve air pollution and climate change management. Sponsored by IAEA



Tisch Environmental Inc. 8-stage Non-Viable Cascade Impactors capable of filtration down to particles <0.43 µm



Radwag UYA 2.4Y microbalance was acquired with a readability of 0.1 µg

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Fellowship Offered during 2018 to Graduate Students

Mr Alfredo Bizarro, visiting researcher from the Autonomous University of Mexico (UAMEX) faculty of geography, who is studying for a Master of Science degree in spatial analysis using GIS and QGIS, to analyse water reservoirs.

Mr Bizarro is studying the northern part of Mexico where the presence of uranium and thorium can influence the water quality.

Mr Bizarro was supervised by Mr John Preston during his stay at ICENS. Mr Bizarro was at ICENS from the 1st of February to 22nd of March 2019.



International Workshops/ Conferences hosted in 2008- 2019

International Atomic Energy Agency Regional Training Course on the “Implementation of Safeguards in States with Small Quantities Protocol - The Government of Jamaica, through ICENS as the lead organization, hosted this course from May 14th to 18th, 2018. The training course further equipped experts who have responsibility for safeguarding nuclear material in their respective countries within the Caribbean region, with additional knowledge necessary to meet their countries’ safeguards obligations to the IAEA.

21 participants from Jamaica, the Bahamas, Bolivia, Costa Rica, Ecuador, Guatemala, Panama, Paraguay, Saint Kitts and Nevis and Saint Vincent and the Grenadines along with experts from the IAEA.

International Response Training Course for Radiological Security Emergencies - The course was held in Montego Bay from September 24th to the 27th, 2018 and was organized by the Pacific Northwest National Laboratory; a US Department of Energy contracted institution, and aimed to equip first responders with basic skills and information on how to respond to a security threat/emergency where radioactive material is involved.

Energy Challenges Nuclear Technology, Safety and Regulations in the Caribbean- ICENS in collaboration with our international partners ORC from Japan Opes Oceani, Orano and the International Nuclear Services hosted this seminar March 27, 2019 at which 86 participants attended with 21 VIP inclusive of the Japanese Ambassador.



International Workshops/ Conferences hosted in 2008- 2019 Cont.

Ministry Of Transport and Mining
providing service on land, in the water,
in the air... everywhere.

ICENS

OPES OCEAN

ORC

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THE UNIVERSITY OF THE WEST INDIES
MONA CAMPUS, JAMAICA, WEST INDIES

PROFESSOR DALE WEBBER
PRO VICE-CHANCELLOR &
PRINCIPAL
CORDIALLY INVITES
YOU TO ATTEND THE SEMINAR

"ENERGY CHALLENGES,
NUCLEAR TECHNOLOGY,
SAFETY AND REGULATIONS
IN THE CARIBBEAN."

RSVP: Ms. Linda Lunan
876-927-1777, 876-935-8532-3,
linda.lunan02@uwimona.edu.jm

WEDNESDAY, MARCH 27, 2019 @ 9:00AM
VENUE:
THE UWI REGIONAL HEADQUARTERS

Future Projects

- National project currently underway to reduce the countries incidence of dengue, ZIKA and other mosquito borne related disease. To date mosquitoes have been harvested and good progress made in identifying the male population
- ICENS have received approval and sponsorship from the IAEA to purchase and implement a Multi- Purpose Irradiator facility @ approx 700K Euros. This facility is expected to be in place by January 2020 to assist with the sterilisation of the male egypti mosquitoes.
- Irradiation will also assist in producing more disease resistant agricultural crops such as ginger.
- With its successful implementation it is hoped that a commercial sized one will be approved to and help to eradicate fruit flies which is a major impediment to our export of mangoes and other fruits. It will also be used for sterilization of medical equipments.
- IAEA Small Island Developing States (SIDS) Project - This interregional project aims at supporting the human and institutional capacity of SIDS in key Areas, such as human health, nutrition, food, agriculture, water management, marine environment, as well as safety and security through knowledge and experience-sharing among SIDS.



Facility Upgrade

- JAM 1001 02 Upgrading the Research Reactor Infrastructure at the University of West Indies, Slowpoke, Facility JM-1. to improve operational safety at the ICENS continue such as: refurbishing of pool water cooling system piping and harnesses, pool lighting, pool water purification system pumping infrastructure among others.
- Continuing upgrade of analogue MK2 control system to the digital SLOWPOKE Integrated Reactor Control and Instrumentation System (SIRCIS).



Areas for Potential Collaborations

Given the small size of ICENS there is merit in collaborating with COMSAT from a ministry- wide perspective to truly realize the potential from the expertise and programmes that are available among member organisations.

Possible Research and Potential Collaborations

- Environmental Geochemistry protection inclusive of green house emission and its mitigation.
- Trace Elements in Air Particulate Matter and in animal/human tissue/ Health
- Heavy Metal Pollution in Jamaica and its marine environment
- Biogeochemical Cycles
- Forensics, Food Safety
- Essential Oils - Mango
- Cyber Security
- Renewable Energy – wind, solar, Hydro and Nuclear
- Waste Water treatment/management
- Hosting of a future council meeting

Thank you for your attention!!