



# INTERNATIONAL CENTRE FOR ENVIRONMENTAL & NUCLEAR SCIENCES

**Prof. Charles Grant** · Director General

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## OVERVIEW

There were several highlights for the International Centre for Environmental and Nuclear Sciences (ICENS) during the reporting period. Among these was the visit of Mr Hua Liu, one of the IAEA's Deputy Director Generals (DDG, Head of Department of Technical Cooperation) on June 30th, 2022. The Centre hosted the Regional Meeting on Technical and Scientific Support Services to Regulatory Functions in Caribbean Members States on Friday, July 1, 2022, chaired by Mr Liu which positioned the ICENS as a Technical and Scientific Support Organisation (TSO) for the region. Professor Charles Grant, the Director General of ICENS, delivered his inaugural professorial lecture on February 24, 2022. The Centre also hosted a visit from the Honourable Christopher Hanson, the Chairman of the US Nuclear Regulatory Commission (NRC) and his delegation on April 5th, 2022. Scientific Officer Jhénelle Williams was awarded the Chevening Scholarship to pursue her master's degree in Climate Change. Ms Williams was also recognised at the Faculty of Science and Technology Awards for Excellence in the Performance of Technical Duties (MONATS). Despite disruptions caused by the pandemic ICENS continued to meet its mandate, completing projects such as the International Atomic Energy Agency's Coordinated Research Project F11021 - "Enhancing Nuclear Analytical Techniques to Meet the Needs of Forensic Science."

## Access

### Students

The International Centre for Environmental and Nuclear Sciences (ICENS), a joint venture of the Government of Jamaica as an agency of the Ministry of Science, Energy, and Technology (MSET) and the University of the West

Indies, does not have academic responsibilities. However, the Centre through the activities of various members of staff contributes to the academic activities of the UWI, Mona. Professor Charles Grant, the Director General, has academic duties including supervision of post-graduate students, PhD thesis and viva review. Mr Johann Antoine, section head of the Nuclear Analytical Laboratory at the ICENS, continued his association with the MSc programme in Forensic Science in the Department of Basic Medical Sciences, Faculty of Medical Sciences by supervising two students for the thesis portion of the degree. Mr Antoine and Dr Adrian Spence, section head of the Atomic Spectroscopy and Wet Chemistry Laboratory, also supervised students from the Department of Chemistry in their work-study programme. Mr Haile Dennis also continued his duties as an adjunct lecturer of Electrical Power (Nuclear) Engineering in the Faculty of Engineering.

The Centre also embarked on a media blitz at the beginning of the period of review starting with Professor Grant's appearance on Smile Jamaica on TVJ for Nuclear Science Week (October 18-22, 2021). This was followed by Mr Antoine's appearance on Get The PH (@gettheph) on TVJ on November 9th, where he was interviewed about the hazards of Lead in Paint. This was followed in January 2022 by Mr Antoine's participation in a Jamaica Information Service Think Tank on Lead in the environment (<https://jis.gov.jm/practise-proper-disposal-of-electronic-waste/>) (<https://jis.gov.jm/partnership-urged-on-research-into-lead-exposure/>). Mr Antoine was also interviewed for the JIS on the ICENS and this article was featured in various media outlets (<https://www.jamaicaobserver.com/news/icens-using-nuclear-technology-for-research-and-development/>) in March 2022.

## **Publications**

The ICENS continued to collaborate with project partners, particularly the UWI to increase publication numbers and impact. Of the six publications during the reporting period, three were with authors from the UWI, and one with international project partners. The five peer-reviewed articles represented an increase over the three in the previous year. A technical report was submitted to the Jamaica Agricultural Commodities Regulatory Authority (JACRA) following the use of nuclear technology to identify the provenance of coffee blends mixed by the Authority and submitted to the

## Refereed Journal articles

- Darrion Walker, **Johann Antoine, Jhénelle Williams, Charles Grant, Mitko Voutchkov**. "Elemental investigation of renal calculi in Jamaica by instrumental neutron activation analysis (INAA)." *Journal of Radio-analytical and Nuclear Chemistry*, October 2021, DOI:10.1007/s10967-021-08071-6.
- Sheena Francis, Chelsea Frank, Luke Buchanan, Sean Green, Roxann Stennett-Brown, Georgiana Gordon-Strachan, Yasmin Rubio-Palis, **Charles Grant**, Ruby Lisa Alexander-Lindo, Chukwuemeka Nwokocha, Dwight Robinson, Rupika Delgoda. "Challenges in the control of neglected insect vector diseases of human importance in the Anglo-Caribbean." *One Health*, Volume 13, December 2021, 100316.
- **Haile T Dennis, Charles N Grant, John A Preston**. "Atmospheric dispersion modeling for an accidental release from a SLOWPOKE-2 research reactor: a case study." *Radiation and Environmental Biophysics* 61 (2), 325-334, April 2022.
- P Chytry, GMS Souza, R Debastiani, CEI Dos Santos, **Johann MR Antoine**, A Banas, K Banas, L Calcagnile, M Chiari, I Hajdas, M Molnar, P Pelicon, N Pessoa Barradas, G Quarta, Francesco Saverio Romolo, A Simon, JF Dias. "The potential of accelerator-based techniques as an analytical tool for forensics: The case of coffee." *Forensic Science International* Volume 335, June 2022, 111281
- **Johann MR Antoine, Charles N Grant, Jhénelle A Williams, Oshane OJ Hamilton, Corey K Roberts**. "A pilot study on the use of neutron activation analysis and multivariate statistics for the provenance of Jamaican Cannabis sativa L (Marijuana)." *Forensic Science International* Volume 335, June 2022, 111281

## Technical Report

- **L.A. Hoo Fung, J.M.R. Antoine**. Differentiation of Coffee Blends of Varying Composition: Preliminary Results. International Centre for Environmental and Nuclear Sciences, Jamaica. November 2021. Report to the Jamaica Agricultural Commodities Regulatory Authority (JACRA)

# Alignment

As an agency of the MSET, the ICENS is obliged to position its corporate and strategic plans, its operational places, and projects with Jamaica's Vision 2030. For example, research supported by the Bureau of Standards Jamaica (BSJ) and the Pan-American Health Organization was conducted on lead in paint in the Jamaican market. The results directly supported the promulgation of the Draft Jamaican Standard -DJS 358:2022 the Jamaican Specification on the Limit of Lead Content in paint and similar coating materials which was adopted in June 2022. This is a compulsory standard and will come into force on January 1st, 2023. Projects in the ICENS operational plan cover all four National Goals and five National Outcomes including a Health and Stable Population, World Class Education and Training, Security and Safety, A Technology-Enabled Society, and Hazard Risk Reduction and Adaptation to Climate Change.

## Papers Presented

- **Jhénelle Williams, Johann Antoine.** "Elemental Composition of Holopelagic Sargassum along Jamaica's Coast." Poster Presentation. 74th Gulf & Caribbean Fisheries Institute Conference November 8th-12th, 2021- Virtual Meeting.
- **Johann Antoine.** "Report on the Lead Analysis of Paints sold in Jamaica." Lead in Paints Virtual Conference – A Safer Jamaica in Every Stroke. PAHO/World Health Organisation and Bureau of Standards Jamaica. June 22nd, 2022.

## Public Service

### **Mr Johann Antoine**

- Chair, Paint and Surface Coatings Technical Committee, Bureau of Standards Jamaica, 2021 to present
- Vice-chair, Chair, National Mirror Committee/ISO TC/93 Starch (including derivatives and by-products), Bureau of Standards Jamaica, 2019 to present.

### **Professor Charles Grant**

- Member of National Bioethics Committee;

- ARCAL National Coordinator (Jamaica), and member of the ARCAL;
- Technical Coordination Board (OCTA which oversees all ARCAL Projects);
- Member, Ministry of Energy Committee on Nuclear Energy as an option for Jamaica;
- Member, NEPA/UNDP Committee for renewable wave energy technologies for the generation of electric power in small coastal communities in Jamaica;
- National Coordinator for Incident Reporting System for Research Reactors;
- National Coordinator, IAEA Radiation Safety Information Management System; (RASIMS);
- Chair, Hazardous Laboratory Waste Ad-Hoc Committee (Ministry of Science, Energy and Technology/ National Commission on Science and Technology).
- Fellow, Institute of Physics

#### **Ms Leslie Hoo Fung**

- Member, National Food Standards Committee (ISO TC34 Mirror committee, convened by the Bureau of Standards, Jamaica)
- ISO/IEC 17025 Assessor, Jamaica National Agency For Accreditation
- Member, Codex Committee on Methods of Analysis and Sampling (subcommittee, Jamaica)
- Member/ Technical Advisor, Hazardous and Laboratory Waste Ad-Hoc Committee (HALWAC) - Treatment, Disposal and Laboratory Guidelines Subcommittee, National Commission on Science and Technology/Ministry of Science, Energy and Technology, Jamaica
- Royal Society of Chemistry, May 2012-Present
- AOAC International, April 2016-Present
- Member, National Water Quality Technical Committee
- Mrs Sandra Hunter
- Fellow of the Institute of Chartered Accountants, Jamaica.

#### **Mr John Preston**

- Member, Land Information Council of Jamaica;
- Independent Member, GOJ Telecommunications Appeals Tribunal.

#### **Dr Adrian Spence**

- Member of the Geochemical Society;
- Member of the American Chemical Society;

- Member of the Royal Society of Chemistry;
- Chemistry Ambassador and Co-Advisor, American Chemical Society (ACS) Student Chapter, UWI.

## Agility

### Income Generation

The ICENS generates income from four main sources: through its major commercial activity of Thermoluminescence Dosimetry (TLD) services, radiation services, commercial analytical services, and grant funding through projects.

The TLD services added a total of thirteen new customers with an additional seventy-two personnel being monitored during the reporting period. Over this period there were eighteen radiation surveys, four orphan radioactive source recoveries and several training and sensitization sessions offered to various clients. As the impact of the COVID-19 pandemic eased there was a notable uptick in the number of samples submitted by the medical cannabis industry for analysis to meet regulatory requirements.

The ICENS also generates income through grant-funding from several projects, either entirely administered by the Centre or where the ICENS was the lead organization. These include:

- CRP F11021 - "Enhancing Nuclear Analytical Techniques to Meet the Needs of Forensic Science" running from June 12th, 2017 to December 2021 and receiving total funding of €20,000.
- CRP D52042 - "Implementation of Nuclear Techniques for Authentication of Foods with High-Value Labelling Claims" running from March 2019 to March 2024 and earmarked to receive total funding of €35,000.
- JAM1001 – "Upgrade of Reactor Infrastructure at the University of West Indies SLOWPOKE Facility JM-1" – which had a start date of January 2016 and is ongoing and the budget for this project is €810,000.00.
- JAM5014 – "Establishing a Self-Contained Gamma Irradiation Facility for the Introduction of Sterile Insect Technique and Experimental Mutagenesis and Diagnostic Technologies", this national project was approved in January 2020 with an initial budget of €750,000.00.
- RLA0059 - "Strengthening Regional Cooperation" which commenced

in January 2018 and is ongoing with a total budget allocation of Total IAEA budget allocated for this regional project to date is €190,575.00.

- INT0093 -“Applying Nuclear Science and Technology in Small Island Developing States (SIDS) in Support of the Sustainable Development Goals and the SAMOA Pathway” is slated to run from January 2018 to January 2022 and has a total budget allocation of €828,806.25.

Real-Time Sensor Network for Green House Gas Emissions (GHG) Monitoring Project - Funding was received from the United States Department of State’s Science Diplomacy Grant for the ICENS to develop carbon dioxide (CO<sub>2</sub>) sensors, and eventually deploy sensors throughout urban areas in Jamaica.