

DEPARTMENT OF PHYSICS

Dr. Tannecia Stephenson, BSc, PhD UWI, – Head of Department



OVERVIEW

The 2018–2019 academic year was characterized with the development of new programmes and giving attention to upgrading some of the infrastructure within the Department. Five new programmes were approved along with two new courses. Emphasis was also placed on increasing the publication output of the Department and forging new partnerships with external institutions to advance their mandates as well as to facilitate integration of students in their operations.

UNDERGRADUATE CURRICULUM AND STUDENT EXPERIENCE

New Bachelor of Science Degrees in Biomedical Instrumentation; Climate Science and Electronic Systems and Electronics and Alternative Energy Systems were approved by the Board for Undergraduate Studies for commencement of offer in 2019–2020. Speech and Language Technology (COMP3350/ELET3211) and Speech Processing (COMP2350/ELET2210) were approved by the Academic Quality Assurance Committee. ELET2210 will be on offer in Semester 2, 2019–2020. An undergraduate Minor in Renewable Energy Management and the Postgraduate Diploma in Renewable Energy Management were also approved for commencement in 2019–2020.

Approximately 30 students completed the requirements for majors/minors in the Department. Five students will graduate with First Class Honours. The Physics Honours Society (PHS) continues to acknowledge the exceptional performance of outstanding undergraduate students. Forty-five students across Levels 1–3 were recognized. The second of two PHS events was held at the Digicel Head Office.

UNDERGRADUATE STUDENT AWARDS

Approximately 13 students were recipients of scholarships and bursaries.

STAFF

Dr. Andre Coy went on sabbatical for the 2018–2019 academic year. Dr. Masaō Ashine resigned his position as Lecturer in Renewable Energy at the end of the academic year. Miss Natalie McLean was seconded to the Faculty Office for Semester 2 2018–2019. Miss Sherica Hall assumed her responsibilities as Instrument Technologist. Mr. Phillip Logan resigned his position as the Laboratory Technologist for the Virtual Lab. Mr Kriston Kong was appointed to assume these duties for Semester 2 2018–2019.

Dr. Michael Neville McMorris, former Head of Department and former Dean of the Faculty of Science and Technology passed away on Friday, October 13, 2018.

RESEARCH AND GRADUATE ACTIVITIES

There are five (5) active Research Groups that continue to attract research grants and consultancies and to publish in their respective disciplines. Research areas include Statistical and Dynamic Downscaling of Climate Data, Evaluation of Renewable Energy Technologies and Modelling Renewable Energy Resources, Examination of the effect of wireless devices used on human health in realistic environments, Compact Stars in General Relativity and Astrophysics. BioGlass, Novel Application of Optics, Human Speech Recognition, the Detection of Trace Elements in BioSamples and Characterization of Materials post a fire event and Satellite Prototype Development.

Graduate Enrolment was 39 postgraduate research students and 28 M.Sc. students (9 students in Renewable Energy Management; 19 students in Medical Physics). Graduate students participate in local and international workshops, conferences and overseas exchanges. There were 5 graduates for the Master of Science in Medical Physics.

The Department produced twenty (20) publications. Nine of the publications were co-authored by postgraduate research students.

RESEARCH AND GRADUATE AWARDS

Recipients of Research Days Awards on February 8, 2019 are noted on page 342 below:

The Office of Graduate Studies and Research hosted an Awards Ceremony recognizing Graduate Research Excellence on June 4, 2019. Mr. Jayaka Campbell was recognized for his role as co-author in a publication that attracted one of the Research Days Best Publication Awards. Other Graduate Scholars who were recognized were: Candice Charlton, Delando Grant, Deron Maitland, Da-Vaugh Sanderson and Theodore Wynter.

Recipients of Research Days Awards

| | | |
|--|--|--|
| Best Research Publication: | Dr. Leonardo Clarke, Professor Michael Taylor, Dr. Tannecia Stephenson and Mr. Jayaka Campbell | Article: “Future Caribbean Climate in a World of Rising Temperatures: The 1.5 vs. 2.0 Dilemma” |
| Most Outstanding Researcher: | Dr. Marhoun Ferhat | Five publications |
| Research Project with the Greatest Business/Economic/ Development Impact | Climate Studies Group Mona | Caribbean 1.5 Project |
| Research Project with the greatest Multidisciplinary/Cross Faculty Collaboration | Dr. Marhoun Ferhat | Other Departments/Centres represented on the team were Chemistry, Basic Medical Sciences and Biotechnology Centre. |

TRAINING AND INTERNSHIPS

Three students successfully completed the Physics in Practice Internship (PHYS3400). Miss Kaycilee Wright and Mr. Jhamali Vassell were among the 10 Jamaican students participating in the 2-week Huawei Internship Programme hosted in China October 2018. Miss Sharmoy Findley and Mr. Vijay Gregory participated in a 2 week course of study offered by Sophia University in Japan in January 2019. Mr. Matthew Williams, Final year Energy and Environmental Student worked as an intern in the Meteorological Service in Trinidad and Tobago as part of the Caribbean Catastrophe Risk Insurance Facility (CCRIF) Internship Programme. The Climate Studies Group Mona hosted Miss Abigail Jones, an intern in the CCRIF Internship Programme for 8 weeks.

Two undergraduate students participated in the Photovoltaic Associate Training & System Inspectors Course (NABCEP Training) hosted by Green Solutions International in partnership with the Department of Physics and the Faculty of Engineering held December 10–14, 2018.

Partnerships

A Memorandum of Understanding (MOU) was signed between the University of the West Indies through its Energy Management Unit/Faculty of Engineering and the Alternative Energy Research Group and the Bureau of Standards Jamaica on June 20, 2019. The Spectrum Management Authority commenced a partnership with the Physics Department for the development of a wireless device/EMC test lab at The

UWI. A Team from SMA visited The UWI Mona Campus on May 9, 2019 to view the space for setting up the lab.

Academic Visits

Dr. Tanya Kerr participated in a training and research visit to the University of Waterloo, Ontario, Canada to do modelling of Compartment fire dynamics in 2018. Dr. Louis-Ray Harris attended a January 2019 training workshop at the International Centre for Theoretical Physics (ICTP), Trieste, Italy on Rapid Prototyping of Internet of Things (IoT) Solutions for Science. Dr. Paulette Bynoe, former Dean of the Faculty of Earth and Environmental Sciences at the University of Guyana was hosted in the Department of Physics on a 6-month consultancy under the Pilot Programme for Climate Resilience (PPCR). Mr. Cicero Lallo, a retired Senior Lecturer at The University of the West Indies St. Augustine Campus was hosted in the Department of Physics on a 6-month consultancy under the PPCR. Professor Kezia Page from Colgate University along with her students were hosted in the Department of Physics for Semester 2, 2018–2019.

Mr. Karlus Redway, a postgraduate student was the recipient of a UWI Postgraduate Research Grant to enable his visit to the Khalifa University of Science, Technology and Research in Abu Dhabi in January 2019. Mr. Dawin Morna, postgraduate student in Materials Science visited the Columbia University on a 6-week research exchange from July 2019. His research objective was to use existing techniques to mechanically exfoliate and characterize monolayer transition metal dichalcogenides, so that we can stack them and twist them to study interlayer charge transfer excitons as a function of twist angle.

Marketing and Outreach

CAPE Workshops were held January 7–11, 2019 (Kingston) and January 15–16, 2019 (Montego Bay). Seven Hundred and Ninety-Five students participated. Three follow-up CAPE Physics Sessions were hosted on February 15, March 16 and April 13, 2019. Sessions were facilitated by the Alumni of the Department and supported by Postgraduate Students.

Dr. Michael Ponnambalam, a former lecturer in Physics hosted a Fifth Form Physics Workshop from January 31–March 1, 2019. The aim was to give Fifth Form students an opportunity to discover, experience and enjoy the beauty and fun in the subject of Physics, through the use of lively and interactive demonstrations, computer simulations and experiments, all related to their syllabus. Over 150 CSEC students were engaged in this exercise. Dr. Ponnambalam was supported by member of staff and postgraduate and undergraduate students in Physics.

Mr. Leaford Henderson through the Astronomical Association of Jamaica organized a local version of the International Night of Astronomy, “Yuri’s Night”. The event commemorates the first human spaceflight in 1961 and is celebrated annually worldwide on April 12. The Jamaican event was open to the general public and saw twenty (20) attendees participating in discussion of topics related to space and astronomy, interspersed with documentaries and “stargazing” through telescopes in the Department.

Public Forums

The Alternative Energy Research Group (AERG) hosted a renewable energy forum entitled *100% Clean: The Why and How of Jamaica’s Transition from Imported Fossil Fuels to Natural Resources* on September 6, 2018. The Mona Fire Research Environment together with the Jamaica Fire Brigade hosted a Science for Today Public Lecture on *A Burning Issue: Jamaica’s Fire Building Code and You* on October 25, 2019. The AERG hosted a panel discussion on *The Built Environment and Energy Efficiency* on February 28, 2019.

WORKSHOPS AND CONFERENCES HOSTED

The Climate Studies Group Mona (CSGM) hosted a Validation Workshop on March 6-7 2019 in the Department of Physics in relation to the State of the Caribbean Climate 2017: Information for Resilience Building Document that is being compiled. The Document addresses the state of knowledge on Caribbean climate variability and change and their impacts on different sectors. A second validation workshop was hosted by the CSGM in St. Lucia May 2–3, 2019. SOCC activities are funded by the Caribbean Development Bank. A Caribbean Climate Modelling Consortium Meeting was held in the Department of Physics August 7-8, 2019 under the Inter-American Bank Pilot Programme for Climate Resilience (PPCR). The 15th International Conference on Intelligent Tutoring Systems was hosted in the Faculty of Science and Technology June 3–7, 2019. Dr. Andre Coy was a member of the Planning Committee.

INFRASTRUCTURE UPGRADE

The level 1 Physics Lab was renovated with the laying of new tiles, installation of electricals and painting. The Tutorial Room 2 (Glass House) was renovated with installation of new solid glass frames, refurbishing of furniture and painting of room. The board frame on the ceiling along the corridor was removed and the ceiling was painted and new LED lights installed. The railing in front of the Glass House was polished and the grills were painted.

PRE-LABOUR DAY PROJECT

The Department undertook a Pre-Labour Day Project on May 17, 2019 which included the addition of plants to the Physics Quadrangle and paving of the walkway through the Quadrangle.

AWARDS

Yekini Wallen-Bryan was featured prominently in the National Innovation Awards 2018 and was awarded for his concept “WatchDawg” – a device to help farmers combat praedial larceny whilst also providing an affordable security alternative to the everyday consumer. Additionally on November 2, 2018 at the Climate Innovation Summit Mr. Wallen-Bryan and his company, PreeLabs Limited, were invited to pitch WatchDawg in a competition with 5 other entrepreneurs from across the Caribbean. Mr. Wallen-Bryan placed 2nd and received grant funding courtesy of the World Bank, Government of Canada and the CCIC to accelerate the development of the project and get it to market.

The Organization of American States (OAS) in partnership with the Inter-American Committee against Terrorism (CICTE) staged the Diplohack Student Challenge 2019. The Jamaican team who placed second comprised five (5) UWI students including two from FST – Toni-Ann Willis (Computer Science) and Gisellé Hall (Physics major and Geology minor student). Other members of the team were Sayeed Bernard (Law), Chavel Ford (Social Sciences), and Kyle Glegg (Medicine) as well as the team’s mentor Dr. Lisa Vasciannie (Government).

The Robotics Team placed third in the Open Competition of the annual IEEE SoutheastCon 2019 Student Hardware Competition held in Huntsville, Alabama in the United States April 11–14, 2019. In addition to Yekini Wallen-Bryan, coach and student advisor, the team comprised Brandon Campbell; software team member, Jhamali Vassell; hardware captain, Shane Smith and vice-captain, Jourdan Dunkley; and hardware team members: Galen Hare, Justine Shaw, Jordon Hayles and Danelle Julal.

RECOGNITION AND AWARDS

Mrs. Rosalene Simmonds was the recipient of a Distinguished Worker Award (MONATS) for Excellence in the performance of Administrative Duties at the Faculty of Science and Technology Awards Ceremony.

Dr. Phylicia Ricketts was awarded the 2018 Prime Minister’s Youth Award for Excellence in the category of Innovation Science and Technology on Sunday November 25, 2018. Dr. Ricketts was awarded for her outstanding work in Medical Physics.

Professor Michael Taylor was named a Fellow of the Caribbean Academy of Science Thursday, November 29, 2018 in recognition of his remarkable work in Climate Science.

DEPARTMENTAL STATISTICS

Total Undergraduate Students Registration

| | Semester 1 | | Semester 2 | |
|----------------------|------------|------------|------------|------------|
| | 2018-2019 | 2017-2018 | 2018-2019 | 2017-2018 |
| Preliminary | 84 | 77 | 79 | 56 |
| Introductory Physics | 132 | 146 | 91 | 102 |
| Year 2 | 177 | 106 | 183 | 94 |
| Year 3 | 61 | 57 | 86 | 72 |
| Totals | 454 | 386 | 439 | 324 |

Prizes Awarded

Recipients of undergraduate departmental awards for 2018–2019 are:

- Dayna-Leigh Plummer – The Professor John Lodenquai Prize for Introductory to Physics
- Vijay Gregory & Rickardo Anderson. – Level II Physics Bursaries
- Jarvis Hayman – Michael Tharmanathan Physics Bursary

SIGNIFICANT FUNDING

Dr. Phylicia Ricketts participated in the United States Embassy Women's History Month Grant Pitch competition held on March 27, 2019. A pitch on behalf of a non-governmental organization called ACLaS (A Classy Lady of Science). This initiative is geared towards empowering young girls to pursue STEM-related fields. Dr. Ricketts received \$1000 USD for project start up.

Mr. Leaford Henderson, Postgraduate Student participated in the Democratizing Innovation in the Americas (DIA) Labs Innovation Retreat and Pitch Competition on April 6–8, 2019. The project proposal for a low cost, user friendly soil quality testing system, was awarded fourth place in the competition, along with \$100,000 JMD start-up capital.

PUBLICATIONS

Refereed Journal Articles

- **W. Marlтан, P. Venkateswara Rao, H.O. Tekin, M.I. Sayyed, R. Klement, D. Galusek, G. Lakshminarayana, P. Syam Prasad, N. Veeraiah** (2019). Analysis of Red mud doped $\text{Bi}_2\text{O}_3\text{B}_2\text{O}_3\text{-BaO}$ glasses for application as glass solder in radiation shield repair using MCNPX simulation. *Ceramics International*, DOI: <https://doi.org/10.1016/j.ceramint.2019.01.058>. IF 3.057
- **K. Stephenson, T. Stephenson and A. Centella-Artola** (2019). Advancing Climate Science and Response for Caribbean Islands, *Eos*, 100, <https://doi.org/10.1029/2019EO114415>.
- **P. Venkateswara Rao, G. Naga Raju, P. Syam Prasad, T. Satyanarayana, L. Srinivasa Rao, F. Goumeidane, M. Iezid, W. Marlтан, G. Sahaya Baskaran, N. Veeraiah** (2018). Role of molybdenum ions in lead zinc phosphate glass system by means of dielectric studies. *Materials Science-Poland*, DOI: 10.2478/msp-2018-0074. IF 0.854
- **M. Vetter, J. Gonzalez-Rodriguez, E. Nahau, T. Kerr** (2019). The use of Raman Spectroscopy to monitor phase changes in concrete following high temperature exposure. Accepted. *Construction and Building Materials*. IF:3.485
- **A. Fevrier-Paul, A.K. Soyibo, S. Mitchell, M. Voutchkov** (2018). Role of Toxic Elements in Chronic Kidney Disease. *J Health Pollut.* 8(20):181202. doi:10.5696/2156-9614-8.20.181202
- **N. A. Mahammedi and M. Ferhat** (2019). "Investigation of the Structural, Electronic and Mechanical Properties of Type-VIII $\text{Ba}_8\text{Si}_{46}$ Clathrate under High-Pressure through First-Principles" *Silicon*, vol: 11, n: 45, 2019, <https://doi.org/10.1007/s12633-019-00145-1> IF:1.246
- **Shaik Meera Saheb, P. Venkateswara Rao, R. Vijay, P. Ramesh Babu, Ch. Chandrakala, P. Syam Prasad, G. Naga Raju**: "Spectroscopic and electrical investigations of copper ions in PbO-GeO_2 glasses" *Results in Physics* 11 (2018) 880-786, ISSN. 211-3797, IF: 2.147.
- **W. Marlтан, P. Venkateswara Rao, R. Klement, D. Galusek, M.I.Sayyed, H.O. Tekin, P. Syam Prasad, N. Veeraiah**: "Spectroscopic and thermal analysis of lead-free multipurpose radiation shielding glasses" DOI: <https://doi.org/10.1016/j.ceramint.2018.11.231> *Ceramics International*, ISSN: 0272-8842, IF: 3.057
- **D. Sanderson, M. Voutchkov and N. Benkeblia** (2019). Bioaccumulation of cadmium in potato tuber grown on naturally high levels cadmium soils in Jamaica. *Science of the Total Environment* 649: 909-915. IF 5.589

- T. Sambasiva Rao, D.V. Krishna Reddy, SK Taherunnisa, A. Siva Sesha Reddy, **P. Venkateswara Rao**, N. Veeraiah, M. Rami Reddy (2019). "Studies on structural characterization and near white light emission through energy transfer between Ce^{3+} and Tb^{3+} in barium gallium borosilicate glasses doi.org/10.1016/j.molstruc.2019.04.065 IF: 2.011
- **T. S. Stephenson**, **M. A. Taylor**, A. R. Trotman, C. J. Van Meerbeeck, **J. D. Campbell**, **A. Brown** and J. Spence (2019). [Regional Climates] Caribbean [in State of the Climate in 2018]. Accepted to Bull. *Amer. Meteor. Soc.* IF 7.804
- G. Lakshminarayana, U. Caldiño, A.N. Meza-Rocha, A. Lira, **P. Venkateswara Rao**, Vijay Singh, Dong-Eun Lee, Jonghun Yoon, Taejoon Park (2019). Fluorescence features of Tm^{3+} -doped multicomponent borosilicate and borotellurite glasses for blue laser and S-band optical amplifier applications Optical Materials, IF: 2.687
- Satyanarayana Talama, Rambabu Busi, Nagarjuna Gunnam, P. Syam Prasad, **Venkateswara Rao Penugonda** (2019). Preparation and structural characterization of P_2O_5 - CaO - Na_2O : CuO glasses *Journal Of Optoelectronics and Advanced Materials*, IF: 0.588
- **R. Stennett-Brown**, **T. S. Stephenson** and **M. A. Taylor** (2019): Caribbean Climate Change Vulnerability: Lessons from an aggregate index approach. Accepted to *Plos One*. IF 2.776
- T. Rogers, **M. Ashtine**, **R. Koon Koon**, and M. Atherley-Ikechi. 2019. Onshore wind energy potential for small island developing states: Findings and recommendations from Barbados. *Energy for Sustainable Development*, I.F. 3.307
- D. Batic, N. G. Kelkar, M. Nowakowski, and **K. Redway** (2019) *Perturbing microscopic black holes inspired by noncommutativity*. Eur. Phys. J. C 79: 581, DOI: 10.1140/epjc/s10052-019-7084-x. IF 5.172
- D. Batic, M. Nowakowski, and **K. Redway** (2019) *Reply to "Comment on 'Some exact quasi-normal frequencies of a massless scalar field in the Schwarzschild space-time'"*. Phys. Rev. D, Vol. 99, 088502, DOI: 10.1103/PhysRevD.99.088502. IF 4.368
- **L. P. Brown**, J. Charlery and **M. Voutchkov** (2019). Investigating the apparent link between Cosmic-ray Muon Flux, Sudden Stratospheric Warmings and dry season rainfall over Jamaica. Accepted to Atmospheric and Climate Sciences. IF 1.09

Peer-reviewed Conference Proceedings

- **M. Ashtine**, **R. Koon Koon**, **G. Delando** and A. Maharaj, 2018: Advancing the Caribbean Energy Landscape – A Comprehensive Review of Electric Vehicles and Storage. Proceedings of Caribbean Academy of Science Conference.

- L.Srinivasa Rao,, V. Ravi Kumar, P. Naresh, **P. Venkateswara Rao**, N. Veeraiah (2018). Optical absorption and photoluminescence properties of vanadium ions in ‘lithium-tungsten-borate’ oxide glasses. *Materials Today: Proceedings* 5 (2018) 26290–26297.
- **Kaycilee S. Wright, Brandon O. Campbell, Louis-Ray O. Harris**. A Cost-effective Virtual Reality Headset for Immersive Interactive Learning in Developing Nations. *Proceedings of The Caribbean Academy of Sciences (CAS-2018) – 21st General Meeting and Conference, CAS-031*, pp. 147–153, November 2018.
- **Brandon O. Campbell, Kaycilee S. Wright, Louis-Ray O. Harris**. An Environmentally Friendly Solution to Realising ICT Sector Growth in Developing Countries. *Proceedings of The Caribbean Academy of Sciences (CAS-2018) – 21st General Meeting and Conference, CAS-031*, pp. 118–124, November 2018.
- **Vijay Gregory and Louis-Ray Harris**. Evaluation of Magnetic Field Strength Induced by 50-Hz Power Lines in Kingston, Jamaica. *9th Annual National Health Research Conference*, November 22–23, 2018.

Research Grants

- Leonardo Clarke, Michael Taylor, Jayaka Campbell and Tannecia Stephenson (2018–2020): Assessing the Effects of Solar Radiation Management on Future Caribbean Climate. Developing Country Impacts Modelling Analysis for SRM (DECIMALS) Project. The World Academy of Sciences (TWAS). USD\$10,000.
- Leonardo Clarke, Michael Taylor, Jayaka Campbell and Tannecia Stephenson (2018–2020): Assessing the Effects of Solar Radiation Management on Future Caribbean Climate. Developing Country Impacts Modelling Analysis for SRM (DECIMALS) Project. United Nations Educational, Scientific and Cultural Organization (UNESCO). USD 51,000
- Michael Taylor and Tannecia Stephenson (2018–2019). Resilience Strengthening to Climate Change Impacts through Youth Education in Primary Schools. The UNDP Global Environment Facility (GEF) Small Grants Programme. USD \$93,000. Project Managers: Kimberly Stephenson and Dale Rankine.

PUBLIC SERVICE

Dr. Masao Ashtine

- Member of the Energy and Environment Committee of the Private Sector Organization of Jamaica.

Dr. Andre Coy

- Convener, Physics Panel for Caribbean Examination Council

- Reviewer Journals, IEEE Transactions on Audio, Speech and Language Processing, Computer Speech and Language, Instrumentation Science & Technology
- Member IEEE Signal Processing Society
- Member IEEE Communications Society
- Member STEM Integration Committee – Ministry of Education
- Advisor to the Ministry of Education – Core Curriculum Unit.

Dr. Victor Douse

- Chairman, Cement Technical Committee, Bureau of Standards
- Technical Assessor, Jamaica National Agency for Accreditation (JANAAC)
- Chairman, Aggregates Technical Committee
- Vice Chairman, Building and Associated Materials Committee.

Dr. Tanya Kerr

- Member of the International Association of Fire Safety Science (IAFSS).

Dr. Leary Myers

- Member of Hazardous Substances Regulatory Authority.

Dr. Venkateswara Penugonda

- Editorial Board Member for the *Journal of Engineering Publication House*
- Life member in Luminescence Society of India (LSI).

Dr. Tannecia Stephenson

- Member of Coordinated Regional Climate Downscaling Experiment Science Advisory Team (CORDEX SAT)
- Member, Steering Committee, Pilot Programme for Climate Resilience (Caribbean)
- Member of the Task Team on Guide to Climatological Practices (TT-GCP) of the World Meteorological Organization Fifth Open Panel of the Commission for Climatology (CCI) Experts (OPACE 5)
- Member of the World Meteorological Organization Extremes Committee
- Lead Author of the Intergovernmental Panel on Climate Change Sixth Assessment Report.

Professor Michael Taylor

- Member, Board, Water Resources Authority;
- Member, Climate Change Advisory Board, Ministry of Land, Water, Environment and Climate Change

- Member, International Science Panel of VAMOS/CLIVAR
- Member, Steering Committee, Pilot Programme for Climate Resilience (Caribbean);
- Reviewer Journals: *Journal of Geophysical Research*, *International Journal of Climatology*, *Journal of Climate*, *Climate Dynamics*, *Theoretical and Applied Climatology*, *Tellus A*.
- Coordinating Lead Author of the Intergovernmental Panel on Climate Change Special Report on Global Warming of 1.5°C.

Professor Mitko Voutchkov

- Member of the Board of Directors of International Centre for Environmental and Nuclear Sciences
- Member of the Editorial Board of the *West Indies Medical Journal*
- Member, Jamaica's Energy Council, Ministry of Science, Technology, Energy and Mining
- Life Member, International Society of Environmental Geochemistry and Health
- Chairman, Technical Advisory Committee "In-situ Methods for Characterization of Contaminated Sites", International Atomic Energy Agency (IAEA)
- IAEA Technical Co-operation Expert in Nuclear Physics.