

**MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY, FACULTY
OF SCIENCE, DEPARTMENT OF PHYSICS, P. O. Box 1410 MBARARA**

**ICTP PHYSICS WITHOUT FRONTIERS UGANDA: East African Training
Workshop On Machine Learning And Data Science Applications In Space Weather
And Ionospheric Research**

8-12 September, 2025

WORKSHOP PROGRAM

Day 1 (08 Sept 2025): Foundations of Space weather and Ionospheric Science			
Time in EAT	Activity	Speaker	Moderator
0800-0900	Arrival and registration	Secretariat	Dr. Aol Sharon
	Opening Ceremony		
0900-0905	Welcome address	Dr. Aol Sharon <i>chairperson Local organizing committee</i>	Dr. Mungufeni Patrick
0905-0910	Welcome remarks	Dr. Okot David Kilama <i>HOD, Physics Department</i>	Dr. Mungufeni Patrick
0910-0915	Welcome remarks	Dr. Eunice Olet <i>Dean, Faculty of Science</i>	Dr. Mungufeni Patrick
0915-0935	Welcome remarks/opening workshop	Prof. Pauline Byakika Kibwika <i>Vice Chancellor, Mbarara University of Science and Technology (MUST)</i>	Dr. Mungufeni Patrick
0935-1005	Space Science and Aeronautics in Uganda	Dr. Doreen Agaba <i>Department of Aeronautics and Space Science, part of the Science, Technology and Innovation Secretariat under the Office of the President</i>	Dr. Mungufeni Patrick
1005-1030	Space Science Infrastructure in	Dr. Andima Geoffrey	Dr. Mungufeni Patrick

	East Africa: Milestones and Future Prospects	<i>Physics Department, Busitema University</i>	
1030-1040	International Center for Theoretical Physics-Physics Without Frontiers (ICTP-PWF)	Dr. Yenca Migoya-Orue <i>STI unit, The Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy.</i>	Dr. Mungufeni Patrick
1040-1100	Tea/Coffee Break (Photo moment!)		
1100-1145	Keynote speech: “The importance of Space Weather and Ionospheric Research in Africa: Opportunities and Challenges”	Prof. Babatunde Rabi <i>Research Director, National Space Research and Development Agency, Abuja, Nigeria</i>	Dr. Aol Sharon
11:45-1200	The African Geophysical Society(AGS)	Prof. Olivier Obrou <i>President, AGS</i>	Dr. Aol Sharon
1200-1300	Session1: The Earth’s ionosphere	Dr. Omondi George <i>Maseno University</i>	Dr. Aol Sharon
1300-1400	Lunch Break		
1400-1530	Session 2: GNSS for ionospheric studies	Prof. Wojciech Miloch <i>University of Oslo, Norway</i>	Dr. Abiriga Faustine
1530-1615	Hands-on Training 1: Basics of Matlab programming and Extraction of VTEC from GNSS observations using Matlab	Dr. Andima Geoffrey Prof. Wojciech Miloch	Dr. Opio Philip
1615-1630	Tea/Coffee Break		
1630-1730	Exercise: Extraction of VTEC from GPS using Matlab	Dr. Andima Geoffrey Prof. Wojciech Miloch	Dr. Opio Philip

Day2 (09 Sept 2025): Data Analysis and Modeling Techniques

0900-1000	Session 3: Basics of python programming	Dr. Mungufeni Patrick <i>Physics Department, Muni University, Local project coordinator, PWF</i>	Ms. Daphne Ayebare
1000-1030	Session 4: Introduction to Ionospheric models	Dr. Yenca Migoya-Orue	Ms. Daphne Ayebare
1030-1100	Tea/Coffee Break		
1100-1145	Hands-on Training 2: Basics of Fortran programming	Dr. Yenca Migoya-Orue	Dr. Mungufeni Patrick
1145-1300	Hands-on Training 2 continued: Plotting IRI/NeQuick values extracted from Fortran code with Matlab	Dr. Yenca Migoya-Orue Dr. Andima Geoffrey	Dr. Mungufeni Patrick
1300-1400	Lunch Break		
1400-1530	Session 5: Principles of ionospheric data assimilation/tomography techniques	Dr. Nicholas Ssessanga <i>University of Oslo, Norway</i>	Dr. Aol Sharon
1530-1645	Hands-on Training 3: Data assimilation/tomography techniques	Dr. Nicholas Ssessanga	Dr. Aol Sharon
1645-1700	Tea/coffee Break		
1700-1730	Continuation of Hands-on Training 3		

Day 3 (10 Sept 2025): Machine Learning/Data Science for Space based observations of Ionospheric irregularities

0900-0930	Session 6: Introduction to machine learning and applications in Space weather and ionospheric research	Dr. Ola Abu Elez <i>Space Weather Monitoring Center, Physics Department, Helwan University, 11795 Cairo, Egypt.</i>	Dr. Andima Geoffrey
0930-1000	Session 7: Supervised learning	Dr. Okoh Daniel	Dr. Andima Geoffrey

	for Ionospheric studies		
1000-1030	Session 8: Unsupervised learning for Ionospheric studies	Dr. Yenca Migoya-Orue	Dr. Andima Geoffrey
1030-1100	Tea/Coffee Break		
1100-1230	Session 9: Ionospheric irregularities and scintillations	Prof. Wojciech Miloch	Dr. Opio Philip
1230-1300	Session 10: Swarm satellites: Revolutionizing Space Science Research and collaborative opportunities	Prof. Wojciech Miloch	Dr. Opio Philip
1300-1400	Lunch Break		
1400-1530	Session 11: Radio occultation observations of ionospheric irregularities (CHAMP)	Dr. Mungufeni Patrick	Dr. Nicholas Ssessanga
1530-1645	Hands-on Training 4: Ionospheric irregularities observed by Swarm	Prof. Wojciech Miloch Dr. Aol Sharon	Dr. Abiriga Faustine
1645-1700	Tea/Coffee Break		
1700-1730	Continuation of Hands-on Training 4		
Day 4 (11 Sept 2025): Equatorial Electrojets			
0900-0930	Session 12: The study of EEJs	Dr. Habyarimana Valence <i>Department of Physics, Mbarara University of Science and Technology,</i>	Dr. Aol Sharon
0930-1030	Hands-on Training 5: Extraction of EEJ from magnetometer observations	Dr. Habyarimana Valence Ms. Daphne Ayebare	Dr. Aol Sharon
1030-1100	Tea/Coffee Break		
1100-1200	Hands-on Training 5: Extraction of EEJ from Swarm	Ms. Daphne Ayebare <i>Physics Department, Mountains of the Moon University</i>	Dr. Mungufeni Patric

1200-1300	Session 15: Space weather phenomena and geomagnetic storms	Dr. Jean Uwamahoro <i>College of Education (UR-CE), University of Rwanda, Rwanda.</i>	Dr. Mungufeni Patrick
1300-1330	Lunch Break		
1330-1700	Tour of Mbarara City: Igongo Cultural center		
1900-2100	Workshop dinner		
Day 5 (12 Sept 2025): Networking, Collaboration, and Future Directions			
0900-0945	Ionosonde for ionospheric studies	Dr. Opio Philip <i>Physics Department, Mountains of the Moon University</i>	Ms. Daphne Ayebare
0945-1030	Hands-on Training 6: Solar wind and geophysical parameters	Dr. Abiriga Faustine <i>Physics Department, Gulu University</i> Dr. Omondi George Dr. Jean Uwamahoro	Ms. Daphne Ayebare
1030-1100	Tea/Coffee Break		
	Panel Discussions/Business meeting		
1100-1130	Building capacity for Space Science Research in East Africa	Assoc. Prof. Edward Jurua, Dr. Jean Uwamahoro, Dr. Mungufeni Patrick, Dr. Okoh Daniel, Dr. Yenca Migoya-Orue	Dr. Andima Geoffrey
1130-1145	Strengthening Space Science Research in East Africa	Assoc. Prof. Edward Jurua, Dr. Jean Uwamahoro, Dr. Mungufeni Patrick, Dr. Okoh Daniel, Dr. Yenca Migoya-Orue	Dr. Andima Geoffrey
1145-1200	Exploring the Feasibility of a Mentoring Programme	Dr. Yenca Migoya-Orue Prof. Wojciech Miloch Dr. Aol Sharon	Dr. Andima Geoffrey
	Closing ceremony		
1200-1230	Award of certificates	Vice Chancellor	Dr. Aol Sharon
1230-1235	Closing remarks by the PWF	Dr. Mungufeni Patrick	Dr. Aol Sharon

	project coordinator		
1235-1245	Closing remarks by workshop chair local organising committee	Dr. Aol Sharon	Dr. Aol Sharon
1245-1300	Closing remarks by Vice Chancellor	Vice Chancellor	Dr. Aol Sharon
1300-1400	Lunch Break and departure		