

# Developing Astronomy in Uganda

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**Abstract.** Astronomy as a discipline has not been widely established in Uganda. However, some aspects of astronomy, especially, concerning the solar system, are integrated in geography syllabi for secondary and tertiary institutions. The technological spin-off benefits from astronomy to humanity are immense and therefore, efforts should be geared towards establishing astronomy as an autonomous discipline across the entire school system in the Uganda. So far, the urge and efforts made to popularize the discipline in Uganda have started yielding tangible results. This paper presents the achievements and future strategies of establishing astronomy in Uganda's school system.

**Keywords.** Astronomy, Astrophysics, Space Science

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## 1. Introduction

Uganda is a landlocked country located astride the equator, at a distance of about 800 kilometers inland from the Indian Ocean. It extends from  $1^\circ$  south to about  $4^\circ$  north latitudes and  $30^\circ$  to  $35^\circ$  east longitudes. Uganda is bordered from the north by Sudan, west by Democratic Republic of Congo, east by Kenya, and south by Tanzania and Rwanda. It has a land surface of 241,139 square kilometers.

The Government of Uganda has put strong emphasis on the importance of popularizing science and technology due to the vital role it plays in promoting societal transformation through the development of various skills and professions. Furthermore, education is also viewed as being responsible for raising the awareness of the population on various issues of national importance, resulting in the improvement of general standards of living. The introduction of astrophysics in the Ugandan education system is therefore in line with the aspirations of the government as the importance of its technological spin-offs cannot be undermined.

## 2. The Education System in Uganda

Uganda was a British colony until independence in 1962 and consequently, the education system is closely related to the British education structure. The science syllabi from primary to tertiary educational institutions have not strongly integrated astronomy as a critical component. This scenario has led to the invisibility of astronomy in all aspects of the science syllabi in Uganda. Aspects of the solar system are included in Geography syllabus, while primary and secondary science syllabi introduce students to the concepts of eclipses as a component in optics. Therefore, astronomy has not been provided with adequate space in the educational curriculum and hence the importance of understanding and appreciating our place in the vast and varied universe is not given attention. This has affected the process of nurturing and cultivating and subsequent development of careers in astronomy in Uganda. Since 2001, Mbarara University of Science and Technology created a deliberate strategy to nurture and develop interests and subsequently train interested students in astrophysics so as to kick-start the development of astronomy in the country.

### **3. The role of Mbarara University of Science and Technology in development of Astrophysics and Space science in Uganda**

Mbarara University of Science and Technology (MUST) is the only public and science-oriented university in Uganda. As part of her mandate as a flagship institution promoting science and technology in the country, it has introduced astrophysics as a course in the Physics department. The ultimate goal is to develop the discipline and eventually create a department of Astrophysics and Space Science in the University.

The exposure of students to a course, such as Astrophysics, that articulates an in-depth description and analysis of the structures and forms that characterize the universe has played a central role in broadening their perception and activating their awareness about the importance of studying and understanding our natural heritage, the universe. The introduction of Astrophysics has not only created awareness among students, but has also cultivated a lot of interest in pursuing further careers in Astrophysics. As a result, a total of eleven students have taken various courses in Astrophysics and Space Science in various universities in South Africa since 2003 and two of whom have completed their Doctoral degree programs and have returned to teach in MUST.

This achievement in human capacity development in Astrophysics and Space Science in Uganda has been possible due to the selfless support from South African Institutions. The South African National Astrophysics and Space Science Program (NASSP) has been very instrumental in the provision of the requisite scholarship and it has encouraged and enabled Ugandans to access training in this noble discipline.

MUST has also acquired a GPS antenna and receiver. This equipment will enable us train many other students who are very much interested in Space Science and have not received scholarship opportunity elsewhere in pursuit of the same specialty. This equipment will not only provide data on space weather for research but also serves as a starting point for introduction of postgraduate programmes in Space Science. Besides, there is a strong national interest in developing Space Science research. The government of Uganda appreciates importance of citizens' awareness about environmental change and its consequences. This therefore makes the studying and understanding of the state of our planet, the earth, very crucial and urgent. In this respect, as an institution of science and technology, MUST has a strategic importance in championing the operationalisation of this position. The immediate plan is to introduce programs on remote sensing, satellite communication, and geodesy.

### **4. The way forward**

As an Institution, we have started the process and plan to make astronomy popular in other institution of learning right from primary to other higher institutions of learning. This is possible due to the fact that MUST trains secondary schools Science teachers in addition to other Training Institutions. These science teachers are already being exposed to Astrophysics and therefore, the capacity for curriculum development for astronomy is already established. There is now need to engage all the other stakeholders to justify and together pursue the introduction of astronomy at all levels of education in Uganda.

Workshops, seminars, conferences, and even schools have to be organized to sensitize the stakeholders about the importance of developing Astrophysics and Space Science in the country. During the International Year of Astronomy, MUST organized a workshop for secondary school students and their teachers. There is need for more of such sensitization workshops to popularize the discipline.

The formation of Astronomy societies and clubs in schools have started in Uganda. MUST and Makerere University have armateur astronomers clubs. These clubs are formed from inherent interest and admiration for Astronomy. Many of the members are students, though there are university lecturers who have also joined these clubs. This is one avenue of making Astronomy popular and should be encouraged so that these clubs are formed in schools and social networks all over the country.

Training of interested students at postgraduate level will boost the human resource capacity in Astrophysics and Space Science. There is need to build capacity both locally and internationally so as to realize the critical level of competences in Astrophysics and Space Science.

Research is an important aspect of development. The research infrastructure for Astrophysics and Space Science in Uganda is still inadequate. There is a critical need for support form both the government of Uganda and the development partners in building research infrastructure for Astrophysics and Space Science. This will go a long way in promotion and generation of new knowledge and continuously facilitate training in this discipline.

## **5. Conclusion**

Astrophysics and Space Science in Uganda is still at her embryonic state and MUST has moved forward to build capacity in terms of human resource and equipment infrastructure. We need to do more in terms of curriculum development at all levels of education; sensitize the public through workshops, seminars, clubs, and conferences about the importance of Astrophysics and Space Science to mankind; build research infrastructure for building a viable human capital in this discipline. It is with these stated action points and even more that we shall develop Astrophysics and Space Science in Uganda.