

## **Regional Astronomy Development Workshop for Eastern Africa**

**Held from 9<sup>th</sup> to 13<sup>th</sup> November 2009**

**At Meridian Court Hotel, Nairobi, Kenya**

### **Consolidated Report**

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#### **1. Introduction/Background:**

##### *Overview:*

The workshop was attended by 43 people including 29 Kenyans and 14 foreign participants and resource persons. A total of 8 Kenyan Universities sponsored at least two participants each (one academic staff and a student) to the workshop. The workshop was a blend of lectures at the hotel, and hands-on laboratory exercises conducted at the University of Nairobi. A high level

meeting was also organized between the IAU and the Kenyan Government Policy makers drawn from amongst University Vice Chancellors, College Principals, National Council for Science and Technology, Ministry of Higher Education Science and Technology and Kenya National Academy of Sciences. Both the workshop and the high level meeting were a success and at the end of the workshop participants were issued with certificates. Each country also received one astronomy textbook entitled "Universe: Stars and Galaxies" which would help lecturers to prepare small modules on astronomy or to use it as a reference.

The workshop was jointly sponsored by the International Astronomical Union (IAU) and International Science Programmes (ISP) of Uppsala University, Sweden. Both donor organizations were represented at the workshop by Prof. Edward Guinan and Prof. Ernst van Groningen respectively.

### *Why East Africa:*

The workshop in East Africa came about as a result of many contributing factors. Firstly, as part of the International Year of Astronomy 2009 (IYA2009), it was acknowledged that astronomy needed to be developed in Sub-Saharan Africa. In the months preceding IYA2009 many activities were carried out to try to determine the state of astronomy in Africa and to set up a network of individuals and organisations willing to drive its development. One of the activities, as part of the "Developing Astronomy Globally" (DAG) cornerstone project of IYA2009, was a survey of the state of astronomy in Africa. From this survey and the level of participation and enthusiasm from countries in East Africa, it became clear that this region had the potential to develop astronomy further. This potential was also identified during visits by Peter Martinez as part of the IAU Commission 46's "Worldwide Development of Astronomy" programme group. In March 2008 Kevin Govender also carried out 2 visits to Nairobi where a number of astronomy outreach and stargazing events were held at the university, a nearby school and a refugee camp for internally displaced persons. The enthusiasm from the students (especially Physics students) and the lecturers were significant enough to warrant a follow-up event of larger scale.

### *DAG and the IAU:*

During IYA2009, the DAG cornerstone project carried out several initiatives to stimulate astronomy in developing countries. These included: a baseline survey of astronomy at all levels in a country; seed funding grants for countries who sought to stimulate some astronomy activities during 2009; distribution of donated telescopes to developing countries; consolidation of electronic resources for free distribution on DVDs to regions without high internet bandwidth. All the while one major activity remained on DAG's agenda, and that was a regional visit and workshop to stimulate the development of astronomy. This activity was only realised with the involvement of Ed Guinan, chair of the IAU Commission 46's "Teaching Astronomy for Development" (TAD) programme, which became the major funder for this workshop. During the IAU General Assembly in Rio de Janeiro, after meetings with Ed Guinan, Bob Williams (IAU president) and George Miley (IAU Vice President in charge of development), the approval was given for IAU funding of a regional initiative in East Africa. This initiative would be slightly different from the conventional TAD programmes but was seen as a pilot for development initiatives in severely underdeveloped regions.

### *The bigger picture:*

It should be mentioned that East Africa was also chosen for reasons other than those mentioned above. Since 2008, individuals and organisations across Africa were becoming organised in terms of developing astronomy. Some of the main drivers were students of astronomy who were currently studying together in South Africa and who would soon return to their home countries as lecturers of astronomy. From this network came a general plan for the development of astronomy in Africa, a document which has since evolved into a more specific "10 Year Plan" for Africa. This level of organisation within the continent warranted efforts to support the region. The East Africa workshop remains part of this bigger plan to develop astronomy across Sub-Saharan Africa.

### *Partners:*

The success of the project was only due to various partners who played a significant role, either from an organisation or funding point of view. They are:

- IAU Commission 46: Teaching Astronomy for Development (TAD)
- International Year of Astronomy 2009 Cornerstone Project: Developing Astronomy Globally (DAG)
- Uppsala University: International science Programmes (ISP)
- University of Nairobi (UoN)
- South African Astronomical Observatory (SAAO)

### *Participants:*

The participants were selected from various universities around Kenya and neighbouring Eastern African countries of Uganda, Rwanda, Ethiopia and Tanzania. Each country, except for Kenya, was represented by one lecturer and one student (if not in the field of astronomy then at least a related field such as Physics or Mathematics). From Kenya there were student-lecturer pairs from a number of higher education institutions. The role of the lecturers would be to investigate the possibility of starting an astronomy programme or module as part of the Physics or Mathematics department at their university. The role of the student was to return to their university and establish a student club or society that could propagate the objectives of astronomy development. Selections were based on references, enthusiasm shown during IYA2009, and on the potential for the person to drive development activities in their country.

### *Speakers:*

We are grateful to have had the following speakers in attendance:

- Ed Guinan: Chair of the IAU's Commission 46 Teaching for Astronomy Development programme
- Petri Vaisenen: Astronomer at the South African Astronomical Observatory
- Hakeem Olyseyi: Department of Physics and Space Sciences, Florida Institute of Technology
- Charles McGruder: American Society for Black Physicists/Western Kentucky University
- Kevin Govender: South African Astronomical Observatory

## **2. Objectives**

The main objective of these regional initiatives is to stimulate astronomy development activities through empowering local lecturers and students to drive the process themselves.

Specific objectives in support of this are:

- Introduce astronomy topics to inspire students and lecturers to pursue astronomy studies and research
  
- Provide basic training to participants on doing astronomy outreach

- Provide basic training to participants on doing practical astronomy research
- Network locally and regionally regarding outreach
- Network locally and regionally on a university research level
- Set up a regional steering committee to be responsible for astronomy activities into the future
- Stimulate the formation of student organisations who would support astronomy activities
- Hold high level discussions with decision makers
- Identify potential astronomy research students and champions for astronomy development

### 3. Preparation

The preparations for this workshop were pulled together in a very short space of time with the funding being confirmed and organisation beginning in earnest only about a month before the event. The organisation was conducted jointly by the University of Nairobi (Paul Baki) and the South African Astronomical Observatory (Kevin Govender). An added and unforeseen

complication was that Paul Baki took ill with malaria a week before the event. The programme and budget were prepared and circulated over email and the local logistical arrangements were made by Dr Baki's team in Nairobi. Participants were identified from our knowledge of the countries involved and through consultation with individuals active in astronomy and IYA2009. However, there were a few challenges in terms of the identified invited participants, mainly due to miscommunication or misunderstandings between South Africa and Kenya. Nonetheless, even though the event was arranged in a short space of time it was generally considered by the participants to be very beneficial and an overall success. This was mainly because of a combination of the enthusiasm of the participants in getting themselves to the workshop; the flexibility and high quality of the invited speakers; as well as the general high spirit of development for the region.

#### 4. Highlights from Programme

The final programme is given in Appendix 1. There were several adjustments made to the original programme based on input from both the participants and the speakers during the event. The flexibility of the programme allowed for us to maximise on the time we had with the participants but also to learn about what would be the optimum programme for future such workshops. Some comments and highlights are given here:

4.1. *Astronomy talks:* These were seen as essential for such a workshop even though there were comments about some of the levels being a bit high. This is probably because most of the participants had never been exposed to astronomy before and had to be introduced to it at the most basic level. These talks should not be left out of future workshops but a prior survey should be done about the level of understanding of the audience in order to match the talks accordingly.

*4.2. Basic astronomy outreach talks:* Although the initial intention was to teach the participants ways of doing astronomy outreach, it turned out that a lot of the basics taught were actually more useful to the audience themselves in understanding astronomy. Perhaps in the future a solid introduction to astronomy can be done at the most basic levels in order to bring everyone up to the same level of understanding before the main astronomy talks. More time at the beginning would have to be allocated for this. The outreach materials were considered useful and we hope to follow up as to what activities are being run at each of the institutions represented.

*4.3. Stargazing events:* This was popular as usual especially amongst the students at local universities. There didn't seem to be large public interest though and this may be due to the amount of marketing of the event. However, the number of attendees was just about the maximum for the number of telescopes available. If greater marketing were to be performed then there would have to be more telescopes made available. The participants were generally very quick to learn how to use the telescopes provided and could answer general questions based on what they had learnt in the workshop. We hope to see more stargazing events taking place in the near future.

*4.4. Public talk:* This should always remain a part of the programme as it helped to involve people who were not able to attend the full workshop, especially university students. Once again, there was not a large number of public – the room was dominated by university students and lectures. This event should be marketed more for future workshops as the lecture room had plenty of space available. The topic was also one of great public interest, dealing with life on other worlds. It was noted that the questions at the end were plentiful and some of a very high quality.

*4.5. High level meeting:* Although the matters discussed in the meeting were quite significant and useful to all who attended, the national government of Kenya was not well represented. It is not very clear as to why this was the case but it is something to bear in mind when arranging future high level meetings. Perhaps greater notice should be given to the government officials or that the letters of invitation should come from a higher authority such as the IAU. The notes from the meeting are attached in Appendix 2.

*4.6. Discussions about the future of astronomy in Eastern Africa:* This was considered an extremely productive session and possibly the most useful for anyone looking to develop astronomy in Eastern Africa. The delegates were asked to meet (on their own) and discuss the way forward for the region. To guide the discussions the delegates were presented with the draft 10 year plan for Africa. The most significant outcome was the establishment of the Eastern African Astronomical Society which would be tasked with the development of astronomy in Eastern Africa. Notes from this meeting of the delegates as well as the general discussion on the last day (with the facilitators) are included in Appendix 3 and Appendix 4 respectively. The general discussion led into the discussion on curriculum planning and notes are contained in the same Appendix.

*4.7. CLEA workshops:* The “Contemporary Laboratory Exercises in Astronomy” (CLEA) workshops were very popular and should be an essential part of future regional workshops. These simulations of astronomical data and instruments gave the delegates a reasonable idea of what is entailed in observational astronomy. The delegates were also given copies of the software to use at their own institutions. It was recognised as a useful laboratory practical for an astronomy module but also for a Physics practical at undergraduate level. There were a few small hiccups in installing and running the software on all the computers in the Physics computer laboratory at the University of Nairobi but once it was running the workshop went very smoothly. In future, it would also be useful to use this opportunity of the delegates being in front of a computer to run a tutorial on useful astronomy outreach software such as Celestia and Stellarium.

*4.8. Social Events:* It was recognised that the week was extremely busy with so many talks and practical activities happening in quick succession. The down side of this was that there was not a lot of time left over for social events. The cocktail function was a good opportunity for the delegates to get to know each other a bit better but should have been held earlier in the week rather than on the last evening. However, in spite of the busy schedule many delegates still managed, after the long days, to get together at restaurants surrounding the hotel. For future workshops it would be advisable to have a social event at the beginning to break the ice and set the atmosphere for good social and academic collaboration. Then at the end an organised excursion or event that keeps all the participants together would seal the friendships and collaborations created.

*4.9. Identification of Potential Students:* Although not explicitly shown on the programme, a natural next step, after inspiring the delegates towards astronomy, was to record the delegates interests in studying further. We had an overwhelming response with a number of students and lecturers indicating that they would be keen to take up further studies in the field. These delegates were asked for their current qualifications, positions, and what opportunities they were looking for. These details, along with their contacts, have been recorded in Appendix 5.

## 5. Feedback and recommendations

Feedback forms were handed out to the participants on the last day of the workshop. An example of the forms with the average score from all the feedback is given in Appendix 7.

Scanned copies of these feedback forms will be provided upon request.

Although the general feeling was that it was a very successful workshop, we highlight some of the recommendations for improvement here:

- There should be more such workshops held on an annual basis
  
- The programme ran late every night meaning that those who were not staying at the hotel could not participate in all activities
  
- More students should be invited to attend
  
- Need to include training on astronomy outreach software
  
- Participants should be given notes before hand to prepare for workshop
  
- More time needed for some of the presentations which may have been at too high a level
  
- Could run basic form of these workshops for secondary schools
  
- Need specific training for lecturers so that they can implement astronomy modules

- Need more telescopes and more outreach events
  
- More time needed for practical sessions (CLEA)
  
- More publicity needed for public talk and stargazing
  
- Increase the number of participants
  
- More handouts needed
  
- Experience from South Africa and non-African countries should be highlighted
  
- Participants need internet access

Some of the positive responses include the following:

- A good idea
  
- I wish that more of these workshops are organised
  
- The meeting is useful and hoped to be organised regularly say once per year

- Should be an annual event regardless of country to be held
  
- Successful
  
- Very good beginning
  
- Very informative
  
- A lot of knowledge was shared and curiosity sparked
  
- Good for a start
  
- This workshop will help each country implement astronomy in their schools
  
- Useful and successful
  
- Excellent opportunity to share ideas and initiate astronomy in the region. Keep up the good work
  
- We need more of this
  
- Very, very useful. We should have more in the coming year

- We benefitted a lot and managed to form an association
  
- Lectures were good
  
- This will spearhead the formation of an organisation that will promote astronomy in the region
  
- Well informing, eye opener for both students and educators of the EA region
  
- The workshop has been a good success and very informative.
  
- It is very important to do similar workshops in the future

***Feedback from some of the presenters:***

***Petri Vaisanen:***

In general I think the workshop was great. It worked well for the purpose of creating links between those interested in (developing) astronomy in East Africa and giving a taste of modern

astronomy to physics students/lecturers.

In my opinion it had a good mixture of science, time to discuss/do outreach, and time for participants to discuss future plans.

This last aspect would be always important to slot in.

Individual comments:

- Practical organization was ok, but not great. Several missed opportunities with regard to 'high-profile' visitors, budget not handled very well, clear mess-ups with regard to selection of neighbouring country delegates. In the future it would be great if someone from here (SAAO) could be more involved in the practicalities in the planning stage.

- The success of the work-shop in the long run is defined by the follow-up. Visits? Student/lecturer exchange?

Regional IAU?

Clubs? I think the IAU must understand that and offer ways how to help individual cases springing up from the meetings such as this.

[eg. couple of students who got at least informal supervisors elsewhere, help for an occasional trip?]

- This type of workshop is very good as a first one. But you probably wouldn't hold the same in East Africa anymore - a next step would need to be more research skills oriented probably.

- I was sceptical initially of the CLEA stuff - but in fact it seemed to work well and people liked it.

- The cultural aspect of astronomy / outreach in Africa should always be discussed, as you (Kevin) did briefly. We just always get those questions - I got many during coffee breaks as well.

- In addition: we/you (Kevin) should brief European/American lecturers beforehand on the fact that in Africa a large fraction of their audience is religious. This is important, and so very difficult for your average Westerner to realize. They should avoid jokes and examples putting down religious beliefs.

Thanks very much for organizing all that, it was a pleasure to be involved,

***Hakeem Oluseyi:***

1) Kevin, you did a great job. Your leadership and energy are both exactly what is needed to get and keep this effort moving. I hope that you will be able to sustain both to see this through.

2) Now that the East Africans have had an introduction to the topics and methods of astrophysical research, education, and outreach, they must now implement in their own countries. One of the topics that has come up often is the fact that the West operates via specialists. I think that the specialist model should be employed. Kenya is in a good position since they already have one active and well-trained research specialist (Baki) and one active and trained outreach specialist (Susan). I think that there are a few steps that now must be taken. The first is that Kenya should decide one or two research areas to specialize in. Second, there should be a trained scientist who handles all administrative matters (proposals, reports, etc.) so that the researcher can focus on the science; both would be primary authors and PIs on grants. Third, I think Susan should develop a more concrete plan for outreach in Kenya (and Uganda?) beyond HOU in one or two schools. She may even want to write proposals to fund these efforts.

3) The idea of the Faculty and Student Teams (FaST) model that is used by the DOE and NSF here in the US came up. I think that once each East African nation decides their one or two areas of research focus, it would be a good idea for a prof and a couple of undergrad junior/senior or first/second year grad students to travel to an expert in the topic in order to jump-start their own expertise.

## 6. Conclusion and way forward

Although we have identified many areas that we could improve upon, this pilot event has generally been viewed as very successful and has succeeded in planting the seeds of astronomy in Eastern Africa. Following this workshop it is important to track the activities of the Eastern Africa Astronomical Society as well as those of individual participants (see participant list in Appendix 8). An email list will be used to keep the communication flowing about activities that has resulted from the workshop. The next workshop in the region should be organised by the team elected to head the regional astronomy body. All aspects from concept to fundraising to implementation, should be arranged locally with support, where necessary, being provided by the partners of this workshop.

Definite outcomes which have been achieved:

- The introduction of astronomy to various universities in the region who have not been exposed to it before
  
- The establishment of a regional body for astronomy development: The Eastern Africa Astronomical Society
  
- The identification of potential students of astronomy within the Physics departments

Outcomes expected in the near future (see also notes from discussions in Appendices 2 to 4):

- The development of an Eastern Africa plan for astronomy development (target date of delivery set for February 2010)

- Outreach activities being carried out at institutions which were represented
- Potential scholarships for interested students
- Plans for a future Eastern Africa astronomy workshop

Way forward: the successful implementation of this pilot regional astronomy development workshop now lays the foundation for similar workshops in West Africa and Southern Africa. With the success of this project it is envisaged that funds can now be raised independently of the IAU, who funded the bulk of this event. A succession of regional initiatives should take place in parallel with the ongoing development of plans for astronomy in Africa. Champions of regional efforts should feed into a pan-African development strategy that will ensure that within the next decade astronomy is a significant part of the science agenda in Africa.

## 7. Acknowledgements

Both the organisers and participants wish to record our sincere thanks to all the partners who helped make this workshop a reality with special individual thanks to Ed Guinan, Bob Williams and George Miley from the IAU; our inspiring speakers Petri Vaisanen, Hakeem Oluseyi and Charles McGruder; and the organisers in the form of Paul Baki's team at the University of Nairobi and Kevin Govender's team at the South African Astronomical Observatory (comprising Lolan Naicker and Jun Takahashi).

**8. Appendix (files available upon request to [kg@sao.ac.za](mailto:kg@sao.ac.za))**

APPENDIX 1 - Final Programme

APPENDIX 2 - Minutes of High Level Meeting

APPENDIX 3 - Notes from Delegates meeting

APPENDIX 4 - Notes from general discussion

APPENDIX 5 - Potential Students

APPENDIX 7 - Feedback form with average scores

APPENDIX 8 - List of Participants