

# Report on the Outreach at Thuto-Kitso Comprehensive School, Fochville (South-Africa) on May 24, 2012\*§

## Participants:

GYA members:

- Jauad El Kharraz (France/Morocco)
- Reza Afshari (Iran)
- Jeronimo Maze (Chile)
- Javier M. Moguerza (Spain)
- Rob Jenkins (Scotland)

## Place:

We met at the the Sci-Bono discovery Centre in Johannesburg at early morning on May 24, 2012. From there, we took two cars to Fochville in the North West Province (<http://www.nwpg.gov.za/education/>) of South Africa, and we were received in Thuto-Kitso Comprehensive School (Fochville) by its director: Ms. Eunice Mabiletsa. Thuto-Kitso School is in Fochville, a small town 30 miles WSW from Soweto [<http://goo.gl/maps/a72f>]. Upon arrival in the morning, each of us was then assigned to a class.

## Activities:

After the presentations of the participants (GYA members) a briefing on the school was given by the director of the school; Ms. Eunice Mabiletsa, who also presented us a couple of professors charged by receiving us in their classes.

Each one of us (the 5 GYA members) prepared a presentation or a game before the day before. Each one of us was directed to a different class. Almost of us conducted by 3 class sessions as an average.

The learners/students were 9-14 years old, wearing the school uniform.

The learners were able to interact on topics ranging from soft matter, DNA, polymers, environment and water, climate change, remote sensing, mathematics, physics, chemistry, pollution, renewable energies, to astrophysics and space.

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\* Report edited by Dr Marc Creus: [marc.creus@unibas.ch](mailto:marc.creus@unibas.ch)

§ The participants of the Global Young Academy (GYA) would like to thank all those involved in this outreach activity, including the teachers and learners of the school and most particular the fantastic team at the Sci-Bono Discovery centre, especially the local organiser Mr Hemant

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**Author:** Dr Jauad El Kharraz, GYA member

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Personally, I conducted the first session in a mathematics class, and waited the professor to give his learners an exercise on mathematical equations (derivatives and limits), then I tried to observe and check the responses and the way all the students were following to solve out the questions, and tried to explain and help some of them. Then, I got the opportunity to talk about the importance of saving water and save our environment from pollution; I used a power point support (see the file enclosed with this report). They were very keen to listen quietly and they gave me a lot of questions, especially as I explained to them that other kids in countries such as Jordan or Somalia struggle to get a safe drinking water, in the first case because of water scarcity and in the second case because of drought, water scarcity, climate change and conflicts/wars, etc.

I moved then to another class where the learners were younger, and I talked about science in general and its importance in achieving all what we have now in hands and they asked me a lot of questions, among others: when the world will end? How big is the planet, what kind of studies I carried out, what is the best science?! I told them it does not really matter which science you decide to enter inside straight out of school, it all rocks and useful for our society and the whole humanity, even if I mentioned the quote of the famous physicist Sir Ernest Rutherford (as I am also a physicist) when he said: "All science is either physics or stamp collecting", but clarified that any scientists will defend the most his own science, while all sciences remain very important.

After a lunch break in the professors' room, I visited another class where the professor was preparing a presentation on a chemistry experience. He gave me the floor at the beginning, and I gave them a long speech about my career, the studies I carried out, the importance of choosing a career and a science we love, because science is a passion. They were very enthusiast, and asked me a lot of questions, such as: how can we become scientists? What is the extent of using solar energy instead of oil!!!! What are the space black holes? One student told me he has not good marks in physics and wanted to become an IT engineer, so I explained to her the importance to doing well in mathematics and physics which are the basis, and then explained to her that there is the part of IT related to software and the one related to hardware, and encouraged her to keep up working hard to achieve her dream. Many others told me what they want to become in the future, and tried at the end to take with me photos with their own mobiles, etc.

We found the learners very enthusiastic, attentive, participative, and very excited to learn. The professors told them before our arrival that they were going to meet scientists that usually they see only in TV and books, so in part that was a reason for their excitement.

Definitely, it was an exciting journey, we had a lot of fun, and it was fascinating to meet all those young learners.

I believe we could contribute somehow to raising awareness of the benefits and contribution of science and technology to the society and the whole humanity for those young learners, and those next scientific and economic actors in South Africa!

**Author:** Dr Reza Afshari (PhD-MD), GYA member  
<http://www.globalyoungacademy.net/members/AfshariR>

Following the successful 2nd general assembly of Global Young Academy, I got the opportunity to go for related outreach activities on 24th July 2012. We went via the Sci-Bono Discovery Centre, a non governmental organization funded to bring extra education to deprived students of South Africa (Pictures 1, 2 & 3). We met with the principal Ms. Eunice Mabiletsa and other staff of the Thuto-Kitso Comprehensive School (Picture 4). This school provides food for the children as well (Picture 5).



Picture 1. Our team; Jawad, Javier, Jeronimo, Rob and Reza.



Picture 2. SCI-BONO' car, marked with its Logo.



Picture 3. Entrance of Sci-Bono Discovery Centre in Johannesburg



Picture 4. Members of the GYA with the principal Ms. Eunice Mabiletsa and other staff of the Thuto-Kitso Comprehensive School

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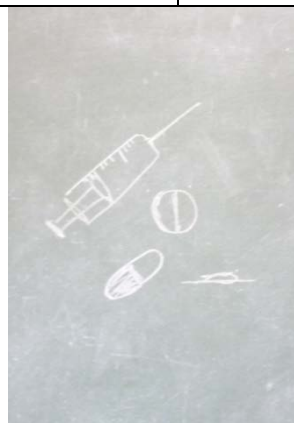
As a physician and based on the request of the SCI-BONO authorities, I talked about diseases prevention and health with focus on common cold, tonsillitis, pneumonia, HIV/AIDS and drug abuse (Picture 6 & 7). I got the opportunity to go to four classes. These students were very enthusiastic and eager to participate in these sessions. As can be seen from picture 8, we all enjoyed this opportunity; so energetic and happy students were.



Picture 5. This school provides food for students.



Picture 6. One of the classes.



Picture 7. Some discussions on Blackboard.



Picture 8. We all enjoyed this opportunity; so energetic and happy students were.

**Author:** Dr Javier M. Moguerza, GYA member

<http://www.globalyoungacademy.net/members/javier.moguerza>

I interacted with two classes, with ages 14 to 15 in both classes. Basically, I demonstrated to the students the laws of probabilities. To this aim, we used a deck. It was a muppets deck, with cards containing the different character from this TV series, namely: Kermit the Frog, Miss Piggy, Fozzie Bear, Gonzo the Great and Rizzo the Rat, among others. The students had to choose ten cards from the deck. Then, from the group of ten cards, each student has to chose randomly one of the ten cards, and just say to everybody the name of the character pictured in the card chosen, and put the card back in the group of ten cards. We annotate on a board the different characters appearing, and then from this information we guess how many cards do we have among the ten cards corresponding to character. In all the cases, the students were able to guess the correct number of cards corresponding to each character.

After that, I showed to the students a presentation of real applications of Statistics and Probability. Basically, applications to image recognition. I think they really liked the applications and many of them said that they would like to become scientists, and develop in the future similar tools to the ones that I showed. The experience was really nice, and I have to say that the faces of the students while I was explaining the applications cannot be described with words. Amazing!!!

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**Author:** Dr Rob Jenkins, member of the Royal Society of Edinburgh Young Academy  
<http://www.psy.gla.ac.uk/staff/index.php?id=RJ001>

I was assigned to Grade 10 Mathematics (Geometry) with Christina Nchapha, and joined her in two consecutive 1 hour sessions with different groups (approx 40 pupils in each group). The pupils were clearly hugely excited about the visit, and were eager to hear about life in Scotland, as well as careers in science. As can be seen from the accompanying photographs, they were a lively and engaged bunch, and had plenty of questions on many topics. It was a pleasure to meet them.

One of the pupils asked a very interesting question concerning the extent to which our private mental lives are under our own control, as opposed to being driven by external stimuli. I used this as an opportunity to conduct a live demonstration of the well known Stroop effect [<http://bit.ly/WmLTH>]. This is a classic effect in cognitive psychology which neatly illustrates some limits of executive control. The demonstration requires only some printed lists of words in different colours of ink (I used an iPad), a stopwatch (several volunteers offered to time events on their phones), and some experimental participants (there were many volunteers). The demo worked extremely well and generated a great deal of follow-on questions. During the Q&A, I passed the iPad around so that pupils who did not participate in the demonstration could try it out for themselves. The demo also provided an opportunity to work through some basic principles of data analysis (e.g. why a mean of several samples is a better estimate than a single sample), and the scientific method (e.g. how systematic observations and analysis can inform theory). I related both of these points their foundational study of mathematics.

A comment from the teacher about teenage pregnancy triggered a wider discussion of the importance of education and wise decision making. I drew on the board a simple diagram of recursive forks in a path. The consequences of some decisions close off certain options for good (e.g. underage pregnancy, drug addiction, prison), whereas others keep options open, or open new ones (e.g. education). This diagram engaged the pupils strongly and drew approving comments from the teacher.

Since returning, I have sent photos of the classes to Christina Nchapha, who will share them with the class. I have also sent four books (3 Psychology, 1 Mathematics) that address specific questions raised by the pupils.

**Author:** Dr Jeronimo Maze, GYA member

<http://www.globalyoungacademy.net/members/jeromaze>

I participated in the class led by Eugene Zondo on mathematics. A group of 30 to 40 students from the eleventh grade were organized in the classroom sharing tables with other 5 to 8 persons. I presented myself as a scientist from Chile and a brief description of what I do. Then we distributed a preliminary list of mathematical exercises to evaluate their skills. We observed their performance on those exercises and then Eugene decided to handle the other list of mathematical exercises he had prepared for them. We walked through the class answering questions and making sure students understood the exercises. Students were enthusiastic and having no problem on asking questions other than mathematical ones. I spent a good time.

On the second part of the class, I gave a presentation on "The Mysterious Behaviour of Light". I covered topics such as the speed of light, relativity and rainbows. Students were listening very attentively and asking all kind of questions. I followed a suggestion by Javier Moguerza and I explained the fact that, since the speed of light is finite, we always look at the past. They were astonished to know that the light we receive from the closest star resembles events that occurred about 4 years ago.

For lunch we, people from Sci-Bono, GYA participants and schoolteachers, gathered together for some sandwiches at the administrative offices of the school where we share our experiences and some amusing traditions about soccer culture and teams such as Pirates and Chiefs. In the afternoon session, I gave my presentation to students from the twelfth grade. They were keen to understand rainbows formation and other light effects they have experienced.

We all came back to the Sci-Bono museum (also our starting place). It was a great experience I hope to soon repeat it again in any other country.



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## GYA – VISIT (Guest Scientists) ON THE 24<sup>TH</sup> MAY 2012

### OUTREACH – EMASONSOSONDO visits the Thuto Kitso secondary School

- **Arrival Time at Sci-Bono :** **07h00 am**
- **Departure Time :** **07h15 am**
- **Appox. Arrival Time at school :** **08h15 am**
- **Time per subject :** **2 hours**
- **Lunch Time :** **± 45 minutes**
- **Resources:** We will provide you with Lap-Tops, Projectors, Projector Screens, activity sheets and power - point presentations. However, you are welcome to bring some of your own materials.
- **Mathematics Lessons :** Handouts and activities sheet provided.
- **Physical Sciences Lessons :** Handouts, activities sheets and apparatus to conduct experiments on electric circuits.

| <b><u>Name of School: Thuto Kitso secondary School</u></b> |                                       |                                      |                                      |
|--|---------------------------------------|--------------------------------------|--------------------------------------|
| <b>Grade:</b>  | <b>10</b>                             | <b>11</b>                            | <b>12</b>                            |
| <b>Topics: Maths</b>                                       | 1. Functions<br>2. Euclidean Geometry | 1. Functions<br>2. Reduction Formula | 1. Calculus<br>2. Linear programming |
| <b>Topics: P. Sciences</b>                                 | 1. Electricity - Circuits             | 1. Electricity - Circuits            | 1. Rate of extend of reactions.      |



Some photos included in the short report are available in full resolution at:  
Photo gallery:

<http://www.emwis.net/topics/ways/gya2012/photo-gallery-outreach/comprehensive-school-fochville/>

You can also find Jauad's report and the presentation I gave to the learners at:  
Report + presentation:

<http://www.emwis.net/topics/ways/gya2012/outreach-24-may-2012-1>

And general information on the General Assembly of the GYA:  
<http://www.emwis.net/topics/ways/gya2012/>

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Rob Jenkins with students



The GYA team at the Sci-Bono Discovery Centre



The GYA Team with teachers of the Thuto-Kitso Comprehensive School (Fochville).

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