December 18, 2018

MATHS in AFRICA

I've been to Africa six times.
The last two I was at Manor House in Kitale.

Kitale is a very small town in the west of Kenya. It has been growing and expanding in the last couple of years, but at the moment it's still quiet and tiny. You can reach Kitale with a short flight from Nairobi, followed by four hours by car. The day I took the domestic flight the sky was spectacular. I might have taken a hundred of pictures of it which was violet and yet blue and covered by millions of clouds. The same clouds I loved from the ground I totally hated when on the plane: I forgot that clouds usually imply turbulence (and that I sometimes get panic attacks on planes). As a result, on the way back I decided to go car road to Nairobi, with ten never-ending hours of road.

Manor House is an agricultural centre that offers one year certificate or two years diploma in bio-intensive agriculture, together with outreach programs to small-holder farmers providing information on protection and preservation of natural resources. It aims to improve the sustainable well-being of rural farmers. The centre often hosts conferences and workshops, due to its quiet location and for the facilities available, such as dorms, kitchen, huge classrooms and a gaggle of six adorable and inseparable, terrific geese.

I personally love being at Manor House. It's one of the quietest places I have ever been in my life, and one of the fewest in which you can still see billions of stars at night.

SAMI is the reason for which I discovered Manor House.

I joined "Supporting African Maths Initiatives" (SAMI) at the beginning of 2017. The charity was founded in 2013 to support the local NGO "African Maths Initiatives" (AMI) and *build on the cornerstone that a quality education, career and love for mathematics should be available for all*. SAMI currently works in multiple countries in Africa, particularly in Kenya, Ethiopia, Ghana and Tanzania. It is involved in projects at high school and university level, which include running Maths camps and Maths clubs, as well as supporting the use of technology for mathematics education.

So far, I have taken part in a small fundraiser to financially support some summer Maths camps in 2018, in a book donation that resulted in 69 kg of books that I brought to Kenya last November, and in three Maths camps.

Maths camps are two-week long events that team up students, teachers and volunteers to provide students across Africa with the opportunity to explore Maths beyond school curricula. They aim to inspire and encourage students to pursue future studies in the field and to discover the link between science and everyday life. The focus is on critical thinking, teamwork and creativity, on being logical in solving puzzles and problems. Maths camps have shown that students' perception of mathematics can change over the course of just a few days, and the gain in self-confidence and enthusiasm has helped students improve their results across subjects in the long-run. There has been high school students inspired to pursue mathematics at university, university students that joined the local team, and that were successfully accepted onto international Master's programmes [back in August I met Evans, who joined the first maths camps in Maseno in 2013, then studied Math at university and then became part of the local team. In November I met Cabrine, who also experienced the Maths camp from a student and then from a teacher point of view.]

Typically, Maths camps are held during summer. However November 2018 had an additional camp to celebrate the Africa Science Week, an initiative of the Next Einstein Forum. The event reached 35 African countries throughout the months of September, October, November and December 2018, promoting science, technology, engineering and mathematics with the final goal to leverage science for human development globally.

The November Maths camp was organised by AMI in partnership with the Mawazo Institute, a Kenyan non-profit which aims to support the next generation of female thought leaders and scholars in Africa. As such, for the first time the camp was created specifically for female students, with 40 young women selected from across the country and provided with a full bursary to attend the camp.

In Kenya (and in lots of other countries in the World) there are significant inequalities between females and males in education. It's difficult to overcome inequalities when gender barriers are built on strong held and steady stereotypes. [Since 2010 the Article 81 (b) of the Constitution says that the National Assembly and the Senate should not have more than two-thirds of their members of the same gender, but that this section has not been implemented yet over the last eight years.] However, the Global Gender Gap Report, the annual report designs to measure gender equality, reports that in the last ten years the situation has been, slowly, improved. This first all-girls Maths camp is a small step towards re-balancing and one that I wanted to be part of. As such, I have joined the team of local volunteers with a select number of international volunteers, to help mentor and support.

Being my second time in Kitale, I already knew most of the people from the local team, including Zach (the person behind AMI) and Chris (one of the directors of SAMI). The day I arrived I was thrilled to meet everyone, but also nervous about people's acceptance of my cumbersome presence there (I once asked the postal address of a house [apparently there is no such a thing], I offered my mosquito spray to a local [apparently it's non-African to use it] and I still can't eat ugali in the proper way). That said, the nervousness lasted approximatively five seconds. Everyone was very welcoming and made me feel immediately part of the group.

We spent an intense planning week ahead of the students' arrival, where days started early and run late (usually from 8am to 10pm). During this time we selected the mathematical themes, developed the materials and taught and refined mock sessions. We decided for programming, robotics, mathematical thinking, statistics and cryptography, with additional sessions for physical activities, guest speakers, and mathematical games. Programming and robotics are usually part of each camp, mainly because they allow scholars to see science in action and to look at technology from a different point of view. Math thinking and cryptography show that maths is not only a rigorous story that we tell but one that we can build together. Last, statistics can be linked to several different areas, such as biology, finance, medicine and public health; and statistical analysis can be shown to promote awareness on the percentage of people affecting by malaria and HIV or of people having access to education, and on gender issues. To this point, some female speakers were also invited to talk about their scientific careers and to discuss the difficulties they have encountered as women.

Before every journey to Africa I have been asking myself why I am going there and what I can actually achieve in such a short period of time. I don't think I have a clear answer. However, it does feel right to be there. I have met extraordinary people, with whom I have shared ideas, discovered to have a very different background and nevertheless thousands of things in common (and Maths, that I love, being one of them). I have met people willing to answer to all my "I have a question", to guide me through this world, to braid my hair, to talk, to laugh and to grow with. I might not know what we can achieve on the large scale, but on the personal side I have no doubts on the magic of such events. [Every night, before going to bed, scholars were asked to write a small journal reporting their experience: the photo below reports one of the journals collected on the very last day.]

I have only visited Africa six times, but I'm sure the number will increase in the future.

Marta-Nagumichi

[Nagumichi is a Swahili name that refers to the action of planting seeds *of maths*: that's how Zach addressed me while there.]

[I'm currently a PhD student in Ergodic Theory at Leiden University, The Netherlands.]