Istanbul Center for Mathematical Sciences – IMBM

IMBM

istanbul matematiksel bilimler merkezi
istanbul center for mathematical sciences

Betül Tanbay (Istanbul, Turkey)

The IMBM

When Martin Raussen asked me to introduce the Istanbul Centre for Mathematical Sciences to the readers of the EMS Newsletter, the first sentence that came to my mind was: "It all started with a mistake!" After all, every serious piece of information I shall eventually give in this article is accessible through the address http://www.imbm.org.tr/, so why not start with a few informal lines about the beginning?

Some history

It was early in 2003. My colleague Cem Yalçın Yıldırım was running in the hallways of the Boğaziçi University Mathematics Department, incredulous. With his collaborator Dan Goldston on the other side of the world, in San Jose, they seemed to have an important result on small gaps between twin primes. Good old times when a result had to be checked for years were over! Rumours ran faster than proofs and in no time, due to an announcement by Montgomery in Oberwolfach, Yalçın found himself on the first page of *The New York Times*. He would not have cared less, were it not for the fact that a sudden interest in mathematics in the Turkish media had brought local paparazzi to our department doors. Yalçın ran away and the Chair (me in those days) had to deal with the most profound (!) questions they were insistently asking. Rather strange interest. News was not scarce in those days: despite millions protesting in all the big cities of the world, the US and their European partners had entered Iraq. While chasing journalists away, I was trying to convince Yalçın to give a talk on the new result at the department's Wednesday colloquium. The proofs were not full-proof, so Yalçın resisted but media and academic pressure rose and finally we posted a discrete announcement! It was to be expected that our regular seminar room wasn't going to host all the curious minds. We moved to a big amphitheatre. Luckily the university president happened to be a *New York Times* reader and also joined the colloquium. At the tea service that followed, it was an excellent moment to tell him that we badly needed a location to build a mathematical research centre. We agreed to meet in the following days to discuss a possible spot. A little path in the woods of the campus led to a small shack overlooking the Bosphorus. A small hidden paradise just in the middle of the campus! The president said: "If you can find the money to turn this into a centre, go ahead!" It took a

The view from the IMBM

few days for *The New York Times* to announce that the proof was fallacious but we had already found a generous mathematics fan who happened to chair ENKA, the country's biggest construction company. The university executive committee accepted the plan. A lucky visit to the university from David Mumford for a talk on "Vision" gave us the confidence we needed. He visited the shack, listened to our intentions and had the trust (vision?) to accept being the first member of the scientific advisory committee, which over the years came to include Victor Kac, Selman Akbulut, Edriss Titi and Gilles Pisier. Another fruitful visit during the planning stage was made by K. R. Sreenivasan, then the director of ICTP. We talked about collaboration possibilities. A long visit to IHES, where Jean-Pierre Bourguignon offered generous advice and precious support, allowed us to watch our steps carefully in this still modest but already serious project. We constituted the scientific steering committee with five members of the Turkish Academy of Sciences (Attila Aşkar, Rahmi Güven, Mete Soner, Tosun Terzioğlu and Ali Ülger) and the management committee (Alp Eden, Mete Soner, Betül Tanbay, Ali Ülger and Yalçın Yıldırım) was chosen from the faculties of Boğaziçi, Koç and Sabancı Universities, which promised their support

Ben Green's special talk at IMBM, 14 October 2009

to the centre. To symbolise the cooperation of several universities, two co-directors were chosen from Sabancı and Boğaziçi Universities: Mete Soner and Betül Tanbay. Mete has become a professor at ETH since then but he is still on our team.

In October 2006, mathematicians of the city were all present at the opening of the Istanbul Centre for Mathematical Sciences (IMBM) where Tosun Terzioğlu (then the Rector of the Sabancı University and the President of the Turkish Mathematical Society) presented Caratheodory's life, which started in an old neighbourhood of Istanbul – a promising opening talk for the IMBM!

Do not be too sorry for the lost theorem! The first workshop that followed the opening was held by the Goldston-Pinz-Yıldırım trio with a much stronger result on small gaps between twin primes than the first fallacious one! Furthermore, the fallacious approach was to be cited by Fefferman at the 2006-ICM in Madrid when explaining the Green-Tao theorem. As ever, mistakes were as precious as theorems in mathematicians' lives.

Some financial support

Already a framework of support was developing. The Boğaziçi University was taking care of all the infrastructural needs, from electricity and heating to cleaning and the Internet. The collaborating universities were funding many activities. Thanks to the visits and efforts of Jennifer Chayes and Peter Sarnak, the US National Committee of Mathematics had decided to support Goldston's participation in the first workshop and thereafter to fully support the visit to the IMBM of two mathematicians from the US every year. Let us not forget the first precious gift: John Pym, professor emeritus at Sheffield, donated his beautiful collection of mathematics books.

As a committee of mathematicians, we started to work with the Scientific and Technological Research Council of Turkey, TÜBİTAK, in order to create a fund to support mathematical collaboration and the creation of a network in which the IMBM had an essential role to play. After a long negotiation period and bureaucratic difficulties, a support of four years, between 2008 and 2012, was obtained, allowing a serious number of activities in a network comprising more than 60 researchers in 15 universities of Istanbul, organised under a project director (Betül Tanbay) backed by an executive committee (Tosun Terzioğlu and Ali Ülger) and six group leaders (Tekin Dereli, Alp Eden, Ismail Güloğlu, Ali Nesin, Henning Stichtenoth and Yalçın Yıldırım) conducting research in the subjects of geometry-topology, differential equations, ring theory, foundations, arithmetic and finite fields, analysis and analytical number theory.

Some legitimacy

The TÜBİTAK grant was naturally bound to give a certain emphasis to the listed areas but in its mission the IMBM had not actually specialised in any particular branch of mathematics. The first priority had been to have an accessible home for researchers in the city and the possibility for them to invite their colleagues from other cities and countries. David Mumford was the first to point out that given the geographical location of the centre and the attractiveness of Istanbul (see AMS-Notices May 2005 issue) the IMBM had the potential to become an international centre.

In October 2009, the visit to Istanbul of the European Mathematical Society Executive Board, presided over by Ari Laptev, was certainly a confirmation of this foresight. The IMBM became one of the 28 research centres in the proposal for the MATHE-I project, which aimed to provide a mathematical European Infrastructure under a call from the European Commission.

Some results

Let us now try to describe the kind of activities at the IMBM. If we were to look at the activities in the first three years, they can be grouped as follows:

- Year long **seminars** attended by a fixed group of researchers joined by temporary visitors, such as the Geometry-Topology-Physics Seminars, the Partial Differential Equations Seminars and the Discrete Mathematics Seminars. These seminars have weekly or monthly meetings.
- One or two week long **workshops** have become one of the "specialities of the house", such as the workshops for prime numbers, the Kadison-Singer Conjecture, non-linear dispersive equations, non-commutative geometry, supergravity, contact topology, Banach Algebras, and singularity. The IMBM is located in a very calm and beautiful location and, within a minute's walk, all the facilities of one of the best universities of Turkey are at the disposal of the visitors. It has guestrooms and, as needed, uses the university residences. The offices allow small teams to work and discuss. A small kitchen allows decent coffee breaks. The seminar room, where all the standard technology is installed, allows up to 50 listeners. Again, for bigger events, the Boğaziçi University Mathematics Department offers extra space. This environment also suits teams of 5-6 researchers, who may reserve the centre for a week or more to intensely discuss their common topic in the framework of a **miniworkshop**.
- Besides seminars and workshops, more than 100 **special lectures** were given at the IMBM, such as those by P.L. Lions, G. Pisier, P. Sarnak, E. Titi, S.R.S Varadhan

and E. Zuazua, to name just a few. Cooperation with the Gökova Geometry-Topology Conference, led by Selman Akbulut and Turgut Önder, allowed us special talks by Yum-Tong Siu and Gang Tian. Similarly, thanks to the collaboration with the Middle East Technical University-Cahit Arf Lecture Series, David Mumford, Günther Harder and Ben Green were able to visit the IMBM. We have also been able to give a few talks to a more general public, one of them being the talk on the Four-Colour Theorem by Robert Wilson.

Some hopes?

Research possibilities have developed enormously thanks to the development of technology. A mathematician sitting in her office in Beijing can watch a conference given in Sao Paolo! It just needs a cc to a few more people to have an article published together!

Mathematics certainly has a very peculiar relationship to the "time" of humanity. Sometimes it is much slower, sometimes much faster than the rest of the world. Sometimes ahead, sometimes behind, sometimes even beside. The open problems in mathematics can sometimes be explained to a child and sometimes there is a need for weeks of high level lectures.

Research methods also follow this strange pattern. Indeed, mathematicians cooperate in very important research projects without even having met. But can any one of us deny the importance of a simple silent room with a few comfortable armchairs, a blackboard and some chalk, to see, to hear and to discuss with one another?

I am writing these lines at a time when the IMU secretary Martin Groetschel is warning us about the difficulties of visa problems for delegates participating in the 2010 General Assembly. Many of us know how difficult it is to enter the USA, the UK, Germany and so many other countries where mathematics has seen the most important achievements of the last 300 years. How long can we insist on the importance of a theorem, faced with the ridiculously humiliating or the humiliatingly ridiculous visa processes? Mathematicians are mostly people who want to keep a clear distance from politics. But we find ourselves in a world where politics does not want to keep at a distance from anything.

Before we get too depressed, let us come back to the IMBM! Turkey only asks for visas (to save honour) from countries that require it from its own citizens – and issues it right at the arrival at the airport. Istanbul is one of the most interesting cities in the world. And the IMBM has armchairs and chalk, and a lot more to offer to all mathematicians.

Betül Tanbay [tanbay@boun.edu.tr] obtained her PhD at UC Berkeley in operator algebras and joined the faculty of the Boğaziçi University Mathematics Department. She has initiated the IMBM during her chairwomanship and is one of the co-directors.

ICMI column

Bill Barton and Louise Sheryn (Auckland, New Zealand)

In this issue, the ICMI column, authored by Bill Barton (President of the ICMI) and Louise Sheryn, concerns the Pipeline Project. The Pipeline Project is a study about issues associated with the supply and demand of mathematics students and personnel in educational institutions and the workplace. The study is coordinated by the ICMI at the request of its mother organisation, the International Mathematical Union (IMU). It also builds on, and is an extension of, the work of the Survey Team for ICME-11 on the topic of "Recruitment, entrance and retention of students to university mathematical studies in different countries", chaired by Derek Holton. The study aims at providing data for decision making in different countries as well as promoting better understanding of the situation internationally. At the moment, the following countries are participating in the study: Australia, UK, Finland, France, Korea, New Zealand, Portugal and the USA.

Similar problems are addressed, mainly for European countries and with more detail, in the paper by Miriam Dieter & Günter Törner published in this issue.

The Pipeline Project
Preliminary Summary

The aim of the Pipeline Project has been to collect data, on an international basis, on the number of mathematical science students passing through four transition points:

1. School to undergraduate courses.
2. Undergraduate courses to postgraduate courses.
3. University into employment.
4. University into teaching.

After distributing an initial questionnaire to establish the availability of data, the Pipeline Project began collecting data from ten countries: Australia, Finland, France, Hong Kong, New Zealand, Portugal, Scotland, Taiwan, UK and USA. There were great fluctuations between countries as to what data was available.

Overall, the perception that there are declining numbers of students seems to be unfounded. There are many