My visit to the Center for Mathematical Sciences and Applications at Harvard University

by Sepideh Mirrahimi[*]

I was invited by Professor Shing-Tung Yau to visit the Center for Mathematical Sciences and Applications at Harvard University in April 2014. I had the huge honor of being the first visitor of the center and participating in the opening ceremony. This was a great opportunity for me since I had many inspiring discussions with brilliant researchers in different fields.

The most amazing aspect of my visit was that I was able to meet researchers in very varied fields. I really had this impression that there is no (or small) boarder between different departments and it was very easy to meet people in different departments. For me, this is a great sign to show that the opening of this new center, which is supposed to emphasize more on the interaction of mathematics with other sciences, is really natural and consistent with the atmosphere. People seem to be very open to interactions and I am sure that the creation of the new center will be a great way to structure and reinforce these interactions.

I am a researcher, from Toulouse (France) and I work on parabolic intregro-differential equations, Hamilton-Jacobi equations and their applications in biology and population dynamics. Certainly, it was a great honor for me to be invited by Professor Yau and to be able to discuss with him about my work. I really appreciate the fact that a brilliant researcher like him makes himself accessible to young researchers. He had also the great kindness to introduce me to several other brilliant researchers. I was particularly amazed to see that even researchers in geometry and topology (as Professors Michael Hopkins and Clifford Taubes)

were also interested in problems coming from biology.

I gave a seminar at the beginning of my visit which made the communication even easier. I particularly had a very inspiring discussion with Professor Michael Brenner who is in the board of the center of mathematical sciences and applications and is also interested in applications in biology. He introduced me to some physicists (Melanie Mueller and Wolfram Moebius) at Harvard University who work on topics very related to mine. This was a great opportunity for me to talk to researchers who do experiments on models very close to the ones that I study theoretically.

The most natural interaction was with Professor Martin Nowak who works also on problems related to population dynamics and evolution. We started a collaboration in a problem related to cancer. Coming from a more theoretical community I really enjoyed my discussions with Professor Nowak who is much closer to applications. During the recent years, I have been studying models that describe similar type of phenomena related to this problem in cancer. During my visit I was very interested to see on a concrete problem what are the terms of my models, if the tools that my collaborators and I have developed can be applied to these problems, which mathematical questions we should still resolve to be able to obtain a useful response in practice. Getting to know the works of Martin Nowak and his group in these problems was very inspiring for me and helped me to understand better my models. Moreover, this led me to several challenging and interesting questions. I also had many interesting discussions with different members of the group of Professor Nowak who

[*] Institut de Mathématiques de Toulouse
E-mail: sepideh.mirrahimi@math.univ-toulouse.fr

work mostly on game theory, stochastic processes and their applications in evolution.

Another exciting chance that I had was to participate in the opening ceremony of the center. The ceremony started with some opening remarks on the creation of the center. It was really interesting for me to get to know the first motivations on reinforcing the mathematical sciences and applied mathematics, that have led to the creation of this center, the major efforts that have been done to make this happen and the generous funding coming from China letting this dream realized. Next, two seminars given by Professor Shoucheng Zhang (entitled "Topological insulators, superconductors, and mathematical science") and Professor Stanly Osher (entitled "What sparsity and l1 optimization can do for you?"), were the best way to set the spirit of the center.

During the dinner, I had the opportunity to meet several other researchers, mostly from MIT as, Professors David Jerison, Bjorn Poonen, Gigliola Staffilani and David Vogan, and also two professors from Harvard: Professors Noam Elkies and Mark Kisin. I really enjoyed the discussions on mathematics, stories about their teaching, music and even France.

I can imagine some years from now, the center of mathematical sciences and applications could be one of the most prestigious and well-known centers of mathematical sciences. I am really happy and honored that I was a witness of the very beginning of it.