In a garden in Cairo

a tale of a crystallographer from Egypt

In 1997, in a beautiful garden overlooking the river Nile in Cairo, I was reading a molecular biology text book. I stared at a magnificent ribbon diagram of insulin and wondered how in the world such atomic details could have been obtained. I could easily imagine the wealth of information retrievable from such a structure and its physiological relevance. At the time, I had a masters degree in medical biophysics with only a shallow knowledge of structural biology. There was not a single structural biology laboratory in all of Egypt. I really wanted to know the power and limitations of NMR and crystallography in determining the three dimensional structures of proteins and DNA. I read several text books but reading was not enough. I wanted to understand the methodology through practice and hands-on experience. I soon realized that I needed a formal education and training in a field that was not available in Egypt. Therefore, I decided to pursue my PhD abroad.

Moahmmad S. Yousef

I received a scholarship from Florida State University and joined the Institute of Molecular Biophysics in 1998. One of my rotations was in the crystallography laboratory of Michael Chapman. Looking at the three-dimensional images of the enzyme arginine kinase bound to a transition state analogue was breathtaking. It felt like swimming within a molecule of nanometer diameter. I saw every residue and made measurements at close to atomic resolution. That was so impressive. The power of the technique was immediately obvious to me and I knew then that crystallography was exactly what I wanted to do.

I joined Chapman's group and received my PhD in 2002 with three publications. I am indebted to him for teaching me all aspects of crystallography. He was also instrumental in improving my writing and communication skills.

I finally became a crystallographer! Wow! I had to cross an ocean and complete four years of graduate work to understand that single page I had read in the garden. My mother still wonders why it took me so long to understand one colored figure!

Then I moved to the University of Oregon to work with Brian Matthews who is, by all means, an exceptional scientist and a true gentleman from whom I learnt a lot. He is smart but cheerful, famous yet approachable and serious but very considerate. I spent three years in his laboratory and left with three more papers in my bag. It could not have been better. My family and I immensely enjoyed the magnificent beauty of Oregon (It is a must-visit if you are in the neighborhood).

I am now a faculty member in the Biophysics Department, Cairo University and concurrently work at the structural biology research center of the Photon Factory synchrotron with Soichi Wakatsuki who has provided me with a unique opportunity to develop several structural biology projects while being exposed to beam-line commissioning and operations. I enjoy very much the decent society of Japan and its unique culture.

Recently, I have been going to Egypt more often to teach at Cairo University. Unfortunately, there are still no structural biology laboratories in Egypt (and probably in the entire Arab world!). I get to see very talented students who are passionate and interested in macromolecular crystallography but, regrettably, have no clear path to follow.

In an attempt to change this situation, we have organized a series of workshops and summer schools in macromolecular crystallography at Cairo University. We would also like to establish a state-of-the-art center of excellence for interdisciplinary science in Egypt. The proposed center will encompass modern wet and computational laboratories for macromolecular crystallography linked to the SESAME project. (SESAME – see articles on pages 7-10 – is a synchrotron facility being built in Jordan under the auspices of UNESCO, www.sesame.org.jo). The center is expected to serve scientists from the entire region by providing training and help with the design and execution of experiments. Experiments will be divided into three parts: sample preparation (cloning, protein expression/purification and growing crystals), data collection and computational analysis (data processing, phasing and refinement). Sample preparation and computational analysis will take place in the center with data collection at SESAME.

SESAME is expected to start operations in 2010, however, we prefer not to wait. Partnership and collaborative projects with the international community and synchrotrons around the world could "jump start" this initiative. The IUCr could help coordinate and catalyze these activities. Consortia between SESAME members are also highly encouraged. Our over-arching objective is not only to advance basic science in the region but also to address serious regional problems such as epidemic diseases. Malaria, bilharzias and hepatitis could be targets for structural genomic approaches linked to the international endeavors to combat those diseases.

Funding is being sought nationally and internationally to establish the center. Much like everywhere else, obtaining governmental funds for scientific projects is not easy. Fortunately, the Minister of Higher Education and the administration of the faculty of science at Cairo University have been very supportive. We would certainly appreciate any possible help to support the endeavor.

I have a firm belief that education, science and technology have unstoppable power to reform societies and promote mutual understanding and respect. I am optimistic by nature and sincerely hope that ten years from now, when I walk into that same garden in Cairo I will find a number of students engaged in an animated discussion over the latest advances in crystallography!!

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Baker Receives Rutherford Medal

Ted Baker (IUCr President 1996-1999) has received the Rutherford Medal, the highest accolade presented by the Royal Society of New Zealand. Ted established the first structural biology program in New Zealand and he is the first person outside Europe and America to complete a protein structure. His current research, as Director of the Maurice Wilkins Center for Molecular Biodiscovery in Aukland, focuses on Mycobacterium tuberculosis, the cause of TB. His group has already solved at least 12 new TB protein structures and they are developing high-throughput methods of protein expression and crystallization. He also serves on the advisory boards of the RCSB PDB, the wwPDB and BIOXHIT.c