things available now, for example, very cheap ultrasounds, very cheap x-rays, this kind of research started to play an important role.

This big variety also gives a lot of uncertainty.

Definitely, you're completely right, there are two kinds of uncertainty. One is uncertainty whether they succeed or not and the second one is whether will the FDA approve and the like. Where should one rely on a solution? These are definitely complex issues.

Guest

"You have to give them freedom!"

You have met and taught hundreds of students, you have met hundreds of surgeons. What is the best thing that you have learned from your students and what is the best thing you have learned from the surgeons that you met?

I learn from good students much more than they learn from me. This is definitely the case, because in this new world, the students have access to information much more than in our time, so they can go much faster and learn things and teach you, and you have to run after them. They challenge us. The students find new things in the literature, I have to read it over weekend to catch up with my students, so I love it! I learn from them that you have to give them freedom. If you tell them exactly what to do, then you are blocking their creativity, from learning more. They have more information access and more information than what I have learned, so I should not limit them to what I know, I should support them in finding how to do science, rather than tell them exactly what to do in terms of science.

From surgeons, what I learned, is that the clinical, real problems are much more complex and exciting than the ones that academia separately tries to solve. The real difficult problems stems from the variability of everything. One of the things we were discussing in the course is, they do many systems to evaluate surgical skill for example: very often scientists define surgical skills in how you move the knife, but for them, it's very difficult to evaluate how the surgeon imagines the physiology of a patient which is 80 years old, 70 years old, 50 years old, they don't move the tools in the same way if the patient under them has 10 different conditions or not. When you work with surgeons, very quickly you find out why you need 30 years of education and 10 years of experience, because intuition of the surgeon is accumulation of 40 years of information.

Understanding the complexity of the biology of human beings.

Exactly. You learn from them that your research team has to look at all the problems in a very holistic way, and not try to simplify it in one equation or one robotic solution, because for them, every single patient is a new huge puzzle. Different anatomy, different genetics, different way of life, different experiences in their life, different weight, different desire, different process. For a doctor, two patients with the same disease are never a couple of each other. What I learned from surgeons is exactly that: that as a scientist I try to turn the problem into a manageable problem with 10 parameters. The real patient has millions of parameters in fact. We learn that we need to be more tolerant to