

PORTRAIT OF A RAFFLESIAN THE ULTRAMARATHONER IN RESEARCH

At 49, Professor Jackie Yi-Ru Ying has the stamina of a teenager. That is what you'd think to yourself as you hear stories of her long, and at times arduous, journey in research, which began when she was just a young girl studying at RGS. Her love for Science, sparked by the interesting Chemistry labs at her alma mater and the effervescent nature of experiments, was further fuelled when she moved to the United States and was inspired by the teachers in her high school and university there. With that, she continued on to become a full professor at America's Massachusetts Institute of Technology at 35, and was elected to Leopoldina (the German National Academy of Sciences) at just 39. When she returned to Singapore in 2003, she took on the uphill task of setting up the world's first bioengineering and nanotechnology research institute, the Institute of Bioengineering and Nanotechnology (IBN), which has today grown to become a leading institute in multidisciplinary research across science, engineering and medicine for breakthroughs to improve healthcare and quality of life, and in nurturing future generations of research talents.

Dressed in her usual work attire of suit and pants, along with a pair of track shoes, Prof Ying is all set for another run of research projects, showing no signs of slowing down her pace even after having just won the prestigious Mustafa Prize "Top Scientific Achievement" Award for her work on the development of a material that delivers insulin automatically upon detection of high blood glucose levels (which is currently in phase 1 clinical trial). After all, Prof Ying's work in research is never done, even after chalking up numerous accolades and awards in her career-span. She's all set, together with her team, to discover the next breakthrough in scientific research, and to pass on the baton by nurturing young scientists, one running step at a time. The rest of us wait on with bated breath.

The Rafflesian Spirit

"It's about everybody coming together, trying their best, cheering one another on, and also helping one another."

Receiving the Inaugural Mustafa Prize "Top Scientific Achievement" Award

"It's very gratifying to receive this award, because it recognises many years of hard work and effort my group members and I put into the research. Receiving an award on this scale also motivates us to push forward, especially the very high-risk and really challenging projects. It is also heartening to note that for an institute that started from scratch 13 years ago, IBN is now recognised internationally. The award is also a reaffirmation of the government's faith in us, bearing in mind that when we talk about biomedical research, it takes a long time to bear fruit because of all the preclinical and clinical trials required."



Prof Ying and her daughter Hsi-Min at the Mustafa Prize award ceremony in Iran.



Photo credit - Institute of Bioengineering and Nanotechnology

Fondest Memories of Studying at RGS

"The fondest memories I have are those of the times spent with my classmates, especially those from my secondary two class! We had a lot of fun doing projects and performing together. Even when we moved on to secondary three, we still kept on referring to ourselves as the class 2/2 of 1980."

Building Something from Nothing

*"The person who hired me (Mr Philip Yeo, former A*STAR Chairman) really took a great leap of faith. My vision was to build an institute that would bring in the best people, both locally and overseas, people from different disciplines, to tackle complex problems together. IBN is quite different from most academic and research institutes because we are very multi-disciplinary. Therefore, it takes a lot of recruiting efforts to find the right people who are very energetic and dynamic, and at the same time, good team players who truly want to work with experts from different fields. I wanted to create a nurturing environment that will foster this kind of cross-collaboration."*

About the Mustafa Prize

The Mustafa Prize is a top science and technology award granted to the top researchers and scientists of the Organization of Islamic Cooperation (OIC) member states biennially. It seeks to encourage education and research and plays a pioneering role in developing regional relations between science and technology institutions working in the OIC member countries

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Qualities of a Good Researcher

"I feel that our young people have become very grades-oriented and results-driven. When we do research, we are driven by a passion to make a difference. It's not just about accomplishing results, but also trying to figure out what is the best way, the most effective way and the least expensive way. So we have to come up with many creative solutions, and at the same time, make them practical so that people can afford and use them. Some people may just want to have their work published in a top journal, but their work may not be very practical or useful. What we have undertaken is perhaps, a much more difficult path of wanting to make a societal impact, and that means a lot of hard work that people don't see because it doesn't culminate in publications. A good researcher should also have the right values and possess a deeper purpose in what they do, which in turn gives them meaning in their lives. Not everyone can attain this, and sometimes, if they cannot rise up to it, then it becomes a fight for credit, of who did what, and whose name should be put first in a publication. If you are in research for tangible, quick rewards, then you will give up very easily, because in this field, we don't see the rewards for many, many years, in the sense of having something that can be commercialised and make a difference in people's lives. Research is a long journey that requires a lot of endurance and perseverance."

Succeeding Against the Odds

"When I was in the States, I was a minority because I'm a woman and I'm Asian, and when I started my career, I was still quite young. So I have to work a lot harder to break whatever glass ceiling. Certainly you have to work smart and be creative, but the hard work in research is like a prerequisite, much like musicians or athletes, who undergo years of training to become good at what they do."

Ways to Tackle Challenges

"I always remind myself why I am doing this work and the meaning of life. Sometimes one may get upset at how things turn out, or at people who make things difficult. But at the end of the day, we need to understand that we do certain things because they are meaningful to us, and not because of what we can get out of them. If it's about the rewards, then you'll often be unhappy and unfulfilled."

Vision for the Future of Science

"Through programmes like the YRP, we really hope to inspire the young people, to help them discover that though science is hard work and full of challenges, it is also a lot of fun. It is also about working together with different people from different backgrounds. A really good scientist will move in different fields, and in the process, learn a lot of things from different people. So that's the part that can be really exciting. We also need to have better-equipped science labs in schools here. We are so obsessed with content that we are not teaching students how to understand concepts better, at the very fundamental level, which is through doing experiments and scientific discoveries. Hence, students learn lots of well-established facts and mug for exams, but when they have to take risks, venture into the unknown and figure out what to do, they are not so well-prepared. We need researchers who can think out of the box, be creative and not be afraid of taking risks to make a great impact. Also, we notice that many young people who are good in science only want to do medicine. We hope to offer an alternative path, which is research. Nothing wrong with being doctors, but doctors don't come up with innovative technologies, researchers are the ones who do that, right? (Smiles)"

Proudest Moment in Life

"When my daughter was born in 2001. I was very proud when she was born; she is really someone who is very, very special, and I'm really glad that she gets to go to my alma mater as well."



Nurturing Future Research Talents

"I'm very fortunate to have an old friend, Ms Noreena AbuBakar, Director, IBN (she was also my classmate from RGS Sec 2/2) helping me out in this area. She started the Youth Research Program (YRP) in 2003, which has reached out to close to 95,000 students. We got many of them interested about research through open houses, seminars and workshops, and more than 2,300 students have done research attachments at IBN for at least one month full-time. It is a lot of hard work, organising the various activities and mentoring the students, but we really want our researchers to be involved in this because it is important to get the young people excited about doing research. We have been successful in this as a lot of our students have gone on to pursue further studies and careers in science, engineering and medicine. It's also about giving back. Because we are very fortunate to have the opportunity to do research, and we see the exciting options that are available in research for young people, we want to offer them more choices for their career paths."

Getting Inspired for New Research Topics

"I get my inspiration by reading broadly, attending conferences and also talking to people. For example, when I'm doing my biomedical research, I try to understand what the medical doctors face as issues, and try to create better technologies that can help them in the early and accurate diagnosis of diseases, and to come up with better treatment."