

INTERVIEW

with Tony Qian, undergraduate student at Columbia University
in the City of New York and RISE intern at Forschungszentrum Jülich

This chance to meet a different kind of scientist was irresistible

To support young scientists at an international level, Forschungszentrum Jülich regularly participates in the RISE (Research Internship in Science and Engineering) programme of the German Academic Exchange Service (DAAD). RISE offers opportunities for students from the US, Canada, and the UK to gain research experience at German universities and research institutions. As part of their internships, students are matched with doctoral students – whom they assist and who act as mentors. Interns receive a monthly stipend to cover everyday expenses. RISE is sponsored by the German Federal Foreign Office. In 2016, 7 RISE students have been undertaking an internship at Forschungszentrum Jülich, each one lasting around three months. One of them is Tony Qian, a 21-year old student of physics at Columbia University in the City of New York.



Tony Qian (right) and his mentor Karandeep Singh

You are carrying out your RISE internship at the Institute of Complex Systems – Theory of Soft Matter and Biophysics (ICS-2). What field of study are you focussing on there?

Tony Qian: I am studying Theoretical Biophysics. In particular, I am interested in soft matter: cell membranes and cytoskeletons. Cells ingest foreign objects, such as a bacterial pathogen, to render them harmless and protect the organism. The same cells can also wrap around nanoparticles that contain nutrients and medicine. The physics of how cells wrap around nanoparticles can also be applied to customize drug delivery or to contain certain viruses.

For generations, people have understood that such a process occurs, but to date nobody has explained how it occurs. It is challenging for biophysicists to construct mathematical and physical knowledge purely from the energies associated with various mechanical forces exerted in the process.

You are currently taking a sabbatical year from your studies at Columbia University in the City of New York. What motivated you to make this decision and how are you using this time?

Tony Qian: After two years of physics and philosophy I longed to do hands-on work. I therefore left school last Christmas and found all sorts of jobs working on cars in auto + body shops. However, I could not stay too far away from physics. So in my time as a car mechanic, I eagerly read up on all sorts of topics and came across an online PDF on the subject of electric propulsion. Through a miraculous turn of events, this led to me working on plasma thrusters at NASA's Jet Propulsion Laboratory (JPL) in the spring. JPL is NASA's leading research and development arm, and is co-managed by the California Institute of Technology. I really enjoyed all the energy and curiosity that JPL inspires. Nevertheless, when the opportunity to carry out an internship at Forschungszentrum Jülich arose, I couldn't resist this chance to meet a different kind of scientist and also learn some German. Now I've been at ICS-2 for almost three months.

JPL is a research centre approximately the same size as Jülich. How did you enjoy your stay there?

Tony Qian: I especially enjoyed the intense exchange on all kinds of scientific questions. At JPL, there are a number of talks on different subjects each day: in the morning, at lunch, in the afternoon, and in the evening. Those talks are open for all employees to visit, as it is considered a good use of time to visit fields with no

obvious connection to your own research – an investment for future innovation. From this programme, I found at least two or three talks per week on subjects I was really interested in. Moreover, at JPL it was very easy to engage with strangers, whom I had never talked to before, in conversations on a broad range of scientific topics. Once I entered a building and met someone on his way to the elevator. We got talking and it turned out he was one of the scientists involved in controlling the rover "Curiosity" that NASA sent to Mars to explore the planet. He was hurrying to a meeting where the rover's next moves were going to be decided. Even so, he was glad to take five minutes to talk to a young intern like me. This was typical of the organizational culture at JPL. Everybody was so excited about their work.

At FZJ I tried to reach out in a similar manner. Over lunch I met some exciting people, and 3 or 4 even agreed to let me visit their lab! But all but one forgot or cancelled. I think a research lab should be a place where ideas flow freely and willfully.

How do you like working at Jülich?

Tony Qian: Jülich is great! I really enjoy the environment and your impressive level of diversity: there are Iranians, Indians, Chinese, Russians, Americans, and Germans all working together every day at my institute. The group shares lunch together, and we like to play football as a team. Between birthdays and farewells we find something to celebrate almost every week! There is always a festive atmosphere.

Part of what brought me to Germany is the desire to understand how humans use different ways to communicate the same fundamental issues. This is why I'm interested in foreign languages. I learned English and Chinese growing up. Later, I delved deeply into Latin, which gave me a foundation in French and Spanish. Now, German is my next big project.

I also really like the Forschungszentrum Jülich Guest House because it provides people from all over the world a neat living space to learn from one another. I think it's great that Jülich lent me a bike to ride to work – the 5km to and from work each day is my favourite part of living in Jülich.

To all the people I have met, thank you so much for helping me feel at home here. You live in a beautiful country and participate in courageous research.

The interview was conducted by Kristin Mosch.