

IGS Scholar's Name: Sudhanshu Shukla
Research Centre: Energy Research Institute @ NTU

- 1. Your current employment details (Designation, name of company, country and scope of work)**
Research staff, Energy Research Institute @ NTU, Nanyang Technological University, Singapore. My work is related to the study of fundamental processes in perovskite based solar cells and its commercialization aspects.
- 2. What motivates or trigger you to pursue a doctorate?**
Our society has a lot of problems and only scientific innovations can provide solution to that. It is the field where my job is to come up with numerous creative ideas to solve a challenging problem and how a problem can be approached by “n” different perspectives. Also, the joy of knowing of how something works, the underlying principles and testing hypothesis is just inexplicable.
- 3. Why or how did you decide to apply to IGS or the interdisciplinary route of research?**
After my basic studies in physics major, I got exposure to real world problems while working at IIT Bombay as research assistant. It did not take too much time for me to realize that the current problems are highly interdisciplinary in nature and integrated approach should be pursued. Therefore, IGS at NTU was such centre that I was looking for.
- 4. What is your thesis about?**
My thesis is about studying a low cost solar material, FeS₂. The material is very promising for solar photovoltaics but it doesn't give desirable output because of its intrinsic loss mechanisms. I studied in detail to explain what are the possible reasons affecting the performance and how it's affecting and also provided potential solution to overcome that.
- 5. Why did you choose this topic and how does it benefit people or industries globally or internationally?**
Getting electricity from a low cost earth abundant material FeS₂ is would cheap electricity on large scale. International energy dynamics is closely related to the growing energy demands and rising population. I chose this topic because if I can advance the understanding of this material, this would help in a step closer to the above goals.
- 6. What kind of interaction did you have in IGS? How did that help you?**
It was a great experience working with IGS. Working in two departments and two groups gave me more opportunity to interact with experts in many scientific techniques which proved to be extremely useful in my own research.
- 7. What are the challenges you faced during the candidature and how did you overcome it?**
I knew I am riding on a wave. There were times when I felt down and depressed when things were not working and I was asking myself “why and what am I doing”. But I knew that it was just a phase and it will pass by. My instincts helped me a lot. I told myself over and over that even if things do not work out in the end, I will learn things in the process and it is ultimately the learning that helps a researcher and makes more mature in dealing tougher problems.

8. What was your proudest moment or fondest memories over the years of candidature? e.g awards, overseas conference, patent, published papers, etc.

The first “well-done” from my professor was definitely a happy moment. The best moment that I can recall is during the exchange at UC Berkeley, when I discussed my ideas in front of a panel of professors. They appreciated my approach of tackling the problem. It was for the first time when I was heard seriously by eminent scientists. Also, my email correspondences with a retired professor proved to be very motivating.

9. What do you think are the attributes for PhD students to successfully go through the 4 years?

Clear mindset, don't let yourself or anyone confuse you. Perseverance is very important. Learn everyday something new, give yourself a bit of time to think any problem or any paper in your own way. Imagine how you would have solved it and then go on to your research problem.

10. Please share 1 key motivational/ key take away message with your juniors?

Keep your instincts alive. Nobody can or able to judge you. Learn and become expert. Nobody would listen to you first but remember the first ray of the rising sun is hazy in the dawn.

11. How does it feel like when you received the scholarship offer?

It was absolutely exciting. I was at my sitting on a public computer system at the institute in India where I was working as research assistant when I received the offer of scholarship by email. I was running around to tell my friend and my family that it happened. Now, it was like opening of a whole new chapter of my life to fulfil my ambitions.

12. Share with us some memorable photos you've taken with 1 line description of each photo. (e.g. Overseas conference, interactions in IGS, etc)

Well I do not have any photo right now with me. But overseas conferences and exchange was the experience of the lifetime. I not only learned new things but also saw a different way of living life. Open atmosphere and wisdom.

13. What will you miss after graduating?

Responsibilities increase after reaching a milestone. Its bit tough to be equally creative and innovative when you have pressure of dealing different things. I will miss this liberty of sitting anytime in the library reading anything that interest me. I will miss that. Because now I have to be a bit confined on the things I can do.

14. What is your next adventure / challenge or any plans for the future?

My plan is to go ahead in the scientific areas and take more challenging problems. After that I want to go back to my home country (India) to help people at the ground level by making students aware about the energy and climate change scenarios and provide cheap/affordable energy solutions to the small towns.

15. Is there anything you want to say to your family, supervisors, mentors, friends or anybody?

I want to thank them all for supporting me in all the times. I want to add here a bit. I was grown on a small town and a very average student. When I finished my masters, it was almost impossible for me to go out for higher studies due to family condition. But my family did sacrifice here for a greater cause and very eminent scientist at IIT Bombay (Prof. Ramgopal Rao) gave me an opportunity to work in a fantastic place full of talents. When I look back, it seems like a scripted story.