On 22nd March 2014, the Career Development Centre of IISER Pune and the Venture Centre (a technology business incubator) jointly organized a panel discussion on 'CAREERS FOR SCIENTISTS AND ENGINEERS: INSIGHTS AND PERSONAL EXPERIENCES', at IISER Pune.

WORKSHOP SUMMARY:

The aim of the workshop was to make students trained in science and engineering aware of careers in industrial research, entrepreneurship, tech commercialization, intellectual property, academia among others and to provide to them insights and experiences of various people working in the above-mentioned fields. The workshop, heavily attended by people from IISER and NCL, was divided into four panel discussions:

- Industrial Research Careers
- Careers in Entrepreneurship
- Careers in Intellectual Property, Tech Commercialization, Innovation Management and Consulting
- Academic Research Careers

Session 1: Industrial Research Careers

Panelists present: Dr. S. Sivaram (Ex-Director of NCL), Dr. Rajendra Lagu (Intel Innovations Manager at Intel Technology India Pvt. Ltd.), Dr. Venkataramana Runkana (Principal Scientist at Tata Consultancy Services Ltd.), Dr. Chetan Gadgil (Scientist, NCL), Ms. Ruby R.P. (Research Engineer at Oneirix Labs)

Session Moderator: Mr. Aashay Patil (Student at Indian Institute of Science Education and Research, Pune)

The panelists comprised of researchers working with industries. They were asked to share their experience in the industry and what they had learnt. Several opinions that came up were that high-end engineering in industries is driven by basic science; Structure of the industry determines how the working experience will turn out to be, and so on. Most panelists agreed on the fact that the problems to be solved in industrial research are different from those in academic research in that
-they need to be solved in a limited time period for the solutions to be of any value
-the industry is very dynamic and problems keep changing regularly
-Industrial research problems involve a mix of several disciplines and one needs to have an integrated view of them in order to provide a solution based on the industry's requirement.

Some panelists also explained how the problems they worked on in industries were often completely different from anything they had been trained for and hence recommended a thorough knowledge of basics, and a willingness to adapt and learn things anew as essential skills for a successful career in the field. A discussion on intellectual freedom in industries as compared to academia revealed that the scope of problems in industries is limited to their applicability. Also, unlike in academia, only individual brilliance is not sufficient in industries where team work is very crucial to bring together various aspects of a solution.

An important question raised by an audience was about the difference between a focused industrial PhD course and a broad academic one, to which the panelists responded by saying that for someone seeking an industrial career, an industrial PhD would just mean working on a pre-decided problem, a shorter duration, and less groundwork, but the track record of the company needed to be thoroughly checked before enrolling for such a program. As for the growth of the R & D sector and available opportunities in

India, they threw light on the fact that for local industries, which are highly sensitive to changes in the economy, the present prospects are bleak due to the suffering economy, but those in MNCs aren't as bad since they don't depend as much on the local economy. However, jobs in local industries are more likely to involve employees in all stages of implementing the solution and broader learning opportunities unlike MNCs, which provide different sections of research problems to different places depending on the available skill sets. As for what industries look for while hiring students, they emphasized on competence for any task provided, reliability, ability to work in a team, and good communication skills rather than a good GPA. The concluding question was whether a PhD was necessary for an industrial research career, to which the response was-not at present, but with age, the possibility of getting selected into a PhD program decreases,and already in high-end labs, master's degrees are becoming a dead-end, so it would be wise to go for a PhD as, for the same post, a PhD degree-holder would have more value than a master's degree holder.

Session 2: Entrepreneurship

Panelists present: Dr. Chaitanya Saxena (CEO, Shantani Proteome Analytics Pvt. Ltd.),
Mr. Amitabh Shrivastava (Member IAN, & CEO at CSIR Tech), Mr. Ashish Gawade (Social Entrepreneur/CEO,Co-Founder BOPEEI), Dr. Vishwas Joshi (MD at Seagull BioSolutions),
Mr. Tanuj Gigras (Founder of Nayam Innovations)

Session Moderator: Mr. Suraj Chawla (Student at Indian Institute of Science Education and Research, Pune)

This panel entirely comprised of Science Entrepreneurs who talked about their stint in business, their motivation and their goals. This was a group of people who wanted the science they had learnt to have an impact on the society, while fetching them money. They believed that an enterprise of their own would help contribute more effectively than an industrial job. One of the primary question posed to them was how an idea could be judged as worth selling. They answered this by saying that any idea needs to be developed into something tangible or implementable before judging it. Once workable, it can be optimized to make it into an investible proposition which could yield good returns. Given the risk that entrepreneurship is, another important concern for many audience members was handling social pressures and fear of failure. To this, the unequivocal answer was that entrepreneurship is not for the fearful, and that as long as there is some support system, such as family or friends, societal pressures are unimportant. As for whether or not a degree in management is required, the panelists agreed upon the view that as long as one has an ability to interact with customers and visualize their idea from the point of view of buyers to sell it better, a degree is not required. They mentioned that as an enterprise grows, the time spent in doing actual science goes down and administrative responsibilities go up. Potential entrepreneurs were also asked to be prepared for extensive scrutiny by investors, and were advised to create a stronger social (crisis-support) network, develop communication skills and the ability to visualize various market scenarios and also to ensure 'survival money' before starting a venture.

Session 3: IP, Tech Commercialization, Innovation Management and Consulting

Panelists present: Dr. V. Premnath (Founding Director – Venture Center and Head, NCL Innovations), Mr. Kaushik Gala (Chief Business Officer at CSIR-Tech Pvt. Ltd.), Mrs. Srividya Ravi (Patent Associate at Gnanlex Hermeneutics Pvt. Ltd.), Adv. Hasit Seth (LL.M (Commercial Law, LL.M in IP, Member of the New York Bar.), Dr. Magesh Nandagopal (Scientist, NCL Innovations), Dr. Nitin Tewari (Scientist, IP Group,NCL Innovations)

Session Moderator: Mr. Sourajit Basu (Student at Indian Institute of Science Education and Research, Pune)

This panel comprised of several patent officers, a lawyer and people working with intellectual property (IP). After the discussion of how the panelists got to where they are presently, several questions regarding patents and careers in patent law followed. A career in these fields is at the interface of science, law and management, and hence is often considered more of a secondary activity in an organization. However, the panelists were by no means discontent by this fact and most of them admitted that the satisfaction of getting a scientist's idea patented and brought into practice was rewarding enough. They mentioned that value of a patent is determined by its real-world application, commercial potential, novelty and utility. They mentioned that patent officers is a broad term which encompasses patent drafters as well as patent examiners. The Patent Office conducts an exam once a year which needs to be cleared in order for a job in this area, but NLS, Jodhpur and Symbiosis Law School, Pune offer degrees in IP as well. As for the skills required by a patent officer, the main requirement is good drafting skills as well as good communication skills to present a case well, analytical skills, and the ability to read, do more research on, and understand what the scientist wishes to say, and meta-skills such as the ability to persuade, influence, and so on.

Session 4: Academic Research Careers

Panelists present: Dr. Guruswamy Kumaraswamy (Scientist, NCL), Prof. LS Shashidhara (Professor at IISER), Dr. Ashish Lele (Scientist, NCL), Dr. Vivek V. Ranade (Scientist, NCL)

Session Moderator: Ms. Krishna Anujan (Student at Indian Institute of Science Education and Research, Pune)

This was the most heavily attended panel discussions among all the sessions. The panelists were renowned researchers working in academia. This discussion, too, began with a brief account of the panelists' career and how they got drawn into the field. A lot of students found this to be a good platform to clear a lot of doubts regarding life in academia. One much pondered upon question was how research proposals were evaluated and whether one's background had any influence on decisions taken regarding the proposal. To this, the answer given was that though having a 'branded' background helps, mostly what is considered is what kind of work has been done, how well the applicant knows their area of work, what ideas they can come up with, and how well they can defend their proposal. The response to the much debated issue of Indian and foreign research institutes was that the top institutes in India actually have better facilities than average institutes abroad. Also, funding opportunities as well as intellectual freedom are more in India because the pressure to publish is not (yet) as much as it is abroad. They added the point that studying abroad was good exposure to diverse cultures, and advised students to not miss out on any opportunity that might come by. Another interesting question raised was whether one should choose a research area based solely on their interest or other factors should be considered. The panelists answered that though the primary consideration should be interest, one should also try and look for fields that will have scope for research in the future, and that are not already so populated that jobs in them are

difficult to come by. They were also asked how they juggled research and teaching, to which they replied that it is difficult, but enjoying both is important to manage both better. Also, a teaching job has fixed working hours, whereas research can mostly be conducted at any time of the day. The point of awards and their significance in science was also brought up, but the panelists concurred on the opinion that it is unwise to make awards the goal of one's research and also, the awards are more to provide recognition, incentives and financial aid for the recipients as well as the field. Finally one of the most-asked questions in an institute like IISER was posed – expertise in a specific field or interdisciplinarity? The response to this was that with growing collaborations, interdisciplinarity is becoming indispensable, but that one must be rigorous in whatever they know.

With this the workshop concluded. Mementos were provided to all the panelists for playing such a key role in this enlightening programme. The general feedback from the students was positive, and many of them said they learnt quite a bit from it and demanded more such workshops in the future.