Lindau Nobel Laureate Meetings: Bridging the Generations of Scientists

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Abstract. “Educate, Inspire, Connect” is the motto of yearly Lindau Nobel Laureate Meetings which completely replicates what this gathering is all about. Since 1951, Nobel laureates have assembled in the pleasant town of Lindau, Germany, to discuss the progression of science. Beginning in 1953, the gatherings integrated young scientist from all over the world to ingrain in them enthusiasm and acquaintance on science, while likewise giving an environment for fruitful collaborations. From June 30 to July 5, 2019, around 580 young scientist representing 89 nations accumulated in this small town on the shores of Lake Constance to directly interact with 41 Nobel prize winners. In light of this year’s theme dedicated to Physics, it was an incredible benefit to go to this gathering as a young materials scientist. In spite of the fact that it was an overall gathering of physicist, a considerable insights into current advancement and development in materials science was offered by the many Nobel laureates. My objective in this article is to share these experiences and to increase awareness of this interesting and unique scientific meeting.

1. Introduction to Lindau Nobel Laureate Meetings

Once every year, around 30-40 Nobel Laureates gather in Lindau to meet the next generation of young scientists consisting around 600 master students, doctoral students, and post doctoral fellows from all over the globe [1-3]. The Lindau Nobel Laureate Meetings cultivate the research exchange among researchers of various age groups, cultures and disciplines [4-6]. The gatherings focuses on three main categories i.e. physiology and medicine, physics, and chemistry which are the three main branches of Nobel Prize disciplines in natural sciences. An interdisciplinary gathering rotating around each of the three main categories is held once in five year. Furthermore, the Lindau Meeting on Economic Sciences is held once in every three years. The scientific program of each Lindau Meeting depends on the principle of dialogue. It consist of various sessions such as key lectures, discussions, Master classes, panel discussions and open exchanges that are intended to enact the sharing of information, thoughts, and experience between and among Nobel Laureates and young researchers.

2. History of Lindau Nobel Laureate Meetings

Since their beginnings in 1951, the Lindau Meetings have advanced into an interesting global gathering for scientific exchange and sharing. It was the two Lindau physicians Franz Karl Hein and Gustav Wilhelm Parade who moved toward Count Lennart Bernadotte af Wisborg of close by Mainau Island to together create and execute the idea that denoted the beginning of a long and proceeding with history [7-9]. Count Bernadotte – a grandson of King Gustaf V of Sweden – had superb associations...
with Stockholm. Particularly because of his endeavors, seven Nobel Laureates consented to partake in the very first "European Meeting of Nobel Laureates in Medicine" held at Lindau in 1951. This extraordinary gathering was considered as an European activity of post-war compromise among researchers. The underlying achievement prompted the foundation of intermittent gatherings of Nobel Laureates in Lindau, committed on the other hand to the Nobel Prize disciplines physiology or medicine, physics and chemistry. Effectively in 1953, the resolution was made to have master students, doctoral students, and post doctoral fellows join the discourse. In 2004, the first of the additional Lindau Meetings on Economic Sciences was held.

3. Reflections on the 69th Lindau Nobel Laureate Meetings: Dedicated to Physics
A very inspiring environment with a significant number of Nobel Laureates and full of very talented young people with lots of potential and energy, motivated and united by the same passion, coming from around the world to discuss the Physics was the scenario in Lindau (Germany) during the 69th Lindau Nobel Laureate Meeting that took place from June 30 to July 5, 2019. I was one of the lucky young scientists to be there as one of the representatives of India, a dream come true. The key topics were cosmology, laser physics and gravitational waves, inspired by the winners of the Nobel Prize in Physics 2018, two of whom — Gerard Mourou and Donna Strickland, were present.

For those who don’t know what I am talking about, the annual gathering called “Lindau Nobel Laureate Meeting” has taken place since 1951 and is the world’s most unique scientific conference. Hundreds of young scientists, selected among several thousands of applicants from all around the world (this year we were 580, coming from 89 different countries), are given the opportunity to meet, discuss and even to have lunch or walks with dozens of Nobel Prize winners (they were 39 in 2019). “Educate, Inspire, Connect” is the motto of the Lindau Nobel Laureate Meetings, which totally reflects what these meetings are about. They call this “The Lindau spirit”.

I got to know about these meetings back in November from the Department of Science and Technology, India’s web portal. The application process consists of two steps. First I had to apply at the Department of Science and Technology, India, who nominates our name to Lindau council and gives the partial financial support. I passed this first hurdle, and they nominated me to Lindau council organizing the meeting. In the end of February I got the mail saying that I was chosen as one of the 580 students attending the meeting! I was excited, but didn't think too much of it at first. But by seeing the reactions of others on Twitter and Facebook, it really started to dawn on me how special this was.

Following to a one day before briefing meeting at DST office, New Delhi, it took a nine-hour plane journey towards Frankfurt-Germany and four-hour bus journey for us (Me and other Indian delegates) to get to Lindau, a Bavarian Island in Germany at late night. I was fortunate enough to have my hotel right across the street from the meeting venue, the newly built Inselhalle. During the next day morning walk, I was amazed by the Lake Constance surrounded by the Alps in a beautiful sunny day. After having the morning breakfast, I went to the registration desk. They had a personalized agenda for everyone, which was incredible and demonstrated the effort of the organization committee in making this event memorable. I met some young scientists there. They were from more than 89 countries, people from all the continents, many of them working in places different than they were born. So, this was a key lesson, “Internationalization is very important in Science”.

The meet started with an opening ceremony and the keynote speech was given by 2011 physics laureate Brian P Schmidt followed to the Welcome by Countess Bettina Bernadotte, President of the Council for the Lindau Nobel Laureate Meetings and Address by Anja Karliczek, Federal Minister of Education and Research, Germany. Climate change, the threat to democracy from populists, open science, and unconscious bias (both gender and race-based) were some of the topics he spoke about. The opening ceremony was ended with the musical concert by Vienna Philharmonic Orchestra which was very nice and peaceful.

As this year’s topics of focus were cosmology, gravitational waves, and laser physics, so a lot of the laureates came from these fields. None of these is directly related to my research unfortunately, but there were plenty of others in the same meeting. There were a variety of different formats in the
program. In the morning there would be classical lectures, although these often focused more on the life story as a scientist, or a broader perspective on science in society, than on the hardcore physics. A bit more interactive were the Agora talks, where the laureate would give a brief talk followed by questions from the audience. The most interactive were the open exchanges, where we had the chance to ask questions about basically everything to one laureate at a time. Selected groups of young scientists also got to have lunch with a laureate or walk around the island and have more personal interactions. Panel discussions, master classes where the young scientists present their work to a Nobel laureate and get feedback from peers and the laureate formed a large part of the event.

After lunch on second day, there was a session called ‘open discussion’ where young scientists were allowed to interact with a Nobel laureate who gave a lecture earlier in the day. I attended the session with William D. Phillips. He answered questions ranging from his Ph.D. to the day he got the call from Stockholm. I asked him what is the most important quality of an experimental physicist and he said “patience”.

After that, I attended the open discussion session with Takaaki Kajita and was bewitched by his enthusiasm. The day ended with an informal Grill & Chill session on the park by the lake. We also had the chance to go for lunch or a walk with one laureate and just a handful of young scientists. Along with nine others, I got the chance to have talk with Steven Chu. He won the Nobel Prize in 1997 for laser trapping and cooling, but more interestingly he has been Secretary of Energy in the first administration of Obama. The fact that we went more than hour over time shows that it was an engaging discussion.

I paid special attention to Sir Konstantin Novoselov (also called as Graphene Man), winner of 2010 for discovering the material Graphene. His research is somewhat related to mine, but also the story of their discovery and very quick awarding of the Nobel Prize is very interesting. He also turns out to be a very approachable person with a good sense of humour. Also, I found William D Phillips a wonderful example of an enthusiastic, extremely smart but modest scientist, still so engaged with his research to perform experiments at the bench every day at the age of 71 and still having a lot of fun doing it! I was fortunate enough to personally talk to him during the Lindau Meeting. He also underlined the importance of having a good mentor, because, as he also stated in a slide, “you cannot learn how to do good science just from reading the literature!”

On fourth day, there was a panel discussion about career planning for young scientists and 2001 physics laureate Wolfgang Ketterle said that he can only share anecdotes and that the path each scientist takes is different. The stories of all Nobel laureate were full of lucky accidents, being at the right time at the right place and accepting failures. The most frequently asked question at the conference was certainly the one concerning the magic formula for receiving a Nobel Prize. All the Nobel Laureates agreed that obviously there was no standard recipe or special secrets, however “catching the right question” was the most important thing for everyone.

The final day of the meeting deserves a special mention as well. This day was traditionally spent on the Mainau island, which is the home of Countess Bernadotte Bettina, the President of the Lindau council. The island is on the other side of Lake Konstanz, and we were brought there by a ship that looked more like a spaceship. This boat trip was sponsored by the state of Baden-Württemberg, and they were sure to let us know that. There were a lot of stands from different universities and research institutes in the state, and they had a lot of goodies with ridiculous slogans (even fortune cookies!). They also kept repeating the name of Baden-Württemberg, just to let you know how awesome Baden-Württemberg really is.

After arriving on the island, we listened to an interview with Tawakkol Karman, Peace Prize Laureate, and the face of the Yemeni revolution. She spoke really passionately about the struggles of the Yemeni people, and the troubles in the Middle East in general. The last part of the program (aside from the closing ceremony) was a big panel discussion on how science can change the world for the better. While there obviously was no final answer on such a big question, there were some interesting points of discussion such as the importance of communicating your science to the public. Also, the discussion made us realize that science can’t change the world but scientific thinking can.
After this we had a picnic on the grass and had some time to explore the island. Mainau is also called the flower island, and for good reason! The whole island is basically one beautiful botanical garden. And I have seen quite a few botanical gardens, but this was probably the nicest one I have been to. One of the highlights was the butterfly house, a large greenhouse with a huge variety of butterflies. For the boat trip back, the beer taps were opened for one final party! While some people danced to the 90s cover band downstairs, I spent most of my time on the top and middle of the deck. Chilling there, drinking a cold drinks with new friends, enjoying the sun and the views over the mountains was the perfect ending of an amazing week.

Following to the Lindau meeting, I got the chance to visit some Premier research institutes and Universities from all over the Germany. This post Lindau tour was organized and sponsored especially for the Indian delegates by German Research Foundation (DFG) as a part of the agreement and MoU signed between India and Germany. So, now we became the part of Indo-German collaboration. During the post Lindau tour, we had visited the Neuschwanstein Castle (which appears at the starting in every Disney Movies) which is one of the most visited castles in Germany and one of the most popular tourist destinations in Europe. Neuschwanstein Castle has a very beautiful inner garden surrounded by a walled courtyard. It even has an artificial cave. Neuschwanstein’s interior is as beautiful as it is outside. Marienbrücke Bridge is just a few minute walk down a sloping trail from the castle entrance and hangs magnificently between two cliffs. After the castle visit and Lunch at Fussen, we all transferred to Konstanz for the overnight stay.

On the next day, the Konstanz city tour was organized for us with a lady guide who told everything (past, present and future) about the Konstanz. Following to the city tour, we had a lunch at Indian restaurant ‘Sitara’ which gave the flavour of Indian recipes with a great test we are missing in the whole Lindau week. After the overnight stay at Konstanz, we moved towards the University of Constance for the visit. In the introductory meeting, Prof. Ulrich Nowak gave the information about history, departments, courses and ongoing research activities of the university. He also gave the information about the enrolment and funding opportunities for the international students for the different courses. After, the introductory session, we are divided in two groups for the visit of four different labs like condensed matter lab, photonics lab, nanophysics lab and computational physics lab. All the labs were equipped with the latest state of art facilities. Following to the lunch at university dining hall we are transferred towards the Karlsruhe for the overnight stay.

The next day was dedicated for the visit to the Karlsruhe Institute for Technology (KIT). The KIT officials were organized a special visit to the Helmholtz Alliance for Astroparticle Physics, where we visited the Karlsruhe Tritium Neutrino Experiment (KATRIN). KATRIN measures the neutrino mass in a model-independent way via ultrahigh precision measurements of the kinematics of electrons from beta-decay. Its wide spectrum of involved physics and engineering, varying for example from molecular physics to nuclear physics, or from cryogenics over vacuum engineering to material science, made the special touch and fascination of such an experiment for us. After the lunch, we were transferred towards the Heidelberg for the visit to Kirchhoff Institute for Physics. In this institute we observed the different research aspects of Classic Complex Systems, Quantum Systems, and Fundamental particles and interactions through different lab visits. After the overnight stay at Heidelberg we moved towards Mainz for the visit to Johannes-Gutenberg University where we visited the Physics, Mathematics and Computer science department. We had a visit to a renowned research groups that work primarily in the areas of astroparticle, high energy and hadron physics, nuclear chemistry as well as precision physics with ultra-cold neutrons and ion traps. After the lunch at university canteen, we moved towards the Bonn for overnight stay.

On the next day morning, we transferred to the Head Office of the German Research Foundation (DFG) in Bonn by public transport (Metro). This visit was arranged by the DFG in collaboration with the German Academic Exchange Service (DAAD), Alexander von Humboldt Foundation and The Federal Ministry of Education and Research (BMBF) to give a landscape of the research activities in Germany and funding opportunities offered by these agencies for the International students. After the joint lunch at DFG and overnight stay at Bonn, we were transferred to the Mainz for the visit to Max
Planck Institute for Polymer Research. The lab visits gave us the outlook of the institute combining all the necessary specialized expertise - from the creative design of new materials, from their synthesis in the lab to their physical characterization as well as the theoretical understanding of polymer characteristics. After the lunch at University dining hall, we moved towards our final destination i.e. Frankfurt. We had a visit to Consulate General of India in Frankfurt as our last official visit of post Lindau tour. In the office of the Consulate General of India, all the Indian delegates shared their experiences about the whole tour. Followed to the meeting, a dinner was arranged in Indian tradition which was very tasty. After the overnight stay at Frankfurt, on the next day we are transferred to the Airport following to the late lunch at 'eatDOORI' an Indian restaurant. Finally, the time has come towards the end of our tour and everyone was emotional while saying bye to Germany.

4. Conclusions
In summary, I would like to say that the Lindau Nobel Laureate Meeting 2019 and post Lindau tour has exceeded all my expectations. I feel so grateful that I had the opportunity to attend this meeting at this stage of my scientific career, when the doctoral phase is about to give way to a more independent one. In fact, this is a time in which one still needs a lot of advice and mentorship, but is already able to understand all the problems and important issues that characterize the charming but complicated world of materials science research. The Lindau experience will be cherished for a lifetime. True to the meeting motto, I was educated, inspired and motivated. While the educate part might’ve been a bit less obvious, I definitely felt inspired by all the stories of the laureates. Also, I’ve connected with a lot of awesome people, who I’ll hopefully meet again someday! I hope my experience will inspire young researchers to apply for this unique and interesting meeting with great enthusiasm and their experiences will positively contribute to the societal development in future.

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