



## Scientific sales

Scientific communication is a key process for advancing science, which includes scientific publishing, scientific talks, participating in meetings and seminars. Each of us does publish scientific papers, books and possibly conference proceedings, which is the official channel of documenting our scientific findings. Giving scientific talks is an effective way of advertizing our research results and ideas, which is the process of scientific sales.

As our research progresses, we publish individual articles periodically to report our scientific finding to the community. By certain period of time, we need to write a review so that our research findings can be systematically organized in a coherent way, so that the readers can have a unified picture about our research progress. We assume that the researchers of our field would read our publications. However, due to the large volume of today's publications at a fast growing rate, we are flooded with information, and in many cases one may not have the time to systematically read and absorb the current literature. In such a case, giving a coherent talk is important for fully introducing your work to the listeners. A 30 min talk can give a lot of information to the audience if the talk is organized in a logical, systematic and coherent way. One can possibly cover the results contained in a few years in one talk, which is probably the quickest way for introducing the ongoing research activities in one's group. This is a great opportunity to sell and promote one's scientific ideas.

If you have an opportunity to give a talk, even a 15 min talk, you should fully prepare for it, because it is a platform to present your results to a wide range of audience. There are many tips for preparing a good scientific talk. The first point is: the key idea that you like to present to the audience must be clearly defined and specifically spelled out, which is the most important take-home message that you would like to give to the audience.

Second, organize your talk in a coherent and logical manner so that the talk looks like telling an exciting and interesting on-going story with a strong support by data, rather than patching pieces of data without any organization. A good talk is a coherent organization of your published papers with a main theme, rather than from one paper moves to another paper.

Third, the flow of your talk has to be reasonable. A fast talk can easily lose the audience as they may not catch the main ideas and details. A slow talk, on the other hand, can lead the audience to lose focus, because they may start to look at his/her cell phone or ipad. You should closely catch their attention and give them no chance to diverse. Keeping an eye contact with the audience is very important. My own recommendation is that the flow of slide should be 45–60 sec each slide. 30 sec per slide is too quick, but 1.5 min each slide is probably too slow.

Fourth, I personally do not recommend to prepare a complex slide that has a lot of text especially with small fonts, because the audience is more sensitive to pictures/diagrams and videos rather than long text. Since the talk goes fairly quickly, the audience may not absorb the contents presented in a complex slide. One should split the contents in this complex slide into several slides, so that the information can be clear and precisely delivered.

Fifth, the purpose of using a laser point is to guide the audience's attention during the talk. Hold the laser point firm rather than wobbling around, because the audience has to know what you are pointing to in synchronizing with what you are talking about. A wobbling laser point makes people feel dizzy. Lastly and most importantly, prepare your every talk as if you are giving the most important talk in the world. Your excitement and enthusiasm should be delivered and expressed in your talk. At the end, if you are excited about your talk, the audience must be.

Science citation is a measure of your success. Giving great scientific talks is an approach to introduce your work to the people, so that they can learn from it, and then they will cite your publications. The more people know about your work, the more citation you will receive. The more great talks you give, the more invitations you will receive. This is also a measure of impacts. Naturally, your h-index will grow as well, which is now being accepted as a common criterion to measure the success of a scientist in comparison to his/her peers in the same field. The entire process is like rolling a snow ball.

The purpose of participating in conferences is not only to give a talk about our own research results, but also listening to and communicating with experts in the field. In many cases, we read someone's research papers, but

we probably have not met the author. By participating in conferences, we have an opportunity to meet the authors so that the information exchange can be more effective. Nothing is better than meeting the people. This is an important step for building collaborations and personal relationship.

Participating in conferences, especially international conferences can be complex and tedious. One has to book airline ticket, possibly apply for a visa, reserve a hotel, take a long flight, and find local transportation. But international conference is vitally important to introduce your ideas to a broad range of audience. In one sentence, if you want people to accept your ideas, besides publishing high quality papers, you have to travel and have to present your research results in conferences. Scientific sale is indispensable for your success in science!

Regardless of one likes it or not, it is a way of science being propagated. Scientists often need to act like a salesman. Your research result is your product. It is your duty to tell the audience how exciting your research is and how it can revolutionize our life. Hopefully, some people will like your result, follow your research, extend your science and develop new technologies based on it.

Best wishes!!!



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**Zhong Lin Wang** is the Hightower Chair in Materials Science and Engineering, Regents' Professor, and Director of the Center for Nanostructure Characterization at Georgia Institute of Technology. Dr. Wang has made original and innovative contributions to the syntheses, characterizations and understanding of fundamental physical properties of oxide nanobelts and nanowires, as well as applications of nanowires in energy sciences, electronics, optoelectronics and biological science. His discovery and breakthrough in developing nanogenerators establish the principle and technological roadmap for harvesting mechanical energy from environment and biological systems for powering personal electronic appliances. He pioneered the field of piezotronics and piezo-phototronics by introducing piezoelectric potential gated charge transport process in new electronic and optoelectronic devices. Dr. Wang's publications have been cited over 55,000 times (h-index = 116).