

## **The Takagi Fund for Citizen Science – An International Perspective**

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Jinzaburo Takagi passed away one year ago to the day – an appropriate date to launch the Takagi Fund for Citizen Science. Takagi-san called his autobiography “Living the life of a citizen scientist”. I was in the very fortunate situation to have shared with Takagi-san over the last 10 years of his extraordinary life an unusually intensive and fruitful working relationship *and* a deep friendship. We have spent countless hours discussing technical, social and policy issues. And yet, while working on the orientation of the Takagi Fund for Citizen Science, I realized that we have hardly spoken about the theoretical background of Citizen Science. We were so much in harmony about the practical approach that we did not feel necessary to get into theoretical details of what we are doing every day.

### **Where does the Citizen Science concept stem from?**

In the early 1970s a group of American graduate students, under the impression of the protests against the Vietnam War, started the Stanford University Workshops on Social and Political Issues. Frank von Hippel, then assistant professor of physics and Joel Primack, then graduate student of physics joined in a year-long workshop on “Scientists in Washington”. The group realized, in Frank’s words, that “scientists were being invited to Washington not only for their advice but also to give political decisions the appearance of objectivity” and that this procedure allowed “government officials to reject citizen concerns as ‘uninformed’”. As a consequence they decided that “some scientists at least should begin to give benefit of their expertise to the public *directly*.” Inspired by consumer advocate Ralph Nader’s concept of “public-interest law” they called the activity “public-interest science”. They found out that there were already some examples of successful citizen scientists and Frank wrote later that “there was therefore ample evidence that, given favorable conditions, a small number of scientists – **even one** – could have an impact on public policy.” In 1973 Frank von Hippel decided to change his own career “from elementary-particle to public-policy physics”.

It was that very same year 1973 that Takagi-san came back from the Max Planck Institute for Nuclear Physics in Heidelberg, Germany, where he had worked as a guest scientist. Strongly influenced by the Vietnam War protests, with broadened scientific background and cultural and linguistic knowledge, he decided to change his career from “nuclear” to “citizen” science.

In 1974 Frank von Hippel, together with Joel Primack, published his first book on citizen science under the title “Advice and Dissent: Scientists in the Political Arena”. One year later, Takagi-san started the Citizens’ Nuclear Information Center (CNIC) in Tokyo.

### **So what is Citizen Science? From Theory to Praxis.**

Citizen Science can be defined as the participatory and combined effort in research, analysis and public education that strictly follows the guiding principle of striving towards collective well being of present and future generations of human beings all over the planet and the biosphere.

The Citizen Scientist, through particular skills in independent research and analysis, shall assist in protecting society from industrial, economic and social development patterns that are placing State or corporate interest above collective sustainable benefit.

The Citizen Scientist is the counter-expert par excellence.

The degree of development and characteristics of citizen science vary largely from one country to the other. While it is “rather” developed in countries like the US, Germany or the Netherlands it is practically non-existent in France and Japan. However, even in the best case, the total number per country of scientists that merit the term independent or citizen scientist remains extremely low – several hundred at best – compared to tens of thousands of scientists in academic, national or industry research.

Let me give you three examples of what I would consider typical citizen science projects I have been associated with:

- The risk analysis of an industrial waste treatment plant in the French city of Nantes that I directed in 1993 led to the entire 3 billion yen project being scrapped. The study was commissioned and financed by the city administration after strong citizen demand organized in local interest groups.

- The two-year international IMA Project (Comprehensive Social Impact Assessment of the Use of MOX Fuel in Light Water Reactors), in which I served Takagi-san as assistant director, was aimed at the licensing procedures for the first MOX fuel loadings into Japanese nuclear reactors. I do believe that the IMA Report, published in 1997, played a significant role in providing technical background for the subsequent – and still ongoing – controversy over MOX fuel in Japan. The project involved over 15 experts from 8 countries and was financed through Foundation and private funds.

- A few days before the terrorist attacks on the US on 11 September 2001, WISE-Paris completed a major study on “the possible toxic impacts of the nuclear reprocessing plants at Sellafield (UK) and Cap de La Hague (France)”, commissioned and financed by the Scientific and Technological Option Assessment Panel (STOA) of the European Parliament’s Directorate General for Research.

In the aftermath of 11 September 01, we publicly released 1 page from the main report and 1 page from the annexes of the 150-page study relevant to a potential accident at the La Hague spent fuel pools that concludes that the release of radioactive cesium could be several dozen times larger than in the case of Chernobyl. Subsequent research carried out by WISE-Paris, financed by Foundations in the framework of our Plutonium Project, into the specific effects of an airplane crash onto La Hague - an exercise later extended to the case of Sellafield - with the result that the consequences calculated in the accident scenario could even be exceeded significantly. One could say that the consequences of such a scenario would make the US terrorist attacks appear as a comma in history. More generally speaking, a targeted attack would turn every large-scale nuclear facility into a weapon of mass destruction.

The analysis got widespread international media coverage and resulted in the issue being discussed on top government levels, including the French Prime Minister’s office. The WISE-Paris briefings of officials and media activities played a clear role in the government decision to install anti-aircraft weapons at the La Hague site and to extend the no-fly zone from 100 m to 10 km around the site.

These cases illustrate “measurable” results of citizen science projects. Many projects do not have the same catchy effect but constitute rather a tool in a longer process of decision making or policy change.

### **Why are there so few Citizen Scientists?**

The lack of qualified citizen scientists is obvious everywhere. There are numerous ill advised policy decisions and industrial developments with devastating long term consequences, whether in the environmental, energy, defense or social fields. The civil societies ask for independent expertise and existing capacities are increasingly overworked and booked out.

So why are there not more citizen scientists? Frank von Hippel identified several reasons:

- “many scientists are pretty much totally absorbed by their science”;

- “most scientists have never learned how the democratic policy-making process works and how they could usefully contribute”;
- many scientists do not “go public” because they simply fear to get fired: “although the Bill of Rights guarantees US citizens freedom of speech, it does not guarantee that they will keep their jobs if they exercise this right”.
- “official” scientists and policy advisors tend to think that they lose their access to government if they go public,
- Finally, there is little confidence in the effect of public expression.

Lack of such confidence and psychological pressures of the established “scientist group” make it even more difficult to leave the establishment and a secure social situation. The group identification leads to the person leaving being considered as a traitor. An effective black listing system in certain industries – and the nuclear industry in particular – makes it practically impossible for someone who went public to find work, in particular if he or she had “blown the whistle” over specific technical problems.

As a result, many scientists who are sympathetic to the citizen science approach or who are even convinced of the ethical need for this approach are hesitating to even make the first step that is to defend a personal opinion against established university, corporate or State official line, leave alone to quit the job for an uncertain future.

Here is where the Takagi Fund can help. One of the functions should clearly be to encourage people to stand up for the research and analysis they have identified as important for collective benefit.

The position of the citizen scientist is not easy.

- Citizen scientists are often subject to corruption attempts – I was offered money twice if I had been ready to “doctor” research results, including once during the work on the chemical waste project mentioned above.
- Sometimes citizen scientists receive physical threats – as one of my close friends, a professor for biology in Argentina, who in August 2001 received death threats after he had publicly denounced that the local government was planning to sacrifice a natural reserve for a golf course.
- Citizen scientists are regularly accused, generally without reason, of scare-mongering, of exaggerating potential risks of a given policy.
- Citizen scientists are threatened with legal claims if they publish information – After having released the information on the La Hague accident scenario from the yet unpublished study mentioned above, I received a formal letter from the European Parliament forbidding any further release of parts of the report or of the entire report until the report has received the go-ahead from the oversight panel. (The Panel has voted since, on 23 October 2001, to publish our report.)
- Citizen scientists are constantly requested to do work that is either not paid for or under-funded. A couple of years ago I have been asked to appear as an expert witness at three occasions: in front of a Parliamentary Enquiry Committee into the fast breeder Superphénix, in the framework of a Prime Minister commissioned study into transparency and nuclear power and in the course of a government appointed evaluation of the reversibility of radioactive waste storage. Although they were expected to be of top professional quality, none of these contributions were to be paid for. I turned down all three invitations on the ground that I consider that independent professional expertise has to be financed, otherwise some lobby has to pay for it, which might put the very independence of the expert into question.

In order to be effective under these conditions, the citizen scientist has to be persistent, firm and precise. More than any other expert, he works under the constraint of having to avoid making errors. It takes many years to build up a reputation, but it sometimes takes a single stupid statement to ruin it.

The citizen scientist has to know what he does not know. And finally, he has to be eloquent, able to express sometimes complex technical issues in a way that the target group not only understands - whether politicians, experts or the general public - but can turn research and analysis into policy options.

Yes, it is not easy to become and remain a citizen scientist.

On the other side, what is more rewarding than being able to work every day in full accordance with ethical and political convictions, entirely free of that bad consciousness, so common in the traditional science arena?

What is better for your children than realizing that their parents simply do what they profoundly believe in? Finally, what is providing more satisfaction than realizing that one is actually able to have an impact – sometimes significant impact - on what is happening in this world?

#### US scientists Offer Support

In 1991, Frank von Hippel, published his book called “Citizen Scientist”. After having spent a couple of years as non-proliferation advisor to the White House during the Clinton administration, Frank went back to the Princeton University. He is also the Chairman of the Federation of American Scientists.

Frank von Hippel offers a dedicated copy of his book to the Board of the Takagi Fund for Citizen Science. Moreover, he offers to co-operate with the Takagi-Fund in order to identify potential future citizen scientists that could profit of a fellowship with research groups in the US or Europe and to assist the establishment of such research groups in Japan. This approach has been successfully implemented in Moscow, Shanghai and Beijing.

Two out of five Grant Programs the Takagi Fund launches today are aimed at the support of scientists from other Asian countries. The co-operation with existing initiatives is therefore also particularly important.

I have been contacted as well by the Washington based Union of Concerned Scientists in order to inquire whether the Takagi Fund could assist identifying a host organization and potential participants in a 6-day summer symposium for up to 40 people to encourage scientists to work on arms control and security issues, and to create an international community of such researchers.

These are very encouraging developments. They also demonstrate that there is great interest in international science communities to see independent science emerging in Japan. The launch of the Takagi Fund’s Grant Program shall be a signal that there is now a partner in the support of young scientists who wish to devote their future to the development of citizen science.

Takagi means “tall tree”. The tree is a symbol of natural strength, resistance, flexibility and persistence in time. I planted an oak tree in the memory of Jinzaburo Takagi and encourage everyone to plant a tree that will still be there for coming generations to remember this great man when we all will be already gone.

The Takagi Fund for Citizen Science is meant to help spread the seeds for future generations of citizen scientists. But the citizen scientist draws its legitimacy from the citizens. The explicit mandate and support must come from all of you.

Thank you.