

## Professors Hargittai

Magdolna Hargittai and István Hargittai are research professors associated with the Materials Structure and Modeling Research Group of the Hungarian Academy of Sciences (HAS), Budapest University of Technology and Economics, and are Full Members of HAS. They each have a number of degrees and memberships to their credit, and have worked not only in various departments in HAS and Hungary, but also as visiting professors of chemistry or visiting scientists in different universities across the world (see <http://www.amkcs.ch.bme.hu/HI/hargittai.html>; <http://www.amkcs.ch.bme.hu/HM/hm.html>).

Magdolna (MH) and István (IH) have spent decades in chemistry, and most of them as a married couple. They have worked together; initially they did joint research and wrote research papers together. Even after their research activities had diverged, they have done considerable joint work on interviewing eminent scientists and writing books on chemistry and symmetry (Box 1). They share the Szechenyi State Prize of Hungary (1996) and the Annual Science Communication Award of the Club of Hungarian Science Journalists (2011).

The couple was in India in September 2011 and gave the first two lectures of the Science and Society series organized by the National Centre for Biological Sciences (NCBS), Bangalore. While Magdolna spoke on women in science,

István narrated the story of the five 'Martians of Science'. Professors Hargittai spoke to *Current Science* via e-mail.

*Did you always want to study chemistry?*

MH: No. Originally I wanted to become an archaeologist. But then, considering the difficulties for such studies in a small country like Hungary, I decided on chemistry – and have not regretted it at all.

IH: When I was ten years old I won a city competition in mathematics and the prize was a chemistry book. This is how my interest turned toward chemistry and stayed with me ever since.

*How do you balance personal and professional life? There is a widespread notion that it is difficult for a couple to work together?*

MH: Is that really such a widespread notion? I do know several husband and wife teams that work together in harmony. For me there has never been any other way – I was my husband's first graduate student and after my PhD, I continued to work in his laboratory; so this is the only experience I have. Of course, I soon realized that in order to get any recognition at all, I have to have my own research field and I developed

that. Therefore, for the past several decades we have not worked together as far as our research is concerned. However, we still are in the same field, we discuss most of our results with each other and, what is important, we still love to have joint projects in our book writing.

So as to your question about 'balancing personal and professional life', for me the two can hardly be separated. For me the two together is the natural way.

IH: We enjoy working together and don't mind if our professional life penetrates our private life.

*Do you see your interest for chemistry in your children or grandchildren?*

Our son is also a chemistry professor; so obviously, we did have some influence; although it must have been only by example and not by trying to suggest to him to pick chemistry. Our daughter – although she did always well in the sciences – became a sociologist. Our grandchildren are too young to see any influence.

*What are your plans for the future?*

MH: Writing books on topics that I find exciting and challenging. My first goal is to write the book on women in science that I have been planning for years. I have been interested in this topic for quite a while, interviewed many famous woman scientists in different fields and gave lectures on this topic all over the world. It is obvious that women are painfully underrepresented in the sciences, especially at the higher echelons, and the more we draw attention to this, the better chance we have for change.

IH: I have become fascinated with broad aspects of 20th century science and have plans for books.

### On scientific discovery

*What qualities are necessary to do research?*

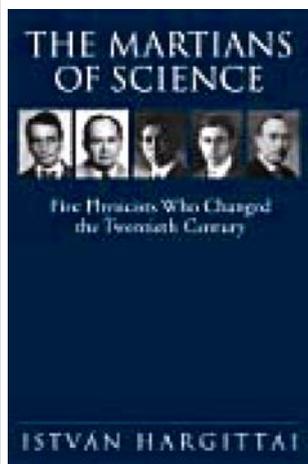
Drive and curiosity seem to be common traits among discoverers, but in most cases there is at least one more very



Magdolna Hargittai and István Hargittai

**Box 1.** Some books by Professors Hargittai.

István Hargittai, *Martians of Science: Five Physicists who Changed the Twentieth Century*

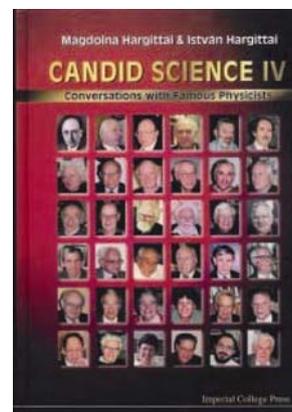


István describes the lives of five physicists – Theodore von Kármán, Leo Szilard, Eugene P. Wigner, John von Neumann and Edward Teller – and the lessons to be learnt from their story. These five Jewish Hungarians went from Budapest to Germany and then to the US; they had to become Americans before they could impact how the 20th century played out. Their diverse scientific contributions (ranging from aerodynamics, quantum mechanics, stored program computers, molecular biology, nuclear chain reaction to game theory) had fundamental value and significance for military defence. All of them were actively involved in the security of the US during and after World War II. They were ‘dedicated to the defense of democracy’ and were ready to endanger their scientific careers for the same.

Hargittai states that ‘it was their common interests in science and defense and their networking that made them a group’. He feels that a similar group of Martians may not be possible because, in addition to the individuals, the surroundings had also played a role.

Magdolna Hargittai and István Hargittai, *Candid Science IV: Conversations with Famous Physicists*.

The Hargittais present interviews with 36 physicists (many of them Nobel laureates) including Steven Weinberg, Gerard 't Hooft, Maurice Goldhaber, Robert W. Wilson, David E. Pritchard, Freeman J. Dyson and Jocelyn Bell Burnell. These conversations were conducted by Magdolna, István or both together. The talks bring out the interviewees’ personal backgrounds, their entry into physics, their choice of theoretical or experimental physics, their research and teaching, their mentors, students and heroes, their hobbies, the challenges they faced, science communication, politics and religion. The discussions range from the Standard Model, Higgs particle, quantum field theory, Theory of Everything, black holes, extraterrestrial intelligence, symmetry, chirality and pulsars.



pronounced characteristic. However, all these traits still don’t guarantee that one would make a discovery.

*Is the scientific discoverer a lonely person?*

Very much so because the discoverer knows something that nobody else does for a shorter or longer period.

*Who should decide the applications of inventions – scientists or society?*

Society, but the scientists must help making the members of society well informed.

*Does culture and environment influence discovery?*

Yes, a free and open society facilitates it. The more open and less regimented a society is, the better the chance for original thoughts and ideas to develop.

*Do overseas students and researchers perform better?*

Can’t make such a distinction.

**On the history of science and scientists**

*Why is the study of scientific history and scientists important?*

Apart from satisfying our curiosity, many things had been discovered that we might not be aware of without studying science history. But even from failures one can learn a great deal.

*Is the present trend towards or away from such study?*

Most people are – or think they are – too busy for studying history.

*What triggered your interest in this and how has it helped?*

IH: My interest was not so much in history per se than in the way discoveries happen.

**On writing**

*How do you prepare for an interview, especially on an unfamiliar subject?*

IH: I believe that a medium degree of preparation is ideal. If you are totally ignorant, you can’t make a truly in-depth interview. But if you are familiar with every minute detail of the interviewee’s life and oeuvre, the natural interest is gone and the interview may become boring.

MH: Yes, you have to be well prepared; otherwise you can only ask generalities. Obviously, the more you know about the interviewee, the more chance there is that you can get interesting answers in such details that are not known about

that particular scientist. I do not feel that knowing more about the interviewee would hurt the result.

*How do we develop skill in scientific writing?*

By reading a lot of books by authors whose writing you appreciate.

*Your advice when writing for children versus popular science articles versus research papers?*

IH: Each is difficult on its own merit; so each should be approached with equal willingness to work hard and with considerable humility.

MH: Obviously, the two are very different. I agree with István that humility is important, even or especially when writing for children. It is a mistake to think that writing for children is easy and a superficial knowledge of the subject is sufficient. In fact, you have to know what you are writing about deeply and broadly – only that can assure that children would enjoy reading it and learn from it.

### On symmetry in chemistry

*What triggered your interest in symmetry?*

IH: Initially, my interest in mathematics and in photography.

MH: Hard to say. Probably it was my interest in the structure of molecules and seeing how beautifully symmetrical most of them are. Also, the symmetry of flowers always fascinated me.

*How does symmetry help? Does it indicate fitness or increase stability or imply order?*

The question refers to different aspects of symmetry. Generally, it helps sys-

tematizing factual information and making deductions. In the case of molecules, for example, most often a more symmetrical molecule is, indeed, more stable because that particular configuration is energetically preferable. When you ask about order: yes, symmetry may mean order in a general term, although even chaos can be looked at as symmetrical.

*Is the concept of symmetry same in different fields?*

Basically yes, but its manifestation may be very different.

*How can symmetry link the two cultures of humanities and science?*

Exactly due to the fact that the basic symmetry principles are the same everywhere.

### On women in science

*Your interest in women scientists – what is the part played by role models?*

MH: My interest in the question of women in science has developed gradually. When I was young I was simply too busy with my family, with our children, my research, to notice this problem. It happened later and only gradually did I notice that something was wrong in this regard. During the years we worked on our *Candid Science* series (interviews with famous scientists), it gradually dawned on me how few women we have among our interviewees. Eventually, I decided to look into this question and the more I learned about it, the more convinced I became to look into this deeper and have to try to do something about it – of course, only within the means available to me, which I decided was giving lectures and writing about it. With my lectures I am trying to focus on the difficulties all women, famous and less famous alike, face. By talking about the

few truly successful women scientists, I am trying to give role models to young women who are interested in a science career, but are afraid that science is a field for men.

### On the Martians of Science

*What can we learn from the lives of the five ‘Martians of Science’<sup>1</sup>?*

IH: The basic message of their lives is that science is very important; but if and when the liberty of mankind and the survival of free society are threatened, scientists must risk their careers and work for the defence of their values. I provide details in my book *The Martians of Science* (Oxford University Press, 2006; 2007).

### Your advice to young scientists

- Try to find a good mentor, a recognized scientist, but also one with whom you feel comfortable.
- Never be afraid of asking questions. Asking good questions may be more important than finding the answers.
- Don't embark on a new problem before you unambiguously identify the problem you would like to solve.
- Don't be afraid of branching out in any direction in the process of your study.
- Truly, have an open eye and an open mind in every situation.

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1. István Hargittai uses this term to refer to a group of five scientists: (i) Theodore von Kármán (1881 Budapest–1963 Aachen, Germany), (ii) Leo Szilard (1898 Budapest–1964 La Jolla, California), (iii) Eugene P. Wigner (1902 Budapest–1995 Princeton, New Jersey), (iv) John von Neumann (1903 Budapest–1957 Washington, DC) and (v) Edward Teller (1908 Budapest–2003 Stanford, California).

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