

### Robbert Dijkgraaf: a Mathematical Physicist Throws the Windows Wide Open

Robbert Dijkgraaf (1960-), who took over as President of the Royal Netherlands Academy of Arts and Sciences (Koninklijke Nederlandse Akademie voor Wetenschappen, KNAW) on 19 May 2008, is a man of many talents. A brilliant mathematical physicist, he is a passionate champion of his own field of study and a talented populariser who has also made a name for himself as an artist. The youngest president in the history of the KNAW, Dijkgraaf is the ideal person to promote science in the Netherlands, with his great enthusiasm and strong sense of social responsibility.

While he was still at grammar school Dijkgraaf wrote computer programmes to calculate the orbit of a planet around a black hole. As a sixteen-year-old, he discovered the journal *Scientific American* and became fascinated by physics. He went on to study the subject at Utrecht, but lost interest because of a lack of intellectual challenge. After an interlude studying painting at the Gerrit Rietveld Academy in Amsterdam, however, Dijkgraaf returned to physics. In Utrecht he became a pupil of Nobel Prize winner Gerard 't Hooft. His doctoral thesis was on string theory, a cutting-edge branch of theoretical physics that currently attracts a great deal of interest and posits minuscule oscillating lines as the basis of nature. String theorists often come under fire because the theory operates with extra dimensions, not just the four dimensions of time and space that we are familiar with, and the energy required makes it practically impossible to prove the theory through experiment.

After a stimulating period as a postdoctoral fellow at Princeton, in 1992 Dijkgraaf was offered a professorship in Amsterdam. His colleagues at the Institute for Advanced Study, the research centre where Einstein had spent his later years, advised him against the move, arguing that Amsterdam had little to offer in the field of string theory and that you constantly had to submit proposals, whereas Princeton pampered its fellows. However, Dijkgraaf still chose to return to the Netherlands, partly because of his sentimental ties to

the country and also out of a sense of responsibility. Amsterdam now has an internationally renowned string-theory research group that is a match for the best in the world. For Dijkgraaf the fascination of string theory, the most extreme form of theoretical physics, lies in the way it asks the very biggest questions about nature and thereby creates a new mathematics.

Dijkgraaf feels that the most important qualities for a successful scientist are focus and daring. Strangely, the best ideas often seem to come when you're relaxing. You might suddenly find yourself taking a silly joke



Robbert Dijkgraaf with pupils of the Panta Rhei school in Coevorden on the occasion of their meteorology project.

about your research very seriously. You also have to be able to immerse yourself completely in your work. Dijkgraaf is at his best after ten in the evening, when his three children have settled for the night. Ideas never come to him when he's at his desk. However, Dijkgraaf describes the development of string theory as a very painful process, like digging a tunnel with no guarantee that you'll ever reach daylight. It's like creating a work of art: only when it's finished can you relax.

Dijkgraaf was appointed a 'university professor' in Amsterdam in 2005. This professorial rank carries more privileges than an ordinary professorship: a good deal of freedom, additional research funds and in many cases exemption from administrative work and

teaching duties. This means that Dijkgraaf is spared the fuss of paperwork and meetings and can dedicate himself to research. He also has an ambassadorial role, which he carries out with great enthusiasm. He writes a column for the Science and Education supplement of the daily *NRC Handelsblad*; is the chairman of the Commissie Bètacanon, a group that aims to promote essential basic scientific knowledge among the Dutch population; a member of the innovation platform headed by the Dutch Prime Minister Jan Peter Balkenende; editor of the *Amsterdamse Boekengids* (Amsterdam Book Guide); and he is also involved in secondary education.

In 2003 when Dijkgraaf won the Spinoza Prize, the highest scientific award in the Netherlands, he used the one and a half million euros not only to support groundbreaking string-theory research, but also to set up *proefjes.nl*, a virtual laboratory for ideas and experiments. This website is a fun way for children of eight and older to explore physics and chemistry. The children's television programme *Villa Achterwerk* has also adopted the initiative with great success.

Robbert Dijkgraaf is unique in his ability to convince the general public of the importance of science. Likeable and enthusiastic, with boyish enthusiasm and great verve, he has a talent for winning people over. In 2005 he appeared as a guest on the popular Dutch television slot *Zomergasten*, in which famous people put together an evening of entertainment consisting of their favourite shows and television moments. He delighted viewers with his original insights and his brilliant selection of films, including the funeral of Nobel Prize winner H.A. Lorentz in 1928. Dijkgraaf appears as an expert on *Hoe?Zo!*, a popular TV science programme, writes opinion pieces that can be both pointed and polite, and even managed to captivate pop fans at the Lowlands festival in Biddinghuizen.

In his acceptance speech as the new president of the KNAW, Dijkgraaf stressed the point that science in the Netherlands owes its strong position today to investments made in the past. However, current levels of research in the Netherlands, at universities and in industry, are among the lowest in Europe – and the rate of decline shows no sign of slackening. The KNAW has

its back to the wall, says Dijkgraaf. In order to put a halt to this attrition, he would like the KNAW to help bring together as many different parties as possible, with the aim of creating a common agenda. What is needed is a breath of fresh air, and Robbert Dijkgraaf, with his charm and energy, is the ideal person to throw the windows wide open.

Dirk van Delft

*Translated by Laura Watkinson*

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