DDB GROUP BELGIUM ***FocusEurope***
Rue Saint-Hubert 17
1150 Brussels - BELGIUM
Stéphane De Swaef
Tel direct +32 2 761 20 12
Email: s.deswaef@ddb.be

TRANSCRIPT «DESCARTES PRIZE FOR COLLABORATIVE RESEARCH 2005»

TC In: 00:03:00:00
TC Out: 00:43:03:18

Program duration : 40'04''

Introduction
Speaker
Tc in : 00:03:00:00
This year 10 projects are competing for the Descartes Prize for excellence and scientific research. We have interviewed to many scientists working on these transnational research projects among a short film about each of the candidates here they are.

Voice Over
Tc in : 00:03:18:00
René Descartes was a mathematician, a scientist and a philosopher – a European citizen and a great historical Figure of learning. The scientific award for excellence named after him realizes that science today is not the outcome of a single brilliant mind from a single country. The Descartes prize is awarded to teams of researchers that have achieved exceptional scientific or technological results through collective research in all fields of science including the social sciences.

Pulse: a telescope
Speaker
Tc In : 00:03:50:00
Technology makes it possible to explore space in different ways. Radio astronomy for example enables astronomers to observe special stars called pulsars. These neutron stars behave like an extremely accurate clock and by observing them, fundamental physical laws can be tested to determine the nature of the universe.

Voice Over :
Tc In : 00:04:12:00
Pulse gathers together the researchers from Manchester, Capoterra, Bonn, Dwingeloo, Thessaloniki,

Itv Andrew Lyne – University of Manchester
Tc In : 00:05:29:00
'Radio astronomy is using radio waves to study the universe, instead of optical waves, or x-rays, or ultra-violet. It is electro-magnetic radiation but they are very long wavelengths. And we see quite different phenomena when we look at the universe through radio eyes.'

Itv Andy Faulkner – University of Manchester
Tc In : 00:04:49:00
'Well, pulsars cannot be seen optically, they can really only be seen in radio waves, and sometimes in x-rays. We are able though to study pulsars, which are fairly weak radio emitters, and for that we need very big telescopes, like the level behind us.'

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Itv John Seiradakis – University of Thessaloniki
Tc In : 00:05:10:00
"Pulsars are created when a supernova explodes. The outer layers of the star begin to disintegrate, thus enabling the inner layers that make up the core to create a high-density neutron star. A pulsar. Pulsars are, in fact, minuscule stars with a diameter of between 10 and 20 kilometres.
They have a very powerful magnetic field. Due to their rapid rotation, they emit beams of light much like that of a beacon."

Itv Axel Jessner – Max Plank Institute for Radio Astronomy
Tc In : 00:05:52:00
"Pulsars are at the heart of modern physics.Over a very small range, we create extreme conditions in order to study them using condensed matter physics, quantum mechanics, the general relativity theory, electrodynamics and plasma physics. The conditions are so extreme that no lab on Earth could risk recreating them for research purposes without destroying our planet."

Itv Martha Burgay – Cagliari Astronomical Observatory
Tc In : 00:06:23:00
"At the end of 200 3, our research team discovered a unique system, a double pulsar. They'd been looking for one for 30 years, ever since the discovery of the first pulsar in a binary system."

Itv Andrea Possenti – Cagliari Astronomical Observatory
Tc In : 00:06:36:00
"The speed and the orientation of these stars are aligned, which increase the effects of relativity. This, in turn, confirms Einstein's predictions in a way no other system has up to now."

Itv Nicolo D'Amico - – Cagliari Astronomical Observatory
Tc In : 00:06:52:00
"What contributed significantly to the discovery of so many pulsars in a just few years, 800 in 10 years, are the multibeam receptors. They allow you to look at various parts of the sky at the same time.
With one telescope, you can investigate a number of pulsars with the help of a single large telescope. On the other hand, for the follow-up, you need several telescopes in the form of a European network."

Speaker
Pathfinder: a model of DNA
Tc in : 00:07:36:00
In Pathfinder, a group of researchers is studying the nuclear receptors found in human tissues. These receptors are lodged in the nucleus, not the surface of the cells. Nuclear receptors regulate the expression of certain genes. Pathfinder, has been looking deep into our DNA.

Voice Over
Tc In : 00:07:50:00
Pathfinder gathers together the researchers from Huddinge, Lyon, Thiais, Oslo, Turku, and Singapore.

Itv Vincent Laudet – Ecole Normale Supérieure de Lyon
Tc In : 00:08:15:00
"A nuclear receptor is a molecule that binds itself to another molecule, usually a hormone. It is nuclear, i.e. located within the cell nucleus. So it is capable of activating and directly regulating gene activity inside the cell rather than on its surface."

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Itv Jan-Ake Gustafsson – Karolinska Institute
Tc In : 00:08:35:00
"Receptors are important, both for the physiology and for the functioning of the cell with regard to sickness and health. In certain diseases, these receptors function badly. Here one can implement the key and lock mechanism, the key being the medication which the receptor carries, thus affecting its activity. One can apply this technique in the case of a number of diseases. The major discovery of the past ten years is that of the oestrogen receptor beta. Before that, we thought there was only the alpha receptor. But it was discovered that these two receptors, and this is the breakthrough, that they seemed to neutralize each other. This is very important in certain diseases. In certain cases, the alpha-nuclear receptor seems to trigger the development of cancer. Because of this finding, we can now come up with new drugs to treat a number of gynaecological disorders, for example."

Itv Sari Mäkelä – University of Turku
Tc In : 00:09:55:00
"*We're researching hormonodependent cancers and the nutritional factors that influence the receptors and how they increase the risk of cancer. We're hoping to find factors that reduce the risk of cancer, which is on the increas and for which we need to find ways to reduce the risk. Nutritional factors are one potential cause."*

Itv Vincent Laudet – Ecole Normale Supérieure de Lyon
Tc In : 00:10:24:00
"The purpose of our studies is to find a specific treatment for certain diseases which can minimize the side effects. For example, osteoporosis, which we'll be able to treat without increasing the risk of breast cancer. Or many metabolic problems such as obesity or diabetes. Receptors are at the very heart of these problems.
Many drugs that will be on the market in future for these diseases will be dependent on nuclear receptors."

Speaker
Ceca: a thermometer
Tc In : 00:11:05:00
Scientists working on the multidisciplinary CECA project are warning us. They have observed climate changes in the Arctic, particularly global warming due to greenhouse gases. The ice will soon disappear completely from this part of the world during the summer. The ecosystem is threatened, but not all the projections are negative.

Voice Over
Tc in : 00:11:26:00
Ceca gathers together the researchers from Bergen, Hamburg and Saint Petersburg.

Ola M. Johannessen – Nansen Environmental & Remote Sensing Center
Tc in : 00:11:38:00
'We are studying the global change in the artic, and in particular, we are focusing on climatical variability, what is called natural variability and what is caused by man-made influence. Since the industrial revolution that started some hundred years ago, the concentration in the atmosphere has increased by about thirty percent. We discovered that the ice was decreasing in the artic, particularly since 1970, and, by satellite measurement, we have shown that we have had a decrease of the ice cover of about 3% per decade. This is roughly the same area as France.'

'Our Russian, German and Norwegian team has worked for some ten years since the project started and it's also very valuable for us to have the Russian partners because this gives us access to a lot of data from the Russian artic which we did not have before and also, a lot of the Russian expertise.'

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'If we now use this data over the last hundred years, we use a climate model to validate the models and then we predict what will happen in the next hundred years and our prediction is that the ice cover will disappear during summertime by the end of the century, while, during winter, we'll only have a decrease of approximately 20%.'

'One of the negative consequences is that when the ice is melting, the melted water will be evacuated down the Norwegian Sea and stop some of the deep-water formations, which will affect the Gulf Stream. Polar bears live on the ice. They hunt seals and the decrease in ice cover will provoke the death of the 5000 polar bears living on the ice.'

'The positive consequence is that when the ice is retreating, you will open up easier transportation along the so-called northern sea route that is at the north of Russia. The other positive consequence is dealing with the energy supply, because, in the Norwegian and Russian artic, 25% of the remaining gas and oil resources is present. So when the ice is retreating, both exploration and production will be easier from the artic region.'

Speaker
Pitcid: a microscope
Tc in : 00:14:55:00
Chronic inflammation and allergies are the cause of many deaths today. Pictid is a basic research project that combines the knowledge of scientists working in a large pharmaceutical company and scientists from academic milieus.

Voice Over
Tc in : 00:15:09:00
Pitcid gathers together the researchers from Basel, Plan-les-Ouates, Torino, London, Jena, and madrid

Itv Mathhhias Wymann – university of Basel
Tc In : 00::15:26:00
"We started workingon P3 kinases in 1991. A short time later, we discovered that wortmannin, the first inhibitor of P3 kinase, could be used as an experimental substance to study these enzymes. Normally, when in a state of total equilibrium, the body needs the P3 kinase response in order to live. But illness causes an overstimulation of that response. Inflammatory cells are activated for far too long and can't defend the body against the invasion of foreign organisms that attack our tissues. This patient has rheumatoid arthritis.
Her white blood cells, called neutrophiles, have invaded her tissues and attacked the cartilage and bones. When we started to study these neutrophilic responses, we discovered that this, at the time unknown, substance Wortmannin inhibited P3 kinase activity. The interaction between industry and the university is fascinating. We learn a lot from each other. We exchange data and can conduct experiments which would be impossible to do purely on a university level."

Itv Jeffrey Shaw - Serono Pharmaceutical
Tc in : 00:17:14:00
'The three dimensional aspect is very important, it allows us to see depth, it allows us to see the interactions that the small molecules make on the surface of the protein, the hydraulical interactions, the charge interactions, all sorts of information is revealed with this technique. When trying to identify a small molecule in the centre of a molecule, usually the first step is the screening of a large library of small molecules. Once a small molecule is identified that interacts with the protein, that is when the ---- can kick in to precisely identify how the interaction takes place. And after that, with this information, the chemists can then proceed on designing the molecules themselves.'

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Christian Rommel – Serono Pharmaceutical
Tc In : 00:17:44:00
"One of the most successful milestones in this project was the computer-assisted track design technologies. We were not only able to crystallize protein tracking but also to co-crystallize the inhibitors. This has, in turn, helped to develop computed-assisted programs for the new generation of inhibitors."

Itv Mathhhias Wymann – university of Basel

Tc In : 00:18:05:00
"We hope that our basic research will help pharmaceutical firms to develop new drugs which will have an effect on the migration and proliferation of cells. And perhaps these substances will help prevent inflammatory and proliferative diseases."

Speaker
Tc In : 00:18:40:00
ESS: a microphone
We continue with a database meant for both scientists and European citizens. The European Social Survey project endeavours to monitor social change in Europe. Based on more than 50 000 interviews, ESS gives a scale of comparison of European social values. A new methodology to create a new reference barometer.

Voice Over
Tc in : 00:19:02:00
ESS gathers together the researchers from London, Mannheim, Den Haag, Amsterdam, Leuven, Bergen, Strasbourg.

Itv Roger Jowell – City University London
Tc In : 00:19:30:00
'It started in 2001, and it had two main purposes: the first was to set-up a project that would monitor, over time, changes in European attitudes and values. That's in many countries in Europe, there are now 25 countries or so, that are taking part. And the second purpose was to improve social measurement techniques in Europe.'

Itv Caroline Roberts – City University London
Tc In : 00:20:02:00
'To choose somebody to be interviewed, we take a random sample of the population, and we want to interview people who are aged between 15 and any age upwards. In the United Kingdom, we do that by taking a list of postcodes in the country and taking a random sample of households from that list of postcodes. But different methods have to be used in different countries, it really depends on the information we have available. But we use a very strict scientific method to ensure that the samples are comparable across the different countries, no matter how we select the sample in each country.'

Rory Fitzgerald – City University London
Tc In : 00:20:39:00
'Topics for the European social survey are chosen by a scientific advisory board, made up of representatives from around Europe, one representative from each country. And they choose the questions for the --- on politics, religion, and general social attitudes. And also, there's a competition where two teams are asked to design the bastions on immigration and citizenship.'

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Jaak Billiet – Catholic University of Leuven
Tc In : 00:21:00:00
"Considerable attention is now being paid to the quality of the data and to establishing possible sources of error with the aim of correcting them. Both with regard to random sample errors, by studying the non-respondents, and to the concepts, by using methods which allow us to gauge if the concepts mean the same thing."

Itv Peter Ph. Mohler – Zentrum für Umfragen, Methoden und Analysen
Tc In : 00:21:22:00
"Our team developed and implemented a new method of translation based on various theories. And we succeeded in eliminating certain problems: for instance, avoid translating the German sentence, "I like adventure" into "I like having adventures", which has a sexual connotation."

Itv Ineke A.L. Stoop – Social & Cultural Planning Office of the Netherlands
Tc In: 00:21:44:00
"We try to record all important events that happen in the countries. ESS deals with attitudes and values, which remain fairly constant, but something can happen in a country, such as the assassination of Theo van Gogh in Holland last year, that suddenly has a huge impact on public opinion regarding immigrants, as he was killed by a Muslim. But if you don't know that, you get differences between countries or times that you can't explain.
But if this event reporting occurs correctly, then you have an explanation."

Itv Roger Jowell – City University London
Tc In : 00:22:30:00

Speaker
TC In : 00:23:00:00
Tannin Adhesive: a piece of tree bark
The tannin contained in the bark of trees is a natural polymer. This is a non-toxic additive that can be used in the manufacture of furniture and wooden structures. In addition to the fact that it is not dangerous to health, it offers reduced production costs as compared to traditional methods. This is the subject of the Tannin Adhesive research project.

Voice Over
TC In : 00:23:18:00
Tannin Adhesive gathers together the researchers from Epinal, Biel, Kyoto, S. Michele Mondovi.

Itv Antonio Pizzi – School of Wood Science & Timber Engineering
Tc In : 00:23:35:00
"--- on wood products, and particularly in manufacturing adhesives – natural adhesives – to bond wood boards, like particle boards, plywood and other materials of this kind.'

'We discovered with tannin, a natural material that comes from the bark of the trees, that tannin could be used alone or with environmentally friendly hardener, as glues for wood, because they work very very well.'

Itv Gianpaolo Benevento - Silvachimica
Tc In : 00:24:06:00
"Tannin is a renewable source which comes primarily from cultivated materials that can be gathered over time and then renewed. With tannin, you can manufacture boards and panels without any ensuing formaldehyde emissions, as it is non-toxic."

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Itv Antonio Pizzi – School of Wood Science & Timber Engineering
Tc In : 00:24:25:00
'The main kind of tannin we use at the moment, that comes from the bark of the mimosa, we are using pine tannin, you know, from the bark of the pine tree, all the world has got pine tannins, and sometimes we use --- tannin from the barks of ----.'

'To make glue starting from tannin, you actually take the tannin and you treat that for viscosity or --- to decrease the viscosity. You heat it or do something to add. After that, you add the hardener, and the glue is ready. You actually apply it on the timber, and then you press it until it hardens, at high pressure and high temperature, like you do for normal boards with normal adhesives. So the adhesive itself --- some few modifications, is actually manufactured by the tree itself, and not by chemical manufacturing.'

'There are several breakthroughs. The first one is the natural utilisation of tannin by outer condensation by itself. As glue, it works. Then, to the use of a hardener, that actually gives you a better board, better chemical resistance, and then, we can actually use this product with much lower pressure, that brings automatically when it presses, where the frames are much lighter, and the material is much cheaper. If it used to cost a minimum of a million euros, it will cost much less. The last is of course steam injection to make the pressing much faster.'

'At the moment, the main application for this new technology is actually in Japan for the fabrication, for the manufacturing of the poles and the panels for the Japanese wooden houses. The hope for the future is that if we have an equally severe legislation as in Japan, the indications are all there that this actually is the case, that the technology will be adopted in Europe. There is a rigorous Swedish company well on the way to use this technology in Europe as well."

Speaker
Tc In : 00:26:35:00
Europid: seeking balance
The human immune system is at times in an unstable equilibrium**.** Immune deficiencies can lead to extremely rare infectious diseases. Researchers at Europid have identified and described some twenty molecular defections and have succeeded in treating one of these rare diseases that principally affects children. The technique consists of replacing the defective gene by a healthy gene.

Voice Over
Tc in : 00:27:00:00
Europid gathers together researchers from Paris, Segrate, Brescia , London, Stockholm.

Itv Alain Fischer – Université René Descartes / Inserm
Tc In: 00:27:15:00
"Our work group consists of seven European teams who are interested in genetic diseases that affect the immune system which protects us against infectious agents. Fortunately, many of these diseases are quite rare.
They often affect children, sometimes adults. The body has no defences against them. These are immune deficiency diseases. Innate immunity is very old in terms of evolution. It's found in plants, in human beings, in mammals, and is linked to white blood cells, polynuclear cells and macrophages. Then you have adaptative immunity, which appeared recently in terms of evolution, 400 million years ago. It is linked to lymphocytes, a more sophisticated system of recognizing foreign organisms. We're trying to characterize the genetic and molecular mechanisms which cause patients to develop a deficiency in one of these systems. We're trying to focus on characterizing the mutating gene in a certain number of diseases. It's the work of geneticists to identify this gene and the mutations, if unknown, as well as to find out the exact purpose of the protein coded by this gene in the immune response. For example, what is its role in the production of T lymphocytes? How is it produced? The work of geneticist is often carried out on mice. They reproduce the human disease in mice in modified form so that they can study the response of their immune systems.

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The patients are scattered all over Europe, so we need expert centres that collaborate, bringing together groups of patients for which very precise data can be gathered. And research must continue into certain genetic diseases, such as into immunoglobulin in Sweden. Or into the anomalies in the development of T lymphocytes in Italy, in Brescia or Milan. Or into other diseases relating to innate immunity at the two centres in Paris.
Other therapies, such as genetic therapy, are being developed in collaboration with London, Paris and Brescia. Today we can successfully treat one disease: severe combined immunodeficiency. The total absence of T lymphocytes is not compatible with life a few months after birth. There is a long-term cure for this disease. But we've noticed that these treatments cause complications in some children, so now we need to find a new way of modifying the procedure. We're working together with our British colleagues to find a better, but just as effective, treatment."

Speaker
Hidemar: a hard disc
Tc : 00:30:36:00
Smaller and smaller – an essential rule for new technologies in general and hard discs in particular. But there are physical limits to the capacity to store data. Thanks to a new technique, scientists have improved those limits. The Hidemar research scientists have given their names to this so-called perpendicular technology.

Voice Over
Tc in : 00:30: 54:00
Hidemar gathers together researchers from Rome, Cornaredo, Athens, Paris, Madrid, Wien, and Bazers.

Itv Stefan Seifried - Unaxis
Tc In : 00:31:17:00
"The future of the hard disk's capacity looks very positive. Storage capacity has doubled every year over the last ten years. But this technology has reached its limit physically. It's time for a new technology. Consumer applications such as the MP3 player or game consoles require more and more storage capacity. Our company's project, Hidemar, has developed a new sputter system called Racetrack, which is able to meet the demands of this new market."

Itv Fernando Briones - Microelectronica Institute of Madrid
Tc In : 00: 00:31:52:00
"When you try to store information on a hard disk with a high-density capacity of 100 gigabytes per cm², the problem is that the thermal fluctuations at ambient temperatures delete the information, since one byte has its own nanometric size. That is the superparamagnetic limit which we are trying to reverse within the framework of this project by using two approximations. One with high-energy magnetic nanoparticles, at a high perpendicular anisotropy. The other with nanostructures deposited on an ultrafine film similar to that used in industry today."

Itv Hartmut Rohrmann - Unaxis
Tc In : 00:32:42:00
"We must increase the magnetic energy of each magnetic byte, but then they can't be written to using standard technology. That's why we have to switch to vertical magnetisation in order to store data, which will double or triple current writing capacity and allow us to make the technology's magnetisation more stable. The current work on increasing vertical memory density involves researching high anisotropic, magnetic alloys and multilayers. Our project places particular emphasis on multilayers where cobalt-palladium layers, only one atom thick, can achieve extremely stable magnetisation."

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Itv Marisol Martin – Microelectronica Institute of Madrid
Tc In : 00:33:33:00
"Collaboration is very important to us. One person alone can't develop such a project by himself. It is crucial to be able to work together with leading firms within the industry in order to obtain information and orient our research to what exists or will exist on the market in future.

Itv Hartmut Rohrmann - Unaxis
Tc In : 00:34:08:00
"Vertical data storage is, of course, not the final answer for the future.To increase capacity further, we need to add pre-imprinted byte structures to the hard disk. One way would be by means of nanolithography, the other by adding autonomously organised nanoparticles to a disk."

Speaker
Tc In: 00:34:33:00
Hess: a movie camera
A movie camera like the one we use to film daily life. But technology can go much further. The scientists working on the Hess project have developed sophisticated, extremely sensitive cameras with the objective of recording gamma rays traveling through the universe by observing them on the earth's surface.

Voice over
Tc in : 00:34:54:00
Hess gathers together researchers from Paris, Gif –sur -Yvette, Durham; Berlin, Heidelberg, Hamburg, Bochum, Dublin, Prague and Potchfstroom.

Itv Heinrich J. Völk – Max Plank Institute for Nuclear Physics
Tc In : 00:35:39:00
*"HESS is a project involving high-energy astrophysics in which optical telescopes are used to study the processes in the universe that are highest in energy.***"**

Itv Werne Hofmann – Max Plank Institute for Nuclear Physics
Tc In : 00:35:50:00
"*The gamma rays observed are generated by very specific celestial objects, for example exploding stars. Withour telescopes we can measure the direction and energy of the rays, reproduce the source and thus better understand what is going on.."*

Itv Paula Chadwick – University of Durham
Tc in : 00:36:13:00
'When a gamma ray comes into the upper atmosphere, it produces a cascade of particles. When that happens, we get the light equivalent of a sonic boom. If you take an aeroplane, and it moves faster than the speed of sound, you get a Bang! Now if you take a particle, and if it moves faster than the speed of light, you get a flash of light, and that's called Cherenkov light, named after the person who discovered it. And so, what we do is we actually detract this flash of light. It's blue, it lasts a few millionth of a second, and it's very faint, it is about one thousandth of a starlight.'

Itv German Hermann – Max Plank Institute for Nuclear Physics
Tc In : 00:36:50:00
"*Our telescopes, which have reflectors which are about 100 m² in size focus the light from air showers, called Cherenkov light, on a camera situated in the focus plane of the telescope.*
These are special cameras with an exposure time of only a sixteen billionth of a second that make it possible to photograph these extremely short flashes of light. Various parts of the telescope system were made by different groups. The electronic components of the camera were built by our colleagues in Paris. The photomultiplier and the high-tension system were supplied by and calibrated and tested in Heidelberg and installed in France. The reflectors were made by Armenian and Czechoslovakian firms. They were tested here in Heidelberg, then built into the telescope in Namibia."

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Itv Bruno Khelifi – Centre National de la Recherche Scientifique
Tc In : 00:37:48:00
"The first thing we discovered was a hitherto unknown sky. Depending on the objects being observed, we can study different phenomena. For example, with objects that are very far away, outside our galaxy, we are trying to understand how gamma rays are propagated all the way to the earth. On the other hand, with objects in our galaxy, such as dead stars or neutron stars, we're studying what happens inside and around these objects, how particles are accelerated. Since our telescope has only been in operation for one and a half years, we are only now producing scientific results. They are very promising."

Speaker
Tc In : 00:38:38:00
Exel: an antenna
We finish with a discovery that will open up a new field of investigation in modern physics. Exel researchers are developing a new kind of composite materials called metamaterials or left-handed materials. They have surprising characteristics including better conduction of electromagnetic signals. These objects have a particular feature: negative refraction.

Voice Over
Tc In : 00:39:02:00
Exel gathers together researchers from Heraklion, London, Ankara, Karlsruhe, Durham.

Itv Costas Soukoulis – Foundation for Research and Technology
Tc In *:* 00:39:15:00
"*I met two members of the programme in California in 1999, John Pendry and David Smith, at a conference dealing with this programme. We got involved in metamaterials and negative refraction. What's all this about? As we learnt in primary school, if you put a pencil in water, you will get a refraction. If you try to obtain materials with a negative refractive index, they will be refracted in a negative way."*

Itv Maria Kafesaki – Foundation for Research and Technology
Tc In : 00:39:54:00
"Negative refraction takes place when a wave strikes a surface, and the refracted ray points in the same direction as the ray descending vertically in relation to the surface".

Itv Nikos Katsarakis – Foundation for Research and Technology
Tc In : 00: 40:11:00
"These are metamaterials. They consist of composite resonators and continuous threads. Put together, they produce negative refraction. And they can be used in a number of technological applications. These metamaterials function at gigahertz frequencies. They're made up of five honeycomb-like units positioned in the direction of the electromagnetic ray. We analyze their reflexivity at a frequency in the gigahertz range. For materials in the micron range, we use higher frequencies in the terahertz range, using an ultrared spectrometer."

Itv Stefan Linden – University of Karlsruhe
TC In : 00:41:08:00
"To produce our samples, we use electronic-beam lithography in order to obtain structures that are less than 100 nanometres. A thin layer of varnish is applied to the substrate during centrifugation. This varnish is exposed using a computer-controlled electronic beam and is then developed. We add a layer of gold by means of vaporisation and remove the varnish."

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Itv Maria Kafesaki – Foundation for Research and Technology
Tc In : 00:41:39:00
"Before I talk about the applications, one of the reasons we are studying them is their very interesting physical characteristics. It is a new branch of physics with many new phenomena and is of interest to theoretical physicists."

Ekmel Özbay – Bilkent University
Tc In : 00:41:52:00
"Metamaterials can be used, at various wavelengths, for wireless transmission, in that network capacity can be multiplied 100 times. It can also be used in the production of DVDs. The capacity of the DVD can be increase to record 100 times more information."

Mike Witlshire – Imperial College London
Tc In : 00:42:13:00
"Magnetic resonance imaging requires the use of very large magnetic fields and magnetic materials to text the signals in the machine, so we need to use a meta-material, which is not magnetic but behaves in a magnetic way, that behaves like an aerial in a magnetic resonance machine so it can improve the sensitivity and help us to develop new imaging techniques in our machines."

Voice Over :
Tc in : 00:42:40:00
Hess, Exel, Tannin Adhesive, Ceca, Europid, Pitcid, Hidemar, Pulse, Ess and Pathfinder are the 10 finalists and prizewinners for the Descartes Prize 2005.

Tc Out : 00:44:03:18