

Max Planck Research Award 2010

The prize of 1.5 million euros goes to Sebastian Thrun and Bernhard Schölkopf



The two award winners: Sebastian Thrun (left) and Bernhard Schölkopf.

Intelligent systems can optimize themselves in such a way that they can operate successfully in a changing environment. Sebastian Thrun teaches and researches at Stanford University. His main interest is robotic systems that are able to learn and move independently. Thrun was able to demonstrate that it is possible to use a mobile robot to create a map of the surroundings without the availability of prior knowledge, and to effectively estimate the robot's position and orientation. In 1997, he

help traffic flow more efficiently. "Stanley," the driverless SUV developed by his team, covered a distance of more than 125 miles of rough terrain across the Mojave Desert in 2005. Seven test cars are currently navigating California's road system and have already traveled more than 125,000 miles. These vehicles can detect their surroundings using laser scanners and cameras, and respond to any situation in accordance with the relevant traffic regulations.

developed the robot called "Rhino," which was capable of providing a guided tour of the Deutsches Museum in Bonn. The findings of Thrun's research have also been used in the development of autonomous vehicles. Intelligent driver-assistance systems are designed to reduce the number of road fatalities and

Bernhard Schölkopf is a Director at the Max Planck Institute for Intelligent Systems in Tübingen and one of Europe's leading researchers in machine learning. He researches computational methods, known as algorithms, that can be used to program computers to enable them to respond flexibly to new situations. Schölkopf's research findings have made algorithms for machine learning more efficient. For example, he analyzed and considerably expanded knowledge of support vector methods, which can be used to help computers recognize faces in photos more quickly. He has also found a way to work with far fewer support vectors, which simplifies the decision about whether a segment of a photo contains a face. This means that photos can be analyzed 30 times faster than with an analysis using all of the support vectors. Support vectors can also be used to identify genes. The genetic profiles of patients with known diagnoses are also examples of where an algorithm can predict the diagnosis of patients with different genetic profiles.

Zoo Turned Ark

Max Planck researchers urge greater role for zoos

Zoological gardens are somewhat controversial. In particular, animal rights activists criticize them for keeping animals in conditions that are not suitable for their species. "Zoos play an important role in conserving threatened species," emphasize Dalia Conde and Alexander Scheuerlein from the Max Planck Institute for Demographic Research in Rostock. A study carried out by the researchers shows that zoos house 20 to 25 percent of threatened mammal species, 9 to 18 percent of threatened bird species and 18 to 50 percent of threatened reptile species. Zoos offer animals a refuge until they are ready to survive in the wild again and can be released into their natural habitats. The researchers are calling



The Californian condor and Przewalski's horse were successfully bred in zoos and then released into the wild.

for the establishment of specialist zoos that focus on the breeding of just one or a small number of species, with the aim of increasing breeding success. Examples of animal species whose risk status has been downgraded thanks to zoological gardens are the Asian wild horse (Przewalski's horse) and the Californian condor.

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Living on the Edge

Experts from all over the world meet in Berlin at the 4th Max Planck Symposium: "Life under extreme conditions"



Tubeworms have adapted perfectly to their deep-sea habitat.

Over the course of evolution, almost everywhere on our planet has been colonized – even those places considered to be extremely hostile to life. Microorganisms live in boiling volcanic water, for instance, as well as in cold marine sediment hundreds of meters thick in the depths of the oceans. As John Parkes from Cardiff University reported, their distribution and activity there depends on environmental factors and their access to certain energy sources. According to Peter Girguis of Harvard University, however, some enter into symbiotic relationships and, in this way, make themselves independent of external energy sources, operating their own power plant as it were. Microorganisms such as halobacteria have developed particular strategies in order to survive extremely high salt concentrations like those that prevail in salt ponds or in the Dead Sea. Dieter Oesterhelt summarized the results of de-

acades of research carried out at the Max Planck Institute of Biochemistry: these microorganisms manage to survive in such extreme conditions thanks to an appropriate membrane structure and a special form of breathing. Both vertebrates and invertebrates can also make inroads into extreme areas. For example, as Arthur deVries from the University of Illinois reported, fish in Arctic waters virtually produce their own natural antifreeze protection. These extraordinary abilities of organisms are very interesting for basic research, as the limits of their ability to adapt can be traced back to the properties of life's building blocks. However, they also yield potential innovative technical applications. For example, bacteriorhodopsin, a protein pump in the membrane of halobacteria first described by Oesterhelt and his team, is also suitable as a recording medium in holography, and a patent was filed for it in 1991.

Southern Sudan – Fit for the Future

Max Planck researchers in Heidelberg involved in drafting transitional constitution

In a referendum held in January 2011, an overwhelming majority (98.83 percent) of the Southern Sudanese population voted in favor of an independent state. At a conference held in Heidelberg from March 8 to 12, 2011, Southern Sudanese legal experts and parliamentarians, together with international experts, drafted a transitional constitution under the guidance of Rüdiger Wolfrum. According to Wolfrum, it was clear from the consultations that there was a desire for a structure based on the rule of law and democracy. As there was not enough time for a comprehensive constitutional process before the country became independent in July, a transitional constitution was drafted. A key element in the foundation of a state is the creation of a constitutional framework, guaranteeing that the new state is based on democracy and the rule of law. The subject of future dealings with Northern Sudan, particularly in relation to issues such as state succession, future citizenship, the sharing of natural resources and the cross-border movement of nomads, was also on the agenda. The Max Planck Institute for Comparative Public Law and International Law has been actively involved in a number of projects in Sudan since 2002.



Intelligent Systems in Stuttgart

New direction for Max Planck Institute for Metals Research

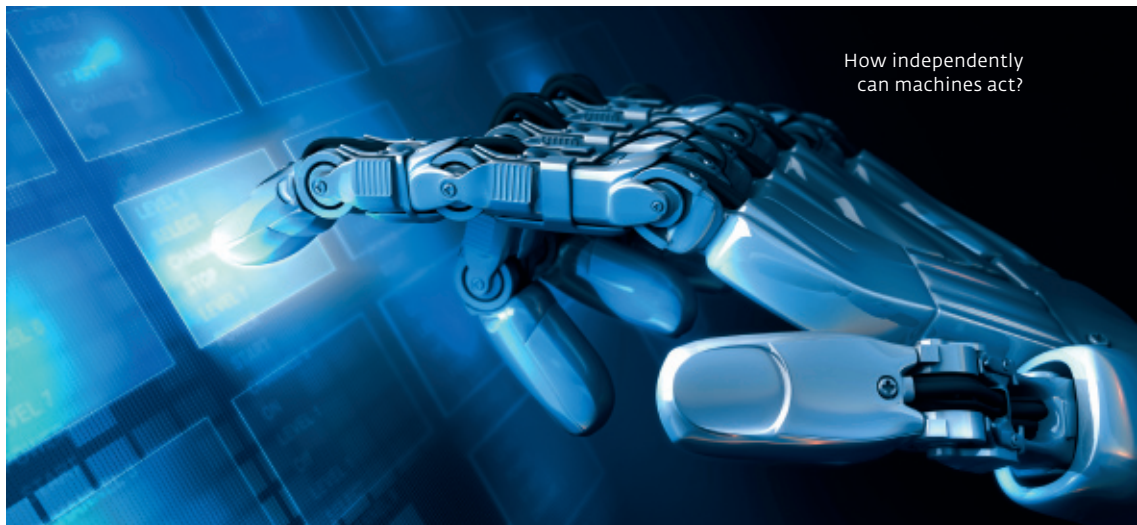
The new focus of research includes computer science and biology, as well as the areas of materials research that were already established at the institute. In addition to the Stuttgart location, a new division of the institute is under construction in Tübingen. Each site will have four research departments. The German federal state of Baden-Württemberg has allocated special financing of 41 million euros for the project. Along with a new research direction, the institute will also get a new

name: The Max Planck Institute for Intelligent Systems. The Founding Directors include Bernhard Schölkopf, previously a researcher at the Max Planck Institute for Biological Cybernetics in Tübingen, Joachim P. Spatz from the Max Planck Institute for Metals Research, and Michael J. Black from Brown University, USA. Black's appointment brings one of the world's leading experts in machine vision to

the helm of the new institute. The computer scientist took up his position in Tübingen on January 1, 2011. Other appointments will follow.

The new institute has a globally unique selling point: it is the first institution ever to accommodate, under one roof, software and hardware expertise in three key aspects of intelligent systems: perception, learning and action. Machine learning, image rec-

ognition, robotics and biological systems will be studied in Tübingen, while "learning material systems," micro- and nanorobotics and self-organization will be explored in Stuttgart. Although the focus will be on basic research, there is also great potential for practical applications at the institute, for instance in robotics, medical technology and innovative technologies that are based on new materials.



How independently can machines act?

Benefits of the Genetic Material Data Flood

Max Planck Institute for Molecular Genetics coordinates European infrastructure for sequencing and genotyping

The European Sequencing and Genotyping Infrastructure project (ESGI) is coordinated by the Max Planck Institute for Molecular Genetics and will be funded for four years as part of the EU's Seventh Framework Programme. The project brings together researchers from Austria, Spain, France, Germany, Sweden and the UK. ESGI aims to consolidate Europe's position as a world leader in genetics, genomics and molecular biology. Research infrastructures are crucial in ensuring that scientists reap the greatest benefits from the huge quantity of data that is generated every day. For example, sequencing a genome previously took years; now it can be done in a matter of hours. The

flood of data generated in sequencing and genotyping experiments must be managed cooperatively, as no single institution working on its own can handle such masses of information and simultaneously keep up with evolving technical challenges.

ESGI partners are focusing their attention on integrating and standardizing current and emerging technologies. "The infrastructure is designed to expedite research in the life sciences in Europe," explained project coordinator Sascha Sauer. ESGI aims to make it possible for scientists across all disciplines to use emerging technologies to decipher the complex functions of genes in a cost-effective way.

Take a Bow!

Max Planck Society's press office awarded two prizes

Together with colleagues from the Max Planck Institute for Evolutionary Anthropology in Leipzig, the press office at the Max Planck Society has won the idw's first prize for scientific communication. The prize is awarded in recognition of press releases published in the idw in 2010 "that are marked by their professionalism (quality), outstanding news value (relevance) and scientific importance (originality)." The MPS received its prize for the press release dated May 6, 2010 entitled "The Neanderthal in Us". idw (Informationsdienst Wissenschaft e. V.) is one of the most important Internet platforms for news from universities and the scientific community in German-speaking countries, and includes around 850 scientific facilities among its members.

MAXPLANCKRESEARCH also scooped up a prize: the Max Planck Society's research magazine was presented with an "Award of Excellence" as part of the first International Corporate Media Award. A total of 194 publications from seven countries were submitted. Max-PlanckResearch's contribution



Science – communicated superbly:
The Max Planck Society received first prize from the idw for a press release.



Science – illustrated superbly: MAXPLANCKRESEARCH received the „Award of Excellence“ for its visual merit.

impressed "with the manner in which the magazine utilizes images. Abstract contents were illustrated very well. In addition, images showing scientists within the context of their research work were well chosen and integrated into the page layout. MAXPLANCKRESEARCH provides an excellent overview of the broad spectrum of the Max Planck Society's field of activity," the jury found.

On the Net



BirthDay Podcast for Feodor Lynen

Feodor Lynen, winner of the Nobel Prize for Medicine in 1964, would have been 100 years old this year. The biochemist deciphered the role of activated acetic acid in fatty acid metabolism and laid the foundations for the development of drugs to fight arteriosclerosis and excessive blood cholesterol. A new podcast (in German) in the "Echt nobel" (Truly nobel) series recalls this extraordinary scientist: www.mpg.de/1330934/Feodor_Lynen

Focus on People

The intellectually curious will have the opportunity to go on a voyage of discovery on the island of Mainau between May 20 and September 4, 2011. Visitors to any of the 20 pavilions will be amazed at the experiments, simulations and exhibits on the subject of health. The exhibition, in which the Max Planck Society is once again involved, provides schools with a broad range of activities and workshops, such as a "health rally." Take a virtual tour of the pavilions at: www.mainau-entdeckungen.de

Patent Twitter

Markus Berninger, who works at Max Planck Innovation in Munich, tweets about inventions, patents and the transfer of technology and knowledge at the Max Planck Society. His Twitter streams (in English) are very popular and he quickly acquired more than 1,300 followers in science and industry:

www.twitter.com/MP_Innovation