News from the INSTITUTES

MAX PLANCK INSTITUTE FOR MOLECULAR GENETICS

Canadian Prime Minister Visits Institute

On February 19th 2002, the Canadian Prime Minister Jean Chrétien and the Canadian Ambassador to Germany, Marie Bernard-Meunier, paid a visit to the Max Planck Institute for Molecular Genetics in Berlin. During his visit, the Prime Minister witnessed the signing of a 'Memorandum of Understanding on Elucidation of Human Genetic Disease using Genomic Technologies'.

Steve Scherer from the Canadian Institutes for Health Research (CIHR) - Institute of Genetics, Ron Woznow, CEO of the Canadian Genetics Diseases Network, and Hans-Hilger Ropers, Managing Director of the Max Planck Institute for Molecular Genetics (seated, from left) sign the collaborative agreement under the watchful gaze of Canadian Prime Minister Jean Chrétien (standing, left) and President-elect of the Max Planck Society, Peter Gruss.

PHOTO: MPI FOR MOLECULAR GENETICS

The parties to this agreement are the Max Planck Institute for Molecular Genetics, Berlin, the Canadian Institutes of Health Research (CIHR) – Institute of Genetics, and the Canadian Genetics Diseases Network (CGDN). The signatories on the Canadian side were Ron Woznow, CEO of the 'Network' and Steve Scherer, representing the CIHR. The signatory for the Max-Planck-Institute was Managing Director Hans-Hilger Ropers.

Accordings to the initiators, the Memorandum shall lead to joint collaboration between Canadian and German scientists in order to catalyse the rate of discovery of disease-causing genes, benefitting the health of citizen worldwide. It concentrates especially on the large-scale elucidation of human genetic diseases, the development of new genomic methodologies and clinical resources databanks to enhance gene identification, and the dissection of complex diseases through the study of single gene disorders and mouse models of humans conditions. The Memorandum also includes the enhancement of collaborative activities through joint seminars and workshops, the exchange of scientists between institutions, and reciprocal support in the training of students and young scientists.

"In addition to the expected benefits for health care, this collaboration will provide new insights into the molecular processes of life", said Dr. Ropers. After the agreement was signed, Jean Chrétien gave a short speech congratulating the heads of the Institutes on their collaboration. MPI directors Hans-Hilger Ropers, Hans Lehrach, and Martin Vingron subsequently took their Canadian guests on a tour of the Institute. The Max Planck Institute for Molecular Genetics carries out top level international research in the fields of genome analysis, the exploration of molecular causes of human hereditary disorders, and computational molecular biology. Prime Minister Chrétien caught a glimpse of their every day work when he participated in isolating genomic DNA in the laboratory.

The Max-Planck-Institute for Molecular Genetics is recognized internationally as a key player in the development of automated and miniaturized genome analysis. Robots specifically developed for this purpose provided a further highlight for the Canadian visitors. Other recent success stories include the institute's major contribution to the decoding of Chromosome 21, as well as the continuous inroads made in elucidating the action of various antibiotics. ●

EUROPEAN WORKSHOP

Research into Plants is Set to Thrive

Researchers in Golm cultivate *Arabidopsis* in the greenhouse.

PHOTO: MPI OF MOLECULAR PLANT PHYSIOLOGY

In late November 2001, scientists, politicians, and representatives of industrial and consumer associations participated in a workshop in Brussels which highlighted the importance of research into plants for Europe, and discussed the possibility of an "integrated project" in the field of "Plant Functional Genomics". The workshop was organised by the Max Planck Institute of Molecular Plant Physiology in Golm and the European Plant Science Organisation (EPSO).

The first draft of the 6th European Research Framework Programme (FP6) for 2002 - 2006 provided a backdrop for this workshop. From the point of view of research and many industrial and consumer organisations, this did not take sufficient consideration of the plant sciences. The aim of the workshop therefore was to highlight approaches in the area of plant genome research, introduce possible 'integrated projects' for the FP6 based on concrete project ideas, and finally, to demonstrate the willingness of the scientific community to contribute to the shaping of a Europe-wide sphere of research.

The workshop was attended by scientists from renowned institutes. The European industrial and consumer associations EuropaBio, BEUC, and AEC as well as a representative of Germany's Small and Medium Sized Enterprise Association (Kleine und Mittelständische Unternehmen (KMU)) supported their plans for a discussion on the need and feasibility of Europe-based plant genome research. Many of the participants have already forged links to each other through their membership of EPSO. Furthermore, the presence of many politicians – including Research Commissioner Philippe Busquin, Cabinet Member Kurt Vandenberghe, and Bruno Hansen, Managing Director of E Life Sciences – demonstrated their approval of this plan. MEPs and members of the ITRE Committee also attended the gathering.

During the half-day workshop, an introduction of the core subjects of a possible "integrated project" for FP6 was achieved through the scientific presentation of many areas in which research into plant genomes is expected to continue to play a role in the European scientific community as well as for Europe as a place of science. The Max Planck Institute of Molecular Plant Physiology in Golm is prepared to coordinate this project in close collaboration with other interested industrial and scientific institutes, organisations, and associations. The additional management tasks this brings with it could be taken on by the Institute's EU Liaison Officer, whose employment has been made possible by start-up financing provided by the Max Planck Society. In order that the 6th Framework Programme does justice to the aim of an interdisciplinary approach together with a stronger consideration of consumer interests, the "integrated project" should include contributions from industry and consumer and plant breeding organisations. ●

@ For more information on the Internet: www.epsoweb.org www.mpimp-golm.mpg.de

COOPERATION

Science Network for the Balkans

After years of war and destruction the countries that made up the former Yugoslavia face a new beginning. This is also true for the sciences. Three years ago Julius Wess, Director of the Max Planck Institute for Physics in Munich, learnt the extent of the drama for himself. As a result, he founded "Scientists for Global Responsibility" ("Wissenschaftler in globaler Verantwortung" (WIGV)) to help bring colleagues in Southeast Europe back up to international standards. The development of a high-powered information network for the countries of Southeast Europe is the organisation's most ambitious project.

So far, the group's scientific contacts have been limited to the fields of physics and mathematics, since these disciplines have always worked closely with western scientists. In fact, in 1954 Yugoslavia was one of the countries that participated in the establishment of the European particle research facility CERN in Geneva. However, during the last ten years teaching and research in south eastern Europe have seen a sharp decline. It is virtually impossible for equipment to be properly maintained, so experimental physics has become practically inexistent. Existing computers are obsolete, and libraries have endured radical budget cuts. Since 1994, the Faculty of Physics' library in Sarajevo has had sufficient funds to be able to afford a grand total of four books.
In the long term, however, the chief problem for these countries is a brain drain: "40 to 50 percent of the best scientists and up to 70 percent of new graduates have left Serbia, mostly for the USA", is how the Serbian Minister for Science Dragan Domazet summed up the situation during a meeting in Munich. This comes as no surprise; a professor on a monthly salary of 100 to 150 Euros has no choice but to take on a second job just to survive. When Julius Wess began his aid project, he was reminded of his own past: "The Americans helped us to reconnect with international research community after the Second World War, and we now wish to assist the nations of the former Yugoslavia in the same way." This means overcoming numerous rifts, because, as Wess points out, "Scientists have also been left with deep scars from the war".
Already, conferences have been staged and libraries given support thanks to a number of sponsors, including the Max Planck Society, the German Ministry of Science, the German Research Community (Deutsche Forschungsgemeinschaft [DFG]), and the Volkswagen Foundation. The DFG provided financial assistance for a special graduate college in Munich for students from southeast Europe. However, in the long-term it is important that students receive a good education in their own homelands. The result of support schemes like grants can often be that students do not return to their countries of origin. "We must prevent this happening by significantly improving the working and living conditions in our country", argues Serbian Science Minister Domazet. The Serbian government's top priority therefore is to improve the infrastructure, and so it has acquired several thousand PCs and refurbished laboratories. In this context, "Scientists for Global Responsibility" hope their next project will go well beyond traditional development aid. The aim is for every country in southeast Europe to be connected to a joint, powerful data network within one to two years. This will provide them with fast access to the Internet and the facility to exchange scientific data and publications. Simultaneously, a new system of "electronic learning" is planned, whereby learning materials are fed into the net at a few points with a decentralised retrieval facility. With the assistance of this project, known as SINSEE (Scientific Information Network South Eastern Europe), southeast Europe will gain the latest technology which will assist self-help measures. For example, the hope is that "e-learning" will help to relieve the dramatic shortage of teaching staff at many universities. Towards the end of 2001, the German Science Ministry contributed more than 300,000 Euros towards a pilot project. The scientific institutes in the three university towns Novi Sad, Belgrade, and Nis will be provided with a local, state of the art network. At the same time, there will be workshops and conferences to consider the application of new technologies, e-learning, and details of regional cooperation. Developing such a scientific network at an internationally competitive level has become one of the Serbian government's most important projects. The Serbian Prime Minister Zoran Djindjic is personally committed to this. Everyone concerned agrees that providing young people with a sound scientific education is a major precondition for the country's economic reconstruction. The ability to communicate freely across all national boundaries is a basic precondition for democratisation and stability.

PHOTO: LUTZ MÜLLER

A meeting in Munich (from left): Dr. Simeon Angelov, UNESCO advisor, Prof. Dragan Domazet, Prof. Pierre Lasserre, Director of UNESCO ROSTE (Regional Office for Science and Technology in Europe), Vera Herrmann, Head of the Computer Centre at Lübeck College, and Prof. Julius Wess.

Even during the war, the Internet proved itself as a stable, albeit slow, means of communication between dissenting scientists and their colleagues in the west.
The technical design for a scientific network in the Federal Republic of Yugoslavia is ready. It was drafted in collaboration with the network provider Cisco Systems and the integrator Telindus, who have contributed advance financing to this project.
At present the plans are being extended to cover the countries neighbouring the Federal Republic of Yugoslavia, with the aim of developing, within one to two years, an information network that will link all the universities and research institutions in seven southeast European countries. With transmission rates of between one and ten gigabytes per second, the network will be at the cutting edge of technology. Naturally, many PC workstations will have to be updated, and digital teaching rooms with cameras, broadcasting technology, and servers will need to be built.
The approach to this network project is new in that foreign investment into the network will be coupled with free provision of glass fibre cables throughout the countries of southeast Europe. Technically, this can be achieved either by wavelength-multiplexing, i.e. through parallel signal channels via a glass fibre cable, or by developing a private glass fibre infrastructure. Both solutions are compatible with the existing telecommunications monopolies. Serbia came to a pioneering decision by resolving to provide the future academic network with new glass fibre cables free of charge.
Wess says, "This removes one of the major obstacles in the way of the WIGV project." The European Geant network has expressed its willingness to link it with Europe as quickly as possible.
The networks in Bosnia-Herzegovina, Albania, Macedonia, Croatia, Bulgaria and Rumania would also be provided with cost saving connections to the Internet, for instance through the high-speed connection in Yugoslavia. There are also plans for the networks in these countries to be directly integrated in a joint technological structure. All these countries have so far had to share the same fate in that to a large extent they have been cut off from the European networks. Following the investment provided by the German Ministry for Education and Science, there is now a need to secure additional financing. Julius Wess, his partners and colleagues are making efforts to locate sources of finance, which could include the European Commission and individual European donor countries. To achieve this they are working closely with other organisations, especially the German UNESCO commission.
"I am very pleased about the moral and financial support we have had from all our contacts so far. There is still a long way to go before the project is secure, but I am confident", says Wess. ●

@ Additional information on the Internet: www.wigv.de

HUMAN DEVELOPMENT

Publication of PISA Study Results

PISA (Programme for International Student Assessment) is the most extensive and comprehensive international study of educational performance ever undertaken. It is being carried out by the Organisation for Economic Co-operation and Development (OECD), whose member countries are jointly responsible and provide support for the project. In Germany, the PISA study was commissioned by the Conference of Ministers of Culture and Education (Kultusministerkonferenz [KMK]), and responsibility for the project lies with a national consortium under the direction of Prof. Jürgen Baumert, Director of the Max Planck Institute for Human Development. Dr. Petra Stanat of the same Institute is the project coordinator.

Three cycles (for the years 2000, 2003 and 2006) of data on the achievements of 15-year-old students in reading, mathematics and science are to be compiled. The study also looks at cross-curricular competencies like the prerequisites for self-regulated learning and general problem-solving ability. The frame of reference is an internationally agreed concept of basic education ('literacy'). It is not factual knowledge that is at the core of the project, but rather an analysis of the basic competencies that form the basis for participation in the social, economic, and political life of modern societies.
The central results of the first cycle of assessment, which focused primarily on reading and comprehension ('reading literacy'), were presented to the public in late 2001. This comparison of German students' test results with those of students of the same age from 31 other participating countries permits a precise and subtle examination of the German educational system's strengths and weaknesses.
Furthermore, the inclusion of students' learning and living environments, both in and out of school, provides important information for the interpretation of the, sometimes considerable, achievement variations between OECD countries.
PISA provides those who are involved in school education with a uniquely broad empirical foundation for action at the level of educational policy. Across Germany, there has been a rise in interest in educational matters since the results were published. In order to enable the PISA Study results for Germany to be analysed at federal state level, the sample of 219 schools used in the international comparison was expanded to 1466 schools with a total of approximately 50,000 students. The results of this project expansion at national level are expected to be put before the Conference of Ministers of Culture and Education in the summer of 2002.
The national report on the PISA results has been published in book form, and is currently only available in German: Jürgen Baumert, Eckhard Klieme, Michael Neubrand, Manfred Prenzel, Ulrich Schiefele, Wolfgang Schneider, Petra Stanat, Klaus-Jürgen Tillmann & Manfred Weiß (ed.), PISA 2000: Basiskompetenzen von Schülerinnen und Schülern im internationalen Vergleich (An international comparison of students' basic competencies), Leske + Budrich, Opladen 2001. ●

@ Internet: www.mpib-berlin.mpg.de/pisa

SEMINAR

Surfaces in the Interplay of Forces

"Electronic Origin of Magnetoelastic Anisotropy and Stress in Atomic Layers" was the title of a seminar organised by the Max Planck Institute of Microstructure Physics, and sponsored by the Wilhelm and Else Heraeus Foundation. The particular electronic, magnetic, structural, and mechanical properties found on surfaces and in epitaxially expanded atomic layers were discussed at this 258th Wilhelm and Else Heraeus Seminar which took place in September 2001 at Schloss Ringberg. 33 participants from France, Italy, the Netherlands, Spain, the USA, and Germany attended 22 lectures and a poster session in which experimental and theoretical results were presented.

The latest magnetic sensors and data storage elements are made with materials which may only have a thickness of few atomic layers, and with lateral extensions equivalent to just a few thousand atomic diameters. In general, the physical properties of these nanostructures differ from the equivalents in voluminous samples. It is not possible in general to "scale down" the volume characteristics to the nanoscale because new phenomena often determine the physics of the nanostructures. From the point of view of fundamental research as well as that of the applications, a physically founded understanding of the way in which the reduction of dimensions alters the characteristics of materials is of enormous interest.
The main focus of this seminar was the question of the way in which the altered physical characteristics on surfaces and in atomic layers are correlated with the special binding relations and structural characteristics on surfaces and in epitaxially strained atomic layers. New experimental results on these subjects were presented in relation to stress measurements during adsorption and film growth, to measurements of magnetic anisotropy and magnetoelastic coupling, as well as on the electronic and elastic long-range of interactions on surfaces. Forces on surfaces and in atomic layers can be determined with high sensitivity measuring the distortion of thin substrates. Experiments on electron and X-ray diffraction elucidate the atomic structure close to the surface. Magnetic properties are investigated by means of electronic spectroscopy and magneto-optical procedures. In an evening lecture, the application of magnetoelastic components as pressure and torque sensors was described.
Theoretical contributions provided an impressive demonstration of the progress that has been made since a seminar was held at the Max Planck Institute back in June 1998. In particular, the understanding of the relevant electronic processes that determine the stresses on surfaces and boundary layers has seen a substantial improvement. Extending earlier models, current calculations show that – besides the transfer of charges between adsorbing layer and substrate – the symmetry of interacting orbitals is crucial for the resulting change of the surface tension.
Progress in the numerical precision of first-principle calculations have also made it possible to calculate the magnetic anisotropies associated with even the smallest changes of energy of the order of magnitude of μeV per atom. Hence, for the first time, calculations of the dependence of magnetoelastic coupling on dilatations were presented. They provide a theoretically founded basis for the interpretation of measurements of magnetoelastic couplings in strained atomic layers that goes beyond phenomenological observation. ●

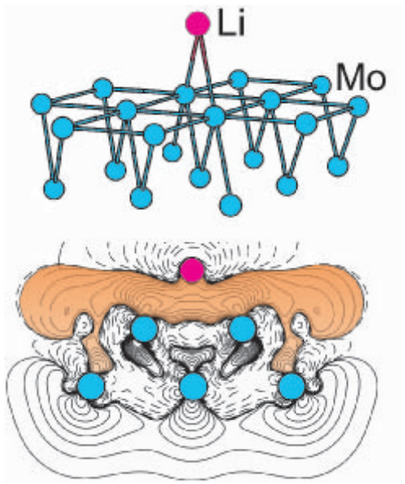

DIAGRAM: JÜLICH RESEARCH CENTRE / MÜLLER

Structural model (top) and resulting change of the electron density (bottom) during adsorption of lithium (red) on molybdenum (blue). The orange colouring shows the increased charge density in the Mo surface below the Li adsorbate as calculated by Jürgen Müller, of the Jülich Research Centre. This causes an attractive interaction between Li and Mo in the surface.

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CLOSER LINKS WITH UNIVERSITIES

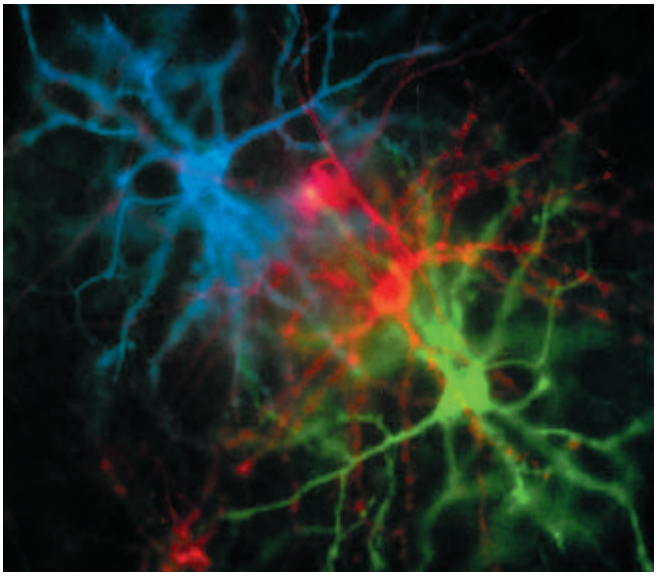
Max Planck Research Group in Erlangen

On the 8th of March, the Senate of the Max Planck Society met in Jena, where a resolution was passed to set up a Max Planck Research Group for "Optics, Information and Photonics" at Friedrich Alexander University in Erlangen-Nürnberg for a period of five years. Additional scientific concepts for establishing Max Planck Research Groups at German universities are currently being discussed with other higher education establishments.
The establishment of the first Max Planck Research Group within a German university means that the Max Planck Institute is fulfilling a recommendation articulated by the international system evaluation commission of the Central Funding Organisation for Academic Research in Germany (Deutsche Forschungsgesellschaft) and the Max Planck Society back in 1999. One element of this recommendation was that the Max Planck Society should make a contribution to improving the structural conditions for university-based research work and to strengthening collaborations with universities. Accordingly, the Max Planck Society put forward a proposal whereby between three and five fixed-term university-based Max Planck Research Groups would be set up within the framework of a flexible pilot programme, and the Society would take on a share of their funding. For the time being, joint support of these establishments is fixed for a period of five years. At present, the Max Planck Society is looking at another four, variously detailed, suggestions for establishing Max Planck Research Groups at universities. The realisation of these plans depends on future developments as regards national and regional government funding of the Max Planck Society.
The initial concept for the Max Planck "Optics, Information and Photonics" Research Group to be established in conjunction with the Friedrich Alexander University Erlangen-Nürnberg encompasses three scientific departments. The first Research Group department, the Centre for Modern Optics (Zentrum für Moderne Optik [ZEMO]), has already been set up, and incorporates Professor Gerd Leuchs' chair for optics. Two more departments are to be set up immediately, and a fourth is planned for sometime in the future.
The principal scientific appointments will be put out to international tender, and candidates will be selected by an appointment committee of the Max Planck Society made up of professors of the University's Science Faculty I (Physics and Mathematics). The partners will share the running costs of the joint project which will amount to approximately 14 million Euros for each new department for the fixed-term of five years. In addition, the setting-up costs of a research group will require a one-off investment of around 14 million Euros, to be provided by general university construction funding sources and special finance initiatives.
Now that it has been approved by the Max Planck Society, the "Optics, Information and Photonics" Research Group at Erlangen-Nürnberg University will research and develop modern optics methods, investigate basic research problems in the areas of optical measuring systems, optical communication and optical materials, as well as optics in biology and medicine, and considering their possible applications.
According to experts from Erlangen University and the Max Planck Society, optics is currently experiencing "a remarkable renaissance". Pioneering advances, for instance in the fields of microscopy, optical lithography, or the use of very short pulses in the range of femtoseconds, will overcome the current limits of optics – this is a development which has caused the USA, for example, to react by significantly expanding fundamental research at their major existing centres in Orlando, Tucson and Rochester, while at the same time establishing new centres.
An important prerequisite for the "extreme optics" of the future is provided by optically active, electrically drivable materials which may have a use in a number of applications including the production of new types of improved light sources even for the difficult short-wave ultraviolet area. Potentially, this may enable the biochemical processes within living cells to be recorded in all three dimensions for the first time. In principle, the "new optics" should help improve the accuracy of measurements, spatial resolution, and image processing, and, above all, considerably increase measuring speed. Innovative approaches to the inclusion of quantum data in such studies promises to bring about entirely new possibilities for the future.
The optics research work undertaken at Erlangen-Nürnberg is of an internationally high standard. There are few places in Germany that can compare in their dedication to the field of optics. This work is further bolstered by the fact that other university departments, i.e. the Faculties of Natural Sciences, Medicine and Technology, are conducting extensive research in the applications of optics.
The traditionally strong science of materials is of particular importance. Communication engineering also has a significant role to play at Friedrich Alexander University, and creates additional synergies. All this work is geographically concentrated in and around one place, thereby creating a unique constellation for German optics research.
The University's Centre for Modern Optics, founded in the year 2000, ties together existing research activities in the field of optics, and is also a founding member of the "Bayern Photonics" network of experts, sponsored by the BMBF (Federal Ministry for Education and Research), which aims to intensify existing good relations with the industry. ●

SCHLOESSMANN SEMINAR

A Closer Look at Optical Methods

In the middle of December 2001, 130 participants from nine countries, including 21 scientists from the USA, met at Schloss Elmau in Upper Bavaria to exchange views on optical methods in modern biology. During this 5th Schloessmann Seminar, Nobel laureate Erwin Neher presented eleven young scientists with Schloessmann Fellowships and Schloessmann Awards. The Seminar was organised by the Max Planck Institute of Neurobiology based in Martinsried.



The organising committee, made up of Tobias Bonhoeffer, Alexander Borst (Directors at the Max Planck Institute of Neurobiology), Winfried Denk (Director at the Max Planck Institute for Medical Research), Reinhard Jahn and Erwin Neher (Directors at the Max Planck Institute of Biophysical Chemistry), was successful in drawing outstanding scientists as well as young talent to give lectures at the event. In 17 lectures, young researchers – primarily postdoctoral fellows – presented their studies on the theme of "New methods in microscopy", "New ways to study biologically important molecules", "Visualizing molecular movements", and "Optical methods to study neuronal function". There was ample opportunity for detailed discussion during the course of three poster sessions which included 55 poster presentations.

The invited scientists Scott Fraser (California Institute of Technology/Pasadena), Udi Isacoff (University of California/Berkeley), Amiram Grinvald (The Weizmann Institute of Science/Rehovot), Jeff Lichtman (Washington University), Wolf Almers (Oregon Health Science University), Noam Ziv (The Technion/Haifa), Karel Svoboda (Cold Spring Harbor Laboratory), Derek Toomre (Yale University/New Haven), Tim Ryan (Cornell University/New York), as well as Stefan Hell, Petra Schwille und Tom Jovin (Max Planck Institute of Biophysical Chemistry) each gave a lecture lasting one hour in which they presented their work on the subject.

The lecture by Reinhard Genzel of the Max Planck Institute for Extraterrestrial Physics in Garching on "Black holes, galaxies and the early universe" diverted the seminar participants' vision away from microscopes and upwards into the world of telescopes. Stimulating lectures, lively discussions and consistently positive feedback from participants demonstrated that the Schloessmann Seminar fulfils an important function of interdisciplinary scientific communication as well as attracting talented young researchers to the Max Planck Institutes. This would have pleased Ernst-Rudolf Schloessmann, who, as a Supporting Member of the Max Planck Society, helped to establish a foundation to promote young scientists prior to his death in 1993.

The following young scientists received a Schloessmann Award: Dieter Braun (Rockefeller University), Veronica Egger (Cold Spring Harbor Laboratory), Giovanni Galizia (Freie Universität Berlin), Sally Kim (Max Planck Institute of Biophysical Chemistry), Arnd Pralle (University of Berkeley) and Philip Tinnefeld (Max Planck Institute of Biophysical Chemistry). Schloessmann Fellowships were awarded to: Sidney Cambridge (Max Planck Institute of Neurobiology), Maz Hasan (Max Planck Institute for Medical Research), Bernd Kuhn (Max Planck Institute of Biochemistry), Christian Lohmann (Washington University), Malte Wachsmuth (Deutsches Krebsforschungszentrum (German Centre for Cancer Research), Heidelberg). ●

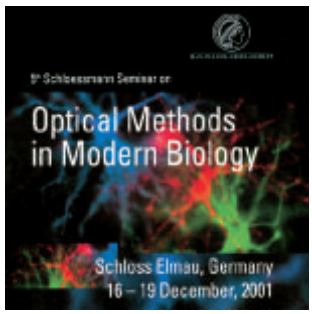


PHOTO: MARTIN KORTE, MAX PLANCK INSTITUTE OF NEUROBIOLOGY