

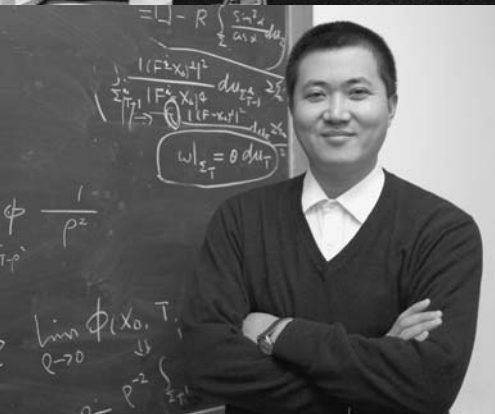


the

abdus salam

international centre for theoretical physics

1964
40th anniversary
2004



NEWS from ICTP



2 WHAT'S NEW

Homeward Bound

8 DATELINE

2005 Calendar
Climate Change

12 MONITOR

Open Day
New Website

3 COMMENTARY

Science in Pakistan

10 ACTIVITIES

July-September 2004

14 PROFILE

Jagadish Shukla

4 FEATURES

Uncertain World

ICTP's 40th Anniversary

**AUTUMN
2004**
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15 WHAT'S NEXT

Conferences, Schools,
Workshops

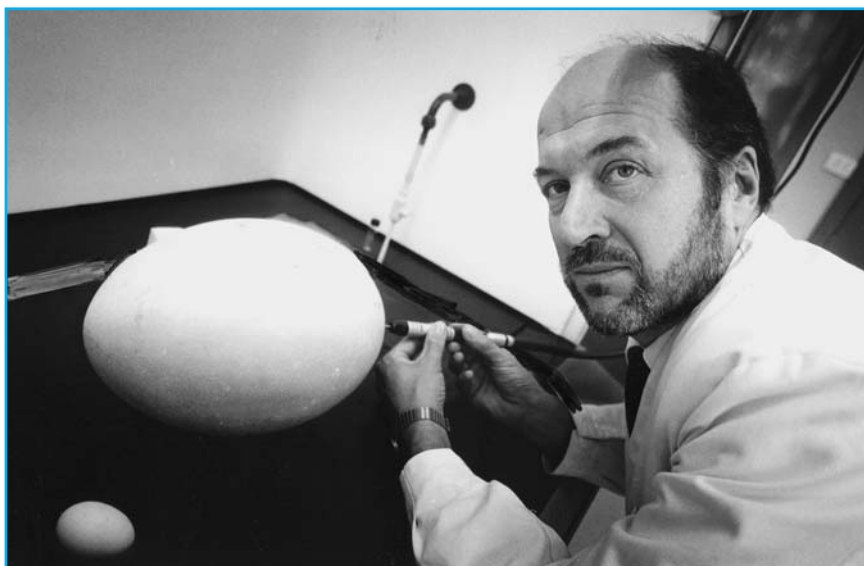
Homeward Bound

It's often not easy to return home after a 15-year absence. But Claudio Tuniz, ICTP's newly appointed special assistant to the director, had an added incentive to come back to his native Italy. It meant reuniting with his family after nearly 15 years of long-distance commutes.

Tuniz explains. "In 1991, I was appointed lead scientist of the accelerator mass spectrometry group for the Australian Nuclear Science and Technology Organization (ANSTO) in Sydney, marking the beginning of a rewarding career in Australia. Five years later, I was promoted to the position of director of ANSTO's 100-person physics division. Then, in 2000, I relocated to the Australian Embassy in Vienna, Austria, to represent the Australian government at the International Atomic Energy Agency (IAEA) on issues related to science and technology."

"Throughout my far-flung journeys, my wife, a professor of economics at

In 1993, Claudio Tuniz's Australian-based accelerator mass spectrometry group attracted worldwide attention when it helped date a giant egg of the flightless Aepyornis Maximum (Elephant Bird) found in the desert near Perth, Australia. Scientists believe that the 2000-year-old egg, equivalent in size to 150 normal-sized eggs, floated to Australia from Madagascar, landing ashore without a scratch.



the University of Udine, remained in Italy, doing most of the commuting so that we could be together as often as possible. While we both enjoyed our experience abroad, we both had grown weary of our 'in-jet' life-style. Italy beckoned and I knew it was time."

As a result, Tuniz, who was born in the small village of San Canzian d'Isonzo, near Gorizia in northeastern Italy, moved home last spring to begin the next phase of his life. Within a month of his arrival, he was at work in ICTP's Main Building, where he was greeted by several of his former University of Trieste professors—including Gallieno Denardo, GianCarlo Ghirardi and Giuseppe Furlan. Tuniz earned a doctorate in physics from the University of Trieste in 1974.

During the first decade of his career, Tuniz found himself hard at work at a number of institutions, including the National Institute for Nuclear Physics (INFN) and the *Elettra* Synchrotron Light Laboratory in Italy, and Rutgers University and Brookhaven National Laboratory in the United States, where he engaged in research projects ranging from the development of accelerator-based analytical methodologies for counting rare atoms to pioneering applications of radionuclides designed

to cast light on the cosmic record embedded in meteorites and lunar rocks.

Tuniz is not only delighted to be back in Trieste but glad to be working at ICTP, an organisation that he calls "an international treasure that has had an enormous impact on global science and, yet, has enormous potential to do even more."

As the director's special assistant, Tuniz will take the lead in exploring new opportunities to strengthen ICTP's cooperative

activities with the United Nations Educational, Scientific and Cultural Organization (UNESCO), IAEA and other UN organisations, concentrating on such areas as education and training, knowledge management and the application of physics to cultural heritage. Tuniz also hopes to explore the possibility of cooperative projects with European scientific institutions through the European Commission's Framework Programme for Research and Technological Development.

"My own major field of scientific research has focused largely on studies that rely on long-lived radioisotopes generated by galactic cosmic rays that subsequently reside in the Earth's atmosphere and landmass. Such isotopes have proven useful in dating climatic events—for example, the last Ice Age that occurred 20,000 years ago—as well as such prehistoric cultural phenomena as the rock paintings of Australian aborigines."

"After many years as a civil servant vagabond in pursuit of scientific adventures around the globe, I am glad to have finally found my way back home," says Tuniz. "I know my family is happy to be back together again and I can only hope that ICTP will be happy with my efforts." □

Science in Pakistan

Parvez Butt, chairman of the Pakistan Atomic Energy Commission (PAEC), visited Trieste in September to sign a memorandum of agreement with ICTP that will enable 25 Pakistani scientists to visit the Centre each year to participate in training and research activities. PAEC will cover travel costs to and from Pakistan, and ICTP will cover hospitality costs during the scientists' stay in Trieste.

Butt noted that "this effort is the latest example of a long and fruitful relationship between ICTP and Pakistan's scientific community." He pointed with pride to the fact that ICTP was founded by Pakistani-born scientist Abdus Salam (Nobel

"Salam spent his entire adult life urging Pakistan and the rest of the developing world to secure a proper place for science in their plans for development. He was convinced that a nation's development efforts could only be built on a firm foundation of science and technology."

"For decades Salam was more renowned outside of Pakistan than inside," says Butt. "But that is no longer the case. Even more importantly, Salam's ideas are finally taking hold in Pakistan's science policies." Butt points proudly to more than a seven-fold increase from US\$4.4 million in 1999-2000 to US\$34 million in 2004-2005 in Pakistan's annual science and technology budget. He also cites substantial investments in communication technologies that have enabled virtually every university and research centre in Pakistan to be connected to the internet. Other areas of primary concern include biotechnology and indigenous and medicinal plants.

"Thanks in large measure to ICTP, Pakistan has developed a strong community of physicists and mathematicians and we are now able to tap this pool of scientists to participate in a wide range of disciplines where knowledge of physics and mathematics can play an important role. These fields include weather and climate, bioinformatics, lasers and optics, and nanotechnology."

PAEC has historically been Pakistan's largest and most active science institution. In total, PAEC consists of 72 centres, including the Pakistan Institute of Nuclear Science and Technology (with a staff of

20,000, it is the premier centre in PAEC's constellation of centres) and the Pakistan Institute of Engineering and Applied Science that awards degrees in a variety of fields. The National Institute for Biotechnology and Genetic Engineering (NIBGE) conducts advanced research in the fields of agriculture and medicine, and 13 medical centres serve some 300,000 patients each year.

"Today," says Butt, "specialised science centres unaffiliated with PAEC are cropping up everywhere in Pakistan in both the basic and applied sciences. The growing number and diversity of these centres is a reflection of the government's commitment to science. Our desire to strengthen our ties with ICTP, moreover, is an indication that Pakistan is increasingly interested in reaching out to international organisations and we are using more and more of our own resources to do so. All in all, the trends for science in Pakistan look good." □

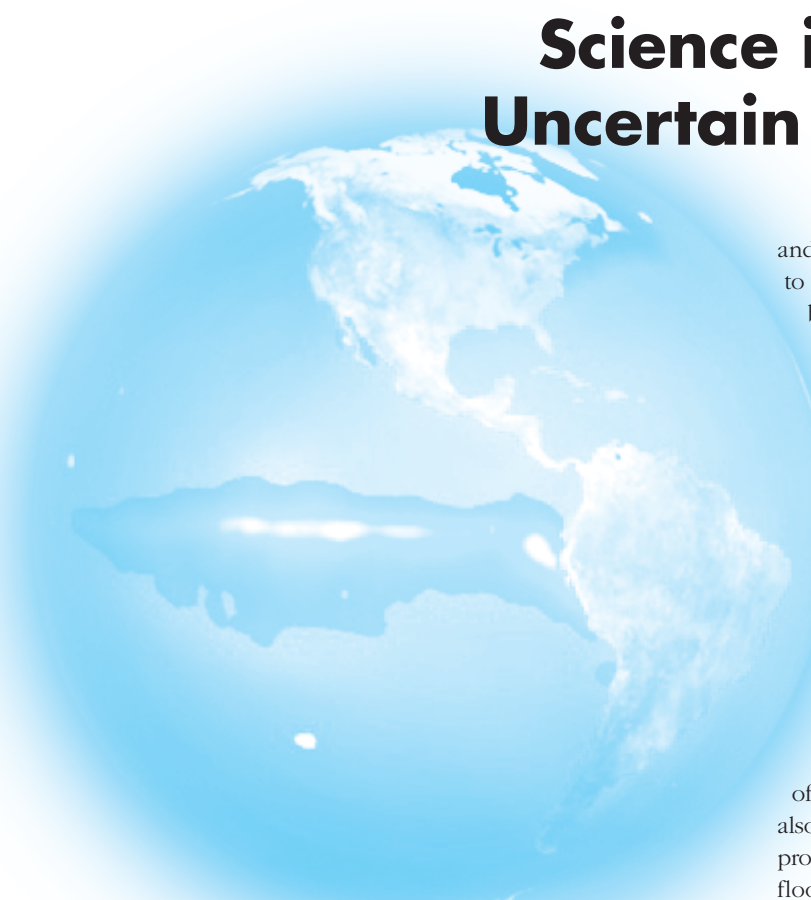


K.R. Sreenivasan and Parvez Butt signing memorandum of agreement in Abdus Salam's office. Abdullah Sadiq looks on.

Laureate in Physics 1979) during the 1960s and that Salam continued to oversee the administration of the Centre until the early 1990s when ill health forced him to relinquish the reins.

"ICTP," he said, "has been a primary point of destination for Pakistani physicists and mathematicians ever since the Centre opened its doors in 1964." Indeed over the past 40 years, more than 1300 Pakistani scientists have participated in ICTP research and training activities. In addition, more than 90 scientists have been appointed ICTP Associates, which has enabled them to forge strong and lasting relationships with the Centre. ICTP Associates from Pakistan include Riazuddin, director, National Centre for Physics, (NCP); Ghulam Murtaza, first Salam professor of physics at Government College in Lahore; and Abdullah Sadiq, former rector of the Pakistan Institute of Engineering and Applied Sciences (PIEAS) and a member of PAEC.

Science in an Uncertain World



Most people first heard of El Niño in 1997 when newspapers and television gave extensive coverage to devastating floods in California, severe droughts in Indonesia, and strange weather everywhere—all attributed to El Niño.

Today most people are familiar with the term, but few realise that the phenomenon has been with us for millennia, and that originally it was welcomed as a blessing.

The name was initially given to a modest, warm, seasonal current that appears along the shores of Ecuador and northern Peru around December when the accompanying rains transform the barren coastal desert of that region into a garden. El Niño is Spanish for 'the boy' and refers to Child Jesus.

Over the past few decades, even though the phenomenon has remained essentially constant, our perceptions of it have undergone a remarkable transformation. We now regard El Niño as a global hazard that we anticipate with trepidation.

El Niño is an example of the paradox that, as we grow in wealth and in population, so does our vulnerability to natural hazards. Insurance companies find that claims related to damages inflicted by severe storms, hurricanes, floods and earthquakes are rising steeply even though there is no evidence of an increase in the number and intensity of those hazards. For example, today El Niño still turns the desert of Ecuador

and northern Peru into a garden, but few people have time to behold that miracle; they are preoccupied with the roads, bridges and houses that are washed away by the rains.

To cope with environmental hazards we turn to scientists for predictions. Meteorologists have responded by transforming weather prediction from an augury into a source of reliable information. Attention has recently shifted to the prediction of longer-term climate fluctuations. Progress has been so rapid that, although El Niño caught everyone by surprise in 1982, by 1997 scientists anticipated its arrival in the Pacific several months in advance. This was an impressive achievement, but it carried a most unfortunate blemish.

During the summer of 1997 scientists alerted Californians, on television and in newspapers, of a high probability for exceptionally heavy rains during the winter of 1997-1998 because of a very intense El Niño. Scientists also advised the people of Zimbabwe that rainfall there would probably be below normal. Californians did indeed experience floods, and were prepared, but Zimbabweans had normal rainfall and were unprepared. Because of the expectation that crops would be poor, and that farmers would be unable to pay back loans, financial institutions in Zimbabwe declined loans to farmers. The consequences were dire: Crop production fell 20 percent below normal. The prediction of a drought in effect caused a drought.

The tragedy in Zimbabwe underlines the urgent need to improve communications between producers and users of scientific information. The latter group faces by far the bigger challenge because the decisions it has to make are extremely difficult, even when the scientific information is perfectly accurate. Available resources to cope with a multitude of problems that range from public health to agriculture and education are limited. Any setting of priorities reflects values that depend on race, gender, religion and culture, making the formulation of policies acceptable to everyone difficult. Given the enormous complexity of social issues, we must guard against exaggerating the value of scientific information. Consider the case of the Indian monsoons.

In the second half of the 19th century, poor rains over India often contributed to poor harvests, famines and the death of millions of people. At the time, it was assumed that the solution to the problem required scientific information that would allow accurate predictions of the monsoons.

Today scientists have a much better understanding of

monsoons than they did 100 years ago, but they are still unable to predict accurately when monsoons will arrive or, for that matter, will fail to arrive. Nonetheless for several decades now, there have been no disasters comparable to the famines of the 19th and early 20th century. Of prime importance to this impressive achievement are political changes in India. Development and implementation of effective policies to cope with famines started once India became an independent country and acquired a democratic government. Science has played a secondary role.

Although much progress can be made on certain environmental problems even in the absence of scientific information, we need to acknowledge that such information can be valuable, especially if it is accurate. For example, government officials now act swiftly in response to predictions that a hurricane will make landfall. As recently as World War II the admiral of a fleet in the Pacific chose to ignore the prediction of a typhoon because of a lack of confidence in the prediction. His fleet suffered enormous losses. Because of advances in weather prediction such a decision on the part of an admiral would be unthinkable today.

Progress in weather forecasting comes from improved measurement networks, better understanding of such weather phenomena as fronts, tornadoes, hurricanes and cyclones, and frequent tests of the theories and models of meteorologists. Of central importance is a balance between science for the sake of science and science for practical purposes.

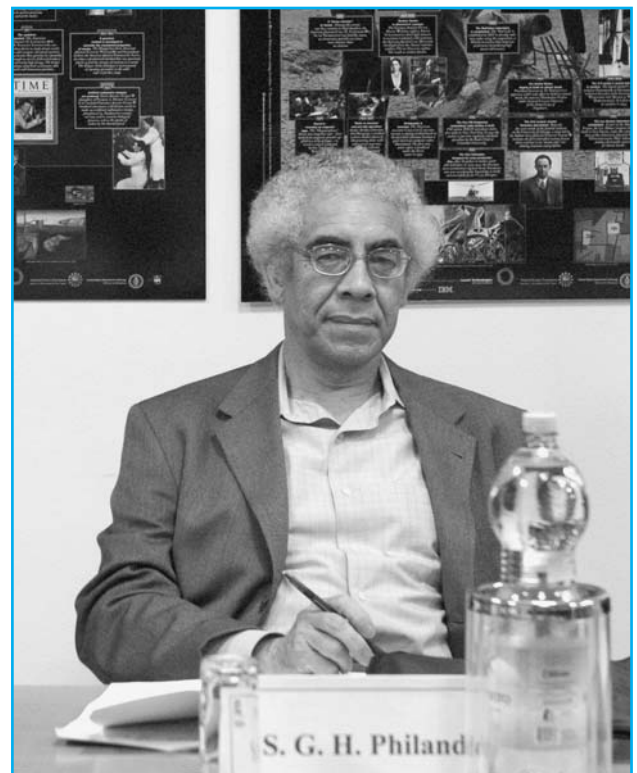
Finding a similar balance in the case of El Niño studies is proving difficult. During the cold war, scientists studying El Niño enjoyed considerable freedom to explore a beguiling phenomenon mainly for the sake of understanding it. They made rapid progress and, after the exceptionally intense El Niño of 1982, could explain what had happened. However, they failed to sound a public alert beforehand, in part because there was no pressure to do so. Sponsors of scientific research subsequently insisted on useful results. This emphasis on science for practical purposes contributed to a significant increase in the number of scientists involved in social and policy issues related to environmental problems. In principle, this is a laudable development, but in practice it is fraught with dangers, as the tragedy in Zimbabwe illustrates.

For science to flourish, scientists must have a sceptical attitude towards their own results, constantly questioning and testing apparent solutions to problems. When trying to persuade potential clients that those results are useful and merit attention, they have to adopt a very different attitude, one of confidence in their results. This is not a problem in the case of weather forecasting for tomorrow because the accuracy of the forecasts can be checked immediately. However, it is a serious dilemma in the case of predictions related to infrequent environmental phenomena that develop over months and longer.

El Niño forecasts have huge uncertainties at present. Is such information of any value at all? Consider the daily weather forecasts that the British government started making available to the public in the 1860s. Scientists objected and forced the government to halt those forecasts on the grounds that the predictions had huge uncertainties and were not

based on any understanding of weather phenomena. After a public outcry, the forecasts were resumed because they were proving useful, especially to those involved in coastal shipping. The forecasts significantly reduced the number of shipwrecks, and therefore saved many lives. Scientific information with large uncertainties can be of considerable value, but such an evaluation is best made by the public, not by scientists.

The worlds of science and of human affairs are radically different. Each scientific problem, in principle, has a well-defined solution that can be found by means of universal methods independent of race, gender or religion. A social problem, by contrast, has a multitude of solutions, each with advantages and disadvantages that are weighed differently in different cultures.



S. George Philander

The methods and skills required to solve the problems encountered in the cold, uncompromising world of science have very limited applicability in the heated, nuanced world of human affairs where compassion is a virtue and compromise a requisite.

Scientists live in both worlds and thus face a dilemma. The most effective way to minimise this quandary is to reduce the uncertainties in scientific results. To achieve that goal the producers and also the sponsors of scientific research should strive for a balance between science for the sake of science and science for practical benefits. □

This article includes excerpts from the author's recent book, Our Affair with El Niño; How we transformed an enchanting Peruvian current into a global climate hazard (Princeton University Press, 2004.)

ICTP's 40th Anniversary Celebration



Opening Ceremony

On 4-5 October, ICTP celebrated its 40th anniversary with an international conference, 'Legacy for the Future,' that attracted some 200 scientists from around the world, including four Nobel Laureates: Walter Kohn (Chemistry 1998), University of California at Santa Barbara; Rudolph A. Marcus (Chemistry 1992), California Institute of Technology; John Nash, Jr. (Economic Sciences 1994), Princeton University; and Ahmed H. Zewail (Chemistry 1999), California Institute of Technology. The conference also included a roundtable discussion on the future of science in the developing world that highlighted the unique role that ICTP has played—and will continue to play—in such efforts.

The conference's opening session included presentations by Altero Matteoli, Italy's Minister of the Environment and Land Protection; Roberto Antonione, Undersecretary, Italy's Ministry of Foreign Affairs; Riccardo Illy, President of the *Regione Friuli-Venezia Giulia*; and Ambassador Nassir Abdulaziz Al-Nasser, Chairman of the Group of 77. There were also messages from Koïchiro Matsuura, Director General of the United Nations Educational, Scientific and Cultural Organization (UNESCO), and Mohamed ElBaradei, Director General of the International Atomic Energy Agency (IAEA), and opening remarks by Walter Erdelen, Assistant Director General, UNESCO, and Werner Burkart, Deputy Director General, IAEA.



Altero Matteoli, Italian Minister of Environment and Land Protection, awards a plaque to Ambassador Nassir Abdulaziz Al-Nasser, Chairman of the Group of 77

Conference highlights included:

- The signing of a memorandum of agreement between Brazil's National Council for Scientific and Technological Development (CNPq) and ICTP that will provide funding for four co-sponsored activities each year in South America—two in Brazil and two in other South American nations. Each of these activities, which are scheduled to begin next year, will be open to scientists from throughout the region.
- An announcement by the Templeton Foundation that it would fund five new awards for 'Leadership in Science and Public Life' to be administered by ICTP. One of the five prizes will be named after the Centre's founding director Abdus Salam, Nobel Laureate in physics in 1979, and two will be named after Ahmed H. Zewail, Nobel Laureate in chemistry in 1999. The prizes, each of which will carry a cash award of US\$20,000, are designed to recognise and honour young scientists and scholars who have made significant contributions to the interface between science and Islamic thought.
- An announcement by the Niels Henrik Abel Memorial Fund of Norway that it would fund an ICTP Prize in mathematics comparable to the ICTP Prize in physics. The prize will be given in cooperation with the International Mathematics Union (IMU). Named after the great Indian mathematician, Ramanujan, it will include a cash award of US\$10,000. The first winner will be selected in 2005.
- An announcement by the Italian Ministry for the Environment and Land Protection that Italy would establish a new international institution in Trieste for the training of scientific experts and technologists in environmental protection. Named the International Programme for Environmental Development (IPED), the initiative will receive €1 million in funding to start. The programme's ultimate goal is to boost capacity building and know-how for addressing environmental issues throughout the world.

"Italy," noted Carlo Azeglio Ciampi, President of Italy, in a congratulatory message sent to the participants of the conference, "is proud to have endorsed the mission of ICTP 40 years ago, and for having hosted and supported it. The Centre," he added, "has produced research of the highest standard and has taken in and educated thousands of researchers from the South...I extend my best wishes to the director of ICTP, to all of its scientists and co-workers, and to the distinguished guests who have gathered to celebrate this important anniversary, with the hope that the Centre will go from strength to strength in the years to come." □

For additional information about the ICTP 40th anniversary conference, see www.ictp.it/pages/events/40years.html.



Video Message from UNESCO Director General Koichiro Matsuura



K.R. Sreenivasan and Letizia Moratti, Italian Minister of Education, University and Research



Nobel Laureates Ahmed Zewail, Rudolph Marcus, Walter Kohn and John Nash



Scientific lecture by renowned Italian physicist Nicola Cabibbo



DATELINE

Scientific Calendar 2005 ictp International Centre for Theoretical Physics

2005 Calendar of Events

The ICTP calendar of events for 2005, published in print form in October, lists 42 activities—colleges, colloquia, conferences, schools and workshops—on subjects ranging from nanoscience to superstrings, regional weather prediction to quantitative ecology, and soil physics to computational cosmology. Six of the nine activities outside of Trieste will be held in Africa (Egypt, Ghana, Namibia, Niger, and Tanzania); the other three in Cuba, Indonesia, and the Islamic Republic of Iran. To review ICTP's 2005 calendar of activities, see www.ictp.it. The calendar will be continually updated on the web.

Visit to India

ICTP director **K.R. Sreenivasan** visited India between 3-14 July, where he met with the heads and scientific staff of the International Centre for Genetic Engineering and Biotechnology (ICGEB) Indian Component in New Delhi; delivered the Second C.K. Majumdar Memorial Lecture at the S.N. Bose National Centre for Basic Sciences in Kolkata; and spoke at the 22nd International Conference on Statistical Physics (STATPHYS 22) in Bangalore. Throughout the visit, the director discussed potential areas of cooperation between ICTP and India's scientific institutions.

Dirac Medal

James D. Bjorken, professor emeritus of physics, Stanford University, and **Curtis G. Callan**, professor of physics, Princeton University, USA, are the winners of the 2004 Dirac Medal. The announcement was made on 8 August, the birth date of the prize's namesake, Nobel Laureate Paul A.M. Dirac, who was a close friend and strong advocate of the Centre. Bjorken and Callan are being honoured for theoretical investigations that led to the use of deep inelastic scattering for shedding light on the nature of strong interactions. The awards ceremony will take place at a later date. For additional information and the list of previous winners, see www.ictp.it.

Prizes

Gabriele Veneziano, senior staff member of the European Organization for Nuclear Research (CERN), who has lectured at ICTP's high energy workshops since the 1980s, has received the Dannie Heinemann Prize for Mathematical Physics for his "pioneering discoveries in dual resonance models," which have helped lay the foundation for string theory and the quantum theory of gravity. **Juan Maldacena**, professor of physics at the Institute for Advanced Study in Princeton, New Jersey, USA, and course director of several ICTP high energy physics schools, has been given the Edward A. Bouchet Award "for providing a deeper understanding of the correspondence between theory in d space-time dimensions, and for communicating fundamental principles of theoretical physics to the public, including Spanish-speaking audiences." For additional information, see www.aps.org/praw/index.cfm.

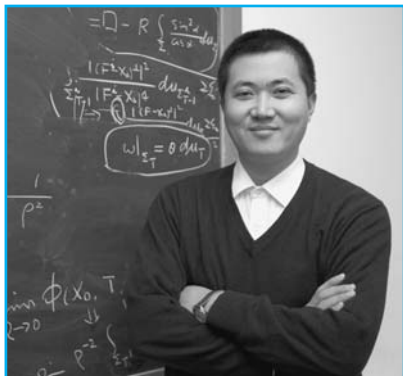
Staff Sitings

Uros Seljak, a native of Nova Gorica, Slovenia, has joined the ICTP High Energy, Cosmology and Astroparticle Physics group. Seljak received a Ph.D. in physics from the Massachusetts Institute of Technology (MIT), USA, in 1995. He has held posts at the University of Ljubljana and Jozef Stefan Institute, Slovenia; European Organization for Nuclear Research (CERN), Switzerland; Max Planck Institute for Astrophysics, Germany; and Harvard-Smithsonian Center for Astrophysics, USA. Most recently, he was assistant professor of physics at Princeton University, USA.



Uros Seljak

Li Jiayu, previously with the Chinese Academy of Sciences' Institute of Mathematics, has joined



Li Jiayu

the ICTP Mathematics group. Li, whose area of expertise is geometry, received a Ph.D. from Hangzhou University in 1988. In addition to working with the Chinese Academy of Sciences, Li has also been employed with Anhui University in Hefei; Fudan University in Shanghai; and the Academy of Mathematics and System Sciences in Leipzig, Germany. He was a Humboldt Fellow in 1996-1997 and was selected an Outstanding Young Scientist in China in 1999. From 1992 to 1994, he was a post-doctoral student with ICTP's Mathematics group.

George Thompson, member of the ICTP High Energy, Cosmology and Astroparticle Physics group for the past 11 years, has been appointed head of the Office of External Activities (OEA). Australian-born Thompson obtained his Ph.D. in physics from the University of Tasmania in 1982. He has been a Diploma Course teacher since 1993.



George Thompson

Climate Change Here

The lead authors of the Intergovernmental Panel on Climate Change (IPCC) Working Group 1, which focuses on the physical sciences, met at ICTP from 26-29 September to kick-off IPCC's fourth assessment report. Rajendra K. Pachauri, IPCC chairman, was among those at the opening session. Susan Solomon (USA) and Dahe Qin (China), co-chairs of Working Group 1, were also in attendance. The first three rounds of assessment reports (1990, 1995, and 2001) are among the most important scientific reports produced over the past 15 years. The reports are widely credited for bringing the issue of climate change to the forefront of concern among the public and policy makers. Filippo Giorgi, scientific staff member with ICTP's Physics of Weather and Climate group, will serve as one of the chief coordinators of the Working Group 1 report.



Rajendra Pachauri and Dahe Qin

Medical Physics

The ICTP Workshop on Medical Applications of Synchrotron Radiation took place on 23-25 September, marking the first time the event has been held in Trieste (previous workshops took place in Japan and Switzerland). More than 180 scientists from 45 countries participated in the activity. The workshop, which was organised in collaboration with *Elettra* Synchrotron Light Laboratory, the University of Trieste and the Italian Institute for Nuclear Physics (INFN), focused on imaging and clinical applications of synchrotron radiation.



ACTIVITIES

WORKSHOP ON THEORETICAL PLASMA PHYSICS

5 - 16 July

Directors: R. Bingham (Rutherford Appleton Laboratory, Didcot, UK), B. Dorland (University of Maryland, College Park, USA), S.M. Mahajan (Institute for Fusion Studies, University of Texas at Austin, USA), J.T. Mendonça (*Instituto Superior Técnico*, Lisboa, Portugal), A. Rogava (Abastumani Astrophysical Observatory, Tbilisi, Georgia), P.K. Shukla (*Ruhr-Universität*, Bochum, Germany), L. Stenflo (Umeå University, Sweden) and Z. Yoshida (University of Tokyo, Japan).

Local Organiser: B. Stewart (ICTP).

WORKSHOP ON NOVEL STATES AND PHASE TRANSITIONS IN HIGHLY CORRELATED MATTER

12 - 23 July

Directors: A. Chubukov (University of Wisconsin, Madison, USA), P. Coleman (Rutgers University, Piscataway, New Jersey, USA), C. Pepin (*Centre d'Etudes de Saclay*, Gif-sur-Yvette, France), A. Rosch (University of Cologne, Germany), A. Schofield (University of Birmingham, UK), H. Takagi (University of Tokyo, Japan) and Yu Lu (Interdisciplinary Center of Theoretical Studies, ICTS, Beijing, China).

Local Organiser: E. Tosatti (International School for Advanced Studies, SISSA, and ICTP, Trieste, Italy).

ASIAN/PACIFIC REGIONAL SCHOOL ON ELECTRONIC STRUCTURE METHODS AND THEIR APPLICATIONS, Beijing, China

19 July - 30 July

Co-organisers: National Natural Science Foundation of China (NSFC) and Interdisciplinary Center of Theoretical Studies (ICTS, Beijing, China).

Directors: R. Gebauer (ICTP), Gong Xingao (Fudan University, Shanghai, China) and S. Scandolo (ICTP).

Local Organiser: Yu Lu (ICTS).



SUMMER SCHOOL AND CONFERENCE ON DYNAMICAL SYSTEMS

19 July - 6 August

Directors: M. Viana (*Instituto de Matemática Pura e Aplicada*, IMPA, Rio de Janeiro, Brazil) and J.-C. Yoccoz (*Collège de France*, Paris).

Honorary Directors: J. Palis (IMPA) and Ya. Sinai (Princeton University, New Jersey, USA, and Landau Institute for Theoretical Physics, Moscow, Russian Federation).

Local Organiser: B. Fantechi (International School for Advanced Studies, SISSA, Trieste, Italy).

VII SCHOOL ON NON-ACCELERATOR ASTROPARTICLE PHYSICS

26 July - 6 August

Directors: R. Carrigan (Fermi National Accelerator Laboratory, Batavia, Illinois, USA), G. Giacomelli (University of Bologna, Italy) and N. Paver (National Institute for Nuclear Physics, INFN, and University of Trieste, Italy).



TARGETED TRAINING ACTIVITY: COURSE ON CLIMATE DYNAMICS FOR UNIVERSITY LECTURERS

9 - 27 August

Directors: F. Molteni (ICTP) and J. Shukla (Center for Ocean-Land-Atmospheric Studies, COLA - Institute for Global Environment and Society, IGES, Calverton, Maryland, and George Mason University, Fairfax, Virginia, USA).



ADVANCED SCHOOL AND CONFERENCE ON NON-COMMUTATIVE GEOMETRY

9 - 27 August

Directors: O.A. Laudal (University of Oslo, Norway), C. Procesi (*La Sapienza* University, Rome, Italy) and M. Van den Bergh (*Limburgs Universitair Centrum*, Diepenbeek, Belgium).

COLLEGE ON MEDICAL PHYSICS

30 August - 22 September

Directors: A. Benini (University Hospital of Copenhagen, Denmark), P. Sprawls (Emory University, Atlanta, Georgia, USA) and S. Tabakov (Kings College, London, UK).

Local Organiser: L. Bertocchi (University of Trieste, and ICTP).



SCHOOL AND CONFERENCE ON FUNDAMENTAL ASPECTS OF COMPLEXITY

6 - 10 September

Co-organisers: STIPCO and DYGLAGEMEM European Networks.

Directors: M. Marsili (ICTP), M. Mezard (*Université XI Paris-Sud*, Orsay, France), F. Ricci Tersenghi (*La Sapienza* University, Rome, Italy) and R. Zecchina (ICTP).

CONFERENCE ON FUNDAMENTAL SYMMETRIES AND FUNDAMENTAL CONSTANTS

15 - 18 September

Co-sponsor: National Institute for Nuclear Physics (INFN, Italy).

Directors: E. Adelberger (Washington University, Seattle, Washington, USA), J.D. Barrow (University of Cambridge, UK), G. Dvali (New York University, USA), G. Fiorentini (University of Ferrara, Italy), V.A. Kostelevy (Indiana University, Bloomington, Indiana, USA), R.N. Mohapatra (University of Maryland, College Park, USA), V.A. Rubakov (Russian Academy of Sciences, Institute for Nuclear Research, INR, Moscow, Russian Federation), U. Seljak (ICTP) and A.Yu. Smirnov (ICTP).

Scientific Secretary: Y. Takanishi (ICTP).

WORKSHOP ON MEDICAL APPLICATIONS OF SYNCHROTRON RADIATION

23 - 25 September

Directors: M. Altarelli (*Sincrotrone Trieste* and ICTP), L. Bertocchi (University of Trieste and ICTP) and E. Castelli (University of Trieste, Italy).

FOURTH ANTONIO BORSSELLINO COLLEGE ON NEUROPHYSICS

27 September - 8 October

Directors: M.E. Diamond (International School for Advanced Studies, SISSA, Trieste, Italy) and L. Krubitzer (University of California at Davis, USA).

for additional information see www.ictp.it



Miramare Open Day

On Saturday 18 September, ICTP and other scientific institutions in and near Miramare Park organised their first Open Day for residents—young and old—from Trieste and the surrounding region. More than 4000 people—that's 2 percent of Trieste's population—came to visit and learn more about the world of science here in Miramare. In addition to ICTP, other institutions participating in the event included the International School for Advanced Studies (SISSA), the Third World Academy of Sciences (TWAS), the University of Trieste's Department of Physics, the Consortium for Physics, *Fondazione internazionale Trieste per il progresso e la libertà delle scienze*, *Immaginario scientifico*, the World Wildlife Fund (WWF) Natural Marine Reserve, Miramare Castle Park and *Parco tropicale*.

Open Day began with a welcome by ICTP director **K.R. Sreenivasan** in ICTP's Main Lecture Hall. **Piero Angela**, Italy's most renowned science television broadcaster, spoke on science, society and the media. A roundtable discussion followed with **Margherita Hack**, **Edoardo Boncinelli** and other researchers from ICTP and SISSA. The topic of discussion was "The Scientist's Job". Talks, movies, exhibitions, interactive experiments and tours rounded out the day-long programme.



Demonstration by Joseph Niemela, Fluid Dynamics group



Television personality and author Piero Angela



Exhibition on distinguished scientists who have visited ICTP



Overflow crowds listen to the talks taking place in the Main Lecture Hall from a screen on the Main Building Terrace

New Website

ICTP has launched a new website designed to be more informative, user-friendly and attractive. There's also a new URL. It is www.ictp.it. Comments and suggestions may be sent to pub_off@ictp.it.

Visit from China

More than 20 officials—all directors and deputy directors of science and technology institutes in China—visited ICTP on 16 July. Trieste was one of their main stops in a three-week tour of scientific institutions in



Europe. The officials were eager to learn more about the management of ICTP and the Third World Academy of Sciences (TWAS). Presentations by ICTP director, **K.R. Sreenivasan**, and TWAS executive director, **Mohamed H.A. Hassan**, were followed by a lengthy question-and-answer period.

IAEA General Conference



The International Atomic Energy Agency's (IAEA) 48th General Conference took place on 20-24 September 2004 in Vienna, Austria. ICTP director **K.R. Sreenivasan** and staff members **Claudio Tuniz** (left), **Gallieno Denardo** (third from left) and **Brian Stewart** (right) represented the Centre. ICTP's exhibition emphasised the Centre's long-standing collaboration with IAEA. For additional information, see www.iaea.org.

Visits to EU and UNESCO

ICTP director **K.R. Sreenivasan**, accompanied by **Claudio Tuniz**, special assistant to the director, visited the European Union (EU) in Brussels in August to discuss potential avenues of cooperation between the EU and ICTP. Discussions focused on efforts to promote science in eastern and central Europe and potential initiatives for expanding scientific data collection both within Europe and the developing world. The director, accompanied by ICTP scientists **Hilda Cerdeira** and **Marco Zennaro**, also travelled to UNESCO headquarters in Paris to discuss possible initiatives to provide rapid internet access to major universities and research centres in developing countries where access remains difficult and slow. About 60 representatives from UNESCO member states, including the Italian ambassador Francesco Caruso, were present.

IN MEMORIAM



Francis H.C. Crick and Abdus Salam at ICTP in 1968

Francis H.C. Crick, who with James Watson discovered the structure of DNA, died on 28 July in San Diego, California. He was 88. The British-born scientist shared the Nobel Prize in Medicine in 1962 with Watson for what is considered one

of the greatest scientific findings in the 20th century. Crick was one of the distinguished speakers at the Symposium on Contemporary Physics held in June 1968 to celebrate the opening of the Centre's Main Building.



Joan Oró, a pioneer in the study of the origins of life and a frequent lecturer at ICTP's biennial conferences on this topic, died on 3 September. He was 81. The seminal discovery of his career took place on Christmas eve in 1959 in his laboratory when he synthesised adenine, a key component of DNA. Oró, founder and first director of the biochemical and biophysical sciences department at the University of Houston, Texas, USA, worked for the US National Aeronautic and Space Administration (NASA) during the Apollo and Viking programmes.



Bryce DeWitt, Roland Blumberg professor of physics at the University of Texas, Austin, and winner of the ICTP Dirac Medal in 1987, passed away on 23 September. He was 81. DeWitt was an internationally renowned scientist best known for his studies on quantum gravity and gauge theory. His name is associated with the Wheeler-DeWitt equation, which provides the basis for quantum cosmology, and the Schwinger-DeWitt expansion, which is widely used in the study of field theories in curved space-time and string theory computations.



PROFILE

Jagadish Shukla's multifaceted career has found success across the continents both in science and service to society.

Weather to Change

In an extraordinary life and career that began in a small impoverished village in eastern India and continues to unfold today in suburban Washington, DC, **Jagadish Shukla** has applied his diverse talents and skills over the past four decades to scientific research, scientific institution building and service to society, pursuing his broad ambitions on three continents—North America, Europe and Asia.

At ICTP, Jagadish Shukla is best known for launching and then heading the Centre's Weather and Climate research and training activities from their inception in 1988 until Filippo Giorgi assumed responsibility for this initiative in 1997.

Yet Shukla has also distinguished himself as a scientist who has divided his time over the past two decades between George Mason University in Fairfax, Virginia, where he is chairman and professor of climate dynamics, and the Center for Ocean-Land-Atmospheric Studies (COLA) in Calverton, Maryland, USA, a nonprofit research centre that receives more than US\$3 million in annual funding from the US National Science Foundation, the National Oceanic and Atmospheric Administration (NOAA), and the National Aeronautics and Space Administration (NASA). Shukla founded and now directs the internationally recognised Center, which currently has a staff of 25 scientists and 15 doctoral students.

More recently, Shukla has decided to devote a small portion of his time and money to his native village of Mirdha, situated in India's most populous state Uttar Pradesh, home to 200 million people, which would make it the fifth most populous country in the world if it were an independent nation.

Shukla's education began modestly. "My first lessons," he recalls, "took place in the open under a banyan tree. In the fifth grade I attended a one-room school house built with the help of my father. And from the sixth to the tenth grade, I walked 10 kilometres each day to attend secondary school, where I studied Hindi, Sanskrit and mathematics. Science was not part of the curriculum."

A summer of intense reading of grade-school textbooks in science, which his father encouraged him to do, allowed Shukla to do well enough to pass the entrance examination for admission to the eleventh-grade science class in the city of Balbia. For his undergraduate and graduate education, he went to Benares Hindu University where he ultimately earned a doctorate in geophysics.

Shukla was destined to lead a conventional life as a government employee in India (upon graduation, he obtained a civil service position in Pune) when a last minute trip to Japan to attend a conference transformed his career. There the 24-year-old Shukla met Jule Charney, professor of meteorology at the Massachusetts Institute of Technology, USA, and, at the time, the world's most eminent meteorologist.

"For reasons that remain unclear to this day, Charney came to me and began to discuss my presentation. This chance encounter with a world-class scientist ultimately led to a doctorate in meteorology at MIT."

Shukla's studies and, more importantly, modelling experiments at MIT and subsequently at NASA led him to a breakthrough concept in climate predictability. "No one," he explains, "can predict the weather beyond five to 10 days. Yet, ironically, climate is predictable. In other words, science cannot tell you what the temperature will be two weeks from now but science can be used to predict what the mean seasonal temperature will be six months from now." Shukla's investigations, conducted during the 1980s, were among the first to prove this point.

The reason that such calculations can be made is that changes in the ocean temperatures directly affect the temperature of the air locally as well as globally. Using a deep understanding of the physics of climate and feeding large quantities of data into state-of-the-art computers, scientists can integrate complex mathematical models to simulate and predict climate variations.

"The temperature ties between the oceans and land and the overlying atmosphere are strongest in tropical regions near the equator, which makes tropical climate variations far more predictable than other regions," Shukla observes. "This relationship is a 'gift of nature' that many developing countries have not been able to take advantage of because they lack the scientific expertise and resources to do so."

That was the explanation Shukla gave to Abdus Salam during a conversation in 1992 that soon led to a series of ICTP workshops and conferences in the physics of weather and climate and ultimately to the creation of today's Physics of Weather and Climate group.

"The initiative," explains Shukla, "was designed both to build scientific capacity in the physics of weather and climate in the developing world and to make the information gathered by scientists available to countries that could then put the information to work to improve crop yields, for example."

Soon after he relinquished responsibility for the Centre's weather and climate activities, Shukla embarked on yet another 'adventure' when he decided to "give something back" to the village of Mirdha where he grew up and where most of his family, including his brother Shri Ram, still lives.

Why does he lend a helping hand to his home village? "My efforts are not only intended to improve the lives of people in Mirdha but also to alter the mindset: to show people that change is possible and that some degree of change can be good." To advance his goals, Shukla has recently decided to devote 10 percent of his time in Mirdha, matching his previous commitment of 10 percent of his salary.

"Giving of myself has more been difficult than giving my money," he admits. "After five days at a house without electricity or running water, I often find myself looking for a comfortable hotel. Change is difficult but possible," he notes, "and I'm the living proof that change changes us all." □

4 - 5 October

ICTP 40th Anniversary Conference: Legacy for the Future

18 - 22 October

International Beacon Satellite Symposium 2004

18 October - 5 November

Workshop on Designing Sustainable Energy Systems

25 October - 5 November

7th Workshop on Three-Dimensional Modelling of Seismic Waves Generation, Propagation and their Inversion

1 - 12 November

School and Workshop on Quantum Entanglement, Decoherence, Information, and Geometrical Phases in Complex Systems

6 - 15 November

School on Radio Science for South Asian Scientists

8 - 12 November

Workshop on Managing Nuclear Knowledge

8 - 19 November

Workshop on Nuclear Power Plant Simulators for Education

17 - 19 November

Conference on Practical Applications of Fractals

17 November - 1 December

International Host Lab Experiment on the Synthesis of Nano Materials by Thermal Plasmas (Pune, India)

22 November - 17 December

Third Workshop on Distributed Laboratory Instrumentation Systems

29 November - 30 November

2nd Workshop on Integrated Climate Models: An Interdisciplinary Assessment of Climate Impacts and Policies

29 November - 17 December

Microprocessor Laboratory Second Central American Regional Course on Advanced VLSI Design Techniques (Puebla, Mexico)



Throughout the year, the most up-to-date information on ICTP activities may be found on the World Wide Web and via e-mail. Here's how to find out what's going on.

ON THE WORLD WIDE WEB (WWW)

Our address is <http://www.ictp.it/>

The site includes detailed information on our research groups and activities, and a listing of our preprints, awards and job opportunities.

ON E-MAIL

(1) For Yearly Calendar of Scientific Activities

Create a new e-mail message and type

To: smr@ictp.it

Subject: get calendar 2005

Leave the body of the message blank. Send it.

Your e-mail will generate an automatic reply from the ICTP server containing the most updated version of the yearly Calendar.

(2) For Information on a Specific ICTP Activity

Each activity in the Calendar has its own 'smr' code number, which is located on the last line of each activity description. The 'smr' number will enable you to obtain more information—if available—on those activities you are interested in. To receive this more detailed information, create a new e-mail message and type the smr code number that you found on the calendar:

To: smr####@ictp.it

Under the e-mail's subject, type

Subject: get index

Leave the body of the message blank and send it.

You will receive automatic reply messages containing all documentation available on that particular activity.

(3) For Information on All ICTP Activities

A free online service for the dissemination of information on all ICTP activities, programmes and related announcements is available via e-mail. To subscribe, create a new e-mail message and type:

To: courier-request@ictp.it

Leave the subject line empty.

In the body of the message type

subscribe

and your e-mail address. Send the message.

Any comments or suggestions on this service are most welcome. Please address them to pub_off@ictp.it.

NEWS from ICTP

The Abdus Salam International Centre for Theoretical Physics (ICTP) is administered by two United Nations Agencies—the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Atomic Energy Agency (IAEA)—under an agreement with the Government of Italy. Katapalli R. Sreenivasan serves as the Centre's director.

News from ICTP is a quarterly publication designed to keep scientists and staff informed on past and future activities at ICTP and initiatives in their home countries. The text may be reproduced freely with due credit to the source.

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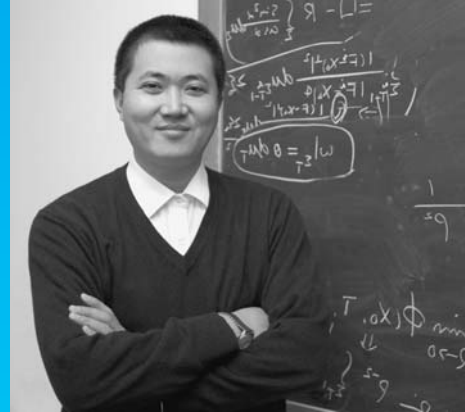
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