The Abdus Salam
International Centre for Theoretical Physics

United Nations
Educational, Scientific
and Cultural Organization

International Atomic
Energy Agency

NEWS from ICTP

WINTER
2004-2005

#111

A celebration of the role of physics in our global society, led by UNESCO, will take place in 2005—the World Year of Physics.

World Year of Physics

The World Year of Physics 2005 was launched on 13-15 January at an international conference sponsored by the United Nations Educational, Scientific and Cultural Organization (UNESCO), ICTP's lead administrative agency.

The conference, 'Physics for Tomorrow,' which included an opening-session presentation by ICTP director K.R. Sreenivasan on physics and development, was attended by more than 1500 scientists and students from 70 countries. Eight Nobel Laureates were among the participants.

The year 2005 marks the 100th anniversary of the most remarkable year in Albert Einstein's remarkable life, and one of the most noteworthy years in the history of science, comparable only to Isaac Newton's 18-month burst of scientific genius, his *annus mirabilis*, in 1665-1666 during which time he invented calculus, explained how gravity works and discovered the laws of motion.

In 1905, Einstein experienced a similar burst of genius highlighted by the publication of three illustrious papers in *Annalen der Physik*, Germany's leading physics journal.

No other set of academic papers in the 20th century had such a profound impact on both science and society. In these papers, Einstein did no less than prove that light consists of discrete particles (photons), for which he won the Nobel Prize in 1921; provide a powerful new tool for studying the movement of atoms through his explanation of Brownian motion (which reinforced kinetic theory and laid the groundwork for quantum mechanics); and present his theory of special relativity (which transformed our understanding of the relationship between space and time and for which Einstein is best known). "A storm broke loose in my mind," Einstein later noted.

As a result, it is only fitting that the life and work of Einstein provide the impetus for the World Year of Physics 2005. This year also marks the 50th anniversary of his death.

Throughout much of the 20th century and continuing to this day, Einstein's remains the public face of physics. His unruly tufts of hair, sometimes 'spiking' upward, sometimes 'draping' downward, and earnest yet impish eyes, which have been captured on many historic photographs and, more recently, used in advertisements for an endless array of products and services ranging from computers to money market funds to soft drinks, have made Einstein the world's most recognisable scientist. Apple Computer, Daimler-Chrysler, Disney, Fiat, Fuji, France Telecom, Microsoft, and Xerox all have licensed his image. Einstein, in fact, is the Elvis Presley of science, displaying the remarkable quality of remaining as famous—and perhaps even more famous—in death than in life. But Einstein is more than a pop culture icon. How many people worldwide are familiar with Einstein's formula $E=mc^2$? How many people can recognise one other physics formula?

Organisers and participants in the World Year of Physics 2005 hope to accomplish two goals over the next 12 months, which parallel Einstein's broad influence.

First, they plan to provide the public with easily accessible information on the current state of physics—its growing ties to biology and chemistry, its part in the development of new materials and nanotechnologies, its critical role in examinations of the cosmos and our understanding of the origins of the universe, and its centrality in efforts to develop a unified theory of nature's forces, including gravity (an effort that preoccupied Einstein during the concluding decades of his life).

Second, organisers and participants will seek to present these insights in ways that will engage—and, yes, entertain—the public. A recent survey by the European Commission, for example, shows that between 1998 and 2002 the number of physics graduates in European universities declined by 15 percent. It is hoped that the events surrounding this year-long celebration—the workshops, conferences, lectures and exhibits—will draw the attention of students, helping to spark broader interest in physics.

ICTP plans to participate actively in the World Year of Physics 2005 not only through staff presentations at conferences and workshops organised by other institutions but also by holding its own set of public lectures. The Centre hopes to build on its successful efforts to forge closer ties with the surrounding community and region—efforts begun last year during ICTP's Open Day and 40th anniversary celebrations. Information about the lectures will be posted on the ICTP website (see www.ictp.it) and published in subsequent newsletters.□

For additional updated information on activities taking place around the globe celebrating the World Year of Physics 2005, see www.physics2005.org.

The John Templeton Foundation has launched an awards programme for scientists and scholars examining the relationship between Islamic culture and modern science. ICTP will oversee the effort.

Templeton Foundation Prizes

The John Templeton Foundation, headquartered in Philadelphia, Pennsylvania, USA, has announced that it will fund five new awards designed to recognise and assist young 'scholar-leaders' who have vigorously examined the 'creative interface' between traditional Islamic culture and modern science. ICTP has been asked to administer the programme. Each prize will carry a cash award of US$20,000.

"In these difficult times," says Charles Harper, the John Templeton Foundation's executive director and senior vice president, "we are pleased to sponsor a series of prizes that we hope will help promising young scholar-leaders better establish themselves as opinion makers within their own countries and regions. We also hope our efforts will help these young scholar-leaders build ties with their peers worldwide."

"Our aim," adds Barnaby Marsh, who directs the Foundation's Venture Philanthropy Strategy and New Programs Development, "is to support scientists engaged in exploring the important challenges posed by the intersection of the worlds of science and religion in a critical part of the world."

The five prizes, to be given annually, include the:

- Abdus Salam Prize for Leadership in Islamic Thought and the Physical Sciences.
- ICTP Prizes (2) for Leadership in Islamic Thought and the Applied Sciences.
- Ahmed Zewail Prize for Leadership in Islamic Thought and the Biological and Chemical Sciences.
- Ahmed Zewail Prize for Leadership in Science and Islamic Life.

Pakistani-born Salam, founding director of ICTP, and Egyptian-born Zewail, professor of chemistry at the California Institute of Technology, are the only two scientists from the Islamic world to have won the Nobel Prize.

"We are delighted that the Templeton Foundation has decided to launch this initiative," says ICTP director K.R. Sreenivasan, "and we are happy that it has chosen the Centre to implement the programme. The goals of the initiative fit well with the Centre's expanding agenda to not only assist individual scientists, which it has done so well over the past 40 years, but also to improve the environment for research in their home countries. The ultimate aim is to ensure that science becomes an integral part of the larger agenda for economic and social development not only in the Islamic world but throughout the developing world."

Candidates will be selected for their 'demonstrated' ability to insightfully and sensitively examine the relationship between Islamic culture and modern science both in scholarly and popular writings. The hope is that recipients of the prize will have displayed—and will continue to display—the talent and drive necessary to engage their colleagues and the larger public in exploring this complex issue, especially their colleagues and the public in the Islamic world.

"This initiative," says Harper, "builds upon several exploratory workshops and conferences convened by the John Templeton Foundation in France and Morocco over the past few years that have focused on religion and science in the Islamic world. Our ultimate objective is to develop a core group of scholars and scientists who can emerge as experts and intellectual trend-setters both within their own countries and regions and throughout the world."□

For additional information about the John Templeton Foundation's Prizes for Leadership in Science and Public Life programme, see www.ictp.it or www.templeton.org.

After being barred for more than a decade, Iraqi scientists can now visit ICTP. Matti Nasir Abdul R. Makadsi, who visited Trieste late last year, was the first to arrive.

Notes from Iraq

When Matti Nasir Abdul R. Makadsi, a 69-year-old professor of physics at Baghdad University, arrived at ICTP in November, he became the first Iraqi scientist to visit the Centre since the United Nations lifted sanctions against his home country in June 2004. The sanctions had been put in place more than a decade earlier following the first Gulf War in 1991.

Matti Nasir Abdul R. Makadsi

By coincidence, he was also the last Iraqi to visit the Centre.

In fact, Makadsi's most recent trip to ICTP had been delayed for more than decade. "I visited the Centre on three different occasions in the late 1980s and early 1990s," he explains, "both as an ICTP Associate and to attend the Centre's colleges on semiconductors and superconductivity. The last trip, planned for 1992, was cancelled when the UN first imposed sanctions on Iraq that prohibited Iraqi scientists and scholars from participating in UN activities. I still have the invitation letter that Luciano Bertocchi, who was ICTP's deputy director at the time, sent to me. No one—least of all me—anticipated then that the restrictions would last so long."

Makadsi's latest journey to Trieste, which was spurred by an invitation from ICTP director K.R. Sreenivasan and which began in late November, was both trying and treacherous. To begin his journey, he hired a van driver to take him from Baghdad to Amman, Jordan. The 16-hour trip across the desert terrain began along stretches of highway in Iraq's battle-torn Baghdad and Al-Anbar provinces that have become infamous for insurgent car bombings and kidnappings.

After safely arriving in Amman, Makadsi remained at a hotel for eight days, the time that it took to finalise his travel arrangements to Italy. A four-hour airplane ride from Amman to Rome, followed by a seven-hour train trip from Rome to Trieste, brought him to the doorstep of the Centre. Makadsi's journey concluded with a 15-minute taxi ride from Trieste's main train station to ICTP's Adriatico Guesthouse.

"My journey took 10 days in all," Makadsi notes. His stay at ICTP lasted just 25 days.

"Iraqi science," Makadsi acknowledges, "has suffered terribly under the restrictions imposed by the sanctions. The two greatest handicaps," he says, "were the inability to learn first-hand about advances in research in other parts of the world and the fact that we were unable either to purchase replacement parts for our laboratory equipment as it wore out or to buy new laboratory equipment as advances were made in technology."

Despite the difficulties faced by Iraq's scientific community, Makadsi asserts that "scientific research and teaching continued to take place through the 1990s and the early years of this decade." He cites his capacity to publish articles in his field of condensed matter physics on subjects such as phase transitions in superconducting compounds and the electrical and optical properties of thin films. He also cites his ability to create and sustain a laboratory at the University of Baghdad devoted to the study of superconductivity, which during the 1990s served as a training ground for seven Ph.D. students. An additional seven doctoral and two master-degree candidates are currently conducting experimental research as part of their training. The creation of the laboratory was sparked by his experience at ICTP.

While international sanctions virtually froze Iraqi science in place throughout the 1990s, Iraqi researchers used their

ingenuity both to maintain their equipment and to conduct the most innovative experiments that they could under trying circumstances.

"We worked doubly hard using our imagination and determination to compensate in part for our inadequate equipment and limited contacts," Makadsi notes.

He proudly points to his own experience to confirm his claim. In the 1990s, scientists in both the United States and Europe turned to state-of-the-art 'discharge sputtering' laboratories to conduct research on solar cells, while scientists in Iraq continued to rely on 'thermal evaporation hydrogenated' facilities to pursue similar research. "Although we were somewhat handicapped," he maintains that "the outdated equipment did not prevent us from pursuing productive research that has contributed to the overall understanding of this promising technology."

While Makadsi welcomes Iraq's new-found access to information and increased mobility, he notes that the chaos and violence that followed the fall of Saddam Hussein has made both life and work more difficult and dangerous than during the years of Saddam's oppressive rule. Last year, Makadsi had his car stolen at gunpoint while entering his garage and, although average citizens are rarely a direct target, innocent people sometimes find themselves in the crossfire between the insurgents and US-led forces or collateral victims of the car bombings directed against Iraqi public officials or police. The British medical journal, *The Lancet*, in October 2004, conservatively estimated that more than 100,000 Iraqis have lost their lives since the US launched their first attacks in March 2003—a figure that has been rising ever since.

Makadsi accepts the situation for what it is and remains neither pessimistic nor optimistic. "In the 1950s," he recalls, "as a student at the University of Baghdad I was suspended from school (and even jailed for brief period) for protesting the regime of King Faisal II, the British-backed ruler of Iraq and, as a result, I had to suspend my studies for four years. In the 1980s, under the regime of Saddam Hussein, virtually all capital funding for university facilities came to a halt and professors' salaries were cut sharply. In the 1990s, Iraqi scientists suffered through years of debilitating isolation created by the sanctions."

While he expresses disappointment with the failure of US-led forces to secure peace ("protection was given only to our oil industry; even the offices and laboratories of the Atomic Energy Commission were left unguarded," he laments), Makadsi is eager to pursue the full range of opportunities beyond Iraq's borders that are now available to scientists in his country. He is particularly thankful for his ability to resume his ties with ICTP after such an extended absence and he hopes that his colleagues—particularly his younger colleagues—will also be able to take advantage of the Centre's research and training activities now that the sanctions have been lifted.

After visiting his sons in Stockholm and London, Makadsi recently returned home—via the same long and arduous route that brought him to Trieste. He is now more determined than ever to embrace the everyday routines of life and work that most of us take for granted.

"The Iraqi people," explains, "are no different than other people: the 'silent community' represents the vast majority of the population. Despite the escalating violence, we remain hopeful—perhaps wishful is a more accurate term—that peaceful solutions to the nation's myriad problems can be found. That would allow us to focus on what we all hold dear: family, friends, spiritual fulfilment and rewarding work."□

Baghdad University

ICTP AND IRAQI SCIENCE

Between 1970 and 1989, more than 200 Iraqi scientists visited ICTP, making Iraq's scientific community among the most active participants in ICTP research and training activities in the Arab world. The number of Iraqi visitors peaked in 1989 when 43 scientists came to Trieste. That number declined to 24 in 1990 as international tensions mounted. It then dropped to zero in 1991, the first year that UN sanctions were imposed. Between 1991 and 2004, not a single Iraqi scientist was able to come to the Centre. Now that the sanctions have been lifted, both ICTP and the Iraqi scientific community hope to re-establish their once-strong ties.

Gallieno Denardo
Former Head, ICTP Office of External Activities

Gallieno Denardo describes the Centre's rapid development in the 1980s—a decade of explosive growth that, in many ways, transformed ICTP into what it is today.

Ideals and Realities in the 1980s

The glory that the Nobel Prize brings to its recipients also brightens the reputation of the institutions for which they work.

But those institutions are usually already well-known throughout the world—the likes of Cambridge, Harvard and Stanford universities. As a result, it's usually the newly minted laureates who gain lasting star status not only among scientists but the public at large.

25th Anniversary celebration, 1989

In the case of Abdus Salam and ICTP, however, the impact of the Nobel Prize boosted the institution as much as and, in fact, even more than the individual.

Abdus Salam received the Nobel Prize in physics in 1979, which he shared with Sheldon Glashow and Steven Weinberg for their theoretical unification of the electromagnetic and weak forces.

The recognition afforded by the prize not only represented a personal triumph for Salam but a boon to the prestige of ICTP and a primary force that soon elevated the Centre to new heights.

In the late 1970s, the Centre operated on an annual budget of US$1.8 million—not much higher in real terms than a decade before.

Spurred by the enthusiasm for the Centre expressed by its foreign minister Giulio Andreotti, an enthusiasm that became even more intense after Abdus Salam won the Nobel Prize, Italy initially decided to raise its annual contributions to ICTP to US$7.3 million. The announcement took place at the ICTP Commemorative Meeting on 'The Next Twenty Years in Plasma Physics' held in Trieste in September 1984. By the end of the decade, ICTP's budget would exceed US$13 million with funding not only from the Italian government but also from the International Atomic Energy Agency (IAEA) and the United Nations Educational, Scientific and Cultural Organization (UNESCO).

This boost in funding meant that the Centre would never be the same.

Not only was ICTP able to greatly expand its core research and training activities in high energy physics, condensed matter physics and mathematics, but it was also able to embrace new subfields and to develop new capacity building strategies that substantially broadened the scope and range of its activities.

Workshops and conferences, for example, in radiopropagation, geophysics, cloud physics and microelectronics were all organised for the first time during this decade, setting the stage for the creation of the Aeronomy and Radiopropagation Laboratory, the SAND (Structure and Nonlinear Dynamics of the Earth) group, and the ICTP-INFN (Italian National Institute of Nuclear Physics) Microprocessor Laboratory. ICTP activities in optics, medical physics, soil physics and a host of other areas all received their start in the 1980s.

In the 1970s, ICTP organised fewer than 15 research and training activities each year. In the 1980s, the annual number of Centre-sponsored research and training activities nearly tripled to 40. In the 1970s, about 1500 visitors on average came to ICTP each year. In the 1980s, the average number of visitors stood at 4000 a year—again virtually a threefold increase.

As the level of activities and the number of scientists participating in ICTP activities rose, the Centre had to take a number of significant logistical steps to accommodate these changes. There was a dramatic growth in staff, which increased from 20 in 1980 to 120 in 1989. With additional help from Italian authorities, ICTP doubled the size of the Main Building through a construction project that began in 1984; occupied the Galileo Guesthouse in 1982; and signed a long-term lease for the Adriatico Guesthouse in 1985. Miramare train station was re-opened in 1987 to accommodate the increased flow of staff and visitors.

Before the 1980s, all ICTP research and training activities took place on the Miramare campus. But now the Centre was ready to 'export' its successful strategies to the developing world—and parts of the developing world were ready to receive them. The infusion of additional resources, of course, provided ICTP with an opportunity to pursue this goal but it was the *ad hoc* advisory committee's recommendation for "the Centre to operationalise activities in developing countries," issued in 1983, that provided the rationale for such endeavours.

To help advance its overall outreach strategy, ICTP first turned to its closest scientific neighbours—the Italian research laboratories—and it did so by creating the Training and Research in Italian Laboratories (TRIL) programme in 1983.

Three primary principles lay behind the birth of the TRIL programme. First, it enabled ICTP to tap the expertise and facilities found in Italy's network of laboratories, allowing the Centre to extend its reach well beyond the research and training activities offered at ICTP. Second, TRIL provided opportunities for scientists from the developing world to engage in experimental and applied physics, a choice not readily available on the Miramare campus where the focus remained largely on theoretical studies. And third, TRIL enabled the Centre to strengthen its ties with scientific institutions in Italy in ways that would benefit both ICTP and its host country. Over the past two decades, some 1000 scientists from the developing world have participated in the TRIL programme, and more than 330 Italian scientific institutions have partnered with ICTP in this effort.

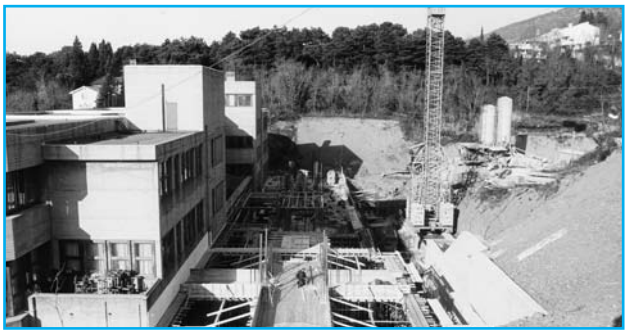
TRIL, however, still confined the Centre's capacity-building strategies to Northern institutions. One of the most fundamental shifts in ICTP's method of operation took place in 1985 with the creation of the Office of External Activities (OEA), which seeks to help scientists in the developing world forge their own research and training agendas by developing research and training activities within their own countries. To advance this goal, OEA has financed the creation of affiliated centres and networks, organised visiting scholars' programmes, and funded workshops and conferences. The point is that all of these activities have taken place 'there' and not 'here,' and that all are designed to have scientists from the developing world assume the lead in the programmes' development and implementation. Over the past two decades, more than 40 affiliated centres and networks have been established, among them the Lasers, Atomic and Molecular Physics (LAMP) Network in Dakar, Senegal, for the African countries, and the Multiple Optical Network (MON), based in La Plata, Argentina, for Latin-American countries.

At the same time, the 1980s, largely as a result of the growing reputation and visibility of ICTP, witnessed the creation of an expanding Trieste-based nexus of international scientific research and training centres that ultimately came to be called the Trieste System.

These institutions include TWAS (the Academy of Sciences for the Developing World) and the International Centre for Genetic Engineering and Biotechnology (ICGEB), both created in 1983, and the International Centre for Science and High Technology (ICS), which was created in 1988. The latter operates under the United Nations Industrial Development Organization (UNIDO).

The 1980s proved to be a stimulating and productive decade, one in which the Centre's programmes were vastly expanded.

All in all, the 1980s were a decade that saw Salam's noble ideals turn into Nobel realities.□



Expansion of Main Building, 1984

ICTP IN THE '80s

1980
- First workshop on earthquake processes

1981
- First college on microprocessors

1982
- ICTP Prize created
- Galileo Guesthouse opens
- First college on biophysics
- First meeting on applications of physics to medicine and biology
- First course on mathematical ecology

1983
- TWAS established
- TRIL programme begins
- First college on soil physics

1984 – 20th anniversary
- Expansion of Main Building
- Books and Equipment Donation programme launched
- Carlo Rubbia wins Nobel Prize for confirming experimentally Abdus Salam's theory
- First college on troposphere, stratosphere and mesosphere

1985
- Italian contribution increases to US$7.3 million
- ICTP Dirac Medal established
- Office of External Activities established
- ICTP-INFN Microprocessor Laboratory established
- Renting of Adriatico Guesthouse begins
- First workshop on cloud physics and climate

1986
- Mathematics research group established
- Adriatico Research Conferences expand training and research in condensed matter physics
- First conference on synchrotron radiation

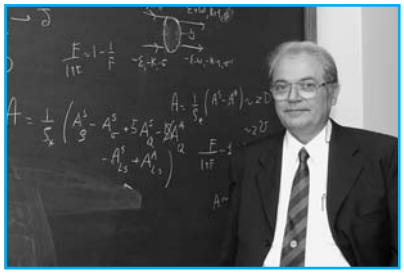
1987
- High Temperature Superconductivity laboratory opens

1988
- Abdus Salam proposes creation of International Centre for Sciences (ICS)
- Creation of Third World Network of Scientific Organizations (TWNSO) and Third World Organization for Women in Science (TWOWS)

1989 – 25th anniversary
- First Staff Associates appointed
- Scientific Computer section installs mini-supercomputer
- Italian contribution reaches US$13.5 million

DATELINE

Slippery Science



Erio Tosatti

Erio Tosatti, former ICTP acting director and a condensed matter physicist at ICTP and SISSA, published an article in the December edition of *Nature Materials* exploring why cars tend to slip on wet roads. We all know that wet roads are dangerous roads. In fact, most of us have been terrified by the experience. But scientists have never been able to devise a convincing quantitative explanation as to why this occurs. Tosatti and his colleagues showed, through a series of simple but illuminating calculations, that wet road surfaces created during and after rainstorms yield a 20-percent reduction in friction, matching in theory what has been observed in practice. In scientific terms, by making the surface effectively less rough, water on wet roads reduces the tires' deformation and decreases the viscoelastic damping of the mechanical energy in the rubber. Simply put, the results can be harrowing. For additional information, see *Nature Materials*, doi:10.1038/nmat1255. The findings were also reported by ScientificAmerican.com (www.sciam.com) on 8 November, and ABC News in the United States on 24 November 2004.

The New York Times on Strings

A feature article in *The New York Times* (7 December 2004) examined the state of string theory 20 years after the concept was first introduced as a theoretical construct that depicted the make-up of the universe as intertwined strings and not single points. The scientists quoted in the article have been among the most active participants in ICTP high energy physics research and training activities over the past two decades: former SISSA (International School for Advanced Studies) director Daniele Amati; Dirac Medallists Michael Green (Cambridge), David Gross (Kavli Institute, Santa Barbara), John Schwarz (Caltech) and Edward Witten (Institute of Advanced Study), and course directors Robbert Dijkgraaf (Amsterdam), Brian Greene (Columbia), Juan Maldacena (Institute of Advanced Study) and Cumrun Vafa (Harvard). Of the 24 scientists mentioned in the article, 19 have visited ICTP.

Nobel Prizes

David J. Gross and Abdus Salam at the ICTP Dirac Medal awarding ceremony, April 1989

Frank Wilczek at ICTP in 1994

The Royal Swedish Academy of Sciences has announced that the Nobel Prize in Physics 2004 has been awarded to: **David J. Gross**, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, CA, USA; H. David Politzer, California Institute of Technology, Pasadena, CA, USA; and **Frank Wilczek**, Massachusetts Institute of Technology (MIT), Cambridge, MA, USA, "for the discovery of asymptotic freedom in the theory of the strong interaction." David Gross won the ICTP Dirac Medal in 1988 and Frank Wilczek won the Medal in 1994. Gross has been conference lecturer at several high energy physics research and training activities from 1989 to 2001. For further information, please see nobelprize.org.

In the News

ICTP director **K.R. Sreenivasan** published an editorial in *Science* examining the impact of ICTP over the past 40 years and the Centre's evolving strategies for improving science in the developing world. For the full text, see the 19 November 2004 issue. The November 2004 edition of *Cern Courier* published a 3-page feature article examining ICTP's accomplishments over the past 40 years, as well as an editorial by ICTP director K.R. Sreenivasan on its next 40 years. *Physics World*'s staff writer Edwin Cartlidge, who visited ICTP just before the 40th anniversary conference, has written a feature article examining the Centre's wide-ranging programmes and impact. The article appears in the October edition of the magazine.

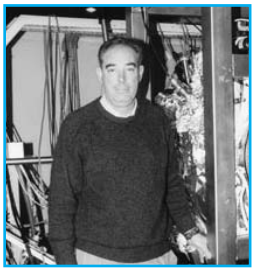
ICTP in Beijing

Sandro Maria Radicella, head of the ICTP Aeronomy and Radiopropagation Laboratory (ARPL), represented Italy at the Workshop on Ionospheric Research for Satellite Navigation and Positioning. The workshop, organised under a Bilateral Agreement on Science and Technology between China and Italy, was held between 29 November and 1 December in Beijing, China. Radicella spoke about ionospheric research at ICTP. He was joined by Roberto Coisson, Scientific Counsellor for the Italian Embassy in Beijing.

2004 ICTP Prize

Bernardo Gabriel Mindlin, Department of Physics, University of Buenos Aires, Argentina, has been named the winner of the 2004 ICTP Prize. The 2004 Prize is being given in honour of Arthur Taylor Winfree, a distinguished theoretical biologist and Regents Professor at the University of Arizona, Tucson, USA, who died in autumn 2002. Gabriel Mindlin is a theorist who has made important contributions to the fundamental, applied and interdisciplinary aspects of nonlinear dynamical systems. In his publications, which include over 50 well-cited papers and several books, he has made original contributions to such fields as diverse as solar activity, lasers, neural modelling, speech recognition and bird songs. The award's ceremony, which will take place on 17 May 2005, will feature a lecture by Mindlin. For additional information, see www.ictp.it.

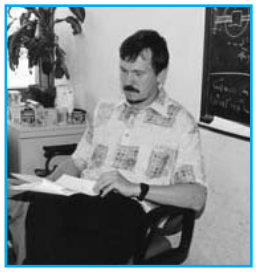
Awards and Accomplishments



Massimo Altarelli

Filippo Giorgi

Lê Dung Tráng



Alexei Smirnov

Massimo Altarelli has been promoted to the post of senior scientific director of Elettra Synchrotron Light Laboratory in Trieste. Altarelli, who came to Trieste in 1999 under a joint appointment with Elettra and ICTP, had previously worked at the physics department of the University of Illinois, Urbana-Champaign, USA; the Max Planck Institute in Stuttgart, Germany; and the High Magnetic Field Laboratory and European Synchrotron Radiation Facility in Grenoble, France. **Filippo Giorgi**, a member of the ICTP Physics of Weather and Climate group, has been included in the Institute for Scientific Information's (ISI) list of Highly Cited Researchers. Based on ISI's citation index, the world's most authoritative index for measuring the impact of publications, Giorgi is included among the 295 most cited researchers in geoscience, placing him in the top 0.5 percent of the most cited researchers in his field. **Lê Dung Tráng**, head of the ICTP Mathematics group, has received an honorary degree of sciences from the Vietnamese Academy of Sciences and Technology (VAST). Lê Dung Tráng has been recognised for his contributions to the development of education and science in Vietnam. The awards ceremony took place in Vietnam in December 2004. **Giuliano F. Panza**, head of ICTP's Structure and Non-linear Dynamics of the Earth (SAND) group and professor of seismology at the University of Trieste, has been awarded the Central European Initiative (CEI) Medal of Honour for his "eminent services to the organisation" as chairperson of the CEI Committee of Earth Sciences. The award's ceremony was held in December in Trieste. **Jagadish Shukla**, who was instrumental in the creation of ICTP's weather and climate research activities and then led the initiative from its inception in 1988 until 1997, has received the American Meteorological Society's (AMS) 2005 Carl-Gustaf Rossby Research Medal. Shukla is currently professor of physics at George Mason University, Fairfax, Virginia, and head of the Center for Ocean-Land-Atmosphere Studies (COLA) in Calverton, Maryland (see "Profile", *News from ICTP*, Autumn 2004). The award, which represents the highest honour that AMS gives to atmospheric scientists, took place in January 2005 at the Society's 85th Annual Meeting, in San Diego, California, USA. **Alexei Smirnov**, staff scientist, ICTP's High Energy, Cosmology and Astroparticle Physics group, has been named a Humboldt Research Fellow, one of Germany's most prestigious awards in science. Smirnov was honoured for his lifetime achievements in physics. The award enables outstanding scientists and scholars from abroad to spend up to six months at the Humboldt Institute to carry out research on projects of their own choosing. Smirnov will begin his fellowship this year.

ACTIVITIES

ICTP 40TH ANNIVERSARY CONFERENCE: LEGACY FOR THE FUTURE

4 - 5 October

Local Organising Committee: K.R. Sreenivasan (ICTP), L. Bertocchi (University of Trieste, and ICTP), G. Furlan (University of Trieste, and ICTP), M.H.A. Hassan (The Academy of Sciences for the Developing World, TWAS, Trieste, Italy), F. Hussain (ICTP), D.H. Johannessen (ICTP), S. Randjbar-Daemi (ICTP), D. Schaffer (ICTP) and E. Tosatti (International School for Advanced Studies, SISSA, and ICTP, Trieste, Italy).

See *News from ICTP*, Autumn 2004, p. 6-7.

INTERNATIONAL BEACON SATELLITE SYMPOSIUM 2004

18 - 22 October

Co-sponsors: Federal Aviation Administration (Washington, DC, USA), International Union of Radio Science (URSI, Ghent, Belgium) and Boston College (Chestnut Hill, Massachusetts, USA).

Organisers: R. Leitinger (University of Graz, Austria), P.V.S. Rama Rao (Andhra University, Visakhapatnam, India) and P. Doherty (Institute for Scientific Research, Boston College).

Local Organiser: S.M. Radicella (ICTP).

WORKSHOP ON DESIGNING SUSTAINABLE ENERGY SYSTEMS

18 October - 5 November

Co-sponsor: International Atomic Energy Agency (IAEA, Vienna, Austria).

Organiser: D.T. Bui (IAEA).

Local Organiser: B. Stewart (ICTP).

7TH WORKSHOP ON THREE-DIMENSIONAL MODELLING OF SEISMIC WAVES GENERATION, PROPAGATION AND THEIR INVERSION

25 October - 5 November

Co-sponsor: European Commission (Brussels, Belgium).

Organisers: B. Bukchin (International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Moscow, Russian Federation) and G.F. Panza (University of Trieste and ICTP).

SCHOOL AND WORKSHOP ON QUANTUM ENTANGLEMENT, DECOHERENCE, INFORMATION, AND GEOMETRICAL PHASES IN COMPLEX SYSTEMS

1 - 12 November

Co-sponsors: QUACS (Quantum Complex Systems) Research Training Network of the European Commission (Brussels, Belgium) and *Scuola Normale Superiore* (Pisa, Italy).

Organisers: V.M. Akulin (*Laboratoire Aime Cotton*, Orsay, France), G. Kurizki (Weizmann Institute of Science, Rehovot, Israel), R. Fazio (*Scuola Normale Superiore*), J. Siewert (*Universität Regensburg*, Germany) and V. Vedral (Imperial College, London, UK).

SCHOOL ON RADIO SCIENCE FOR SOUTH ASIAN SCIENTISTS

6 - 15 November

Organiser: A.P. Mitra (National Physical Laboratory Dr. K.S. Krishnan Marg, New Delhi, India).
Local Organiser: S.M. Radicella (ICTP).

WORKSHOP ON MANAGING NUCLEAR KNOWLEDGE

8 - 12 November

Organisers: P.J. Gowin and Y. Yanev (International Atomic Energy Agency, IAEA, Vienna, Austria).
Local Organiser: B. Stewart (ICTP).

WORKSHOP ON NUCLEAR POWER PLANT SIMULATORS FOR EDUCATION

8 - 19 November

Organiser: A. Badulescu (International Atomic Energy Agency, IAEA, Vienna, Austria).
Local Organiser: B. Stewart (ICTP).

CONFERENCE ON PRACTICAL APPLICATIONS OF FRACTALS

17 - 19 November

Organisers: B. Sapoval (*Ecole Polytechnique*, Palaiseau, France) and A. Vespignani (Indiana University, Bloomington, Indiana, USA).

THIRD WORKSHOP ON DISTRIBUTED LABORATORY INSTRUMENTATION SYSTEMS

22 November - 17 December

Organisers: A.S. Induruwa (Canterbury Christ Church University College, UK), C. Kavka (*Universidad Nacional de San Luis*, Argentina), U. Raich (European Organization for Nuclear Research, CERN, Geneva, Switzerland) and C. Verkerk (formerly CERN).

2ND WORKSHOP ON INTEGRATED CLIMATE MODELS: AN INTERDISCIPLINARY ASSESSMENT OF CLIMATE IMPACTS AND POLICIES

29 - 30 November

Organiser: C. Carraro (University of Venice and *Fondazione ENI Enrico Mattei*, FEEM, Milan, Italy).
Local Organisers: M. Eberle (FEEM) and M. Marsili (ICTP).

MICROPROCESSOR LABORATORY SECOND CENTRAL AMERICAN REGIONAL COURSE ON ADVANCED VLSI DESIGN TECHNIQUES, Puebla, Mexico

29 November - 17 December

Organiser: A. Cicuttin (ICTP).
Local Organiser: S. Blanca Soto Cruz (*Benemerita Universidad Autónoma de Puebla*, BUAP, Puebla, Mexico).

MONITOR

ICTP, Iran Ministry Sign MOU

Jafar Towfighi Darian (centre), Iranian Minister of Science, Research and Technology, visited ICTP on 22 November to sign a memorandum of understanding (MOU) with the Centre that calls for the creation of two joint postdoctoral positions, co-sponsored by ICTP and the Ministry, in basic physics and mathematics; the expansion of the existing federation agreement between ICTP and Isfahan University of Technology to include an additional university; and the admission of up to two Ph.D. students each year in a 'sandwich' programme funded jointly by ICTP and the ministry. ICTP and the ministry also agreed to explore the establishment of cooperative regional activities.

Very Important Visitors

Claudio Tuniz and Pius Yasebasi Ng'wandu

Pius Yasebasi Ng'wandu, Minister of Science, Technology and Higher Education of Tanzania, met with ICTP officials and staff on 30 November. Discussions focused on ways ICTP could be of even greater help to sub-Saharan Africa. The minister acknowledged the enormous contribution that ICTP has made to the physics and mathematics communities throughout the region. But he also stated that he believes that more can be done, especially in areas where science can be put to use to improve the lives of the region's most impoverished citizens.

Djoomart Kaipovich Otorbaev (left), Deputy Prime Minister of the Kyrgyzstan Republic, accompanied by Minister Giancarlo Riccio, Italian Ministry of Foreign Affairs, met with ICTP director **K.R. Sreenivasan** on 8 November to discuss opportunities for additional collaboration between Kyrgyzstan and ICTP.

Arthur J. Carty (left), the Canadian government's National Science Advisor, visited Trieste's scientific institutions on 6 December to discuss possible avenues of international scientific co-operation, especially in nanotechnology. Carty learned about the full range of scientific research in Trieste through a series of presentations that included talks by ICTP director, **K.R. Sreenivasan** (centre), and AREA Science Park president, **Maria Cristina Pedicchio**. He also visited Elettra Synchrotron Light Laboratory and the Centre for Molecular Biomedicine in AREA Science Park. The last stop on his day-long tour was ICTP on the Miramare campus. He was accompanied by **Paul Dufour**, Senior Advisor on International Affairs, and **John Picard**, Director of the Science and Technology Program of the Canadian Embassy in Rome, Italy.

ICTP's Pakistan Chapter

Mohammad Khaleeq-ur-Rahman, University of Engineering and Technology, Lahore, and former ICTP Associate **Arshad Saleem Bhatti**, University of the Punjab, Lahore, have been elected president and secretary of the Pakistan Chapter of ICTP. They will replace former ICTP Associates **Imtinan Elahi Qureshi**, Pakistan Institute of Nuclear Science and Technology, Islamabad, and **Anis Alam**, University of the Punjab, Lahore. The Pakistan Chapter, which is celebrating its second anniversary, serves as a forum for the distribution of information on ICTP activities and, more generally, on research in physics and mathematics. For additional information, contact arshadsb@lhr.paknet.com.pk.

Public Eye

ICTP director **Katepalli R. Sreenivasan**, along with University of Trieste Rector Domenico Romeo, participated in a public forum, "Moving Lives: Fluidity and Exchange Inside the Science Community," held at *Teatro Miela* in downtown Trieste on 10 November. Sreenivasan and Romeo spoke about Trieste's enhanced role in international science and praised the community's response to Open Day (see *News from ICTP*, Autumn 2004, p. 12), expressing hope that this event will mark the beginning of stronger ties between Trieste's scientific community and the public.

Trieste's local television station, *Tele4*, broadcast an interview with **Seifallah Randjbar-Daemi**, head of ICTP's High Energy, Cosmology and Astroparticle Physics group, on 12 November, exploring his work as a scientist and his personal experiences as a resident of Italy for the past 20 years.

Retirements

Hilda Cerdeira, staff member of the ICTP Condensed Matter and Statistical Physics group and head of the eJournals Delivery Service, has retired. Cerdeira, who arrived at ICTP in 1986 to help Stig Lundqvist organise the Adriatico Research Conferences, subsequently played a major role in the development of the Centre's research and training activities. She assisted in organising workshops and conferences in condensed matter physics and was the lead person in the Centre's efforts to expand electronic access to scientific literature for scientists working in the developing world, especially in the least developed countries (LDCs). Cerdeira will relocate to Brazil to join her family and friends. The Centre thanks her for her service and wishes her well.

Faheem Hussain, head of ICTP's Office of External Activities from 1998 to 2004, retired on 15 December. Born in India and educated in the United Kingdom, Hussain first came to ICTP in June 1970 to attend a summer school in high energy physics. During the 1980s, he became a frequent visitor to the Centre, initially as an Associate and then as a visiting scientist in the High Energy Physics group. In 1990, he was hired as a permanent staff member and given the task of helping to launch the Diploma Programme. He was a representative of ICTP's staff union for two terms. Hussain will also be fondly remembered for organising weekly cricket matches for visitors and staff. Hussain will be relocating to Pakistan to teach physics. He will be missed.

Global Security

ICTP hosted the XVI Amaldi Conference on Problems of Global Security on 18-22 November.

Wolfgang K.H. Panofsky

The three-day event, which was sponsored by *Accademia Nazionale dei Lincei*, Italy, featured discussions on the problems of providing independent scientific advice to governmental security policy; nuclear weapons, biological weapons and biodefence research; and dual use technologies. More than 25 scientists from 13 nations and international organisations were in attendance.

IN MEMORIAM

Gabriel Olalere Ajayi, an ICTP Associate from 1992-2004, died on 12 December 2004, in Abuja, Nigeria. He was 63. Ajayi played an essential role in developing ICTP's activities for the advancement of information and communication technologies in Nigeria and he lectured regularly at the Centre's annual schools on digital radiocommunication. A former professor at Obafemi Awolowo University in Ile-Ife, Nigeria, Ajayi was the director general and chief executive officer of the National Information Technology Development Agency (NITDA), Federal Ministry of Science and Technology. His professional experience covered a wide range of activities in telecommunications, broadcasting and computers, including teaching, training, research and development. His friends at ICTP extend their condolences to his family and colleagues.

ICTP has always been a crossroads for science and culture. Two colleagues reminisce about their first encounter in Trieste 40 years ago—and the course of their careers ever since.

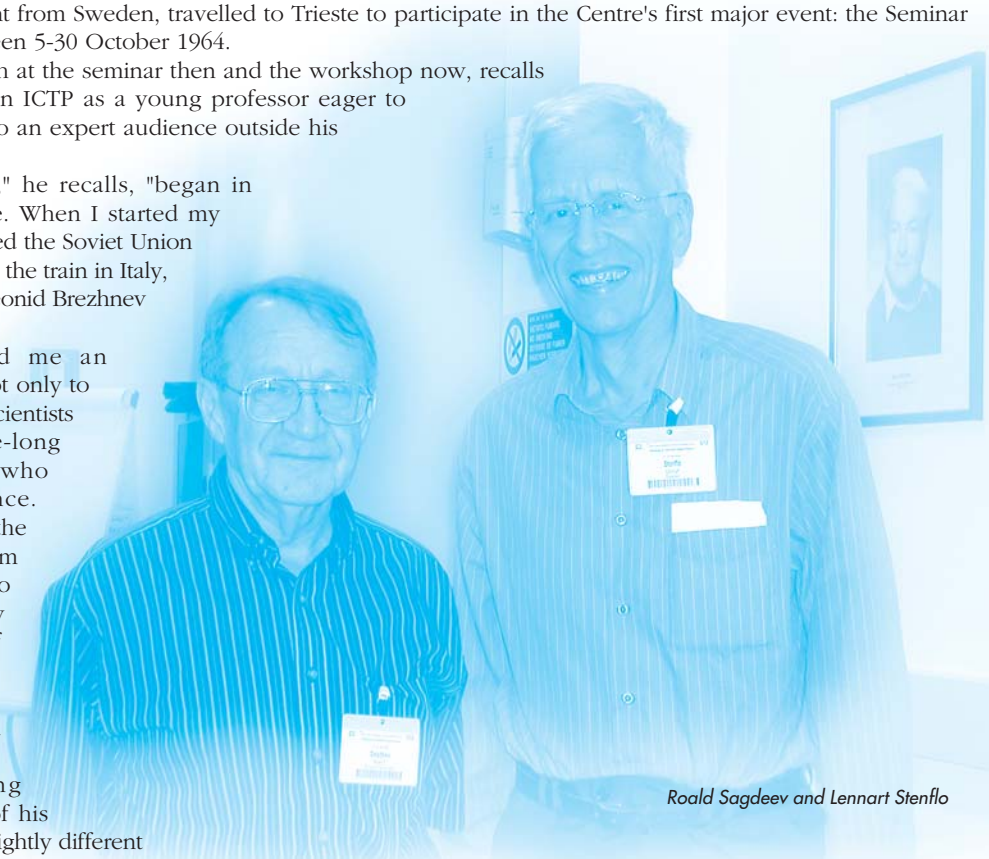
Plasma Memories

When **Roald Sagdeev** and **Lennart Stenflo** recently crossed paths at ICTP's Workshop on Theoretical Plasma Physics, held this past summer, it was by no means their first encounter. In fact, the workshop brought back a flood of memories concerning another ICTP activity that took place 40 years ago when Sagdeev, then a young Soviet professor, and Stenflo, then a graduate student from Sweden, travelled to Trieste to participate in the Centre's first major event: the Seminar on Plasma Physics, held between 5-30 October 1964.

Sagdeev, who lectured both at the seminar then and the workshop now, recalls that he arrived at the just-born ICTP as a young professor eager to present his research findings to an expert audience outside his home country.

"The three-day train ride," he recalls, "began in Moscow and ended in Trieste. When I started my journey, Nikita Khrushchev ruled the Soviet Union and when I stepped down from the train in Italy, I learned, to my surprise, that Leonid Brezhnev had replaced him."

"The workshop offered me an unprecedented opportunity not only to exchange ideas with Western scientists but to begin to nurture life-long friendships with physicists who shared a passion for science. Marshall N. Rosenbluth from the United States, Brian Taylor from the United Kingdom, and Bruno Coppi, who was born in Italy but who spent a good part of his career in the United States, became long-time friends and colleagues whom I first met in Trieste in the fall of 1964."



Roald Sagdeev and Lennart Stenflo

Stenflo, then a young researcher at the beginning of his career, arrived in Trieste with slightly different goals in mind. As a graduate student, the seminar gave him his first opportunity to interact with eminent scientists in a field that he would ultimately call his own.

"Plasma physics was a hot topic," he recently observed, "and it was good to have an opportunity to interact with the community's best scientists. I could not help but be impressed by the intelligence, enthusiasm and commitment of the seminar's lecturers and participants."

Both Sagdeev and Stenflo have gone on to enjoy distinguished careers of their own. Sagdeev has held prestigious positions both in the Soviet Union and the United States. He served as director of the USSR Space Research Institute in the 1970s and as Mikhail Gorbachev's chief science advisor in the 1980s. Between 1989 and 1990, he was a member of ICTP's Scientific Council, a post that he relinquished after emigrating to the United States, where he became a professor of physics at the University of Maryland.

Stenflo, who is a member of the Royal Swedish Academy of Sciences, has been a professor of physics at Umeå University in Sweden since the early 1970s. His fond memories of the Seminar on Plasma Physics in 1964 led him—along with his fellow plasma physicists Padma Kant Shukla, *Ruhr-Universität-Bochum*, Germany, and Robert Bingham, Rutherford Appleton Laboratory, UK—to begin organising topical meetings in plasma physics in 1989. Since then, the three have organised six conferences in Trieste and three others in Portugal and Greece.

"Forty years is a long time," notes Sagdeev, "and I know that Lennart and I have matured a great deal since then. And so has the field of plasma physics, which has turned from a theoretical into an applied science. The Centre too has matured now, ably serving a global scientific community more skilled and more diverse than ever before."

"I like to think that we all have grown better in the years since those youthful excursions in the early 1960s. This much I do know. Activities like ICTP's Seminar on Plasma Physics helped shape the lives and careers of a large number of scientists from many different places, benefitting both scientists and societies around the globe."□

WHAT'S NEXT

6 - 8 January

Research Workshop on Ecosystems and Tourism in Southern Africa: Economic and Ecological Resilience (Chobe, Botswana)

11 - 13 January

Research Seminar Follow-up of the Teaching Workshop on Accounting for Urban Environment (Arusha, Tanzania)

13 - 15 January

12th International Workshop on Computational Physics and Material Science: Total Energy and Force Methods

17 - 23 January

IAG-IASPEI Joint Capacity Building Workshop on Deformation Measurements and Understanding Natural Hazards in Developing Countries

17 - 28 January

ICTP School on LINUX Clusters for High Performance Computing (Kumasi, Ghana)

7 - 18 February

Winter College on Optics and Photonics in Nanoscience and Technology

7 February - 4 March

School on Radio Based Computer Networking for Research and Training in Developing Countries

14 - 25 February

2nd Workshop on Earthquake Engineering for Nuclear Facilities. Uncertainties in Seismic Hazard Assessment

20 - 27 February

Workshop on Algebra, Geometry and Algorithms for Young Mathematicians in Africa (Niamey, Niger)

28 February - 12 March

1st Latin-American School and Conference on Statistical Physics and Interdisciplinary Applications (Havana, Cuba)

1 - 4 March

Conference on Higher Dimensional Quantum Hall Effect, Chern-Simons Theory and Non-Commutative Geometry in Condensed Matter Physics and Field Theory

2 - 4 March

Second IAEA Technical Meeting on the Theory of Plasma Instabilities: Transport, Stability and their Interaction

7 - 11 March

Workshop on Plasma Physics: Capacity Building in Plasma Applications and Diagnostic Techniques

7 - 18 March

Workshop on Nuclear Data for Activation Analysis

14 - 22 March

Spring School on Superstring Theory and Related Topics

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. Katepalli 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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