



NEWS

from

ICTP



the
abdus salam
international centre for theoretical physics



2 WHAT'S NEW

Helping Hand

8 DATELINE

New Staff Members
World Summit
Dirac Medals

13 PROFILE

W.E. Muhogora

3 COMMENTARY

Two Steps Closer

10 REPORTS

July-September 2002

14 MONITOR

Trieste System,
UNESCO, IAEA

4 FEATURES

Bridge Between

New Director

Physics at Work

AUTUMN
2002

#102

15 WHAT'S NEXT

Conferences, Schools,
Workshops

A special grant by ICTP is helping Argentina's physicists overcome some of the difficulties they face due to their nation's economic crisis.

WHAT'S NEW

A Helping Hand

No sector of Argentina's society has escaped the brutal force of the nation's economic storm that began three years ago and shows no signs of abating. Argentina's scientific community, one of the largest and most advanced in Latin America, is no exception.

ICTP recently decided to lend a helping hand to Argentina's hard-pressed physics community when the Scientific Council agreed in May to provide a one-time 'special grant' to research centres and university departments. ICTP contributions will be assigned to existing research projects that would otherwise be interrupted without extra financial support.

This effort, intended to provide some shelter from the incessant economic storm, will be managed through the offices of the Latin American Centre of Physics (CLAF), whose headquarters are located in Rio de Janeiro.

CLAF and ICTP have enjoyed a long and fruitful relationship (see *News from ICTP*, Summer 1999, pp. 6-7) that dates back to the birth of both organisations in the early 1960s and has continued through this year when the organisations reconfirmed their close partnership at CLAF's 40th anniversary ceremony.

Luis Masperi, director of CLAF and a former ICTP Associate, recently spoke about the CLAF/ICTP collaborative effort in Argentina: "CLAF has been following with great concern the current economic crisis in Argentina, trying to gauge its impact on major ongoing physics research projects, especially in Argentina's universities where the situation has been particularly bleak."

"To ease the situation," Masperi says, "CLAF has launched a fellowship and scientific exchange programme in cooperation with the Brazilian government intended to help Argentinean scientists remain active in their fields through direct contact with their colleagues outside their country. At the same time, the government of Argentina, despite the economic difficulties it faces, has sought to create new positions for young scientists who would like to remain at home if given an opportunity to pursue their careers."

These initiatives have sought to address two critical fallouts of the economic crisis in Argentina: increasing isolation and the intensification of the brain drain problem.

A third issue, however, has been left largely unattended.

The precipitous decline in the value of Argentina's currency has made the purchase of laboratory equipment from outside the country prohibitively expensive. For example, a computer that would have cost 1500 pesos before the crisis now costs almost 6000 pesos.

That's where the ICTP special one-time emergency grant will come into play. Under the terms of the grant established by the Scientific Council, each of the selected institutions will receive funds to help it overcome the budget shortfalls for equipment purchases caused by the loss in value of the nation's currency and the accompanying cuts in spending power.

Thirty-one applications have been approved for universities and research centres in, for example, Buenos Aires, La Plata, Bariloche and Córdoba, as well as laboratories in Santa Fe, San Luis, Rosario, and Tandil. The total allocation for the emergency fund has been set at US\$100,000.

As Erio Tosatti, acting director of ICTP, observes: "Helping physicists in Argentina will likely have the added benefit of helping scientists throughout South America. A small investment now to keep worthwhile projects going could have a substantial payoff in research in the years ahead."

Gallieno Denardo, ICTP's acting director of administration who has worked closely with CLAF for many years in his capacity as head of the ICTP Office of External Activities, notes that this is not the first time the Centre has decided to intervene in an emergency situation.

"In 1989, for example, ICTP gave assistance to scientists in eastern Europe to help ease the shock caused by the collapse of the Soviet Union. Through extra funding provided by the Italian Ministry of Foreign Affairs and the regional government of Friuli-Venezia Giulia, ICTP organised a series of training courses on the management of computer networks.

More recently, the Centre has provided funds for the training of scientists and engineers from the Middle East as the centrepiece of its contributions to the SESAME (Synchrotron-light for Experimental Science and Application in the Middle East) project." (see "Two Steps Closer," p. 3.)

Such one-of-a-kind initiatives represent one more aspect of ICTP's continuous effort to lend a helping hand to scientists and scientific communities throughout the developing world. □

Two Steps Closer

Not all of the news coming from the Middle East is as bad as the daily reports we read and hear about. Life does go on—and, in some instances, progress is being made toward a better future.

In science the greatest hope for the region lies in the SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) project. The aim is to eventually install in Jordan a decommissioned synchrotron light facility, BESSY I, previously located near Berlin, Germany (see photo above).

The German government has donated the facility for reconstruction. The expectation is that once it is up and running, BESSY I could become a focal point for scientists and technicians from countries throughout the Middle East—much the same way as CERN (European Organization for Nuclear Research) in Switzerland has served as a gathering place for European scientists since the 1950s.

Last May, the project, which had been spearheaded by Herwig Schopper, former director general of CERN, was officially placed under the wing of the United Nations Educational, Scientific and Cultural Organization (UNESCO). That should make it easier to raise the funds necessary to rebuild the facility at the chosen site of Allaan, about 30 kilometers from Jordan's capital city Amman.

This past June, UNESCO arranged for the shipment of BESSY I, which had been disassembled and placed in storage in Germany. BESSY I has now been relocated to a warehouse in Jordan's Zarqa Free Zone, awaiting its next and hopefully final move to its new home.

The project carries both scientific and political importance. Access to synchrotron beamlines will foster cross-disciplinary research in physics, chemistry, biology and materials science, enabling scientists from countries throughout the Middle East to work together on challenging questions that should help advance science throughout the region on many fronts. At the same time, the environment of co-operation and interaction created at BESSY I may provide an opportunity for promoting peace in a region that has been plagued by distrust and violence for too long.

ICTP has been involved in the SESAME project since its beginning. The Centre's focus has been on training scientists and technicians who can then work at the facility once BESSY I is re-assembled and operational.

"It's an important opportunity for the Centre," says Massimo Altarelli, head of the ICTP group on synchrotron radiation related physics, and science director of *Elettra*, Trieste's synchrotron radiation source based in AREA Science Park.

"ICTP's SESAME training committee has received applications from scientists and engineers throughout the Middle East. Those chosen not only attend training activities in Trieste but have a chance to work in synchrotron radiation facilities throughout Europe. As a result, the effort boosts co-operation among scientists and engineers both in the Middle East and Europe. And since the International Atomic Energy Agency (IAEA) in Vienna is helping to fund and arrange the training activities in Trieste, it helps to draw the Centre and the Agency closer together too."

The ultimate goal is to enable scientists and engineers acquire state-of-the-art knowledge and skills in electronic control systems, vacuum technologies, accelerator physics, and applications in radio frequencies that can be used both in synchrotron physics and, more generally, advanced communications systems.

So far three applicants have been chosen for training in Trieste: two from Jordan, each of whom has received a three-month contract, and one from Pakistan, who has received a six-month contract. The costs for the training will be covered by IAEA, which will work with the Centre to secure funds for additional fellowships.

Both the overall SESAME project and the ICTP-led training component are strongly supported by King Abdullah of Jordan, whose country is hosting the facility. SESAME's other members are Bahrain, Egypt, Greece, Iran, Israel, Morocco, Oman, Pakistan, the Palestine Authority, Turkey, and the United Arab Emirates.

The SESAME project itself will not gain official legal status until at least six members approve the statutes and begin paying their dues. Meanwhile, the hoped-for opening of SESAME has recently moved two steps closer to reality with the transfer of the facility from Germany to Jordan and the launching of the ICTP-led training programme. □

For additional information about ICTP's SESAME training programme, please contact the SESAME Training Committee, c/o ICTP, Strada Costiera 11, I-34014 Trieste, Italy; fax +39 040 2240410.

FEATURES

A Bridge Between

Between Miguel Virasoro's retirement last May and the arrival of ICTP's new director, Katepalli R. Sreenivasan, this coming March, the Centre finds itself in a state of transition.

As the person who has been called—coaxed might be a better word—to stand at the helm of ICTP during this transition, I have felt a bit like a flimsy bridge perched across two massive tectonic plates.

Sure enough, there is no deadly crevice beneath us—no immediate cause for apprehension. Virasoro left ICTP in excellent shape.

New in-house research groups in the physics of weather and climate and in statistical mechanics are flourishing. So are the capabilities of ICTP to meet its training mission in these new critical areas as well as in our more traditional disciplines.

Funding is in good shape, thanks mainly to the support of the Italian government, which has been both generous and foresightful in its policy towards developing countries and, more specifically, in providing young scientists from the South with broad opportunities to pursue their research interests with the resources and dignity that they deserve.

ICTP's infrastructure has been expanded and refurbished. Extensive renovations in the Adriatico Guesthouse have given the Centre ample new lecture rooms. The computerisation of administrative services is now complete and a new state-of-the-art system will soon be in operation allowing all lecture material from ICTP's training sessions to be placed directly on the web.

A dozen new scientific staff posts were recently opened and widely advertised for selecting not just the best brains available worldwide but the most motivated and giving among them—and several of these posts have already been filled. New scientific staff should boost our relevance and improve our ability to help developing world scientists even more.

Meanwhile, the Centre's staff continue to perform their tasks in quiet efficiency, enabling ICTP to carry on its many training and research activities as smoothly as a well-oiled machine.

All of these factors have helped to create an institution that many others envy. More importantly, these elements provide a very solid tectonic plate on which to face the future.

So, where do the fault lines lie? What are the gaps that an acting director must straddle until the next full-fledged director—the next tectonic plate—arrives?

Not surprisingly, despite all the good things, there are some troubled waters to bridge and gnawing gaps to fill. There are indeed important things to do that should not wait.

Here are a few immediate priorities that have stood in front of me and that I have tried to broach during my brief tenure.

The first is to refresh and revitalise contacts with the three parties that oversee the Centre: the United Nations Educational, Scientific and Cultural Organization (UNESCO), the International Atomic Energy Agency (IAEA), and the Italian government.

UNESCO provides the framework for nearly all our administrative functions. Because it is neither a scientific nor an academic institution, it must literally stretch its rules to accommodate some of our unusual procedures. The Centre, in turn, must stretch to fit into UNESCO's rules as best it can, while still being able to function well.



Erio Tosatti

These simultaneous stretching exercises have become more synchronised with the welcome visit to ICTP of UNESCO's head of human resources management, Dyane Dufresne-Klaus. On the science and training side, we are now opening new channels of co-operation with UNESCO's natural sciences sector, headed by Walter Erdelen, most notably through contacts with Maciej Nalecz and Minella Alarcon in the basic sciences programmes.

Relations with IAEA, the Centre's *alma mater* until 1996, which have always been close, are becoming still closer, due to many joint training activities now taking place at ICTP. I have met with Werner Burkart and Hadj Slimane Cherif of IAEA at the Centre and attended the Agency's General Conference this September in Vienna to discuss additional avenues of cooperation.

The Italian government, the third party in the tripartite agreement that guides ICTP, has been kept well informed of our initiatives through continual contact with Nicola Cabibbo, the government's liaison with the Centre, as well as through frequent discussions with Aniello Izzo and Gioacchino Fonti, representatives of the government's research and treasury ministries, together with counsellor Enrico Vicendi.

Italy, however, also deserves to be informed of what ICTP is doing, within the Centre's mandate, that may be of real or potential value to the country. Francesco Caruso, Italy's ambassador to UNESCO; Claudio Moreno, Italy's ambassador to IAEA; and Francesco Aloisi de Larderel, director general, Department of Cultural Promotion and Cooperation of Italy's Foreign Ministry, have been kept abreast of our initiatives and invited to ICTP. A recent visit by Harald Kreid, director general, Central European Initiative (CEI), also provided an opportunity to raise relevant issues concerning the Centre's relationship with its host country and major funder.

We should intensify informal as well as formal contacts and, in fact, do everything we can to make our activities more visible to the public: in Trieste, the city that so graciously hosts us; in Italy, the country that so generously funds us; and throughout the world so that we may more effectively attract young, still unknown scientists in the South striving in isolation, to whom we could lend a helpful hand if only we knew of each other's existence.

That is why I believe our celebration of UN Day in October was such an important event. It helped us to re-establish our ties with local Italian officials and, at the same time, gave us an opportunity to tell our story to a larger public, including national government leaders, through the media.

I would also like to hand over to our new director an institution that enjoys a greater sense of unity. More unity can be achieved by examining decisions together before making them, delegating more effectively, and informing staff about what is to come, good or bad, so that new things will not be perceived, as so often happens when one neglects to inform, as being imposed from above.

Finally, I should like to do something for science at ICTP. After all I am—and will always remain—a scientist.

Ever since I came to Miramare a quarter of a century ago, ICTP has been a good, sometimes excellent, place for analytical theoretical physics—science done with paper and pencil. But it has always been a lesser place for computational theoretical physics—science that needs computers and supercomputers to crunch numbers.

The reason for this disparity goes back to the founding of ICTP by Abdus Salam and Paolo Budinich: both elementary particles physicists who pursued abstract questions and theories that did not require computers for their work. That Roberto Car and Michele Parrinello invented here their celebrated computational method, struggling in 1984 with the terribly inadequate machines that ICTP provided them with at the time, is merely a tribute to their ingenuity.

Today ICTP does have computers but not of the type, power, and speed needed to conduct serious computational physics. Even colleagues from the Third World grin when they note the superiority of their facilities at home. Because ICTP is now developing strong computational research lines in condensed matter physics and in the physics of weather and climate, we have decided to take an important step in remedying this computational deficit by acquiring in-house supercomputer facilities.

The other thing I am doing for science at ICTP is to

oversee, as carefully as I can, the recruitment of new young staff scientists.

A restaurant is only as good as its cooks; a scientific institution is only as good as the people it can attract. If ICTP were to become a haven for second-class scientists, it would seriously erode its standing within the global scientific community and, consequently, its ability to attract the best scientists from both the North and South, who meet and collaborate here.

The thrill of being able to do creative science is a real possibility for every young man or woman with talent. But for that possibility to become a reality, first-class teachers and mentors are essential.

Recruitment of talented young scientists with great potential for future accomplishments and with a gift for giving is what I am striving for in filling ICTP's new scientific posts. I believe such efforts will help advance the ideals of the Centre's founders, Abdus Salam and Paolo Budinich. Lê Dung Tráng, Marcelo Osvaldo Magnasco, Matteo Marsili and Sandro Scandolo, who have all been hired during the past six months, represent critical steps for ensuring a brighter future for the Centre.

I can think of no better way of serving as a sturdy bridge between Miguel Virasoro, who left in May, and Katepalli R. Sreenivasan, who will arrive in March. □

ICTP APPOINTS NEW DIRECTOR



Katepalli R. Sreenivasan, born in India and now a citizen of the United States, has been appointed the new director of the Abdus Salam International Centre for Theoretical Physics. The announcement was made by Walter Erdelen, UNESCO Assistant Director General for Natural Sciences, at the ICTP Scientific Council in Trieste, Italy, on 4 November.

Sreenivasan is a world renowned experimental physicist whose major fields of interest are fluid dynamics and turbulence. He is currently a professor of physics and mechanical engineering at the University of Maryland in the United States, where he also directs the Institute for Physical Science and Technology.

Sreenivasan, 55, received his education in India, first at the University of Bangalore and subsequently at the Indian Institute of Science, Bangalore, where he earned a doctorate in aerospace engineering in 1975. Following two years of post doctoral study in Sydney and Newcastle, Australia, he travelled to the United States to serve as a researcher at Johns Hopkins University in Baltimore, Maryland, and then at Yale University in New Haven, Connecticut, where he was the Harold W. Cheel professor of mechanical engineering and professor of physics, applied physics and mathematics. He moved to the University of Maryland last January.

Sreenivasan has numerous publications to his credit in such fields as turbulence, complex fluids, combustion, cryogenic helium and nonlinear dynamics. He is scheduled to begin his tenure at ICTP in March next year.

FEATURES

Physics at Work

When we think of physics, we often think of abstract, mind-bending intellectual pursuits that have little to do with the real world.

Well, think again. How does physics and money-making sound? Or physics and smoke detectors? Or even physics and coffee beans?

These are some of the unlikely connections that are being made by one of ICTP's newest activities, the Joint Master's Degree Programme on Modelling and Simulation of Complex Realities.

Launched in May 2001, the programme is co-sponsored by the International School for Advanced Studies (SISSA). It is modelled after the successful ICTP Diploma Course programme (see *News from ICTP*, Summer 2001, pp. 4-5).

In the programme's first year (2001-2002), 10 students from 8 different countries were selected from a pool of more than 100 candidates. Reflecting the programme's multidisciplinary nature, the students had earned undergraduate degrees in pure and applied mathematics, environmental physics and biophysics before arriving in Trieste.

"The first six months of study," explains Riccardo Zecchina, co-ordinator of the Joint Master's Degree Programme, "were devoted to course work in a variety of subjects, including probability and game theory, stochastic processes, financial mathematics, fluid dynamics, and combinatorial optimisation. The purpose was to provide students with a strong analytical background in modelling and simulation."

With six months of course work behind them, this fall the students turned their attention to projects with real-world challenges and potential applications. Local and regional businesses were contacted to see if any would be interested in having students work, free-of-charge, on projects that might help companies better understand an important aspect of their businesses or even improve the efficiency of what they do and how they do it.

"Most importantly," Zecchina adds, "we wanted to make sure that the projects would be intellectually stimulating, allowing students to fully utilise the concepts in physics and mathematics and the modelling techniques that they had just been exposed to in the classroom."

After several months of surveying and speaking to members of the business community in Trieste and the surrounding area, some private firms agreed to participate: *Assicurazioni Generali*, *Pittway Tecnologica*, and *Demus*.

Once these companies agreed to welcome students into their work world, the next step was to divide students into

three groups and to assign them specific tasks.

Financial Management. "Financial institutions like *Assicurazioni Generali*," explains Zecchina, "always seek to optimise the return that their clients earn on their investments—that is, financial institutions want to make as much money as possible for their customers."

Yet both financial institutions and the people they serve also know that the higher the return, the higher the risk. The recent high-tech stock market bubble, which began in the 1990s and burst in 2000, is an example of the 'ups and downs' inherent in the stock market.

As a result, the issue for financial institutions and individuals is how to create a portfolio of assets that optimises financial returns while minimising risks.

In the past, financial managers relied on experience and intuition to serve their clients. More recently, they have relied on idealised mathematical models to project market behaviour.

In the real world, however, financial managers must deal with a number of constraints related to the number of assets a client is willing to hold and the size of the investment he or she is willing to make. Combinatorial optimisation and probability theory are the tools that scientists have crafted to devise more analytical—and more accurate—assessments of stock performance.

"We turned *Assicurazioni Generali's* financial management challenge into a math problem," explains Zecchina. "We did this by putting together and analysing a portfolio of stocks to determine the optimal combination for maximising returns and minimising risks. In mathematical terms, we designed an algorithm to find an optimal portfolio composed of a minimal number of stocks."

This could prove an important finding because fewer stocks in the portfolio require less computational time to analyse. And less computational time means reduced costs for the financial management firm.

Smoke Detectors. Moving from financial management to the manufacture of smoke detectors, such as those made by *Pittway Tecnologica*, Silvio Franz, of the ICTP condensed matter physics group, explains that the potential contribution of physics and mathematics here is based on this fact: "Smoke detector manufacturers want to create an alarm system that rings when sensing smoke caused by 'real' fire but is not falsely set off by such factors as traces of smoke caused by lighting a cigarette or turning on a gas stove."

Current smoke detectors rely either on an interruption in light or a rise in temperature to signal an alarm. "The devices

are good but by no means perfect," says Franz. "Light-ray detectors are fast but somewhat unreliable; temperature-dependent detectors, on the other hand, are more reliable but slower to signal a problem."

"To improve the performance of smoke detectors," Franz notes, "our students have investigated the possibility of relying on neural networks, that could reduce the number of false positives without undermining the detector's reliability. The devices would have the added benefit of costing a lot less to manufacture."

The system would work like this: Instead of relying on one parameter, the detector's sensors would rely on a range of parameters to trigger an alarm—for example, the amount of smoke, its density and composition, and rising room temperature.

For ICTP and SISSA, neural networks represent an abstract model; for manufacturers of smoke detectors and many other electronic devices, neural networks ultimately mean wires and circuits.

Theoretically, researchers may be on to something, but additional study and time will be required for their preliminary insights to find their way into the manufacturing process.

Coffee Beans. As *Demus*, one of Italy's largest and most prestigious coffee processors, can attest, public demand for decaffeinated coffee is on the rise. Yet, meeting this demand involves a costly, time-consuming process in which beans are steamed to raise their moisture content bringing the dissolved caffeine to the surface. The steamed beans are then washed in an alkaline solution consisting of methylene chloride to drain them of 99.9 percent of their original caffeine content.

"To achieve this international standard, which is necessary if a company hopes to participate in the international coffee market, each bean must be washed some 10 times during the production process," says Matteo Marsili, staff member of the ICTP condensed matter physics group.

The problem is that when the alkaline solution becomes saturated with caffeine, it loses its absorption capabilities. At that point, the solution must be discarded and replaced.

"Knowing when best to change the solution is no trivial matter," Marsili notes. "The chemicals are expensive and the process can take several hours each time. As a result, both money and time are at stake."

"The bathing process, moreover, is by no means a simple one," adds Marsili. The flow of the solution through the beans, the concentration of caffeine in the beans, the size of the bean pores, and the temperature of the water all have an impact on how efficiently the caffeine is removed

and how long the solution will last.

But what if researchers could develop a computer model that illustrates how to optimise the decaffeination of a single bean? Could *Demus* extrapolate data and information from this model to develop a more efficient decaffeination process saving both time and money?

Like the other ICTP/SISSA student projects, investigations into coffee decaffeination have shown interesting results for *Demus*. Students pinpointed the optimal solution-replacement schedule for their 'synthetic coffee' composed of modelled beans. If this schedule proves a good approximation of the optimal solution-replacement schedule for real coffee beans undergoing a real decaffeination process, then *Demus* will have acquired a powerful tool for making its decaffeination more efficient.

"Yet," as Zecchina cautions, "the field work that is part of the ICTP/SISSA Joint Master's Degree Programme in Modelling and Simulation of Complex Realities is not designed to provide companies with cost-saving strategies for their businesses. In fact, the major criteria that we use in selecting activities is the intellectual challenge that the research questions pose and, equally important, whether something can be learned by students during their three months of field work."

"That's not to say that the experience won't someday help companies become more efficient," he adds. "But ICTP and SISSA are research and training institutions and the education we provide—whether in the classroom, laboratory or field—is intended first and foremost to create top-flight scientists."

"We are indeed thankful to the firms for giving our students opportunities to test their knowledge and skills in unusual settings," Zecchina says. "It's another way to put mathematics and physics to work in a world that increasingly needs the formidable analytical abilities that only these disciplines can provide." □



Riccardo Zecchina

IAEA Fellowships

The International Atomic Energy Agency (IAEA) has signed a memorandum of agreement with ICTP that will substantially expand the organisations' joint Ph.D. fellowship programme for students from developing countries. Participants will now be able to receive training not just at ICTP but at other Trieste-based scientific institutions, including the International Centre for Genetic Engineering and Biotechnology (ICGEB) and the *Elettra* synchrotron light facility, as well as at European laboratories that have collaborative arrangements with ICTP. Up to 30 scientists per year are expected to participate in the programme in such fields as nuclear and laser physics, biotechnology, synchrotron radiation, biophotonics, and mathematical modelling and simulation. **Gallieno Denardo**, ICTP acting director of administration, will be responsible for the programme.

World Summit

ICTP and other scientific institutions that are part of the Trieste System were well represented at the World Summit for Sustainable Development (WSSD), held in Johannesburg, South Africa, between 26 August and 4 September. The Third World Academy of Sciences (TWAS) was one of the primary organisers of the Science Forum held during the summit's first week, and TWAS's executive director, **Mohamed H.A. Hassan**, participated in the roundtable discussions that took place between summit participants and heads of states during the summit's second week. **Arturo Falaschi**, director of the International Centre for Genetic Engineering and Biotechnology (ICGEB), spoke at the summit's plenary session and **David King**, science advisor to UK's Prime Minister Tony Blair, cited ICTP as an ideal model for the training of scientists in the developing world.



Mohamed H.A. Hassan in Johannesburg

Palis Honoured

ICTP Scientific Council member **Jacob Palis**, professor of mathematics at the Institute of Pure and Applied Mathematics, Rio de Janeiro, and immediate past president of the International Mathematical Union, has been elected a foreign associate of the French Academy of Sciences. Palis, who is one of the most influential

mathematicians in Latin America, has concentrated his research on the mathematical principles driving hyperbolic dynamic systems, a field that he helped to pioneer. He has gained additional stature as a thoughtful and powerful voice for the strengthening of advanced mathematical research and training in the developing world.

ICTP-Pakistan Chapter

More than 100 Pakistani alumni of ICTP recently formed an ICTP-Pakistan Chapter. India (1993) and China (1996) have formed similar national chapters for their countries. **N.M. Butt**, scientist emeritus, Pakistan Institute of Nuclear Science and Technology (PINSTECH), Islamabad, has been elected president. The chapter's primary objectives are to enhance the participation of Pakistani scientists in ICTP research and training programmes and raise the public profile of Centre-affiliated activities throughout the country. Specifically, the chapter will hold a lecture series and present award medals in honour of the late Nobel Laureate Abdus Salam, ICTP's founding director, who was born in Pakistan.

Panza Receives Honorary Degree

Giuliano F. Panza, head of ICTP's Structure and Non-linear Dynamics of the Earth (SAND) research group and professor of seismology at the University of Trieste, has been awarded an honorary doctorate in physics from the University of Bucharest in Romania. The degree was given in appreciation of Panza's outstanding contributions to science and society and particularly for his development of a widely accepted innovative methodology for the mitigation of seismic hazard.

Dirac Medal 2002

Three cosmologists have been awarded the ICTP Dirac Medal for 2002: **Alan Guth**, Massachusetts Institute of Technology; **Andrei Linde**, Stanford University; and **Paul Steinhardt**, Princeton University. They have been recognised for their contributions to "developing the concept of inflation in cosmology." The concept, first presented in the 1980s, has shed revealing light on the early history of the universe, which experienced rapid expansion immediately after the Big Bang. The initial force of the expansion lasted only a fraction of a second but its intensity was sufficient to account for the enduring structure of the universe. Guth has been one of the pioneers of this theory, and Steinhardt and Linde have contributed substantially to our understanding of what has become a seminal concept in cosmology. Each winner will receive a medal and a prize of US\$5000. The award ceremonies will take place in 2003.

New Math Head

Lê Dung Tráng has been appointed the new head of the ICTP mathematics group. Lê, who was born in Viet Nam and educated in France, has been a professor at the University of Provence, Marseille, France, since 1999. He has also been the director of research at the *Centre Nationale de la Recherche Scientifique* (CNRS) and a faculty member of the University of Paris and *Ecole Polytechnique*, Palaiseau, France, and Northeastern University, Boston, Mass., United States. He is a member of the Third World Academy of Sciences and serves as editing director of *Travaux en Cours* and *Actualités Mathématiques*. Lê's major fields of research are geometry and theory of singularities.



Lê Dung Tráng

Three New Staff Members

Three new staff members have joined the ICTP condensed matter physics group. Argentina-born **Marcelo Osvaldo Magnasco** received his undergraduate degree in physics from the University of La Plata, Argentina, and his master of science and doctorate degrees from the University of Chicago, USA. He most recently served as associate professor in the mathematical physics laboratory at Rockefeller University in New York City. Magnasco's primary areas of research focus on biological physics and computational neural science, in which he has made noteworthy contributions to our understanding of the dynamics of the cochlea (the hearing organ) and higher oratory functions. Italian-born **Matteo Marsili** received his undergraduate degree from the University of Rome *La Sapienza* and his master's and doctorate degrees from the International School for Advanced Studies (SISSA). He has held post doctorate positions at the University



Matteo Marsili

of Manchester in the UK, and the University of Fribourg in Switzerland. Most recently, he has been an INFM (Italian National Institute for the Physics of Matter) researcher at SISSA. His research has focussed on the interdisciplinary applications of statistical physics to economic and social systems where he has made noteworthy contributions to minority game theory. **Sandro Scandolo** received his undergraduate degree from the University of Pisa, Italy, and his doctorate degree from the *Scuola Normale Superiore* in Pisa. He served on the faculty of SISSA, and as a visiting researcher at Princeton University's Materials Institute in the United States. Scandolo's major fields of interest are condensed matter theory and atomistic simulations, avenues of study tied to materials science, chemical physics, geophysics and planetary science.

Diplomas

On 23 August, students from ICTP's 2001-2002 Diploma class received their diplomas. This marks the 11th anniversary of the Centre's Diploma Course. Since its inception in 1991, more than 300 students from the developing world have successfully completed the programme.



Diploma class 2001-2002

Fields Medals

Vladimir Voevodsky, one of the two 2002 Fields medallists, lectured at ICTP's School and Conference on Algebraic K-Theory and its Applications held in July. Born in the USSR, Voevodsky is a professor at the Institute for Advanced Study in Princeton, New Jersey, USA. The Fields Medals ceremony took place in Beijing, China, at the International Congress of Mathematicians. The medals were awarded by the former Chinese President Jiang Zemin and Jacob Palis, immediate past president of the International Mathematical Union and a member of the ICTP Scientific Council. The Fields Medal is considered to be the Nobel-Prize equivalent for mathematicians. **Alberto Bressan**, of the International School for Advanced Studies (SISSA), in Trieste, was the only Italian plenary speaker at the Congress.

**WORKSHOP ON INTRINSIC MULTISCALE
STRUCTURE AND DYNAMICS IN COMPLEX
ELECTRONIC OXIDES**

1 - 4 July

Co-sponsors: Los Alamos National Laboratory (LANL, Los Alamos, New Mexico, USA) and Office of Naval Research (Arlington, Virginia, USA).

Directors: A.R. Bishop (LANL), S.R. Shenoy (ICTP) and S. Sridhar (Northeastern University, Boston, Massachusetts, USA).

Workshop participants reviewed static and dynamic microscopies; presented theoretical models and simulations of textures; and explored relationships among micro/meso-scale textures, macroscopic properties and technological functionalities. A nanoworld of 'intrinsically inhomogeneous' states has been revealed through high resolution microscopies for such complex systems as superconducting cuprates, CMR manganites, and ferroelectric titanates. The 'texturing' found in such states takes place in low-frequency or diffusive X-ray and neutron spectra; ultrasonic/electromagnetic/dielectric response; and real-space STM imaging. Such concepts as competition between long- and short-range interactions; coupling of spin and charge to lattice strains; and correlated distortions of complex atomic bases of oxide materials could help researchers better understand the relationship of such texturing to, for example, superconductivity or CMR behaviour.

**SCHOOL AND CONFERENCE ON
SPATIOTEMPORAL CHAOS**

8 - 19 July

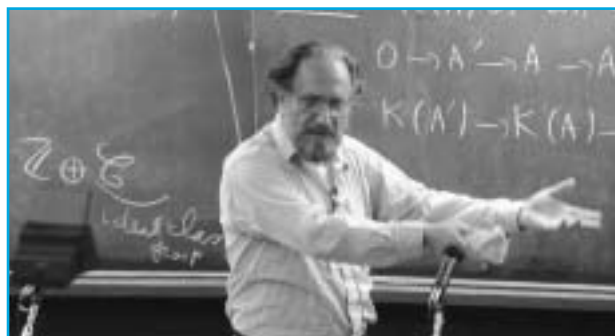
Directors: H. Chaté (*Commissariat à l'Energie Atomique - Centre d'Etudes Saclay*, CEA-Saclay, Gif-sur-Yvette, France), R. Kapral (University of Toronto, Canada) and S. Kuznetsov (Russian Academy of Sciences, Institute of Radio Engineering and Electronics, Saratov, Russian Federation).

Local Organiser: H. Cerdeira (ICTP).

The School examined recent developments in spatiotemporal chaos—an ubiquitous phenomenon that arises in fluid, chemical and other systems with potential applications in many industrial, biological and physical systems. Recent developments have been driven by detailed theories and elegant experimentation. Because spatiotemporal chaos lies at the border between nonlinear science and statistical physics, researchers are able to use concepts and tools developed in both disciplines. The School nurtured exchanges between theoreticians and experimentalists and helped forge links between nonlinear science and statistical physics of far-from-equilibrium systems. Main themes included the statistical mechanical aspects of spatiotemporal chaos and nonlinear waves.

**SCHOOL AND CONFERENCE ON ALGEBRAIC
K-THEORY AND ITS APPLICATIONS, Dedicated
to H. Bass on the Occasion of his 70th Birthday**

8 - 26 July



Max Karoubi

Directors: M. Karoubi (*Université Paris 7*, France), A.O. Kuku (ICTP) and C. Pedrini (University of Genoa, Italy).

Local Organiser: A.O. Kuku.

Algebraic K-theory has grown rapidly due to its fruitful ties to several areas of mathematics, including algebra, topology, algebraic geometry, differential geometry and analysis. K-theory, in turn, has enriched these fields with new structures, methods and concepts. K-theory, in fact, has emerged as a tool for solving problems in several areas of mathematics and, as a result, has become more applicable to other mathematical sciences. This activity, a follow-up to an activity that took place in 1997, emphasised the multidisciplinary nature of K-theory.

**CONFERENCE ON IRREVERSIBLE QUANTUM
DYNAMICS**

29 July - 2 August

Co-sponsors: University of Trieste, and Department of Physics of the University of Trieste.

Directors: F. Benatti (University of Trieste, Italy), R. Floreanini (National Institute for Nuclear Physics, INFN, Italy) and S. Wickramasekara (University of Texas at Austin, USA).

The Conference brought together researchers in physics, mathematics and quantum chemistry, whose studies focus on issues in quantum mechanics related to irreversibility and time asymmetry. The Conference was part of a series that has evolved from the International Workshops on Time Asymmetric Quantum Physics and Rigged Hilbert Space Mathematics, which have taken place in France, Germany, and Spain. Main topics included theoretical aspects of irreversible dynamics in quantum physics; dynamics of open quantum systems; irreversibility and foundations of quantum mechanics; asymmetric time evolution of relativistic and non-relativistic resonance; and time asymmetry, semigroups and causality.

TRIESTE WORKSHOP ON EMERGENT MATERIALS AND HIGHLY CORRELATED ELECTRONS

5 - 16 August



An informal moment of the Trieste Workshop on Emergent Materials and Highly Correlated Electrons

Directors: A. Chubukov (University of Wisconsin, Madison, USA), P. Coleman (Rutgers University, Piscataway, New Jersey, USA), M. Fabrizio (International School for Advanced Studies, SISSA, Trieste, Italy, and ICTP), C. Pepin (*Centre d'Etudes de Saclay*, Gif-sur-Yvette, France), A. Schofield (University of Birmingham, UK), E. Tosatti (SISSA and ICTP) and Yu Lu (Academia Sinica, Beijing, China, and ICTP).

The Workshop represented a continuation of a series of Trieste miniworkshops on strongly correlated matter that took place in the 1990s. The activities, comprised of introductory lectures and in-depth research presentations, are designed both to help students from disadvantaged research communities and to examine cutting-edge research in emerging quantum materials. Special focus was placed on the physics of underdoped cuprate materials; recent developments in field effect transistor (FET) doping experiments; quantum criticality; and heavy electron and perovskite physics. Invitees included both experimentalists and theorists.

CONFERENCE ON THE SCIENCE AND TECHNOLOGY OF SPIN TRANSPORT IN NANOSTRUCTURES

19 - 22 August

Directors: B. Jones (IBM, San José, California, USA), G. Guentherodt (University of Aachen, Germany) and Dan Ralph (Cornell University, Ithaca, New York, USA).

Nanostructure systems and devices are becoming so small that quantum effects are starting to predominate. Such trends have increased the importance of basic science and created opportunities for unique phenomena that could lead to devices with new functionality. Spin currents, the topic of this Conference, opens new avenues of research and technology. Theoretical work is also becoming significant, especially as



John Slonczewski

many-body effects manifest themselves in quantum engineered structures and as quantum computing raises prospects for the miniaturisation of bits and new modes of computing. Marked improvements in our capability for detecting spins; imaging on the atomic scale; performing magnetic microscopy with element-specific contrast; and measuring ultrafast magnetisation dynamics have also increased experimental feasibilities. In addition to covering this cutting-edge topic, the Conference provided an opportunity for younger scientists to learn more about the field. Topics included: current-induced magnetisation reversal; spin injection into semiconductors; quantum mirage; spins in quantum dots; spin transistors; spin tunnel valve systems; and nanomagnets. Discussions covered both basic science and advances in sample preparation and patterning techniques; detection schemes; and technological applications (including future magnetic heads and disks, spin transistors, and other active spintronics devices).

SCHOOL ON STATISTICAL PHYSICS, PROBABILITY THEORY AND COMPUTATIONAL COMPLEXITY

followed by

CONFERENCE ON TYPICAL-CASE COMPLEXITY, RANDOMNESS AND ANALYSIS OF SEARCH ALGORITHMS

26 August - 7 September

Co-sponsors: Intelligent Information Systems Institute (IISI, Cornell University, Ithaca, New York, USA) and Microsoft Research (Redmond, Washington, USA).

Directors: C. Borgs (Microsoft Research), J. Chayes (Microsoft Research), R. Monasson (*Ecole Normale Supérieure*, Paris, France), B. Selman (Cornell University) and R. Zecchina (ICTP).

The past few years have been characterised by increasing interaction among the disciplines of discrete mathematics, computer science and statistical physics on combinatorial problems over random structures and related algorithmic issues. The aim of this activity was to encourage young mathematicians, computer scientists and theoretical physicists to broaden their horizons, learn new subjects, and apply the sophisticated tools developed in mathematics and theoretical physics to the field of computer science.

COLLEGE OF MEDICAL PHYSICS

2 - 27 September

Directors: A. Benini (ICTP), P. Sprawls (Emory University, Atlanta, Georgia, USA) and S. Tabakov (King's College, London, UK).

Local Organiser: L. Bertocchi (University of Trieste and ICTP). *Effective and safe use of medical imaging, which helps save lives and alleviate suffering through effective diagnoses for early detection and treatment of cancer and other diseases, requires the services of a medical physicist. Today the medical profession can turn to a variety of imaging methods, including radiography and mammography, fluoroscopy, computed tomography (CT), ultrasound, magnetic resonance imaging (MRI) and imaging procedures using such*



Perry Sprawls

radionuclides as SPECT and PET. The College consisted of lectures and practical hands-on experience in radiography; mammography; fluoroscopy; computed tomography; magnetic resonance imaging; radionuclide imaging; and ultrasound. The College was designed to contribute to the development of competent medical physicists who can help improve health care in their countries through better medical imaging diagnosis and who can take the lead in proper and safe applications of radiation for diagnostic imaging purposes.

SCHOOL AND CONFERENCE ON INTERSECTION THEORY AND MODULI

9 - 27 September

Directors: E. Arbarello (University of Rome *La Sapienza*, Italy), G. Ellingsrud (University of Oslo, Norway) and L. Göttsche (ICTP).

Local Organiser: L. Göttsche.

This School was devoted to the geometry and intersection theory of moduli spaces in algebraic geometry. The study of moduli spaces has been a central topic in algebraic geometry for the past 30 to 40 years. Connections between the theory of moduli spaces and theoretical physics recently have emerged, leading, for example, to remarkable predictions of intersection numbers on moduli spaces. At a foundational level, the theory of moduli spaces nurtures the study of algebraic stacks. A related problem is the definition and study of invariants of singular varieties reflecting the properties of 'good' resolutions. Topics during the first two weeks included Gromov-Witten invariants and quantum cohomology; invariants of singular varieties; complex symplectic moduli spaces; and vertex operators. The third week was highlighted by expert presentations examining recent developments in the field.

SCHOOL ON NEUTRINO PHYSICS AND ASTROPHYSICS (NEUPAST)

23 September - 4 October

Co-sponsors: European Science Foundation Network "Neutrino Astrophysics" (Strasbourg, France) and National Institute for Nuclear Physics (INFN, Italy).

Directors: G. Senjanovic (ICTP) and A.Yu. Smirnov (ICTP).

The School explored the main achievements of neutrino physics and astrophysics and discussed new perspectives in the field. Lectures, complemented by seminars and exercises, covered the following topics: neutrino propagation in vacuum and different media; solar neutrinos; supernovae and supernova neutrinos; physics of atmospheric neutrinos; high energy neutrinos and cosmic rays; neutrinos and the early universe; long-baseline experiments, CP-violation; theoretical aspects of the neutrino mass and mixing; lepton number violation; and the absolute mass scale of neutrinos.

SECOND ICTP CONFERENCE ON DETECTION AND MODELLING OF REGIONAL CLIMATE CHANGE

30 September - 4 October

Co-sponsor: EC-funded project PRUDENCE (Prediction of Regional scenarios and Uncertainties for Defining European Climate change risks and Effects).

Directors: F. Giorgi (ICTP), R. Jones (Hadley Centre, UK), J.H. Christensen (Danish Meteorological Institute, Copenhagen, Denmark) and M. Beniston (University of Fribourg, Switzerland).

The Conference included papers and poster sessions on the following topics: detection and attribution of climatic trends, emphasising the regional scale; simulation of regional climate change due to increased greenhouse gas concentration; sulfate aerosols and land use changes via coupled atmosphere/ocean general circulation models (A/OGCMs); nested regional climate models; high resolution and variable resolution 'time slice' A/OGCM experiments; analysis of the performance of A/OGCMs and variable resolution models at the regional scale; development and analysis of regional climate models; evaluation of uncertainties in the generation of regional climate change information; and interfacing of climate information and impact assessment models, including statistical downscaling methods. The Conference was designed for scientists and graduate students working in the areas of atmospheric physics and dynamics, climatology, oceanography, physics and mathematics.

6th WORKSHOP ON THREE-DIMENSIONAL MODELLING OF SEISMIC WAVES GENERATION, PROPAGATION AND THEIR INVERSION

30 September - 12 October

Co-sponsor: Training and Mobility Researchers Programme of the European Commission (Brussels, Belgium).

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

The Workshop offered training in advanced research and development methodologies in fundamental studies of the Earth's evolution and dynamics, and in such applied problems as prospecting for mineral resources and estimation and mitigation of possible seismic hazards. Such methodologies are based on an understanding of the physics of seismic wave generation by natural and artificial sources and propagation of these waves through complicated Earth structures. Workshop topics included the theory of propagation, simulation techniques, and methods of inversion of seismic waves generated by natural and artificial sources in realistic Earth structures. Students were exposed to the most recent developments in these areas not only through lectures but by actively participating in computer demonstrations and exercises that examined the following topics: frequency-time analysis; modelling of seismic responses of layered media; source mechanism interpretation using seismic wave data; 2D and 3D seismic tomography; Earth's seismicity; wave propagation; and seismological databases.



PROFILE

W.E. Muhogora is pursuing a career that few others in his home country of Tanzania have.

Physics and Health

The career that ICTP Associate Wilbroad Edward Muhogora has pursued in radiation physics—and, more specifically, in health radiation physics—has not only been filled with continual challenges and rewards; it has proven particularly important to his home country of Tanzania. That's because Muhogora estimates that just five people in all of Tanzania, which has a population that exceeds 30 million, have received advanced training in this field.

Muhogora, who serves on the scientific staff of Tanzania's National Radiation Commission, spends about half of his work time on diagnostics and radiotherapy—providing Tanzania's radiologists and radiation oncologists with the radiation-protection training that they need to optimise the images created by X-rays or the information revealed by radiation isotopes without posing unnecessary risks to a patient's health.

"I spend about another quarter of my time," Muhogora says, "doing radiotherapy, which, as many people know, is a major source of treatment for cancer and other diseases." In addition, Muhogora is also responsible for calibrating Tanzania's four radiotherapy machines that must work with utmost precision if the machines are to provide reliable and effective treatment.

It has been an interesting and rewarding journey of continual discovery for Muhogora—from his earliest school days in Kibondo, a town of 200,000 in western Tanzania, during the 1980s, to the research and training opportunities that he has taken advantage of at ICTP since being appointed an ICTP Associate in 1998.

Along the way, Muhogora received an undergraduate and a master's degree from the University of Dar-es-Salaam, Tanzania's capital city. Moreover, during the past decade, his journey has received a considerable boost from his participation in a variety of International Atomic Energy Agency (IAEA) workshops, ranging from radiation safety and protection to radioactive waste management, that have been held both in Africa and Europe.

This September, Muhogora attended ICTP's College on Medical Physics, helping him build additional dimensions to his research skills that will enable him to better serve his clientele in Tanzania on his return home.

"In addition to my other responsibilities, I head the National Dosimetry Laboratory, which is a member of the World Health Organization/International Atomic Energy Agency (WHO/IAEA) network of secondary standard dosimetry laboratories. This experience, together with my association with ICTP, has strengthened my international connections and led to the publication of several articles in international refereed journals, including the *Journal of Radiological Protection*, *Journal of Radiation Protection Dosimetry* and *Journal of Applied Clinical Medical Physics*."

And that's where Muhogora hopes to continue his journey. "My plans are to eventually earn a doctorate in radiation health physics, perhaps through the recently expanded IAEA/ICTP 'sandwich' programme."

Given the virtual absence of such professionals in Tanzania, this degree—and the training and expertise that it brings—could prove extremely valuable for both him and his country.

Radiation physics. As Muhogora's journey shows, it's a career path that may be difficult to pursue, but far more risky for society to disregard if it wants to provide its citizens with the quality health care that they need and deserve. □



Wilbroad Edward Muhogora



Trieste System

About 40 permanent representatives of the **diplomatic missions to the United Nations organisations in Vienna**, visited Trieste in September to learn more about the Trieste System. The visit was organised by the General Directorate for Cultural Promotion and Cooperation of the Italian Ministry of Foreign Affairs, the Italian Permanent

Mission to the UN organisations in Vienna, and the International Centre for Science and High Technology (ICS), in cooperation with other UN-affiliated scientific organisations in Trieste, including ICTP. Local and regional institutions also participated in the effort.

Visitors from China



A delegation of scientists from the **University of Science and Technology in Hefei**, China, visited ICTP as part of a tour of some of Europe's most prominent scientific institutions. The visitors met with ICTP acting director, Erio Tosatti, and the long-time head of the condensed matter physics group, Yu Lu, who recently retired. They also toured the Centre's library and computer facilities.

UNESCO's Human Resources Director

Dyane Dufresne-Klaus, director of the Bureau of Human Resources Management at the United Nations Educational, Scientific and Cultural Organization (UNESCO), which serves as the lead administrative agency for ICTP, recently visited the Centre. She was accompanied by **Ieng Srong**, the Bureau's legal officer. Dufresne-Klaus and Srong met with ICTP acting director, Erio Tosatti, as well as the Centre's scientific and administrative staff.



APEX Award

People and Places, an edited collection of interviews with ICTP visiting scientists, has been awarded an Apex Award for Publications Excellence in the category "special purpose brochures, manuals and reports." You may view the booklet online at <http://www.ictp.trieste.it/~pio/People&Places.pdf>, or, if you prefer, you may request a print copy at sci_info@ictp.trieste.it.

IAEA General Conference



The International Atomic Energy Agency's (IAEA) 46th General Conference was held at the Agency's headquarters in Vienna on 16-20 September. Among those attending the conference were ICTP acting director, **Erio Tosatti**, and ICTP acting director of administration, **Gallieno Denardo**. Tosatti made a presentation before a small group of IAEA officials at a special session of the Conference (see photo). ICTP also had two posters on display describing the long history and broad range of current research and training activities shared by the Agency and the Centre.

IN MEMORIAM



J. Mayo Greenberg, 79, a pioneer in astrochemistry and astrobiology, recently died in Leiden, The Netherlands. Greenberg studied theoretical physics at Johns Hopkins University (USA). His initial

interest in astronomy was sparked during visits to the University of Leiden, where he moved in 1975 to establish and direct the laboratory for astrophysics. His primary area of research focussed on the origins of life, but he also devoted much effort to science education and the popularisation of science. Greenberg lectured at ICTP in 1994, 1995 and 1997.

Sergio Stabile, who worked for ICTP and SISSA (International School for Advanced Studies) since their inception in a variety of administrative posts, died last April at 76. He was appointed to an entry-level position at the University of Trieste in 1953, and later became an assistant to Paolo Budinich, co-founder of ICTP and founder of SISSA. For more than 40 years Stabile rendered valuable everyday services to ICTP and SISSA administrative staff and scientists. After his retirement, he continued to frequent ICTP until a few months before his death.



4 - 5 October

Round Table on Developing Country Access to On-Line Scientific Publishing: Sustainable Alternatives

7 - 18 October

Workshop on Enhanced Energy System Analysis for Sustainable Development

12 - 15 October

Workshop on Tethysides Structure and Evolution

14 - 25 October

Workshop on Advanced Nuclear Power Plant Simulation

14 - 25 October

Workshop on Quantum Information and Quantum Computation

28 October - 8 November

Joint ICTP-INFM School/Workshop on Entanglement at the Nanoscale

28 October - 22 November

Seventh College on Microprocessor-Based Real-Time Systems in Physics

11 - 20 November

II Workshop on Web Enabling Technologies for Scientists

11 - 22 November

Workshop on Theoretical Plasma Physics

21 - 22 November

First European Workshop on MathML and Scientific e-Contents

25 November - 13 December

ICTP Microprocessor Laboratory Asian Course on Advanced VLSI Design Techniques Using a Hardware Description Language, to be held in Manila, The Philippines

25 November - 13 December

Third International School on Atmospheric Radar

2 - 6 December

A Colloquium on Geometry, in Honour of M.S. Narasimhan, on the Occasion of his 70th Birthday



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.trieste.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.trieste.it

Subject: get calendar 2003

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.trieste.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 replies 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.trieste.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.trieste.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. Erio Tosatti serves as the Centre's acting 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.

Editor-in-Chief

Daniel Schaffer

Staff Writer/Direttore responsabile

Fabio Pagan

Managing Editor

Anna Triolo

Copy Editor

Katrina Danforth

Statistician

Giuliana Gamboz

Photos

Massimo Silvano,
ICTP Photo Archives

Layout

Associazione Progettisti Grafici

Printed by

Arti Grafiche Friulane



public information office

the
abdus salam
international centre for theoretical physics

strada costiera, 11
34014 trieste
italy
sci_info@ictp.trieste.it
fax: (+39) 0402240565
www.ictp.trieste.it