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# TWAS newsletter

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The global culture of science is constantly evolving, but today we are in a period of profound, rapid change. TWAS is changing, too, to maintain and extend its leadership on issues of science and engineering in the developing world.

Since the founding of the Academy 30 years ago, our membership has been divided into Fellows and Associate Fellows. Fellows were scientists from developing countries who had achieved the highest standards of excellence in their work. Associate Fellows lived and worked in developed countries, but their work had brought dramatic benefits to science in developing countries. Historically, they were about 15% of our members.

Under a decision taken by the Academy at its 24th General Meeting in Buenos Aires, the division will be erased. TWAS membership beginning next year shall consist of 'Fellows' only.

This could seem like a change of limited impact on the affairs of our Academy. Even under the revised statute, scientists who live

and work in the developing world will continue to make up about 85% of our membership. But this shift reflects TWAS's changing relationship with global science.

Increasingly, scientists and engineers from the developing world are making major contributions not just in their home countries, but also at the global level. That is evident in Argentina, where scientists at the private company INVAP have built a satellite for NASA. China is leading the world in materials science publications. Brazil is a global leader in energy development, and India's tech sector has renowned strength.

## Building networks for a new era of science

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by The World Academy of Sciences -  
for the advancement of science  
in developing countries (TWAS)  
ICTP Campus, Strada Costiera 11  
34151 Trieste, Italy  
tel: +39 040 2240327  
fax: +39 040 224559  
e-mail: info@twas.org  
website: www.twas.org

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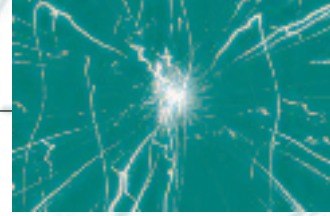
ASSISTANT EDITORS  
Cristina Serra  
Sean Treacy

DESIGN & ART DIRECTION  
Rado Jagodic  
www.studio-link.it

PRINTING  
Stella Arti Grafiche, Trieste

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# BRINGING LIGHT INTO THE DARKNESS

**TWAS-LENOVO PRIZE WINNER CLAUDIO BUNSTER WEITZMAN  
ADVANCED BOTH THEORETICAL PHYSICS AND CHILEAN SCIENCE**

**T**heoretical physicists frequently serve as the stewards of impossible-seeming ideas, trying to reconcile the inconceivably enormous with the inconceivably small. Similarly, scientists from the developing world can be caught between their desire to practice on the edge of their field and the realities of paltry science budgets or even authoritarianism. Scientists who manage to reconcile this conflict leave an impact like few others.

The 2013 TWAS-Lenovo Science Prize, one of the most prestigious prizes given to scientists in the developing world, was awarded to such a reconciler: Chilean theoretical physicist Claudio Bunster Weitzman. The prize, the most important given by TWAS, was awarded for his contributions to understanding gravity and the quirky physics of tiny, fundamental



particles of matter. It was presented to Bunster on 1 October at a special ceremony during the 2013 TWAS General Meeting in Buenos Aires, Argentina, and he joyfully thrust the prize into the air as applause from the crowd washed over him.

“Coming to Buenos Aires to receive this prize from The World Academy of Sciences and Lenovo is to be rewarded at home by the world,” Bunster said. “It is perhaps symbolic that the phone call from TWAS President Professor Bai Chunli with the good news was placed from Beijing in China to Valdivia in Chile: two places with a time difference of 12 hours, and whose latitudes are the same in magnitude, but one North and the other South.”

The honour includes a prize of USD100,000 provided by Lenovo, the Chinese technology firm. Lenovo is a



Chilean physicist Claudio Bunster Weitzman (centre) celebrates after receiving the TWAS-Lenovo Science Prize. (Photo: Roque Silles)

USD30 billion personal technology company, and one of the top two PC makers globally, serving customers in more than 160 countries. Dedicated to building exceptionally engineered PCs and mobile Internet devices, Lenovo's business is built on product innovation, a highly efficient global supply chain and strong strategic execution.

"Being a global technology firm originated from a developing country, we understand how science and technology can be of great value and importance to a growing economy," said George He, chief technology officer at Lenovo. "We felt deeply the responsibility to help promote and support fundamental research in developing countries. Work like Dr. Bunster's, which started a school of theoretical physics in Chile, is most meaningful and has far-reaching impacts in this sense."

Bunster's work has been on the frontier of several areas of theoretical physics, sometimes even bringing them together in creative ways. He has tackled such mysterious topics as black holes, incredibly massive collapsed stars where the gravity is so intense that

even light cannot escape, and magnetic monopoles, extremely minuscule particles that some physicists suspect generate magnetic field lines. Equations consistently give physicists cause to believe magnetic monopoles exist even though they have never been seen in action. Bunster has worked with other leaders in the field to consider creative ideas, such as that the particles might be so elusive because they are hiding in the difficult-to-observe black holes.

"The work done by Claudio Bunster Weitzman over the course of a very productive career has improved our understanding of the fundamental workings of nature," said Bai. "He is a world-class scientist, and he is a powerful symbol of the excellent science that is being done by researchers in the South."

Bunster was born in Santiago, Chile, on 15 April 1947. He was educated at *Universidad de Chile* and Princeton University (USA). He has taught at Princeton, the University of Texas at Austin and *Universidad de Chile*, and he has been a long-term member of the elite Institute for Advanced Study in Princeton. He has

received the Chilean National Science Prize, the Humboldt Award, is an honorary member of the International Solvay Institutes and a foreign associate of the US National Academy of Sciences.

Bunster’s interest in theoretical physics began with the problem in classical dynamics called the radiation reaction – a recoil force from when a charged particle emits electromagnetic radiation. His work on the problem led to a new interpretation of the equation behind the motion. Later, his work focused on general relativity – the theory describing the curvature of spacetime by gravity – shedding light on areas such as the nature of black holes. For example, his work has shown that when a black hole swallows a magnetic monopole, the black hole starts rotating, like the enormous one in the centre of the Milky Way does.

The prize not only honours Bunster’s scientific achievements, but acknowledges his role as a scientist who stood for promoting scientific research in his home country even while it was

the world could visit and bring some light into the darkness”, Bunster told the US National Academy of Sciences in an interview for a 2008 profile.

In 1984, he founded the *Centro de Estudios Científicos* (CECs) in Chile, an independent research centre. Even though he was forbidden from teaching at Chilean universities by the Pinochet regime, CECs’ success eventually led Bunster to permanently settle in Chile. He has been the director of CECs since its founding, and the centre is currently home to first-rate research in theoretical physics, biological sciences, glaciology and climate change.

He was elected to TWAS in 1991. At the beginning of his lecture at the Buenos Aires meeting, Bunster reminisced the early days of the ‘dear little centre’ in Trieste, ICTP, out of which TWAS emerged. He said the Academy’s current state as a promoter of science in the developing world provides valuable proof that such an institution can work. “I think that Abdus [Salam] would be happy and proud.”

He then, with the help of five whiteboards and a short length of rope, gave a lecture on the physics of electromagnetism and spacetime. Electricity and magnetism are part of the same physical force, called the electromagnetic force, a principle first established in Scottish physicist James Maxwell’s equations a century-and-a-half ago. But this duality is in tension with theories describing spacetime.

This is the first year ever for the TWAS-Lenovo Science Prize, the successor to The Ernesto Illy Trieste Science Prize that ran for eight years. During its first four-year cycle (2013–2016), the TWAS-Lenovo prize subject is focusing on the basic sciences, with the subject area changing each year: physics and astronomy in 2013, biological sciences in 2014, mathematics in 2015 and chemical sciences in 2016.

“I want to thank Lenovo for their generous support to TWAS,” Bai said. “We sincerely hope the establishment of TWAS-Lenovo Science Prize will further stimulate science advancement in important fields, across the developing world.”

***Claudio Bunster Weitzman is a powerful symbol of the excellent science that is being done by researchers in the South.***



enduring the oppressive dictatorship of General Augusto Pinochet. After about 15 years abroad in the United States, Bunster returned to Pinochet’s Chile to show through example that a world-class science institute could be established in the developing world.

“I felt that precisely at that time I could be more useful, and this could be best accomplished by having an independent place where colleagues from all over

◆◆◆ Sean Treacy

# WHAT'S TWAS?

THE WORLD ACADEMY OF SCIENCES FOR THE ADVANCEMENT OF SCIENCE IN DEVELOPING COUNTRIES (TWAS) IS AN AUTONOMOUS INTERNATIONAL ORGANIZATION THAT PROMOTES SCIENTIFIC CAPACITY AND EXCELLENCE IN THE SOUTH. FOUNDED AS THE THIRD WORLD ACADEMY OF SCIENCES BY A GROUP OF EMINENT SCIENTISTS UNDER THE LEADERSHIP OF THE LATE NOBEL LAUREATE ABDUS SALAM OF PAKISTAN IN 1983, TWAS WAS OFFICIALLY LAUNCHED IN TRIESTE, ITALY, IN 1985, BY THE SECRETARY GENERAL OF THE UNITED NATIONS.

TWAS has more than 1,000 members from 90 countries, 73 of which are developing countries. A 13-member council is responsible for supervising all Academy affairs. It is assisted in the administration and coordination of programmes by a secretariat, headed by an executive director and located on the premises of the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy. The United Nations Educational, Scientific and Cultural Organization (UNESCO) is responsible for the administration of TWAS funds and staff. A major portion of TWAS funding is provided by the Italian government.

The main objectives of TWAS are to:

- Recognize, support and promote excellence in scientific research in the South.
- Provide promising scientists in the South with research facilities necessary for the advancement of their work.
- Facilitate contacts between individual scientists and institutions in the South.
- Encourage South-North cooperation between individuals and centres of science and scholarship.

TWAS played a key role in the establishment, in 1993, of the Organization for Women in Science for the Developing World (OWSD, formerly the Third World Organization for Women in Science, TWOWS). More than 3,850 women scientists from 95 developing countries and 28 developed countries are members of OWSD, making it the largest organization of women scientists in the world. Membership also includes nearly 100 men from 31 developing countries and two developed countries. Its main objectives are to promote the leadership of women in science and technology in the South and to strengthen the participation of women in science-based development and decision-making. The secretariat of OWSD is hosted and assisted by TWAS.

••• [www.owsd.net](http://www.owsd.net)

Since 2000 TWAS has provided the secretariat for IAP, the global network of science academies. IAP, established in 1993 as the 'InterAcademy Panel on international issues', unites more than 100 science academies worldwide; provides high-quality independent information and advice on science and development to policymakers and the public; supports programmes on scientific capacity building, education and communication; and leads efforts to expand international science cooperation.

••• [www.interacademies.net](http://www.interacademies.net)

Since 2004 TWAS has also hosted the secretariat of the InterAcademy Medical Panel (IAMP), an association of the world's medical academies and medical divisions of science academies. IAMP is committed to improving human health worldwide through the coordinated action of its 70 members. ••• [www.iamp-online.org](http://www.iamp-online.org)