TRIESTESCIENCEPRIZE

Press release

TRIESTE SCIENCE PRIZE WINNERS 2008

Trieste, Italy, 29 September 2008

Beatriz Barbuy, an eminent Brazilian astrophysicist who has made a major contribution to the study of the evolution of the chemical composition of stars, and Roddam Narasimha, an internationally renowned Indian engineer and physicist whose work in fluid dynamics has increased our understanding of turbulence, have been awarded the 2008 Trieste Science Prize.

The prize, administered by TWAS, the academy of sciences for the developing world, and illycaffè in collaboration with the city of Trieste and *Fondazione Internazionale per il Progresso e la Libertà delle Scienze*, provides international recognition to outstanding scientists living and working in the developing world. Winners share a US$100,000 cash award. The prize has received the High Patronage of the President of the Republic of Italy.

Beatriz Barbuy, professor at the Institute of Astronomy, Geophysics and Atmospheric Sciences at the University of São Paulo (IAG/USP), Brazil, and vice-president of the International Astronomical Union (IAU), is being honoured for her contributions to astrophysics and, in particular, for enhancing our understanding of the evolution of the chemical composition of stars.

Barbuy's research has shed light on the formation of the Milky Way through studies of its oldest components. She was the first to demonstrate that metal-poor stars in the galactic halo (the faint sphere surrounding the galactic disk) have an overabundance of oxygen, relative to iron. This indicates that the halo was chemically enriched by 'supernova' explosions of massive first-generation stars, which may have been 500 times the size of the sun.

Hydrogen and helium were the only elements produced in abundance during the formation of the first generation of stars. All of the heavier elements, which astronomers call ‘metals’, were subsequently produced by stars through nuclear fusion. At the end of a star’s life, some of these elements were recycled into the stellar medium, from which the next generation of stars (with greater 'metallicity') was born.

Metal-poor stars are old stars. Their composition presents a celestial 'fossil-like' record of the nucleosynthesis processes of the very first stars, giving clues to the formation of the Milky Way.

Barbuy is an expert in both observational astronomy and the analysis and interpretation of spectroscopic data. Through the use of spectroscopy, astronomers are able to separate light coming from stars into wavelength spectra, from which they can derive the stars' chemical composition and other information. Her skills in spectroscopy have allowed her to assemble a large library of synthetic spectra that has aided many other researchers in their investigations of our own and other galaxies.

Roddam Narasimha, chairperson of the Engineering Mechanics Unit at the Jawaharlal Nehru Centre for Advanced Scientific Research, in Bangalore, and Pratt & Whitney professor of science and engineering at the University of Hyderabad, India, is being recognized for his contributions to fluid dynamics and, in particular, the role that turbulence plays in aerospace technology and atmospheric sciences.

Understanding turbulence carries both scientific and practical significance. Narasimha’s contributions have extended to aircraft design, monsoon predictions and the prospects of using wind energy in rural India. He has also conducted important work on shock wave structure and turbulent shear flows. He is best known for his research on the transitions between laminar and

turbulent flows. 'Laminar flow' is the smooth movement of fluid (for example, air or water) in parallel layers or paths (streamlines). Turbulence is the chaotic movement of fluid.

A search for the hidden order in chaos has been a fundamental motif of Narasimha's work. His path-breaking research includes examinations of the ways in which chaos can arise from ordered motion and the structure and memory of fully turbulent flows.

Narasimha has played a key role in the development of aerospace technology in India. As director of the Indian National Aerospace Laboratories from 1984 to 1993, he helped boost the institution's profile and effectiveness. He has also served on the Scientific Advisory Committee to the prime minister of India, the Indian Space Commission, National Security Advisory Board and Aeronautics Research and Development Board.

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Editor's Notes:

*The **Trieste Science Prize**, administered by TWAS and illycaffè and now in its fourth year, is designed to bring recognition and distinction to the developing world's most eminent scientists who have not yet been honoured by other international award schemes. The prize, awarded under the High Patronage of the Presidency of the Republic of Italy, is dedicated to Trieste, a city in northeast Italy that has made significant contributions to the promotion of science in the developing world. Given annually, it rotates among the following fields: biological sciences and physics/astrophysics (2005); mathematics and medical sciences (2006); agricultural sciences and chemical sciences (2007); and engineering sciences and astronomy, space, ocean and atmospheric sciences (2008).*

TWAS** is the world's foremost academy for scientists from the developing world. Its membership currently consists of 873 eminent scientists, more than 80 percent of whom live and work in the developing world. Based in Trieste, Italy, in addition to administering the Trieste Science Prize, TWAS also sponsors a large number of research and training programmes for scientists from the developing world. **www.twas.org

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For additional information, please contact:
TWAS: Daniel Schaffer, +39-040-2240-538, +39-040-2240-387, schaffer@twas.org
illycaffè: Anna Adriani/Christine Pascolo, +390403890111
Cohn&Wolfe: Alberto Bottalico/Giulia Perani, +3902202391