BIOS

Andrea Centazzo

In a career spanning more than 30 years, composer, conductor, percussionist and video artist Andrea Centazzo has performed in more than 1,500 concerts in Europe and the United States. He has recorded over 150 albums and authored 350 compositions, including operas, symphonies and solo works, as well as eight musicology books. He has appeared on numerous radio and television broadcasts worldwide and has received many international awards. Over the past twenty years, Centazzo has been creating multimedia experiences that combine live music with video images, blending traditional instrumentation with the latest digital technology.

K.C. Cole

K.C. Cole is a science writer for the *Los Angeles Times* and a professor at USC Annenberg's School of Journalism. She has written eight nonfiction books, including *Something Incredibly Wonderful Happens: Frank Oppenheimer and the World He Made Up*, as well as articles for the *New Yorker*, the *New York Times*, *Smithsonian* magazine and the Columbia Journalism Review. Cole is interested in the natural connections between science, art and politics, and she hosts Categorically Not!, an "irregular" series of events exploring these intersections at Santa Monica Art Studios.

Elena Pierpaoli

USC cosmologist Elena Pierpaoli works to understand the universe in which we live, including its overall structure, composition, origins and evolution. By analyzing measurements of the cosmic microwave background, she helped to show that the universe is flat. She has done extensive work on dark matter and galaxy clusters, and is part of the science team for the mission Planck.

Michele Vallisneri

A theoretical physicist at NASA's Jet Propulsion Laboratory, Michele Vallisneri received his PhD in physics from Caltech. He is a member of the LIGO Scientific Collaboration and the deputy mission scientist for LISA, the planned space-based gravitational-wave observatory. His research interests span the detection, analysis and interpretation of gravitational-wave signals, computational physics and the creative interface of science and art as explored through music, visualization and computer programs.

Presented by Visions and Voices: The USC Arts and Humanities Initaitive.
Organized by Elena Pierpaoli (Physics and Astronomy).

www.andreacentazzo.com • www.ligo.org • www.lisa.nasa.gov

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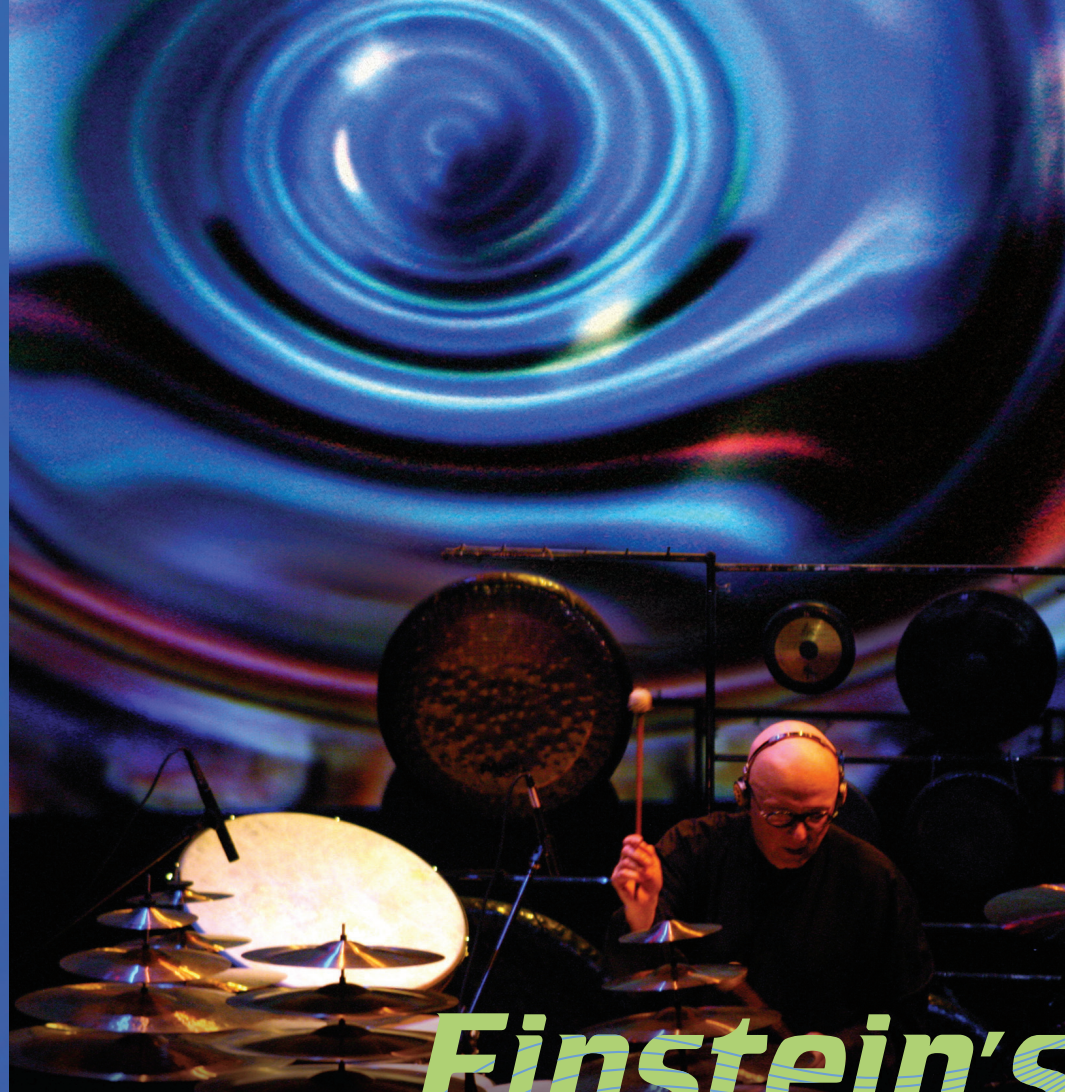

Einstein's Cosmic Messengers

Friday, October 22, 2010, 8 p.m.
Bovard Auditorium
University of Southern California

EINSTEIN'S COSMIC MESSENGERS

Art and Science Illuminate the Quest for Gravitational Waves

Gravitational waves are ripples in the fabric of space and time produced by violent events in the Universe. Albert Einstein predicted their existence in 1916; but only in the last two decades have we achieved the technology to detect them, enabling ground-based detectors such as the U.S. LIGO, and in the future the space-based observatory LISA. Gravitational-wave measurements will illuminate the fundamental nature of gravity and throw open an entirely new window onto the Universe, offering views of previously inaccessible phenomena such as the coalescence of black holes and neutron stars. They will complement the great discoveries of ground- and space-based astronomy and the investigations of missions such as Planck, which observes the radiation originating from the Big Bang itself.

PROGRAM

Andrea Centazzo

Einstein's Cosmic Messengers, multimedia concert for solo performer and video images

1. The Astronomer's Quest

Since our earliest days on Earth, humankind has felt the urge to look up and probe the mysteries of the Cosmos. Slowly the science of astronomy has emerged from magic thinking and astrology.

2. Eternal Discoveries

In the 20th century, technological breakthroughs and the beginning of space science have allowed us to peer out to the edge of the observable Universe, realizing the promise and dreams of generations of early astronomers, to whom this section is an homage.

3. Albert's Lesson

Between 1905 and 1915, Albert Einstein revolutionized our concepts of space, time and gravity. He based his achievement on the modern tools of theoretical physics, but also on years of profound reflection about physical reality, distilled in thought experiments about the measurement of time, length and speed.

4. Voices from the Universe

In the forests of Louisiana and the high deserts of Washington state, the LIGO observatories stand poised to listen for gravitational waves, minute fluctuations in the fabric of spacetime that propagate to Earth from our Galaxy and beyond.

5. Inspiral, Merger and Ringdown

In the dramatic last minutes in the life of a black-hole binary, these spacetime vortices race around each other at incredible velocities, finally merging in an explosion of gravitational-wave energy that is more luminous than all the stars in the Universe.

A project by Andrea Centazzo and Michele Vallisneri

Credits: Images, video and animations by A. Centazzo, California Institute of Technology (LIGO Lab; Division of Physics, Mathematics, and Astronomy; Public Relations), ESA (Hubble Information Center), LIGO Scientific Collaboration, Max Planck Institute for Gravitational Physics/Albert Einstein Institute, NASA (Beyond Einstein, Chandra), National Science Foundation (Einstein's Messengers), Space Telescope Science Institute (Hubble Heritage Project), Teatro Comunale di San Giovanni in Persiceto, M. Vallisneri.
Special thanks: Jay Marx, Fabio Manganelli, Susanne Milde, Carol Nishijima, Elena Pierpaoli, Elisa Piccio, Dave Reitze, Carlo Siliotto, Kip Thorne and the USC Visions and Voices staff.

Panel Discussion

K.C. Cole

Science Writer and Journalism Professor, USC Annenberg School for Communication & Journalism

Elena Pierpaoli

Cosmology Professor, USC College of Letters, Arts & Sciences

Michele Vallisneri

Gravitational Wave Scientist, Jet Propulsion Laboratory

Andrea Centazzo

Composer, Musician, Video Artist

Questions from the audience are welcomed.