

SCIENTIFIC
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Travel

BRIGHT HORIZONS™ 18

RHONE RIVER, NOV. 29 – DEC. 6, 2013



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In November, the tourists are gone from Provence. The harvest's been gathered. The south of France exhales, resuming her essential rhythms, manifesting her ancient uniqueness, effortlessly. It's the perfect time to relax, recharge, and revel in the latest with Scientific American Bright Horizons 18 on a Rhone River cruise from November 29 to December 6, 2013. We'll explore developments in cosmology, cancer, and wine science, and plumb Roman engineering.

Experience river cruising's panoramic charms on Bright Horizon 18's voyage on AmaWaterway's AmaDagio, sailing from Lyon to Arles, France. The light, colors, and flavors of France await.

Make your reservation at <http://www.insightcruises.com/SciAm-18>, call us at 650-787-5665 or email us at Concierge@InsightCruises.com.

The cruise fares start at \$2,799 for a Category E. French Balcony cabins start at \$3,378. A Junior Suite is available for \$4,498. Cruise fares include six half-day excursions. For those attending our educational Program, there is a \$1,395 fee. Additional per-person fees include: government taxes and fees (\$147) and gratuities are €15 per day. The Program, Cruise pricing, and options are subject to change. For more info please call 650-787-5665 or email us at concierge@insightcruises.com.



Quantum Physics

Speaker: Frank Linde, Ph.D.

The Wild World of Subatomic Particles

Explore the realm of electrons, protons, quarks, and Higgs bosons — a world where the normal rules don't apply. Dr. Linde will lead a tour of the smallest constituents of matter, illuminating the theories of quantum mechanics and relativity that govern the subatomic universe. You'll also learn about the mysteries of dark matter, missing antimatter, and the origin of mass.

The Story of the Higgs

A tiny particle called the Higgs boson was predicted 50 years ago to explain the quandary of why particles have mass. After decades of searching, physicists finally tracked down the Higgs in 2012, inside the world's largest particle accelerator. Learn why this one particle is so important, and how its discovery will shape the future of physics.

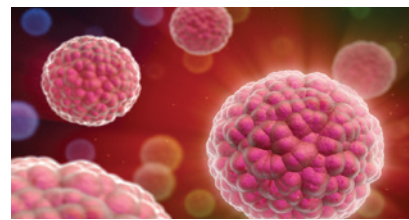


The Mystery of Dark Matter

Dark matter is thought to make up about a quarter of the universe, yet scientists don't know what it is. Learn the history of this mysterious stuff, as well as the best guesses for what it might be made of. Dr. Linde will explain how researchers study something that can't be seen, and the ongoing searches aiming to detect dark matter for the first time.

Particle Physics and You

Subatomic particle experiments deep underground and inside giant accelerators can seem far removed from everyday life. But the knowledge gained about the universe's smallest building blocks has real-world consequences. Dr. Linde will stir your curiosity about particle physics and answer the common question: What use is it?



Targeting Cancer

Speaker: David Sadava, Ph.D.

Know the Enemy:

A Biography of the Target

Set the stage for understanding the attack on cancer by looking at its cellular biography. In most cases, cancer starts off as perfectly normal cells. And then something happens. Find out what those "somethings" may be, and how they transform the cell.

The War on Cancer: Then and Nowadays

In 1972, the U.S. declared war on cancer. Learn the scientific background that led to this bold declaration, and why victory has been elusive.

We see progress in extending the lives of cancer patients, and even cures. But the result is not victory but a long war of attrition. Find out why.

Targeting the Cancer Genome

Knowing the cancer genome in detail leads to precise targeting of potential cancer triggers in the cell. Two spectacular recent successes in targeting certain types of leukemia and breast cancer led to a proliferation of very expensive drugs similarly targeted to specific cancers. Are these drugs worth it? Explore the scientific accomplishments and ethical issues involved in medical progress.

Natural Medicine and the War on Cancer

Faced with a dreadful diagnosis, many cancer patients supplement or substitute their doctor's recommendations by "going alternative." Turns out that some common cancer-fighting drugs originated in traditional medicines. Learn about the process of transforming a traditional treatment to a mainstream therapy. How are alternative medicines evaluated? Are they effective? Join Dr. Sadava and make some surprising discoveries.



Archaeology

Speaker: Lynne Lancaster, Ph.D.

Introduction to Culture and Technology in Gaul

Gaul was influenced by the Iberians, Celts, Greeks, and Romans. Each culture brought skills and technologies such as town planning, architecture and construction, mining of salt and metals, and the adoption of coinage. Get an overview of the technology, culture, and politics of the Greek and Roman colonization of France.

Fire-Based Technologies in Gaul: Terracotta Production and Metal-Working

Terra cotta and metal artisans had to master techniques of balancing chemical interaction to achieve the desired results. Find out how the Romans adopted Greek methods to mass produce pottery. In contrast to this imported knowledge, learn about Celtic metal-working skills, which the Romans assimilated and put to military use.

Building an Amphitheater

Along with bath buildings, the construction of an amphitheater was one of the greatest investments a community could take on. Dig into the engineering and construction process: site preparation for enormous loads, quarrying and transporting great numbers of stone blocks, erecting the structure and distributing loads. Enrich your appreciation of ancient architecture in the Roman world and beyond.

Aqueducts, Baths and Water Mills

The Romans exploited water technology much earlier and on a greater scale than has been realized. This was all possible due to

the mastery of aqueducts. We will explore the principles behind the laying out and functioning of Roman aqueducts, including the use of inverted siphons, tunnel cutting, and arch construction.



Cosmology

Speaker: Mark Whittle, Ph.D.

The Birth of Our Universe: Evidence for the Big Bang

Is the current evidence for the Big Bang strong enough to consider it a fact? Survey the contents of the Universe and scrutinize the six key pieces of evidence for its birth in a "Hot Big Bang."

Billion Years of History: the Birth and Maturation of Galaxies

Study the natural history and structure of galaxies directly, from infancy to maturity. Orient yourself to our own Milky Way, and the types of galaxies that form a web of galaxies filling the Universe. Contemplate dark matter and black holes, and get the latest thought in cosmology.

The Universe's First Million Years: Primordial Light and Sound

Take a trip back in time to explore the incandescent fireball of the infant Universe, just 1/2 million years after the Big Bang. Learn the astounding qualities of its light and how cosmologists use the primordial sound of this period to measure a number of the Universe's properties. Listen, think, and wonder at the cosmological Dark Age before the first stars.

Cosmic Inflation: Making Universe(s) from Nothing!

How was our expanding Universe created? We'll look to cosmic inflation theory for answers and food for thought. Using the astonishing fact that the total mass/energy of the Universe is zero, and its implications, we can begin to understand how cosmic inflation both creates

and launches our expanding Universe — out of nothing! Examine cosmic puzzles, possibilities, and intriguing speculation.



Oenology

Speaker: James Kennedy, Ph.D.

Climate Change and Impact on the Wine World

Wine's chemical composition varies widely across different areas of the world. Much of a wine's uniqueness stems from the impact of place on wine composition. Discover how the climates in the wine regions of the world are changing, and what this means for wine as we know it. In a lab session, we'll taste wine from warm regions.

The Rhone and Its Wines

The Rhone River region produces some of the finest wines in the world. As the Rhone River flows south to the Mediterranean, the grapes and the wines produced from them change considerably. Combining a lecture with a wine tasting, Dr. Kennedy will discuss this amazing wine-growing region and the wines it produces.

Wine and Health

From the French Paradox to resveratrol and beyond, Dr. Kennedy investigates the composition of wine and the role that wine plays in human health. Is wine the wonder beverage as often portrayed in popular media, or is the fascination just a means to feel good about alcohol consumption?

Advances in Grape and Wine Production

Wine labels often evoke the tradition, romance, and history of winemaking. The flowery language and imagery obscures the technological progress made over the past century in viticultural and winemaking practices. Discover how some of the finest wines in the world are produced using sophisticated, state-of-the-art technology and science.

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HIGHLIGHTS RHONE RIVER
NOV. 29 – DEC. 6, 2013



INSIDER'S TOUR OF CERN

Pre-cruise: November 28, 2013—From the tiniest constituents of matter to the immensity of the cosmos, discover the wonders of science and technology at CERN. Join Bright Horizons for

a private pre-cruise, custom, full-day tour of this iconic facility. (If the LHC is still undergoing its scheduled maintenance it is anticipated we will go into the LHC Cavern.)

Whether you lean toward concept or application there's much to pique your curiosity. Discover the excitement of fundamental research and get a behind-the-scenes, insider's look at the world's largest particle physics laboratory.

We'll have an orientation, visit an experiment, get a sense of the mechanics of the Large Hadron Collider (LHC). If at all possible, we'll go down inside the LHC tunnel (picture above), then make a refueling stop for lunch, and have time to peruse the grounds and exhibits on the history of CERN and the nature of its work. And if you're so inclined, you can visit the CERN gift shop.

The price is \$899 per person (based on double occupancy). This trip is limited to 50 people. NOTE: CERN charges no entrance fee to visitors.

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