

CO-PRODUCED BY:



January 27th – February 3rd, 2008

# Bright Horizons™

Western Caribbean / Central America



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Discover an ecosystem designed to engage your intense interest in science—your curiosity, your quest for the information you need in competitive environments, your desire to discuss, debate, and explore cutting-edge topics.

Scientific American has created such a place. Get smart on Bright Horizons, a cruise conference where critical and innovative thinking from the experts converges with the keen minds and sharp wits of science-oriented individuals.

Join John Rennie, Editor in Chief of Scientific American; Steve Mirsky, resolutely outside-of-the-box SciAm columnist and Podcaster; and a faculty of renowned scientists in a program of interactive lectures, discussions, and social events.



Bright Horizons, on Holland America's m.s. Veendam, sailing roundtrip Tampa January 27 – February 3, 2008, is an oasis for forming visions, capturing ideas, and thinking deeply. It's also a place to re-energize the spirit.

Ready to learn how top scientists focus, think, and draw distinctions? Primed to question the experts, exchange viewpoints, and gather necessary information and perspectives to deepen your understanding of contemporary science?

Take your science life from 2-D to 4-D. Bring a companion and explore the splendid cultures and connect with the diverse natural wonders of Central America. Visit [www.InSightCruises.com/SciAm](http://www.InSightCruises.com/SciAm) or call 650-327-3692 to get all the details, and then journey with Scientific American and our thinking community on Bright Horizons.

Cruise prices vary from \$849 for an Inside Stateroom to \$2,899 for a Full Suite, per person. (Cruise pricing is subject to change. InSightCruises will generally match the cruise pricing offered at the Holland America website at the time of booking.) For those attending our Program, there is a \$1,275 fee. Taxes are \$70 per person. Program subject to change.

*John Rennie has been the Editor in Chief of Scientific American magazine since 1994. During his tenure, the magazine has won two National Magazine Awards for editorial excellence with the single-topic issues "What You Need to Know about Cancer" (Sept. 1996) and "A Matter of Time" (Sept. 2002). In 2000 Rennie was honored with the Sagan Award for Public Understanding of Science, bestowed by the Council of Scientific Society Presidents. In September 2003 the Potomac Institute for Policy Studies honored him with its Navigator Award for distinguished service in support of national science and technology policy.*



*Steve Mirsky explains it all for you—evolution, antievolution, molecular biology, genetics, Darwin, Scopes, Kitzmiller. And after that, we'll all really need to shift gears and get Steve's take on what's funny about science, and how the Science Sausage gets made.*



## FUTURE TECHNOLOGY & SOCIETY

### Battlegrounds and Roads Forward for Emerging Technologies

Speaker: **John Rennie**

Nanotechnology, synthetic biology, artificial intelligence, new energy systems and a host of other radical technologies could transform the world as we know it over the next few decades. How they might do so and whether they will get the chance, however, depend strongly on how society copes with some of the dramatic conflicts those technologies will raise on issues such as personal privacy, security and preservation of the environment. John Rennie will explain these new technologies, strip the fiction from the facts about their capabilities and dangers, and discuss how best to prepare for them.

### Free Will, Genetics, and Neuroscience

Speaker: **John Rennie**

Notions of free will influence not only our sense of ourselves as individuals but also social institutions like the law. As genetics and neuroscience trace the roots of our behaviors in more detail, however, it becomes harder to see human beings as completely free. How will further advances in science change our views of personal responsibility and legal guilt? After reviewing highlights in the current state of knowledge about human behavior and consciousness, John Rennie will prompt the class to discuss the significance of these findings to the real world.

### Living Ethically in the Brave New World

Speaker: **John Rennie**

As technologies once known only through science fiction become part of our daily lives, all of us will increasingly be faced with troubling new ethical problems. Is it right for a grieving parent to try to clone a lost child? Should the wealthy be able to buy transplantable organs if poor people are willing to donate them? If an intelligent machine begs you not to turn it off, should you? Should genetics and neuroscience affect legal definitions of guilt and innocence? John Rennie will lead a Socratic discussion with the class that explores these complex topics.



## COGNITIVE PSYCHOLOGY

### What Are Thoughts Made Of?

Speaker: Lera Boroditsky, Ph.D.

Visualize an abstract discussion of the abstract. Whether dealing with scientific progress, business issues, or core human ideas like time, justice, and love, we need to conceptualize, reason, and communicate abstract thought. Without a framework of direct physical experience or sensory input to draw on in abstract thinking, how does our brain use perception and experience to give rise to the mind's thought? Have you wondered:

- What are the ingredients of meaning?
- How do we create meaning?
- How do our brains organize and store knowledge?

### How Do We Imagine?

Speaker: Lera Boroditsky, Ph.D.

From Aristotle's day to ours, imagery and the ability to imagine have been key components in theories of mind. Dr. Boroditsky will bring us up to date on aspects of "imagination" such as attention, recall, formation of new images, and the neural structures involved. You'll learn:

- How well can we focus our attention? What is attention for?
- How do we imagine and re-create images in our minds? How good is our imagery?
- How do we remember, why do we forget, and why do we sometimes remember things that didn't happen?

## ASTROPHYSICS & COSMOLOGY

### Composition of the Universe

Speaker: Tom Abel, Ph.D.

Of what is the Universe made? How do we know this? Is it really true that 96% of the energy in the Universe is of unknown form? How can we be so sure? Can we still understand the origin of stars and galaxies if we only know the nature of 4% of the universe?

### The Big Bang Theory and its Successes

Speaker: Tom Abel, Ph.D.

We've come a long way in our understanding of the Universe. Eighty years ago, Edwin Hubble showed that the Universe is expanding. Sixty years ago, we learned where all the hydrogen and helium in the Universe were made. About 40 years ago, we started observing the radiation left over from the beginning of the universe. Over the last 20 years, we've come to understand that without dark matter, there would be no galaxies nor any of us. What will we know in 2029 on the 100th anniversary of Hubble's discovery?

### Computing the Universe

Speaker: Tom Abel, Ph.D.

We ask: How can we numerically solve the equations of fluid dynamics? Reactive flows? Radiation transport? Stellar winds and explosions? Consider the vastness of the scales: The sun is a trillion times smaller than the Galaxy! We have learned to model enormous numbers of bodies and their gravitational effects on each other. We'll discuss the physics that shape the Universe and how we now solve physical equations on modern supercomputers.

### The First Things in the Universe and their Aftermath

Speaker: Tom Abel, Ph.D.

Ab initio simulations gives us unique details on the first things in the universe. The first things are very massive isolated stars, which have had an enormous impact on everything that has existed since then. These first stars evaporated their parent clouds, expelled the first heavy elements, and seeded the universe with the potential for life. The formation and evolution of galaxies are now being understood — one star at a time.

### How Do We See the World?

Speaker: Lera Boroditsky, Ph.D.

Take a look at the basics of visual perception. See the complex, thoroughly intertwined components of visual perception and the interaction of visual perception with other cognitive processes. This session will illuminate:

- How do our brains construct visual reality?
- Do we see what's really out there? Do we see things the way they really are?
- Why do we sometimes not see things that are there?
- Why do we sometimes see things that aren't there?

### How Do the Languages We Speak Shape the Way We Think?

Speaker: Lera Boroditsky, Ph.D.

What is the relationship between language and thought? Dr. Boroditsky and colleagues have uncovered many fascinating cross-linguistic differences in thought and speech that shape the way we attend to, represent, and remember our experiences in the world. Get the latest on the big questions:

- Do people who speak different languages think differently?
- Does learning new languages change the way you think?
- Do polyglots think differently when speaking their different languages?
- Are some thoughts unthinkable without language?

## COMPUTATIONAL SCIENCE

### Computational Science and Engineering

Speaker: Bebo White

Computational science has become an integral component of all scientific disciplines and promises to fundamentally change the way in which science will be done in the future. The impact of computational science can only be likened to how the execution of scientific research was changed by the elaboration of the Scientific Method. This lecture will describe the elements of computational science and engineering and research methods that take advantage of these elements. Case studies will be presented to illustrate applications of these methods.

### The Once and Future Web

Speaker: Bebo White

Although the technology has only been around for slightly more than a decade, it is difficult to imagine computing without the World Wide Web. Beneath the simplicity that we see in our browsers, the underlying machinery of the Web has changed a great deal. How will the Web evolve in the next ten years and what will be the technological and social forces that drive its changes? Are "Web 2.0" and the "Semantic Web" just hype or genuine indicators of the direction in which the Web is moving? What will the "future Web" look like and how will it be used? We'll examine some of the clues of what we might expect in the "future Web" and how we can prepare for the changes to come.

### High Performance and Grid Computing

Speaker: Bebo White

When the term "High Performance Computing (HPC)" is used these days it is more often than not referring to large "farms" or arrays of small, low-cost computers working together to accomplish a compute-intensive problem rather than to so-called supercomputers. "Farms" provide high throughput, are scaleable, use inexpensive components and open-source software, and are fault tolerant. Similar to "compute farms" are "computing grids" where networks (usually the Internet) provide the "glue" creating a virtual computer architecture. "Computing grids" offer the promise of computing as a "utility" where anyone on the network has access to all the computing resources they want or need.

## ARCHAEOLOGY

### Pyramid Temples & Palaces: Architectural History of the Pre-Columbian Maya

Speaker: Nicholas M. Hellmuth, Ph.D.

Think of the Maya, and one of the first images that comes to mind is a pyramidal temple. Approaching the monumental architecture of the Maya can be done from the viewpoint of several disciplines. Dr. Hellmuth brings his learned work in architecture, archaeology, and anthropology, along with his expertise as a photographer and archivist, to this survey of Maya ritual and palace structures.

### Ethno-botany: Plants Utilized by the Maya from Classic Times through Today

Speaker: Nicholas M. Hellmuth, Ph.D.

We know that plants served an extensive role in the Mayas' relationship with their deities. Back in the earthly Maya realm, what's for supper?

From the familiar cacao and vanilla to the odd-looking, night-blooming pitaya, Dr. Hellmuth will orient you to the interesting and exotic fruits and vegetables used by the Maya from pre-Columbian times through today.

### Sacred Ballgames of Mesoamerica: Iconography & Ballcourt Architecture

Speaker: Nicholas M. Hellmuth, Ph.D.

The ritual ballgames of the Maya and neighboring civilizations are the stuff of legend and of a steadily increasing body of fact. Dr. Hellmuth, who has played the Maya ballgame himself (slightly modified rules!), will sort through the archaeology, architecture, evolving sociological and political theories of the game, and of course, the conduct and process of play.

### Tomb of the Jade Jaguar: Excavating the tomb of the King of Tikal

Speaker: Nicholas M. Hellmuth, Ph.D.

It's Indiana Jones time. Dr. Hellmuth presents his experience and his "beginners' luck" in discovering one of the most richly stocked royal burials of the entire ancient Maya realm — the Tomb of the Jade Jaguar at Tikal.

Dr. Hellmuth will explain the scientific approach to such a find, as well as providing "color commentary" — a month of painstaking excavation to tunnel deep into the pyramid; documentation of progress; ten days of analysis of how best to tackle recording the over-filled tomb chamber and its royal mortuary offerings; and of course, life in the jungle.

Savor the rare opportunity to hear about the discovery of a great king's burial chamber directly from the discoverer!



### Underwaterworld Iconography of the Classic Maya

Speaker: Nicholas M. Hellmuth, Ph.D.

The Maya underworld was an underwater world. Dr. Hellmuth will guide us through the mythology and iconography of the Maya underwaterworld. Using a multi-disciplinary approach and a scientist's keen eye for tropical flora and fauna, Dr. Hellmuth will decipher the design motifs of the supernatural plants, animals, and creatures that signal underwaterworld-related aspects of the Maya cosmos and belief systems.

You'll acquire an enhanced baseline understanding of the symbolism, the abstracted or abbreviated representations in Maya art, and the status of scientific efforts to document and preserve the corresponding living plants and animals that are associated with the Maya cosmos.

### Sacred Plants of the 6th-9th Century Maya of Mexico, Belize, Guatemala, and Honduras

Speaker: Nicholas M. Hellmuth, Ph.D.

Plants were not only a central component of the Classic Mayas' physical environment, they richly populated and functioned in the Maya cosmos, and were highly significant in culture and ritual. To deepen your knowledge of the roles of sacred plants such as maize, cacao, flor de Mayo, hule (a rubber tree), the water lily, and a host of other sacred plants and flowers, Dr. Hellmuth will discuss the importance of the Mayas' sacred plants, their uses, and distribution in the Maya world.

You'll gain a sense of the interrelationship of Maya cosmology, botany, culture, agriculture, and history represented in the concept of sacred plants.

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Plan on snorkeling or scuba diving at the Terneffe Atoll in Belize.

