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Southern Caribbean Intellectual Adventure

# Bright Horizons™ 2

December 7th – 17th, 2008



[www.InSightCruises.com/SciAm2](http://www.InSightCruises.com/SciAm2)

Enjoy uncommon access to uncommon minds. Find out what it's like to recharge your mental batteries with cutting edge thought from scientific experts while energizing your spirit with balmy breezes and nature adventures. Come along with Scientific American on the Bright Horizons cruise-conference on Holland America's Noordam, roundtrip Fort Lauderdale.

Like to learn how to scrutinize and weigh medical studies and bring a measured eye to medical decision making? Looking to brush up your baseball physics color commentary? Game to hear a scientist discuss cosmology and the meaning of life (not to mention dark matter and topologies)? Effortlessly explore and discuss contemporary science with the experts. Linger with your companion among the tropical delights and vibrant flora and fauna on Bright Horizons.

Map out an intellectual adventure. Get the latest on the big picture. Visit [www.InSightCruises.com/SciAm2](http://www.InSightCruises.com/SciAm2) or call 650-787-5665 to get all the details, and then journey with Scientific American and a community of the intensely curious on Bright Horizons.



**Join Ira Flatow**  
Host of NPR Science Friday

### KEYNOTE:

#### *The Catalysts of Creativity*

*Creativity and inventiveness can spring forth from a laboratory. Or they can come from a science fiction novel, a rock star or a movie queen. We'll explore the sources of creativity and the surprising people who have spawned some of the most interesting inventions — from Dracula, to Hedy Lamarr to Steve Jobs.*



### SURVEY THE SCIENCE TERRAIN

#### Behind the Scenes at NPR's Science Friday

Speaker: Ira Flatow

Get a behind-the-scenes look at the environment of Science Friday. What makes for a story with impact? Do some interviews leave an indelible impression? And why not Science Wednesday? If you wonder about the vicissitudes, quirks, history and future directions of this ongoing slice of science life tune in to Ira Flatow as he discusses Science Friday and fields your questions.

#### Cutting Edge New Energy Sources

Discussions of alternative sources of energy pop up everywhere from electric bills to political debates to block parties. Are some alternative energy sources good bets to morph into mainstream technologies, and others too good to be true? Ira Flatow will discuss the advantages and disadvantages of established and emerging power sources in this illuminating session.

#### Why Airplanes Fly: A Modern Myth

Controversy? About how planes fly? Sit back, relax, and listen in as Ira Flatow updates you on the ongoing controversy about the way we were all taught about why airplanes fly and the new thinking on the phenomenon of flight. We'll screen a great video on experiments about helicopter flight, chat about Bernoulli's principle, and see if there are commonalities between flight and baseball.

## COGNITIVE PSYCHOLOGY

### How Do We See the World?

Speaker: Lera Boroditsky, Ph.D.

Seeing seems effortless to us. We just open our eyes, and we see everything. But just think, everything you know about the visual world comes in through two tiny little holes on the front of your head. The visual information our brain receives is scant, noisy, and grossly incomplete. Yet, we experience a vibrant and rich visual world. How is this possible?

- 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 We Imagine?

Einstein revealed that his greatest insights came to him as mental images. The images we form in our minds can be powerful and insightful. They can also be deceptive, misleading, or simply very incomplete. How are we able to form mental images, remember information, and focus our attention? Why is that we can remember things that happened only once decades ago, but can't remember where we put our keys?

- 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?
- What can we do to improve our memory?

### How Do We Learn, Reason, and Make Decisions?

The most important things in our lives happen in our minds: learning and storing vast sums of information, giving information meaning, making millions of decisions. Our experience with the world is physical: photons on our eyes, pressure waves in our ears, and positional information to counter gravity). So how do we: come up with abstract notions like principles, goals, or time-travel; store and organize knowledge; make decisions? How can we reason better?

- How do our brains organize and store knowledge? What are the ingredients of meaning?
- How do we make decisions in an uncertain world?
- Are we rational?
- What are our most common mistakes and how can we overcome them?

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

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?

## METEOROLOGY

### What We've Learned From Storm Chasing

Speaker: Howard B. Bluestein, Ph.D.

Dr. Howard Bluestein has been chasing severe thunderstorms and tornadoes in the Southern Plains of the U. S. for the past three decades. What WAS he thinking? Join Dr. Bluestein and he'll lay out his primary objectives: trying to understand what causes storms and how the wind field varies within them, with the ultimate goal of saving lives.

Glimpse the big picture of the excitement of the chase and the unique beauty of tornadoes when passing over the open countryside destroying nothing but grass and dirt. Get the details on what Dr. Bluestein and colleagues have learned from their field work and what it is really like to be a storm chaser while trying to collect data and remain safe.

### Tornadoes and Severe Thunderstorms: What We've Learned From Numerical Simulations

While atmospheric scientists gather real-world data and thrills from chasing tornadoes and severe thunderstorms, they can't perform controlled experiments on storms in the real world.

In order to understand what causes some thunderstorms to produce severe weather and others to not, meteorologists conduct carefully controlled experimental simulations. Dr. Howard Bluestein will orient you to the practice of simulating, fairly realistically, severe thunderstorms and to a more limited extent, tornadoes

If you'd like to know how scientists depict Mother Nature in the computer lab, what Dr. Bluestein and colleagues have learned from numerical simulations of severe weather and how it relates to observational field programs, this is the session for you.

### Forecasting Severe Weather

Unbelievable to us today, the issuance of severe thunderstorm and tornado warnings was once banned because it was feared that the populace would panic. Throwing caution to the wind, U.S. meteorologists in the late 1940s made the first attempts to forecast severe weather based on pattern recognition, and amazingly it worked!

Dr. Bluestein will update you on the state of the forecaster's art and science. Equipped with an increased understanding of why storms form, a much better national observing network, Doppler radars, satellites, and computer models, meteorologists can forecast severe weather better than ever... but are still not able to predict which thunderstorms will produce tornadoes and which will not.

Visit the frontier of forecasting with Dr. "Cb" and pick up the advances in using cloud models and Doppler radar data as input to make forecasts of individual thunderstorms, and in "ensemble" forecasting which averages many forecasts having slightly different initial conditions and/or model physics.

### Radars as Tools of Choice: Better Living Through Radiation

Radar is the tool of choice to monitor and observe severe weather systems because it probes dangerous storms remotely with amazing detail.

Take a look with Dr. Bluestein at how the radar signal is related to precipitation intensity, how wind information is gathered by Doppler radar, and how polarimetric radars provide useful information that allows us to distinguish rain from hail from snow from airborne cows.

Learn the latest about new phased-array radar systems that can electronically scan an entire storm in less than 10 seconds, and gain insights on future directions for radar in meteorology.



Cruise prices vary from \$1,099 for a Better Inside to \$3,999 for a Full Suite, per person. (Cruise pricing is subject to change. InSight Cruises will generally match the cruise pricing offered at the Holland America website at the time of booking.) For those attending the conference, there is a \$1,275 fee. Taxes, gratuities, and a fuel surcharge are \$210.

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## ASTROPHYSICS & COSMOLOGY

### A Brief History of Our Universe

Speaker: Max Tegmark, Ph.D.

With a cosmic flight simulator, we'll take a scenic journey through space and time. After exploring our local Galactic neighborhood, we'll travel back 13.7 billion years to explore the Big Bang itself and how state-of-the-art measurements are transforming our understanding of our cosmic origin and ultimate fate.

### The Mysterious Dark Side of Cosmology: Dark Matter And Dark Energy

A recent avalanche of accurate measurements has revolutionized our understanding of cosmology, but also stumped us with new puzzles. What are the dark matter and dark energy that together make up 96% of the stuff in our universe? Learn about some of the most promising dark matter and dark energy candidates, and some of the experiments that may solve these mysteries in the next few years.

### How Did It All Begin — Or Did It? How Will It All End?

Although we humans have undoubtedly asked these questions for as long as we've walked the Earth, we've made spectacular progress on them in recent years, forcing us to discard much of what cosmology textbooks told us up until quite recently. Get the latest on competing ideas, their implications and how they can be experimentally tested.

### Questions, I've Got Questions: Black Holes Edition

Take a look at some of the most spectacular recent evidence that black holes really exist. Dr. Tegmark will cover what we know about them and what remains mysterious. Are black holes in fact crucial to enable galaxies to form? Can black holes form new universes in their interiors? Plus, using a fully general-relativistic flight simulator, you'll take a scenic orbit of the monster black hole at the center of our Galaxy and discuss how one could actually make this dizzying journey with only modest energy expenditure.

## BASEBALL: IT'S NOT NUCLEAR PHYSICS. OR IS IT?

### When Ash Meets Cowhide: The Physics of Hitting A Home Run

Speaker: Alan M. Nathan, Ph.D.

For a baseball fan, there are few things more satisfying than hearing that sharp distinctive crack of the bat announcing that the ball is on its way to the centerfield seats. For a physicist, there are few things more satisfying than figuring out how something works. And for a physicist who is also a baseball fan, it is pure ecstasy to have figured out much of what is going on during that very brief instant of time when ash meets cowhide. Dr. Nathan will try to convey a bit of that excitement as he steps you through the physics of hitting a home run.

### The Controversy Over Aluminum Bats

Get a grip on the core issues in play in the aluminum vs. wooden bat dialogue. Hollow metal bats are superior to wood bats as hitting instruments. Because of aluminum bats' effect on hits, they also raise safety questions. Both these issues have led some organizations to actually ban the use of aluminum bats in officially sanctioned games.

In this session, you'll examine the performance differences between wood and non-wood bats from a physics perspective. Dr. Nathan will lay out the underlying physics behind the techniques currently used by governing bodies such as the NCAA to regulate the performance of nonwood bats. Learn how well those techniques work in limiting the performance gap between wood and aluminum. Get the facts and prevailing opinions across the spectrum of baseball.



### Parallel Universes

Is physical reality larger than the part that we can observe? Dr. Tegmark argues that not only are parallel universes likely to exist, but that there may be as many as four different levels of them, related to infinite space, cosmological inflation, quantum mechanics and mathematical structures.

### Cosmology And the Meaning of Life

When gazing up on a clear night, it's easy to feel small and insignificant. Join Dr. Tegmark for a status report on the search for extrasolar planets and extraterrestrial life. Might cosmic life be much rarer than one might guess, making our planet the most significant place in our entire observable universe? We'll discuss and speculate about possible long-term futures for life on earth and in the cosmos.

Curaçao

