

BRIGHT HORIZONS #2 PROGRAM

7th of December — Sunday

5pm Ship Departs from Ft. Lauderdale

6:45pm – 7:30pm Bon Voyage Cocktail Party
[Crow's Nest]

8th of December — Monday

8am Ship Arrives Half Moon Cay

4pm Ship Departs from Half Moon Cay

4:30pm – 5:30pm A Brief History of Our Universe
Max Tegmark, Ph.D. — [Queens Lounge]

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.

6pm – 7:30pm Behind the Scenes at NPR's Science Friday
Ira Flatow — [Queens Lounge]

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.

9th of December — Tuesday (Sea Day)

8:30am – 10am Evaluating Health Messages: Is There Any There There?
Drs. Lisa Schwartz & Steven Woloshin — [Hudson and Half Moon]

Dr. Lisa Schwartz and Dr. Steven Woloshin specialize in critical thinking about health messages and clear communication about health issues. In this interactive session, they'll introduce the core skills and concepts you need to take stock of health messages in ads and the news. You'll see real-world examples of ads and news pieces and articles, and get Drs. Woloshin and Schwartz' take on them.

10:30am – Noon How Do We See the World?
Lera Boroditsky, Ph.D. — [Hudson and Half Moon]

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?

Noon – 1:30pm LUNCH

1:30pm – 3pm What We've Learned From Storm Chasing
Howard B. Bluestein, Ph.D. — [Hudson and Half Moon]

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.

3:30pm – 5pm When Ash Meets Cowhide: The Physics of Hitting A Home Run
Alan M. Nathan, Ph.D. — [Hudson and Half Moon]

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.

6pm – 7pm The Mysterious Dark Side of Cosmology: Dark Matter and Dark Energy
Max Tegmark, Ph.D. — [Queens Lounge]

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.

10th of December — Wednesday

8am **Ship Arrives St. Thomas**

5pm **Ship Departs from St. Thomas**

6pm – 7:30pm **Cutting Edge New Energy Sources**
Ira Flatow — [Queens Lounge]

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.

11th of December — Thursday

8am **Ship Arrives Roseau, Dominica**

5pm **Ship Departs from Roseau, Dominica**

6pm – 7:30pm **How Do We Imagine?**
Lera Boroditsky, Ph.D. — [Queens Lounge]

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 or parked our car just this morning? This session will include:

- 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?

12th of December — Friday (Sea Day)

8:30am – 10am **Why Airplanes Fly: A Modern Myth**
Ira Flatow — [Hudson and Half Moon]

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.

10:30am – Noon **Forecasting Severe Weather**
Howard B. Bluestein, Ph.D. — [Hudson and Half Moon]

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.

Noon – 1:30pm LUNCH

1:30pm – 3pm **The Aerodynamics of Excitement: Curveballs, Gyroballs, Towering Popups, and Tape Measure Home Runs**
Alan M. Nathan, Ph.D. — [Hudson and Half Moon]

Where would the game of baseball be without aerodynamics? Played in a vacuum, the curve ball wouldn't curve and home runs would travel over 700 ft. The trajectory of a baseball in flight, whether it is a pitched or batted ball, is very different from the one we teach in introductory physics courses, where the effects of the interaction of the ball with the air are neglected. In this talk with Dr. Nathan, you'll learn what we know about the aerodynamics of a baseball and how we know it (but not when we knew it). Get the inside scoop on the high-tech tools now being used to study the trajectories of baseballs.

3:30pm – 5pm **A Prescription for Change**
Drs. Lisa Schwartz & Steven Woloshin — [Hudson and Half Moon]

Polish your informed decision making skills about prescription drugs with nuts-and-bolts information and fact-seeking methods from Drs. Woloshin and Schwartz. You'll get a behind-the-scenes look at how the FDA approves drugs. Learn how to look at drug information in direct-to-consumer advertising, package insert, and the medical literature to determine how well drugs work, and whether benefits outweigh side effects.

The doctors seek to promote meaningful patient-physician discussion by giving physicians and the public alike access to data that's hard to find, and to bring everyone's interpretation skills up a notch. If your grandma was known to opine "There's never anything fine in the fine print," take a look at their idea for replacing the fine print with information that will help you draw your own conclusions about how well a drug works.

6pm – 7:30pm **How Do We Learn, Reason, and Make Decisions?**

Lera Boroditsky, Ph.D. — [Queens Lounge]

All of the most important things in our lives happen in our minds. We learn and store tremendous amounts of information, we give the information we receive meaning, and we make millions of decisions. All of our experience with the world is physical (we receive photons in our eyes, pressure waves in our ears, and we flex our toes and bend our knees in just the right way to defy gravity). So how is it possible that we come up with abstract notions like principles, goals, time-travel, or the imaginary number i ? How do we store and organize our knowledge so that we can use it? How do we make our decisions? What kinds of mistakes do we typically make, and how can we learn to reason better?

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

14th of December — Sunday

7am **Ship Arrives Oranjestad, Aruba**

5pm **Ship Departs from Oranjestad, Aruba**

6pm – 7pm **How Did It All Begin — Or Did It? How Will It All End?**

Max Tegmark, Ph.D. — [Queens Lounge]

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.

15th of December — Monday (Sea Day)

8:30am – 10am **The Controversy Over Aluminum Bats**

Alan M. Nathan, Ph.D. — [Hudson and Half Moon]

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.

10:30am – Noon **Buyer Beware!**

Drs. Lisa Schwartz & Steven Woloshin — [Hudson and Half Moon]

Exciting news about new diseases to look out for! Really? Why are you hearing about them now? Drs. Schwartz and Woloshin give you the big picture on "disease mongering" i.e. how disease definitions are being broadened and new diseases created.

You'll sharpen your health-skeptic skills while learning the current state of media and medical/scientific conference reporting. Drs. S and W will show you an approach that gets to both the facts, and the correct interpretation of the facts. Learn how to see through hype about new diseases and their treatments.

Noon – 1:30pm LUNCH

1:30pm – 3pm **How Do the Languages We Speak Shape the Way We Think?**

Lera Boroditsky, Ph.D. — [Hudson and Half Moon]

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?

3:30pm – 5pm **Tornadoes and Severe Thunderstorms: What We've Learned From Numerical Simulations**

Howard B. Bluestein, Ph.D.— [Hudson and Half Moon]

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.

6pm – 7:30pm **The Catalysts of Creativity**

Ira Flatow — [Queens Lounge]

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.

16th of December — Tuesday (Sea Day)

8:30am – 9:30am **Questions, I've Got Questions: Black Holes Edition**
Max Tegmark, Ph.D. — [Hudson and Half Moon]

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.

9:45am – 10:45am **Parallel Universes**
Max Tegmark, Ph.D. — [Hudson and Half Moon]

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.

11am – Noon **Cosmology and the Meaning of Life**
Max Tegmark, Ph.D. — [Hudson and Half Moon]

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.

Noon – 1:30pm LUNCH

1:30pm – 3pm **Radars as Tools of Choice: Better Living Through Radiation**
Howard B. Bluestein, Ph.D. — [Hudson and Half Moon]

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.

3:30pm – 5pm **Healthy Skeptics Read the Medical News**
Drs. Lisa Schwartz & Steven Woloshin — [Hudson and Half Moon]

A healthy skeptic knows that not all the published medical news is fit to print. And that some of the most exciting science news stories are really new science fiction. Drs. Woloshin and Schwartz will go through some actual news reports to expose problems using examples in disease prevention, cancer screening, and cancer treatment.

5:30pm – 7:30pm **Are Barry Bonds' Home Run Records Tainted?**
Alan M. Nathan, Ph.D. — [Queens Lounge]

In 2001, Barry Bonds hit 73 home runs, three more than the previous single-season home run record. In 2007, he hit his 756th career home run, passing Hank Aaron's golden career record.

Bonds is alleged to have used performance-enhancing drugs. If indeed someone were to use such drugs, how might that have affected home run production? At the risk of dampening enthusiastic Bonds-related debates everywhere, Dr. Nathan will go into a scientific framework for answering this question. You'll come away equipped with knowledge of the factors and influences bearing on a slugger's performance that we can quantify with confidence, those about which we can offer an educated guess, and those that are poorly understood.

17th of December — Wednesday

7am **Ship Arrives Ft. Lauderdale**

DATE	PORT	ARRIVE	DEPART
Sunday, Dec. 7	Fort Lauderdale, Florida	—	5pm
Monday, Dec. 8	Half Moon Cay	8am	4pm
Tuesday, Dec. 9	At Sea	—	—
Wednesday, Dec. 10	St. Thomas, U.S.V.I.	8am	5pm
Thursday, Dec. 11	Roseau, Dominica	8am	5pm
Friday, Dec. 12	At Sea	—	—
Saturday, Dec. 13	Willemstad, Curacao	8am	Midnight
Sunday, Dec. 14	Oranjestad, Aruba	8am	5pm
Monday, Dec. 15	At Sea	—	—
Tuesday, Dec. 16	At Sea	—	—
Wednesday, Dec. 17	Fort Lauderdale, Florida	7am	—