



AMERICAN MUSEUM OF NATURAL HISTORY

# HAYDEN PLANETARIUM ISAAC ASIMOV MEMORIAL DEBATE

## The Theory of Everything... Still Searching?

Monday, March 7, 2011 • 7:30 pm  
Samuel J. and Ethel LeFrak Theater



# The Theory of Everything... Still Searching?

Can the entire universe be explained with a single, unifying theory? This is perhaps the most fundamental question in all of science, and it may also be the most controversial. Albert Einstein was among the first to envision a unified theory that could account for the behavior of all matter and energy in the cosmos, but a definitive solution has eluded physicists to this day. As the 21st century progresses, “string theory” remains the leading candidate to be the “theory of everything”—although some have come to question whether string theorists are on the right track. Still others doubt that a “theory of everything” exists at all—and consider the search for such a theory an outdated philosophy of our search for cosmic truths.

**To learn more about tonight’s topic, visit:**

[haydenplanetarium.org/programs/asimov/2011](http://haydenplanetarium.org/programs/asimov/2011)



# Tonight's Program

Welcome and Introduction

Opening Questions

Directed Free Debate Among Panelists

Questions from Audience

Adjournment

Book/Program Signing in the  
Hall of Northwest Coast Indians

## Panelists

**Katherine Freese** is the George E. Uhlenbeck Professor of Physics at the University of Michigan, and the associate director of the Michigan Center for Theoretical Physics. She works on a wide range of topics in theoretical cosmology and astroparticle physics. She has been working to identify the dark matter and dark energy that permeate the universe as well as to build a successful model for the early universe immediately after the Big Bang. She has shown that most of the mass in galaxies does not consist of ordinary stellar material, and has proposed ways to look for alternatives such as supersymmetric particles. Currently there is a great deal of excitement about possible detections of these particles. Recently she has proposed that dark stars were the first stars to form in the universe.

**Sylvester James Gates**, the Toll Professor of Physics and director of the Center for String and Particle Theory at the University of Maryland, is an educator, researcher, and policy advisor. In physics, he is known for his contributions to “supersymmetry,” a mathematical property proposed to describe nature. His most recent efforts led a group to discover that hidden in equations of superstring theory occur computer communications codes like those used in web browsers and Adinkras, the codes related to graphic visualizations. He currently serves on the Maryland State Board of Education and the U.S. President’s Council of Advisors on Science & Technology.

**Marcelo Gleiser** is the Appleton Professor of Natural Philosophy and professor of physics and astronomy at Dartmouth College. A fellow of the American Physical Society and the recipient of the National Science Foundation and White House Presidential Faculty Fellows Award, he is the author of over 100 peer-reviewed papers and dozens of conference proceedings contributions. He is the author of three popular science books, most recently *A Tear at the Edge of Creation: A Radical New Vision for Life in an Imperfect Universe*, which has been translated into 12 languages and appears frequently in radio interviews and TV documentaries here and abroad. He is co-founder of the science and culture blog “13.7” hosted by National Public Radio.

**Brian Greene** is a professor of physics and professor of mathematics at Columbia University and is highly regarded for a number of groundbreaking discoveries in superstring theory, including mirror symmetry and space-time topology change. His first book, *The Elegant Universe*, was the basis for a Peabody Award-winning PBS series and was a national bestseller and a finalist for the Pulitzer Prize; his second book, *The Fabric of the Cosmos*, spent six months on the *New York Times* bestseller list and is also currently in production as a PBS series. His latest book, *The Hidden Reality*, explores the science of parallel universes. With journalist/producer Tracy Day, professor Greene founded the annual World Science Festival. Professor Greene lives in Andes, New York, and New York City.



**Janna Levin** is a professor of physics and astronomy at Barnard College of Columbia University. Her scientific research concerns the early universe, chaos, and black holes. She is the author of the PEN-award winning novel *A Madman Dreams of Turing Machines* and the popular science book *How the Universe Got Its Spots: Diary of a Finite Time in a Finite Space*. She holds a BA in Physics and Astronomy from Barnard College with a concentration in Philosophy, and a PhD from MIT in Physics. She worked at the Center for Particle Astrophysics at the University of California, Berkeley before moving to the UK where she worked at Cambridge University in the Department of Applied Mathematics and Theoretical Physics.

**Lee Smolin** is one of the founding members of the Perimeter Institute for Theoretical Physics. His main research contributions are to the field of quantum gravity. With Abhay Ashtekar and Carlo Rovelli, he was a founder of the approach known as loop quantum gravity, but he has contributed to other approaches, including string theory and causal dynamical triangulations. He is also known for proposing the notion of the landscape of theories, based on his application of Darwinian methods to Cosmology. He also has contributed to the foundations of quantum mechanics, elementary particle physics and theoretical biology. He is the author of *Life of the Cosmos*, *Three Roads to Quantum Gravity*, and *The Trouble with Physics*.

**Neil deGrasse Tyson**, an astrophysicist, is the Frederick P. Rose Director of the Hayden Planetarium. A native New Yorker, Tyson is the author of 10 books, and the recipient of 13 honorary doctorates, as well as the NASA Public Service Medal. He also hosts the PBS TV series *NOVA scienceNOW* as well as the StarTalk Radio Show and podcast. Asteroid 13123-Tyson is named after him. Tyson tweets the universe daily: @neiltyson.

The late Dr. Isaac Asimov, one of the most prolific and influential authors of our time, was a dear friend and supporter of the American Museum of Natural History.

In his memory, the Hayden Planetarium is honored to host the annual Isaac Asimov Memorial Debate, generously endowed by relatives, friends, and admirers of Isaac Asimov and his work, bringing the finest minds in the world to the Museum each year to debate pressing questions on the frontier of scientific discovery.

Proceeds from ticket sales of the Isaac Asimov Memorial Debates benefit the scientific and educational programs of the Hayden Planetarium.

### **Previous Debates**

- 2010** Rose Center 10th Anniversary Asimov Debate: Is Earth Unique?
- 2010** Moon, Mars and Beyond: Where Next for the Manned Space Program
- 2009** From Planets to Plutoids
- 2008** Mining The Sky
- 2007** The Pioneer Anomaly
- 2006** Universe: One or Many?
- 2005** The Enigma of Alien Solar Systems
- 2004** The Dark Side
- 2003** The Big Bang
- 2002** The Search For Life In the Universe
- 2001** The Theory of Everything



## Upcoming Hayden Planetarium Programs

### **Astronomy Live**

6:30 pm

Hayden Planetarium Space Theater

\$15 (\$13.50 Members, students, senior citizens)

### **Spring Skies with Steve Beyer**

**Tuesday, March 29**

During the late 1700s French astronomer Charles Messier catalogued more than 100 sky objects while searching for comets. Using the Zeiss Mark IX star projector, identify and explore many of the Messier objects—including interesting galaxies, star clusters, and glowing nebulae—that can be seen in late March and early April.

### **Exoplanets Revealed with Emily Rice**

**Tuesday, April 26**

Planets were first discovered around stars other than the Sun in 1995, but only indirectly. Since then, astronomers have pushed the limits of technology and obtained actual images of planets around other stars. Journey among the hundreds of extrasolar planets that have been discovered in the universe and view the images that bring us one step closer to answering the question: “Are we alone in the universe?”

### **The Mighty Behemoths with Ted Williams and Brian Abbott**

**Tuesday, May 31**

Come search out the giants of our solar system. Hydra, Cancer, Leo, Draco, and the great bear and monstrous scorpion can now be spotted in the springtime sky. Jupiter and Saturn will be languishing across the night sky along with some of the largest constellations of the year.

### **Summer Stars with Joe Rao**

**Tuesday, June 28**

Summer nights afford beautiful views of the Milky Way as it arches high across the sky. The familiar “Summer Triangle” and the brightest of the zodiacal constellations, Scorpius, the Scorpion, are clearly in view. Explore the summer sky using the Zeiss Mark IX Star Projector and glimpse ringed Saturn and speedy Mercury, both of which will be in prime position for observation this summer.

# Upcoming Hayden Planetarium Programs

## Frontiers in Astrophysics Lecture Series

7:30 pm

Hayden Planetarium Space Theater

\$15 (\$13.50 Members, students, senior citizens)

### A Hitchhiker's Guide to Habitable Planets in Our Galaxy

with **Linda Elkins-Tanton**

**Monday, April 11**

Almost every star is now thought to form with a planetary system around it. But just how rare a phenomenon are habitable planets? MIT Professor **Linda Elkins-Tanton** will discuss what is currently known about planetary formation—and what is needed to encourage the development of life.

### Physics of the Future with **Michio Kaku**

**Monday, May 9**

**Michio Kaku**, author of *New York Times* bestseller *Physics of the Impossible*, will discuss his astonishing forecasts of scientific leaps in the next century, including driverless cars that float above ground, x-ray vision, robot surgeons, and even an elevator to space. A book signing will follow.

### Exoplanets and the Search for Life Beyond Earth

with **Marc Kaufman** and **Sara Seager**

**Monday, June 6**

Each day we learn more about the sheer number and surprising variety of planets orbiting distant solar systems. As our knowledge of exoplanets increases, does the likelihood of finding signs of life in the cosmos increase as well? **Sara Seager**, one of the nation's preeminent experts on exoplanets, will discuss this provocative line of inquiry and discovery with **Marc Kaufman**, author of *Exoplanets and the Search for Life Beyond Earth*, a new book on the science and scientists of astrobiology.



# Upcoming Hayden Planetarium Programs

## Special Events

### Celebrate MESSENGER!

**Thursday, March 17**

8:30–10:15 pm

Rose Center for Earth and Space

Free

On March 17, 2011, the MESSENGER spacecraft will enter orbit about the innermost planet, Mercury, and become the first craft ever to do so. A critical 15-minute orbital maneuver will initiate a one-year science campaign to understand the innermost planet. The MESSENGER spacecraft, developed under NASA's Discovery Program and launched over six years ago, is the first space probe to investigate Mercury in more than 30 years. Join **Denton Ebel**, associate curator in the Museum's Department of Earth and Planetary Sciences, and Director of Astrovisualization **Carter Emmart** as they share the details of this maneuver and watch a live video feed from the Mission Operations Center as we hear the results.

### The Size and Age of the Universe with Wendy Freedman

**Tuesday, April 5**

7 pm

Hayden Planetarium Space Theater

Free (Registration required; call 212-769-5200)

**Wendy Freedman** will describe how astronomer Edwin Hubble discovered galaxies and the expansion of the universe, how astronomers measure the vast distances to galaxies, and how the Hubble Space Telescope is used to measure the size and age of the universe.

### Earth Day with Carter Emmart

**Thursday, April 21**

6:30 pm

Hayden Planetarium Space Theater

\$15 (\$13.50 Members, students, seniors)

It's arguably the most beautiful planet in the solar system. Join **Carter Emmart**, director of astrovisualization, in a celebration of the most current Earth data to be displayed in the Hayden Planetarium in a program that will be part ambient experience, part guided walk-through of data sets made available by NASA's Earth Observing System.

Notes

Notes

Learn more about Hayden Planetarium Programs  
at [haydenplanetarium.org](http://haydenplanetarium.org) or (212) 769-5200.

American Museum of Natural History  
[amnh.org](http://amnh.org) • (212) 769-5100

Department of Astrophysics  
[research.amnh.org/astrophysics](http://research.amnh.org/astrophysics) • (212) 769-3650

Rose Center for Earth and Space  
[amnh.org/rose](http://amnh.org/rose) • (212) 769-5900

Hayden Planetarium's Night Sky Q&A Hotline  
(212) 769-5901

To add your name to the Hayden Planetarium's star-struck e-list  
for sky phenomena and Hayden events, send a blank e-mail to  
[star-struck-join@lists.amnh.org](mailto:star-struck-join@lists.amnh.org).