

BRIGHT HORIZONS #6 PROGRAM

5th of December — Saturday

5pm Ship Departs from Fort Lauderdale
6pm – 7pm Bon Voyage Cocktail Party — [*Crow's Nest*]

6th of December — Sunday (Sea Day)

8:30am – 10am Intro to Geothermal Energy
David D. Blackwell, Ph.D. — [*Queens Lounge*]

Get in on the ground floor of geothermal energy. Dr. Blackwell will cover the natural foundations of this alternative energy resource. You'll deepen your understanding of the origin of the Earth's heat; the role of plate boundaries; spreading centers and hot spots; mechanisms of tapping geothermal; and the risks and benefits, advantages, and disadvantages of tapping this resource.

9am – 10:30am Immune-Mediated Responses: A Double-Edged Sword
Noah Isakov, Ph.D. — [*Hudson*]

While scientific speculation about the immune system dates back to the Plague of Athens in 430BC, the discipline of immunobiology defined itself in the 19th and 20th centuries. Refresh your picture of the immune system with Dr. Isakov, starting with discussions of:

- Introduction to immunobiology
- Basic concepts of the immune system
- Failure of host defense mechanisms

10:45am – 12:15pm Future of Energy — Geothermal as a Major Player
David D. Blackwell, Ph.D. — [*Hudson*]

Any time zettajoules (10^{21}) enter the conversation about alternative energies, you know the potential for the resource is great. Dr. Blackwell will lay out the factors in play in a look at the practical future of geothermal energy. Raw and practical potential, inventory of accessible energy, environmental impact, and competitive position are some of the facets in the discussion. Geothermal economics are on the agenda, too: Short and long term investment and implications, direct and indirect costs, and domestic and imported sources.

10:45am – 11:45am Q&A #1 (of 2) with Lawrence Krauss, Ph.D. — [*Piano Bar*]

Join Lawrence Krauss for a cosmology-themed interactive interlude. Ask a question. Field a question. Share in the burning debates in contemporary physics, and experience Dr. Krauss, unplugged. Please hold your Star Trek questions for our Physics of Star Trek session with Dr. Krauss on Wednesday, December 9. *Attendance limited to Group One.*

2pm – 3:30pm The Many Facets of Allergic Responses
Noah Isakov, Ph.D. — [*Hudson*]

Many faceted, if not many splendored, allergic phenomena have increased in prevalence over the past several decades. Join Dr. Isakov for the latest thought on:

- Allergens, asthma, and other types of immune-mediated responses

- Effector mechanisms in allergic responses
- Approaches for prevention and treatment of allergy

2pm – 3pm Q&A #1 (of 2) with Jim Bell, Ph.D. — [*Piano Bar*]

Bring your burning questions to a lively dialogue with Jim Bell. Curiosity rules as the group does Q&A, and discusses planetary imaging, near-Earth objects, the search for other intelligent life, and more. *Attendance limited to Group Two.*

4pm – 5:30pm An Atom From Boston
Lawrence Krauss, Ph.D. — [*Queens Lounge*]

Standing somewhere between natural history and biography, Dr. Krauss lays out the life history of a single atom from the beginning of the universe to the end. Life is a journey, and this atom's journey runs from nuclear physics to chemistry to cosmology, with passages through geology and biology along the way. Whether you are an atom aficionado, or more a "universe in a grain of sand" type, sit with Dr. Krauss for a refreshing look at an atom.

6pm – 7:30pm The Space Shuttle Program
Guion S. Bluford, Jr., Ph.D. — [*Queens Lounge*]

Countdown to contemporary treasure — a first-hand account of life in space. Dr. Guion Bluford, a veteran of four Space Transportation System (STS) missions (STS 8, STS 61-A, STS 39, and STS 53) will present a look at the Space Shuttle Program, from its inception to the wrap up of its service in 2010. Learn about training for shuttle duty, noteworthy aspects of daily routine in space on the Discovery and Challenger, and gain a behind the scenes look at the science and technology projects executed by Shuttle astronauts.

7th of December — Monday (Sea Day)

7am Ship Arrives Grand Turk, Turks & Caicos Islands

3pm (all aboard 2:30pm) Ship Departs from Grand Turk, Turks & Caicos Islands

2:30pm – 3:30pm Studying the Solar System in 3-D
Jim Bell, Ph.D. — [*Main Show Lounge*]

Don your red-blue glasses and join planetary imaging expert Prof. Jim Bell on a voyage of 3-D discovery of the solar system. Stereo pictures of Mars, the Moon, Saturn, asteroids, comets, and other places taken by astronauts and robotic space probes provide new details about the geology and history of our planetary neighbors. Learn about the ways that 3-D images are taken, and the ways that they are used by scientists and engineers involved in space exploration. Viewing the solar system in 3-D is the next best thing to being there!

3:45pm – 5:15pm Plate Tectonics
David D. Blackwell, Ph.D. — [*Hudson*]

Glide into an updated understanding of plate tectonics. Join Dr. Blackwell for a discussion of the development of the theory, its key principles, and its consequences. You'll learn about physical properties of the dynamic lithosphere, athenosphere, and mantle layers versus chemical layers of the earth, driving forces of plate movement, and the relationship of plate boundaries to geological events such as earthquakes and the creation of topographic features like mountains, volcanoes, and oceanic trenches.

4pm – 5:30pm **Monoclonal Antibodies and Cancer Immunotherapy**
Noah Isakov, Ph.D. — [Queens Lounge]

Take a look under the hood of contemporary immunotherapy. From molecular biology to medicine, monoclonal antibodies are a valuable part of the scientist's toolkit. From his view deep in the trenches of immunobiology, Dr. Isakov will offer:

- An overview of antibody molecules
- A guide to the production of monoclonal antibodies with specificity against a predetermined pathogen
- The scoop on monoclonal antibody use in research, diagnosis, and therapy

6pm – 7:30pm **The International Space Station**
Guion S. Bluford, Jr., Ph.D. — [Queens Lounge]

Join Dr. Bluford for a comprehensive survey of the International Space Station (ISS) Program. He will orient us to the history and complexities of this permanent human presence in space. From project inception to launch to ongoing development and daily living, pick up a new understanding of the logistics, function, and significance of the ISS.

8th of December — Tuesday

10am **Ship Arrives Puerto Rico**

11pm **Ship Departs from Puerto Rico**

8:30am – 10am **Einstein's Biggest Blunder — A Cosmic Mystery Story**
Lawrence Krauss, Ph.D. — [Queens Lounge]

Recent discoveries have implications for our understanding both of the future of our universe and life within it and for our understanding of fundamental physics. Join Dr. Krauss as he covers the fate of the Milky Way, what lies beyond the event horizon, and cosmic phenomena of the next 100 billion years.

10:15am **Depart for Arecibo Observatory**
[meet in Queens Lounge at 10am for our departure at 10:15am]

9th of December — Wednesday

8am **Ship Arrives St. Thomas**

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

4:45pm – 6:15pm **Impact!**
Jim Bell, Ph.D. — [Queens Lounge]

The solar system is teeming with millions of asteroids and comets, and occasionally they crash into the planets with catastrophic consequences. Planetary scientist Jim Bell leads a discussion about the science fact and science fiction of the role of such impacts in shaping the geology and biology of our home world. Earth has been hit in the past, with severe consequences for life on our planet. Will Earth be hit again in the future? Almost certainly. Unlike any previous species in history, however, we have the chance to understand the threat ahead of time and, perhaps, to prevent a planetary-scale catastrophe.

6:30pm – 7:30pm **Physics of Star Trek Q&A**
Lawrence Krauss, Ph.D. — [Queens Lounge]

This Q&A session is open to everyone in our group — whether you signed up for the conference or not. Beer, wine, and soda will be provided while you sit back, relax, and enjoy the journey to where no one has gone before.

10th of December — Thursday (Sea Day)

8:30am – 10am **Searching for Life in the Solar System and Beyond**
Jim Bell, Ph.D. — [Queens Lounge]

Are we alone? The search for habitable environments and for life on other worlds is a major driving force for the exploration of the solar system. Join Professor Bell as we explore the short list of worlds around us that may once have been (and perhaps still are, in places) habitable: Mars, Jupiter's moon Europa, Saturn's moons Titan and Enceladus, and perhaps other places as well. During the last decade scientists have also discovered an amazing diversity of life on our own planet, thriving in what were once considered hostile conditions. And during the same time, astronomers have discovered hundreds of planets orbiting other Sun-like stars, and some of them may be habitable as well. It's an incredible time to search for life in the solar system and beyond!

10:30am – 11:30am **Q&A #2 (of 2) with Lawrence Krauss, Ph.D.**
[Piano Bar]

Join Lawrence Krauss for a cosmology-themed interactive interlude. Ask a question. Field a question. Share in the burning debates in contemporary physics, and experience Dr. Krauss, unplugged. *Attendance limited to Group Three.*

10:30am – Noon **Understanding the Roots of Cancer**
Noah Isakov, Ph.D. — [Hudson]

Dr. Isakov will orient you to the evolving views of the genesis of cancer. Internal and external factors, oncogenes, tumor suppressor genes, cell transformation, immunosurveillance, immunoediting, and immunotherapy are all part of the mix. Learn:

- What causes normal cells to become cancerous
- How cancer cells from a primary tumor form metastases in remote organs
- About immune-mediated approaches for the treatment of cancer diseases

Noon – 1:30pm LUNCH

1:30pm – 2:30pm **Q&A #2 (of 2) with Jim Bell, Ph.D.**
[Piano Bar]

Bring your burning questions to a lively dialogue with Jim Bell. Curiosity rules as the group does Q&A, and discusses planetary imaging, near-Earth objects, the search for other intelligent life, and more. *Attendance limited to Group Four.*

1:30pm – 3pm

Geology and Plate Tectonics of the Americas

David D. Blackwell, Ph.D. — [Hudson]

Take a guided tour of the Americas and the vast North American, Caribbean, South American, and African tectonic plates. From topology to geology to tectonics, you'll get a picture of the forces that created the Americas, and continue to shape it today. Basins, plains, volcanoes, and mountain ranges have stories to tell. Survey the terrain with Dr. Blackwell.

4pm – 5:30pm

Postcards from Mars

Jim Bell, Ph.D. — [Queens Lounge]

The NASA Mars Exploration Rovers Spirit and Opportunity landed on the Red Planet in January 2004, and have been driving, photographing, and analyzing their landing sites for the past five years. Professor Bell has been the lead scientist in charge of the rovers' Panoramic Camera imaging system since the rovers were "born" nearly a decade ago. Come along for an amazing journey of geologic exploration and learn about the ways that both rovers have been utilized to discover convincing evidence that Mars was once warmer, wetter, and much more Earth-like than it is today.

6pm – 7:30pm

The Future of the Space Program

Guion S. Bluford, Jr., Ph.D. — [Queens Lounge]

Travel back to the future with an in-depth discussion on the future of the NASA Space Program. Dr. Bluford will address the issues and opportunities ahead as space exploration matures. You'll get the big picture of the Constellation Program (with its Aries, Orion, and Altair components) which will return humans to the moon and later take them to Mars. Come away with the insights and views on what lies ahead from Dr. Bluford, astronaut and aeronautical engineer.

11th of December — Friday

8am

Ship Arrives Half Moon Cay

4pm

Ship Departs from Half Moon Cay

4pm – 5:30pm

The Undiscovered Country

Lawrence Krauss, Ph.D. — [Queens Lounge]

We humans have undoubtedly questioned the origins of the cosmos for as long as we've walked the Earth but we've made spectacular progress in recent years. This progress forces 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.

6pm – 7:30pm

An Evening with Shuttle Astronaut Dr. Guion Bluford

[Queens Lounge]

How has aeronautics affected society and vice versa? Having worked in space, what open questions does Dr. Bluford have about space exploration, and space? What are the core characteristics and qualities shared by astronauts i.e., what is "the right stuff"? Dr. Bluford will present food for thought arising from his experience in space (688 hours), in jet cockpits (5,200 hours), and in the field of aeronautical engineering. We'll have an out-of-this-world round of astronaut Q&A, too!

SPEAKER PROFILES

Jim Bell, Ph.D. is a Professor in the Department of Astronomy at Cornell University in Ithaca, New York. He received his B.S. from Caltech in 1987 and his Ph.D. from the University of Hawaii in 1992, performing research on Mars surface mineralogy and climate variations using infrared and optical telescopes at Mauna Kea Observatory. Jim spent three years as a National Research Council postdoctoral research fellow at NASA's Ames Research Center in California prior to coming to Cornell in 1995. His research primarily focuses on the geology, geochemistry, and mineralogy of planets, asteroids, and comets using data obtained from telescopes and spacecraft missions.

Jim is an active planetary scientist and has been heavily involved in many NASA robotic space exploration missions including the Near Earth Asteroid Rendezvous (NEAR), Hubble Space Telescope, Mars Pathfinder, Comet Nucleus Tour, Mars Exploration Rover, Mars Odyssey Orbiter, Mars Reconnaissance Orbiter, Lunar Reconnaissance Orbiter, and 2009 Mars Science Laboratory Rover mission. As a member of the Mars Exploration Rover team, Jim has served as the lead scientist in charge of the Panoramic camera (Pancam) color, stereoscopic imaging system on the Spirit and Opportunity rovers. The rovers landed on Mars in January 2004 operated successfully for nearly five years. As a professional scientist, Jim has published more than 30 first-authored and 120 co-authored research papers in peer reviewed scientific journals, has authored or co-authored more than 400 short abstracts and scientific conference presentations, and has edited two scientific books for Cambridge University Press (one on the NEAR mission, the other on the surface composition of Mars).

Jim is also an extremely active and prolific public communicator of science and space exploration. He is a frequent contributor to popular astronomy and science magazines like *Sky & Telescope* and *Scientific American*, and to radio shows and internet blogs about astronomy and space. He has appeared on television on the NBC Today show, on CNN's *This American Morning*, on the PBS Newshour, and on the Discovery and National Geographic cable channels. He has also written three photography-oriented books that showcase some of the most spectacular images of Mars and the Moon acquired during the space program: *Postcards from Mars* (Dutton, 2006), *Mars 3-D* (Sterling, 2008), and *Moon 3-D* (Sterling, 2009).

David D. Blackwell, Ph.D. is the W. B. Hamilton Professor of Earth Sciences in the Department of Earth Sciences at Southern Methodist University.

Dr. Blackwell earned a B.S. in Geology and Mathematics from Southern Methodist University in 1963. While an undergraduate, he worked for two summers as a field assistant for the U. S. Geological Survey, Denver, Colorado, and served as a Teaching Assistant at Southern Methodist University. Dr. Blackwell obtained an M.S. in Geophysics from Harvard University in 1965, and was granted a Ph.D. in Geophysics by Harvard University in 1967. He completed a post-doctoral fellowship at the California Institute of Technology, Pasadena, California during September 1967–September 1968

Since 1968 Dr. Blackwell has been a member of Southern Methodist University: as an assistant professor until September 1973; as an associate professor September 1973–September 1978; and as professor of geophysics from 1980 until the present. He has been W.B. Hamilton Professor of Geophysics since 1980, and served as Chairman, Department of Geological Sciences September 1982–August 1986.

Dr. Blackwell is the author of innumerable papers. He received a Sigma Xi Outstanding Research Southern Methodist University Faculty Award for work in 1979–1980. He has published numerous technical reports, and has been recognized three times by the Geothermal Resources Council (GRC) for presenting the best paper at annual meetings. The GRC gave Dr. Blackwell its Distinguished Service Award in 1997, and its Special Achievement Award in 2004. *The Geothermal Map of North America* edited by David Blackwell and Maria Richards, with cartography by Kansas Geological Survey, was selected for inclusion in ESRI's 2005 *Map Book*.

Dr. Guion S. Bluford, Jr., Ph.D., is Founder and President of The Aerospace Technology Group (ATG), an aerospace technology and business consulting organization specializing in aviation and space related technology development, analysis, and marketing-related activities. Prior to joining ATG, Dr. Bluford was Vice President of Microgravity R&D and Operations for the Northrop Grumman Corporation and was responsible for all corporate microgravity research and technical development activities in support of NASA's Human Exploration and Development of Space (HEDS) Enterprise. He also served as the Program Manager of the NASA Glenn Research Center's Microgravity Research, Development, and Operations Contract (MRDOC). Headquartered in Cleveland, Ohio, Dr. Bluford was responsible for the design, development, integration, and operational support of the NASA Fluids and Combustion Facility and associated space flight experiment hardware for the International Space Station. Prior to joining Northrop Grumman, he was Vice President of the Aerospace Sector of Federal Data Corporation (FDC) and was responsible for all NASA business. He has also been the Vice President of the Engineering Services Division of NYMA Inc. and Program Manager of the NASA Lewis Research Center's Scientific, Engineering, Technical, and Administrative Related Services (SETAR) contract.

Prior to his service with Northrop Grumman, FDC, and NYMA, Inc., Dr. Bluford was a NASA mission specialist and payload commander astronaut on four Space Shuttle missions. He was selected in the first class of space shuttle astronauts in 1978 and was the first African American to fly in space in 1983 aboard Space Shuttle Challenger. In addition, he flew on a Spacelab flight as payload commander in 1985, a Department of Defense Strategic Defense Initiative Office flight in 1991, and a classified Department of Defense flight in 1992. He has over 688 hours in space.

Dr. Bluford served 29 years in the United States Air Force as an Air Force tactical fighter pilot in Vietnam, instructor pilot, staff development engineer, Branch Chief of the Aerodynamics and Airframe Branch of the Air Force Flight Dynamics Laboratory and NASA Astronaut. He has over 5,200 hours of jet flight in ten different aircraft.

Dr. Bluford received a Bachelor of Science degree in Aerospace Engineering from Penn State University in 1964 and Masters of Science and Ph.D degrees in Aerospace Engineering from the Air Force Institute of Technology in 1974 and 1978, respectively. He also has a Master of Business Administration degree from the University of Houston, Clear Lake, Texas and has attended the University of Pennsylvania's Wharton School of Business.

Dr. Bluford serves on the Board of Directors of ENSCO Inc., and the Board of Trustees of The Aerospace Corporation. He has been a member of the National Research Council's Aeronautics and Space Engineering Board (ASEB) and a member of the Board of Directors of the American Institute of Aeronautics and Astronautics (AIAA) and the U.S. Space Foundation. He has also served on the Board of Directors of several local organizations as well as on the NASA Alumni League and has been the Executive Director for Investigative Activities of the Columbia Accident Investigation Board.

He has been awarded the Department of Defense's Superior Service, and three Meritorious Service Medals; the Air Force's Legion of Merit, Meritorious Service, Commendation and ten Air Medals; NASA's Distinguished Service, Exceptional Service, and four Space Flight Medals; the State of Pennsylvania's Distinguished Service medal and 13 honorary doctorate degrees. An AIAA Fellow, he was inducted into the International Space Hall of Fame in 1997.

Noah Isakov, Ph.D. is the Joseph H. Krupp Professor of Cancer Immunobiology in the Department of Microbiology and Immunology at Ben Gurion University of the Negev, Beer Sheva, Israel. His work is focused on mechanisms of regulation of T-lymphocyte activation, signaling pathways mediating cell growth regulation and differentiation, determination of the role of oncogene and protooncogeneproducts in neoplastic processes, and mechanisms of cell transformation.

Dr. Isakov earned a B.Sc. in Biology (with distinction) from Ben Gurion University of the Negev in 1974, an M.Sc. in Immunology from the Weizmann Institute of Science in 1976, and a Ph.D. in Immunology from the Weizmann Institute of Science in 1981. Dr. Isakov undertook a postdoctoral fellowship at the Immunology Research Center, and in the Department of Laboratory Medicine and Pathology, at the University of Minnesota

1981–1983.

Isakov then worked at the Scripps Research Institute, La Jolla, California in the Department of Immunology, as a research associate 1983–1986, and as a Scientific Associate 1986–1988. During the 1990s, Isakov spent five two-month stints as a Visiting Scientist at The Scripps Research Institute and the La Jolla Institute for Allergy and Immunology. From 1993–1995, he served as a Visiting Scientist in the Cell Biology and Metabolism Branch, National Institute of Child Health and Human Development at the National Institutes of Health in Bethesda, Maryland. Dr. Isakov has served on faculty at Ben Gurion University since 1986, and currently holds the Krupp Chair.

Dr. Isakov is on the Editorial Board of *Biology Direct-Immunology* and *The Open Enzyme Inhibition Journal* as well as being an ad hoc reviewer for many other publications. He is a frequent invited guest speaker in his field, having presented in Austria, Scotland, France, the U.S.A., India, Germany, Poland, Russia, Japan, Canada, Norway, Australia, Ireland, and Tanzania.

Lawrence Krauss, Ph.D. is Foundation Professor, Director, Origins Initiative, and Co-Director, Cosmology Initiative of the School of Earth and Space Exploration, Beyond Center, and Department of Physics, Arizona State University.

Dr. Krauss was born in New York City and shortly afterward moved to Toronto, spending his childhood in Canada. He received undergraduate degrees in Mathematics and Physics from Carleton University in 1977, and his Ph.D. from the Massachusetts Institute of Technology in 1982. He became an assistant professor at Yale University in 1985. He was named the Ambrose Swasey Professor of Physics, Professor of Astronomy, and was Chairman of the Department of Physics at Case Western Reserve University from 1993 to 2005.

His research has been based on an attempt to explore how phenomena at various extremes of scale can be used to probe fundamental physics. Dr. Krauss has become increasingly interested in utilizing the Universe as a laboratory to study fundamental physics. He has been active in the emerging field of particle astrophysics, in which both the cosmological implications of ideas concerning fundamental interactions, and astrophysical and cosmological constraints on particle physics are explored.

Among the areas in which Krauss' research has focused are: neutrino physics and astrophysics, big bang nucleosynthesis, gravitational lensing, dark matter theory and detection, particle physics phenomenology beyond the Standard Model, axions and the strong CP problem, symmetry breaking in the Standard Model and the cosmology and physics of the electroweak phase transition, ultra-sensitive laboratory probes of new physics at high energy scales, stellar evolution, general relativity and gravitation, early universe physics, gravitational waves, and the physics of black holes and quantum gravity. Krauss is a critic of string theory.

Among Dr. Krauss' honors are the highest awards of all three major U.S. Physics Societies: the American Physical Society, the American Association of Physics Teachers, and the American Institute of Physics. Krauss received the Gravity Research Foundation First prize award in 1984, the Presidential Investigator Award in 1986, the American Association for the Advancement of Science's Award for the Public Understanding of Science and Technology in 2000, the Julius Edgar Lilienfeld Prize and Andrew Gemant Award in 2001, the American Institute of Physics Science Writing Award in 2002, the Oersted Medal in 2003, and the American Physical Society Joseph P. Burton Forum Award in 2005.

Dr. Krauss believes that science is in part a vital cultural activity and so regularly appears in national media for public outreach in science and has written many editorials for *The New York Times*. He is most famous for his advocacy against intelligent design as a result of his involvement on the issue with the state school board of Ohio. He currently serves on the advisory boards of the Campaign to Defend the Constitution, an organization dedicated to opposing the religious right, and Scientists and Engineers for America, an organization focused on promoting sound science in American government.

Dr. Krauss has written non-academic books, among them: *The Fifth Essence*, *Fear of Physics*, *The Physics of Star Trek*, *Beyond Star Trek*, *Quintessence*, *Hiding in the Mirror*.