



# EYEPIECE

Journal of the Amateur Astronomers Association of New York

April 2009

Volume 57, Number 4, ISSN 0146-7662

---

## Asimov Panelists Probe the Definition of a Planet

By Thomas Haeberle

As the International Astronomical Union (IAU) prepares to meet in August in Brazil, scientists are still brawling over what's a planet. The IAU's controversial 2006 decision to demote Pluto and send it to the icy realm of Kuiper-Belt objects (KBO) still engenders arguments among the astronomy elite, as was demonstrated at the ninth Isaac Asimov debate at the AMNH March 10.

Bad blood still exists as some panelists referred to the IAU and its decision as irrelevant and awful. Mark Sykes of the Planetary Science Institute, a planetary geologist, said that the American Geophysical Union (AGU) is more important than the IAU.

Hayden Planetarium director Neil deGrasse Tyson, who moderated, pointed out that for the past 30 years, there have been many books with the title "The New Solar System. It's only recently that we're seeing a new solar system truly taking shape."

Sykes kicked things off by saying, "Clears orbit, what does that mean?" Steven Soter, theorist/planetary scientist at AMNH, responded, "Now about [the word] clearing. That was a mistake, because planets never fully clear their orbits." Instead, he suggested that Pluto doesn't gravitationally dominate" its neighborhood like planets such as Earth or Mercury.

[Clearing refers to when an object has cleared away most debris from its orbit. There's debate on what that actually means. The asteroid belt has objects basically the same size and within the same orbit, and that's true in most respects for the Kuiper Belt.]

Soter said he turned to history for guidance in his definition. He noted that William Herschel, who was the first to discover a planet--Uranus--realized how the planets were spaced considerably far from each other. Soter also noted that with 20th century searches, "People weren't looking for small objects. They were looking for planets."

Tyson followed with a reading of a letter from KBO hunter David Jewitt. "That people see Pluto as the last planet effectively has closed minds." Sara Seager, an astrophysicist at MIT, disagreed. "[Clyde] Tombaugh [who discovered Pluto] didn't find more [planets], but he didn't find larger KBOs because the technology wasn't in place.

Planetary scientist Alan Stern, who proposed a system of planet classification using the concepts of hydrostatic equilibrium or roundness, argued that any new definition should be inclusive of new discoveries. Seager, whose research focuses on the atmospheres and interiors of all kinds of exoplanets, pointed out, There are so many different kinds of exoplanets: hot Jupiters, super Earths and super hot Jupiters."

Stern lightheartedly accused Jack Lissauer of making a mistake by not agreeing with the roundness criterion. Lissauer, a scientist at the NASA Ames Research Center, called Vesta as an example of having a "volcanic crust. It was once round and soft but it took some hits [from neighboring asteroids and became flattened somewhat]. The roundness criterion is simply not a good dividing line."

Tyson questioned the motivation of slogans used for the New Horizons mission to Pluto, such as "The first mission to the last planet." Stern, principal investigator on this and other missions, replied, "We came up with a lot of slogans to raise a billion dollars." To which Tyson apologetically bowed to Stern, to the delight of the audience.

Lissauer seemed to agree with Soter that if you look at our solar system, there's a "natural divide" from big to small objects. "A bigger difference between objects makes it [easier] to classify and why the IAU's definition makes sense for this system when you add, 'clearing' to the roundness criterion," Lissauer noted. When Soter said this divide is nature telling us something naturally happening, astrophysicist Gibor Basri disagreed: "Other star systems will be dif-

*Asimov continued on page 6*

# What's Up

By Tony Hoffman

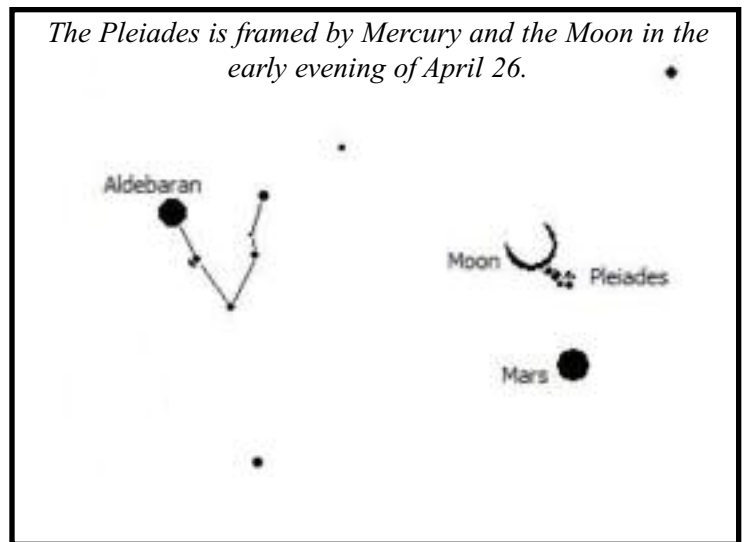
*The Sky for April 2009*

**Mercury Joins the Pleiades.** The innermost planet puts on a fine show in the evening sky this month. Mercury climbs out of the solar glare early in the month, blazing at magnitude -1.3 April 10, when it sets nearly an hour after the Sun. Although the planet gradually fades after that, it remains well-placed until the end of the month, reaching greatest elongation from the Sun April 26, when it lies just below the Pleiades and a two-day-old crescent Moon.

**April's Constellations.** In the early evening, winter's bright stars are leaving the scene. Orion stands in the southwest, with Taurus sinking into the west and Perseus swinging towards the northwest, followed by Auriga. Gemini is high in the west, Leo is near the meridian (with Saturn glowing southwest of Denebola), trailed by Virgo. Ursa Major stands nearly overhead. Bootes, with its brilliant orange star Arcturus, rides high in the east, with Hercules climbing in the northeast. Vega clears the northeast horizon before midnight.

**The spring sky swarms with galaxies.** They are densest in the Leo/Virgo/Coma Berenices region, but galaxies in the Virgo/Coma Cluster are relatively distant and appear faint compared with those overhead in Canes Venatici and Ursa Major, particularly M51 (the Whirlpool Galaxy), M101 and the stunning duo M81 and M82. A small telescope (or large binoculars) will show a hint of detail in these objects.

**April 1** Moon at perigee.



- April 2** First-quarter Moon at 10:34 a.m.
- April 7** Moon lies near Saturn.
- April 8** Full Moon at 10:56 a.m.
- April 13** Moon lies near Antares.
- April 17** Last-quarter Moon at 9:36 a.m.
- April 18** Venus passes 6 degrees from Mars.
- April 19** Moon lies near Jupiter.
- April 21** Mars is at perihelion, 128 million miles from the Sun.
- April 22** Lyrid meteor shower peaks; Moon lies near Venus and Mars.
- April 24** New Moon at 11:23 p.m.
- April 26** Mercury at greatest elongation from the Sun (20 degrees); Moon lies near Mercury and the Pleiades.
- April 28** Moon at perigee. ■

---

## When Jupiter Aligned With Mars

By Joseph A. Fedrick

**Mercury and Jupiter**, having paired spectacularly closely in the southwest evening sky around the first of the year, sank rapidly into the solar glare, only to re-emerge quickly into the morning sky in January and February.

Jupiter followed Mercury into the morning sky during February so it formed a tight pair fitting within the same field of view in my 10x 50 binoculars, with Mercury rising February 20-25.

Jupiter was overtaken by Mars on its way to meeting up with Mercury. Jupiter and Mars appeared very close to each other in bright twilight and in the same field of view in my 60mm refractor at 50x February 17 and 18. I was able to observe a complicated dance of Mercury, Mars and Jupiter low near the southeast horizon in the bright morning twilight dur-

ing late January and February. By March 4, Mercury was hidden in deep morning twilight. Mars no longer had Jupiter next to it so I could locate it by itself in the bright twilight. Jupiter emerged into darker skies, although still too low to allow clear viewing of the pattern of its cloud belts.

**I watched Ceres retrograde** against the stars of Leo using my 10x 50 binoculars. I first observed Ceres in the summer of 2001 when it was low in Sagittarius, so that only unusually transparent skies allowed my seeing it at all with my binoculars. Ceres was much brighter and easier to observe this time due to its unusual proximity. In fact, Ceres will not become as bright again for about 2,000 years.

I saw butterscotch-yellow Saturn and its thin ring system  
*Aligned continued on page 5*

# A Message from AAA President Richard Rosenberg

*Hello members:*

As many of you know, 400 years ago Galileo transformed our view of the universe with his hand-built telescope. To celebrate, the International Astronomical Union has declared 2009 the International Year of Astronomy. The climax of the event is "100 Hours of Astronomy" April 2-5. On those evenings, take your scopes out to show people the Moon, Saturn and other wonderful objects. If you don't have a scope, join someone who does (our website—[www.aaa.org](http://www.aaa.org)--will list when and where observers will be located).

The club will purchase some Galileoscopes shortly. These are simple, very economical telescopes modeled after the one Galileo used, though much improved (after 400 years they should be). We'll have some interesting news for you about them next month.

The chair of the task group which created the Galileoscope is the former editor-in-chief of *Sky & Telescope*, Rick Fienberg. Coincidentally, Dr. Fienberg will be our speaker April 3 at the AMNH. His topic will be "The More Things Change...." See story below for details.

With the coming of spring and April, all our observing sites are active. Carl Schurz Park (10th), Cadman Plaza (21st) and Prospect Park (29th) join Floyd Bennett Field (3rd) and Great Kills (25th). I especially mention Jason Kendall's observations every Wednesday and Saturday at Inwood Hill Park, except for the 15th, when he'll be at The Cloisters.

On April 18 and 19, the Northeast Astronomy Forum and Telescope Show will take place at Rockland Community College in Suffern, N. Y. This annual event has talks on current astronomical research. But in recent years it's become known as the place to check out new astronomical equipment, often at bargain prices. You'll marvel at some of the scopes. Vendors sell books, software and just about anything related to astronomy. Admission is \$20 for one day, \$30 for both days.

We wish Jane and John Swierzbis good seeing as they head for the dark skies of New Mexico. John has done yeoman service

## Ex-Sky & Telescope Editor to Address AAA April 3

**Dr. Richard (Rick) Tresch Fienberg**, visiting scientist in astronomy and astrophysics at Phillips Academy, Andover, Mass., and former editor-in-chief of *Sky & Telescope*, will address the AAA on Friday, April 3 on "The More Things Change...". He will look at the evolution of both the hobby and the science of astronomy during the last 40 years or so, spanning his 20-plus years at *Sky & Telescope* and 40-plus years in the field.

"Some changes were anticipated, others not, and many aspects of astronomy have changed beyond recognition, whereas others haven't changed much at all," Fienberg says. He will also look into his crystal ball and try to anticipate some changes we can expect.

"**Relative newcomers to astronomy** might be amazed at how much they take for granted in terms of what we know about the universe and the technology at our disposal for observing and recording it," Fienberg asserts.

At Andover, Fienberg teaches astronomy, and manages the state-of-the-art campus observatory and 16-inch telescope. Before going to Andover, Fienberg held a variety of

editorial and management positions at *Sky & Telescope*. His coverage of the Hubble Space Telescope mission for the magazine won a citation from the National Space Club. He continues to write occasionally for the magazine as editor emeritus.

**Fienberg has been elected** a Fellow of the American Association for the Advancement of Science. The International Astronomical Union (IAU) named asteroid number 9983 Rickfienberg in his honor. He serves on planning committees for the International Year of Astronomy 2009 for the IAU and the American Astronomical Society, which he also serves as deputy press officer.

Fienberg earned his B.A. in physics at Rice University, and his M.A. and Ph.D. in astronomy at Harvard. He has done research on the aurora borealis, planetary nebulas, active galaxies and the center of the Milky Way.

Though Fienberg is trained as a professional astronomer, he remains an amateur at heart, observing the sky and taking astrophotos from his homebuilt hilltop observatory in New Hampshire. ■

# The Hayden Foreshadowed Demotion of Pluto

By John Delaney

**After recently telling friends** I had attended a lecture by Hayden Planetarium director Dr. Neil deGrasse Tyson, one of them inquired, "Hey, isn't that the guy who demoted Pluto?"

No, he isn't, but perhaps no person is more uniquely qualified to tell the story of Pluto, the solar system's erstwhile 9th planet, and its fall from definitional grace than Tyson, who gave the AAA's John Marshall Memorial Lecture, "The Rise and Fall of Pluto--Witness to Demotion," to a capacity crowd at the AMNH March 13.

The fact that Tyson, author of the recently published "The Pluto Files," has become a public authority on the contentious Kuiper Belt object wasn't really his choice at all. Instead, events conspired to make Tyson the heavy in the planetary status of Pluto in 2001 because of his decision to classify the body as a Kuiper Belt object in the new Hayden Planetarium.

**"That's when my life went to hell,"** Tyson said about January 22, 2001, when The New York Times ran a story with the headline "Pluto's Not a Planet? Only in New York" in response to the omission of Pluto from the planets. The article precipitated a wave of disagreements from other scientists and a torrent of protest mail from schoolchildren.

The root of such strong sentimentality, Tyson suggested, may reside in the circumstances of Pluto's discovery. Even before its discovery in 1930, astronomers were searching for a gravitational source that was supposedly perturbing Neptune--a Planet X. Percival Lowell, a well-heeled amateur astronomer better known for his erroneous observations of canals on Mars, led the search. When he died before finding Planet X, 21-year-old Clyde Tombaugh took up the search and found Pluto a year later. "Amateur astronomer from Illinois...farm boy...All-American...discovers Planet X," said Tyson.

But over the years, more skeptical researchers would contend that Pluto was a planetary misfit right from the start. For instance, Tyson pointed out, Pluto crosses the orbit of Neptune, it has an orbit tipped 17 degrees out of plane of the solar system "and the oddness would accumulate."

**More research would indicate** that Pluto is smaller than previously thought, Tyson said, pointing out that Pluto repeatedly failed to blot out stars in occultations, leading astronomers to decrease its size estimates. Pluto's planetary status became even more dubious in the 1990s with the dis-

covery of several Kuiper Belt objects, very similar to Pluto in size and composition. These discoveries prompted Tyson and his planetarium staff to consider other schemes for presenting solar-system objects for the new planetarium, which opened in 2000. "We were the first public institution to declare that Pluto is perhaps something other than people thought it was for 70 years."

**Instead of grouping the planets together,** the Hayden's displays divide the planets into terrestrial and Jovian. Since Pluto differs in size, composition, distance from the Sun, and orbit from these groups, it was placed in the Kuiper Belt section away from the other bodies. Nevertheless, one child asked his mother, "Where's Pluto?" which was overheard by a New York Times reporter, who reported back to his editors. Months later, the story ran, and the rest is history.

"We didn't say Pluto's not a planet," Tyson observed. "All we did was group it with the other Kuiper Belt objects." But the argument was lost on Pluto lovers, including kids, who inundated Tyson's office with correspondence. "Dear Natural History Museum, you are missing Planet Pluto," Tyson read from one letter. Another young writer protested, "Pluto's my favorite planet. You're going to have to take all the books away and change them," and included a drawing of a crying Saturn who mutters, "I miss my friend Pluto!"

**While the mail to Tyson** continued, support for reclassifying Pluto grew in the astronomical community. Kuiper Belt discoveries, including objects larger than Pluto, brought the issue of planetary definition to a head. In 2006, the International Astronomical Union approved criteria for what can be considered a planet. Bottom line: Pluto is no longer a planet, but a dwarf planet, primarily because it doesn't gravitationally dominate its orbit. As usual, Tyson recalled, the issue of Pluto's status caused tempers to flare. "Ninety percent of the attendees voted in favor of the...criteria. The 10% who didn't were pissed off!"

Tyson feels recent events have vindicated the Hayden's decision. "We had the occasion to think this through before anyone else. The problem came about because people were so heavily invested in the word 'planet.'" ■

*The AAA's Annual Meeting  
Is Wednesday, May 20  
See Back Page for Details*

# Amateur Astrophysics Center Feeds the Data Pipeline

By John Delaney

**Most amateur astronomers** can slake their thirst for cosmic exploration with the craters of the Moon or the rings of Saturn viewed through a small telescope. For really ambitious observers with a research-grade telescope and equipment, Dr. Joseph Patterson, professor of astronomy at Columbia University, offers the chance to make real contributions to astronomy. In fact, he puts them to work on his research team called the Center for Backyard Astrophysics, also the title of his talk to the AAA at the AMNH February 20.

For Patterson, amateur stargazers offer something top observatories can't deliver: reams of long-term observational data on astronomical objects. In return, Patterson gives his worldwide network of amateur collaborators professional guidance and credit on peer-reviewed papers. "Because we coordinate our observations on stars, we're able to get data from around the world which nobody else can get," said Patterson of the center, management of which now consumes most of his time.

As a grad student, Patterson recalled, he made the most out of almost unlimited access to the University of Texas' McDonald Observatory, getting great data and getting spoiled as well. After becoming a professional, he vied for time on premier observatories in Arizona and Hawaii. He found the process of applying for limited slots and the often paltry amounts of data less than ideal, even when sharing results with collaborators. And precious slots of hard-fought telescope time could still be scuttled by inclement weather.

**Patterson's slow liberation** from the struggles of observatory access and funding woes started in the late '80s with a number of technological advances that have made amateur-astronomer networks possible. Automated "smart" telescopes that can observe and record data while their owners sleep have become widespread. CCD cameras now enable observers to record images and data affordably, and the Internet enables sharing data and correspondence worldwide.

With the pieces for a global astronomical collaboration in place, Patterson established the center, now comprising 30 observers in the U. S., Chile, South Africa and other countries. Members have scopes from eight to 24 inches in aperture, and many instruments observe while their owners sleep.

After some delightfully whimsical explanations of stellar evolution--Patterson's Hertzsprung-Russell diagram includes the main-sequence "boarding house" and the neutron-star "graveyard"--he expounded on his primary research topic: cataclysmic variables. These rapidly revolving binary systems generally consist of a relatively normal star and a white dwarf; the

latter develops an accretion disk from its partner. Variables display periodic increases in brightness and magnitude--usually caused the collapse of matter onto the white dwarf--followed by periods of consistency or "quiescence."

**Since they're easily detectable** with commercially available telescopes, cataclysmic variables are ideal subjects of study for amateurs, and long-term data sets reveal their true nature. Contained in the light, Patterson explained, are orbital and rotation periods, and other characteristics as revealed by stellar photometry. Gathering such datasets, consisting of brightness measurements every minute for six hours a night, can be tedious. "We look at a single star, a point of light. The next night, six more hours of numbers."

To become a center member, one needs a telescope, a detector (CCD camera), a computer, e-mail, software, and astronomical charts and atlases. Most importantly, Patterson added, "an enduring love of stargazing and a desire to couple that with scientific research."

**For Patterson, the center** has generated a continuous stream of data on his research interest. "I find when I get to school every morning, there's about five nights of telescope data on cataclysmic variables waiting for me. A nice little present." The project has also been funding-free, without earlier squabbles with NASA and other professionals, and requiring only regular e-mail correspondence to maintain.

The supreme benefit to the collaboration: "Virtually everyone involved loves astronomy. They all have telescopes, they point them at the sky...and we construct stories of accretion disks 1,000 light-years away." ■

---

## *Aligned continued from page 2*

nearly edge-on and several of Saturn's moons through a six-inch Schmidt-Cassegrain scope from Battery Park City after the February 24 meeting of the AAA Observers' Group at its new lower Manhattan headquarters. I also saw a very diffuse, faint barely perceptible Comet Lulin through a pair of tripod-mounted binoculars pointed at the comet. I've seen many more impressive comets from New York recently, including Holmes, Machholtz and Ikeyi-Zheng. Lulin was reported to be more visible from dark-sky sites.

The inferior conjunction of Venus was discussed at the February Observers' Group meeting and, indeed, Venus began to set earlier as it approached conjunction with the Sun in late March. ■

# AAA Board Member Featured in *The Times*

## Featured in The Times

AAA board member **Jason Kendall** was featured in *The New York Times* March 9 for his zeal as a sidewalk amateur astronomer and for trying to darken Dyckman Fields in upper Manhattan.

“How can you appreciate something you’ve never seen?” Kendall was quoted as asking rhetorically. “You’ll never get anyone to make the sky dark until you show them how beautiful it can be.”

Kendall has been seeking to “persuade the city’s parks department to darken Inwood’s Dyckman Fields, which run north for about 15 blocks from Dyckman Street, on April 3 and April 4. On those nights, the Moon will rise early, and astronomy enthusiasts worldwide, through the 100 Hours of Astronomy project, are signifying the occurrence to commemorate the 400th anniversary of Galileo’s first recorded use of a telescope, *The Times* noted.

“**Dyckman Fields, tucked between** the forested ridge of Inwood Hill Park and the Hudson River, is an especially promising place for star watching,” the article noted, quoting Kendall. “Two nights a week, Kendall sets up his telescope just outside the park at Isham Street and Seaman Avenue. With the passion of a street evangelist, he coaxes passers-by to join him in praise of celestial bodies. ‘Hey, how ya doing?’ Mr. Kendall said. theatrically on a recent night as couples, dog walkers and teenagers strolled past. You wanna see Saturn? It’s just starting to peek through the trees. Now, Titan is an amazing place....The surface of Titan looks like New Mexico, except it rains liquid methane.”

If the parks department agrees to turn off the lights, the sky could be dark enough to see hundreds of stars, Kendall says. ■

---

## Library Presentations

Twice-a-month presentations have begun at the Inwood branch of the New York Public Library, Broadway and Dyckman Street, on astronomy subjects. Each planetarium show, at 1 p. m., is a two-hour slide show using astronomy software with a digital projector, and each show will feature photos from NASA’s current space and planetary exploration missions, and up-to-date research and ideas. Shows are free, open to the public and suitable for kids and families.

Last month’s talks were on “Life in the Universe: Is

There Anybody Out There?” On April 4 and 11, the subject will be “Powers of Ten: How Big is the Universe, Really?” Upcoming presentations are: May 2 and 9: “Our Solar Neighborhood: Amazing Views of Our Planets from Space.” September 5 and 12: “Wild Universe: Black Holes and Gamma-Ray Bursts, Quasars and Neutron Stars.” October 3 and 10: “Toolboxes of Astronomy: The Large Hadron Collider, The Hubble Space Telescope, the Voyagers and the Future.” November 7 and 14: “Rocket Science: The Current NASA Missions to Mercury, Saturn, Mars and Earth.” ■

---

*Asimov continued from page 1*

ferent.”

Basri, a brown-dwarf expert at the University of California-Berkeley, has written much on the subject of stellar and planetary classification. He explained, “The controversies come from [a disagreement on] how much weight [to put to] the arguments [of classification] to characteristics, circumstance [location] and where the object formed [cosmogony].”

Basri talked about planemos, planetary-mass objects that don’t necessarily orbit stars. These can be rogue planets if they don’t or planets if they do, and if they’re not a “fusor” themselves. A fusor is an object that has, in its lifetime, achieved core fusion, such as a brown dwarf or some stars. Basri coined both terms, to which Tyson replied, “Planemos ... I don’t really like that word.” “It didn’t really catch on,” Basri said. Unlike the IAU definition, his can be used to describe objects outside the solar system.

In one way or another, the panelists seemed to agree that the IAU’s definition is flawed and most felt more observations and data are needed. “Science is a process,” Stern observed. Basri agreed: “Whenever you get a [scientific] issue decided by a vote, I think you imply that you don’t know what you’re talking about.”

Sykes said, “We’re looking for ‘Earths’ [around stars], focusing on air and water. People don’t care about formation. Soter said that people have the wrong perception that planets are important. KBOs can be important too, he asserted.

Tyson said he likes edgy definitions: “Objects which fall on the edge of definitions are usually interesting objects.” He doesn’t like memorization, like the children’s mnemonic about planets. Science accepts new ideas. It’s a process.” ■

# Review: Astronomy Isn't Devoid of Anomalies

By Edward J. Fox

**Sex, life and death** are three of the 13 topics that Michael Brooks tackles in his book "13 Things that Don't Make Sense" (Profile/Doubleday, \$23.95).

Free will, homeopathy, the placebo effect and the mimi-virus (a giant virus that closely mimics a bacterium) round out the seven that are not directly related to astronomy, cosmology or physics.

Not that readers of *Eyepiece* lack interest in these seven, especially the first three. Brooks' subjects most related to the subject matter of this periodical are dark matter, varying physical constants, Newton's inverse square law, cold fusion, the WOW signal and life on Mars.

Brooks' basic premise is that each of his 13 subjects is to some degree lacking in making perfect sense. Each is still a mystery from a scientific standpoint, even to the most learned. The current understanding of each presents an anomaly.

**Dark matter:** Scientists are at a loss to explain 96% of the matter in the universe. They can't explain what it is. In fact, the existence of something supposedly so abundant called dark matter can only be inferred. Or is it dark energy?

**Varying physical constants:** Years of research and debate by the greatest minds in science have resulted in a number of accepted "constants," which when they are applied in scientific equations and formulas explain the universe, right? Not so fast! Now there are scientists who believe these constants may not necessarily be constant over time. These constants may have been different in the past and they may be different in the future.

**Newton's inverse square law:** The Pioneer probes have been traveling in space for years, but they're not where they should be based on Newtonian gravitational principles. Their trajectories have drifted in a manner that can't be explained. Fourteen years of research and review of Pioneer data have not found a mechanical or human-error reason which would explain the deviation. According to Brooks, this calls into question the Newtonian law of gravity.

**Cold fusion:** Pursuit of this power source has drifted into total disrespect in the scientific community after initial claims couldn't be duplicated. It has ruined careers. Now, the effects of cold fusion on a plastic known as CR39 have reopened the debate. CR39, when placed near a piece of depleted uranium, shows patterns of radiation similar to the projected results of a cold-fusion experiment.

**The WOW Signal:** On August 15, 1977 a radio astronomer

received a very clear signal at the frequency 1420MHz. It caused him to enter "Wow!" in his notes. 1420 MHz is the frequency of hydrogen. Researchers (SETI and others) expect an intelligent life form might transmit a radio signal at this frequency. The signal hasn't been heard again.

**Life on Mars:** In testing samples of Martian soil, one experiment on the Viking lander detected gases that would be present if there had been living matter in the sample. Other experiments, meant to confirm the finding, didn't find life.

Brooks' contention is that each anomaly, that seems to make no sense, could stimulate researchers to change direction and develop new ways for us to think about them, and therefore make major advances in our understanding the universe and our place in it.

In his descriptions of science and the events, Brooks takes the side of the little guy--the underdog battling against the negative inertia of conventional science. In following his premise with life on Mars, maybe it's just one anomaly that will lead to further research in trying to duplicate it, and produce a breakthrough.

Despite the lack of a really full evaluation of issues, based on all experimental data, Brooks presents complicated subjects in an interesting manner. He demonstrates that pointing out an anomaly provokes further thought and evaluation. If this leads to breakthroughs, his point will be proven: Anomalies lead researchers to new possibilities. ■

---

## Nominating Committee Backs 6 for AAA Board

**The AAA nominating committee** last month recommended six members for election to the board of directors at the May 20 annual meeting.

Recommended for re-election to three-year terms were president Richard Rosenberg, corresponding secretary Ron McCullough, *Eyepiece* editor Dan Harrison, and Amateur Astronomers Medal recipient and *Eyepiece* columnist Tony Hoffman. The committee recommended Joe Delfausse and Jocelyn Wilkes for first-time election to the board. Two board members, John Delaney and Richard Tihany, declined to run for re-election.

The committee consisted of former AAA president Michael O'Gara (chair), and board members Luis Marcelo Cabrera and Mary Carlson. ■

# Briefs: Kepler Exoplanet Mission Blasts Off

NASA's new planet-hunting Kepler telescope launched into space March 6, beginning an ambitious mission to seek Earth-like planets around alien stars. The \$600 million spacecraft will gaze at a single region of the Milky Way for at least three years in a planetary census that could fundamentally alter humanity's view of its role in the universe. Kepler will have an Earth-trailing orbit that will circle the Sun every 371 days. The spacecraft will point its eye at a patch of sky near Cygnus and Lyra, where it will scan some 100,000 stars for the telltale dip in brightness that signals a planet crossing in front of its parent star as seen from Earth. Most of the almost 340 exoplanets discovered are inhospitable large worlds that circle stars in orbits too extreme to sustain life as we know it. Kepler will sift through those behemoths for smaller, rocky worlds, like Earth, that orbit their stars in a region just right for liquid water to exist at the surface. Scientists hope to begin spotting larger Jupiter-like planets first, then narrow the hunt to Earth-like worlds.

**Researchers have made the first measurement** of the chemical composition of the atmosphere around Pluto. Its air is warmer, and contains more methane, than previously thought. Pluto's atmosphere is warmer than its surface, though not by much. The air is -292 degrees, while the face is -364 degrees. Researchers think some patches of pure methane in the atmosphere, or perhaps a methane-rich layer covering the surface, create this warming effect. Pluto's atmosphere, a layer of nitrogen, methane, and carbon monoxide, is only present for part of Pluto's 248-year-long, elongated orbit. When it gets very far away from the Sun, the gaseous atmosphere freezes and falls to the ground.

**Researchers have strong evidence** for the existence of a binary black-hole system, a long-theorized result of galactic mergers that features two black holes orbiting around each other at the center of large galaxy. The black holes are expected to merge in what would be one of the most energetic events in the universe. The new evidence comes from a study of the light signatures of 17,500 quasars. Eventually through interactions with stars of the galaxy, the black holes lose orbital energy and fall to the center of a newly-merged galaxy. But once they've migrated to the center, interactions with stars are rare, and the black holes orbit each other in a small tightly bound orbit, unable to lose enough momentum so they could actually merge.

**A faint pinprick of moving light** spotted by Cassini in Saturn's G ring appears to be a moonlet that could be the main source of the ring. Scientists analyzing images acquired over 600 days found the tiny moonlet, which measures a third of a mile across, embedded within a par-

tial ring, or ring arc, previously found by Cassini in the tenuous G ring. Before Cassini, the G ring was the only dusty ring not clearly associated with a known moon. Previous Cassini plasma and dust measurements indicated this partial ring may be produced from relatively large, icy particles embedded within the arc, such as the moonlet. The moonlet is too small to be resolved by Cassini's cameras, so its size cannot be measured directly. However, scientists estimated its size by comparing its brightness to another small Saturnian moon, Pallene.

**A first sighting for NASA's newest** gamma-ray hunter is apparently a record breaker. The gamma-ray blast detected by the Fermi Gamma-ray Space Telescope September 15 exceeded the power of some 9,000 ordinary supernovas. Fermi recorded the explosion in the constellation Carina. It picked up on energies ranging from 3,000 to more than 5 billion times that of visible light in the initial blast. This burst had the greatest total energy, the fastest motions and the highest-energy initial emissions ever seen. The explosion took place 12.2 billion light-years away. A different gamma-ray burst was recorded four days after this event. This burst arose from an exploding star 12.8 billion light-years away, the farthest such event ever detected.

**The Meridiani Planum deposits** on Mars--deep salty areas found by NASA's Opportunity Rover--have attracted several theories to explain their existence. Add another: They could be remnants of a massive ancient ice-field, a new study suggests. This theory better explains odd signatures of the deposits and advances a new idea for how the sedimentology of Mars developed. The layers are scattered across the planet but are concentrated around Meridiani, an area of several hundred square miles. They feature thick layers of salty minerals, including calcium and magnesium sulfates. The new theory draws on the mechanism that scientists think is responsible for the ice that tops Mars' polar caps. It's thought that ice forms from snow created in the atmosphere when water is sucked up by dust and aerosols.

**Ancient water may lie hidden** within the largest volcano on Mars, researchers say, and they speculate that this could also harbor life. The Martian volcano Olympus Mons is about three times the height of Mount Everest. Widespread volcanic material suggests the presence of water-formed clay which can reduce friction — an effect seen on Earth at volcanoes in Hawaii. NASA's Phoenix lander uncovered water ice last year near the Martian North Pole. So some researchers think it's reasonable to suspect water may lie trapped underneath the largest volcano in the solar system, although many suspect remaining water on

*Astronomy Briefs continued on page 9*



# Briefs: Study Suggests 'Recent' Martian Water Flow

*Astronomy Briefs continued from page 8*

the planet remains ice-locked. Fluids embedded in an impermeable, pressurized layer of clay sediment would allow the kind of slipping motion that would account for Olympus Mons' spread-out northeast flank, and may still exist in deep, trapped pockets within the volcano. Finding a currently active source of heat represents one of the future challenges.

**A new study of a system** of Martian gullies worn into the surface suggests the most recent period of water flow was only 1.25 million years ago. Over the past decade, scientists have found numerous geological features, such as gullies and possible lakebeds, that indicate water was once present on the surface. They've also found water-bearing minerals that show water has reacted with Martian dirt. The new study pinned a precise date to gullies with a gully system on the inside of a crater, showing water flowed on Mars more recently than previously thought. The gully system shows water-borne sediments were carried down steep slopes of nearby alcoves and deposited in a fan-like shape during four different intervals. Four distinct lobes in the alluvial fan were created at different times and the oldest was pockmarked with craters, while younger lobes were left relatively unblemished. It was also determined that ice and snow deposits formed in the alcoves when Mars was tilted so that it plunged into an ice age and ice could form in the mid-latitude areas, instead of being confined to the poles.

**Astronomers have found** the strongest evidence yet that a mysterious class of stars known as blue stragglers is the result of stellar cannibalism. Blue stragglers are found in globular clusters. All stars in these clusters are thought to have been born at the same time, but blue stragglers appear younger. At least two stars must be involved in the creation of every blue straggler, because isolated stars this massive simply shouldn't exist in these clusters. Researchers looked at blue stragglers in 56 globular clusters and found the number of blue stragglers in a cluster didn't match the predicted collision rate, dispelling the theory that they are created through stellar collisions. But there was a connection between total mass contained in the core of the globular cluster and the number of blue stragglers observed within it. Since more massive cores also contain more binary stars, the researchers could infer a relationship between blue stragglers and binaries.

**A stellar nursery in a distant cloud** of interstellar gas has given astronomers a glimpse of a new way galaxies can form. Hints of the star birth were spotted in an ancient gas cloud, the Leo Ring, which appears to lack the vital heavy elements and dark matter that astronomers normally expect

to see in growing galaxies. The find suggests some galaxies may not need those core ingredients to grow. Discovered in 1983, the Leo Ring is a cloud of hydrogen and helium in orbit around two distant galaxies in Leo. Since the cloud is nearly invisible to optical telescopes, it was first spotted by radio astronomers. Subsequent attempts to plumb its depths for star formation have come up empty. NASA's GALEX observatory, however, is equipped with detectors that scan the sky in the ultraviolet. The craft spotted clouds of star-forming regions in the Leo Ring that astronomers think are dwarf galaxies. Perhaps gas inside the Leo Ring could be untouched leftovers from the beginning of the universe.

**Japan's Kaguya lunar orbiter** has beamed home a spectacular movie of Earth eclipsing the Sun as seen from the Moon. Kaguya caught the sight February 10 and used its high-def camera to record the moment when the Earth looked like a diamond ring. This moment came when a penumbral lunar eclipse occurred. The Moon's limb, hidden by darkness, obscures part of the lower portion of the ring. This is the first time this phenomenon was shot from the Moon.

**Bright lights that suddenly streak** across the night sky with an accompanying boom aren't typically wayward missiles or satellite debris, but they do come from outer space. A fireball as bright as the full Moon raced across the Spanish skies, Portugal and southern France last July 11. Researchers tracing its path backwards think the boulder may be a chunk of a comet that broke up nearly 90 years ago. Chunks of the fireball may have made it to the ground, which would yield a rare glimpse into the heart of a comet. A bolide can also create a sonic boom that can be heard 30 miles away. These noises were heard over Kentucky February 13 and Texas February 15. Initial speculation that the streaks of light and accompanying boom were caused by debris from the February 10 collision of two satellites was refuted by astronomers, who said it was likely a meteor.

**A telescope at the South Pole** is being fine tuned to search for gravity waves, hypothetical distortions of space-time that, if confirmed to exist, could further validate Einstein and reveal evidence for a big cosmology theory. Cosmic inflation theory, widely accepted, proposes that the early universe passed through a phase of exponential expansion, ballooning almost instantaneously from less than the size of an atom to about golf-ball size. It's tied up with the Big Bang theory of how the universe started and predicts the existence of gravity waves, as well as fluctuations in the density and temperature of radiation left over from the Big Bang--the cosmic microwave background (CMB) and the mass density of the universe. However, unlike CMB and

*Astronomy Briefs continued on page 10*

# Briefs: Obama Approves Funding Boost for NASA

*Astronomy Briefs continued from page 9*

mass density observations, gravity waves have remained elusive. The South Pole telescope will search for signals of gravitational waves, taking delicate measurements of the CMB. Inflation theory predicts that gravitational waves were imprinted on the CMB when space-time inflated.

**Missing asteroids in our solar system** may stem from rampaging giant planets as they migrated to their current positions, says a new computer simulation. It showed the giant planets would have disturbed many asteroids as they fled the scene, leaving behind “footprints” that match real-life patterns in the main asteroid belt. Previous evidence suggested the giant planets once formed a more compact huddle. But their gravitational interactions with the then-larger Kuiper Belt fueled a migration. Jupiter moved slightly closer to the Sun, while the other giant planets moved farther apart from both the Sun and each other. Inner-system planets suffered a period of heavy bombardment 3.9 billion years ago, which may have represented a spike in asteroid impacts rather than just normal planetary-formation chaos. The bombardment may have been a collateral effect of the violent planet exodus.

**President Obama has proposed** a funding boost for NASA that provides more support for Earth sciences missions and aviation while keeping the agency's three space shuttles on target for a 2010 retirement, with an additional flight conducted if it can be completed safely before the end of 2010. NASA would receive \$18.7 billion for the 2010 fiscal year under the budget proposal, an increase from the \$17.2 billion NASA received in 2008 and an overall boost of more than \$2.4 billion for the agency when coupled with the additional \$1 billion it received in the recent economic-stimulus bill. The budget calls on NASA to complete International Space Station construction. The shuttle fleet will be replaced with the Orion Crew Exploration Vehicle, which would fly astronauts to the space station and return them to the Moon by 2020. The budget funds a robust program of space exploration involving humans and robots. NASA will return humans to the Moon while also supporting a program of robotic exploration of the solar system and universe. Among other funding is development of new space-flight systems for carrying American crews and supplies to space, and continued use of the ISS to support the agency and other federal, commercial and academic needs.

**The vast spaces between galaxies** are actually littered with clouds of cosmic dust that were likely ejected from the galaxies themselves. The dust scatters farther into intergalactic space than astronomers expected, a new study finds. The discovery was made by watching subtle shifts in

the light emanating from quasars that sit at the hearts of far-away galaxies. Astronomers analyzed the colors of about 100,000 quasars behind 20 million galaxies. Averaging over so many objects allowed measurement of an effect much too small to see in any individual quasar. The light shifts showed dust wasn't just in the galaxies, but a surprising hundreds of thousands of light-years outside of them. Astronomers had thought any dust spewed out by exploding stars would fall back into the galaxy. The dusty material must be jettisoned much faster than scientists had thought to overcome that gravitational pull.

**China's first Moon probe**, Chang'e 1, intentionally crashed into the lunar surface in February after more than a year of observations. During its flight, the spacecraft mapped the surface, studying its composition and depth, and analyzed the Moon's space environment. A follow-up mission, Chang'e 2, is planned by 2011. Chang'e 1's intentional crash was slated to be a dry run for a potential Moon landing. Chang'e 1 was the first wave in a three-phase plan to explore the Moon with orbiters, landers and rovers. That soft landing is slated to be performed by yet another probe, Chang'e 3, by no later than 2013. A fourth Chang'e probe would also fly during the second phase of lunar exploration. China's third phase of lunar exploration includes landing recoverable Moon rovers between 2017 and 2020.

**An asteroid the size of a 10-story building** flew past Earth in February at about twice the distance as the highest Earth-orbiting satellites. It was about 115 feet wide, perhaps a bit larger than one thought to have created a colossal explosion above Siberia in 1908 that flattened 500,000 acres of forest. At its closest, asteroid 2009 DD45 was some 44,740 miles away. Astronomers knew the asteroid was coming and said there was no risk of collision. Asteroids as big as the one in Siberia might strike Earth as often as once every two centuries, scientists speculate.

**Three galaxies are playing** a game of gravitational tug-of-war that may result in the eventual demise of one of them. About 100 million light-years away in Piscis Austrinus, the interaction may lead to the three reforming into two larger star cities. NGC 7173 and NGC 7176 appear to be smooth, normal elliptical galaxies without much gas and dust. NGC 7174 is a mangled spiral galaxy that appears as though it's being ripped apart by its close neighbors. Due to strong gravitational interaction, a significant number of stars have been ripped away from their home galaxies. These stars are now spread out, forming a tenuous luminous component in the galaxy group. Ultimately, astronomers believe NGC 7174 will be shredded and the other two will remain. ■



# Events on the Horizon

## April 2009

**M:** members; **P:** open to the public; **T:** bring your telescopes, binoculars, etc.;  
**C:** cancelled if cloudy;

**HQ:** at AAA headquarters, Downtown Community Center, 120 Warren St.

**AMNH:** For ticket information call (212) 769-5200.

*For directions to AAA observing events, check the club's website at [www.aaa.org](http://www.aaa.org)*

**Wednesdays April 1, 8, 22, 29, and Saturdays April 4, 11, 18, 25, 8:30-10:30 p. m.**

**Observing at Inwood Hill Park, Manhattan, P, T, C**

Next dates: Wednesdays and Saturdays in May.

**Friday, April 3, 6:15-8 p. m.**

**AAA lecture, free, P**

Dr. Richard Tresch Fienberg, visiting scientist in astronomy and astrophysics at Phillips Academy and former editor-in-chief of *Sky & Telescope*, will discuss "The More Things Change..." in the Kaufmann Theater of the AMNH. The final lecture in the AAA's 2008-09 lecture series will be on May 1.

**Friday, April 3, 8-10 p. m.**

**Observing at Floyd Bennett Field, Brooklyn, P, T, C**

On the model airplane flying field. Next date: May 15.

**Saturday, April 4, evening hours**

**Observing at various locations, P, T, C**

As part of the International Year of Astronomy, several members will have their telescopes set up for viewing by the public. To know where they'll be, check [www.aaa.org](http://www.aaa.org) or call Richard Rosenberg at 718-522-5014.

**Monday, April 6, 7 to 10 p. m.**

**Lecture and observing session at Salt Marsh Nature Center, Avenue U and East 33 Street, Brooklyn, P, T, C**

A lecture on what's up in the sky is followed by observing. Parking available. Info and directions: [www.aaa.org](http://www.aaa.org) or Rich Rosenberg at 718-522-5014.

**Friday, April 10, dusk-10 p. m.**

**Observing at Carl Schurz Park, Manhattan, P, T, C**

Next date: May 15.

**Wednesday, April 15, 8:30-10:30 p. m.**

**Observing at Fort Tryon Park near The Cloisters, Manhattan, P, T, C**

Next date: May 20.

**Thursday, April 16, 6 to 8:30 p. m.**

**Recent Advances in Astronomy Seminar, 239 Greene Street, Room 801, M**

This month's seminar will feature a report on the standard model of the universe and vacuum energy.

Next date: May 14.

**Saturday, April 18 and Sunday, April 19**

**Northeast Astronomy Forum & Telescope Show  
Rockland Community College, Suffern, N. Y., P**

Vendors, speakers, workshops, classes for beginners, kid events, solar observing and planetarium shows. On Thursday, April 16 and Friday, April 17, there will be an astro-imaging conference. Info: [www.rocklandastronomy.com](http://www.rocklandastronomy.com).

**Monday, April 20, 7:30 p. m.**

**Hayden Planetarium lecture, P, AMNH**

Astronomer and author Phil Plait will speak on "Death from the Skies!" which is the title of his new book. Asteroids impact Earth, stars explode, black holes rapidly consume matter and entire galaxies collide. The speaker will discuss cosmic catastrophes that could befall us and what we can do to protect ourselves.

**Tuesday, April 21, dusk-10 p. m.**

**Observing at Cadman Plaza, Brooklyn, P, T, C**

Next date: May 19.

**Saturday, April 25, 10 a. m.-noon**

**Solar Observing, Central Park, P, T, C**

Next date: May 30.

**Saturday, April 25, dusk**

**Observing at Great Kills Gateway National Park, Staten Island, P, T, C**

Next date: May 16.

**Tuesday, April 28, 7-9 p. m.**

**Observers' Group, M, HQ**

Upcoming celestial events, astronomy resources on the Internet, using telescopes and binoculars. Observing afterwards, weather permitting. Next date: May 26.

**Wednesday, April 29, 8-11 p. m.**

**Observing at Prospect Park, Brooklyn, P, T, C**

Next date: May 27.

## ***AAA Annual Meeting May 20***

In accordance with the AAA bylaws, the 2009 annual meeting of the AAA will be held on Wednesday, May 20, 2009.

AAA headquarters, 120 Warren Street, between Greenwich and West streets

**6:30 p.m.: Social gathering, for all AAA members**

**7:30 p.m.: Annual meeting, for all AAA members**

**Board of directors meeting will follow.**

The 7:30 p. m. meeting will include elections to fill vacancies on the AAA board of directors.

Nominations, besides those made by the Nominating Committee, may be presented to the AAA president or to the recording secretary no later than seven days before the annual meeting. Each such additional nomination requires the signature of at least 18 AAA members.

## **Online Exoplanet Catalog**

The Planetary Society has developed an online catalog of exoplanets to keep track of the growing number of confirmed extrasolar worlds.

As the sensitivity of the search and the range of detection methods have increased, so has the variety of known exoplanets. Planet hunters are also detecting smaller planets, as small as twice the diameter of Earth. As detection techniques improve, scientists are closing in on the exoplanet we're all waiting for: an alien "Earth" orbiting a distant star.

The catalog—at [http:// www.planetary.org/exoplanets--](http://www.planetary.org/exoplanets) features the planets' location and home star, mass, orbital period, method by which it was detected and date of discovery, among other information on each planet and parent star. An animated graphic for each exoplanet shows its precise orbit and that of any other known planets in the system. Color coding identifies star types and sizes of planets.

The catalog also includes articles about exoplanet detection methods, discussing advantages and shortcomings of each. A special page is dedicated to "notable exoplanets," those that stand out from the crowd and tell us something unique about distant worlds. ■



**Amateur Astronomers Association  
Gracie Station  
P.O. Box 383  
New York, NY 10028**

**Forwarding and Address  
Correction Requested**

**First Class**