Mount Diablo Astronomical Society

Diablo MoonWatch

April 2011

General Meeting

Tuesday April 26, 2011

Einstein & Light

by Dr. Robert Piccioni

Doors open at 6:45 p.m.
Concord Police Association Facility
5060 Avila Road, Concord

Everything astronomers know about stars, galaxies, and the universe comes from observing light. Light is a unique phenomenon—nothing else in nature is quite like light. We will explore how Einstein discovered the true nature of light, and what astronomers learn from the gravitational lensing, redshifts, and atomic fingerprints of light.

Dr. Robert Piccioni graduated from Caltech, has a Ph.D. in high-energy physics from Stanford University, and was on the research faculty of Harvard University. He is an expert on Einstein's theories and cosmology. Robert ran eight high-tech companies and holds patents in medical equipment, microelectronics, and smart energy. Since "retiring", Robert's mission is making science accessible. He is "Teacher of the Year" at the Osher Institute and hosts the online radio show "Guide to the Cosmos". Robert is the author of two books that won national and international competitions for "Best Popular Science Book of the Year": Everyone's Guide to Atoms, Einstein, and the Universe explores the exciting discoveries of modern astronomy, physics, and cosmology; and Can Life Be Merely An Accident? examines the many exacting requirements for life and how extraordinarily improbable it is that these occurred by random.

What's Up

The International Space Station: Past, Present, and Future

by Ken Coates

The International Space Station is a research facility designed to test space technologies and learn how humans can live and work in space. It is the largest object ever constructed in orbit.

The Space Station was built and is operated by five different space agencies: U.S. National Aeronautics and Space Administration, Russian Federal Space Agency, European Space Agency, Japan Aerospace Exploration Agency, and the Canadian Space Agency. It is scheduled to be completed next year (2012) and will operate at least until 2015 and perhaps until 2020. Astronauts have inhabited the station continuously for over ten years now.

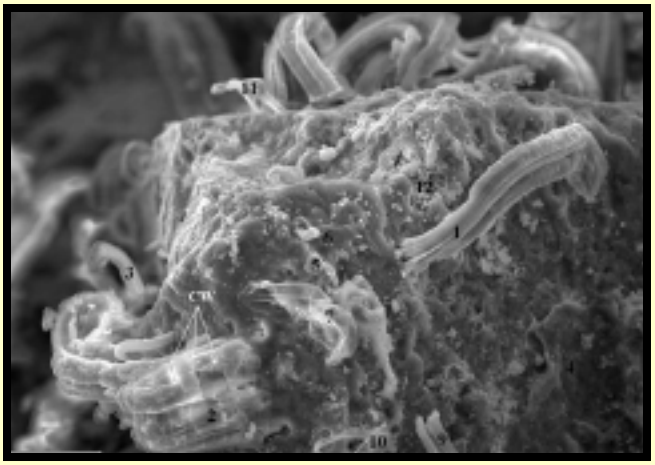
This talk will review the history of the International Space Station, where it is today, and what the future holds. A 1/144 scale model of the Space Station will be displayed to give the audience an idea of the size and layout of the station.

President's Corner

The Anatomy of an Extraordinary Claim

by Chris Ford

Last month saw the announcement of a discovery that provided a useful commentary on the process of scientific peer review while demonstrating Carl Sagan's famous maxim that "extraordinary claims require extraordinary evidence." It also highlighted the changing relationship between science and publicity in the age of the internet.



Magnified image of organic looking structures inside the Orgueil meteorite.

On March 5th it was announced that NASA scientist Dr Richard Hoover had detected evidence of extra-terrestrial life in a meteorite. His findings were published in the online Journal of Cosmology and widely reported in various news outlets and debated extensively in science blogs. Basically Dr Hoover had found unusual bacteria-like structures inside the Orgueil meteorite that fell to Earth in France in 1864 and close up pictures indeed look both intriguing and organic.

As can be seen in this pair of photographs, the visual resemblance between the possible fossilized alien bacteria (left picture) and a terrestrial bacteria (right picture) is quite striking and to a non-specialist fairly convincing. These strange shapes are embedded directly in the rock, and according to Dr Hoover the lack of nitrogen in the surrounding material makes it unlikely that they originated on Earth. Needless to say, if true this discovery would be one the most significant in human history demonstrating that life is not only not unique to Earth, but is also present throughout our solar system on other planets, moons, comets, and probably billions of other planetary bodies throughout our galaxy.

If by now you have a sense of deja-vu, you are probably thinking of the famous meteorite ALH84001 of Martian origin that in 1996 was the subject of a famous public announcement that it too contained possible evidence of extra-terrestrial bacteria that independently evolved on Mars. However the discoverer NASA Astrobiologist David McKay has always stated that though it is his personal opinion that what he found in that meteorite was once organic, he has always been clear that scientifically there is no actual proof and his discovery remains highly controversial to this day. The objects that he examined are also smaller and significantly different in appearance. The scientific method often proceeds slowly and cautiously and there is not yet enough evidence to substantiate his premise.

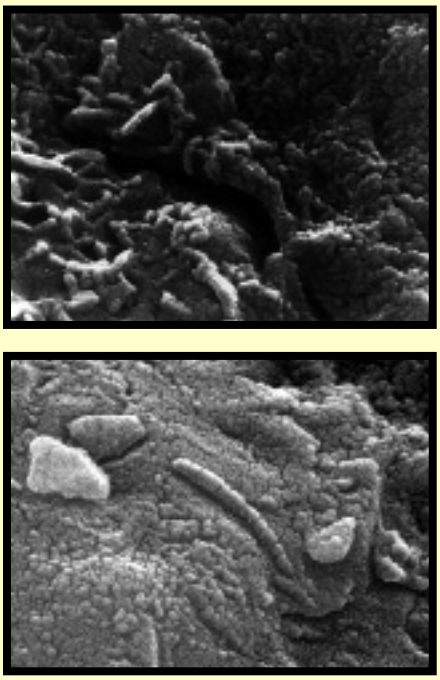
So what evidence is there that last months announcement from Dr Hoover is any more plausible?

Are we really looking at actual tiny fossilized alien life forms?

What was very interesting about this particular claim is the way in which the scientific process of peer review unfolded over only 48 hours after the initial announcement. The initial paper had all the hallmarks of a scientifically legitimate and conclusive finding. The discoverer has an excellent pedigree at NASA and the publishing Journal of Cosmology sent open invitations to 100 scientists asking for their opinions and openly inviting independent verification. According to the journal, "No other paper in the history of science has undergone such a thorough vetting, and never before in the history of science has the scientific community been given the opportunity to critically analyze an important research

The Anatomy of an Extraordinary Claim *(Continued from previous page)*

paper before it is published." Having said that, the Journal went ahead and published it anyway before most peer scientists in the field had commented.



Magnified images of the Martian meteorite ALH84001

In describing his discovery of the apparent extraterrestrial fossil bacteria, Dr Hoover stated that: "The exciting thing is that they are in many cases recognizable and can be associated very closely with the generic species here on earth. There are some that are just very strange and don't look like anything that I've been able to identify, and I've shown them to many other experts that have also come up stump."

Unsurprisingly much of the scientific community was immediately skeptical of his discovery, and within two days of the announcement Dr Hoover's entire claim was being seriously questioned. It was fascinating to see the process of peer review occur publicly in real time through the new media of blogging, mail lists, and internet forums in a manner that was not available at the time of the 1996 ALH84001 announcement. As just one example on a mailing list that I frequent, Dr Penny Boston a biologist at New Mexico Tech and a recognized authority on bacterial slime in rocks and caves, deconstructed the assertion that because the supposed life forms look like bacteria then that is what they must be:

"NO microbiologist would ever suggest that microorganisms are identifiable by their morphology other than in very vague and broad categories. I don't know what is meant by a "generic species" maybe this is a typo to mean "genetic species". A genetic species is only determinable when you have the genetics, not an image of a putative organism. I find many morphologies for which I am not sure that it is actually an organism. I have to find many of them repeatedly in the same context to increase confidence, and ideally I am only really sure I have a true beast in those instances when I can actually grow them in the lab and match them up to the morphology."

It soon became apparent that even if it is possible to prove that we are looking at organic lifeforms or their residue, the biggest challenge that Dr Hoover faces is proving that these life forms are not in fact of earthly origin and did not get inside the meteorite after it arrived on Earth. Dr Boston again:

"So, if you find a microbial form within any rock, what is your possible interpretation? Rocks, even the most high density materials, are prone to microfractures. Microorganisms are notoriously splendid at working their way into incredibly minute microfractures. In fact, many of them actually bore their way into rock materials (the basaltic glasses on the ocean floor, marine carbonates, surface lavas, many of my cave organisms into granite, etc.) Showing that the bug that you have actually is NOT a contaminant organism that made its way into a meteorite is a practically unsolvable problem. If you turn up an organism whose chemistry, way of coding information, or something else (besides morphology) indicates that it is significantly (and I MEAN significantly) different from anything that has ever been seen on Earth, THEN you might have a chance of proving this. Pictures of tube shaped structures don't do it. I myself have seen clay artifacts of preparation that morphologically resembled simple bacterial shapes. To my disappointment, they were not."

Dr Boston's comments are only just one example of the many skeptical voices that were raised from scientists with established credentials in micro and astrobiology or related fields, and a quick Google will reveal numerous additional reasons to question the claim. Almost all expert commentators stated that such an extraordinary claim should have been independently peer reviewed before the public announcement which almost had an air of publicity seeking. Dr Hoover is a reputable NASA scientist and it was unusual in itself that his work was not published with NASA's endorsement in a journal of the repute of Science or Nature. What was just as interesting to me however was the way in which the

The Anatomy of an Extraordinary Claim *(Continued from previous page)*

Internet has changed the way a sensational scientific story is both publicized and analyzed in real time in a manner that the general public can observe.

The journal that published Hoover's paper was also subject to question. One of the editors of the Journal of Cosmology is Astronomer Chandra Wickramasinghe who is well known for his promotion of the theory of panspermia in which life originated away from the Earth. The credentials of the journal are not in themselves evidence that Dr Hoover is right or wrong, but they do provide some context and that extra skepticism is justified. Avoiding the big, reputable journals and instead going with an online publication associated with ideas out of the mainstream has not helped the claims credibility.

The fact remains that it has not yet been proven that these objects are not fossilized alien life forms, but like the objects in meteorite ALH84001 neither has it been proved that they are. The possibility remains that these objects truly are what they seem. The pictures are certainly most intriguing and suggestive but we are still a long way from knowing whether Dr Hoovers claim is valid or not and the evidence remains inconclusive. At the heart of the maxim "extraordinary claims require extraordinary evidence" is the need for a healthy skepticism. It is easy to make extraordinary claims in a specialized and highly technical field but with the Internet it is considerably harder to sustain that claim in the face of public peer review. As a result of last months extraordinary public review on the Internet, NASA has now formally distanced itself from Dr Hoover's claims.

What this story tells us is that the traditional scientific method and peer review remains a tried and tested process, and that though no matter how exciting the results seem and no matter much we want something to be true, there is no substitute for rigorous independent verification, especially in the age on the Internet.

Membership Renewal Time!

It's Membership Renewal Time!

by Marni Berendsen

Renew your MDAS membership and your magazines online!

ANNUAL MEMBERSHIP DUES OF $25 ARE DUE BY APRIL 1, 2011 for members on the April membership cycle. That's almost everyone. Some of our newer members renew in October, but they will be notified separately.

To renew your club membership, you may EITHER:

- Renew online using Paypal or your credit card at http://www.mdas.net/membership/paypalreg.htm#Membership_Renewal. On the same web page, please consider making an additional MDAS Donation of $10 or $15 to further support our club. Even $5 helps.
- OR if you do not have internet access or prefer not to make online payments, you may mail a check for $25 (or more!) made payable the M.D.A.S. to this address:

Mount Diablo Astronomical Society
P.O. Box 4889
Walnut Creek, CA 94596
MAGAZINE SUBSCRIPTION RENEWALS

All Sky & Telescope and Astronomy magazine subscriptions renewals are handled online – AT THE CLUB DISCOUNT RATE!

The Astronomical Society of the Pacific has made arrangements with these magazines to allow members of the NASA Night Sky Network to renew at the club discount rate. All you need is a login for the Night Sky Network (NSN) through our club.

You can log into Night Sky Network and go to the Links page to find the "New and Renewal Subscriptions" link. Here's the direct link: http://www.astrosociety.org/magazine/

If you don't have access to a computer, please renew by mail directly with the magazine using your renewal notification.

Any questions, please email memberinfo@mdas.net or call Marni Berendsen at 925-930-7431.

JFK and the Space Program

by Nathaniel Bates

What we could do for our country:

When we think of the space program, several images come to mind. We think of Neil Armstrong landing on the Moon and his famous "One Small Step for Man" proclamation that is a cross between a philosophical reflection and a battle cry. We also think of the Space Shuttle tragedies that left us with an empty feeling that we could not define but which has stood as a shadow over the nation. We even think of the various Voyager programs and the various unmanned programs that have explored much of the Solar System. However, one thought hovers above all of them, one memory; one reflection remains with us. Even those of us who are not baby boomers think of the man who asked us what we could do for our country. JFK wanted a man on the moon in ten years and we got one there in less time. In some ways, his youth, his vigor, and his forward thinking defined the space program as much as anything else.

I thought I knew everything about JFK having read so much about him. Yet, I did not fully understand what attracted him to the space program. It was the one legacy of a life tragically cut short that has unified all Americans, regardless of Party. Yet, his reasons for wanting a man on the moon are still somewhat vague in the national memory. The purpose of this article is as much of a philosophical meditation as anything else. I do not intend to provide final answers. I do not claim to be a Kennedy expert. However, I will share my view of Kennedy, the space program, along with the remarkable evolution of the Kennedy Presidency and how it shaped our country's voyage beyond its blue home to what might be either a temporary departure or a permanent step beyond our planetary cradle.

A family of political outsiders,

We have to begin our search by understanding JFK as coming from a family of political outsiders who then struggled to define themselves as insiders. The Kennedy's were Irish Catholics and not part of the WASP Establishment. JFK's father was strongly Anti-Communist, and had isolationist views during World War II. Kennedy himself fell under a degree of suspicion of having Axis associations during World War II, even though his naval career was brave and his opposition to Fascism very real. Coming from an isolationist and culturally conservative background, he never defined himself as a liberal during his tenure in the Senate, in true alignment with conservative Democrat family traditions. JFK's sister Patricia Kennedy even dated Joseph McCarthy for a time.

Just as Kennedy did not initially associate with liberalism, at least as it came to be defined in later decades, so it should also be noted that Eisenhower distanced himself from certain conservative ideas. While anti-communist, Eisenhower was not a fanatical militarist. There are even indications that he might have allowed Sputnik to proceed in order to set a precedent under the law of nations. That precedent would have then allowed America to launch her own space program. This type of strategic thinking was lost on those within the Republican Party who criticized Eisenhower for being too moderate. Some of those critics were even in the Democratic Party, particularly among the anti-communist wing that numbered Kennedy as one of its members.

Political considerations:

Kennedy criticized Eisenhower for valuing fiscal conservatism over being willing to spend what was necessary to defeat the Soviet Union. While researching this fact, I finally stumbled across a truth that never occurred to me before. Kennedy backed the space program for political considerations more than any idea of boldly going where no man has gone before. He began to back the space program because of the fact that we were falling behind the Soviet Union. Lurid

JFK and the Space Program *(Continued from the previous page)*

images of the Soviet Union using Earth's orbit as a spring board with which to attack Earth eventually convinced the public mind that beginning the step in to the blackness of space was necessary. A pragmatic approach to space informed Kennedy's advocacy of a man on the moon in ten years. It is an image somewhat at odds with the view of Kennedy as a liberal dove.

However, Kennedy's views evolved gradually during his time in Office.

Once Kennedy assumed the mantle of the Presidency, he began to become radically independent and somewhat of a maverick. He began to back Civil Rights. Kennedy also began to back reforms that would have placed more economic power in the hands of the middle class. Finally, while continuing to be in favor of a tough minded response to the Soviet Union, he also advanced a view of the Space Race as one that would allow for strategic cooperation with the Soviet Union. International cooperation would allow the Russians to be convinced of the superiority of democratic modes of organization by way of the spread of ideas and not war. The dream of a man on the moon became one that would be one small step for Man, not simply one small step for America. Kennedy became a President on the world stage, inspiring nations. Influencing his views may have been a kind of anti-war trend that began to emerge within his foreign policy as he began a withdrawal from Viet Nam. Increasingly, Kennedy's idealism began to trump his initial realism. Of course, the end of Kennedy's Presidency, which was also the end of his life, put a stop to the withdrawal from Viet Nam. Yet, his dream of space as a cooperative venture continued to inspire other Presidents. It has not died to this day.

Kennedy believed in the power of human freedom to overcome totalitarianism.

This emerging world-view cemented later in his Presidency, when he began to embrace Civil Rights and world peace. While still leery of the Soviet Union, Kennedy began to believe that the spread of ideas would bring down ideological strongholds more than the spread of arms. This sentiment eventually became global as it led to the fall of the Soviet Union in 1989, and the fall of dictatorships since. This is a vision of the world that still inspires people globally, and is deeply related to the idea of space exploration as a common endeavor for all of humanity.

Kennedy's vision of space travel as a commons, as a movement of all of humanity and not simply of one nation or another, even inspired the humane cosmopolitanism of Star Trek. "Boldly going where no man has gone before" resonated with the idealism that Kennedy had urged the nations to pursue.

The cutting short of Kennedy's life did not end the space program.

It did, however, cut short his desire to end war. The Viet Nam War ratcheted up. The Soviet Union also retreated from liberalization when Khrushchev was overthrown, leading to a renewal of Cold War tensions. Much of the world was thrown in to radical social change in the later 1960's, with authority being challenged globally. Yet, even with all of the renewed Cold War tensions in the Sixties, the Space Race still continued to be largely a cooperative affair. Kennedy, who has asked for us to consider what we could do for our country, also asked us to consider what we could do for the freedom of mankind. Perhaps that one small step for man that Neil Armstrong took did a lot more for the freedom of mankind than Kennedy himself would have himself supposed when he wanted a man on the Moon in ten years. Whether his dream of space as a cooperative endeavor continues to inspire or whether it dies a slow political death is no longer up to him. It is up to the world of today that still allows his words to inspire us in an increasingly cynical age. It is up to us.

Mount Diablo Astronomical Society Event Calendar–March 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
27	28	29	30	31	Messier Marathon (CANCELLED) (Private) 1	Society Observing (Private) 2 Sunset: 7:32 PM
3	4	5	6	7	8	Observatory Maintenance (Private) 9 Sunset: 7:39 PM
10	Diablo View Middle School (Private) 11 Board Meeting (Private)	Life In the Universe Test (Private) 12 MDAS Imaging SIG (Private)	13	Joaquin Moraga Intermedia (Private) 14	15	16 Sunset: 7:45 PM
17	18	19	20	21	22	23 Sunset: 7:52 PM
24	25	7:15 PM GenMtg: Einstein & Light 26	27	28	29	7:00 PM Astronomy: ARE WE ALONE? 30 Sunset: 7:59 PM

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General Meetings:
Fourth Tuesday every month, except on the third Tuesday in November and December. Refreshments and conversations are at 6:45pm. Meetings begin at 7:15pm.

Where:
Concord Police Association
5060 Avila Road, top of the
Take Avila Road from Willow

Directions to facility: