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# Planetariums, Great Messengers of the Astronomical Research

A. Acker

Planetariums provide up-to date information on scientific advances in Astronomy/ Astrophysics to their visitors (~1,300,000 per year in France). In this perspective, the "Association des Planetariums de Langue Française" (APLF, [www.aplf-planetariums.org](http://www.aplf-planetariums.org)) hosted by the Strasbourg Observatory (Universite Louis Pasteur), realize high quality Planetarium shows, based on images and videos (observations and modelisations performed in international institutes), and produced at different technical levels – the show being available both to giant and small equipments.

Two shows were realized in six languages and distributed by APLF to 40 Planetariums in Europe and beyond:

- In 2001 "The Planet with a thousand eyes", a show devoted to the Earth seen from space, in collaboration with the Centre National d'Etudes Spatiales (CNES).
- In 2002 "The mysteries of the southern sky", a show celebrating the 40th Birthday of the European Southern Observatory (ESO). A new show "Venus and the planets hunters" was realized in 2004 at the occasion of the Venus transit, with an additional presentation of extrasolar planets (thanks the support of the French "ministere de la recherche") for 16 European Planetariums.

In addition, APLF is producing and distributing pedagogic tools, in particular a French/German/English version of an interactive CDrom (with booklet) "Universe Explorer": a series of exercises based on the observation and analysis of astronomical numerical images by using computer, a "Hands-on-Universe" product created by the Laurence Hall of Science at the University of California (Berkeley).

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## From the Hill of Galileo to the Borders of the Universe: the Arcetri Outreach Program

L. Albanese, L. Fini, D. Galli, F. Pacini, F. Palla, G. Risaliti

We shall review the present activities and future plans of the Arcetri Astrophysical Observatory in the outreach area. These include collaborating with the Florence Planetarium and the following areas:

1. night time visits to the Observatory
2. day time visits
3. preparation of hands- on exhibits appropriate for different ages
4. special exhibit on "how adaptive optics and interferometry work", a series of experiments for high school students
5. open day for children in Arcetri
6. development of the Planetarium site [www.planetario.fi.it](http://www.planetario.fi.it) (including a corner for children)
7. more

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# Public Education and Outreach at the NAIC / Arecibo Observatory

D.R. Altschuler & J.L. Alonso

As the site of the world's largest single-dish radio telescope, the Arecibo Observatory is recognized internationally as one of the most important centers of research in radio astronomy, solar system studies and space and atmospheric sciences.

As part of its overall mission, "NAIC contributes to the general understanding and appreciation of science by initiating and participating in public education and outreach programs. NAIC strengthens scientific and engineering research potential by supporting activities that provide undergraduate and graduate students with opportunities to further their education".

The Angel Ramos Foundation Visitor Center at the Arecibo Observatory was inaugurated in early 1997. It is the only facility of its kind in Puerto Rico, an island of four million U.S. citizens. Since its opening, close to one million visitors have enjoyed the experience of its educational exhibit program.

Other education and outreach aspects at the Arecibo Observatory, either made possible or enhanced, by the Visitor Center include the teacher in residence program, summer teacher workshops, scientific workshops and special seminars, such as the "Comunicando Astronomía en Hispanoamérica" workshop held in September 2003, and numerous national and international media presentations related to the activities of the Observatory.

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## Examples of Scientifically Valid and Engaging Animations

Greg Bacon

Scientific results sometimes require more compelling imagery, whether it be a painting or moving pictures. A lot of visuals created by scientist generally utilize the same software used for research papers, tools meant for communicating to experts. Communicating these results to the public, whose visual expectations have been shaped by special effects laden films, is much more challenging. I will present examples of different techniques used in the creation of video and film. The combination of research-level data and specialized software provides both accuracy and aesthetics in presenting science to the public.

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## Hands-on Animation Case Studies: Creating a Continuous Zoom!

Greg Bacon

Fly into deep space! Using off-the-shelf tools you can create "cosmic zooms" and transport your audience from here to there – even if "there" is the other side of the universe as seen by the Hubble Space Telescope. Learn to plunge deep into SPACE.

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## The Nuts and Bolts of a Good News Story

L. Barranger & C. Gundy

The science news has been fleshed out and the release is to be generated but what components make a good News Release? This overview is based on lessons learned and best practices from the Space Telescope Science Institute. Insights into what components go into a release package – when do you add artwork or video and how does 3D animation fit into the mix?

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## IN VIAGGIO FRA LE STELLE, The making of the GSC II

Bernardi, G., Bucciarelli, B., Ferreri, W., Lattanzi, M.G.,  
Morbidelli, R., Pannunzio, R., Smart, R.L., Vecchiato, A.

"IN VIAGGIO FRA LE STELLE" (Voyage in the Stars) will be an educational application based on multimedia and interactive tools developed under Microsoft Windows, which will be made into a Cd-Rom for general distribution. Its guiding theme will be the making of GSC II (the Second Guide Star Catalogue), the largest collection of celestial objects in existence, whose realization is the product of a ten-year collaboration between the Astronomical Observatory of Turin and the Space Telescope Science Institute of Baltimore, and the support of several international astronomical institutions.

The idea is to take a project such as the construction of an astrometric catalogue, a highly technical and specialized subject that would seem ill-suited for popularisation at first sight, and make it accessible to an audience with little if any expertise in the field. This objective will be pursued by combining the flexibility of multimedia applications with an original approach to the subject, i.e. by favouring a narrative rather than a didascalic style in order to make it appealing and easy to follow. In addition, the general structure of the CD-Rom will be used as framework for a didactic tour of the different branches of the Astronomy, from Solar System to Cosmology.

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## Bringing Forth the Spirit of Astronomy by Using Conceptual Maps

M. Birlan & G. Vass

When communicating astronomical knowledge to the public we are sometimes unsatisfied of the quality of our application, making evident that a real efficiency of sharing astronomical concepts and action to the public, needs to be sustained with concepts and actions by the "outside", such as concepts from mathematics, physics, philosophy, etc.

On the another hand, different categories involved (researchers, professors, students, graduate students, media, etc,...) do not have the same purposes in manipulating astronomical information, the researchers are more interested in details and strictness, the professors in the pedagogical aspects, the media searches for the simplest way to explain complex/inter-dependent phenomena. Thus, searching a cohesion factor between several domains and tendencies in communicating astronomical knowledge became obvious and necessary; this factor has to reflect directly that what we can finally call "the spirit of Astronomy". The easiest way of searching for this factor is the analysis of relations between facts and concepts of several domains involved, by using the method of Conceptual Maps, already presented by the authors. The use of Conceptual Maps shows more than the simple anchorage of Astronomy among the exact sciences; it makes evident the eminently creative statute of Astronomy, which is, from the methodological point of view, the origin of modern sciences. This is a fundamental epistemological statute which requires, especially from the astronomers, a more appropriate investigation and afterwards to become the basis of their efforts to communicating astronomy, efficiently, to "the others".

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# Catch the Stars in the Net!? Eight Years of Experiences in Communicating Astronomy via New Technologies

C. Boccato, L. Benacchio, L. Nobili, S. Pastore

The authors describe their work and experiences gathered in the field of POE and Information, in Astronomy in the last 8 years, mainly but not only, through the Web.

Catch the stars in the Net! is a long term Project made up of many initiatives for nearly all types of possible users: young, students, amateurs, general public or simply "curious" people. All the initiatives are developed within a focus group on the field framework and then, after this experimental phase, are published and managed on the Web, in the main Web site.

On the Web server of the Project there are more than 33 astronomical self-consistent Web sites in Italian language; all of them are reachable from one "Web door" with the name "Prendi le Stelle nella Rete!" at the url: [www.lestelle.net](http://www.lestelle.net). We call it "Web door" because it doesn't want to be a simple Home Page neither a Web Portal but it has the function of presenting all the Web sites in a well structured way to facilitate their use by the different kind of users and for different purposes. Half of these 33 Web sites are in English and they are all reachable from the url [www.astro2000.org](http://www.astro2000.org) .

The Project was born and has developed in parallel with the New Technologies: from the first Web site, in 1997, to the weekly News Bulletin in Streaming Audio/Video, in 2000, to the last project with Wireless technology for an astrophysical e-learning programme, supported by the Industry, experienced this year at the primary and middle schools.

The main focus will be on the lessons learnt in this long adventure and on the future developments.

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## The Venus Transit 2004 Programme

H. Boffin

ESO's public outreach activities comprise communication and media activities, educational projects and targeted events, addressing well-defined audiences. However, in 2004, one major activity stands out both in terms of visibility and in covering all of the above areas: the Venus Transit 2004 Public Science Discovery Programme. The objective was to use the 2004 Transit as a vehicle for disseminating knowledge about the Solar System, for raising the awareness of method of transit-based observations of exoplanets, to enable the public to re-enact a historical scientific exercise, to raise public appreciation of the scientific method and to collectively obtain a scientific result based on geographically distributed observations. The very successful programme comprised the development of an extensive set of teaching materials for schools, a web-based information and reporting system, observational activities on the day of the transit (8 June) as well as a video contest and a final event in Paris in November.

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# Astronomical Pills: One-shot Questions about the Universe

F. Cavallotti, S. Romaniello, S. Sandrelli

In the last two years, the Public Outreach & Education office (POE) of the INAF-Osservatorio Astronomico di Brera (Milano, Italy) carried on an extensive survey (800 tests) of the instinctive ideas that intermediate and high school students (14-18) use when facing astronomical concepts.

The students were asked to face nine closed-answer questions plus an open answer one, making their choice in a handful of seconds.

Our goal was to make a first step into the exploration of the naive view of the universe developed by pupils in the different range of ages. In particular we explored the evolution (if it exists) of some misconceptions depending on age. Are misconceptions static ideas or they are removed by school?

In the present talk we present a critical review of the work, making the points of "lessons learned", "what works and what doesn't" and "what can be learnt" from our personal experiences.

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## The ESA Hubble 15th Anniversary Campaign

Lars Lindberg Christensen & Martin Kornmesser

24 April 2005 was the 15th anniversary of the launch of the NASA/ESA Hubble Space Telescope. As Hubble is one of the most successful scientific projects in the World, ESA decided to celebrate this anniversary, among other things, with the production of a Hubble 15th Anniversary movie and a book, both called "Hubble, 15 years of discovery". The movie covers all aspects of the Hubble Space Telescope project – a journey through the history, the trouble and the scientific successes of Hubble. With more than 518,000 multi-lingual DVDs distributed to the public, media, educators, decision-makers and scientists, the Hubble 15th anniversary campaign has been one of the largest such projects on European soil.

The small exhibition will show some of the facts behind the campaign and show part of the 83-minute movie that was produced.

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## Virtual Repository Progress

Lars Lindberg Christensen

When talking to other 'communicating astronomy' colleagues one issue always comes up: how can we better share our resources? And ultimately, how do we allow the public better access to images, videos and other materials? One could even imagine a kind of Astro-Google. In 2004 a Programme Group called Virtual Repository under the IAU Working Group Communicating Astronomy was setup with the goal: "To construct the framework for a virtual repository to allow outreach resources to be 'catalogued' in a virtual repository and accessed by communicators, educators, press, students and public through specialized visual tools combined with search engines."

Here we report on the progress to lay a foundation for discussions during the rest of the CAP meeting. Note that another talk on Friday aims at presenting collected inputs on these topics.

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## Moving the Pretty Pictures into the 21st Century

Lars Lindberg Christensen

One of the first steps towards an Astro-Google or even a Virtual Repository is proper meta-tagging of outreach products such as images and videos. Meta-tags will allow information such as ID, object name, image coordinates and more to 'travel' with the products and thereby facilitate proper searching of the products. The ESA/ESO/NASA Photoshop FITS Liberator v.2 will have support for meta-tags, but a global consensus on these meta-tags must be reached. We report on the latest progress in this area.

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## Using Astronomy and Space Education for National Skills Agendas

R.E.S. Clegg

I will describe Research Council programmes in the United Kingdom linking astronomy and space to young people, though both the formal (schools, curriculum) and informal (science centres, youth groups) education sectors. The overall aim is to use the excitement of these science areas to engage this audience, so that more take up science, maths or technology subjects beyond age 16. This is to address UK national skills agenda and the need for trained people.

PPARC needs to work with key UK education and communications partners in this programme, and to encourage astronomers and space scientists/engineers to participate. Our investments include the Faulkes Telescopes Project, 'Classroom Space', and the UK CREST Awards for young people. Challenges in evaluating the real impact on the target audiences – teachers and young people – are described. The need for international exchange of experience and best practice in such enrichment programmes is highlighted.

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## Washington Charter Progress

D. Crabtree

The Washington Charter was an outcome from the Communicating Astronomy to the Public conference held in Washington, DC in October 2003. The Charter outlines "Principles of Action" for individuals and organizations that conduct astronomical research, who "have a compelling obligation to communicate their results and efforts with the public for the benefit of all". Thus far, the Charter has been endorsed by eight professional societies. More work is required to raise the profile of the Charter and to have it endorsed by more professional societies, research councils, and research institutes.

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## The IAC and the Scientific Outreach

Luis Cuesta on behalf of The Director's Support Team of the IAC

The Instituto de Astrofísica de Canarias (IAC) is a Spanish research centre, formed by the Instituto de Astrofísica (the main headquarters), in La Laguna (Tenerife); the Teide Observatory, in Izaña (Tenerife); and the Roque de los Muchachos Observatory, in Garafía (La Palma). Maintaining a level of excellence, not only for the facilities of the observatories under its administration, which constitute the European Northern Observatory, but also for its research, its technological projects (a large telescope with a diameter of 10,4 m) and its involvement in university, the IAC has not neglected its cultural outreach. On the contrary, as one of its goals, the IAC is constantly making an effort in the popularization of science.

The Director's Support Team carries out the cultural outreach of the IAC that includes visits to the Observatories, exhibits, outreach courses and conferences, educational projects, attention to the media, publications and many other activities related with astronomical events.

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## Astronomia.pl – Polish Astronomy Portal

K. Czar

Astronomia.pl is non-profit internet portal. Its mission is education and popularisation of astronomy. The website was created in November 2001 and quickly become one of the most popular astronomical internet services in Poland. Nowadays it offers over 20 sections. These sections are standard portal features like news, discussion forum, galleries of images, as well as unique ideas, like virtual library of astronomical master thesis. The portal owns several internet domains: astronomia.pl – the main portal, kopernik.pl – biographies of astronomers, astrowww.pl – collection of astronomical websites created by astronomy amateurs, planetarium.pl – website about planetaria in Poland. Recently the portal obtained patronage from Polish Association of Astronomy Amateurs. Astronomia.pl supports many astronomical events in Poland. The address of the website is [www.astronomia.pl](http://www.astronomia.pl).

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## Human Links to the Universe. A Cultural Shift

F. Diego

Our modern view of the universe has potential implications in all aspects of human culture. In this contribution I outline fundamental concepts and facts and propose simple ways to deal with them at elementary levels. These include the basic structure of the universe and its origin and evolution; the amazing link between stars and humans and the majestic scales in time and space that make us feel humble and insignificant and at the same time, proud of the emotions and intelligence that drive us to explore and discover.

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## Needs of a Science Editor

O. Dreissigacker & Astronomie Heute Editorial Staff

The editors of ASTRONOMIE HEUTE, a journal for popular astronomy and space science, the German edition of Sky & Telescope provide some insight into the decision making process: Which news/research make it into an issue and what qualifies them for a feature or a cover story.

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## The XMM-Newton Image Gallery

M. Ehle

The XMM-Newton Science Operations Centre has prepared an XMM-Newton Image Gallery into which scientists who have remarkable and high quality images and results related to XMM-Newton are invited to submit examples.

This Image Gallery is the place to put XMM-Newton based visual results and to demonstrate the high quality of the science XMM-Newton users are doing not only to fellow astronomers but also to the whole of the internet community, see [http://xmm.vilspa.esa.es/external/xmm\\_science/gallery/public/](http://xmm.vilspa.esa.es/external/xmm_science/gallery/public/)

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## Webcamming Solar Telescope Images

B.R. Espey

As part of a teaching technology programme at the University of Dublin, funding was obtained for a H-alpha solar telescope and webcam imaging system. This equipment will be used in classroom teaching but also for public outreach work to demonstrate the nature of the Sun's surface and activity using either direct vision or through pre-recorded images and movies.

Initial demonstrations of the equipment has shown that it makes an impression on students, and further development work is proceeding to develop a display which will be coordinated with a professional solar physics stand at the British Association's Festival of Science which will take place in Trinity College in September 2005.

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## Life after Press – The Role of the Picture Library in Communicating Astronomy to the Public

Gary S. Evans

Science communication is becoming increasingly led by the image, providing opportunities for 'visual' disciplines such as astronomy to receive greater public exposure. In consequence, there is a huge demand for good and exciting images within the publishing media. The picture library is a conduit linking image makers of all kinds to image buyers of all kinds. The image maker benefits from the exposure of their pictures to people who want to use them, with minimal time investment, and with the safeguards of effective rights management. The image buyer benefits by having a wide choice of images available at a single point of contact and in a database featuring a choice of subject-based and conceptual searching. By forming this link between astronomer, professional or amateur, and the publishing media, the picture library helps to make the wonder of astronomy visible to a wider public audience.

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# Seeing Beyond the Naked Eye in a Planetarium

## A. Fairall

I have a philosophy that the traditional naked-eye sky, shown in planetariums, should only be an introductory step in portraying the universe. Consequently, over the years I have produced "inter alia" various versions of an enhanced Milky Way (the latest based on Axel Mellenger's panorama), the extragalactic sky and the radio sky for projection on planetarium domes. I also put together a three-dimensional planetarium show – the audience being equipped with ChromoDepth spectacles – which stepped from the solar system to the Cosmic Microwave Background. The advent of digital technology now makes all this much easier. Currently, Labyrinth, a visualisation program developed in house serves much the same function as Hayden Planetarium's Partiview, but also permits rendering and fly-throughs of large-scale structures. It allows viewers to explore local cosmography. Labyrinth can produce images that operate with the 3D spectacles; we have also produced a version of Partiview that does the same.

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# Kitt Peak – 40 Years of Public Outreach

## R. Fedele

For over 40 years the Visitor Center at Kitt Peak National Observatory has been providing quality astronomy programming to the general public. Visitors from all over the world explore Kitt Peak with an annual attendance of 65,000.

Located 90 km from Tucson, Arizona, guests can take advantage of a variety of programming from Nightly Stargazing, to Advance CCD Imaging. Kitt Peak receives most of its visitors during the day where the public can take advantage of tours to the three different telescopes with trained docents. Exhibits and live science demonstrations can be found in the visitor center along with recent Astronomical discoveries/events through STSI Space Watch Production.

A number of special workshops, classes, school programs, special nights, live broadcasts, all take place at the observatory through the visitor center, which makes the Kitt Peak experience one which visitors will never forget.

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# Using the Night Sky to Cultivate Public Interest in Astronomy

R.T. Fienberg & J. Kelly Beatty

To many people, the word "astronomy" means "science, math, difficult". They do not understand science or how it works, and some even fear it. Yet whenever there is a bright comet, a rich meteor shower, or a lunar eclipse, members of the public come out in droves to see it. And when they do, they want to understand what they are seeing. Widespread interest in the night sky therefore offers many "teachable moments" during which amateur and professional astronomers can share the wonders and methods of science with the public.

There is actually no need to wait for an eclipse or other significant astronomical event. The Moon, bright stars, and one or more planets are visible almost every clear night, even from light-polluted cities. The key is to get people outside to look at them.

As one step toward this goal, the publisher of Sky & Telescope – the world's leading monthly magazine for serious astronomy enthusiasts – has created a new bimonthly magazine, Night Sky, especially for beginners and casual stargazers. We will relate some findings from our market research done before and after the launch, explain our editorial formula, and describe some of the things we are doing to maximize the magazine's impact.

An estimated 2 million small telescopes are sold worldwide each year, but many of them go unused. We want to see more of them outside collecting starlight rather than inside collecting dust.

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## Virtual Tours of the Universe

C. Fluke

Primarily an astrophysics research group, the Swinburne Centre for Astrophysics & Supercomputing has placed a strong focus on providing quality public education in astronomy. Two of our biggest success stories have been the interactive AstroTour that uses stereoscopic (3D) projection to immerse the public in the Universe, and Swinburne Astronomy Online (SAO) – a nested online degree program aimed at a graduate level that is available to students from all over the world. I will discuss our experiences with both of these programs, and how we have approached our goal of "inspiring a fascination in the Universe".

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## Difficult Concepts

R.A.E. Fosbury

How to introduce really difficult concepts: spectra, polarization, interference etc? or is it a losing cause?

1. How do we extract the most information from the stream of photons sent to us by objects throughout the universe?
2. How do we explain to people what we just did in a way they will understand.

Is this a lost cause? Can 'pseudo-explanations' be useful? To which degree can analogies be stretched?

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# Virtual Observatory Compliance for Press Release Images

L. Frattare, Z. Levay, & F. Summers

The beauty and splendor of astronomical images has made an enormously positive impact with the media and public alike. As a leading provider of astronomical imagery, the outreach division of STScI recognizes the importance of making press release images compliant with virtual observatory standards for inclusion in databases and repositories. A small working group has been formed to define and evaluate the procedures for making outreach images accessible by VO applications, and more specifically, to establish a World Coordinate System for these images, which have none. We report on the status of various software techniques that can be used to easily and accurately transform coordinates on images, using reference images and astronomical star catalogs when available. Funding for this work comes from the Virtual Cosmos Project (Berkeley/STScI).

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## Hands-on Images 2

L. Frattare & R. Hurt

Following on where Hand-on Images 1 left off, this Hands-on Seminar is meant to give you and inside to the slightly more advanced 'tips & tricks' of the art of making colour images from raw data. We expect participant to have a basic knowledge of the topics covered in Hands-on Images 1. We will guide you through the following topics using PCs and Adobe Photoshop:

- Basic cosmetics
- Advanced cleaning/cosmetics
- Sky background adjustment
- Noise
- Artifact removal (including seams, gaps, CCD bleeds)
- Layer compositions
- Cropping and orientation
- Composition and layouts
- More about stretch functions
- Metadata

Advance preparations

- Browse Rector et al: <http://arxiv.org/abs/astro-ph/0412138>
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## Hubble and the Language of Images

K. Noll & the Hubble Heritage Team

Images released from the Hubble Space Telescope, for at least a decade, have been very highly regarded by the astronomy-attentive public. Due in large part to these images, the Hubble has become an iconic figure, even among the general public.

This iconic status is both a boon and a burden for those who produce the stream of images flowing from this telescope. While the benefits of attention are obvious, the negative aspects are less visible.

One of the most persistent challenges is the need to continue to deliver images that "top" those released before. In part this can be accomplished because of Hubble's upgraded instrumentation. But it can also be a source of pressure that could, if left unchecked, erode ethical boundaries in our communication with the public. These pressures are magnified in an atmosphere of uncertainty with regard to the future of the mission.

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## New Perspectives in Planetarium Lectures: How to Tell Science under the Dome Preserving the “Enchantment”

G. Gandolfi, G. Catanzaro, S. Giovanardi, V. Vomero

We discuss the philosophy and strategy of a modern planetarium lecture, within the larger frame of the communication of astronomy. The planetarium is a peculiar medium that requires a creative and rigorous approach in order to balance the three propulsive forces behind the ‘planetarium experience’: scientific knowledge (method and contents), technological ‘sense of wonder’ and pre-rational (not necessarily anti-rational) ‘enchantment’. While scientific and technological resources are largely exploited in state-of-the-art domes, the latter concept – introduced by Max Weber in order to categorize the mystic/esthetic impact of nature on the human mind – has not been sufficiently explored. However, it implies an effort to delve into the public perception of astronomy, remarking the crucial role of professional communication skills for an effective communication of science. Rather than a forced alphabetization on science and/or a crusade against astrology, we believe that the planetarium experience should be a stimulating reawakening of curiosity and ecological awareness of the sky – hence of the universe. The research of a fine tuning of the above three components makes the classical conflict between the boring academic lecture under the stars versus the disneyish, hypertechnological shows obsolete. We present some solutions for “fine-tuned lectures”, with examples from our experience at the Rome Planetarium.

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## “StarTeachers”: a Teachers Exchange Program between Hawaii and La Serena

M.A. Garcia & J. Harvey

StarTeachers is an intercultural exchange program for teachers in Hawaii (USA) and La Serena (Chile) that Gemini Observatory has funded and organized since year 2002. By sharing Gemini’s resources and technology with our teachers and students, this program demonstrates how we can all work together as a community to improve our educational system and provide unique educational opportunities that would otherwise not be available. The StarTeachers Exchange is a unique educational program designed to utilize Gemini’s state-of-the-art internet videoconferencing capabilities as an educational “laboratory”. Combined with a two-week visit/exchange, the program provides an innovative venue for the teaching of science and cross-cultural exchanges between the teachers and students of Hawaii and Chile.

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## ApritiCielo, Museum of Space and Astronomy with Planetarium in Torino

M. Giovalli, G. Bernardi, A. Ferrari, P. Rossi

ApritiCielo has been conceived as an educational and didactic centre of astronomy and space physics based on the most modern techniques to explain to the public our advanced theories and knowledge of the Universe. From this prospect the location of the Planetarium next to the building of the Astronomic Observatory of Torino is intended to promote a connection in between the space researchers and the public. The beginning is a virtual walk of discovery of the Universe, from the solar system, to galaxies, to the distribution of the matter on the cosmological scales. There will be succession of interactive exhibits where it will be possible to follow ideas to any level that the visitor wishes. The Planetarium’s virtual Universe is supplied by a projection system of advanced technology (the Evans & Sutherland DIGISTAR 3) with spectacular views of the night sky at different seasons and different latitudes, the planets of the solar system and exciting intergalactic trips to discover the vastness of the Universe.

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# Stars on Stage: the New Planetarium of Rome as an Astronomical Theatre

S. Giovanardi, G. Gandolfi, G. Catanzaro, V. Vomero

We introduce the new Planetarium and Astronomical Museum of Rome, opened in May 2004, as an outstanding research facility on live communication of science. It fills a void left in town 20 years ago when the old planetarium was closed, now granting a renovated access to the sky for the general public and the schools of Rome. The planetarium can be used as a remarkably flexible tool for the communication of astronomy, to help the visitors bridge the gap towards the sky – that is in fact widening, due to the fast progress of astrophysics as a big science vs the lack of references in the public perception of the universe beyond the solar system. We discuss our approach to communicating astronomy and, in particular, the choice of languages and metaphors to rethink the planetarium as a democratic space. The metaphor we suggest is to look at the planetarium as an “astronomical theatre”. Like a theatre, the mission of the planetarium is to share a cultural identity with a community; a sharing that is effective only if guided by the ability to address a variety of audiences, giving proper attention to their languages and their emotional links to the sky. Thus, the Planetarium of Rome is conceived as a communication lab where it is possible to experiment with the contamination of languages and the definition of new communication formats, like our live “astronomical shows”. A cultural playground for imagination and knowledge, free to float surrounded by the experience of space, and cooperate in building new views of the world and personal cosmologies. An environment where it is possible to weave a network of connections and references that is crucial to make astronomical information meaningful for popular culture. In other words, it allows the transposition of scientific information into culture. However, in the absence of institutional subjects entitled to produce a critical reading of modern science – a peculiarity with respect to the arts, literature and the human sciences – it is possible to take this metaphor to a further, deeper consequence: the planetarium as a critical observatory on science, to explore to what extent the sky described by modern astrophysical research still mirrors the cultural identity of our society. The planetarium may then become the ideal theatre for “science criticism”, independent from any propaganda and in close contact with the public. The programs developed within this conceptual framework at the Planetarium of Rome include over 50 events, shaped around the symbiotic connection between the planetarium and the nearby Astronomical Museum. Here we present some representative examples from the first year of activity.

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## Journey Through the Universe in Hawaii

J. Harvey & P. Michaud

Hilo, Hawaii was chosen as one of thirteen national sites for the journey through the Universe program. This national initiative sponsored by the Challenger Center for Space science has teamed with the Gemini Observatory, Keck, other observatories on Mauna Kea, the Department of Education, and the University of Hawaii at Hilo.

This is the first major initiative where the observatories on Mauna Kea are working with the Department of Education at a local community level. Over 5,000 students in 17 area schools were visited by the National Team from the Challenger Center with the astronomers from observatories on Mauna Kea working by their sides in the classrooms.

The community integrated resources from their existing science, mathematics and technology education programs to meet with the National and Hawaii Education Standards. This resulted in heightened awareness of science in the classrooms, improved teaching in the astronomy content field, professional development for teachers, networking and articulation amongst educators, scientists and the community. The parents and the community were also engaged and educated in the space science enterprise during the first week of an on-going five year program commitment.

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## Attracting the Media

N. Henbest

The media provide the essential conduit for the mass communication of science. Yet the drivers for a successful media “story” are not necessarily the same as the factors regarded as most important by the astronomy researcher.

Taking television as the prime example of a medium of mass communication, I examine some of the elements that are involved in the creation of a successful and influential astronomy programme.

The first challenge to the programme-maker is to persuade the broadcasters to screen an astronomy documentary, rather than – say – the latest soap or reality show.

With an interesting and topical astronomical result in hand, the next challenge is to create a show that’s as absorbing as it is informative. The key element is a script that both enthral and guides the viewer: simplicity must sometimes win out over comprehensiveness.

Locations and interviewees must be carefully researched. Sadly, the astronomers who would be selected by their peers are sometimes not the best interviewees when it comes to engaging the viewers.

Last – and of course not least – are the visuals. While astronomy has powerful images from Hubble and other telescopes, the most exciting topics in the Cosmos are often impossible to film in the detail viewers expect – examples include extrasolar planets, black holes, alien life and the Big Bang. Here TV graphics are increasingly the key. But to what extent can these depictions be justified scientifically?

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## Nationwide Astronomy Events in Austria: Summary and Experiences

J. Hron, F. Kerschbaum, A. Pikhard

Over the last few years participation in several nationwide astronomy events have been organised jointly by professional and amateur astronomy institutions: from the participation in science festivals to astronomy days to the Venus transit. We will summarize these activities and discuss the experiences with respect to astronomical content, media work, organisational structure and differences to other science fields.

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## Seeing Infrared

R. Hurt

While the public has become familiar with a variety of ways of seeing the universe through the artificial eyes of telescopes on Earth and in space, NASA’s Spitzer Space Telescope presents new challenges for scientific visualization. In an embarrassment of riches, Spitzer images the sky in 7 different bands, spanning over a factor of 50 in wavelength (and thusly in resolution). A variety of techniques, and sometimes tricks, have been developed to display this imagery alone and with other wavelength regimes. Likewise, even artist’s visualizations often require an extra twist, contrasting an object’s visible light appearance with what the infrared reveals. The presentation will cover various examples of different problems and solutions, and will hopefully encourage discussion of successes, failures, and even new suggestions.

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## Public Tours of the Subaru Telescope

C. Ishida & K. Sekiguchi

In October 2004, Subaru Telescope began offering guided tours within its telescope enclosure to the general public. We present the background, current status, and visitor statistics of the program and discuss the organizational challenges and the cultural impact of inviting the public into operational areas of a scientific research facility.

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## Space Education - A Lifeline to the Skills Shortage?

I. Jones

There is a crisis in education relating to science, technology, engineering and maths. In the UK, universities are closing physics and chemistry departments in favour of subjects such as media studies.

Astronomy and space science may hold the key to engaging and captivating new audiences who may go on to be the scientists and engineers of the future.

Orbit Research Ltd is carrying out practical research and development, to work co-operatively with teachers and pupils in schools, colleges and universities, and industrial partners such as ESA, the National Science Learning Centre and the UK Space Industry Best Practice Club to re-ignite the excitement and sense of excitement that space science can bring.

The research includes the development of a 'space education centre' where the aim is to link elements of current national curriculum science to contemporary space research and space missions.

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## Produce your First DVD

M. Kornmesser, L. Christensen

The DVD is currently the favoured medium for physical transport of broadcast quality video movies and is therefore optimal for astronomical footage longer than a few minutes. In this Hands-on Seminar, we will give you a heads-up on the DVD medium describing its advantages and disadvantages. Working with PCs and software from the Adobe Video Collection you will be guided through the production of a full structure for a DVD.

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## New Horizons for Communicating Astronomy through Digital Planetariums

T.W. Kraupe

Beginning with the first all-dome digital real-time simulation planetarium dome at the American Museum of Natural History in New York, this presentation will explore benefits and challenges of this new medium allowing scientists and educators to immerse audiences with the true 3d-structure of the cosmos.

As a consultant for this New York project and driving force in the field of planetariums, former IPS president Th. Kraupe became creator of the first large-format full-dome-real-time digital theater in Europe – the newly opened Hamburg Planetarium. He will report about the ongoing revolution in our way to present and communicate astronomy to audiences of all ages.

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# Hands-on Images 1

Z. Levay & L. Christensen

The importance of images in public communication of astronomy can not be overstated. But how are the 'pretty pictures' produced? The recent advances in software and technology has made it even easier to make nice colour composites from the raw data. This Hands-on Seminar will guide you through the following topics using PCs and Adobe Photoshop:

- Image acquisition (archives)
- Basic image processing
- Import into Photoshop (FITS liberator)
- Basic functionality
- Use of Stretch functions
- Layering
- Colouring
- Adjusting
- Cropping

Advance preparations

1. If you have never used Photoshop, and have access to a copy: Open the programme, poke around, look at the tools and menus.
2. Please read:  
[http://www.spacetelescope.org/projects/fits\\_liberator/stepbystep.html](http://www.spacetelescope.org/projects/fits_liberator/stepbystep.html)

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## Mission to the Public: A Journalist's Experiences with European Astronomers and Space Agencies

D. Lorenzen

January 2004 – NASA lands two rovers on Mars. The landings are covered worldwide live by CNN with millions of people joining it. January 2005 – ESA lands a probe on Titan. The landing is covered live in the ESOC control room with a few scientists and VIPs on site. The first pictures of the unknown world are presented to the public hours later.

July 2004 – NASA has the Cassini spacecraft in orbit around Saturn. Each day a new picture is released by the Cassini team. January 2004 – ESA has a wonderful spacecraft in orbit around Mars. 16 months later, some 35 Mars Express images are online.

That are just two examples of a communicator's nightmare. What's going wrong in Europe? Why are many scientists so reluctant to communicate their research to the public? Why isn't public relations work an integral part of any project financed by the European taxpayer? Is a scientific observation or a scientific paper really more important than a nice picture making the front page of many newspapers?

Europe is doing great scientifically and technologically – but for some reason, this is not communicated. Can we change the attitude of scientists and agencies towards public communication?

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## Popularisation of Astronomy: why?

V. Luridiana

An increase in the level of public understanding of science (PUS) is often advocated for a variety of reasons. The majority of these tend to be practical: a better PUS can increase the quality of decision-making both in the personal and in the public sphere; help to understand the notions of risk, hazard and uncertainty; improve the understanding of health issues. Astronomy is a very special discipline in that it has virtually no impact on the daily life of people. Its discoveries are unlikely to have more than a very distant echo in the lives of common people, and even the link between investment in basic astronomical research and technological return is controversial. In this sense, astronomy can be seen more like an art than like a science. In this poster I will expose the preliminary results of an investigation into the reasons that might justify doing efforts to popularise astronomy.

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## Science Communication – between Michael Faraday and MTV

C. Madsen

No abstract submitted.

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## The Role of the Popular Article in Astronomical Outreach

T. Mahoney

I examine the history and typology of the popular article and emphasize the difference between news and feature articles. My conclusion is that feature articles tend to be written and published almost exclusively for astronomy buffs, and that it is mainly news articles that can truly claim to be popular, in the sense of successfully reaching a non-astronomical audience. The feature article is an excellent vehicle for reaching out to the non-astronomical public but needs to be angled in a way that is relevant to the interests of a wider readership. Writers of astronomy-based feature articles for the general public need to address the relationship of astronomy to history, literature, art, music and philosophy.

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## A Communications Toolkit for Astronomers

T. Mahoney

This miniworkshop follows on from Writing to be Read: How to Improve Your Writing and takes a look at a number of issues that determine how and what you write:

- \* Knowing your audience: writing for different genres
- \* Background research for news and feature articles
- \* Necessary reference works and the ways of accessing them
- \* Dealing with editors
- \* How your text is edited
- \* Handling proofs
- \* What editors do
- \* Being an editor
- \* The writer's rights

We also suggest ways of getting your message across to the media when it is your work or organization that is being reported.

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## The Visitor Centre "Marcello Ceccarelli"

F. Mantovani, on behalf of many collaborators

In this poster we will present the Visitor Centre "Marcello Ceccarelli", recently open at the Medicina Radio Observatory of the INAF-Institute of Radio Astronomy, Bologna. The VC has been named "Marcello Ceccarelli" in honour of the Professor of the Physics Department, University of Bologna, father of the "Northern Cross" Radio Telescope and of radio astronomy in Italy in the mid 60s. The VC is located in a hundred years old store recently renewed, used by farmers to store rice. The building also hosts a bed&breakfast and a country-side restaurant. With its more than 400 square metres of available surface, the VC "Marcello Ceccarelli" is at present one of the largest such facilities in Europe. The surface is almost equally divided in a exhibition room and a multi-media conference room. The exhibition, the collection of old instrumentation and the multimedia facilities will be briefly described.

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## The ESO-MIM Star Trek: a Broad Public Oriented Short Interactive Exhibition for an Introduction to Contemporary Astrophysics

O. Marco

In the course of ESO EPR actions in Chile, we have realized a permanent exhibition of astronomy for a broad public in the Museo Interactivo Mirador (Interactive Museum of science, Chile), a collaboration between ESO and MIM. This Museum is mostly directed toward scholars (7-14 years old), with adults visits on week-ends, is funded by public money and is unique in Chile. We decided to present the most recent questions relative to astronomy, based on pictures taken mostly at ESO observatories, and to skip the basics of astronomy which are to be teach at school. However, we also designed a video introduction on the history of astronomy, with a time line showing the evolution in discoveries and principles. We tried to be innovative to keep it interactive without modern technologies: the main part of the exhibition is based on a walk among the stars, in a dark room, with a special helmet equipment to look at the pictures placed on the roof.

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## Sighting the New Crescent Moon – Linking Modern Astronomy and Islam

R. Massey

The Royal Observatory Greenwich (ROG) has acted as a resource centre for mosques in the UK, providing data on the visibility of the crescent that is essential for the Islamic calendar. A series of projects have sought to widen the connection between the ROG and the British Islamic community, engaging a 'hard to reach' audience with cutting edge astrophysics.

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# The Gemini Observatory Virtual Tour

P. Michaud

For the past 4 years, the production of the Gemini Virtual tour has evolved from a modest interactive CD-ROM tour of the Gemini Observatory into a multi-faceted, multi-media education and outreach product. The current version (3.0) includes internet accessible science updates, a custom screen saver-generator, an observing module using real Gemini data and several educational games and activities.

Recently the entire text elements of the tour have been translated into Spanish (formerly only English was available) with plans to translate into additional languages over the next 2 years.

This poster will describe the technologies used to create the tour, our feed back from users and our experiences using the tour as a kiosk in public spaces.

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# Astronomical Outreach from Jodrell Bank Observatory

I. Morison & T. O'Brien

The Jodrell Bank Observatory of the University of Manchester undertakes a wide variety of outreach to children and adults both on site at its Visitor Centre, locally to schools and adult groups and world wide through its distance learning programmes and website. Visitors to the Observatory learn about the work it does, see the Lovell Telescope at close quarters, enjoy 3D astronomy presentations in a dedicated theatre and can "Ask an Astronomer". A team takes a portable planetarium out to local schools, astronomers give talks locally and nationwide to adult groups and teach astronomy evening classes. The observatory runs a part-time distance learning programme for adults at undergraduate level incorporating opportunities to observe with a radio telescope controlled over the world-wide web.

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# Communicating What Science Is, Not What It Is Like – Non-professionally Executed Astronomy of Professional Standard

P. Murdin

Attempts to communicate astronomy fall into three categories: (a) witnessing, where an astronomer or a representative describes to an audience of students what astronomers have done and found out; (b) exercises, where the students simulate what astronomers do; and (c) participation, where the non-professional scientists carry out astronomical programmes. About 150 years ago or more, amateur astronomers opened up research in astronomical areas such as deep-sky surveys and spectroscopy through participation. Programmes like these remained operative in for example the activities of the American Association of Variable Star Observers. But for the last century the professionalisation of astronomy and the growth of an entertainment industry as a model for communication to a passive audience have shifted the balance of the communication of astronomy towards witnessing, and directed exercises (like public viewing nights). There are now available new generations of affordable, sensitive detectors, powerful astronomical telescopes are within the financial reach of an individual, and professionally-equipped large telescopes are becoming available through various access schemes. Archives from professionally executed surveys are becoming open. These developments bring so many possible astronomical objects within range that it is becoming easy again for the non-professional astronomer to participate in the discovery of new information. The value of this shift is that science is communicated as a process, not as a collection of results. Are we ready?

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## Credibility Panel Discussion

P. Murdin, R.A.E. Fosbury, D. Lorenzen, C. Madsen

How far can we in the name of science communication keep pushing, or promoting, our respective results or projects without damaging our individual, and thus also our collective credibility? The pressure is larger than ever, and the temptation for hype huge. Are comparisons between different projects of the sort "my scope is better than your scope" necessary? Do we really need scientific results to be peer-reviewed in advance of their public dissemination? Do we need internal political and scientific 'editorial boards', or is it just a kind of double-refereeing? How do we handle the really BIG discoveries (e.g. exo-Simpsons)? How do we treat the NEO threat? Why do press releases that are later proven wrong rarely get withdrawn? Is the time ripe to make a Code of Conduct for press releases that outlines recommended ethics and procedures for conflict resolution, analysis and retraction?

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## The ESA/ESO/NASA FITS Liberator Version 2

Lars Holm Nielsen, Kaspar K. Nielsen, Teis Johansen & Lars Lindberg Christensen

The ESA/ESO/NASA Photoshop FITS Liberator has, since it was released in July 2004, given a worldwide audience of 50,000 easy access to astronomical FITS images. The Liberator has in this way become the 'industry standard' for the production of 'pretty pictures'. At the small exhibition, the team behind the Liberator will demonstrate the general principles of its use as well as the special features available in the upcoming version 2. Version 2 is planned for release July 1, 2005.

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## L'Aula del Cel: Communicating Astronomy at School Level

A. Ortiz-Gil, M. Gomez, T. Gallego

Aula del Cel (The Sky Classroom) is an effort to bring astronomy closer to school children. It is a project led by the Astronomical Observatory of the University of Valencia in collaboration with the regional education authorities. It has been running for two years and it has been a big success, with more than two thousand students visiting the Aula during the school term.

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## Think Inside the Sphere

S. Parello

Bringing the Universe down to Earth — isn't that what it's all about? The Hayden Planetarium in New York City offers frequent occasions to experience the night sky, interact with researchers, and even fly to the edge of the Universe. We invite the public into our hemispherical living room on Tuesday nights. Our well-established audience enjoys opportunities to explore our growing sets of data, discuss the latest news and images, and reflect on the simple enjoyment of just looking up at the stars. Through these regular offerings, we endeavor to convey our love of the cosmos — to reveal the inner workings of the heavens.

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## Astronomy for Young Audiences

A. Pedrosa & P. Russo

The Espinho Planetarium has been a very rewarding experience in what has been our major tool for communicating in Astronomy, inside the activities of the Centro Multimeios de Espinho. We will present, two recent experiences, two planetarium shows, developed by the Espinho Planetarium team, dedicated to the very young 4-10 yrs old and young 10-14 yrs old audiences. They have different goals, not only in the target age, but also on the concept behind the introduction of the different astronomical subjects presented. We will also discuss the different approaches used, the scientific content and the public reactions, both from teachers and students.

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## The Unique Role of the Planetarium/Science Center in Science Communication

C.C. Petersen

Planetariums process around 90 million visitors per year, offering astronomy and space science very wide exposure to public audiences. Information from research institutions is a vital part of planetarium presentations. Therefore, it is useful for scientists and public relations professionals to understand the specialized audio-visual needs, production practices, and educational rationales developed over the years by the planetarium profession. This presentation gives an overview of the planetarium community, its appetite for content from the science community, and the fascinating technological challenges that are changing the way planetariums use and show that content.

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## Outreach from McDonald Observatory

S. Preston

McDonald Observatory communicates astronomy in a variety of different ways to a vast audience in the U.S. and internationally. Its widest reaching programs are the daily 2-minute astronomy radio programs StarDate and Universo (Spanish-language version). A German version, called Sternzeit, airs daily throughout Germany on DeutschlandRadio Berlin. Sternzeit is also sold on CD to individual subscribers.

StarDate Online ([stardate.org](http://stardate.org)) and Universo Online ([radiouniverso.org](http://radiouniverso.org)) offer rich resources to a large audience via the Internet. The "What Are Astronomers Doing?" website ([mcdonaldobservatory.org/research](http://mcdonaldobservatory.org/research)) provides online visitors with an interview of the astronomers using the telescopes at McDonald each week, information on their research project, and background on the telescope and instrument being used.

McDonald Observatory's Visitors Center in Fort Davis, Texas welcomes 100,000 visitors a year and conducts K-12 professional development workshops for teachers and student field experiences. Visitors can learn how astronomers use spectroscopy to uncover the mysteries of the Universe in a bilingual (English/Spanish) exhibit called "Decoding Starlight". A new outdoor exhibit called "Parallax Park" is being designed. When built, this bilingual (English/Spanish), interactive family exhibit will help visitors explore how astronomers measure the distance to stars and how they find extrasolar planets.

Funding for this work was made possible by the National Science Foundation and NASA.

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# The Preparation of Presentation-Quality Astronomical Images

T.A. Rector, Z.G. Levay, L.M. Frattare, J. English & K. Pu'uohau-Pummill

The quality of modern astronomical data, the power of modern computers and the agility of current image-processing software enable the creation of high-quality images in a purely digital form. The combination of these technological advancements has created a new ability to make color astronomical images. And in many ways it has led to a new philosophy towards how to create them. A practical guide is presented on how to generate astronomical images from research data with powerful image-processing programs. These programs use a layering metaphor that allows for an unlimited number of astronomical datasets to be combined in any desired color scheme, creating an immense parameter space to be explored using an iterative approach. Several examples of image creation from Gemini Observatory and NOAO telescopes will be presented.

A philosophy is also presented on how to use color and composition to create images that simultaneously highlight scientific detail and are aesthetically appealing. This philosophy is necessary because most datasets do not correspond to the wavelength range of sensitivity of the human eye. The use of visual grammar, defined as the elements which affect the interpretation of an image, can maximize the richness and detail in an image while maintaining scientific accuracy. By properly using visual grammar, one can imply qualities that a two-dimensional image intrinsically cannot show, such as depth, motion and energy. In addition, composition can be used to engage viewers and keep them interested for a longer period of time. The use of these techniques can result in a striking image that will effectively convey the science within the image, to scientists and to the public.

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## History & Progress of The IAU Communicating Astronomy with The Public Working Group

### I. Robson

A brief update of the progress of the IAU Working Group on Communicating Astronomy with the Public since its formation following the Washington Meeting will be given.

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## The Role of Observatories

### I. Robson

In one way or another our observatories are the source of the information that is ultimately used to convey the excitement of astronomy to the public. Large observatories have their own Public Information Officers and often large outreach activities, handling the press releases on behalf of visiting astronomers. Other observatories rely on the astronomers' home institution for press releases but have visiting programmes and outreach. Older observatories can become a historical attraction for the public, with outreach and many other activities. Innovative ideas are being pioneered by a number of observatories, helped by generous funding. This talk will give an overview from information received from observatories around the world of the various scales of enterprise, activities and 'reach'. In particular, it will attempt to identify what has worked, what hasn't and what, if any, lessons can be learned.

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# The Universe in the Classroom - the Faulkes Telescope Project

P.D. Roche

The Faulkes Telescope Project (FTP) offers access to research-grade, 2-metre telescopes in Hawaii and Australia. Users carry out their live observations from anywhere with an Internet connection, or submit targets to the offline queue. Each telescope is equipped with a scientific-grade CCD and a filter set consisting of u'BVRi' plus Hydrogen Alpha and Oxygen III. Spectrographs will become available in future, opening up exciting new possibilities to all FT users.

Apart from rapid acquisition of extremely high quality images, the FTP offers access to the southern sky from Australia, and the opportunity to collaborate in a range of research projects. Research projects already running involve objects as distant as Gamma-Ray Bursts and galaxy clusters or as close as NEOs – in the latter case, we can track these fast-moving targets to greater distances than almost any other regular observer, contributing vital data.

This poster highlights some of the best images and key events from the first year of FT North operations, including schools use (9-18 year olds), amateur astronomers, undergraduate project work and research results.

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## Do the Stars Tell Your Love Story?

### I. Rodríguez Hidalgo

A great alternative to transmit astronomical concepts is using a “co-lateral” story which catches the public’s attention. It allows, at the same time, to spread the critical sense, in danger of extinction these days. The recipe is simple: nothing but an actor or actress, his/her voice and hands, and a score about a topic of wide popular interest, with bits of magic and humor. An example will be shown in this contribution.

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# The Olmicomics and The Lord of Rings: Two Cases of Non-traditional Education

S. Romaniello, F. Cavallotti, S. Sandrelli

In 2003-2004 the Public Outreach & Education office (POE) of INAF-Osservatorio Astronomico di Brera (Milan, Italy), besides the traditional activities carried out two experiments of educational games: the role-playing game "The Lord of Rings – the mysterious case of the stolen rings" and the narrative laboratory "The Olmi-comics".

"The Lord of Rings – the mysterious case of the stolen rings" is an astronomical role-playing game for kids, ageing from 10 to 13 years old. Its goal is to introduce pupils to some of the main topics of our Solar System: a) the role of gravity; b) the distribution of mass; c) the distribution of light; d) how rotation works in building complex structures; e) where the water is (as far as we know. Since the game was held at the second edition of the Perugia Science Festival (3-12 September 2004), in the following description we refer to that experience. The pupils are divided into 6 groups of 8 members. They are told that the rings of Saturn were stolen by a Centaur while Saturn was sleeping. They are appointed astro-detectives in-charge and asked to find the rings out browsing around the Solar System, which is scaled so to fit Perugia's historical center. Each group starts playing the game from a different area of the city. The astro-detectives soon discover that the rings were incidentally destroyed, so that they must gather the physical ingredients to re-build them. They are requested to collect the right quantities of gravity, light, rotation, inclination, dust and water represented by simple objects like apples, spinning tops, bottles of water and so on. The winner group is the one which prepares the best receipt to re-build the rings in the minor amount of time.

The project "The Olmicomics" is an annual narrative laboratory carried out in collaboration with Prof. Maria Giaele Infantino, a teacher at the ISC middle school "Munari", in the Olmi quarter of Milano. Its goal is to incite school students to use scientific suggestions as a starting line for creative processes in literature and comics. All along the scholastic year, we take a series of informal meeting with pupils and teachers, both in their school and in our Osservatorio, and we discuss some aspects of modern astronomy, so that pupils get a view of contemporary astronomical challenges. After that, they read some tales of Italo Calvino's "Cosmicomics" (Le Cosmicomiche), one of the most famous experimental work of literature and science. Finally they try to write down tales, fables and comics about the subjects we discussed together, trying to use scientific ideas as narrative structures or simply suggestions.

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## Navegar Foundation: 5 Years Communicating Astronomy

P. Russo & A. Pedrosa

Navegar Foundation was created to manage Centro Multimeios de Espinho – Portugal. From the beginning, one of the foundation's main areas was, by default, astronomy education: its main equipment was a planetarium. The regular exhibition of planetarium shows attracted a large number of schools (the statistics tell us that we now have an average of 20,000 students per year in a city of 30,000 inhabitants, our public is now national and not regional). With the ascend of new ideas and equipments new activities came to life: astronomy public library; observatory; student and teacher training; content development; astronomy laboratories; production of planetarium shows; public talks, among others. The main goal of this communication is to present and describe the events and activities developed by Navegar Foundation in the past five years, give an idea of the way they evolved and clues regarding our future plans in Astronomy Education.

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# ESA on RAINNEWS24: A Case Study of Television Communication

S. Sandrelli

In May 2000, ESRIN the Italian establishment of the European Space Agency (ESA) started a collaboration with the television channel Rainews24. Born about 10 years ago, Rainews24 is the "all-news" channel of the Italian public television (RAI). It transmits 24 hours in a day and it is the most diffuse satellite channel in Italy. Each Thursday an ESA representative (Stefano Sandrelli) is interviewed by a professional journalist of RAI, as a 5-6 minutes deepening of the 5 p.m edition of News. The interview is further broadcasted in the late evenings of Thursday and in the early morning of Saturday. Interviews are largely informal and close to a dialogue rather than an academic point of view "from the space". They are strictly linked to the weekly news and prepared in the morning of the same day by the ESA representative in collaboration with two professional journalists of RAI. The subject is chosen among the most debated news of the week; video, images and animations are provided by the ESA television service and by press agencies (Reuters etc.). Moreover, even if they are focused on ESA activities, they are not advertisements: we deal with space and research as a human activity, so that doubts and criticisms can come out about our use of space. This outreach activity began as an experiment, but at this point ESA interviews have become a fixed appointment, waited from week to week. As a result of five years of uninterrupted collaboration, we have recently overcome 200 hundreds interviews and what is more is that about 30% of them are dedicated to pure astronomy, which is seen by Rainews24 as an open source of daily news.

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## A Reporter's View

G. Schilling

Reporters and editors are the intermediaries between scientists and the general public. So if you want to reach your audience through the print media, you'd better have a good understanding of how the newspaper and magazine world works. Dutch freelance astronomy writer Govert Schilling presents a reporter's view of the communication between astronomers and the press: what do news media expect from scientists, how do you maximize your chances of media exposure, and what are the pitfalls and golden rules of communicating with journalists.

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## Writer's Workshop: Writing to be Read - How to Improve your Writing

G. Schilling

Press releases, news stories and web content on astronomical topics face a tough challenge: they need to capture the reader's attention from the beginning to the end, but very often they also contain difficult explanations, abstract arguments and completely new concepts. Participants of this workshop by Dutch freelance astronomy writer Govert Schilling will learn a number of helpful rules to improve their writing for a wider audience by critically judging existing examples and by writing a brief news story themselves.

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# Virtual Visits to Astronomical Observatories

M. Serra-Ricart, L. Martínez, L. Cuesta

The "Observatorio del Teide" (OT), located in the island of Tenerife together with the "Observatorio del Roque de Los Muchachos" (ORM), in the island of La Palma, both operated by the Instituto de Astrofísica de Canarias (IAC, Canary Islands, Spain), are considered one of the best observing sites in the world. Their excellent geographical situation and the splendid atmospheric conditions governing during the most part of the year, make them play a primary role in the present observational science scenario. At present, more than 20 European countries are installed their telescopes in the Canary Observatories. Whereas OT is mainly devoted to solar installations the ORM hosts large night telescopes.

One of the aims of the IAC is the scientific outreach. Between the different activities carried out are the visits to the observatories. Although every year more than 10,000 people visit both observatories we have identified two fundamental problems:

- 1) the visitors cannot enter to large telescope domes due to security reasons or because the telescope is operating (solar installations during day time).
- 2) the number of visitors is limited.

In order to surpass the previous problems a new system of virtual visits has been installed. Using a total of 10 webcams (with Alt-Azimuth movements) located in different places of the observatory (external and telescope domes) it is possible to make a virtual visit.

Using a dedicated software it is possible to define different "tours" to show the observatory and telescopes through Internet. The new system also improves normal guided "tours" with live images of instrumentation using the webcams installed inside telescope domes. The system has begun to work in the OT and once tested it will settle in the ORM.

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# Public Outreach at the Canary Islands' Astronomical Observatories

## Anselmo Sosa Mendez on behalf of The Public Outreach Group\* of the Facilities at the Canary Islands' Astronomical Observatories

In order to strengthen the impact among general public of the research activities carried out at the Canary Islands' Astronomical Observatories, the facilities there installed have established a working group at the end of 2004 to promote further co-ordination on public outreach activities, including a broad diversity of material and actions, as well as dissemination of individual results.

The following specific tasks are being carried out:

- Joint open-doors at Observatorio de Teide and Observatorio del Roque de los Muchachos
- Joint promotional material (press releases, bulletins, educational material,..).
- Informative web pages (European Northern Observatory Website).
- Co-ordination of public events related to exceptional astronomical phenomena (comets, eclipses, etc.).
- Talks and conferences (co-ordination of open talks and conferences on research programmes and activities).
- Co-ordination and organisation of major events and stands on dissemination of S&T results.

These activities are mainly based on the successful exchange and distribution of information among partners and outside. The overall coherence of these activities, based on this common need, aim us to propose this collective and co-ordinated approach in order to reach a higher level of integration and co-ordination of the facilities at the European Northern Observatory.

\* This group forms part of the Network Activity "Co-ordination and Integration of ENO facilities" under the OPTICON Integrated Infrastructure Initiative, funded by the European Commission's 6th Framework Programme under contract nr. RII3-CT-2004-001566)

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# SKY WATCH: Introducing European Youth in the World of Scientific Research through Interactive Utilisation of a Global Network of Robotic Telescopes

M. Sotiriou, P. Ioannou, H. Vrazopoulos, S. Sotiriou,  
E. Vagenas

The SKY WATCH project aims to introduce the European youth in the truly wondrous world of science and technology by engaging school and university students and young science amateurs in escalating, challenging and innovative multidisciplinary "Science Games" combining creativity, intelligence and scientific quest. SKYWATCH introduces a pan-European Science Communication and Celebration Initiative, which will reach its peak during the European Science Week 2005, comprising of two main interrelated events: (1) A two-phase European Science Contest (concluding to a central European Exhibition and a Best Projects Award Ceremony) and (2) series of popular science distance learning courses (16 "Science Days" overall). To perform project activities young people are already given access to an existing global network of five remotely control robotic telescopes though an innovative web-based platform that is currently in use across Europe. The young participants start to organize teams (school classes, groups of students, etc.) and design, develop and implement their science projects, comprising astronomical observations with the use of the telescopes and under the guidance and the continuous support of experts. The SKYWATCH web-portal ([www.sky-watch.org](http://www.sky-watch.org)) had been launched for this scope providing access to the Platform, to advanced collaboration and communication tools and to educational material of high added value, acting as on-line campus for scientific quests. An Integrated Publicity Campaign covering 28 European and other Countries is realising. At least 10,000 secondary school students of 28 European Countries, 1,000 university students, 50,000 visitors of science centres, parks and museums and 5.000 visitors (mainly school students) of the central exhibition will participate in the project's activities. The establishment of a Virtual Community of young people, wider public and the scientific community is the ultimate project objective.

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## Astronomy as Science, Art and Industry

Hossein Teimoorinia & Ashraf Moosavi

We have a scientific club in university. People with different interests are members of our club. We tested several methods to attract people to astronomy. One of the most powerful approaches in our experiences was asking people to do something without giving them direct information about astronomy. We did not tell to a group of our club about our plan. We asked them individually to build a piece of a device carefully and with well-designed in terms of material and shape. We knew that what would be built, a telescope. We designed it before theoretically. We did not know that it would work well or not. In fact that was not our goal. We wanted to involve the group. Finally, we gathered them with their pieces of the device. We understood that the device would work finally because they had powerful motivation to see their final device. They were very excited and started theoretical aspect of theme because the goal was clear. We tested some similar experiences to involve people in astronomy, for example in making astronomical programming code. People like astronomy but some non-traditional methods are needed to change people's view to astronomy such as art, designing and science point of view.

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## Building Educational Websites

G. Verdoes Kleijn, R. van der Marel, D. Schaller, J. Stoke

We have recently finished an educational website on the nature of black holes in the Universe. The aim of the website is to convey in an interactive way the different habitats of black holes, the basic principles of gravitation and its relation to the physics of black holes. We developed the website to reach a wide target audience. The site was developed in a very a close collaboration between scientists at different institutes, science communicators and educational web designers. All three parties were involved deliberately also in the development of areas and material outside their expertise. In this presentation we first analyse the effectiveness of the chosen format and medium for (i) conveying the physics and (ii) reaching a wide audience. We then go on to analyse the close interaction between the three involved parties to identify "do-s and don't-s" for making a successful science-communicating website.

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## Closing the Culture Gap between Scientists and Science Communicators

R. Villard

The effective public communication of scientific results requires a close partnership and symbiosis between astronomers and science communication specialists at universities and NASA/ESA centers. However there remains a vast cultural divide between the goals and desires of both groups. Astronomers often distrust the simplification and popularization of a research finding as pandering to the lowest common denominator. Science communicators and public affairs specialists face the increasingly daunting task of simply getting the attention of science writers, who are flooded with press releases, daily, and must compete for page space or airtime with issues that are much more relevant to their readers: war, economy, medical research, etc. How can scientists and public affairs experts better work together to share discoveries with the public? What are the boundaries between public information and hype? What are the criteria for successfully publicizing an important finding? Beyond simply ensuring accuracy, how can such information be made attention-getting, inspirational, colorful and exciting without being accused of glamorizing science. How important is it to wait and have science results first refereed? What are the future trends in science news coverage?

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## Communicating Chandra's X-ray Astronomy to the Press and Public

M. Watzke & K. Kowal Arcand

As one of NASA's "Great Observatories" along with Hubble and Spitzer, the Chandra X-ray Observatory detects and images X-ray sources that are billions of light years away and provides insights into the Universe's structure and evolution. Since its launch in July 1999, Chandra has probed regions around black holes, traced the debris of exploded stars, and helped outline the enormous structures of the cosmos. But does the public know the name "Chandra" and do they know the field of X-ray astronomy exists? Conveying Chandra's exciting, though often complicated, results to the media poses certain challenges while offering significant rewards. This talk will cover some of the successes the Chandra team has encountered in this endeavour, while outlining areas that need improvement. Finally, we hope to discuss specific ways that Chandra might be able to collaborate with other telescopes and observatories to promote the excitement of astronomical research to the media and public.

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# The Road Less Traveled: Non-traditional Ways of Communicating Astronomy to the Public

M.J. West

In an age of media saturation, how can astronomers succeed in grabbing the public's attention to increase both awareness and understanding of astronomy? In this talk, I will discuss some creative alternatives to press releases, public lectures, television programs, books, magazine articles, and other traditional ways of bringing astronomy to a wide audience. By thinking outside the box and employing novel tools – from truly terrible sci-fi movies, to modern Stonehenges, to music from the stars – astronomers are finding effective new ways of communicating the wonders of the universe to people of all ages.

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## EUDOXOS National Observatory of Education: Communicating Astronomy using Robotic Telescopes

M. Zoulias, N. Solomos

Eudoxos is a Robotic Telescopes Complex located on Mount Ainos, in Kefallinia Island, Greece. Its conception goes back to 1993, with the elaboration of its strategic development plan followed by the design and construction of robotic telescopes, domes, hardware and software systems and most importantly basic curricula for education. In 1999, first light was seen from its main 0.62m robotic telescope "Andreas Michalitsianos". Eudoxos' outreach activity started with the "Eudoxos Project" a joint e-learning project (1999-2001). The project was carried out in collaboration with the Ministry of Education, NRCPS Democritos, Hellenic Naval Academy, Prefecture of Kefallinia & Ithaka and numerous independent contributors from various scientific and technological sectors.

NOE-"Eudoxos" currently provides its users with hands-on access to optical astronomy, astrophysics and general science using remotely submitted observation schedules. Part of the observing time is devoted to research observations.

In the light of new developments, NOE-Eudoxos enriches its own curricula and is continuously upgrading its scientific and support hardware, software and web access infrastructure. Eudoxos project's future involves contributing innovative developments in education and public outreach, expanding its international collaborations and establishing interconnected telescope networks.