

Chapter 1 : The Astronomical Almanac Online – Welcome

The latter section of the Astronomical Calendar is filled with in depth topics on: the individual planets, the moon and its attendant eclipses, comets, asteroids, and finally a summary discussion of the various national and international space programs.

Directions to CSM can be found at <http://www.csm.org>: Contact Marion Weiler if you need further information. The Bazaar Cafe, California St. Welcome to the bizarre and wonderful world of black holes—collapsed stars where gravity has overwhelmed every other force in the universe. In the neighborhood of these stellar corpses, strange things happen to space, time, and the unwary visitor. Learn why falling into a black hole is definitely a once-in-a-lifetime experience, how black holes make a serious kind of time machine possible, and how new instruments have allowed astronomers to detect the presence of these elusive dark objects in our galaxy and beyond. See Their Product Line For Meade Technicians Will Perform: All proceeds shall be donated to local Astronomical Associations and clubs in Northern California If you have any questions, Please call Sam Sweiss or send Sam an email sanfrancisco@scopecity.com. Directions to SF Scope City: Merriam has been organizing the effort to have the monument erected in the correct location in Volcano. This ceremony is the culmination of that effort. The program begins at 10 am at the Volcano Town Hall. Meet family descendants of George Maderia, the man who built the observatory in , and learn about the life and history of this miner turned astronomer. For more details and to secure a lunch reservation, please contact Marshal at mfmerriam@yahoo.com. Overtaken at about 10 kilometers per second, the impactor collided with the comet while the flyby spacecraft watched. Data from this mission is providing an amazing glimpse into the life of a comet, and telling us important information about the early solar system. Astronomer Michael Brown of Caltech will give a non-technical, illustrated talk on: The Discovery of the "10th Planet". The Second Century Lectures celebrate the centennial of the American Astronomical Society, the main body of professional astronomers in the U.S. Free and open to the public. Call the series hot-line at [4157634824](tel:4157634824) for more information. Benjamin Dean Lecture Series. Gamma-ray bursts are among the most fascinating occurrences in the cosmos. Until this year, the origin of short gamma-ray bursts was a complete mystery. A new NASA satellite named Swift has now captured the first images of these events and found that they are caused by tremendous explosions in the distant universe. February 11, Saturday. Coffee and puns at 9: Eclipses and Longitude, chaired by John Westfall. Lunch and a brief business meeting, then afternoon session, Lunar Rays chaired by Robert A. Saturn Night at the Randall Museum. Telescope viewing until 9: Join sidewalk astronomers Ken Frank and Michael Portuesi as they present a minute illustrated talk on Saturn. After the talk, members of the San Francisco Amateur Astronomers will have telescopes set up for you to experience Saturn and its cloud belts, rings, and moons first-hand. Silicon Valley Astronomy Lecture Series. Stardust Mission Update" The Stardust mission is a spacecraft that flew by and, for the first time ever, collected samples from a comet Comet Wild The samples were successfully returned to Earth on January 15, and are now being analyzed. The spacecraft traveled about 2. Sanford, an expert on meteorites and the material between the planets, is co-investigator on the Stardust mission, and was actively involved in the recovery of the Stardust capsule in the Utah desert. He fill us in on what this historic mission accomplished and what the initial analysis of the samples is revealing. Anne Metevier of the University of California, Santa Cruz will describe her efforts to measure how fast distant disk-shaped galaxies rotate, and what this information can tell us about how galaxies formed. The View from the Center of the Universe. Science is establishing the first well-tested cosmology in the history of humankind. They illuminate the astonishing fact that we intelligent beings are turning out to be cosmically central or special, based on fundamental principles of physics and cosmology. Becoming aware of our special place in the cosmos opens a sweeping new perspective on what we truly may be as humans and what we can do to resolve our personal and global challenges. Nancy Ellen Abrams, former Fulbright scholar, with a long-term interest in the history, philosophy, and politics of science. Luis Ho of Carnegie Observatories will chronicle the discovery of massive black holes and the vital role they play in the formation and evolution of galaxies in the Universe. Peidong Yang of the University of California at Berkeley will discuss how semiconductor

nanowires will impact photonics, energy conversion, nanoelectronics, and other areas. View the eclipse at the border region of Egypt and Libya along the Mediterranean. Sightseeing opportunities in Alexandria and Giza before and after the eclipse. Kris Koenig, director of the observatory, and Dr. Sightseeing will include the Egyptian museum, the restored Library of Alexandria, and the Giza plateau. Emphasis on Egyptian archeoastronomy during the tour and assistance in photographing the eclipse. Mukund Vengalattore of the University of California at Berkeley will discuss the basics of "slow light" and present some recent results on using laser-cooled atoms to create optic elements such as amplifiers, switches and slow light waveguides. Call before coming if it appears possible that clouds or fog may force cancellation: Steve Stahler, UC Berkeley. Stars are the natural outcome of processes that occur throughout galaxies. Research has led to a good understanding of the basic evolutionary process, but deep mysteries still remain. Donald Brownlee of the University of Washington will describe the insights gained into the materials that initiated the formation of the solar system from the mission which brought back samples of the remarkably active comet Wild 2. Hogue Park in San Jose. Steve Stahler, University of California at Berkeley. All stars are born from large gas clouds that permeate space. These clouds collapse on themselves to form primitive objects that later mature to stars like our own Sun. Although we now understand the basic evolutionary process, deep mysteries remain in this active, exciting field. News from the Distant Past: Call the series hot-line at for more information and driving directions. Marzke will discuss how astronomers are taking advantage of the "time machine" built into the travel time of light in the universe to understand how galaxies like our own Milky Way formed and evolved. The 4th annual Desert Sunset Star Party. Please check details at our website [http:](http://) Registration is now open. Caballo Loco RV Ranch gives us a special camping rate for this group event. There is no star party fee this year but we will sell door prize tickets. Class is cancelled in the event of cloudy weather. For more information, call x Solar System" We are in the midst of exploring small objects with giant telescopes and with spacecraft, such as Cassini now visiting Saturn and New Horizons on route to Pluto. Arun Majumdar of the University of California at Berkeley will describe how he and his colleagues combine the science and engineering of nanometer scales to develop novel systems and technologies. Probing the cores of stars to the clouds of exoplanets" Dr. Measuring Astronomical Temperatures; Chair: Fisher, Eastbay Astronomical Society. Lunch at a local restaurant, then a brief business meeting. Afternoon discussion, 2 - 5 PM: Cox, San Francisco Amateur Astronomers. Frances Hellman of the University of California at Berkeley will discuss the science and technology of using both the spin and charge of the electron in modern solid state electronics, focussing particularly on how to make a magnetic semiconductor. The Gamma-ray Burst Boom. Call for more info. New satellites in orbit around the Earth are allowing scientists to monitor these sudden bursts and to watch the afterglow that follows the explosions. May 26 Friday 8: Despite more than four decades of searching, astronomers have heard nothing. Is this a quixotic mission, or could there soon be proof that someone is out there? Aparna Venkatesan, University of Colorado. Modern cosmological observations imply that the first stars in the universe were unique objects that strongly influenced their environment, despite their brief existence. This talk will present the current data and theoretical ideas on these stars, and how future telescopes can detect them. Takes place on the runway of a closed airport, five minutes outside the town of Shingletown, where groceries, gas, restaurants, necessities and not so necessities are close at hand. Shower truck provided on-site as part of the admission price. Lynn Cominsky, Sonoma State University. Since , astronomers have discovered over icy, rocky objects beyond Neptune, one larger than Pluto. What is known about this "Kuiper Belt" of bodies and what are the implications for the formation of our planetary system?

Chapter 2 : Astronomical Calendar by Guy Ottewell

ASTRONOMICAL CALENDAR for Kitt Peak Moon Phases for , at Kitt Peak Times and dates are given in local time, zone = 7 hr West. They are generally better than +/- 2 minutes.

It is caused by the motion of the body during the interval it takes light to travel from the body to Earth. Since there are various ways to define a year, there is an ambiguity in the exact distance; the IAU recommends using the Julian year as the time basis. A light-year is approximately 9. Often distances beyond the solar system are given in parsecs. Specifically for the Moon, the angle taken from the Watts lunar limb data Watts, C. The correction is a function of position along the limb and the apparent librations. It is one of the six Keplerian elements that specify an orbit. For planetary orbits, the primary is the Sun, the reference plane is usually the ecliptic , and the fiducial direction is usually toward the equinox. See node ; orbital elements. Also referred to as celestial longitude. See spectral types or classes. Since brightness varies with wavelength, often a wavelength band is specified. A factor of in brightness is equivalent to a change of 5 in stellar magnitude, and brighter sources have lower magnitudes. For example, the bright star Sirius has a visual-band magnitude of The meaning of the mean distance depends upon the chosen method of averaging i. It is also important what power of the distance is subject to averaging. In this volume the mean distance is defined as the inverse of the time-averaged reciprocal distance: They are interpreted as the elements of some reference mean orbit that approximates the actual one and, thus, may serve as the basis for calculating orbit perturbations. The values of mean elements depend upon the chosen method of averaging and upon the length of time over which the averaging is made. Thus, the mean equator and equinox moves in response only to precession. Positions in a star catalog have traditionally been referred to a catalog equator and equinox that approximate the mean equator and equinox of a standard epoch. See catalog equinox ; true equator and equinox. Conceptually, the coordinates represent the direction of the object as it would hypothetically be observed from the solar system barycenter at the specified date, with respect to a fixed coordinate system e. The ephemeris meridian is 1. Note that the latter meridian is about m west of the others. On other solar system objects, the zero-longitude meridian , typically defined via international convention by an observable surface feature or rotational elements. Also, the period of time between the same dates in successive calendar months. It is the mean period of revolution with respect to the background stars. The mean length of the sidereal month is approximately The mean length of the synodic month is approximately The position of one of the nodes the longitude of the ascending node is traditionally used as one of the standard orbital elements. If the primary source of illumination of a reflecting body is cut off by the occultation, the phenomenon is also called an eclipse. The occultation of the Sun by the Moon is a solar eclipse. Oppositions are usually tabulated as geocentric phenomena. Each orbit in the solar system and, more generally, in any perturbed two-body setting can be represented as a sequence of instantaneous ellipses or hyperbolae whose parameters are called orbital elements. If these elements are chosen to be osculating, each instantaneous orbit is tangential to the physical orbit. See orbital elements ; osculating elements. Every real orbit can be represented as a sequence of instantaneous ellipses or hyperbolae sharing one of their foci. At each instant of time, the position and velocity of the body is characterised by its place on one such instantaneous curve. The evolution of this representation is mathematically described by evolution of the values of orbital elements. Different sets of geometric parameters may be chosen to play the role of orbital elements. The set of Keplerian elements is one of many such sets. When the Lagrange constraint the requirement that the instantaneous orbit is tangential to the actual orbit is imposed upon the orbital elements, they are called osculating elements. Osculating elements describe the unperturbed two-body orbit that the body would follow if perturbations.

Chapter 3 : Moon Phase Calendar | What is the Moon Phase Today?

The Astronomical Calendar is for both beginning and advanced astronomers. There is a lot of information packed into this book, and even beginners will soon find that they will depend on this information themselves as they use this book to explore the night sky.

Chuck Keeton Rutgers U. The gravitational deflection of light provided one of the first observational confirmations of general relativity. I will introduce a rigorous and comprehensive analytical framework for black hole lensing, and use it to make concrete predictions that are testable with current or near-future technology. Here are two examples: Observed violations of these relations would falsify all PPN models in one fell swoop. Nick Gnedin Fermilab Title: Yesterday, Today, Tomorrow" I will present a biased overview of the current status of numerical modeling of the process of Cosmic Reionization, emphasizing the rapid progress in our ability to model ever bigger volumes with ever increasing resolution. The pace for bigger simulations is not a self-fulfilling goal, though - there is a big prize just around the corner Daniel Weedman Cornell U. They represent the survivors of what must have been building blocks of larger systems in the early Universe. It is now possible to obtain large kinematic samples in nearby dwarf galaxies that revolutionize our ability to map the gravitational potentials of these systems and to investigate other complicating factors such as the role of tides and internal substructure. I will discuss a survey of dSph kinematics based on observations with powerful new multi-object, high-resolution spectrographs on the Magellan Telescope and the MMT. We have built up unprecedentedly large samples and have developed new techniques for their analysis. In my talk, I will explore what these data and analyses tell us about the nature of the halos in these galaxies and the nature of their interactions with the Milky Way. These findings have given rise to the concept of "Late Heavy Bombardment" LHB , during which the rate of impacts on the Moon went through a major spike. Shock ages of certain meteorites are also used to argue that this bombardment was system-wide. While widespread, such interpretation of the evidence is far from certain. We show that the currently available data on meteorite ages actually weigh against the LHB being system-wide, but indicate that it was restricted to the Earth-Moon system. We show that lunar Trojans can be stable for just long enough to produce the LHB, and that their escape from equilateral Lagrangian points, followed by tidal disruption, could explain all the pieces of evidence we have from the LHB. If this scenario is correct, Earth likely had three moons for the first 0.

Chapter 4 : Hutech Astronomical Products

United States - Calendar with American holidays. Yearly calendar showing months for the year Calendars - online and print friendly - for any year and month.

Early work[edit] Stonehenge has an opening in the henge earthwork facing northeast, and suggestions that particular significance was placed by its builders on the solstice and equinox points have followed. While it is possible that such an alignment could be coincidental, this astronomical orientation had been acknowledged since William Stukeley drew the site and first identified its axis along the midsummer sunrise in . Recently, evidence has been found for a neighbour to the Heel Stone , no longer extant. That was incorrect, but this early exercise in dating is a landmark in field archaeology. The relevant stones were leaning considerably during his survey, and it was not considered accurate. An archaeoastronomy debate was triggered by the publication of *Stonehenge Decoded*, by Gerald Hawkins an American astronomer. Hawkins claimed to observe numerous alignments, both lunar and solar. He argued that Stonehenge could have been used to predict eclipses. Archaeologists were suspicious in the face of further contributions to the debate coming from British astronomer C. Their theories have faced criticism in recent decades from Richard J. Hawkins found not one or two alignments but dozens. Thirteen solar and eleven lunar correlations were very precise in relation to the early features at the site but precision was less for later features of the monument. Hawkins also proposed a method for using the Aubrey holes to predict lunar eclipses by moving markers from hole to hole. In Hawkins and J. A question exists over whether the English climate would have permitted accurate observation of astronomical events. Modern researchers were looking for alignments with phenomena they already knew existed; the prehistoric users of the site did not have this advantage. Newham and the Station Stones[edit] In , C. He also identified a lunar alignment; the long sides of the rectangle created by the four station stones matched the moon rise and moonset at the major standstill. Newham also suggested that the postholes near the entrance were used for observing the saros cycle. It was not until that he turned his attention to Stonehenge. Thom chose to ignore alignments between features within the monument, considering them to be too close together to be reliable. He looked for landscape features that could have marked lunar and solar events. The only megalithic monuments in the British Isles to contain a clear, compelling solar alignment are Newgrange and Maeshowe , which both famously face the winter solstice sunrise. The most recent evidence supporting the theory of winter visits includes bones and teeth from pigs which were slaughtered at nearby Durrington Walls. Their age at death indicating that they were slaughtered either in December or January every year.

Chapter 5 : The Astronomical Almanac

21 Jan (Saturday) Unveiling ceremony of the State Historical Marker for the first astronomical observatory in California in the town of Volcano, in the dark skies of the Sierra foothills! In cooperation with Amador County, Mount Diablo Astronomical Society member Marshal F. Merriam has been organizing the effort to have the monument.

Astronomy Calendar of Celestial Events for Calendar Year This astronomy calendar of celestial events contains dates for notable celestial events including moon phases, meteor showers, eclipses, oppositions, conjunctions, and other interesting events. Most of the astronomical events on this calendar can be seen with unaided eye, although some may require a good pair of binoculars for best viewing. Many of these events and dates used here were obtained from the U. Events on the calendar are organized by date and each is identified with an astronomy icon as outlined below. You can use the UTC clock below to figure out how many hours to add or subtract for your local time. The Quadrantids is an above average shower, with up to 40 meteors per hour at its peak. It is thought to be produced by dust grains left behind by an extinct comet known as EH1, which was discovered in The shower runs annually from January It peaks this year on the night of the 3rd and morning of the 4th. This should be an excellent year for the Quadrantids because there will be no moonlight to spoil the show. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Bootes, but can appear anywhere in the sky. January 4 - New Moon. The Moon is directly between the Earth and the Sun and is not visible. This phase occurs at This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere. January 4 - Partial Solar Eclipse. A partial solar eclipse occurs when the Moon covers only a part of the Moon, sometimes resembling a bite taken out of a cookie. The partial eclipse will be visible in most parts of northern Africa, Europe, and Asia. The Moon will be directly opposite the Earth from the Sun and will be fully illuminated as seen from Earth. This full moon was known by early Native American tribes as the Full Wolf Moon because this was the time of year when hungry wolf packs howled outside their camps. February 3 - New Moon. The Moon will be directly between the Earth and the Sun and will not be visible from Earth. February 18 - Full Moon. This full moon was known by early Native American tribes as the Full Snow Moon because the heaviest snows usually fell during this time of the year. Since hunting is difficult, this moon has also been known by some tribes as the Full Hunger Moon. March 4 - New Moon. March 19 - Full Moon. This full moon was known by early Native American tribes as the Full Worm Moon because this was the time of year when the ground would begin to soften and the earthworms would reappear. This will also be the largest full moon of the year because it will be near perigee, its closest point to the Earth. It is also the largest and closest full moon in the last 18 years. Astronomers call this a supermoon, a phenomenon that occurs about every 18 years, March 20 - March Equinox. The March Equinox occurs at The Sun will shine directly on the equator and there will be nearly equal amounts of day and night throughout the world. This is also the first day of spring vernal equinox in the Northern Hemisphere and the first day of fall autumnal equinox in the Southern Hemisphere. April 3 - New Moon. April 3 - Saturn at Opposition. The ringed planet will be at its closest approach to Earth and its face will be fully illuminated by the Sun. This is the best time to view and photograph Saturn and its moons. April 18 - Full Moon. This full moon was known by early Native American tribes as the Full Pink Moon because it marked the appearance of the moss pink, or wild ground phlox, which is one of the first spring flowers. April 22, 23 - Lyrids Meteor Shower. The Lyrids is an average shower, usually producing about 20 meteors per hour at its peak. The shower runs annually from April It peaks this year on the night of the night of the 22nd and morning of the 23rd. These meteors can sometimes produce bright dust trails that last for several seconds. The second quarter moon may be a slight problem this year, blocking out all but the brightest meteors. Meteors will radiate from the constellation Lyra, but can appear anywhere in the sky. May 3 - New Moon. May 5, 6 - Eta Aquarids Meteor Shower. The Eta Aquarids is an above average shower, capable of producing up to 60 meteors per hour at its peak. Most of the activity is seen in the Southern Hemisphere. In the Northern Hemisphere, the rate can reach about 30 meteors per hour. It is produced by dust particles left behind by comet Halley, which has known and observed since ancient times.

The shower runs annually from April 19 to May. It peaks this year on the night of May 5 and the morning of the May 6. The thin crescent moon will set early in the evening leaving dark skies for what should be a good show. Meteors will radiate from the constellation Aquarius, but can appear anywhere in the sky. May 7 - Astronomy Day Part 1. Astronomy Day is an annual event intended to provide a means of interaction between the general public and various astronomy enthusiasts, groups and professionals. The theme of Astronomy Day is "Bringing Astronomy to the People," and on this day astronomy and stargazing clubs and other organizations around the world will plan special events. You can find out about special local events by contacting your local astronomy club or planetarium. May 11 - Conjunction of Mercury, Venus, and Jupiter. Conjunctions are rare events where two or more objects will appear extremely close together in the night sky. The three planets will form a 2-degree long vertical line in the early morning sky. The planet Mars will also be visible nearby. Look to the east near sunrise. May 17 - Full Moon. This full moon was known by early Native American tribes as the Full Flower Moon because this was the time of year when spring flowers appeared in abundance. June 1 - New Moon. June 1 - Partial Solar Eclipse. The partial eclipse will be visible in most parts eastern Asia, Alaska, northern Canada, and Greenland. This full moon was known by early Native American tribes as the Full Strawberry Moon because it signaled the time of year to gather ripening fruit. It also coincides with the peak of the strawberry harvesting season. June 15 - Total Lunar Eclipse. During this type of eclipse, the Moon will gradually get darker and then take on a blood red color. The June solstice occurs at The North Pole of the earth will be tilted toward the Sun, which will have reached its northernmost position in the sky and will be directly over the Tropic of Cancer at This is the first day of summer summer solstice in the Northern Hemisphere and the first day of winter winter solstice in the Southern Hemisphere. July 1 - New Moon. July 1 - Partial Solar Eclipse. This partial eclipse will only be visible off the coast of Antarctica. This full moon was known by early Native American tribes as the Full Buck Moon because the male buck deer would begin to grow their new antlers at this time of year. July 28, 29 - Delta Aquarids Meteor Shower. The Delta Aquarids is an average shower that can produce up to 20 meteors per hour at its peak. It is produced by debris left behind by comets Marsden and Kracht. The shower runs annually from July 12 to August. It peaks this year on the night of July 28 and morning of July. This should be a great year for this shower because there will be almost no moonlight to spoil the show. July 30 - New Moon. August 12, 13 - Perseids Meteor Shower. The Perseids is one of the best meteor showers to observe, producing up to 60 meteors per hour at its peak. It is produced by comet Swift-Tuttle, which was discovered in. The Perseids are famous for producing a large number of bright meteors. The shower runs annually from July 17 to August. It peaks this year on the night of August 12 and the morning of August. The full moon will block out some of the meteors this year, but the Perseids are so bright and numerous that it should still be a good show. Meteors will radiate from the constellation Perseus, but can appear anywhere in the sky. August 13 - Full Moon.

Chapter 6 : The Astronomical Companion by Guy Ottewell

A calendar of celestial phenomena in November, listing the year's observing highlights. Calendar of Astronomical Events - calendrierdelascience.com

Chapter 7 : Astronomy Calendar of Celestial Events - Sea and Sky

In, which country's illegal opium harvest reached record levels, representing 92% of the world's opium supply? War and Peace, In March, Basque separatists declared a cease-fire with which country?

Chapter 8 : Astronomy Colloquia Calendar from Sep to Dec

Calendar of Cosmic Events - Check out the dates and times for astronomical events like equinoxes, solstices, meteor showers, eclipses, supermoons, and more.

Chapter 9 : Calendar - Astronomical Association of Northern California

MAC Calendar - Midlands Astronomy Club The Midlands Astronomy Club is a group of enthusiastic amateur astronomers in the midlands of SC. Astrophotography, guest speakers, observing sessions are just a few.