The Objective View

March 2012

Newsletter of the Northern Colorado Astronomical Society

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Next Meeting: March 1 7:30 pm

Astronomy from Space: Where Have We Been? Where Are We Headed?

Dr. Paul Lightsey, Ball Aerospace

Club Business at 7:15 pm

Coors Room, McKee Conference Center
2000 N Boise Ave, Loveland CO

Enter campus at 19th and Boise. Drive to Wellness Center Parking north of the buildings. Enter Wellness Center at its NW corner and proceed straight to the Coors Room.

NCAS Programs

April 5 Tom Fay Virgo Walkabout
@ Coors Room, McKee Medical Center

City of Fort Collins Natural Area Program

Fossil Creek Reservoir	8 pm	Mar 30
	830 pm	Apr 28
	9 pm	May 25
Bobcat Ridge Nat Area	830 pm	Apr 13
	830 pm	May 24
	930 pm	Jun 9

http://www.fcgov.com/naturalareas/finder/bobcat
http://www.fcgov.com/naturalareas/finder/fcopenspace

Dark Site Observing Dates

Mar 16, 17: Keota or other site, ask FRAC newsgroup

Other Events

Chamberlin Observatory Open House, 7 to 10 pm
Mar 3, Mar 31, Apr 28, May 26, Jun 23, Jul 28
303 871 5172 http://www.du.edu/~rstencel/Chamberlin/

Cheyenne Astronomical Society 7 pm Mar 16
http://home.bresnan.net/~curranm/

CSU Madison Macdonald Observatory Public Nights
On East Drive, north of Pitkin Street
Tuesdays after dusk if clear, when class is in session

Estes Park Memorial Observatory EVAS meeting, 7 pm Mar 22 TBA http://www.angelsabove.org/

Little Thompson Observatory, Berthoud 7 pm Mar 16
http://www.starkids.org

Longmont Astronomical Society 7 pm Mar 15 NASA Juno Mission, by Dr. Fran Bagenal. IHOP, 2040 Ken Pratt Blvd
http://www.longmontastro.org/

Feb 2 Program: What Time Is It? Timekeeping in Ancient and Modern Astronomy, by Dr. Suzanne Metlay

The Ishango Bone is dated at 20,000 years old. It was scribed with marks that are progressively longer, then shorter. The marks appear to fit the waxing and waning of the Moon. The ancients kept careful track of the motions of the Sun as well. Alignments in Aztec, Incan, Mayan, and Anasazi architecture are tied to the solstices and equinoxes. Pawnee, Chumash, Pueblo, and Zuni people mapped constellations. The Newgrange Tomb in Ireland (3200 BCE) is built to allow winter solstice sunlight to enter. An entire year's calendar is inside the building. The Cross-Quarter days were also noted. They are midpoints between the seasons, currently Lammas on Aug 1 for 1st harvest, Halloween and the Day of the Dead, and Feb 2 our Groundhog Day. We can thank the Ancient Babylonians for a 360 day year, 60 seconds per minute and 60 minutes per hour. The Egyptians gave the 24 hour day. Lunar calendars have 12 or 13 sets of lunar phases every year. The Jewish calendar has leap months added in 7 of every 19 years to keep seasons from slipping. The Islamic calendar is 354 days with no adjustments. The Catholic Church's adjustments produced Julian and Gregorian calendars, and we have leap days added to correct. Modern calendars accommodate the disconnect between Earth's rotation rate, 365.25 days/year, months with 28 to 31 days each, and the year. Calendars are altered for society's needs. Samoa skipped Friday, Dec 30 2011 to coordinate with customers in Australia and NZ better.

The International Date Line zigzags back and forth. An attempt at simplicity is the Hanke-Henry Permanent Calendar. Months have 30 or 31 days. The dates fall on the same day of week every year. An extra week has to be added, end of December every 5 or 6 years. We seem to be happy with the stimulation of shifting birthdays year to year. Sidereal time is based on actual motions of celestial objects. Synodic time is based on people in general see and care about. Calendars and clocks are increasingly synodic. Emphasis is shifting to atomic timekeeping, virtual interactions, especially with space-based technology. The coordinates in the sky include Right Ascension, measured in hours and minutes. The modern clock was invented by John Harrison:
http://www.nmm.zc.uk/harrison
The most accurate clock is the atomic clock. It relies on transitions of Cesium-133 electrons. An excellent video on this is: http://www.bbc.co.uk/news/science-environment-12787502
Modern time zones were driven by the railroads. Before that it hardly mattered that each town had it's own local time. Indiana and Nova Scotia are examples of shifts in the lines for local interests. China is all on 1 zone. With time zones, standard noon will usually be a few minutes off local solar noon. With geodesy and current clock precision, gravity can have detectable effects on time. "ATM banking, voice communication, high-speed computing and the Internet all depend on precise timing . . . GPS clocks depend on the precise positioning derived from NOAA's National Spatial Reference System." The travel time to a GPS satellite is 0.08 sec for 15,000 miles. Every foot in error between fiber optic sites equals 1 nanosecond error in timing, increasing the probability of collision and jamming. Billions of dollars are riding on timely transactions. Defense and commerce depend on accurate time. The US Naval Observatory Master Clock is in Washington DC, with an alternate at Schriever AFB in Colorado. Earth's official timekeeper is the International Earth Rotation and Reference Systems Service. They work together. Earth's rotation is slowing and irregular. We are losing 2/1000 second per day. The Leap Second was introduced in 1972 to help account for the discrepancy between synodic and sidereal time. The next leap second is June 30, 2012. US and France argue that it disrupts.timed systems like GPS. The rest of the world feels that it is best to keep astronomical and atomic time synchronized, and that larger corrections would be worse. The ITU decision is deferred to 2015. An experiment to detect the frame-dragging effect of the Earth was proposed years ago, but Gravity Probe B was finally launched a few years ago. The relativistic behavior was confirmed. A successor to the Cesium atomic clock is being investigated. For now, astronomers provide data to keep clocks aligned with Earth's rotation and orbit around the Sun. The Earth's shape affects satellite motion and data accuracy. Lives and substantial money depend on accurate time. So the story of timekeeping will continue.

Dr. Metlay currently teaches astronomy and geology at Front Range Community College – Boulder County Campus (www.frontrange.edu). She has worked as the Operations Director for Secure World Foundation (Superior, CO) and Education Programs Manager for Fiske Planetarium at the University of Colorado, Boulder.

From Jim Pedersen: Astro Impressionism

With this group of watercolor paintings I have decided that empty space-time looks better with some color. Astro-physicists have added dark matter and even dark energy to space, so I feel enabled to add a some color to aid design.

Thanks for looking, Jim Pedersen

My website

From Gerry Reynolds and Andy Goris: Scale of the Universe 2

Check out the web page below. It is incredible. It takes forever to load - 15 minutes on my computer, but once it's loaded it is very cool. Someone spent a lot of time putting this together.
-Andy

This is a cool tool for comprehending, appreciating, and demonstrating the scale of our universe. I used to recommend Charles and Ray Ames' classic film, Powers of Ten, as the best way to get a sense of our cosmos. It's still effective, but two bothers have made an on-line portal that blows Powers of Ten away.

Check out The Scale of the Universe 2. It takes a minute to load. Once ready, be prepared to have your horizons stretched. I like the way they pile in the expected and unexpected size examples, which anchor the scale in a refreshing way. The continuous zoom is what makes this device work, rather than the quantum powers of ten of the film. (In fact you can read off the powers of ten in this model as well.) And the fact that you drive the slider. And like anytime you drive, you get a better sense of the place than you do as a mere passenger.

For the first time, I really got a visceral sense of our place in the universe. As many have noted before (but none have explained) we -- our visible bodies -- are located approximately in the middle of the universe's size range. The largest things we know and the smallest things we know are roughly the same magnitude away from us.

And BTW, this app is what electronic "publishing" is really about. -- KK

From Karen Tobo: Acrylic Ornament Celestial Spheres

I'm learning quite a bit in our Astronomy 101 class. Dr. Richard Koehler, a hydrologist from NWS, has a great heart for teaching and a wealth of knowledge to share. Here's an idea you might like to steal for public outreach, or for grandchildren. :)

Using acrylic ornament balls from the craft store, we labeled hemispheres with references for our local sky. You could create multiple versions to illustrate the skies seen at the equator or poles.

- Karen Tobo

From Robert Arn: Death (Valley) Rises

Here is an image taken a few days after ALCON last year from Death Valley that I finally got around to processing. I thought with all this cold and snow of late that looking at some summer targets might warm us up a bit.

Death Rises:
http://www.astroarn.com/nightscape/he0a97d2#he0a97d2

Thanks for another Arn masterpiece. BTW, the peak in the photo is Tin Mountain (8,974') which I have climbed -- a gut-busting ca. 5000' gain (no trail of course). Bob Michael

Ice Castle Nightscapes

This past Thursday night the sky west of Denver finally cleared and I got an amazing night of shooting nightscapes in. In the town of Silverthorne they have constructed huge ice castles (available for day and night time viewing/imaging). While I still have many in the set from that night to process, here is the first image.

Laying a Trap:
http://www.astroarn.com/nightscape/h2a7f219e#h2a7f219e

Here is another image from my trip to the ice castles in Silverthorne called "Ice Candle"

http://www.astroarn.com/nightscape/h191aa1d4#h191aa1d4

Here is the next in the series. This one is titled "Jupiter's Court"

http://www.astroarn.com/nightscape/ha1d2c8b#ha1d2c8b

If you want some more info about the place, here is their website:
http://www.icecastles.com/

It is truly an incredible place - worthy of visiting in the daytime and night time!
Cheers, Robert Arn www.astroarn.com

From Thomas Ashcraft: 42-Second Earth Skimming Meteor?

From: Thomas Ashcraft <ashcraft@heliotown.com>
To: Global Meteor Observing Forum <meteorobs@meteorobs.org>

Sent: Sunday, January 22, 2012 2:20 PM
Subject: (meteorobs) 42 second plus long "Earth-skimmer" - a little more info

I still have not been able to come up with a suitable stacked image of the full flight path for my Jan 21, 2012 "Earth-skimmer" capture. I have a partial flight path image that I merged with a sky-map now posted here:

http://www.heliotown.com/Jan21_2012_Fireball.html

Thomas Ashcraft - New Mexico

Best Looks

Moon	By Mars Mar 7; by Saturn Mar 10, 11; By Jupiter Mar 25; by Venus Mar 26
Mercury	Low in W at sunset, first week of month
Venus	Greatest Elongation Mar 26, bright in dusk sky
Mars	Opposition Mar 3. Highest middle of the night
Jupiter	In SW in evening. Passes Venus Mar 12-13

A blustery Feb 25 2012 Fossil Creek Reservoir Starwatch, by Charlie Davis

International Space Station Passes for Loveland – Fort Collins March 2012

Date	Mag	Starts			Max. Altitude			Ends		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
01 Mar	-2.9	18:41:35	10°	WNW	18:44:39	58°	SW	18:47:42	10°	SE
02 Mar	-0.4	19:22:34	10°	WSW	19:24:00	13°	SW	19:25:25	10°	SSW
03 Mar	-1.3	18:25:01	10°	WNW	18:27:42	27°	SW	18:30:22	10°	SSE
15 Mar	-0.5	06:26:30	10°	S	06:28:33	16°	SE	06:30:36	10°	E
17 Mar	-1.7	06:07:42	10°	SSW	06:10:35	31°	SE	06:13:27	10°	ENE
18 Mar	-0.8	05:12:55	14°	SSE	05:13:46	15°	SE	05:15:39	10°	E
19 Mar	-3.1	05:50:53	25°	SW	05:52:33	66°	SE	05:55:43	10°	ENE
20 Mar	-1.3	04:56:19	25°	ESE	04:56:19	25°	ESE	04:58:24	10°	ENE

20 Mar	-2.3	06:28:45	10°	W	06:31:41	32°	NNW	06:34:36	10°	NE
21 Mar	-3.3	05:33:59	52°	W	05:34:29	62°	NW	05:37:39	10°	NE
22 Mar	-0.9	04:39:10	22°	ENE	04:39:10	22°	ENE	04:40:30	10°	ENE
22 Mar	-1.6	06:11:30	12°	WNW	06:13:42	22°	NNW	06:16:15	10°	NNE
23 Mar	-2.3	05:16:35	34°	NNW	05:16:35	34°	NNW	05:19:18	10°	NE
24 Mar	-0.2	04:21:34	15°	NE	04:21:34	15°	NE	04:22:14	10°	NE
24 Mar	-1.1	05:53:54	12°	NW	05:55:38	16°	NNW	05:57:44	10°	NNE
25 Mar	-1.3	04:58:49	21°	N	04:58:49	21°	N	05:00:45	10°	NNE
26 Mar	0.3	04:03:40	10°	NE	04:03:40	10°	NE	04:03:42	10°	NE
26 Mar	-0.8	05:35:59	10°	NW	05:37:30	13°	N	05:39:06	10°	NNE
27 Mar	-0.7	04:40:47	15°	N	04:40:47	15°	N	04:42:02	10°	NNE
27 Mar	-0.6	06:15:53	10°	NNW	06:17:00	11°	N	06:18:06	10°	NNE
28 Mar	-0.6	05:18:02	10°	NNW	05:19:15	12°	N	05:20:27	10°	NNE
29 Mar	-0.3	04:22:34	12°	N	04:22:34	12°	N	04:23:11	10°	NNE
29 Mar	-0.6	05:57:14	10°	NNW	05:58:41	12°	N	06:00:08	10°	NE
30 Mar	-0.5	04:59:46	10°	NNW	05:00:52	11°	N	05:01:59	10°	NNE
31 Mar	0.0	04:04:15	10°	NNE	04:04:15	10°	NNE	04:04:18	10°	NNE
31 Mar	-0.6	05:38:16	10°	NNW	05:40:10	15°	NNE	05:42:07	10°	NE

ISS predictions can be obtained from:
http://www.heavens-above.com/main.aspx?lat=40.4997&lng=-105.05736&loc=Fort+Collins+CO+USA&alt=0&tz=MST