

The Objective View

Newsletter of the Northern Colorado Astronomical Society

April 2008

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Cheyenne Astronomical Society April 18 7 pm

Cheyenne Botanic Garden

<http://home.bresnan.net/~curranm/>

Chamberlin Observatory Open House, dusk to 10 pm

Apr 12, May 10, Jun 7, Jul 12, Aug 9, Sep 6 303 871 5172

<http://www.du.edu/~rstencil/Chamberlin/>

Longmont Astronomical Society April 17 7 pm Dr. Peter

Nielsen, Design for a 1.5 meter **Reflector**

FRCC, 2121 Miller Rd. See new web page design at:

<http://www.longmontastro.org/>

Next Meeting: April 3 7:30 pm

The Solar System in 3D, Nick Schneider

**Dark Energy and Galaxy Clusters,
Erica Ellingson, Univ of Colorado, Boulder**

Club Business at 7:15 pm

**Discovery Science Center
703 E Prospect Ave, Fort Collins**

<http://www.ncastro.org/Sites/DiscoveryCtr.htm>

Club Brochure: http://www.ncastro.org/Contrib/2008_Brochure.pdf

NCAS Programs

April 3	Solar System in 3D	Nick Schneider
	Dark Energy/Galaxy Clusters	Erica Ellingson
May 1	TBD	

Discovery Sci Ctr Starwatch, 703 E Prospect, Ft Collins

April 11	8:00 pm
May 9	8:15 pm

Dark Sky Observing Opportunities, Roland's Astro Corral

April 4, 5, 25, 26. Check club-news that site is accessible.

Other Events

Little Thompson Observatory Star Night:

April 18 7:30 pm Speaker TBA <http://www.starkids.org>

CSU Madison Macdonald Observatory Public Nights

On East Drive, north of Pitkin Street

Tuesdays 8 pm if clear, when class is in session

March 6 Program

**New Horizons Mission to Pluto, by Professor Fran Bagenal
University of Colorado, Boulder**

Fran's interest in a Pluto mission was piqued in a conversation with Alan Stern over 20 years ago. The inner planets are rock, the giant planets are gas, and beyond them are ice dwarfs. The Kuiper Belt is now known to have 1500 objects beyond the orbit of Neptune. A plot of them has a gap coincident with the Milky Way. It is difficult to detect the dim KBOs among all the stars. Why do we see our system of planets? The Astronomer's Periodic Table, which weights the elements by cosmic abundance, makes the point graphically. For every 1 million atoms of hydrogen, there are only 68,000 He, 420 C, 87 N, 690 O, 98 Ne. So in the parts of the solar system too warm for small bodies to hang on to H, the rocks and metals predominate. Far enough from the Sun to be outside the frost line at Mars orbit, the most abundant elements have combined to form water, ammonia and methane. They range from little snowballs to Jupiter which is 20 times the Earth's mass, and big enough to retain hydrogen. Beyond Neptune is the realm of comets and larger bodies including Pluto, "Xena," and Quaoar. Bodies have been kicked out to form the Kuiper Belt. Is Pluto an escaped moon of Neptune? No. It is in orbital resonance such that it never gets very close. It can come closer to Uranus than it ever gets to Neptune. Pluto's moon Charon was discovered in 1978 on an image by USNO. The speck for Pluto on the plate had a lump on its side. These are small objects, smaller than Earth's Moon. The center of mass for their system lies above Pluto's surface. They are spin phase-locked. Pluto has extreme seasons. In the short summer, it warms all over. The temperature is about 40 K, minus 233 Celsius, minus 340 F. The best HST image can show variations in albedo on the surface. New Horizons will be imaging much better than this 3 months before encounter. The surface seems a bit reddish. Dale Cruikshank found frozen methane in 1976. In 1992, signatures for N₂ and CO were reported. Pluto has just completed its closest approach to the Sun. We have a chance to study its atmosphere. Solar UV photos ionize it. A theoretical model posits that it streams behind the object. Are there objects like Pluto any closer? Triton's retrograde orbit indicates that it is a captured object.

Voyager images from 1989 show it has "cantaloupe terrain." There are not many impact craters. Geysers would require liquid water near the surface. Pluto's density is about 2 times water. It is likely half rock and half ice. It may have a rocky core. Charon is smaller and may be mixed. It would take a spacecraft mission to explore these remote objects. Alan Stern and Larry Esposito generated competing proposals, the funding was granted to the team including Fran and Alan. The design from 2002 requires a big antenna. Radioisotope thermionic generators are necessary for power because sunlight 1/900 the strength at Earth, about like the light of the Full Moon. The energy available is 300 watts. The radio antenna uses 15 watts. The radio signal will allow a measure of atmosphere density. There is a long range camera, a wide angle camera and spectrograph. This will determine the composition at the surface. There is a Solar Wind at Pluto instrument. Ionized escaped gases from Pluto's atmosphere will be analyzed. Students from the University of Colorado designed, built, and tested the Student Dust Counter. The gallery was disappointed on the first launch attempt due to wind, and a power glitch scrubbed the second. The third time was a charm. The spacecraft was launched on an Atlas 5 rocket and passed the Moon's orbit in 9 hours. It passed Jupiter in February 2007 and calibration images showed spectacular swirls in the cloud tops. Jupiter was too bright to image directly, so shots were directed to the terminator. Io's volcanism was nicely captured. Fran's favorite so far was the flight down Jupiter's magnetotail. 3 months elapsed and they were still in it. Io spews bubbles of hot gas and they were detected down the tail. New Horizons will arrive at Pluto July 14 2015. It will fly through the shadow. A solid state recorder will save data. Some fuel will be left. Another KBO will likely be targeted between 30 to 50 AU. For a look at New Horizons status and the Jupiter-Io images, see:

http://www.nasa.gov/mission_pages/newhorizons/main/index.html

Fran Bagenal is professor of astrophysical and planetary sciences at the University of Colorado, Boulder and is a co-investigator on the New Horizons mission. Her main area of expertise is the study of charged particles trapped in planetary magnetic fields. She is interested in finding out if the solar wind interaction with Pluto's escaping atmosphere acts like a comet. <http://cafescicolorado.org/Bagenal.htm>

March 6 NCAS Business

President Nate Perkins called the meeting to order. Tom Fay gave info on a NASA info program for the International Year of Astronomy which might be of value to the Discovery Center. It would require a computer with internet connection which would receive new content daily. A subscription is apparently necessary. The calendar of observing events was announced. . Our Spring speakers were announced. The Western Nebraska Star Party is May 29 to June 1. The Astronomical League convention for 2008 is in Des Moines IA this summer. The GLOBE at Night sky brightness survey is

underway until the First Quarter Moon approaches. Andrea Schweitzer circulated at Powerpoint she used for her training session at LTO.

From Tom Fay: Viewspace Program

Here's a link to the program I was talking about.

<http://hubblesource.stsci.edu/exhibits/self-update/viewspace/>

It talks about the program, the hardware requirements, and their charges. I thought the program was free, but it isn't: it costs ~\$800 the first year and ~\$165 per year thereafter (see the specs page). They require hardware that could cost from \$1K to \$7K (also see specs page).

Their downloaded program has 5-15 minute segments and loops every hour or so: they refresh it periodically.

This may not be the right project for the club, but I think we should be thinking about what might make sense for astronomy year next year.

From Mike Prochoda: Great Observing March 9-10

The Clear Sky Chart (note the name change - see my previous post) for last night (3/9/08) predicted a great night after midnight here in Estes Park. As predicted by the CSC, my skies were overcast at dusk but cleared beautifully by about 11:30 PM. The Clear Sky Chart had predicted excellent seeing and transparency and this was definitely the case. I estimated the seeing at Pickering 8-9 (on a 1-10 scale) and got some gorgeous views with my 140 mm TEC APO refractor. Several double stars were observed including Iota Cancri, Epsilon Bootis, and Porrima (Gamma Virginis). I was finally able to split Porrima (just barely) for the first time since periastron. At 245x in the refractor, I could see a rod-shaped diffraction disk with the slightest hint of a "dumbbell" shape in the Airy disk. Saturn was fantastic and took magnification well. Cassini's division was razor-thin, steady, and could be followed for about 1/3 of the total ring circumference at 245x. Several moons were tiny and razor-sharp Airy disks, and the banding on the planet's surface was amazing with subtle hues and contrasts. The ring shadow on the planet was obvious and formed a thin black line just adjacent to the ring. The planet's shadow on the ring was suspected, but could not be definitely seen, which is to be expected with Saturn being so near to opposition presently. Unfortunately, from my site, Mars had slipped behind some trees prior to the clouds clearing, so I didn't get a look at its tiny and fading gibbous disk.

I then performed a "mini-Messier marathon" because I could not do the full marathon as I had originally planned for on Friday and Saturday nights (due to the lousy weather here in Estes Park). Because the sky did not clear until 11:30, I missed the early objects and had to start with M93 in Puppis (which was rapidly setting just above the Western horizon). I then got all of the late winter open clusters, moved on through

the Virgo-Coma-Ursa Major galaxies, and through most of the Ophiuchus globulars as they were rising in the East by about 3:00 AM MDT. On a typical Messier marathon, I will then usually nap for about 1.5 to 2 hours at this point, in order to wait for the Scorpius/Sagittarius Messier objects to rise above the Eastern horizon, and then move on to the pre-dawn race for the last few objects when they are just above the horizon. Unfortunately, I had to get up early to go to work today (Monday) and I was getting tired and pretty chilled (frost was building on the scope and the ground, but did not affect the optics) so I ended up calling it a night. The views were fantastic however, so I was really bummed that I had to go to work today.

During my mini-Messier marathon, the open clusters and globulars showed tiny colorful pinpoint stars and I was able to resolve all of the early globulars to at least some extent in my little refractor (tiny little crystalline pinpoints of light smattered across the central globular glow). Galaxies were fantastic and I could see some spiral structure in M51, M101, M99, M61, and M66. M64 showed the "black eye", and M97 showed the dark "owl eyes" with averted vision in the little refractor. I did manage to get through well over half of the Messier catalog in only about 3 hours of observing time, and it was definitely the best observing that I have had since November!!! It sure has been a lousy winter for observing, but I have finally gotten my first real photon "appetizer" in preparation for a real Spring "feast"! Let's hope the skies are clear and steady for a proper Messier marathon at RAC at the end of March (close to the next new moon)!

Here's hoping for some decent skies in the next few weeks.
- Mike Prochoda (Estes Park)

From Barry Carroll

Presentation at the Center for Science, Math & Technology Education, CSU

9 April 2008, 7pm, Seminar Rm# A302, Natural & Environmental Sciences Bldg.

Dr. Eric R. Craine

The Sky's the Limit: Using Astronomical Data and Sensing Methods on Earth

The Global Network of Astronomical Telescopes (GNAT) has undertaken an aggressive sky survey program that is now producing a large stream of unique astronomical imagery. One of our goals is to encourage development and implementation of a variety of educational experiences using GNAT data and programs. We will explore specific projects available across a broad range of scientific education contexts and discuss a variety of tools that can assist in embarking on these voyages of discovery. These opportunities include

environmental monitoring of night sky brightness, exercises in star distributions & discovery and analysis of properties of variable stars. We will review examples of relevant software packages and discuss their utility, including sky brightness monitoring (SkyView), image acquisition and processing (CCDSOFT and MAXIM DL), variable star period analysis (PERANSO) and spectroscopy (VSpec) and discuss "recipes" for implementing simple but powerful astronomical imaging programs on telescopes typical of those already available to many school systems.

Beyond the realm of science education, the sensing and image processing methods used in astronomy have many other applications. We will discuss a few of these, including a new medical application which has the potential to assist in the detection and diagnosis of skin cancer. We welcome collaborators in applying our data and hope to encourage its wide use.

Dr. Eric R. Craine biographical sketch

Dr. Craine earned his Ph.D. in astrophysics at the Ohio State University; he worked in areas of radio astronomy in Algonquin Park Observatory, Canada and later did optical spectroscopy of extragalactic radio sources at Kitt Peak National Observatory (Tucson, Arizona) and Steward Observatory of the University of Arizona. He left the university to assume the Directorship of the Electro-Optical Test Facility for the U.S. Army after which he began an entrepreneurial career by founding and running two technology companies. He is currently President of Western Research Company, Inc. (Tucson, AZ), a Founding Director of the Global Network of Astronomical Telescopes and an Adjunct Faculty in the Physics Department of Colorado State University.

Yuri's Night April 12

Hi, all! Please join us for CU Astronomy Day and Yuri's Night on Sat 12 April! All events are FREE and open to the public!

For Fiske events, please visit:

<http://fiske.colorado.edu/calendar/events/astronomy-day-fiske-sbo>

Sommers-Bausch Observatory (SBO) will also be open from Noon-10:00pm (weather permitting after 7:00pm) for hands-on astronomy. Members of Boulder Astronomy & Space Society (BASS) will bring their own telescopes to the SBO Observing Deck. Events at Trilogy Wine Bar for anyone 21+ begin at 9:00pm with live bands playing.

Note that National Astronomy Day is Sat 10 May (CU Spring Commencement).

Suzanne Metlay
Fiske Planetarium

Pleiades Occultation by the Moon April 8
Watch the approach after 7 pm MDT.

Best Looks

Moon By Pleiades 4/8, by Mars 4/11
By Saturn 4/14, 15 Jupiter 4/27;
Mercury In W at dusk final week
Mars High early evening
Jupiter In S at dawn
Saturn Highest in evening



Moon and Pleiades 2008 April 8 at 2020 MDT

Simulation from Starry Night

Date	Mag	Starts			Max. altitude			Ends		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
1 Apr	0.8	20:36:12	10	NNW	20:37:08	11	N	20:38:03	10	N
3 Apr	0.7	19:44:52	10	NNW	19:45:51	11	NNW	19:46:50	10	N
3 Apr	0.7	21:21:30	10	N	21:21:55	10	N	21:22:05	10	NNE
4 Apr	0.8	21:42:25	10	NNW	21:43:01	12	N	21:43:01	12	N
5 Apr	0.7	20:30:05	10	N	20:30:21	10	N	20:30:38	10	NNE
5 Apr	1.2	22:03:39	10	NNW	22:03:52	11	NNW	22:03:52	11	NNW
6 Apr	0.2	20:50:49	10	NNW	20:52:27	14	NNE	20:53:22	13	NE
7 Apr	-0.6	21:11:54	10	NNW	21:14:07	24	NNE	21:14:07	24	NNE
8 Apr	0.2	19:58:57	10	NNW	20:00:31	14	NNE	20:02:03	10	NE
8 Apr	-0.5	21:33:08	10	NW	21:34:50	31	NW	21:34:50	31	NW
9 Apr	-0.7	20:19:53	10	NNW	20:22:17	23	NNE	20:24:14	13	ENE
9 Apr	0.6	21:54:41	10	WNW	21:55:32	17	WNW	21:55:32	17	WNW
10 Apr	-2.2	20:40:59	10	NW	20:43:48	58	NE	20:44:55	30	E
11 Apr	-1.4	21:02:21	10	WNW	21:05:03	40	SW	21:05:37	35	S
12 Apr	-2.0	19:48:33	10	NW	19:51:22	52	NNE	19:54:08	10	ESE
12 Apr	0.4	21:24:40	10	WSW	21:26:02	13	SW	21:26:19	13	SW
13 Apr	-1.5	20:09:46	10	WNW	20:12:30	45	SW	20:15:13	10	SSE
14 Apr	0.4	20:31:45	10	W	20:33:22	14	SW	20:34:59	10	SSW

<http://www.heavens-above.com/main.aspx?lat=40.4997&lng=-105.05736&loc=Fort+Collins+CO+USA&alt=0&tz=MST>