

San Diego Astronomy Association

Celebrating Over 40 Years of Astronomical Outreach



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A Non-Profit Educational Association
P.O. Box 23215, San Diego, CA 92193-3215

January 2005

SDAA Business Meeting

Next meeting will be held at:
SKF Condition Monitoring
5271 Viewridge Court
San Diego, CA 92123
January 11th at 7:00pm

FIRST
Program Meeting
for 2005!

February 16th 7:00 pm

Mission Trails Regional Park
Visitor and Interpretive Center
1 Father Junipero Serra Trail

The Urban Astronomer

For the new year, a new article "The Urban Astronomer." Unless you live under dark skies, or travel to TDS regularly, then most of your observing, either hour sessions or a quick look is from your backyard, under light polluted skies. The Urban Astronomer is presented to the backyard observer using small to moderate size scopes. My skies are in southeast San Diego County, where you can almost read your star charts without a flashlight, and the limiting magnitude is 3.0 to 3.5 at the zenith under very good conditions.

Using mostly standard supplied accessories, non-computerized mount, and a little star hopping, urban astronomy can become an enjoyable experience. So with a little practice, and a modest size scope, or large aperture binoculars you too can enjoy the treasure of the night sky even in the urban setting. I'm using a Celestron 4", f10, achromatic refractor, on a CG-4, RA driven mount and budget plössl eyepieces. This is augmented with a pair of 12x50 Bushnell binoculars. My guide is the monthly Sky and Telescope pullout and an Orion 600 Sky Map. For the most part, the objects observed are the same objects appearing on the

Urban continued on page 5

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Banquet News!

By Scott Baker

Don't miss this!

The SDAA Annual Banquet is scheduled for the 22nd of January at the Town and Country Hotel, Royal Palm Ballroom. The invitations are out, so don't forget to sign up either by mail or on-line at the SDAA.ORG web page. The deadline for reservations is the 17th of January and tickets will NOT be available at the door, so get those reservations in now. See the club web page for more details.

Address Change?

Submit your new information to: treasurer@sdaa.org to ensure you don't miss out on SDAA news. If you ordered a magazine subscription through the club, you will still need to notify the magazine as well (see each magazine for change of address instructions).



San Diego Astronomy Association

Astronomy 101

By Scott Baker

Lepus – The Hare

This month's constellation is Lepus, a small, ancient constellation, overshadowed by the beautiful Orion, above it. Lepus has been seen as a hare by many ancient civilizations, often seeing it as the game that Orion, the hunter, and his dogs Canis Major and Canis Minor are hunting. But, as usual, the Greeks have another tale to tell.

It seems that the people of the Greek island of Leros, needed a little food and something to do on Sundays, since football hadn't been invented yet. So they imported a pregnant hare, not indigenous to the island, for sport and food. But as it happens with rabbits, the island quickly became overrun with them. The infestation was greater than anyone had ever seen, and the people themselves became endangered for the rabbits were eating everything. The gods intervened and exterminated all the rabbits, and placed Lepus, the rabbit, in the heavens as a reminder to all men, not to fool with Mother Nature.

Another tale has the legend of the Easter Bunny originating from the constellation Lepus. Seems there was once a bird, that the Anglo-Saxon Goddess of Spring, Ostara, changed into a rabbit. The altered creature lost its ability to fly, but Ostara, feeling compassion for it, gave it great speed. Ever after, once a year, Ostara allowed the hare to lay eggs, which is why we hunt for Easter Bunny Eggs.

For the amateur astronomer, Lepus holds a good smattering of objects for both small and large aperture scopes.

The four brighter stars of the constellation form an easily recognizable trapezoid, anchored by Arneb, Alpha Leporis. The Arabic name for Arneb is Al-Arnab, "The Hare". Arneb is a 2nd magnitude triple star system, with very faint companions, about 10 degrees due south of Rigel. The first companion is an 11.2 magnitude star, 31 arc seconds away and the second companion is an 11.9 magnitude, star 91 arc seconds distant.

Another nice double is gamma Leporis. This pair of yellow and red stars, at 4th mag and 6th mag, respectively, have an easy 95 arc second of separation. It's an attractive pair for binoculars.

Our last multiple star is Herschel 3752, a nice triple star system visible in small telescopes.

R Leporis is a long-period variable of a deep red color (spectral type C6IIe; brightness 7.71 mag average). It is also known as Hind's Crimson Star. The brightness varies from 6th mag to 10th mag about every 430 days.

For the open cluster fan, take a peek at NGC 2017. It's a bit small for the name "star cluster", binoculars and small telescopes reveal five stars building, a multiple star system. The brightness of the stars range from 6th mag to 10th mag. Two of the stars are close binaries, but to split the components a telescope with an aperture of at least 150 mm is needed. So the total number of stars of this group is seven.

For the globular cluster fan, we have only one in Lepus, M79. This globular cluster is quite compact and a good object for small telescopes and fairly bright at 8.7 magnitude. M79 was discovered by Messier's associate Méchain in 1780. M79 lies about 50,000

light years distant from Earth, but over 60,000 ly from the galactic center. With a low power eyepiece, look for Herschel 3752, in the same field of view.

For our planetary aficionados, Lepus has only two to offer, IC 418 and PLN 215-30.1. IC 418 is sometimes called the "Red Nebula" or the "Raspberry Nebula" but it's more famous as the "Spirograph Nebula" after its famous picture taken by the HST. This is one of the few nebulas where people actually report seeing a color other than blue or green. Some say it's red, others report a light pink. What do you see? PLN 215-30.1, a very faint and diffuse 13.2 magnitude planetary located just South of Hind's Crimson Star, above.

For the really faint fuzzy fan, Lepus is chock full of galaxies ranging in magnitudes from 13th to well past 20. If you have the glass, then take a shot at Abell 548, a rich galaxy cluster, 650 Million light years away. Full of 13th, 14th and WAY beyond magnitude galaxies, a large aperture will reveal a rich field of galaxies at your widest field of view.

Get out your warm clothes and check out the wonders of Lepus!

Astro 101 continued on page 3

2005 Desert Sunset Star Party

Pat and Arleen Heimann will again be hosting the Desert Sunset Star Party May 4-8, 2005, at the Caballo Loco RV Ranch southwest of Tucson. Caballo Loco is located east of Kitt Peak and nestled against the Sierrita Mountains. Whipple Observatory on Mt Hopkins is located to the east. Lots to do during the day and great skies at night. There will be speakers and door prizes on Friday and Saturday evenings. Check our website for details: <http://www.chartmarker.com/sunset.htm>



San Diego Astronomy Association

Object name: Arneb
 Magnitude: 2.6
 Equatorial 2000: RA: 05h 32m 44s Dec: -17°49'20"
 Object type: Double Star
 Spectral: F01b
 WDS ID: HJ 3766
 Flamsteed-Bayer: 11-Alpha Leporis
 Components: AB
 Separation (first): 35.7
 Separation (last): 36.2
 Position angle 1: 156
 Position angle 2: 157

Object name: Gamma Leporis
 Magnitude: 3.6
 Equatorial 2000: RA: 05h 44m 28s Dec: -22°26'51"
 Size: 16.2 x -10.5
 Object type: Double Star
 Spectral: F6V K2V
 Source catalog: WDS (Washington

Position angle 1: 349
 Position angle 2: 350
 Spectral: F6V K2V
 Object name: Herschel 3752
 Magnitude: 5.4
 Equatorial 2000: RA: 05h 21m 46s Dec: -24°46'23"
 Size: 0.6 x -11.0
 Object type: Double Star
 Spectral: G0
 WDS ID: HJ 3752
 Components: AB
 Separation (first): 4.0
 Separation (last): 3.5
 Position angle 1: 100
 Position angle 2: 93
 Spectral: G0

Object name: Hind's Crimson Star
 Other ID: HIP 23203
 Magnitude: 8.08
 Equatorial 2000: RA: 04h 59m 36.351s

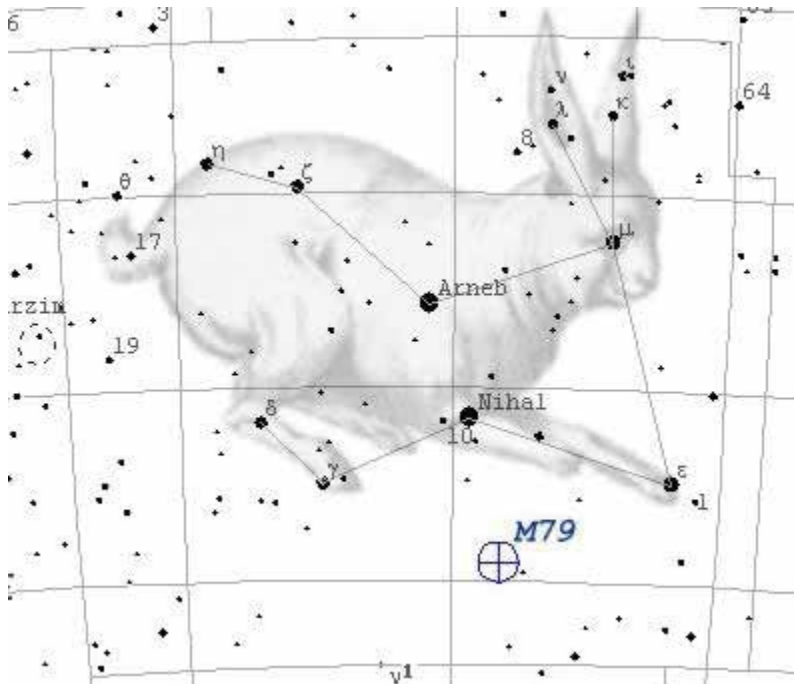
Object name: NGC 2017
 Magnitude: 30.0
 Equatorial 2000: RA: 05h 39m 16s Dec: -17°50'59"
 Size: 4.0 x 4.0
 Dreyer description : Cluster of bright stars.

Object name: M79
 Other ID: NGC1904
 Magnitude: 7.7
 Equatorial 2000: RA: 05h 24m 11s Dec: -24°31'25"
 Size: 9.6 x 9.6
 Dreyer description : Globular cluster, pretty large, extremely rich in stars, extremely compressed, well resolved.

Object name: IC 418
 Magnitude: 9.3
 Equatorial 2000: RA: 05h 27m 28s Dec: -12°41'48"
 Size: 0.2 x 0.2
 Object type: Planetary Nebula
 Dreyer description : Planetary nebula = 9.2th magnitude star (gaseous south-west).

Object name: PLN 215-30.1
 Magnitude: 13.2
 Equatorial 2000: RA: 05h 03m 10s Dec: -15°35'49"
 Size: 12.8 x 12.8
 Object type: Planetary Nebula
 Source catalog: PLN (Planetary Nebulae)
 Common name: 215-30.1

Object name: Abell 548
 Magnitude: 13.7
 Equatorial 2000: RA: 05h 47m 06s Dec: -25°38'00"
 Size: 144.0 x 144.0
 Object type: Cluster of Galaxies
 Source catalog: Saguaro Astronomy Club Database
 Type: Abell 548



Double Star Catalog)
 WDS ID: H 6 40
 Components: AB
 Separation (first): 93.8
 Separation (last): 97.0

Dec: -14°48'22.530"
 Alternate names: HIP 23203 SAO 150058 GSC 5329:366
 Object type: Star
 Spectral: C7,6e



San Diego Astronomy Association

SkyWatch for January, 2005

John Mood



[Times PST]

[* = 1 star = EZ] [** = 2 stars = Moderate] [*** = 3 stars = Difficult]

Sat., 1 Jan. 2005 — 12:00 a.m. HAPPY NEW YEAR!!!!

— PUBLIC STAR PARTY @ Tierra del Sol.

— MOON 0.4 degree from JUPITER @ 6:00 p.m. {see below}.

Fri., 7 Jan. — COMET MACHHOLZ nestles by the PLEIADES tonight {see below}.

Sat., 8 Jan. — "New Moon Night!"

Mon., 10 Jan. — NEW MOON, 4:03 a.m.

Tues., 25 Jan. — FULL MOON, 2:32 a.m.

Sat., 29 Jan. — PUBLIC STAR PARTY @ Tierra del Sol.

Mon., 31 Jan. — MOON 0.9 degree from JUPITER @ 3:00 a.m. {see below}.

Sat., 5 Feb. — PUBLIC STAR PARTY @ Tierra del Sol.

EVENING PLANETS:

Pale bluish NEPTUNE [**] in Capricornus the Goat & pale greenish URANUS [* 1/2] in Aquarius the Water Carrier are now visible high in the sky. They require telescopes to resolve their discs, but you sharp-eyed younger viewers can spot Uranus naked eye if you have a good finder chart. {I used to be able to myself!} Spectacular SATURN [*] in Gemini the Twins rises in the east at sunset & is at its best for the entire year around midnight this month.

BONUS!!! – As predicted, COMET C/2004 Q2 (Machholz) is putting on quite a show as it crosses Taurus the Bull into Perseus, getting even bright enough for naked eye observing. On the 7th, it will lie right next to the Pleiades {see above}.

MORNING PLANETS:

Gigantic JUPITER [*] is in Virgo the Virgin, with the MOON flirting with it on the 3rd & the 31st {see above}. MARS [*] passes from Libra the Scales into Ophiuchus the Serpent Bearer. MERCURY [* 1/2] & VENUS [*] are virtually hand in hand, less than a degree apart, as they cross Sagittarius the Archer the 1st week or so of the month before disappearing into the morning sun's glare. This means the 5 naked eye planets are still simultaneously visible for a while, tho' you may need binocs to spot Venus & especially Mercury during these final days of this amazing gathering.

{ N.B. Because of the recent discovery of 2 relatively large trans-Neptunian objects, many professional astronomers no longer consider Pluto a planet. I'll go along with them! }

BEGINNING OBSERVERS – "How to Become an Experienced Observer, Part 1"

It may seem odd to the beginner, but one must learn how to star gaze, or at least how to get the most out of one's viewing. It takes preparation, & it takes practice. Also, there are a number of "tricks" one can learn to enable one to see dimmer objects & more detail in them.

1st, you have to be rested. If you're tired, or cold, or hungry, or stuffed, or drunk (!), or have a headache, or a backache, or whatever, you simply will not be able to view as well.

2nd, you must be comfortable. Determine for yourself your particular preferences – gazing while seated or standing, with or without your glasses, with or without an eyepatch. (I know, I know, REAL astronomers don't use 'em, but I've always found it easier myself to view while wearing one.)

More next month.....

TIERRA DEL SOL

LAT = 32° 36' 48" N (± 0.1"), LONG = 116° 19' 55" W (± 0.1"), ELEV = 3710'

(± 5'), at the bathroom, as determined from USGS 7.5 min 1/24000 map. (See my essay on GPS at www.sdaa.org.)

Send comments & questions to me by phone (619/225-9639), USPS (4538 Long Branch Av., San Diego, CA 2107)

or my e-mail address (1happyalien@cox.net).

¡HAPPY VIEWING!



San Diego Astronomy Association

Urban Continued from page 1

Astronomical league's Urban and Double Star Clubs observing lists. So enough introductions, on with observing.

As the weather cools, the great winter constellations creep through the glair in the east, as Autumn skies begins to fade in the west, here in Cygnus, is where we start the tour of backyard skies. Cygnus, the Swan, is home to three excellent double stars for small scopes. First and easiest, is Beta Cygni, or Albireo, the lead star at the head of the Swan. Albireo is a showpiece double. Cleanly split at 67x, the pair's moderate separation and brilliant yellow and blue color is easily revealed. Next, we travel down the body of the Swan to Cygnus' brightest star, Deneb. Located along the five o'clock position and about 5 to 6 degrees distance (measured three fingers width from your extended arm) as you face Deneb is a very faint, 3rd magnitude Omicron Cygni, also known as 31 Cygni. Although not as easily located as Albireo, you'll have very little difficulty in finding its location. At 67x, 31 Cygni is widely separated yellow and bluish pair, about three times the separation as Albireo. 31 Cygni can also be easily split with binoculars if you don't have a scope. Our final double in Cygnus is 61 Cygni. At 5th magnitude, this will be much more of a challenge than 31 Cygni. Return to Deneb, as you face the star; proceed along the 10 o'clock position at 10 degrees (a full fist). Using two 3rd magnitude stars on the trailing edge of the Swans wing as a guide, I centered my 6x30 finder nearest the westerly most star. 61 Cygni should be two very small stars spilt within the finder's field of view. These two small orange stars are very nicely split at 67x, and appear with slightly less separation than Albireo.

Leaving the double stars of Cygnus. We travel south across the celestial sky to the Winged Horse, Pegasus, in search of the Globular Cluster, M-15. Our starting point is Epsilon Pegasi, or Enif, a 2nd magnitude orange double star located at the nose of the horse. At 6th magnitude, M-15 will be a real challenge for my 6x30 finder. After several unsuccessful attempts with the finder, I switched to the 50mm binoculars. With these, M-15 is discernable, as a small fuzzy patch located at the three o'clock position 4 to 5 degrees from Enif, not quite midway to Delphinus. Moving the main tube to the location, the finder reveals Gamma Equule, a 4.7 magnitude double in Equuleus, The Little Horse. From that double, proceed 2-3 degrees north, which just removes Gamma Equulei from the finder's field of view. Using a 32mm plössl at 31x, M-15 is revealed, but is only slightly brighter than the background stars. Centering M-15 and increasing the magnification to 67x, then 111x reveals a small compact cluster with relatively bright core, with surrounding glow, but no individual stars surrounding the core are visible.

These are just some to the many objects, which can be seen from your backyard. So if you can't make it to TDS, drag out the scope anyway.

The Urban Astronomer

Treasurer's Report by Michael Finch

With the addition of our new members we now have a total of 590 SDAA members. We have several new members last month. Please welcome Frederick Besancon, Maria, Jordan, & Juliana Godwin, John Hall Jr, Jake Schaffner, Charles Shader, Renee Shaules, Jamie Smith, and Michael Vergara. Welcome to SDAA and may you enjoy clear dark skies!

Reminder to our private pad owners: The renewal date for your pad lease coincides with your membership renewal. Please ensure you pad fee is paid when paying your membership renewal.

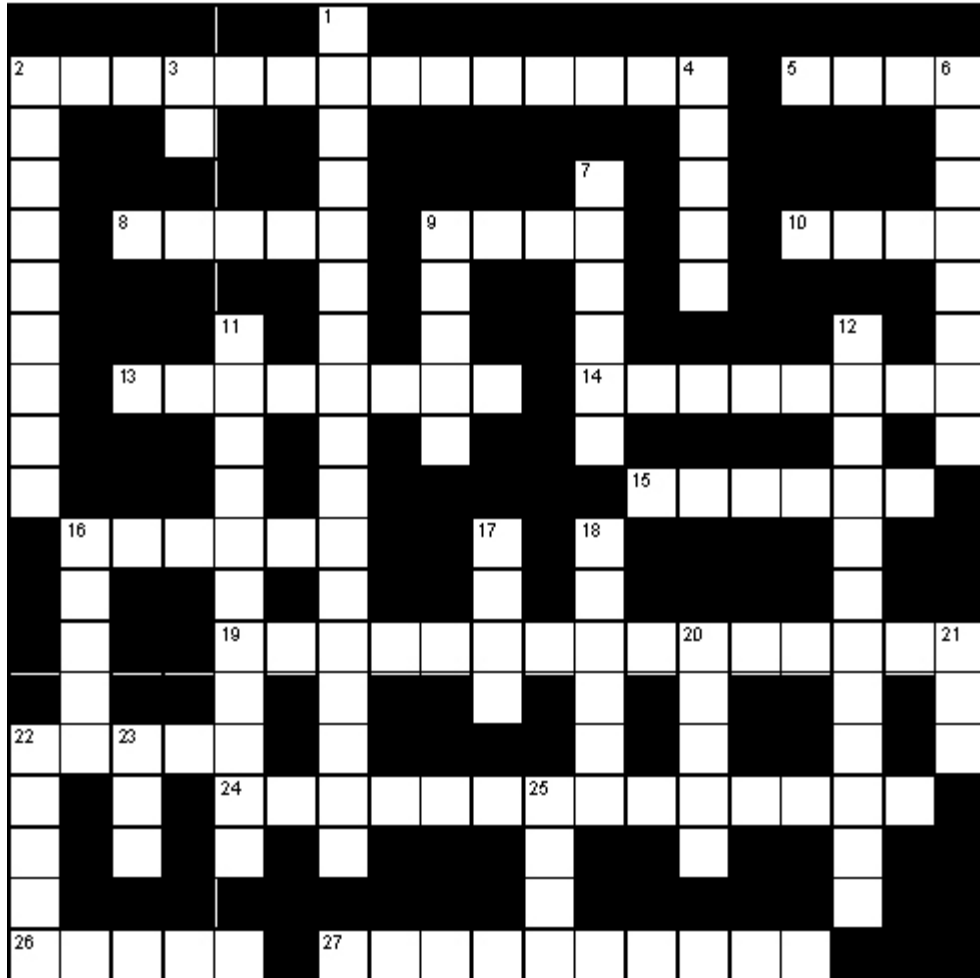
Do you have questions about SDAA membership? Has your address changed? Please contact me at treasurer@sdaa.org. Thank you.

Second Site Fund balance: \$7,710.79

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Scott Baker
Mike Finch
John Mood
Patrick Barry



San Diego Astronomy Association



Answers will be in next months newsletter.



San Diego Astronomy Association

Astronomy Crossword

by Scott Baker
Puzzle #001

Across

2. No eyepieces required.
5. Twinkle Twinkle
8. Evening Star.
9. What you get with cheap eyepieces.
10. God of war.
13. Subaru?
14. Sunburned Snow White companion?
15. Many are Messier objects.
16. In Jupiter orbit.
19. Apogee?
22. In or out of...
24. Listening?
26. Round and round.
27. Endust can't handle this.

Down

1. Declination.
2. See 10 Across.
3. See 16 Across.
4. Point of reference?
6. Slow down! I'm changing color.
7. Lord of the rings?
9. Dusty snowball?
11. Out to Pluto.
12. Shows up every 76 years.
16. The blue planet.
17. 384,000 Kilometers away.
18. Most stars of at least one.
20. The hunter.
21. Closest star.
22. Tombaugh's discovery.
23. Acronym for a busy core.
25. Anyone out there?

Astrophotographers

Have you taken any great shots lately. In addition to posting them on the web site, submit them for the newsletter. We are always glad to showcase the clubs talents. Send them to:
newsletter@sdaa.org



San Diego Astronomy Association

SDAA ASTRO IMAGING SPECIAL INTEREST GROUP



M42, M43, NGC1977
Orion Nebula
Imager: [Randy Marsden](#)

Object Information:

Since I started CCD imaging, one of my most desired targets was the Orion nebula. It has always been a challenge because of the wide range of brightness which makes it very difficult to capture the Trapezium and the much fainter outer regions. I tried it again this year, taking 60 one minute exposures which I could add or average to try to get the best result. In the end I used a masking technique: this layered a median combine which captures the Trapezium nicely on top of an addition of all 60 exposures which captures the faint regions. Finally I have a result showing both the bright and faint regions in one image. Now that I understand the technique, I will need to do much longer exposures to capture the faint parts and slightly longer exposures to capture more detail in the Trapezium.

Imaged at: San Diego, my backyard
Equipment Optics - Tamron LD-IF 300mm
Mount LX-200
Camera SBIG ST-8XE

Exposure Information: 60 x 1 min

Camera Control Software: CCDSoft, Sigma, Iris, Paintshop Pro

Image Processing Software: Acquisition in CCDSoft, aligned in CCDSoft, median combine in Sigma, add combine in CCDSoft. DDP in Iris on median combine, Log stretch in Iris on added combine, Paintshop Pro used to mask combine median layer and added layer.

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San Diego Astronomy Association

Antennas, Designed by Darwin

by Patrick L. Barry

Who in their right mind would design this bizarre-looking antenna? Actually, nobody did. It evolved. Taking a cue from nature, NASA engineers used a kind of “artificial evolution” to find this design. The result may look odd, but it works very well.

“The evolutionary process improves the design of antennas, just as evolution in nature leads to fitter plants and animals,” says Jason Lohn, leader of the Evolvable Systems Group at NASA’s Ames Research Center.

The improvement comes from Darwin’s idea of natural selection: only the fittest members of a generation survive to produce offspring. Over many generations, traits that hinder survival are

weeded out, while beneficial traits become more common. “In the end,” he says, “you have the design equivalent of a shark, honed over countless generations to be well adapted to its environment and tasks.”

Evolutionary computation, as it’s called, applies this principle to hardware design. It’s particularly useful for tackling problems that are difficult to solve by hand—like the design of new antennas.

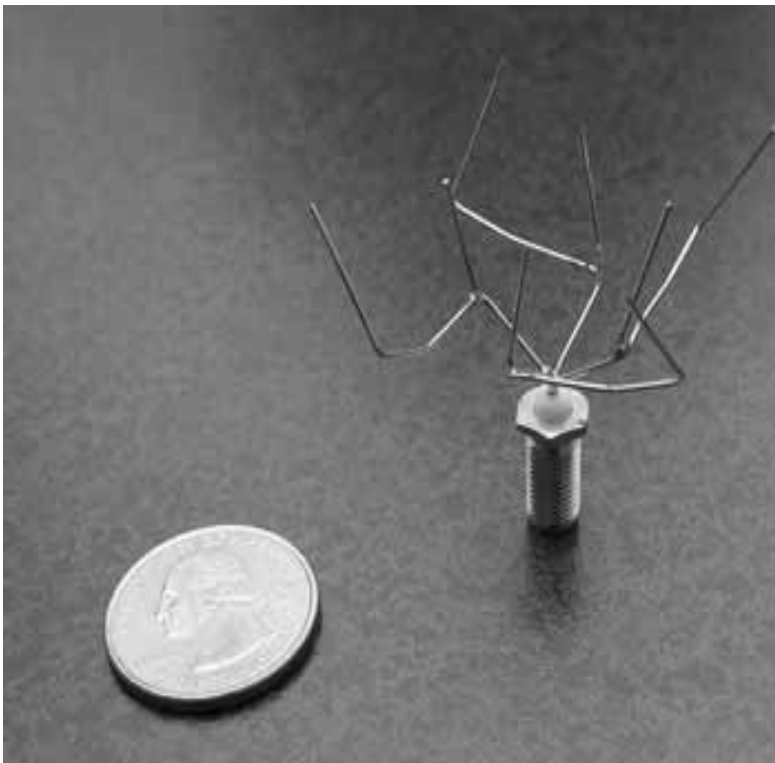
Designing a new antenna for NASA’s Space Technology 5 (ST-5) mission was the challenge facing Lohn’s group. ST-5 will explore how TV-sized “nano-satellites” can perform the tasks of much larger, conventional satellites at a cheaper cost. Antennas on these satellites must be smaller than usual, yet capable of doing everything that a bigger antenna can do.

The evolution of this bizarre-looking antenna happened inside a computer. Many random designs were tested in a computer simulation. The computer judged their performance against certain goals for the design: efficiency, a narrow or wide broadcast angle, frequency range, and so on.

As in nature, only the best performers were kept, and these served as parents of a new generation. To make the new generation, the traits of the best designs were randomly mixed by the computer to produce fresh, new designs—just as a father and mother’s genes are mixed to make unique children. This new generation was again tested in the computer simulation, and the best designs became the parents of yet another generation. This process was repeated thousands, millions of times, until it settled onto an optimal, shark-like design that wouldn’t improve any further. With today’s fast computers, millions of generations can be simulated in only a day or so. The result: an excellent antenna with an odd shape no human would, or could, design.

For more about artificial evolution, see ic.arc.nasa.gov/story.php?sid=86&sec. For more about Space Technology 5, see nmp.nasa.gov/st5. For an animation that helps explain to kids how ST5’s antenna sends pictures through space, go to spaceplace.nasa.gov/en/kids/st5xband/st5xband.shtml.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



Next generation antenna.

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Classifieds



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