SearchLites

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The Quarterly Newsletter of The SETI League, Inc.

Offices:
433 Liberty Street
PO Box 555
Little Ferry NJ
07643 USA

Phone:
(201) 641-1770
Facsimile:
(201) 641-1771
Email:
info@setileague.org
Web:
www.setileague.org

SearchLites, ISSN 1096-5599, is the Quarterly Newsletter of **The SETI League, Inc**., a membership-supported, non-profit [501(c)(3)], educational and scientific corporation, dedicated to the electromagnetic Search for Extra-Terrestrial Intelligence. SETI League, Dr. SETI, and the above logo are all registered service marks of The SETI League, Inc.

SETI League Presents Annual Awards

For more information contact: Dr. H. Paul Shuch, Executive Director Emeritus
(201) 641-1770, or email info@setileague.org

Little Ferry NJ.., 23 April 2006 -- At its Annual Meeting this afternoon at its New Jersey headquarters, the nonprofit SETI League, leaders in a global search for extra-terrestrial intelligence, recognized two individuals for major contributions to the art and science of SETI. Honored this year were retired engineer Tom Sanders of Washington State, and Canadian internet security guru Marcus Leech.

Tom Sanders, a respected amateur radio operator (callsign W6QJI) and SETI League Charter Member, was selected to receive The SETI League's annual Orville Greene Service Award. Sanders has been an active contributor to SETI League technical activities since the group's founding. He served for a decade as The SETI League's volunteer Regional Coordinator for the US Northwest Region, participated actively on the organization's various technical email discussion lists, and organized and coordinated a popular annual Ham Radio QSO Party for those SETI League members who happen to be licensed radio amateurs.

The SETI League recognized Marcus Leech VE3MDL, with its annual Giordano Bruno Memorial Award, for his significant technical contributions to SETI science. Leech, who has contributed significant signal analysis software to the public domain through the GNURadio project, is an active participant in The SETI League's Project ARGUS all-sky survey, with his innovative small radio telescope in Ontario, Canada. An internet security expert in his working persona, Leech has conducted a thorough analysis of the SETI Hacker hypothesis, which holds that malevolent signals from space might somehow damage Earth's computer networks. His analysis suggests that the risk, though minimal, is indeed non-zero, and should be considered in our experimental design.

As neither Leech nor Sanders was present at SETI League headquarters today, both were informed of their awards during the meeting, by telephone calls from the SETI League's Executive Director Emeritus.

In other actions at today's meeting, the Trustees of The SETI League, Inc. adopted a 2006 budget, accepted the Executive Director's annual report, re-elected its officers (Richard Factor, WA2IKL, President; A. Heather Wood, Secretary/Treasurer) for an additional one-year term, modified its bylaws to reflect their earlier action elevating Executive Director H. Paul Shuch, N6TX, to Emeritus status, and approved cost sharing of the Executive Director Emeritus' health insurance premiums.

Largely using radio telescopes and optical telescopes, SETI scientists seek to determine whether humankind is alone in the universe. Since Congress terminated NASA's SETI funding in 1993, The SETI League and other scientific groups have privatized the research. Amateur and professional scientists interested in participating in the search for intelligent alien life, and citizens wishing to help support it, should email join@setileague.org, check the SETI League Web site at http://www.setileague.org/, send a fax to +1 (201) 641-1771, or contact The SETI League, Inc. membership hotline at +1 (800) TAU-SETI. Be sure to provide us with a postal address to which we will mail further information. The SETI League, Inc. is a membership-supported, non-profit [501(c)(3)], educational and scientific corporation dedicated to the scientific Search for Extra-Terrestrial Intelligence.

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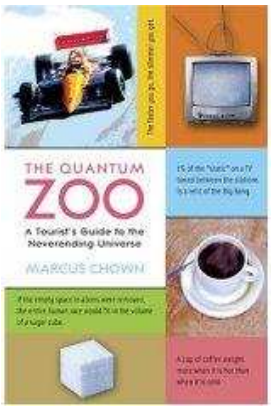
Book Review:

The Quantum Zoo: A Tourist's Guide to the Neverending

Joseph Henry Press, ISBN 0-309-09622-7, $24.95 US



After reading countless books claiming to explain quantum theory and relativity to "dummies" - and ending up baffled! - Marcus thought "There's got to be a better way". As Einstein said: "Most of the fundamental ideas of science are essentially simple and may, as a rule, be expressed in a language comprehensible to everyone." Marcus was convinced he was right - so he wrote this book. Learn how the entire human race could fit in the volume of a sugar cube; how every breath you take contains an atom breathed out by Marilyn Monroe; how 1% of the static on a TV tuned between the stations is from the big bang...

PRAISE FOR THE QUANTUM ZOO...

"An entertaining little gem that leads the reader through many of the wonders of twentieth century physics with a light and sometimes quirky touch that I thoroughly enjoyed. It is so full of little insights and neat analogies that I found myself folding over the top corners of countless pages containing quotable passages. What is remarkable is the number of new ways Marcus Chown has found to explain difficult and often abstract concepts.This is what good popular science writing is all about."

Jim Al-Khalili, University of Surrey (Nature, 13 April 2006)

"Marcus Chown rocks! Quantum theory and relativity normally evoke a shudder of fear in the mind of the Man in the Street. 'Isn't this way to difficult for me to understand?' Well, no more! In this elegantly written book, Marcus Chown takes you to the heart of the most challenging concepts known to man and makes you feel that understanding is truly within your grasp."

Brian May (Guitarist "Queen" and astrophysicist)

"Chown admirably takes on the task of elucidating two of the most commonsense-defying concepts in modern science: quantum mechanics and relativity. He divulges the mysteries hidden in the very building blocks of matter, piques reader curiosity with every question and then satisfies it using language that is light, companionable and full of wonder. From why tables are solid when atoms contain lots of empty space, to the fact that gravity isn't a real force and you age faster the higher up you are, Chown touches on the intriguing consequences of quantum mechanics and relativity. The success of any popular science book about these unfathomable realities hinges upon the deployment of metaphor and imagery; in this, the author stands out. Readers who want to know what the big deal is about quantum mechanics but want to avoid more nitty-gritty examples (such as black body radiation) will find a clear window into the utter strangeness that defines our universe."

Publishers Weekly, 9 January 2006

"You age faster at the top of a skyscraper than you do on the ground floor. Marcus Chown uses startling facts to illustrate the strange consequences of Einstein's general theory of relativity. Popular books on quantum theory and relativity are plentiful, so it is a welcome relief to find a fresh approach. Each chapter begins with a short vignette that highlights how bizarre the key ideas in modern physics are and then describes them in a non-technical way. An entertaining romp for those who want to get to grips with physics, yet struggle with standard explanations."

New Scientist, 25 March 2006 ❖

Minutes of the Twelfth SETI League Annual Membership Meeting

Sunday, 23 April 2006, Little Ferry NJ

Call to Order

The meeting was convened at 1306 hours EDT, in the Library at SETI League Headquarters, Little Ferry NJ, by Executive Director Emeritus Dr. H. Paul Shuch. Five SETI League members in good standing present. Our Bylaws requiring one percent of the current membership to be in attendance for the conduct of SETI League business, the above represents a quorum.

Minutes of 2005 Membership Meeting

The Minutes of the 2005 Membership Meeting having been previously posted to The SETI League's World Wide Web site, a motion was passed to accept the minutes as published.

Treasurer's Report

Presented jointy by the Executive Director and the Secretary/Treasurer, covering the calendar year 2005 (unaudited).

1. Revenues: Dues and Contributions $24914, Interest Income $117, Other $1,130, Total $26,161.
2. Expenses: Educational/Scientific Programs $13,919, Management/General $5,637, Fundraising $5,209, Total $24,765.
3. Revenues minus Expenses: $1,396.
4. End of 2005, SETI League account balances equalled $8,562. End of 2004 balance was $7,166.
5. Current balance (cash on hand and owed) is approximately $9,000.
6. 2006 Budget: Projected Revenues $25,150, Program Expenses $15,000, Management/General Expenses $5,000, Fundraising Expenses $5,000, Projected Excess $150, Projected Ending Balance $8,712.
7. This report was accepted by those present.

Executive Director's Report

The Executive Director's annual report of Program Service Accomplishments having been previously posted to The SETI League's World Wide Web site, a motion was passed to accept the report as published.

Committee Reports

EME Committee

Report delivered by Richard Factor in the absense of chairman Dr. Allen Katz: Our moonbounce beacon is now functional and much more reliable. It has been running since 3/3/06 with no glitches of hardware or software. The monitoring software is still under test. The new beacon has a 2 dB stronger signal. New antennas are in the pipeline. These will add an additional 3 dB or more to the signal strength. We may add a second exciter (synthesizer and IQ modulator; can send JT-65).

Old Business

1. **Audits**
   Heather Wood reported that the IRS audited our 2003 return, found no errors, but made a few recommendations. Our Workmens' Compensation Insurance audit resulted in a refund of approximately $400, since we have had no employees since 15 August 2005.
2. **Accountant's report**
   Delivered by the Executive Director.

New Business

1. The proposed 2006 budget is income $25,000, expenditure $25,000. Motion to adopt the new budget was passed. Motion to adopt the annual report was passed.
2. The next Annual Meeting will be held at the same venue. A date of Sunday 29 April 2007 was tentatively suggested. The meeting will be at 1300 hours EDT, to be followed immediately by the Board of Trustees meeting.
3. Via telephone, the Orville N. Greene Service Award was presented to Tom Sanders, and the Giordano Bruno Award to Marcus Leech. The Greene plaque will be mailed to Mr. Sanders. The Bruno plaque will be presented to Mr. Leech in person at the SARA conference.

Good and Welfare

1. A mid-year renewal letter will be sent in May to lapsed members (Heather will sort the database to see how many per year).
2. Once the new moonbounce beacon antennas are installed and tested, a notice will be sent to radio observatories worldwide.

Adjournment

The Annual Membership Meeting was adjourned by the Executive Director at 1340 hours EDT on 23 April 2006. The annual Board of Trustees meeting occurred immediately afterward. All members in good standing were invited to attend. ❖

Ask Dr. SETI

Dear Dr. SETI:

Why does SETI use radio signals instead of light signals to search/communicate? To me, light is the most obvious source for navigation, communication, and other purposes. Does our species have different sciences from the extraterrestrials?

Mark B., via email

The Doctor Responds:

That is an excellent question, Mark. Before I answer it directly, let's clarify some terminology.

When you say "light" you probably mean visible light, electromagnetic radiation at wavelengths to which our human eyes are sensitive. But, to the physicist, "light" includes *all* electromagnetic waves (since they all travel at the same speed, and follow the same laws of nature). **Most** such "light" is invisible to our human eyes. We see only a very narrow sliver of the spectrum, extending from red to violet (in terms of wavelength, that's 750 to 400 nm; expressed as frequencies, we see 400 to 750 THz). Of course, we have no way of knowing the range to which alien eyes are adapted, if indeed they have eyes at all.

A number of different types of electromagnetic radiation are included in the category of light to which our human eyes are not sensitive. Radio waves, microwaves, X-rays, gamma rays, infra-red and ultra-violet rays are all light that is "invisible" to our eyes (but not to our instruments). And all can travel through interstellar space.

So, which is best for the SETI enterprise? Those "colors" of light that technology can generate at high power levels, which travel relatively unimpeded through the interstellar medium (and through planetary atmospheres), and for which little or no natural interference exists. A difficult but vital task for SETI scientists is to select the regions of the electromagnetic spectrum in which to concentrate their efforts.

"Searching for Interstellar Communications" was the very first modern SETI article, published in Nature magazine in 1959. In it, Professors Phil Morrison and Giuseppi Cocconi contemplated that very question. Their research at the time was focused on gamma rays, so that's where they started. The two scholars quickly realized that another form of light, in the microwave part of the radio spectrum, was much more likely to succeed. We on Earth could already generate prodigious amounts of microwave radiation. We already had very sensitive microwave receivers (our early radio telescopes). The sky was quiet at these frequencies. And we were already studying the Universe in the microwaves, in search of natural astrophysical phenomena, so it made sense to search the same space for artificial signals as well. We still do much of our SETI research in the part of the invisible light spectrum that Cocconi and Morrison suggested.

But, we don't stop there. Today, we have technology to generate visible and infra-red light at very high power levels indeed (using lasers, something that hadn't even been invented yet when SETI science was born). And, we have sensitive receivers for detecting laser flashes. So, we now practice opti-

cal SETI, looking for what you call "light." In other words, we are following your worthy suggestion!

Are there other kinds of "light" we should be exploiting in the SETI enterprise, perhaps as yet undiscovered on Earth? Probably. Prof. Morrison used to talk about "zeta waves," mysterious communications media that we have not yet discovered on Earth, but that extraterrestrial species exploit. You can be sure that, once we discover them, we will certainly start conducting zeta wave SETI! Until then, we use what we have.

Dear Dr. SETI:

Can you tell me how parabolic dish antennas work?

ES (California)

The Doctor Responds:

They work pretty well, actually.

OK, I'll get serious. First, imagine a naked flashlight bulb, burning in space, sending out its light into the black void. Its beam pattern is isotropic; omnidirectional. It radiates equally poorly in all directions. You can see its illumination from across a darkened room, but you can't read by it. It throws too little light upon the page.

But a practical flashlight contains more than a naked bulb. It also has a reflector behind the bulb: a parabolic mirror to direct the beam of light. Behind the mirror, it is dark. Off to the sides, it is dark. But all the bulb's radiation has to go somewhere. Where it goes is out, in the direction that the mirror focuses it. Instead of a dim glow in all directions, the flashlight gives us a bright spot, aimed just one way. You can read by that beam, because it concentrates otherwise wasted energy in a desired direction. That's how parabolic mirrors focus energy.

We're talking here about transmitting, but mirrors work equally well in both directions, so you can also use them to receive. Imagine your eye trying to collect dim light from a distant fire. You can just barely perceive the flicker. Now, face away from the fire. In front of you, place a large parabolic mirror, facing back toward you, and toward the dim glow of the fire behind you. Looking into the mirror, you see bright light. That's because the large mirror intercepts far more photons (massless particles of pure light energy) than your small eye can. And it focuses all those photons to a single spot. If you put your eye at that spot (the mirror's focal point), you can gather up all those photons, and see not a flicker but a blaze. This is exactly how Newtonian optical telescopes work.

So much for flashlights and optical telescopes. Now, how about radio telescopes? Same thing, except they "look" not at visible photons, but at radio photons, particles of invisible light perhaps 100,000 times bigger than the ones your eyes can see. So, to work as well with radio waves as your flashlight does with light waves, the parabolic mirror has to be that much bigger than the one in your flashlight. If it is large enough, a radio parabolic antenna will turn a flicker into a flame, one bright enough to be seen by your radio eye (a microwave receiver), clear across the cosmos.

Without a parabolic reflector, the best microwave receiver can't see very far, because it gathers few photons, and any distant signal burns too dimly. But put your microwave receiver at the focal point of a large parabolic mirror, and suddenly the photons you gather are magnified a million-fold, and a weak echo becomes a roar.

You do the same thing with sound. Across a crowded room, two people are conversing. You'd like to listen in, but their sound waves are not strong enough to vibrate your eardrum, or to stimulate your hammer, anvil, and stirrup. So, you cup your hands behind your ear, in a parabolic shape. You've just built a bigger antenna, and (with luck and a bit of concentration), you can now eavesdrop on unsuspecting strangers.

That's exactly what radio astronomers do, only it is not sound, but rather invisible light, by which we eavesdrop on unsuspecting stars. ❖

Event Horizon

SearchLites' readers are apprised of the following conferences and meetings at which SETI-related information will be presented. League members are invited to check our World Wide Web site (www.setileague.org) under *Event Horizon*, or email to us at info@setileague.org, to obtain further details. Members are also encouraged to send in information about upcoming events of which we may be unaware.

June 18 - 21, 2006: *SETICon06 Technical Symposium*, in conjunction with *Society of Amateur Radio Astronomers* Conference, NRAO Green Bank WV.
June 21 - 24, 2006: *Green Bank Star Quest III*, NRAO Green Bank WV.
July 27 - 30, 2006: *Central States VHF Conference*, Minneapolis MN.
August 23 - 27, 2006: *L.A.Con IV* World Science Fiction Convention, Los Angeles, CA.
August 25 - 27, 2006: International Astronomical Union XXVIth General Assembly, Prague, Czech Republic.
August 25 - 27, 2006: *EME Conference 2006*, Wuerzburg Germany.
September 8 - 10, 2006: *EuroSETI06*, in conjunction with the *Fourth International Congress for Radio Astronomy*, Heideburg Germany.
October 2 - 6, 2006: *57th International Astronautical Congress*, Valencia Spain.
October 6 - 8, 2006: *AMSAT Space Symposium*, San Francisco CA.
November 17 - 19, 2006: *Philcon 2006*, Philadelphia PA.
April 21, 2007, 0000 UTC - 2359 UTC: Eighth annual SETI League *Ham Radio QSO Party*, 14.204, 21.306, and 28.408 MHz.
May 18 - 20, 2007: *Hamvention 2007*, Dayton OH.
June 2007 (dates TBA): *Society of Amateur Radio Astronomers* Conference, NRAO Green Bank WV.
July 26 - 29, 2007: *Central States VHF Conference*, San Antonio TX.
August 30 - September 3, 2007: *65th World Science Fiction Convention*, Yokohama Japan.
September 24 - 28, 2007: *58th International Astronautical Congress*, New Delhi, India.
September 30 - October 4, 2008: *59th International Astronautical Congress*, Glasgow, Scotland. ❖

Moonbounce Beacon Update

The SETI League Moonbounce Beacon is back on the air following a long hiatus. The facility, developed to provide continuous calibration signals for SETI League stations around the world by bouncing precision microwave signals off the lunar surface, was first activated at low power (just 20 watts) on 4 March 2001. Intermittent outages began in July of that year for rebuilding, and the addition of a solid-state high-power amplifier. In February, 2002, the beacon (which operates under the SETI League club callsign W2ETI) began operating experimentally at nominally 200 Watts of output (100 Watts at the antenna), key-down during the first full minute of every five-minute clock interval.

After a ten week outage for maintenance, the W2ETI 1296 MHz EME (Earth-Moon-Earth) Beacon was again returned to service at the 200 watt level on 22 October 2002. The solid state power amplifier's reliability and stability remained a problem, and several unscheduled outages followed.

The beacon remained operational at full power throughout the two weekends of the 2002 ARRL EME competition, and was copied by at least two stations. The power amplifier then began operating at slightly reduced power, until suffering a power failure on the morning of 12 March 2003. This resulted in a one-month outage, which provided us with the opportunity for much-needed system refurbishment. The beacon was returned to service at the 100-Watt level on 13 April 2003, just in time for planned tests with the Arecibo and Jodrell Bank Radio Observatories.

Subsequent outages for power module replacement occured on several occasions, with output power levels generally ranging between 100 and 150 watts. Power amplifier reliability remained a problem. The beacon power amplifier used sixteen Mitsubishi M57762 RF modules in its final stage. These modules proved quite unreliable, especially when used continuously twelve hours per day. Having replaced several such modules over the period of a year (at a cost of roughly $100 US apiece), we began studying alternatives to this particular solid state power amplifier.

Following a power supply failure on 6 November 2003, the W2ETI Moonbounce Beacon underwent an emergency repair, and was returned to service just in time for the November 15-16 ARRL EME Contest period. It remained operational until thunderstorms in the Spring of 2004 inflicted apparent lightning damage.

The beacon was returned to service in March, 2006, after nearly a two-year outage due to catastrophic failure of its solid state power amplifier. The completely refurbished beacon gained a new 1/2 kW MOSFET power amplifier, repackaged exciter, atomic and GPS frequency standards, new control computers and associated software, new power supplies, and a 3 kW UPS. This latest iteration of the beacon is depicted on our website at www.setileague.org/eme, as well as on the personal website of station trustee Richard Factor, WA2IKL.

Announcing:
The Fourth International Congress for Radio Astronomy
Hosted by the European Radio Astronomy Club and The SETI League, Inc.

At the University city of Heidelberg Germany University of Applied Science (FH) Heidelberg 8th, 9th and 10th of September 2006

By Peter Wright, DJ0BI,
President, European Radio Astronomy Club

We are pleased to inform you of our next International Congress For Radio Astronomy which takes place at the University of Applied Science (FH) Heidelberg (www.fh-heidelberg.de). It will be held Friday the 8th, Saturday the 9th and Sunday the 10th of September 2006 in the Great Lecture hall of the "Science Tower". Rooms are available for early bookers for 59 Euro per night (Single) and 88 Euro per night (Double) including breakfast.

These events, held every 3 years, are hosted by The European Radio Astronomy Club, an organisation with over 250 members in 16 different countries, pledged to assist and inform interests in Radio Astronomy, both Professional and Amateur. As in previous years, the organisation of this important event is in the good hands of Peter Wright, ERAC's President, who is also a teacher in the field of Communications electronics at the Fachhochschule (FH) Heidelberg.

The 4th ERAC Congress will be Co-Hosted, as before, by the SETI League and its Executive Director, Prof. Dr. H. Paul Shuch. This is a 3 day event with lectures and workshops, as well as the chance to visit Heidelberg, Germany's finest University city .

The congress will be on campus with the hotel as well as the mid day food and directly next to the Lecture hall the Tram car is situated which takes everyone directly into the old city of Heidelberg for the evening banquet. This is also a wonderful opportunity to bring along your wifes Or Partner as the city of Heidelberg is only 5 minutes away which allows wonderful shopping during the day when the men are at the congress. In other words, the 4th ERAC Congress is wonderful for the family, so no excuses are open for not bringing the partner, especially the cheap price of the double room.

On Friday, guests will be arriving from all over the world, professionals from radio astronomy sites, institutes and universities as well as many amateur radio astronomers. This is the chance of a lifetime for scientists to have a wonderful weekend as well as their partners for a short holiday!

The University town of Heidelberg is World famous being also the home of important scientific institutions like for example The Max-Planck-Institut für Astronomy, Max-Planck-Institut für Kernphysik, Astronomisches Recheninstitut, Heidelberger Akademie der Wissenschaften, Verlag "Sterne und Weltraum" and many more. It has a Main Line Railway Station and Frankfurt International Airport is Just around the Corner. An Hourly Schuttle bus leaves the airport directly for Heidelberg City. Ask Lufthansa where it leaves from, the price is very cheap!

For a complete information package of Heidelberg with maps, special offers, all the things to see, please write to info@cvb-heidelberg.de and state: "Attention Mrs Seiferling, I wish to attend the 4th International Congress for Radio Astronomy 8th 9th 10th of September 2006 at the University of Applied Science (FH Heidelberg). Could you please send me the information package reserved for me as arranged with Mr Wright from ERAC." You should now place in your name and address and send off the e-mail!

Friday the 8th will be a workshop day, the official opening of the Congress will be at 09:00 hrs and the Congress will continue till about 19:00 hrs, with a long lunch break at noon. In the evening, we will be gathering for our evening meal, once again open ended. Saturday and Sunday will be a lot of lectures with the same schedule as on Friday, finishing on Sunday at 17:00 hrs.

To close, as usual, Dr Paul Shuch from the SETI League will be playing Radio Astronomy Shanties in the afternoon sun.

Contact Information:

The European Radio Astronomy Club
Ziethen Str 97, D-68259 Mannheim Germany
Tel Home ++49 (0)621 794597 Mobile 01704133653 Work ++49(0)6221 512470.
email: erachq@aol.com
web: eracnet.org

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The SETI League, Inc.
433 Liberty Street
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Little Ferry NJ
07643 USA

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***SearchLites* Volume 12 No. 3, Summer 2006**
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Annual Renewal: Is This Your Last *SearchLites?*

SETI League memberships are issued for the *Calendar Year*. Please check the expiration date indicated on your mailing label. If it reads December 2005 or earlier, you have already expired, and *must* renew your SETI League membership **now!** Please fill out and return this page along with your payment.

Please renew my membership in this category:

Full Member	$50 / yr
Supporting Member (elderly, retired, or disabled)	$35 / yr
Scholarship Member (full-time students only)	$25 / yr
Household Member (same address as a Full Member)	$15 / yr
Household Life Member (same address as a Life Member)	$300
Life Member (until we make contact)	$1,000
Sustaining Life Member – a generous *annual* pledge of:	$1,000 / yr
Patron (priority use of The SETI League's radio telescope)	$10,000
Director (Patron membership plus seat on advisory board)	$100,000
Benefactor (a major radio telescope named for you)	$1,000,000

Annual memberships are issued for the calendar year. Those processed in January through April expire on 31 December of that year. Those processed in September through December expire on 31 December of the *following* year. Those members joining in May through August should remit half the annual dues indicated, and will expire on 31 December of the same year.

Order Your Membership Premiums:

	(u *)	(o *)
Pocket protectors	$ 3	$ 4
Mouse pads	$ 5	$ 7
Tune In The Universe! (CD-ROM)	$25	$30
Proceedings of SETICon01	$20	$25
Proceedings of SETICon02	$20	$25
Proceedings of SETICon03 (CD)	$15	$20
Proceedings of EuroSETI04 (CD)	$15	$20
Proceedings of SETICon04(CD)	$15	$20
SETI League Technical Manual (CD)	$10	$13
Project Cyclops 2nd Edition	$20	$25
The Listeners by James Gunn	$15	$15
Sing a Song of SETI (Songbook)	$10	$13
Sing More Songs of SETI (Songbook)	$10	$13
T-shirts, specify M, L, or XL	$15	$18
SETI Nerd Gift Set (one each Mouse Pad, Pocket Protector, *Project Cyclops* and *Tech Manual*) at 20% Savings to Members Only:	$30	$40

*** Includes postage to (u) US, or (o) other addresses.**
Payments may be by US Dollars check payable through a US bank, or by Credit Card (see form below).

Pleased to Accept Credit Cards

The SETI League invites you to pay your membership dues and additional contributions via Visa or MasterCard. Please fill out the form below and return it with any order. We thank you for your ongoing support.

Circle One: Visa / MasterCard Exp.___/_____
Card Number:_____

Cardholder: _____
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Phone: _____ email:_____

Ham call: _____ URL:_____
Total Contribution (US Dollars):_____
Signature:_____
Today's date:_____