



SearchLites

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The Quarterly Newsletter of The SETI League, Inc.

Offices:

433 Liberty Street
Little Ferry NJ
07643 USA

Phone:

(201) 641-1770

Facsimile:

(201) 641-1771

Email:

info@setileague.org

Web:

www.setileague.org

President/Registered Agent:

Richard Factor

Secretary/Treasurer:

A. Heather Wood

Executive Director Emeritus:

H. Paul Shuch, Ph.D.

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One With Everything

by Dan Duda

from the December, 2015 issue of Penn Central, the monthly newsletter of Central PA Mensa, used by permission

I'm still amazed at how often scientific pronouncements are presented in a way that suggests we really know what's going on. However, when you consult the real giants a different worldview emerges. Einstein, Planck, Bohr, Heisenberg, Schrodinger, Eddington, and more, have a more specific opinion about what science can actually tell us. They tend to feel that science is infallible only within limited and well-defined ranges. Science oversteps its bounds when it makes pronouncements beyond the focus of the original study. For example, according to Einstein:

"...you could not be a scientist if you did not know that the external world existed in reality, but that knowledge is not gained by any process of reasoning. It is a direct perception and, therefore, in its nature akin to what we call faith."

Einstein did get into trouble, however, when he opted to trust his perceptions over one set of scientific results. "Entanglement" is one of the spookiest realities of the universe. In fact, it caused Einstein to abandon quantum physics, a field he was largely responsible for founding, because "physics should represent a reality in time and space, free from spooky actions at a distance." But the hypothesis and the scientific results behind entanglement called for acceptance of the idea that somehow, somehow, time and space do not exist.

Ah Ha! If you're new to these ideas you're saying 'no time and space, that's ridiculous!' Congratulations. You see eye to eye with Uncle Albert. Unfortunately, technology has caught up with the paradox (EPR) that Einstein and two colleagues used to "prove" quantum science couldn't be an accurate picture of reality—and he lost the argument.

The EPR Paradox was one of Einstein's famous thought experiments. Through it he proved that, if quantum mechanics is accurate, an action taken on one particle would automatically and instantly affect another particle—even if the pair were separated by a distance of billions of light years. The requirement is that the particles would have to have been "entangled" at some point in their histories. This would of course violate Einstein's speed limit (nothing can move faster than the speed of light). In essence—this suggests that, in some way, neither time nor space exist.

So you think it can't get any weirder, right? But wait, there's more. A continuation of research on the subject by Alain Aspect and more recently Anton Zeilinger is showing us a whole new world of "bizarre." "Now we are beginning to see that quantum mechanics might actually exclude the possibility of mind independent reality, and already does exclude a reality that resembles our usual concept of such." (Aspect). In other words, anything that we think exists, is actually just a result of what we think—a figment of our imagination (did you ever think that cliché would be taken so literally?)

Now, enter the world of Zen. There are so many puns related to the concept that we are "one with everything." But that seems to be where quantum science is taking us. Buddhists suggest that man's confusion begins as soon as we give something a name. "Facts come in pairs at the very least, for a single body is inconceivable apart from a space in which it hangs. Definitions, setting bounds, delineation—these are always acts of division and thus of duality, for as soon as a boundary is defined, it has two sides."

When I first encountered these ideas I just knew they were ludicrous bloviations spewed by would-be philosophers educated beyond their intelligence and possessed of too much time on their hands. But as I pursued my real interests in science it began to dawn on me that the advance of particle physics and mathematics were on a collision course with these very ideas. I'm still convinced that we really know nothing—that what seems so real to our senses is not only suspect, but possibly totally wrong. In the immortal words of Yasutani Roshi (author of *The Three Pillars of Zen*):

"The fundamental delusion of humanity is to suppose that I am here and you are out there."



In Memoriam

Remembering Sam Lightfoot

It saddens us to report the death on 19 Feb. 2016 of our friend and colleague Sam Lightfoot, after a prolonged illness.

Robert "Sam" Lightfoot, 60, was an anthropologist, criminologist, and associate professor at South Georgia State College. He received his Ph.D. in Criminal Justice from Florida State University in 2007. An active researcher in the fields of sociology and criminal justice, he performed research on solar and extra-solar exploration and social consequences as a necessary area in our preparation for Contact.

As a research and consulting archaeologist, Sam's major focus was on European contact with native cultures. Focusing on the typically extreme casualty rates during early 16th century attempts by the Spanish to form colonies in the Americas, Lightfoot noted, "If we go to Mars, Jupiter, or Saturn, we better make sure we have everything in order. This includes who's in charge, making sure there are enough supplies, and other necessary things."

Sam was active in popularizing science to the general public, and was a regular participant at Chattanooga's LibertyCon science fiction convention, where he regularly contributed to science outreach panels. In addition to his classroom pursuits, Dr. Lightfoot participated in archaeological digs, spoke a number of foreign languages, including a little Navajo, and taught and practiced martial arts, including Judo, Jujitsu, and (in his Society for Creative Acronyms persona as Lord Ernst von Nuremberg), European swordfighting.

Sam may be best remembered for his participation in the first three Tennessee Valley Interstellar Workshops, where he collaborated closely with a number of SETI League members. His death came just one week before the opening of the fourth TVIW, in which he was scheduled to participate.



Sam Lightfoot (right) seen with fellow SETI enthusiasts Robert Kennedy (left) and H. Paul Shuch at the Tennessee Valley Interstellar Workshop, November 2014, in Oak Ridge, TN. Sam chaired the Communications workshop at that conference, and subsequently co-authored (with Shuch, Kennedy, and Eric Hughes) the article *Communication, SETI, and Strategies* (in *Journal of the British Interplanetary Society* 68(5/6):167-171, May/June 2015).

Paul Gilster photo

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.

February 28 - March 2, 2016: *Tennessee Valley Interstellar Workshop*, Chattanooga, TN.

March 11 - 13, 2016: *SARA Western Conference*, Prescott, AZ.

April 16, 2016, 0000 UTC - 2359 UTC: Sixteenth annual SETI League *Ham Radio QSO Party*: 3.551, 7.0309, 7.2039, 14.084, 14.204, 21.306, and 28.408 MHz.

April 17, 2016, 1300 EDT: Twenty Second SETI League *Annual Membership Meeting*, Little Ferry NJ.

May 27 - 30, 2016: *Balticon 50*, Baltimore, MD.

August 17 - 21, 2016: *MidAmeriCon II*, the 74th World Science Fiction Convention, Kansas City, MO.

September 26 - 30, 2016: *67th International Astronautical Congress*, Guadalajara, Mexico.

November 10 - 15, 2016: *AMSAT Space Symposium*, Galveston, TX.

November 18 - 20, 2016: *Philcon*, Cherry Hill, NJ.

April 15, 2017, 0000 UTC - 2359 UTC: Seventeenth annual SETI League *Ham Radio QSO Party*: 3.551, 7.0309, 7.2039, 14.084, 14.204, 21.306, and 28.408 MHz.

April 16, 2017, 1300 EDT: Twenty Third SETI League *Annual Membership Meeting*, Little Ferry, NJ.

August 9 - 13, 2017: *75th Science Fiction Convention*, Helsinki, Finland.

September 25 - 29, 2017: *68th International Astronautical Congress*, Adelaide, Australia.

October 1 - 5, 2018: *69th International Astronautical Congress*, Bremen, Germany ❖



Want a painless way to support The SETI League? Browse to www.smile.amazon.com. In the "Pick your own charitable organization" box, just type in "SETI League." Now, every time you shop Amazon, they will donate a half percent of your purchase price to SETI research!

Financial Reports

2015 Balance Sheet

990 Line	REVENUES:	2015 (budget)	2015 (filed)
1d	Dues, Grants & Contributions	14,999	12,448
4	Interest & Investments	1	0
12	Total Revenues:	15,000	12,448
	EXPENSES	2015 (budget)	2015 (filed)
13	Educ. and Scientific Programs	11,500	11,575
14	Management & General	1,600	2,196
15	Fundraising	1,500	980
17	Total Expenses:	14,600	14,751
18	Excess or (Deficit) for the year	400	(2,302)
	BALANCE SHEET:	2015 (budget)	2015 (filed)
19	Beginning Net Assets	6,147	6,147
21	Ending Net Assets	6,547	3,845

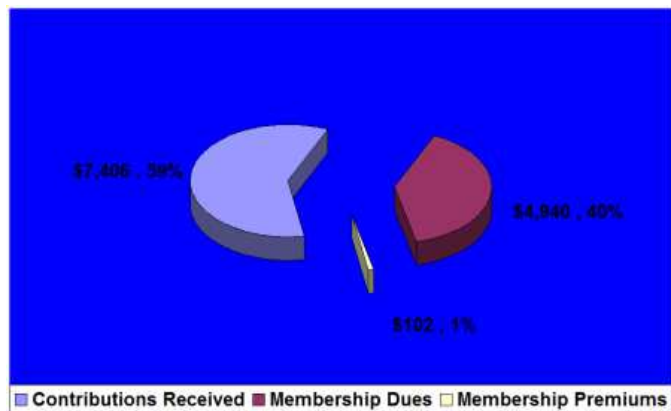
Members-Only Access

SETI League members in good standing are invited to access the latest issue of *SearchLites* on the day of publication (typically on the first day of December, March, June, and September) via www.setileague.org/members

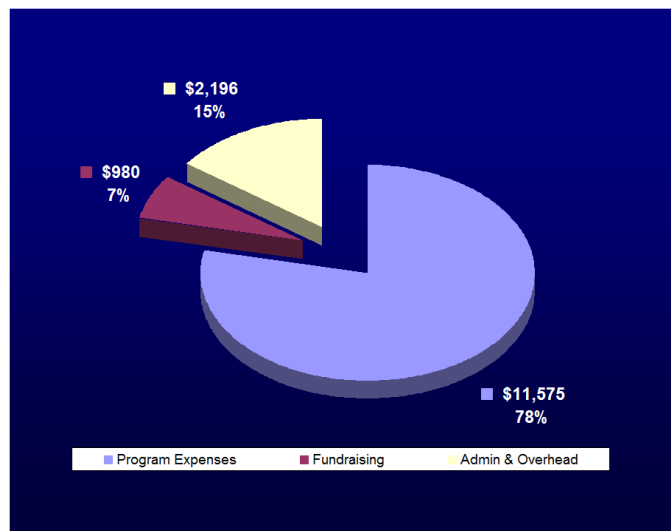
The password for access to that section of our website is sent via post to dues-current members every year. If your membership has expired, you are invited to renew online. If you are a current member and have not yet received the current password, please contact our Secretary by email to heather@setileague.org.

All back issues of *SearchLites* are available to the general public at www.setileague.org/srchlite.

2015 Revenues



2015 Expenses



www.facebook.com/setileague

SearchLites, the official SETI League newsletter, is published quarterly. For more timely updates, our members, supporters, and interested parties are invited to access our Facebook page, for the very latest in breaking SETI news.

Guest Editorial:

Einstein's Gravitas

by Dan Duda

Einstein took a real beating in his debates with Niels Bohr and the quantum reality establishment of the early 1900s. But when it comes to cosmology, his theories of relativity, both special and general, continue to make him the Nostradamus of universal predictions. There's been a lot of news recently about the discovery of "gravitational waves," and there's a lot to be excited about. It looks like Einstein's picture of time and space being a unified continuum or "fabric" is being confirmed.

What makes this exciting? Think about it! First it means that time is flexible—it's not the constant thing we imagine it to be. Time will flow differently for people under differing conditions. Even issues like the sequence of events can be different for people traveling in separate directions at significant speeds. And what about space? It turns out it's warped by the gravitational effects of nearby masses, like planets, stars and galaxies. But taken together—Wow! Can you conceive of time and space actually being just one thing, bending and flowing in response to other forces?

It's important to distinguish "gravitational waves" from "gravity waves." Gravity waves are a global phenomenon used most often in weather forecasting. Many of the news reports you're seeing mistakenly used this term to announce the current scientific breakthrough. Gravitational waves, on the other hand, are a cosmological phenomenon. They were predicted by Uncle Albert's in-credible theory of general relativity developed in the early part of the last century.

How did we detect these gravitational waves? How do we know anything about the universe? Well, it started with light waves. Humans first learned about the universe by looking at the stars (visible light). Later, 'looking' was enhanced by the telescope. More recently the Hubble space telescope penetrated incredible distances by observing infrared and ultraviolet light. And observing microwaves and radio waves that are emitted by the cores of galaxies allowed us to penetrate beyond the barriers that block our view of objects when we are limited to the human light spectrum. But now the technology that enhances our ability to "see" has made another major leap forward.

Let's start with the fact that Einstein predicted that the acceleration of massive objects would churn the fabric of the space-time continuum which would cause waves to form—much like the waves that emerge in water when you throw a pebble into a pond. Two of the most massive objects we know of, black holes, have been courting each other in deep space. Finally, the irresistible gravitational attraction would not be denied, and their dance ended in a conjoining of the two massive objects (sounds like a marriage, right?). The resulting roil, according to Einstein's theory, should generate "gravitational waves" that spread through space-time at the speed of light.

So, how did we detect these waves? LIGO. That's the *Laser Interferometer Gravitational-wave Observatory*. The collision of two black holes is a super-massive event. Yet, by the time the waves cross an enormous stretch of the universe to reach Earth, the waves are extremely subtle. So the apparatus

designed to receive the signal had to be extremely sensitive. LIGO bounces laser light back and forth through 4-kilometer-long pipes. This process measures the very slight changes in space-time that indicate a gravitational wave passing through Earth.

This is what occurred on September 14th, 2015. Since then researchers have been analyzing the results to ensure the significance of the signal as proof of the elusive gravitational wave. And this was confirmed with a 5.1 sigma significance. In English that means that there is only a one in 6 million chance that the result is erroneous.

This discovery is important on many levels. First, it confirms an incredible prediction of Einstein on the nature of the universe. Next, it provides a powerful new tool for exploring the universe. And, it paves the way for another advance in technology—that is using the LIGO concept with satellites placed at a Lagrange point between the Earth and the Sun. It will be the biggest "machine" ever made. In the immortal words of Albert Einstein:

"To raise new questions, new possibilities, to regard old problems from a new angle, requires creative imagination and marks the real advance in science." ❖

SETI League 2016 Budget (Subject to Board Approval)

990 Line	REVENUES:	2016 (budget)
1d	Dues, Grants & Contributions	15,000
4	Interest & Investments	0
12	Total Revenues:	15,000
	EXPENSES:	2016 (budget)
13	Educ. and Scientific Programs	12,000
14	Management & General	2,000
15	Fundraising	1,000
17	Total Expenses:	15,000
18	Excess or (Deficit) for the year	0
	BALANCE SHEET:	2016 (budget)
19	Beginning Net Assets	3,845
21	Ending Net Assets	3,845

Announcement of the Twenty-Second Annual Membership Meeting Sunday, 17 April 2016, Little Ferry NJ

In accordance with Article IV, Section 1 of our duly approved Bylaws, the Trustees of The SETI League, Inc. hereby schedule our Twenty-first Annual Membership Meeting for 1 PM Eastern time on Sunday, April 17, 2016, at the conference room of Eventide, Inc., One Alsan Way, Little Ferry NJ 07643. This office is located adjacent to The SETI League office, one block north of Route 46 and one mile east of the Teterboro Airport, accessed off of Route 46 via Liberty Street to Harding Avenue to Alsan Way. Here is a map, courtesy of MapQuest.



We recommend that out-of-town members and guests flying in commercially use the Newark International Airport (EWR), which is about twenty minutes South of our office. There is a wide variety of hotels available at the Newark Airport. A rental car is recommended. From Newark, drive North on the New Jersey Turnpike to US Route 46 Westbound, cross over the Hackensack River, and two long blocks after the traffic circle, turn right onto Liberty Street.

Our members and guests using General Aviation are invited to use the Teterboro Airport (there *are* landing fees and a security fee). Of the half-dozen Fixed Base Operators offering transient parking, we recommend Atlantic Aviation (ask Ground Control for parking in the Atlantic Midfield). They should be able to assist you with ground transportation, and will waive the ramp fee if you purchase fuel. Please coordinate your schedules and needs in advance through our secretary via email to [heather at setileague dot org](mailto:heather@setileague.org).

As attendance by one percent of the League's membership constitutes a quorum, all members in good standing are encouraged to attend. The preliminary agenda for this meeting, per Bylaws Article XII, appears below.

Per Article IV, Section 3 our Bylaws, written or electronic notice of this Meeting is being provided to all members in good standing, not less than ten days nor more than ninety days prior to the meeting date. Members are encouraged to submit additional Old Business and New Business items for inclusion in the Agenda. Please email your agenda items to [paul at setileague dot org](mailto:paul@setileague.org), not later than April 1, 2016. For planning purposes, we would appreciate it if members would also RSVP to our secretary, [heather at setileague dot org](mailto:heather@setileague.org), if planning to attend.

The annual Board of Trustees Meeting required per Bylaws Article V, Section 3 will immediately follow the Membership Meeting. All SETI League members in good standing are welcome to attend.

Preliminary Agenda

- Call to Order
- Minutes of 2015 Membership Meeting
- Financial Report
- Committee Reports
- Old Business
- New Business
- Good and Welfare
- Adjournment



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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 2015 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
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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.

Pleased to Accept PayPal

The SETI League invites you to pay your membership dues and additional contributions via credit card, using the PayPal online payment system. Simply log on to www.paypal.com and specify that your payment be directed to paypal@setileague.org.

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Order Your Membership Premiums:

	(u/c)*	(o)*
Pocket protectors	\$ 3	\$ 4
Mouse pads	\$ 5	\$ 7
<i>Tune In The Universe!</i> (CD-ROM)	\$25	\$30
<i>Proceedings of SETICon01</i>	\$20	\$27
<i>Proceedings of SETICon02</i>	\$20	\$27
<i>Proceedings of SETICon03 (CD)</i>	\$15	\$18
<i>Proceedings of EuroSETI04 (CD)</i>	\$15	\$18
<i>Proceedings of SETICon04(CD)</i>	\$15	\$18
<i>SARA Conference Proceedings:</i>		
2006, 2007, 2008, 2009 (specify)	\$20	\$27
<i>SETI League Technical Manual (CD)</i>	\$10	\$13
<i>Project Cyclops 2nd Edition</i>	\$20	\$30
<i>The Listeners</i> by James Gunn	\$15	\$21
<i>Sing a Song of SETI</i> (Songbook)	\$10	\$13
<i>Sing More Songs of SETI</i> (Songbook)	\$10	\$13
<i>Sing a Song of SETI</i> (music CD)	\$15	\$18
<i>Sing More Songs of SETI</i> (music CD)	\$15	\$18
<i>Demented!</i> (music CD)	\$15	\$18
T-shirts, specify M, L, or XL	\$15	\$22
SETI Nerd Gift Set (one each Mouse Pad, Pocket Protector, <i>Project Cyclops</i> and <i>Tech Manual</i>) at 20% Savings to <u>Members Only</u> :	\$30	\$45

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