



# SearchLites

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The Quarterly Newsletter of The SETI League, Inc.

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## Prophet Without Honor

By H. Paul Shuch, Executive Director Emeritus

There he goes, making those bold predictions again. During a recent talk at the 2014 NASA Innovative Advanced Concepts (NIAC) symposium at Stanford University, our friend and colleague Seth Shosak stated:

"Astronomers will have scanned enough star systems by 2040 that we'll have discovered alien-produced electromagnetic signals."

If you're experiencing a sense of *deja vu*, you're not exactly alone. Seth has been predicting imminent SETI success for about the past twenty years. At first, his prediction event horizon was ... about twenty years. Notice how he keeps moving the goalpost?

I find two factors significant about these predictions. First, SETI success is now framed in terms of not "if," but "when." The general consensus within the scientific community is that the eventual detection of clearly artificial extraterrestrial electromagnetic emissions is a certainty; it's just a matter of time.

How much time? That's the second epiphany we've reached. Unlike Frank Drake's naive enthusiasm when, in 1960, he witnessed his first tantalizing Project Ozma false alarm ("I couldn't believe it was going to be this easy!") we have now come to accept the multigenerational aspect of the SETI effort. Nobody, not even Seth, is holding his or her breath for an immediate detection. This is going to take a longterm, concerted effort (at least out to 2040).

Okay, what's wrong with Seth's predictions? Nothing, actually -- what we humans do best is speculate. We speculate about the nature of the Universe, and life within it, and what kinds of technology the Other may employ, and whether or not we have the means to recognize it when we see it.

One thing about which we need not speculate is the vastness of the time-space we occupy. Though it may take nearly infinite time to explore the infinite, how can we not continue, while there is so much left to learn?

So, I encourage Seth to continue speculating -- and searching -- for as long as the search may take us. Only, he should take greater care as to his predictions. After all, he wouldn't want to jeopardize the SETI Institute's non-prophet status.



## 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](http://www.setileague.org)) under *Event Horizon*, or email to us at [info@setileague.org](mailto:info@setileague.org), to obtain further details. Members are also encouraged to send in information about upcoming events of which we may be unaware.

**March 14 - 16, 2014:** *Lunacon 2014*, Rye Brook, NY.

**March 17 - 21, 2014:** *Search for Life Beyond the Solar System*, Tucson, AZ.

**March 20 - 21, 2014:** *5th IAA Search for Life Signatures Symposium*, Paris, France.

**March 22 - 23, 2014:** *Society of Amateur Radio Astronomers Western Conference*, Owens Valley Radio Observatory, Bishop CA.

**March 29 - 30, 2014:** *LI-Con 1*, Rockville Centre, NY.

**April 13, 2014:** Twentieth SETI League *Annual Membership Meeting*, Little Ferry NJ.

**April 19, 2014, 0000 UTC - 2359 UTC:** Fifteenth annual SETI League *Ham Radio QSO Party*: 3.551, 7.0309, 7.2039, 14.084, 14.204, 21.306, and 28.408 MHz.

**April 25 - 26, 2014:** *Southeastern VHF Conference*, Atlanta, GA.

**April 26, 2014:** Northern Lights Radio Society *Aurora Conference*, White Bear Lake, MN.

**May 2, 2014, 6:15 - 8 PM:** *SETI, Evolution, and Human History*, presented by Claudio Maccone. Kaufman Auditorium, American Museum of Natural History, New York, NY.

**May 23 - 26, 2014:** *Balticon 48*, Hunt Valley, MD.

**June 20 - 22, 2014:** *Contata*, Morristown, NJ.

**June 29 - July 2, 2014:** *Society of Amateur Radio Astronomers Conference*, National Radio Astronomy Observatory, Green Bank WV.

**August 14 - 18 August, 2014:** *Loncon3*, 72nd World Science Fiction Convention, London, England.

**September 29 - October 3, 2014:** *65th International Astronautical Congress*, Toronto, Canada.

**November 21 - 23, 2014:** *Philcon 2014*, Cherry Hill, NJ.

**April 18, 2015, 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 19, 2015:** Twenty First SETI League *Annual Membership Meeting*, Little Ferry NJ.

**April 24 - 25, 2015:** *Southeastern VHF Conference*, Morehead, KY.

**October 2015 (dates to be announced) :** *66th International Astronautical Congress*, Jerusalem, Israel.

**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:** Twenty Second SETI League *Annual Membership Meeting*, Little Ferry NJ.

**October 2016 (dates to be announced) :** *67th International Astronautical Congress*, Guadalajara, Mexico.



## Quantum Weirdness and Consistency

by Ed Chatterton

from the January, 2014 issue of Penn Central,  
the monthly newsletter of Central PA Mensa,  
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Because Dan Duda and I share a common interest, I am always intrigued by his articles. Because he is so much more knowledgeable than I, I almost always learn from them. His recent description of quantum weirdness [*Does the Universe Have an Agenda?* SearchLites 19(3)] re-ignited my thought, and the new contemplation has given me a new insight.

I have always been and tried to be skeptical. My first grade teacher called my grandmother to complain that I had made many of my classmates cry by telling them that there was no Santa. I sanctimoniously felt my superiority to those who relied on faith as a foundation of their beliefs.

Recently, however, in thinking about quantum weirdness, I have been humbled by the sudden discovery that some of my beliefs are based on faith. I have no problem with the proposition that humans have not evolved to grok particle/wave duality. I am not confident we will escape extinction long enough for evolution to grant us that complete understanding. However, my recent insight is that I have always had faith that the understanding in principle is available in a Platonic sense, and that it is consistent with the evidence. I have always had faith that truth contains no inconsistencies.

Since I view theism as obviously internally inconsistent, I have let that particular description of ultimate reality join Santa in the set of things I believe to be false. But, like poor Euclid, I have insufficiently examined my axioms. The consistency of reality for me has been a self-evident truth, so obvious and basic as to escape my critical evaluation.

Quantum weirdness seems to challenge the consistency axiom, and because it doesn't occur to us that the axiom might be false, we conjure up interpretations of the evidence. Since I am unable and unwilling to discard the axiom, I must continue on that path.

I am not tempted to dismiss the consistency axiom because to do so would force me to give up my entire understanding (such as it is) of reality. Yes, reality is absurd in some respects, and quantum weirdness, Godel's theorem, and perhaps other phenomena for me are intractable paradoxes. But like Linus needs his blanket, I absolutely need my consistency, logic, and some order to survive until the end.

My insight, then, is an explicit acceptance of the axiom of consistency. I have faith (ugh) that it is true. If the axiom is false, then I will have to join Linus in the padded cell.



*Guest Editorial*

**The Scala Naturae:  
Alive and Well in Modern Times**

by Lori Marino

Three thousand years ago, in Ancient Egypt, people generally believed that the sun god Ra rose from the darkness each day and rode across the sky. Observations – by sailors, for example, who could watch mountains slowly sinking below the horizon as they sailed from shore – gradually disproved that notion.

However, for another 2,000 years it was still mostly agreed that the Earth was at the center of the universe and that all heavenly bodies revolved around it. Indeed, it could be quite dangerous to suggest otherwise. But scientific data kept showing that this view was indisputably incorrect. And despite persecution from the Catholic Church, Galileo's model of the universe eventually won out.

Over time, the dynamic self-correcting nature of science has led us to an increasingly better understanding of the world. We no longer accept Earth-centered astronomy, flat-earth models, or the idea that disease is based on imbalances in bodily "humors".

But there is still one domain that we cling to despite all the evidence to the contrary – a view of nature known as the Scala Naturae or Great Chain of Being. The Scala Naturae is a philosophical view of nature attributed to Aristotle in Ancient Greece. According to this view, nature is arranged on a kind of ladder or hierarchy of increasing "advancement" and value, moving up from inorganic objects like stones, at the very bottom, to plants, through the "lower" animals such as sponges, to vertebrates such as fish, then to "higher" animals such as mammals, then to monkeys and apes, and finally humans.

While we've rejected every other inaccurate model of the world, like the flat Earth, we continue to embrace the Scala Naturae. As Christianity grew, the church added spiritual beings to the ladder, placing angels above humans, and then, at the very top, God, who was seen as perfect and all other natural forms as progressively less perfect as one moved back down the ladder.

As this view of nature spread, humans were increasingly seen as being separate from animals by virtue of being "part-animal" and "part spiritual."

Darwin's discoveries showed conclusively that there is no ladder, but that all life is instead connected through branching evolutionary relationships – known as phylogeny. Even though he demonstrated that there is no "up" and "down", Darwin's insights were relabeled as the "phylogenetic scale", which continued to preserve a hierarchical system in which "higher" organisms were more "evolutionarily advanced" than "lower" ones.

To this day the phylogenetic scale leads many people to claim the impossible: that some modern species are ancestral to other modern species. For instance, modern fish are viewed as ancestral and "more primitive" to mammals, and modern great apes are viewed as ancestral to humans, who are considered the most "advanced". And while we've rejected every other inaccurate model of the world, like the flat Earth, we continue to embrace the Scala Naturae.

The effects of this belief system continue to be disastrous for us, the other animals, and the planet. That's because there are consequences to upholding incorrect and archaic views of the world – like when doctors recommended plunging sick people into ice cold water to get rid of the yellow bile. The seductive quality of the Scala Naturae is that it places us at the top of a hierarchy and tells us that we are not only better than all the other animals but that we are qualitatively different and that we enjoy some of the perks of being spiritual, like being closer to God and the angels.

As long as we view ourselves as "higher than" or "qualitatively different from" the other animals, we will continue to make assumptions about them that promote abuse and exploitation. The Scala Naturae gives us license to exploit other animals because they are seen as being further down the ladder. It also helps us to view ourselves as not being fully part of nature, and therefore to disconnect from empathizing with other animals. It seems to give us a "right" to treat them as commodities for our own use. Even seemingly well-intentioned ideas about stewardship and dominion are ultimately just manifestations of the same hierarchical view that leads to abuse and exploitation.

It's time to add the Scala Naturae to the list of archaic and disputed ideas like the Flat Earth, and to adopt the science-based view of nature as an interconnected tree of life forms, branching in many directions, and where we humans live.

**Disclaimer:** The opinions expressed in editorials are those of the individual authors, and do not necessarily reflect the position of The SETI League, Inc., its Trustees, officers, Advisory Board, members, donors, or commercial sponsors.

## Annual Meeting Notice

For a number of years, it has been customary for The SETI League to hold its Annual Meeting on the first Sunday following April 15th. This year, that date falls on Easter Sunday. Out of respect for our members who celebrate that day as a holiday, the SETI League Board of Trustees has decided to reschedule our meeting for one week prior. Therefore:

In accordance with Article IV, Section 1 of our duly approved Bylaws, the Trustees of The SETI League, Inc. hereby schedule our Twentieth Annual Membership Meeting for 1 PM Eastern time on Sunday, April 13, 2014, 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.

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, then left in one block onto Harding Avenue, which becomes Alsan Way.

Our members and guests using General Aviation are invited to use the Teterboro Airport (there *is* a landing 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. Please coordinate your schedules and needs in advance through our secretary, Heather Wood (hwood50@aol.com).

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 drseti@verizon.net, not later than April 1, 2014.

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 2013 Membership Meeting
- Financial Report
- Committee Reports
- Old Business
- New Business
- Good and Welfare
- Adjournment ❖

## The End of Time

by Dan Duda

from the March, 2014 issue of Penn Central,  
the monthly newsletter of Central PA Mensa,  
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*"I believe that time may not exist, and that quantum gravity—the unification of general relativity and quantum mechanics—will yield a static picture of the quantum universe."*  
~Julian Barbour, *The End of Time*

There's probably no concept in physics more counter-intuitive than the idea that time doesn't exist. After all, you started reading this article at one point, but now you're reading these words. Doesn't the distance between those two events require a passage of time? Well, within the limited scope of our intuition, time must exist. But we continue to find, time after time, that our innate intuition is far too limited to comprehend reality. And it looks like our perception of time will be another casualty of that limitation.

So, you ask, if time doesn't exist, at least not as we perceive it, how can we explain the phenomena we experience? Let's start with our good friend Albert Einstein who said *"people like us who believe in physics know that the distinction between the past, the present and the future is only a stubbornly persistent illusion."* For him, the classical understanding of time began to fall apart with his insight on relativity. In that breakthrough theory, time is just another dimension like up/down, backward/forward, and left/right. And it's not constant—the speed of time's passage that affects us depends on the impact of motion and gravity.

Perhaps most shocking is the fact that simultaneity depends on the relative position and motion of an observer. For example, an arrow is shot at a target. In classical reality we see the arrow let loose, followed by its flight, and finally its contact with the target. However, at relativistic speeds, an observer might see the arrow already at the target followed by its flight back to the bow. According to the theory this would not be an illusion, but rather the physical reality for that observer.

So Uncle Albert and the many scientists in his camp on this topic describe something called "the block universe." One way to come to grips with this idea is to ask 'does time pass...or do we pass through an existing field that we call time?' In the latter scenario everything that ever happened, everything that is happening now, and everything that ever will happen is all laid out in one interconnected landscape of "now." The dinosaurs are there, as well as the asteroid that ended them. The best and the worst moments of our lives still exist in this block universe. And that alien invasion (or whatever will happen in the future) is there, too. If true, that hypothesis puts an end to the old debate about free will vs. determinism.

A British physicist, Julian Barbour, has articulated another way to look at why we perceive (or misperceive) time as we do. His ideas are based on the assumption that there is no framework to the universe. He describes motion and the perceived passage of time as being "background independent." According to Barbour *"Time is a measure of difference be-*

tween two configurations.” Therefore, it’s not so much that time passes, but rather that things change. A reasonable metaphor is a movie. The film proceeds one frame at a time—each succeeding frame changed slightly. Yet the whole film (all of the frames) exists at one time: past, present and future. It’s only that our attention is drawn to each segment so we focus on that point rather than the whole—hence our perception that time is actually flowing in the movie.

Barbour’s theory is based, in part, on the ideas of Ernst Mach, an Austrian physicist who made significant scientific and philosophical contributions around the turn of the 19th to the 20th centuries. Mach said “*It is utterly beyond our power to measure the changes of things by time. Quite the contrary, time is an abstraction, at which we arrive by means of the changes of things.*”

As a capstone to this discussion of time (or lack of it) consider one of the major enigmas of modern physics called *the problem of time*. It’s best defined by the Wheeler-DeWitt equation which is an attempt to describe the quantum universe “...and there is not a trace of time in it. It seems to describe a completely timeless universe” (Barbour). In the immortal words of John Wheeler “*The black hole teaches us that space can be crumpled like a piece of paper into an infinitesimal dot, that time can be extinguished like a blow-out flame, and that the laws of physics that we regard as ‘sacred,’ as immutable, are anything but.*”

## Remembering:

### Thomas Pierson (1950 - 2014)

Tom Pierson, who founded the nonprofit SETI Institute in Mountain View CA, and went on to become its Chief Executive Officer for most of the organization’s first thirty years, died on February 20 of cancer. He had been on medical leave since 2012.

Under Pierson’s guidance, the Institute grew from a tiny, narrowly focused research center with a handful of employees to its current status: an internationally known organization that is home to more than 130 scientists, educators, and support staff. While founded to conduct SETI searches, the Institute soon broadened its mandate to encompass all aspects of understanding the nature and prevalence of life beyond Earth.

Growing up in Norman, Oklahoma, Pierson studied aerospace engineering at the University of Oklahoma. By the early 1980s, Pierson was working as a grants administrator at San Francisco State University where he helped adjunct Professor Charles Seeger obtain research funds for the new SETI project headquartered at NASA’s Ames Research Center, an hour’s drive to the south. Intrigued, he made a proposal to project participants Barney Oliver, John Billingham and Jill Tarter, suggesting a more efficient way to organize the NASA efforts. Pierson laid out the benefits – both organizational and financial – of setting up a non-profit entity, dedicated to the research. In this way, the administrative and other costs associated with the project could be kept low, and more of the budgeted monies could go to the science.

Finding broad agreement with his idea, Pierson completed the paper work in the Fall of 1984, at which point the SETI Institute became a reality.

A decade later, the existence of this non-profit organization became crucially important in saving the nation’s largest SETI program. In 1993, a Senate amendment cancelled funding for NASA SETI, and the Institute stepped into the breach to keep the research going with private funding. Over the course of the last two decades, these efforts raised approximately \$90 million in private monies from donors such as Barney Oliver, Paul Allen, Gordon Moore, Bill Hewlett and David Packard, making possible the construction of the Allen Telescope Array, now used for the Institute’s SETI searches. Today, monies won by its scientists in competitive solicitations generate approximately \$17 million annually for astrobiology research.

For his extensive contributions to furthering the field of astrobiology, Pierson was recently recognized with NASA’s Distinguished Public Service Award, the highest honor given by the agency to non-government employees. The citation reads: For distinguished service to NASA and the scientific community through leadership of the SETI Institute, supporting basic research and education dealing with life in the universe.

Tom Pierson was not a scientist, but he was as fervent about the Institute’s varied research agenda as any of its investigators. He would exuberantly convey the excitement of SETI and astrobiology at any gathering, professional or amateur, formal or casual. His management style was characterized by a fierce loyalty to the Institute’s employees, and an easy willingness to let them try new ideas.

The persona and personality of Tom Pierson continues to define the organization that he founded. He was the touchstone for everyone who works at the SETI Institute: his enthusiasm, upbeat attitude, sense of humor, and humility are the organization’s DNA. He was always pleased to let his employees take the credit for any of the Institute’s many accomplishments. And yet those who had the great fortune to work there during the nearly three decades of his tenure know that their work and their rewards were made possible by Tom Pierson. The SETI Institute remains a burnished legacy of the man who conjured its existence.

Tom Pierson is survived by his wife, Elyse, his daughter Elizabeth and son Thomas, and Justin, his son by a previous marriage. The SETI League extends its deepest sympathy to Tom’s family, his many friends, and our colleagues at the SETI Institute.





**Rocket Scientist**  
**(on becoming a NASA Principal Investigator)**  
**Copyright © 2013 by Dr. H. Paul Shuch**

[In the previous issue of *SearchLites*, I waxed poetic about my modest role in the founding of The SETI League. Not content to retire, when I exited my SETI League position, I found myself back in industry. Here, again in verse, is the story of how I went from Executive Director to government contractor.]

I suppose I've always known that all good things must end.  
Starting up The SETI League with Richard, my ham friend,  
Never did I doubt his dedication to the cause,  
Knew he would provide support and funding without pause.  
I guess I began to think of him as Santa Claus.

For a while, the resources all fell into our lap.  
Richard had a company whose profits he could tap  
For the cool components and equipment we desired,  
Building radio telescopes. We had all we required  
To realize my new designs (which really were inspired).

Richard's patent lawyer, Orville, lent us his support,  
Moral and financial, so we needed not resort  
To extensive fundraising. We really were in luck,  
Knowing he would lend a hand whenever we got stuck.  
When he passed away, he left us half a million bucks.

That sum was enough to fund us half a dozen years.  
Though we were abstemious, you can guess our fears  
That Orville's endowment would be running dry some day.  
"Find another benefactor," Richard had to say.  
"I don't know how long I can keep covering your pay."

My consulting company was my ace in the hole,  
Because I knew The SETI League could not long be my sole  
Source of income. And so I began to look around  
For a high-tech startup breaking new and fertile ground,  
And a NASA contractor I ultimately found.

QorTek had a contract to design and fabricate  
A space-borne radar system, and it promised to be great.  
To implement it, they required an aerial design.  
With a Penn State EE prof, they hatched a plan to sign  
Up one of his grad students to build them one on time.

QorTek's NASA contract was intended for three years.  
One year in, their CEO was starting to have fears  
That the Penn State student was not holding up his end  
Of the project. He decided maybe he should send  
Me to campus, to see what assistance I could lend.

What I saw was disappointing, at the very least.  
Very quickly I perceived that not if we increased  
Penn State's budget tenfold, would their circuits ever fly.  
Just re-engineer the thing, my client begged me try.  
Sadly, I said "better just to let the damned thing die."

Megabucks in contract funding clearly were at stake.  
I insisted PSU had not made a mistake.  
NASA's goals and PSU's objectives don't agree.  
NASA needed space-flight hardware, anyone could see.  
Penn State wanted just to fund another PhD.

Were they to abandon this design, my client feared,  
There'd be insufficient funding for the coming year.  
With renewal deadline looming, I took to my lab,  
Did some testing, built some circuit boards, and took a stab  
At a fresh design. I gave it everything I had.

Three weeks later, I'd produced the crudest prototype,  
Thinking to buy time from NASA, tried my best to hype  
My alternate design approach to QorTek's CEO.  
He said he'd consider it, but that I'd have to go  
Down to Goddard and put on a dog and pony show.

"Our initial concept," I told NASA's engineers  
"We thought showed great promise, but we've all along had fears  
That it wouldn't be all that it was cracked up to be.  
So, along the way, we funded as IR&D,  
This design alternative I want you now to see."

I then showed my prototype. Although it seemed quite crude  
All the NASA managers quite quickly understood  
It would clearly outperform the PSU design.  
(Little did they know I was just trying to buy time.)  
The antenna ultimately voted for was mine.

But, there was a catch. The Program Manager chimed in,  
"We sincerely want your Phase Two contract to begin.  
Just one minor detail," she continued with a sigh.  
"We will fund it, but you must take over as PI.  
Run the program, and you're in." "OK," was my reply.

Principal Investigators under contract can't  
Simply be consultants. A condition of the grant  
Is that the PI must be a full-time employee.  
I had my consulting client, I began to see,  
Over quite a barrel. For I would not work for free.

"What is it you want from us?" the CEO inquired.  
It was obvious I was expecting to be hired  
At substantial salary, and title, and the best  
Benefits they could afford. He sounded quite distressed,  
But I knew that somehow we'd negotiate the rest.

Thus did I become Vice President and CTO,  
And for two years I was most content to run the show.  
NASA got their radar system. I got decent pay.  
I resigned the SETI League. And, when I went away,  
They made me Emeritus. I still am, to this day.



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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 2013 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 <i>annual</i> 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/c)*	(o)*
Pocket protectors	\$ 3	\$ 4
Mouse pads	\$ 5	\$ 7
<i>Tune In The Universe! (CD-ROM)</i>	\$25	\$30
<i>Proceedings of SETICon01</i>	\$20	\$27
<i>Proceedings of SETICon02</i>	\$20	\$27
<i>Proceedings of SETICon03 (CD)</i>	\$15	\$17
<i>Proceedings of EuroSETI04 (CD)</i>	\$15	\$17
<i>Proceedings of SETICon04(CD)</i>	\$15	\$17
<i>SARA Conference Proceedings:</i>		
2006, 2007, 2008, 2009 (specify)	\$20	\$27
<i>SETI League Technical Manual (CD)</i>	\$10	\$13
<i>Project Cyclops 2<sup>nd</sup> 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	\$17
<i>Demented!</i> (music CD)	\$15	\$17
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	\$43

**\*Includes postage to (u/c) US/Canada, or (o) other locations  
Payments in US Dollars, check payable through a US bank**

**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](http://www.paypal.com) and specify that your payment be directed to [paypal@setileague.org](mailto:paypal@setileague.org).

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Address: \_\_\_\_\_  
 \_\_\_\_\_  
 Phone: \_\_\_\_\_ email: \_\_\_\_\_  
 Ham call: \_\_\_\_\_ URL: \_\_\_\_\_  
 Contribution enclosed (US Dollars): \_\_\_\_\_