



The SETI League, Inc.

2010 Annual Report
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SETI scientists seek to determine, primarily through microwave and optical measurements, whether humankind is alone in the universe. Since Congress terminated NASA's SETI funding in 1993, The SETI League and other scientific groups have been attempting to privatize the research. Experimenters interested in participating in the search for intelligent alien life, or citizens wishing to help support it, should visit us on the Web at <<http://www.setileague.org/>>, email to join@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 electromagnetic Search for Extra-Terrestrial Intelligence.



SETI League Vision

Recognizing that confirmed evidence of extraterrestrial intelligence will change forever our view of humanity's place in the cosmos, The SETI League, Inc. envisions a worldwide network of amateur and professional scientists working together to hasten our entry into the galactic community.

SETI League Mission

To encourage and support the Search for Extra-Terrestrial Intelligence by:

1. attracting a wide range of amateur and professional scientists into the SETI community;
2. developing technologies to assist the SETI experimenter in assembling a workable radio or optical SETI observatory;
3. disseminating hardware and software designs in support of SETI;
4. coordinating SETI experimenters worldwide in conducting a thorough sky survey;
5. providing a variety of forums and media for wide-ranging communication among SETI experimenters, enthusiasts, and organizations;
6. designing, assembling, and operating advanced optical and radio telescopes;
7. identifying and publicizing potential spin-off applications of SETI technologies; and
8. raising public consciousness as to the importance and significance of a broad-based Search for Extra-Terrestrial Intelligence that encompasses a variety of strategies.



Six Degrees of SETI Separation

by Prof. H. Paul Shuch
Executive Director Emeritus

How can one possibly associate the Space Shuttle with SETI? It's a long, convoluted path, so stay with me.

I'm sure every space enthusiast of appropriate age remembers exactly what he or she was doing when the Challenger shuttle exploded - it's one of those pivotal moments in history that's indelibly etched in our memory banks. Following that disaster, a panel of experts was convened to investigate. The person on the Rogers Commission who first figured out, and then demonstrated, the connection between low temperatures and O-ring deformation was CalTech professor Richard Feynman. That brilliant physicist and Nobel laureate (like many brilliant American physicists of his generation) had spent the years of World War II at Los Alamos, NM, developing the first atomic bomb. There he worked for Enrico Fermi, best known to the SETI community for the famous Fermi Paradox -- but I digress.

I remember reading, in a volume of Feynman's memoirs in the late 1980's, a passing reference to someone named Tukey, whom he had known in graduate school at Princeton. The name rang a bell, so I went back to a book given me by my uncle, the late Bayesian statistics authority Ward Edwards of USC, when I was in grad school. The title was *Exploratory Data Analysis*, and the author was John Tukey, a noted statistician at Princeton. The very same Tukey of whom Feynman wrote. (That book informed and inspired some of the analysis tricks I employed in my doctoral dissertation -- but I digress.)

It was Tukey, I later learned, who had developed the Fast Fourier Transform (FFT), the algorithm which has been, until recently, the primary signal analysis tool of observational SETI. I first learned about the FFT in a landmark textbook on the Fourier Transform, written by Ron Bracewell of Stanford. Bracewell was an Australian radio astronomer who co-authored the very first radio astronomy textbook, and later became very involved in SETI research -- but I digress.

One of the things that motivated Bracewell's interest in SETI, it turns out, was the seminal article *Searching for Interstellar Communications*, by Cocconi and Morrison. Phil Morrison, as I'm sure you know, went on to become the father of modern SETI science, and a mentor to many SETIzens, including me. He was also a veteran of the Manhattan Project at Los Alamos, and somewhere along the line had gotten to know Tukey. Interestingly, Morrison, Feynman, and quite a few other Los Alamos scientists went on to become staunch pacifists, and proponents of nuclear disarmament. (But I digress.)

I could go on (digressing), but I think you can see the pattern here. From Challenger to Feynman to Tukey to Bracewell to Morrison, it all points to SETI. It's a case of convergent influences, quite common to all intellectual pursuits, and I'm sure you've seen similar connections elsewhere. The point is, SETI is so highly interdisciplinary a field of study that you can get there from just about any conceivable starting point. And, from wherever you started, you arrived at this page for a reason. SETI science needs your skills and background, whatever they may be.

But, I digress.



Case for Support

Ever since mankind first used intellect to distinguish itself from the rest of the animal world, a fundamental and profound distinction became evident --- we do not seek simply to survive, we seek to understand.

Intellectual curiosity is part of what separates man from beast. And scientific endeavor has always been driven less by need than by desire. We desire knowledge not for what we can do with that knowledge, but for the sake of the knowledge itself.

Modern scientific research has until recently followed the same principle: ask the questions, find the answers, then figure out how to apply that knowledge. But today, more and more scientific research is being dictated by a pre-determined end, an application in search of a question.

Scientific research isn't about application, but discovery. The Search for ExtraTerrestrial Intelligence (SETI) is mankind's search to know what, or who, is out there. Because it is contrary to our nature to not try and discover if there is intelligent life beyond our own world.

The SETI League was established in 1994 to continue the scientific research formerly conducted by NASA. When funding for NASA's SETI research was cut, it was left up to a handful of visionary pioneering scientists to privatize the search for intelligent life in the universe.

The SETI League is a 501 (c)(3) not-for-profit scientific research and education organization. Universal in its scope, it is international in its composition, with more than fifteen hundred volunteers in five dozen countries participating in the organization's activities.

Project Argus is a prime example of the type of work **The SETI League** is involved in. *Project Argus* is an effort to deploy and coordinate roughly 5,000 small radio telescopes around the world, in an all-sky survey searching for microwave signals which might possibly be of intelligent extra-terrestrial origin. When fully operational, *Project Argus* will provide the first ever continuous monitoring of the entire sky, in all directions in real time.

SETI League members have developed the necessary hardware, software, protocols, and procedures for distribution worldwide. Traditional research grade telescopes, of the type used by NASA, can view only a small fraction of the sky at a given time, typically on the order of one part in a million. To achieve the goal of continuous all-sky coverage would require one million telescopes, properly located and aimed. The cost for such an enterprise would exceed the Gross Planetary Product.

Project Argus has taken an innovative approach to the problem. By employing much smaller, relatively inexpensive amateur radio telescopes, built and operated by **SETI League** members at their own expense, we will be able to achieve an all-sky view for an infinitesimal expenditure.

Only 5,000 of these smaller instruments, properly coordinated, are required to see in all directions at once. The equipment, though modest, is capable of detecting microwave radiation from likely sources out to a distance of several hundred light years.

This is an example of the innovative volunteer projects in which members of **The SETI League** are engaged. And, while the relative cost of these types of projects is low, there are hard costs nonetheless.

To continue this research and expand **SETI League** activities, the organization needs to raise \$600,000 over the next three years. Membership dues, gifts, and contributions will certainly help, but it is necessary to expand funding sources beyond current levels and current sources.

The SETI League is seeking investments of \$50,000 from foundations, corporations, and individuals, those who are committed to scientific research and radio astronomy.

We welcome the opportunity to present our annual report and a full proposal for funding. And while spin-off technologies and applications are an inevitable result of scientific exploration and discovery, it is the search that inspires us, that causes us to lift our eyes to the heavens and wonder.

Program Service Accomplishments – Science

During 2010, The SETI League and its members made the following contributions to radio astronomy and SETI science:

- Supported 147 Project Argus radio telescopes built by members in 27 countries on all seven continents. Coordinated their SETI and astrophysical observations. Argus stations analyzed and cataloged several new candidate signals during 2010.
- Members' stations continued to monitor telemetry signals and science beacons from several NASA and ESA interplanetary space probes.
- Provided Committee leadership (as co-chairman) to the SETI Permanent Study Group of the International Academy of Astronautics.
- SETI League members continue to lend computer support to the SETI@home distributed computing experiment, through the Berkeley Open Infrastructure for Networked Computing (BOINC).

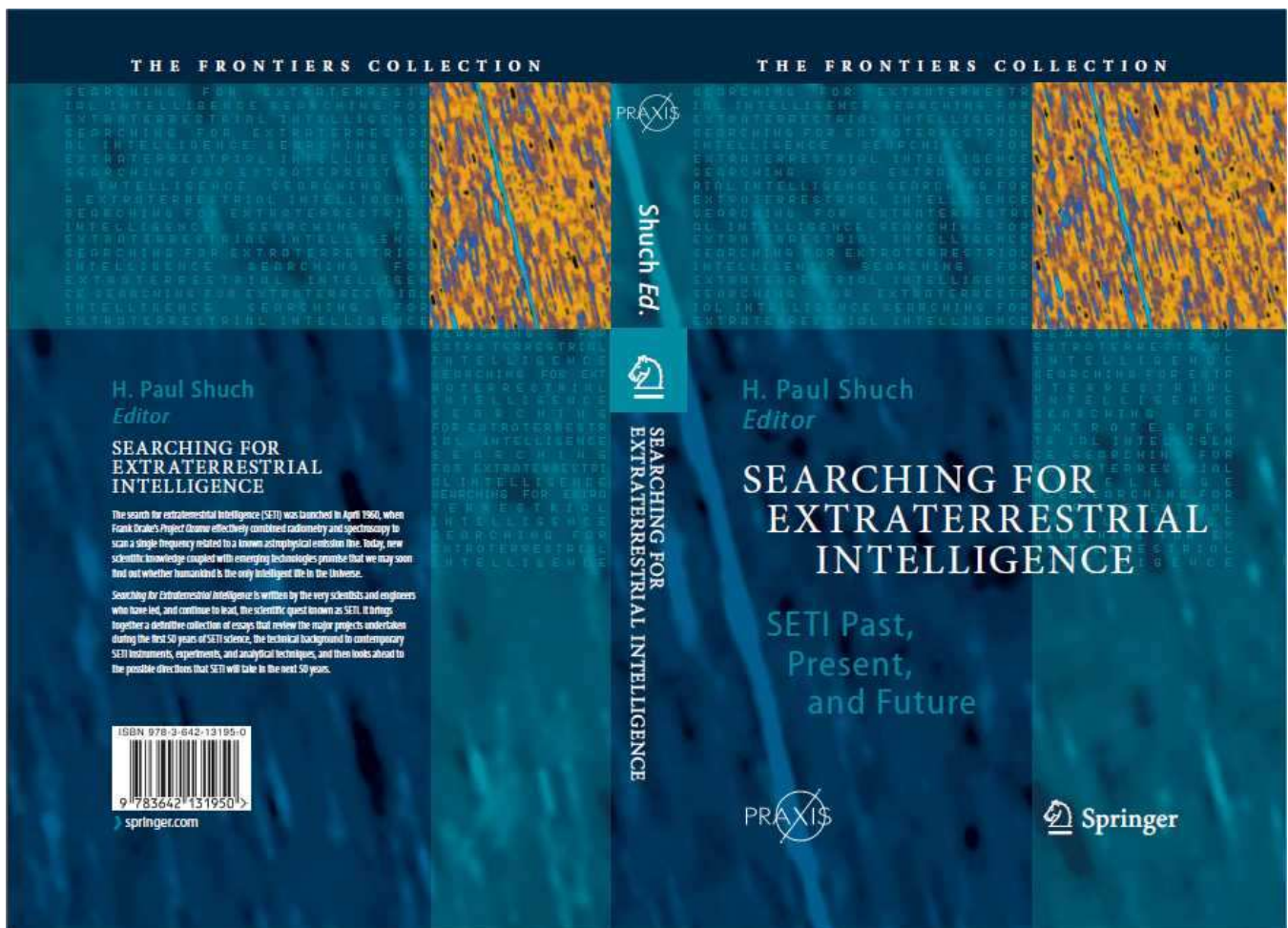


SETI League member Marc Franco with his newly constructed 20 foot diameter stressed parabolic dish antenna in North Carolina, USA. (N2UO photo)

Program Service Accomplishments – Technology

During 2010, The SETI League and its members made the following contributions to technology design and development:

- Assisted three members in bringing new Project Argus stations online.
- Coordinated and archived four closed technical email lists.



This new SETI book, edited by The SETI League’s executive director emeritus (who also contributed the Dedication, Preface, and three chapters), was published to mark the fiftieth anniversary of observational SETI science. Most of its 26 chapters were authored by SETI League members. (Springer Verlag image)



Program Service Accomplishments – Public Education

During 2010, The SETI League and its members made the following contributions to educating the public on SETI science and technology:

- Executive Director Emeritus delivered six SETI lectures in the US, India, and Europe.
- Members participated in the 2010 Green Bank Technical Conference of the Society of Amateur Radio Astronomers (SARA), a SETI League affiliate, as well as SARA's regional conference at Stanford University, by presenting papers and conducting workshops.
- Executive Director Emeritus published six technical articles in scholarly journals, Conference proceedings, and the popular press, and served as a manuscript reviewer for the International Academy of Astronautics and the British Interplanetary Society.
- More than twenty SETI League members contributed chapters to a 50th Anniversary SETI book published by Springer Verlag, Heidelberg, Germany.
- Provided webmastering and website hosting services to the International Academy of Astronautics SETI Permanent Study Group.
- Distributed CD copies of "The SETI League Technical Manual" and "Tune In The Universe!", a radio amateur's guide to the Search for Extra-Terrestrial Intelligence.
- Officers and volunteer Regional Coordinators answered numerous email queries from around the world on technical and societal aspects of SETI.
- Distributed numerous print and CD copies of various SETI League Conference Proceedings.



SETI League affiliate SARA (Society of Amateur Radio Astronomers) held a Regional Conference at Stanford University in March, 2010. A number of SETI League members participated.

(SARA photo)

Program Service Accomplishments – Media and Outreach

During 2010, The SETI League and its members engaged in the following media and outreach activities:

- Published four issues of SearchLites, the quarterly newsletter of The SETI League, Inc.
- Coordinated and archived two open public email lists.
- Distributed four Press Releases and twelve Editorials to over 700 media outlets worldwide.
- Filed 52 weekly updates to The SETI League's extensive website.
- Mailed out dozens of membership brochures to email requesters.
- Several of our 60 volunteer Regional Coordinators in 46 countries conducted print and broadcast media briefings and interviews.
- Executive Director Emeritus granted print media and broadcast interviews in California, Pennsylvania, New Jersey, India, and the Czech Republic.
- Awards Committee chairman designated recipients for the fifteenth annual Giordano Bruno Memorial Award, and twelve SETI SuperStar Awards.



During a SETI workshop at the 2010 AAAS (American Association for the Advancement of Science) meetings in San Diego, SETI@Home chief scientist Dan Werthimer (left) received The SETI League's annual Giordano Bruno Memorial Award for technical excellence in the furtherance of SETI science. The presentation was made by prominent radio astronomer Jill Tarter, the previous year's Bruno Award recipient.

(SETI League photo)

Trustees and Officers

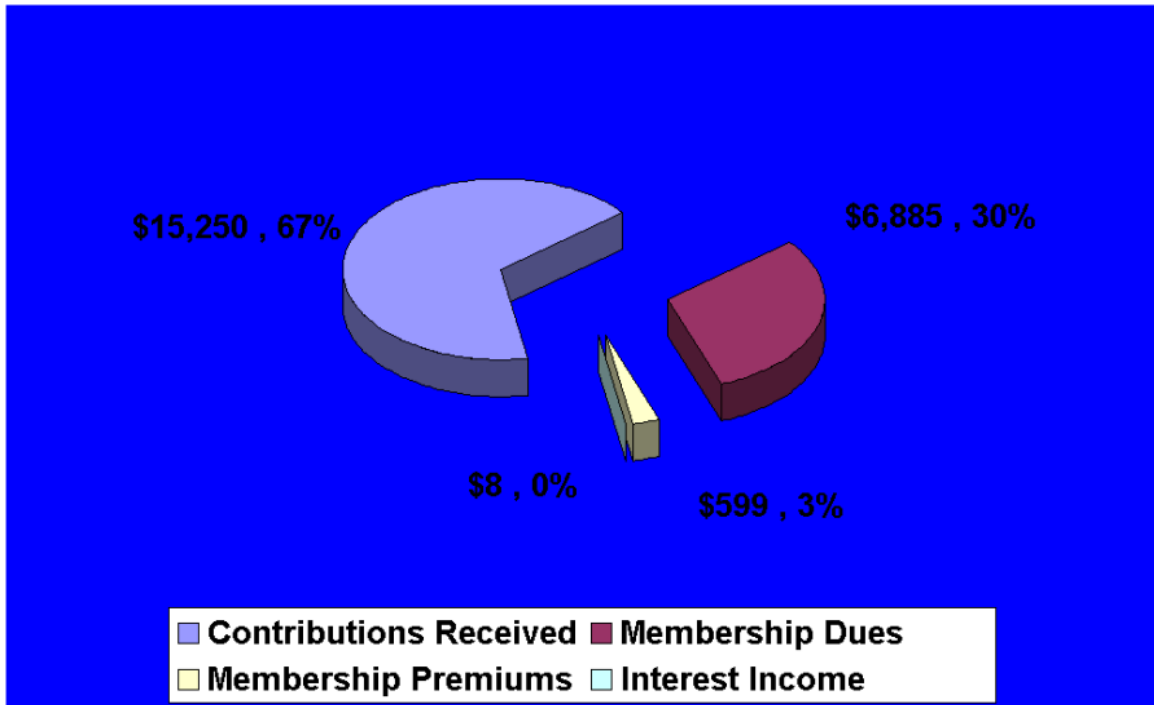
In accordance with Article V, Section 2 of the Bylaws of The SETI League, Inc., as amended, “The Board shall consist of all officers along with such other trustee positions as determined by the Board of Trustees at their annual meeting.” At its annual meeting on 18 April 2010, the Board confirmed the following officers and trustees to serve for a term of one year:

<u>Appointee</u>	<u>Position</u>	<u>Professional Affiliation</u>
Richard Factor	President	Chairman, Eventide Inc.
A. Heather Wood	Secretary/Treasurer	The SETI League, Inc.
Martin Schreiber, CPA	Trustee	Brand Sonnenschine LLP
H. Paul Shuch, Ph.D.	Executive Director Emeritus	AvSport of Lock Haven

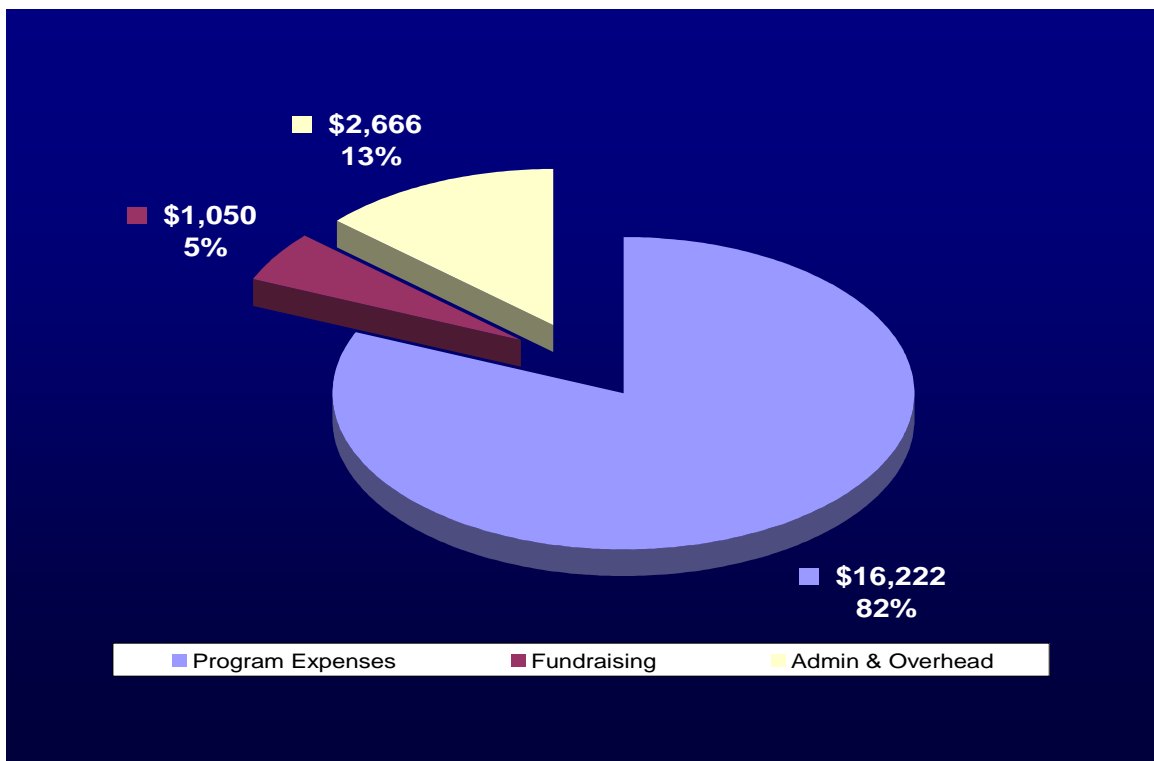


While in India on lecture tour, SETI League executive director emeritus Prof. H. Paul Shuch gave one of his popular Dr. SETI concerts, at which he performed a number of educational SETI songs. (Nitin Tiwari photo)

Financial Highlights



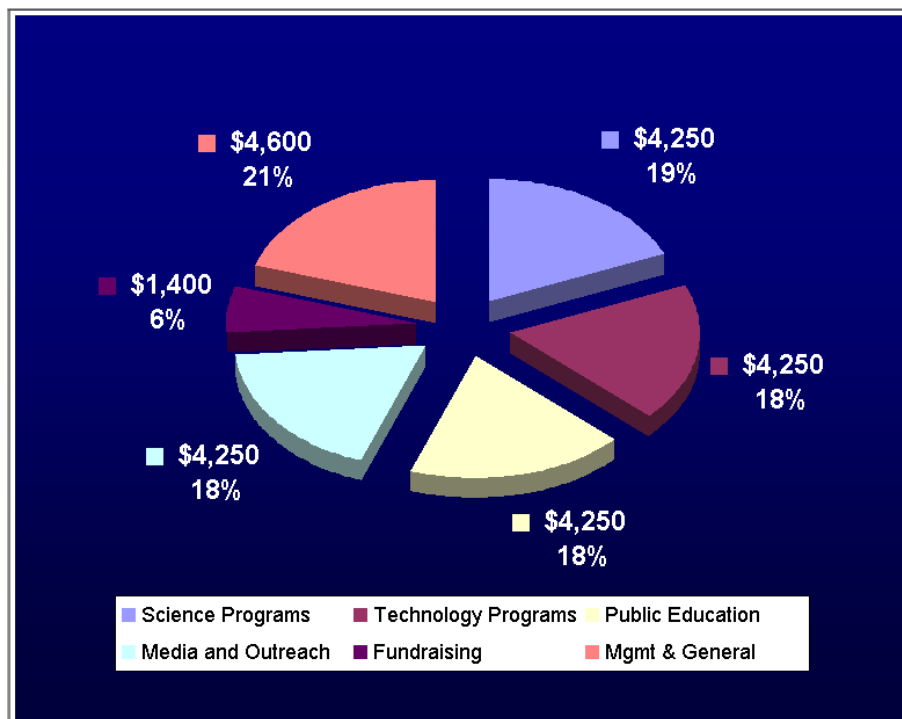
2010 Revenues



2010 Expenses

Annual Budget – 2011

990 Line	REVENUES:	2011 (projected)
1d	Dues, Grants & Contributions	20,000
4	Interest & Investments	19
12	Total Revenues:	20,020
	EXPENSES:	
13	Educ. and Scientific Programs	17,000
14	Management & General	4,600
15	Fundraising	1,400
17	Total Expenses:	22,000
18	Excess or (Deficit) for the year	(1,981)
	BALANCE SHEET:	
19	Beginning Net Assets	10,981
21	Ending Net Assets	9,000



2010 Projected Expenses



2010 Donors

The SETI League recognizes the extraordinary commitment of our Major Donors, each of whom has provided contributions of \$1,000 US or more, in cash or in kind, during 2010:

- Mr. Richard Factor (USA)
- Mr. Mark G. Pankhurst (British West Indies)
- Second Foundation (USA)
- Prof. H. Paul Shuch (USA)

We gratefully acknowledge the following supporters, who during the past year have made financial or in-kind contributions to The SETI League above and beyond membership dues:

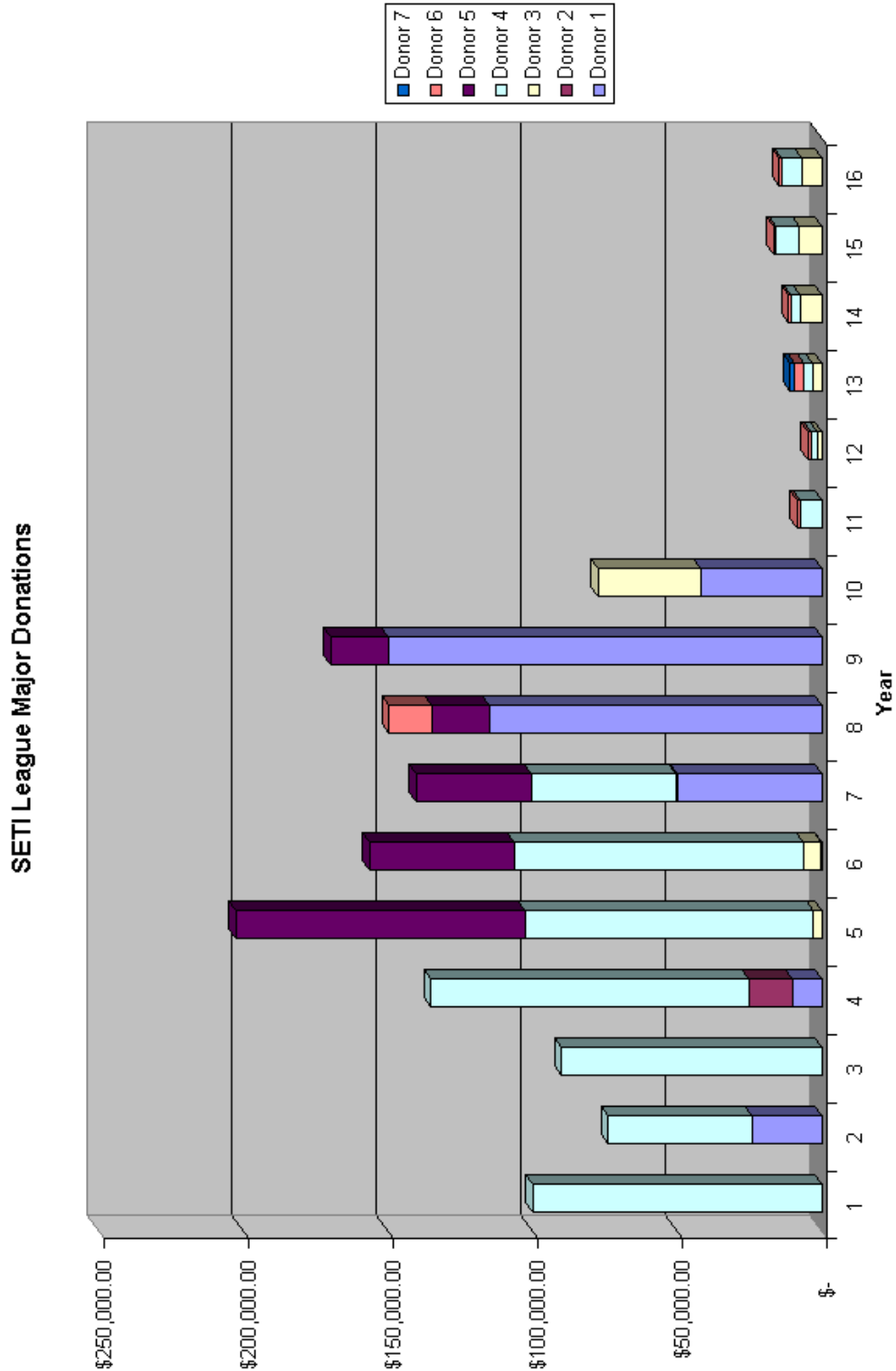
- Peter Backus
- Stephen Baxter
- John Billingham
- Stuart Bowyer
- David Brin
- Ralph Broom
- Peter Cheasley
- Jack Cohen
- Kathryn Denning
- Steven Dick
- Bob Dixon
- Jerry Ehman
- Albert Harrison
- Paul Horowitz
- Stuart Kingsley
- Eric Korpela
- Darren Leigh
- Claudio Maccone
- Stelio Mongebugnoli
- Dennis Murphy
- Joseph Ranger
- Monte Ross
- Christopher Rossie
- Seth Shostak
- Jill Tarter
- AllenTough
- Douglas Vakoch
- Stephen Webb
- Crispin Weinberg
- Jay Whipple
- Alexander Zaitsev

The SETI League welcomes the following individuals, who became new members of The SETI League during 2010:

- Chuck Gullage (USA)
- Michael Hresko (USA)
- Eric Korpela (USA)
- Michele Mallardi (Italy)
- Brian McCarthy (USA)
- Paulo Minafra (Italy)
- Gary Paulson (USA)
- Vincent Plousy (France)
- Joseph Ranger (Canada)
- William Severn (USA)
- Michael Veldman (USA)
- Connie Woods (USA)



Major Donations, Since Inception





Additional Information

For additional information about The SETI League, Inc. and its various educational and scientific programs, please see the following pages on The SETI League website.

Main Page	http://www.setileague.org
Financial Information	http://www.setileague.org/finances
Membership Services Department	http://www.setileague.org/admin
Publications Department	http://www.setileague.org/articles
Press Relations Department	http://www.setileague.org/press
Photo Gallery	http://www.setileague.org/photos
Technical Programs:	
Project Argus	http://www.setileague.org/argus
Very Small Array	http://www.setileague.org/vsa
Array2k	http://www.setileague.org/array2k
Moonbounce Beacon	http://www.setileague.org/eme
Awards Program	http://www.setileague.org/awards
Hardware Support	http://www.setileague.org/hardware
Software Support	http://www.setileague.org/software
Technical Symposium	http://www.setileague.org/seticon
Dr. SETI ® On Tour	http://drseti.org

We are saddened to report the death during 2010 of astrophysicist Malcolm I. Raff, a Charter Member who served on The SETI League's scientific advisory board, as well as chairing our Strategic Planning Committee. This Annual Report is fondly dedicated to Mal's memory.

