

# IEEE life members newsletter



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## Welcome New 2015 IEEE Life Members

Joe Cruz, Chair, IEEE Life Members Committee

Welcome to the more than 2,500 IEEE Members including Fellows, Senior Members (SMs), and Members (Ms) who became IEEE Life Members (LMs) [Life Fellows, Life Senior Members (LSMs), and LMs] on 1 January 2015. Congratulations to you all throughout the world. IEEE recognizes your many years of professional work as well as your membership and commitment to the organization. We encourage you to continue your engagement with IEEE.



**IEEE Life Members  
Committee Chair  
Joe Cruz**

The *IEEE Life Members Newsletter* also goes out to other IEEE Members whose interests are similar to those of LMs, such as retirees. We hope that the articles in the newsletter stimulate you to interact with others outside your usual social, technical, and professional circles. We encourage you to continue your engagement with your local Sections, Chapters, and affinity groups. If you need helping connecting with your local geographic unit, please send us an e-mail at [life-members@ieee.org](mailto:life-members@ieee.org).

In locations where nearby colleges or universities offer engineering, there are opportunities for mentoring IEEE Student Branch members. These students are future active members of IEEE. If you influence the career paths of these students, you will experience great satisfaction making a difference in their lives.

The IEEE Life Members Committee (LMC), whose members are listed on page 16, is a joint committee of the IEEE and the IEEE Foundation. Among its functions, the LMC provides leadership in identifying and supporting the interests of the LMs in IEEE activities. It helps to determine what

projects deserve financial support from the Life Members Fund (LMF) in the IEEE Foundation. LMs are encouraged to contribute to the LMF. This newsletter includes articles about projects supported by the LMF, including the support of students participating in the Intrepid International Space Station Challenge, the Atomic Heritage Foundation–Manhattan Project’s Legacy of Innovations, and the IEEE Global History Network.

In the December 2014 issue of the *IEEE Life Members Newsletter*, I mentioned in my column that many LMs are currently at the LM grade. With at least 35 years of IEEE membership and technical work, LMs should review their career record and see if they have at least five years of significant performance, as required for elevation to the LSM grade. For more details, please visit [www.ieee.org/senior-member](http://www.ieee.org/senior-member). Don Wright, 2015 chair of the IEEE Admissions and Advancement Committee, has written a nice article with tips for successful application for senior membership (please see page 9 of [www.ewh.ieee.org/reg/3/](http://www.ewh.ieee.org/reg/3/)). If you do not personally know three SMs or Fellows to serve as your references, the IEEE Senior Member staff can assist you in locating references; send them an e-mail at [senior-member@ieee.org](mailto:senior-member@ieee.org). So, LMs, consider applying for the LSM grade. Others who are nearing LM eligibility, I urge you to review your career accomplishments and apply for elevation to SM grade if you are not already there.

The LMC is working to enhance the content of our newsletter. We are specifically focusing on increasing the content in the subject areas related to history, highlighting grants given

through the LMF, and featuring local LM activities. The newsletter welcomes “Tales from the Vault” articles that focus on your personal involvement with projects that

turned out to be historically significant. Let us hear from you. You are welcome to communicate with me directly via e-mail at [jbcruz@ieee.org](mailto:jbcruz@ieee.org).

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## LMF Grants Fund a Wealth of Programs

The IEEE Life Members Committee (LMC), a joint committee of the IEEE and the IEEE Foundation, is responsible for the administration of the IEEE Life Members Fund (LMF). Thanks to the generosity of IEEE Members, the LMF—in collaboration with the IEEE Foundation—supports activities of interest to Life Members, potential engineers, and engineering students. The fund is supported by the generosity of IEEE Members. The LMF is pleased to announce its monetary support for the following programs.

- **Intrepid 5 Borough ISS Challenge (US\$25,000):**

To meet the challenge of providing more engaging, in-depth science, technology, engineering, and mathematics (STEM) experiences for students in high-needs areas, the Intrepid Sea, Air & Space Museum received funding to facilitate an experiment design competition with partner public schools from across all five boroughs of New York City. In partnership with the Student Space Experiment Program, the winning experiment will be sent to the International Space Station (ISS), where an astronaut aboard the ISS will conduct the experiment (see article on page 4 for more information). After six weeks in orbit, the experiment will be returned safely to Earth for data collection and analysis. Students will publish the results of their experiment to be shared with other participants.

- **South Texas Electrical Engineering Mobile Lab (US\$13,945):** By outfitting the South Texas Electrical Engineering Mobile (STEEM) Lab at the University of Texas–Pan American (UTPA), the UTPA IEEE Student Branch (SB) will be able to promote greater interest in electrical engineering among area middle- and high school-age students. Through the STEEM Lab, engaging reusable projects, demonstrations, and exhibits will be developed that will be used for activities such as pre-university summer STEM camps and hands-on design challenges for first-year electrical engineering students.

- **MOOC on Standards: A Driving Force for Commerce (US\$30,000):** Standards fuel the development and implementation of technologies that influence and transform life, work, and communication. They form the fundamental building blocks for developing new products and technology around the world. Through this project, IEEE Educational Activities and

IEEE Standards will develop a massive open online course (MOOC) called “Standards: A Driving Force for Commerce,” offering a practitioner view of standards and standards development aimed at graduate-level students, educators, and new professionals in the fields of engineering, technology, and computing, as well as business, economics, and law. The MOOC is expected to be launched in March 2016 and will be delivered by a university professor over the course of six weeks.

- **Powering-Up Excitement with Computing Lesson Plans (US\$25,000):**

Recent reports indicate that efforts are needed to address anticipated shortfalls in the evolving technological skills required for the workforce of tomorrow. Launched in 2012 by IEEE Educational Activities and the IEEE Computer Society, IEEE TryComputing.org strives to bridge this gap by providing free online computing education resources for pre-university educators, parents, and students around the world. It currently offers a small selection of high-quality lesson plans on a variety of computing topics. Working together, IEEE Educational Activities and the IEEE Computer Society (the founders of TryComputing.org) will add ten exciting new lesson plans to IEEE TryComputing.org, thereby expanding support for the teaching and learning of computing.

- **Robotics Engineering for Girls: Quad Copter Camp (US\$15,000):**

Robotics Engineering for Girls is a new project created by the Science and Engineering Center (SEEC) at The University of Texas at Dallas to address the low representation of women in engineering fields. Studies show that girls begin to divert from STEM well before college and that not enough is being done at an early age to encourage young girls to sustain an interest in STEM subjects. The new, 14-day-long Quad Copter Camp targets girls from ages 13 to 15 and will teach participants to learn how to fly a small quad copter, work in teams to build a large copter capable of commercial applications, and build a business plan for commercial quad copter application. All campers will attend at no charge, with preference given to girls from low-socioeconomic families.

- **Globalization for Humanitarian Engineering Education (US\$15,715):** Humanitarian engineering helps disadvantaged people via the creation of

technologies for water filtration, sanitation, cooking, shelters, electricity generation, renewables, and agriculture. To date, people involved in humanitarian engineering have been primarily from the United States and Europe (e.g., via Engineers Without Borders, USAID, etc.) and most often they do not have access to a general preparation course to take before service trips. This issue was the genesis to create such a course and accompanying textbook, *Humanitarian Engineering: Creating Technologies That Help People*. The course and book, both available online (unlike any related book or course in existence), were developed to prepare humanitarian engineers to be effective helpers. This Ohio State University program seeks 1) to “globalize” the course and book by incorporating more common topics so that humanitarian engineers are well prepared no matter where they serve and 2) to “localize” the course within a given country by using it as a basis for creating short courses tailored to the needs of a specific region in a country (e.g., via recorded/online eight-hour short courses).

- **Open Source in Schools—Lumifi Technology (US\$2,500):** The Power to Be International, in partnership with the University of Toronto’s Enactus, seeks to provide technology and resources to high schools in rural western parishes of Jamaica. This project will reduce the impact of the digital divide and lack of the accessibility to educational materials and information for teachers and students. The benefits are twofold: 1) students and teachers in selected schools in rural Jamaica will receive technological resources to increase and expand the quality and accessibility of educational materials, and 2) engineering and computer students (local and international) will have an opportunity to further develop and enhance their skills in the field by planning and implementing technological training and assistance with devices.
- **Pre-University Workshop Tour and Competition (US\$10,000):** The IEEE Cordoba Subsection will visit more than ten schools in rural communities to introduce pre-university students to engineering. Using videos, pictures, and demonstrating small projects, the goal is to excite students about engineering. Students and teachers from all the schools that are visited will be invited to participate in a competition where they will be eligible to win prizes.
- **Embedded Computer Summer Camp—Middle School Students (US\$7,400):** One of the challenges

America faces today is that it is not able to produce a sufficient number of computer engineers. To address this challenge, the College of Engineering, Technology, and Computer Science (ETCS) at Indiana University–Purdue University, Fort Wayne (IPFW), and the IEEE Fort Wayne Chapter are initiating an Embedded Systems Summer Camp for 6th–8th-grade students with hands-on projects using very powerful, yet inexpensive, Raspberry Pi kits that are easily programmable and have been used in outreach activities in the United Kingdom. Through this camp, middle school students, parents, and teachers will become more aware of technical careers and can stimulate interest in computer programming.

- **Lab Robotics Design—STEM SoutheastCon 2015 (US\$18,000):** The IEEE Broward Section, IEEE Region 3, is using its grant to support the creation of new robotics labs in participating magnet schools and impart the skills required to design and build robots using the LEGO 8547 Mindstorms NXT 2.0 Robotics Kit. Participating schools were invited to participate in the SoutheastCon 2015 Robotic STEM Competition. IEEE Student (undergraduate and graduate) Members from the SoutheastCon 2015 partnering education institution will serve as mentors for these K–12 students.

The IEEE Foundation, in partnership with the LMC, invites grant applications from IEEE organizational units for projects under the theme: increase the understanding of technology and its critical role in meeting global challenges and improving the human condition. Eligible projects will inform the public about technical issues such as, but not limited to: energy, health care, cybersecurity, Internet governance, and environmental change for the purpose of fostering balanced factual discussion and understanding of a current public issue. Projects should result in the creation of materials and activities such as presentations and/or simulations that are suitable for one or more of the following audiences: secondary school/college students, secondary school teachers, IEEE groups, local community groups, and technology policy makers.

Applications are being accepted from now until 1 August 2015. Funding decisions will be announced in December 2015. For more information about applying for a grant, please visit the IEEE Foundation Web site [www.ieeefoundation.org/Grants](http://www.ieeefoundation.org/Grants).



## An “Uplifting” Grant Benefits NYC Students

Teams of middle school students from across New York City competed in April to have their research experiments conducted by a live astronaut aboard the International Space Station thanks in part to a US\$25,000 grant awarded by the IEEE Life Members Fund of the IEEE Foundation. Student teams proposed experiments involving microgravity, or weightlessness in space, and astronauts, engineers, and scientists served as mentors. The winning team’s experiment will spend six weeks in orbit beginning in October and then return to Earth for data collection and analysis. Students will publish the results of their experiments, which will be shared with other participants.

“This experiment design challenge, led by the Intrepid Sea, Air, & Space Museum, captures the imaginations of not just one classroom, but nearly 200 students, early on in their education,” says Glenys Gotthardt, program manager, IEEE Foundation. “This design challenge has the tangible elements of a competition, so it’s not abstract or theoretical and can create a spark in the students that may eventually lead toward a career in engineering.”

As a way of saying thank you to IEEE Members for making this grant possible through donations to the IEEE Life Members Fund, IEEE Members and their families may visit the Intrepid Sea, Air, & Space Museum on IEEE Day (6 October 2015) for free. Please note that for those wishing to visit the Space Shuttle Pavilion, a fee



**At the competition’s kick off, 200 students listened to former NASA Astronaut Mike Massimino and learned about the first Intrepid International Space Station Challenge. (Photo courtesy of the Intrepid Sea, Air & Space Museum.)**

will be charged. Tickets can be reserved for IEEE Members visiting the Intrepid on 6 October 2015 at <http://tinyurl.com/IEEEDay-Intrepid>.

The Intrepid Sea, Air, & Space Museum is located at One Intrepid Square, 12th Ave. and 46th St., New York, NY 10036 USA. Additional information will be shared as IEEE Day approaches.

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## Manhattan Project “Innovations” Tour Is Launched

Neutronic reactor. Calutron. Exploding bridge-wire detonator. These are just a few of the innovations developed during the Manhattan Project, the top-secret effort to create an atomic bomb during World War II. Thanks to a generous grant from the IEEE Life Members Fund, the Atomic Heritage Foundation (AHF) has launched a new “Manhattan Project Innovations” tour on its “Ranger in Your Pocket” Web site ([www.atomicheritage.org/tours](http://www.atomicheritage.org/tours)) to highlight some of the 6,500-patented scientific and engineering innovations that came out of the Manhattan Project.

People around the world now can listen to firsthand accounts of scientists and engineers who worked on the Manhattan Project and developed creative solutions to complex, first-of-a-kind problems. The tour features 28 different stops or programs such as “Thinkers and Tinkerers,” about the collaboration between theorist J. Robert Oppenheimer and experimentalist Ernest O. Lawrence. Another, “No Can, No Fuel,” illustrates how a statistical approach solved the dilemma of creating leak-proof cladding for fuel rods. Each stop highlights the ingenuity and resourcefulness of Manhattan Project participants as they tackled myriad challenges.

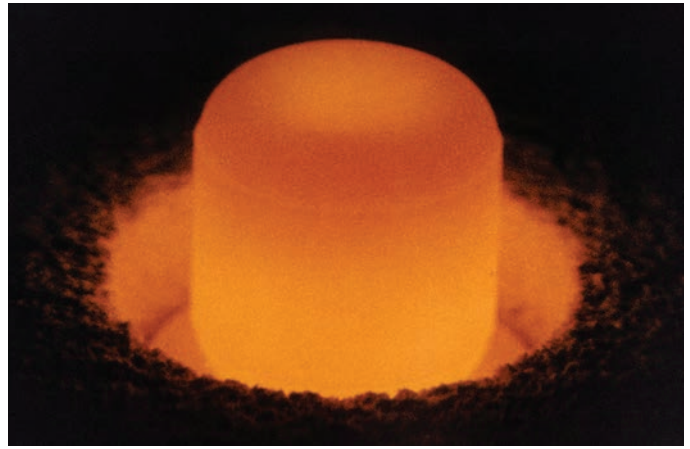
In one program, nuclear physicist Philip Abelson explains his unique process for separating uranium isotopes known as liquid thermal diffusion: “All it consisted of was three concentric pipes. This is all you had to put together and put heat in the middle and cool on the outside and uranium isotopes separate in between. The light goes to the hot and climbs, and the heavy goes down...it



**Ernest Lawrence, Enrico Fermi, and I.I. Rabi.**



**J. Robert Oppenheimer and Ernest Lawrence.**



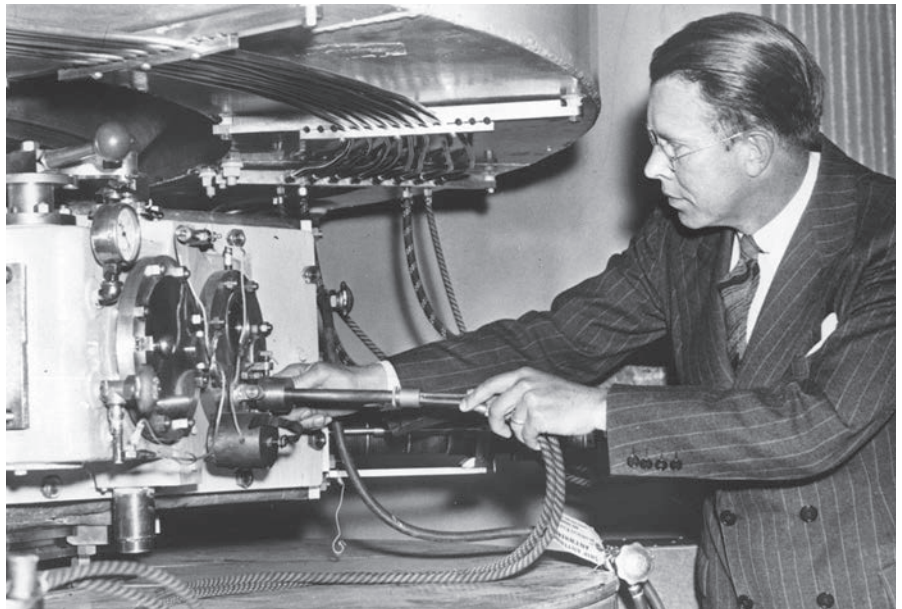
**A glowing cylinder of plutonium.**

worked!" Abelson's new process was installed at the S-50 Plant in Oak Ridge, Tennessee, in just 67 days and helped speed up production of uranium fuel for the atomic bomb.

The tour also features insights from Manhattan Project experts. David Kaiser, a professor of the History of Science at the Massachusetts Institute of Technology and author of *How the Hippies Saved Physics: Science, Counterculture, and the Quantum Revival*, explains the role of interdisciplinary collaboration. "On many Manhattan Project sites," Kaiser explains, "there were people trained in engineering who were for the first time working very closely—elbow to elbow—with people trained in very abstract and theoretical basic sciences...The hothouse of war threw them into projects with immensely pressured timelines where they had to learn how to work together."

In "The Colloquium," Manhattan Project veteran Ben Diven remembers how Laboratory Director J. Robert Oppenheimer inspired innovation through weekly colloquia in Los Alamos. "The colloquia were one of the most important things...Oppenheimer insisted that everything could be discussed there. The idea was to have various group leaders describe what the group was working on and what their main problems were, what they were having trouble with. Very frequently it would turn out that somebody not associated with the problem would come up with an idea that would actually be an important breakthrough."

Other tour stops, such as "Culinary Arts," focus on some of the lesser known, yet equally important, inventions that came out of the Manhattan Project. Harry Petcher, the manager of the box lunch department at the Hanford Site in Washington State, recalled an ingenious solution to solve the problem of spreading butter on the 50,000 sandwiches required to feed



**Ernest Lawrence tinkering with one of his machines.**

the site's enormous workforce. "We were slowing down the job during the spreading of the margarine... One of the girl's husbands came up with a solution. He took a paint spray gun with a thing that sucks the paint up. He took two metal cathodes that had electric heat in them and put those down into the margarine. Then he'd suck up the liquid margarine and take the spray gun, 'Psh, psh, psh,' and spray margarine on the bread. He took them down to the engineering department and they said, 'Oh, hell! That's the greatest idea I've ever heard of!'"

AHF plans to develop additional Manhattan Project tours on the "Ranger in Your Pocket" Web site. One tour will focus on Bathub Row, Fuller Lodge, and the former technical area in downtown Los Alamos, New Mexico. Another will focus on espionage and the role that spies played during the Manhattan Project.

For the Innovations tour, AHF is very grateful for the support of the IEEE, Crystal Trust, M.J. Murdock Charitable Trust, and Manhattan Project veteran and innovator James Schoke.



# IEEE History Center Unveils the Engineering and Technology History Wiki

IEEE Life Members (LMs) may be familiar with the IEEE Global History Network (GHN), the IEEE History Center's main platform for the exhibition and publication of its materials. With funding from a grant from the United Engineering Foundation, the IEEE History Center has partnered with six other engineering societies—the American Institute of Chemical Engineers, the American Institute of Mining Engineers, the American Society of Civil Engineers, the American Society of Mechanical Engineers, the Society of Petroleum Engineers, and the Society of Women Engineers—to expand the IEEE GHN by launching the Engineering and Technology History Wiki (ETHW). The IEEE History Center is proud to announce that the ETHW is live and can be viewed at <http://ethw.org>.

The GHN's scope was limited in a sense in that its focus was the history of electrical engineering and other fields related to IEEE's interests, whereas the ETHW aims to capture the history of all disciplines of engineering and related fields of interest beyond IEEE. Expanding the scope of the site allows the History Center to better serve its mission of reaching the public and a much wider body of potentially interested readers.

All of the content on the GHN has been migrated to the ETHW. This includes several thousand encyclopedic articles, more than 600 oral histories, and approximately 200 "First-Hand Histories," as well as thousands of scanned archival documents, including hundreds of hours of audio-visual material. In addition to the content migrated over from the GHN, IEEE's partner societies have begun posting their own content. The Society of Women Engineers has posted 65 oral histories as of

April 2015 and will be posting roughly 30 more. The Society of Petroleum Engineers has posted 19 oral histories and 15 "First-Hand Histories" on the Web site. Over the course of 2015, the ETHW will be approaching additional engineering associations for future partnerships. The IEEE History Center believes that greater diversity in the partnerships of the ETHW will lead to a more comprehensive body of content.

The ETHW's user database has also been preserved from the GHN. If you previously registered an account on the GHN, the login and password credentials will still be active. Both the GHN and the ETHW are running on MediaWiki, so users familiar with the editing interface of the GHN will feel right at home on the ETHW.

The IEEE Milestones proposal process has been moved off the ETHW and is now residing on its own site. Users interested in the IEEE Milestones program or who wish to propose an IEEE Milestone can view relevant information at <http://ieeemilestones.ethw.org>.

The IEEE History Center strongly encourages IEEE LMs to explore the ETHW and contribute their own original content. Writing a "First-Hand History" on the ETHW is a great way to preserve your memories and experiences so that they can be enjoyed and viewed by future generations. Contributing to encyclopedic articles helps the IEEE History Center record the legacy of IEEE engineers and technologies. Many IEEE LMs have submitted "First-Hand Histories" in the past, and you can view the list of "First-Hand Histories" or submit your own at [http://ethw.org/First-Hand:List\\_of\\_First-Hand\\_Histories](http://ethw.org/First-Hand:List_of_First-Hand_Histories). If you have any questions about the Web site or submitting content, please contact Nathan Brewer at [n.w.brewer@ieee.org](mailto:n.w.brewer@ieee.org).

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## REACHing Pre-University Students

The IEEE History Center is excited to partner with the IEEE Foundation to raise funding for its signature program, REACH: Raising Engineering Awareness and Appreciation through the Conduit of History. Many of you, through Life Member (LM) affinity groups, are involved in Northeastern University's RE-SEED (Retirees Enhancing Science Education through Experiments and Demonstrations) as volunteers in middle school classrooms. Working alongside teachers, you provide an in-depth look into the world of engineers and assist teachers who otherwise may not have the expertise to present highly technical subject matter.

REACH is the answer to teachers' oft-spoken desire to have well-crafted materials that will help them teach and engage pre-university students in the history and role of engineering and technology in their society. The IEEE History Center is ideally situated to help in this area, as it

has very deep resources regarding the public history of engineering and technology including IEEE history and archives, Oral Histories, and IEEE Milestones that can be purposed to create multimedia enrichment modules including professionally-created videos and complementary activities and materials. Each module will provide a snapshot of a segment of technological history and expand students' awareness and appreciation of engineers' roles in our present-day world.

While not every student who learns about engineering throughout history will enter a technical field, everyone will gain a better understanding of the technology they use daily, how the engineering discipline helped create the world many take for granted, and create a path for those students with an interest and/or talent in all engineering fields. History is the perfect conduit to position engineers as technological heroes, and social studies/

history teachers currently lack the tools to do so in an effective and exciting way.

One third of the IEEE History Center's budget is generated through the IEEE Foundation. As a signature program, REACH will be supported entirely by philanthropic dollars, and we are working with Natalie Krauser McCarthy, development officer, IEEE Foundation, to identify and cultivate donors. Our ultimate goal is to raise US\$4 million, which will be used to build a network of teacher and administration champions, develop and produce materials, create supporting marketing collateral, and, when possible, expand REACH into elementary and middle schools.

We are developing an advisory committee of educators and administrators who can help us further refine the most-needed topics and types of materials that will inspire and energize students. You may know of institutions or educators who want to learn more about this exciting initiative or who wish to help fund the enrichment modules. Please contact me at [m.geselowitz@ieee.org](mailto:m.geselowitz@ieee.org) or + 1 732 562 6022, or Natalie at [n.krauser-mccarthy@ieee.org](mailto:n.krauser-mccarthy@ieee.org) or +1 732 562 6065 today and become involved in REACH's success!

Michael Geselowitz  
Senior Director, IEEE History Center

## IEEE Life Members Fund 2014 Honor Roll of Donors

The IEEE LMs Committee (LMC) gratefully recognizes the IEEE Members and other friends who have directed their donation to the IEEE Life Members Fund of the IEEE Foundation. Those names are listed here. A full listing of donors of US\$100 or more to all of the 150+ IEEE Foundation funds appears in the IEEE Foundation's Honor Roll of Donors, which is published in July. Your support enables the IEEE LMC to support philanthropic activities that encourage students and young electrical engineers to pursue careers in engineering, investigate the history of electrical engineering, and represent the interests of IEEE Life Members (LMs) or similarly mature Members. All listings acknowledge gifts of US\$100 or more made during the calendar year 2014 specifically to the IEEE Life Members Fund of the IEEE Foundation.

The IEEE Development Office makes every effort to ensure the accuracy of the listing, including proper acknowledgment of gifts and correct spelling. Please notify us of omissions or errors by sending an e-mail to [donate@ieee.org](mailto:donate@ieee.org) or calling +1 732 465 5871.

The IEEE LMC extends a special thank you to those donors who are not included here.

### 2014 Honor Roll of Donors

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Hans L. Richter, LM  
David Rivkin, LM  
John D. Robbins, LSM

\* 2014 IEEE Life Members Committee Member

LM: Life Member, SM: Senior Member, LSM: Life Senior Member, LF: Life Fellow, M: Member, AM: Associate Member, I: Individual, F: Foundation

**Silver Advocate**  
**(US\$250 to US\$499) cont.**

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Michael Aparcar, LSM  
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Anastasia A. Balafas, LM  
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Thomas R. Balgie, LM  
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Tatsuya Harada, LF  
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## Donor Profile: His Commitment Honored

With a degree in engineering physics, Barney Finn found his first professional job rewarding but somehow lacking in a sense of fulfillment. This led him to earn a Ph.D. degree in the history of science, which he still feels would have made him a satisfied engineer, but instead he became curator of the Smithsonian Institution's historical electrical collections.

His position brought him in contact with the nascent IEEE History Committee. The consequence of this acquaintance was a career-long association, highlighted by the establishment of the IEEE History Center in 1980. "The enthusiasm of the committee members, and ultimately the creation of the center, provided reassurance that history should be considered an important element in an engineer's long-term education," Finn says. "I feel strongly that engineers should have exposure to the humanities, especially history."

The Bernard S. Finn IEEE History Prize (previously known as the IEEE Life Members Prize in Electrical History) is funded in part by the IEEE Life Members Fund and administered by the Society for the History of Technology. Finn adds, "Nothing could have made me feel better about my commitment to these two groups than this great honor." The prize is awarded annually to the author of the best published paper on the history of



***Finn feels strongly that engineers should have exposure to the humanities, especially history.***

electrotechnology—power, electronics, telecommunications, and computer science.

"The IEEE Foundation is a significant supporter of the Life Members Fund and the History Center's programs," says Finn. "Because of that, my modest financial contributions have given me great satisfaction."

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## Adding *Life* to IEEE!

Watch any awards show and you'll likely notice that among the most prestigious awards bestowed are those for lifetime achievement. Rare is the instance when excellence can be sustained over a long period—let alone a lifetime. It is for this reason that this combination of excellence and longevity holds such a place of honor in our society.

IEEE is no exception. Each year, IEEE is proud to welcome a new class of Life Members (LMs) to its ranks. LMs have traditionally set an example of leadership for the membership of IEEE. Their service, longevity, and philanthropy represent standards that are significant and impactful. Through their generosity, LMs annually make up a majority of the donor base providing critical support to IEEE objectives through the IEEE Foundation.

Among the benefits of IEEE Life Membership is the waiving of base membership dues. By gifting the amount of your waived fees, you can significantly impact the mission of the IEEE Foundation in a manner that is tax deductible in accordance with the law. Please continue the generous tradition of previous LMs by considering a donation to the IEEE Foundation.



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## Your Help Is Needed to Honor Wardencllyffe

As reported in the IEEE Long Island Section newsletter, *PULSE*, Wardencllyffe, the only remaining research facility of Nikola Tesla, was saved from the threat of a wrecking ball when it was acquired by the nonprofit Friends of Science East and is now known as the Tesla Science Center at Wardencllyffe. Plans are underway to convert the now-vacant laboratory to an educational science facility and museum, which will be open to the general public.

In support of the project, an informal committee of the IEEE Long Island Section is planning to propose to the IEEE History Committee that the IEEE present a special citation to the new science center. The citation would be recognized by means of a permanently installed plaque. The plaque would be dedicated in a ceremony coincident with the official opening of the new center.

To help make the strongest case for the citation, the committee is seeking assistance from IEEE Life Members or anyone who might provide documentation or information concerning historical activities that took place at the laboratory during its active years. The lab originally contained Tesla's office, a library, and an instrument room, plus generators and transformers, a machine shop, and glass-blowing and X-ray equipment. The widely used Tesla coils were also reported to have been fabricated there. The committee welcomes any specific records or documentation that relate to these or other significant activities at the lab.



**A statue of Nikola Tesla stands watch in front of Wardencllyffe.**

Please contact Jesse Taub, IEEE Long Island Section historian and a member of the citation committee, at [jjtaub@aol.com](mailto:jjtaub@aol.com).

Victor Zourides  
Citation Committee Chair, Long Island Section

Louis A. Luceri  
Region 1 Life Members Affinity Group Coordinator

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## IEEE Day—6 October 2015

Preparations for IEEE Day 2015 are underway, which will mark the sixth time in history when engineers worldwide celebrate the anniversary of the first time members gathered to share their technical ideas in 1884. Organize and collaborate to bring IEEE Day joy to your

local group. There are many fun ways to participate. Use the IEEE Day event map to read about the many worldwide celebrations at [www.ieeeday.org/local-events/](http://www.ieeeday.org/local-events/).

Start planning your event soon, and don't forget to network online and promote it on social media sites.

# Locating Local Life Member Activities

Are you interested in attending or volunteering at local activities for Life Members? Be sure to get in touch with your local Life Member affinity groups (LMAGs). The list of all our LMAGs can be found at: [www.ieee.org/lmag](http://www.ieee.org/lmag).

Newly formed IEEE LMAGs include:

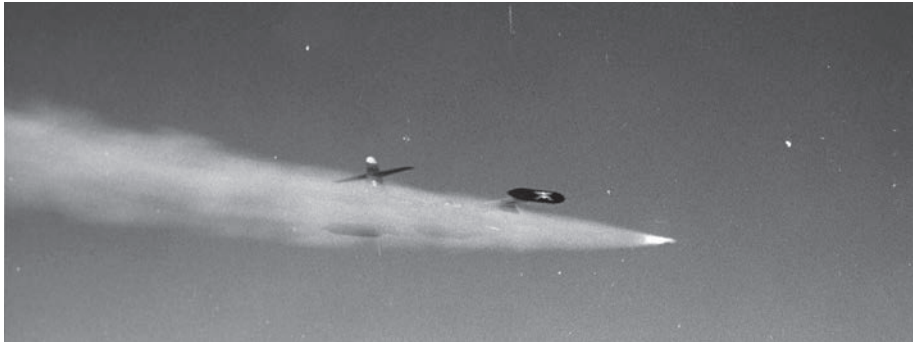
- Berkshire Section LMAG (Region 1)
- Coastal Los Angeles Section LMAG (Region 6)
- Kerala Section LMAG (Region 10).

## tales from the vault

### The Hill Genie

During the early 1960s, I was a newly minted Air Force lieutenant and a math-loving electrical engineer from the University of Michigan. I was assigned to work on the Minuteman intercontinental ballistic missile guidance system at Hill Air Force Base in Utah when the Vietnam War was really getting serious. My commander called me into his office one day to say that he was assigning me to work with the base's 2705th Air Munitions Wing to help them test an anti-surface-to-air missile (SAM) site weapon that they were developing, and it would be my job to calculate ballistic trajectory prediction data.

Hill's 2705th design used a rocket engine and nose shroud from the unguided Genie (AIR-2) missile. It normally carried a nuclear warhead for use as an air-to-air weapon, but that was being replaced with a load of



*An F-89 launching a Genie.*

cluster bomblets inside the frangible nose cone, which were cast-iron spheres about the size of tennis balls. Each one contained an explosive charge, a centrifugal fuse, and steel balls impregnated into its circumference. When dispensed mid-air, small veins on their surfaces caused them to spin, arm, disperse, and subsequently explode as they hit the ground, sending deadly shrapnel in all directions.

After calculating the probable correct combination of launch altitude, speeds, and other vectors, we tested our missile by firing it over the desert from an Air National Guard F-89, just west of Utah's Great Salt Lake. Our target was a plywood mockup of what a North Vietnamese SAM site would look like, and the "Hill Genie" did its intended target considerable damage.

The only problem in getting this new and apparently very effective weapon into use was bureaucratic, not technical. We were logistics people, and the Air Force Armament Lab, with other designs, was the nominal development agency for this type of weapon. The effort perished, and I went back to working on statistics and Minuteman guidance.



*A U.S. Air Force F-89.*

Michael Petz, LSM  
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## The First Integrated-Circuit Computer?

In the 1950s, thousands of transistors were made at the same time, with the switchable element diffused into a silicon substrate and connecting films deposited on top. The devices were then cut apart and tested. To make computer logic circuits, these “dice” were then wired onto a printed circuit board. Why was this necessary? Why couldn’t the connections be made at the same time as the devices and not cut them apart? Yields of individual devices with appropriate switching characteristics were way too low—a complete circuit of more than a few devices would never work.

In 1956, a senior engineer at the GE lab in Schenectady, New York, where I worked, showed me an article by Dudley Buck at the Massachusetts Institute of Technology of a wire-wound superconducting switching device—a cryotron. I knew that the GE research lab nearby had equipment to get to the low temperatures needed. I went there and repeated Buck’s experiments. It was soon clear that the gate wire could be hollow,

and—whoa!—it could be flat. The control coil could be also be flat, and it needed only a single crossing. This meant that the devices could be made flat on a substrate, with the connections between the devices made at the same time. Why would this have more chance of acceptable yields than semiconductors? Because cryotrons could be made of amorphous metals, not carefully diffused crystals, and only reasonable purity would be required. For a few years I developed these devices, making flip-flops and the like, together with Vernon Newhouse.

In 1960 GE’s head of computer research and development asked me to come to their new computer lab in the San Francisco Bay area (not yet called Silicon Valley). With the team there, we built ever-more complex circuits with first dozens, and later hundreds, of devices made together and connected together at the same time. In 1963, we built demonstration computers; the first one had troubles but the second one worked. (I still have it.) It had a control “chip,” an arithmetic “chip,” and

several memory “chips.” The first integrated circuit computer!

The semiconductor industry was working hard. They were also using photolithography to pattern device layers. Jean Hoerni’s planar structure, discussed at informal meetings, would greatly help the yield. I realized that semiconductors would soon overtake us, and we closed down our work and I went on to other things.

The logic devices being made now, in cross section, look just like our crossed-film cryotrons: a switchable element deposited on a flat substrate, covered with a flat insulator, in turn covered with a flat conductor that turns the switch on or off. Many devices are all connected into logic circuits at the same time using the same photolithography scheme I worked out with my colleagues 50 years ago. Semiconductors—not superconductors. Oh well, we had a lot of fun, and we were ahead for a little while.

John Bremer, LSM  
Fernandina Beach, FL

## Cinephonic Sound

Regarding the article on page 8 of the December 2014 *IEEE Life Members Newsletter* by James E. Beck concerning the Bell and Howell Filmosound 8 cameras, Model 1230: I purchased an 8-mm sound camera and projector that was sold on the consumer

market in 1962. It was developed in 1959 and was manufactured by Fairchild Camera. It was called the Cinephonic 8 mm sound system, and it used a magnetic stripe on the edge of the film.

Also, numerous articles were published in amateur photo magazines in

the mid 1950s with constructional details about synchronizing projectors with tape recorders.

Peter Brooks, LM  
Palm Bay, FL

## Tell Your Tale

One of the most popular features in the *IEEE Life Members Newsletter* is our member-submitted “Tales From the Vault” recollections. If you are interested in submitting your own story for publication in a future issue of the newsletter, you can find more details on page 16.

We are also interested in hearing about Life Member Affinity Group (LMAG) activities. Has your LMAG hosted any particularly successful events this past year? Send your stories and corresponding photos to Craig Causer at [c.causer@ieee.org](mailto:c.causer@ieee.org). Please keep all articles between 500 and 700 words.

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## Submitting Articles

We welcome articles for this newsletter. In particular, we seek articles about projects that are initiated at the Section and Region level by Life Members as well as “Tales from the Vault,” which should focus on novel or interesting technical issues. The suggested length for “Tales from the Vault” submissions is 500 words.

Acronyms should be completely identified once. Reference dates (years) also should be included. Editing, including for length, may occur. If you wish to discuss a story idea before hand, you may contact Craig Causer, managing editor, by e-mail at [lm-newsletter@ieee.org](mailto:lm-newsletter@ieee.org). The deadline to submit an article for possible inclusion in the next issue is 1 October 2015. Please include your Life grade, town, state, country, phone number, member number, and/or an e-mail address with your piece.

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## Qualifying for Life Member Status

To qualify as a Life Member, an IEEE Member must be at least 65 years old, and the sum of the member's age and the number of years of paid membership effective the following January must equal or exceed 100 years.

## Have Questions, Ideas, or Concerns?

Have questions regarding your Life Member status? Reach out to the IEEE Contact Center for assistance. Have something else you need to ask or discuss? E-mail the Life Members Committee or its staff at: [life-members@ieee.org](mailto:life-members@ieee.org), or call: +1 732 562 5501, or fax: +1 732 463 3657.

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