December 2013
www.ieee.org/lmc

IEEE life members newsletter

contents

The Fruits of Your Support

Louis A. Luceri, Chair, IEEE Life Members Committee

During my tenure as chair of the IEEE Life Members Committee (LMC), I've had the opportunity to meet with many of the Section officers and chairs of Life Member (LM) affinity groups. Unfortunately, time doesn't permit me to visit with all of the groups, so I thought it would be appropriate to share with you here how you, the LM, are represented and how you play a significant and critical role in this organization we call the IEEE.

IEEE Life Members Committee Chair Louis A. Lucer

You are represented by the LMC, a one-of-a-kind committee responsible to two organizations: the 1) IEEE Foundation, for the management of the IEEE Life Members Fund (LMF), and 2) IEEE for supporting the interests of existing and future LMs. The LMC is one of five committees reporting to the Member Engagement and Life Cycle Committee, which is a standing committee of the Member and Geographic Activities Board (formerly known as the Regional Activities Board). The LMF supports the activities of you, the LMs, engineering students, and potential engineers. Ongoing activities and grants are made possible in our six program areas thanks to the generous contributions entrusted to the LMC. The six program areas include: Pre-University Education, Students/Young Engineers, History and Technology, Humanitarian Activities, Peer Recognition, and Benefits to LMs.

The LMC depends upon your donations to the LMF to continue supporting these and other activities:

• Life Member Graduate Fellowship to a graduate student in the area of electrical engineering

• Washington Internships for Students of Engineering, which is ranked by The Princeton Review as one of the best internships in the United States, enabling a student to spend nine weeks in Washington, D.C., learning about the public policy process

• history of technology activities such as the Sarnoff Study Center at The College of New Jersey, where college classes, school field trips, and visitors can gather to learn about the Sarnoff collection, examine artifacts, and study a broad range of information. (The Center opened on 2 October 2013, and I was fortunate to attend the opening reception)

• IEEE LMs Fellowship in Electrical History, which supports one year of graduate work or post-doc research in history of electrical science of technology

• humanitarian activities such as, Bringing Light to "Le Refuge" Health Centre, a project of Electriciens Sans Frontieres from France, which enabled the building of a 2-kW peak photovoltaic-based micro ac network on a non-profit health center in Burkina Faso that cares for young children and their mothers free of charge

• cosponsoring the IEEE James H. Mulligan Jr. Education Medal, which recognizes individuals who have made outstanding contributions to education in the fields of interest of IEEE

• benefits to LMs to encourage members to remain active such as the biannual publication of the *IEEE Life Members Newsletter,* Milestone Technology Tours, and the funding of LM affinity groups.

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Many of these and other activities are presented to the LMC through the IEEE Foundation's Grants Program. The grant process occurs twice in a calendar year with deadlines in March and August. It seeks innovative projects that further the scientific and educational purposes of IEEE from IEEE units and other charitable organizations. Grant applications that meet the IEEE Foundation's guidelines are submitted to a six-member Grants Committee. The Grants Committee evaluates each application to identify those worthy of being recommended to the IEEE Foundation Board and LMC for financial support. In the first cycle of 2013, 15 grant applications totaling US$361,525 have been approved for funding. Eight, valued at US$139,225, were supported by the LMF (see article on page 3).

As of this newsletter, the second review cycle is underway, and 24 grant applications were submitted to the Grants Committee to see if they are worthy of support. To learn more about the IEEE Foundation Grants Program, visit www.ieeefoundation.org.

The LMC relies upon donations to operate and support activities of interest to LMs, engineering students, and potential engineers. You can make a donation through the LM Profile Review sheet that you receive each year at membership renewal time. There are a total of nine different funds that you can give to through the renewal. You can also make a donation by returning the enclosed business reply envelope or visiting www.ieee.org/donate.

The LMC and its fund are able to support the interests of members, like you, thanks to your donations. These donations enable the LMC to award grants, fund ongoing programs, and support local LM groups.

I encourage you to be an active Life Member!

Life Member Tech Tour Visits Canada

The IEEE Life Members Committee (LMC) Technical Tour was held in Canada from 25 August to 3 September. The tour included visits to IEEE Milestones and related museums as well as historical heritage sites in Hamilton, Toronto, Ottawa, Montreal, Sydney, and St. John's. IEEE Milestones included the First Distant Speech Transmission, DeCew Falls Hydro-Electric Plant, First External Cardiac Pacemaker, Alouette-ISIS Satellite Program, First 735 kV AC Transmission System, First Submarine Transatlantic Telephone Cable System, Landing of the Transatlantic Cable, Reception of Transatlantic Radio, and others.

Twenty-two Life Members (LMs) started the tour in Toronto, and it was interesting to note that at least six of the participants from the United States have been on every LM Technical Tour to date. Guests were provided a welcome package with name badges, copies of *IEEE Canadian Review* (four issues that talked about the IEEE Milestones that they would be visiting), a brochure, the participants list, and an IEEE Canada Life Member Tour 2013 pin. Various Sections reported back on the success of the tour.

- *Paris, Ontario—Cathie Lowell*
  I felt the tour participants enjoyed themselves and was glad that I had met them at their first stop. They had a brief overview from Bert DeKat of the Hamilton Section. The River Lily Store owner (a plaque is located on the outside of her store, which had opened up just for our tour) gave them more detailed background on Alexander Graham Bell's work in Paris. She then called over to the Paris Museum and asked them to open up for our tour. Many of the participants spent the rest of the time they had in Paris at the museum. Some walked through the town (many of them made purchases at the River Lily). We took a group picture before they departed.
- *DeCew Falls—Dave Hepburn*
  At DeCew they were really very interested in the old plant. They lingered, asked lots of questions, and chatted with the maintenance workers. In the end, instead of the 30 min I originally estimated, they spent 1½ hours there.
  For my part, the machines there are older than I remembered—1903, which makes them 110 years old and still running. And Ontario Power Generation is beavering away in refurbishing them to as-new condition, with the objective of getting at least another 20 years out of them. That would make them 130 years, which is extraordinary.
- *Toronto Dinner on 26 August—Patrick Finnigan*
  The group enjoyed themselves. The bar opened at 5:45 p.m., and we started dinner by 6:30 p.m. The dinner guest sitting closest to me spent his entire career computing at Los Alamos Lab and was a fellow HAM radio operator, so we had plenty to talk about. There were many stories being swapped among our visiting and local LMs.
  I was able to review the very positive IEEE Region 7 story, which Keith Brown sent, and also highlight Toronto Section history, as well as our Teacher In-Service Program activities. Roger Jones brought the group greetings from the Professional Engineers Ontario and the Ontario Society of Professional Engineers. Karl Martin's talk about his research and Bionym was excellent and very well received with dozens of insightful questions.
- *Banting Centre, Toronto—Pat Finnigan*
  The plaque part of the tour went off successfully. Some of the guests enjoyed riding the Red Rocket streetcar over to the University of Toronto and back.
- *University of Ottawa and Carleton University—Janet Davis*
  The tours went really well this morning. Guests enjoyed talking with the presenter at Ottawa University and seeing the labs at Carleton.
- *Sydney Mines—Dirk Werle*
  I met with the LM group in the early evening at the Heritage Museum in Sydney Mines to visit the IEEE

Tech Tour guests make a stop to visit the Paris Museum in Ontario.

Milestone plaque for the TAT-1. The visit went very well. I had coordinated with the museum curator, Dr. Critchley, to reopen the museum at 6 p.m., as the bus arrived. I had been in telephone contact with the driver during the day. We were able to access the plaque within a rich setting of railroad and communication memorabilia. I provided an informal ½-hour overview talk for the group onsite, with questions and (some) answers (that I was/was not able to provide as a geoscientist). I found the group most attentive with expert knowledge contributed by many distinguished individuals.

As a bonus, Dr. Critchley volunteered to show us the landfall site of the cable a mile down the road from the museum. So we all piled into our vehicles and bus to explore that site. There was great excitement and fun to see the site of raggedy cables sticking out of the sand, especially after a long bus ride. A neighbor—who watched all of the sudden activity along the shore with amazement from his porch—provided a sample. It was duly made the centerpiece of attraction for our group photo. After a good hour and a half, the group departed for the hotel and supper. I had the impression that everyone was appreciative of the TAT-1 plaque visit and the opportunity to see the landfall site.

The LMC is currently exploring options for a 2014 IEEE Milestone Tour in Europe. The tour will likely focus on the IEEE Milestones of Germany and France as well as visit related museums and cultural sites. If you have any questions about the tour, please contact lm-tours@ieee.org.

Eight New Programs Funded by the IEEE LMF

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

- **Balkan STEMification** (US$18,750): aims to promote young engineers and other science, technology, engineering, and math (STEM) professionals, especially women, as role models in Serbia, Bosnia, Croatia, Montenegro, and FYR Macedonia in order to encourage pre-university students from these countries to consider STEM as their professions. Filming 100 short stories, asking young STEM professionals from the region why and how they chose their profession and what are their dreams, hobbies, and passions, will achieve this goal. They will be filmed at places where research is carried out, at a relaxed atmosphere, or at work. Each story will be accompanied with short CV. All movies will be available on a specially designed Web portal as well as at YouTube.

- **The Computer Wore Heels interactive iBookApp** (US$4,000): an iBookApp aimed at 10–12-year olds that will share the story of young women who worked as mathematicians for the U.S. Army during World War II. Through outreach and digital distribution, this iBookApp will offer millions of school children an inspiring story of women and technology while supplying much-needed female role models to girls. By targeting girls at this crucial age, it is hoped that more will continue their studies in STEM areas. The Computer Wore Heels is a media project taking the form of an interactive iBookApp. Based on the *Top Secret Rosies* story, the app will target elementary-aged students. The story will utilize character development and dramatic arc, but the app structure will offer interactivity that a standard book lacks. As a student reads, he or she will be able to choose to investigate primary sources related to the

action, such as archival films, audio clips, and photographs. The student can also choose to engage in math exercises associated with a particular topic. By creating an iBookApp, the story of these female computer pioneers will be shared on the latest computer technology, allowing this story to come full circle.

- **K–12 STEM Outreach in Computer and Electrical Engineering** (US$19,680): for the past three years, the School of Engineering at the University of Alaska Anchorage (UAA) has run K–12 summer outreach camps to encourage precollege students to become interested and potentially pursue an education in one of the STEM fields (http://www.uaasummercamps.com). The camps are one-week long, led by a faculty member, and aided by UAA engineering students. Each camp provides students with the ability to build or simulate an engineering problem, and the emphasis is on hands-on activities. Some funding has been received for 2013. Previous camps included robotics, rapid prototyping, surveying, alternative energy, FM radio design, and structure destruction. Professors and students have participated in previous camps.
- **Futuros Ingenieros** (US$3,000): aims to empower children and youth on the basics of robotics through understanding the operation and programming of LEGO Mindstorm NXT. The Futuros Ingenieros project is a pilot project conducted by the IEEE Women in Engineering affinity group of the IEEE Student Branch at the The Universidad Técnica Particular de Loja, Ecuador, which aims to raise the skills of engineering in childhood, so that the next generation can provide technological solutions for the city and the country. The LEGO workshop is an opportunity for children and young people to demonstrate their ingenuity, creativity, and curiosity and to develop their skills in the construction of different types of robots. With the help of tutors, software tools, and LEGO Mindstorms NXT kits, students are initiated into the wonderful world of robotics.
- **Let There be Light: Beginnings of Multiphase ac** (US$9,500): devoted to acknowledging the historic and technical importance of the first multiphase ac electric power system in Croatia and one of first multiphase ac systems in the world. Several inventions were applied for the first time in hydro power plant Jaruga, e.g., ZBD transformers and Blathy wattmeters. The transmission line was also very interesting, built on wooden poles and having six wires, four power conductors (double two-phase line), and a communication (telephone) line. The transmission system from the power plant to the City of Šibenik was 11.5-km long, and the municipal distribution grid (3,000/110 V) included six transforming stations. It supplied 340 streetlights and some electrified houses in the town. The power system was set to operation on the night of 28 August 1895 and was the first multiphase ac power system in Croatia and one of the first complete ac systems (production to consumption) in the world. Three years later after the first Jaruga power plant, the construction of the second Jaruga hydro plant began.

- **The Manhattan Project's Legacy of Innovation** (US$50,000): the goal is to increase public awareness of the importance of the engineering and other technical innovations of the Manhattan Project, one of the most significant undertakings in the 20th century. The Manhattan Project illustrates the double-edged sword of scientific and technological innovation. The Atomic Heritage Foundation (AHF) will record oral histories of veterans detailing the technical innovations of the Manhattan Project and conduct research to establish the links to science and technology that followed. The oral histories developed under this proposal will be included on AHF's Web site, "Voices of the Manhattan Project" (manhattanprojectvoices.org). In addition, educational materials including audio/visual vignettes will be available on AHF's Web site (atomicheritage.org) for students, educators, and the general public. The materials will also contribute to museum exhibits on the history of the Manhattan Project and its legacy for science and society.

By 2017, we plan to create a national traveling exhibition to commemorate the 75th anniversary of the Manhattan Project that will be available to science and history museums across the country. AHF will work with the IEEE History Center during the planning phase to ensure that the project will have a broad national reach through cross-links with the IEEE Global History Network (GHN) and other means. AHF will take advantage of resources on the GHN and use the IEEE History Center's connections.

- **IV Engineering, Technology and Innovation Week** (US$13,325): an event organized by the student community of IFBA at Salvador to reach out not only the university members but the whole academic society in Salvador and possibly Bahia. It's directed from technician to undergraduate level, open for all of those interested, however within the requirements. In its fourth edition, the week will continue to hold mini-courses on a variety of subjects, seminars, and discussion panels in relevant topics. Most of it will focus on engineering areas, but in order to involve all the students on campus, the week always provides speakers and material from business and other STEM majors.
- **CMD-IT Student Professional Development Workshops** (US$21,000): held at the University of Washington in Seattle and the University of North Carolina, Chapel Hill, they provide in-depth professional development over the course of two days for underrepresented minority and disabled undergraduate and master's-level students. The workshop prepares underrepresented students for the rigors of industry recruitment through skill building and knowledge sharing with industry professionals. The major concern with students from underrepresented groups is that they often lack the necessary professional development exposure necessary for them to learn about career paths in computing, hiring practices, and marketing themselves more effectively for industry careers. Students who are exposed to professional development

are more effective with interviewing and take advantage of job opportunities. Providing opportunities for professional development early in their academic career increases students' confidence in their field and will increase the likelihood of retaining underrepresented students in computing where they experience greater degrees of isolation. It is vital that students from underrepresented groups have access to resources that will enable them to be competitive in the job market, ultimately help increase the pipeline of computing professionals from underrepresented communities, and address the strong need for diversity in computing, which allows companies to remain innovative.

To submit a grant application, visit the IEEE Foundation Web Site at www.ieeefoundation.org. To the maximum extent possible, Life Members should financially support the LMF. You can make a donation to the LMF online at www.ieee.org/donate.

Honoraria Giving: Turn Your Speaking Engagement into a Good Deed

Award recipients and conference speakers who receive payment in exchange for their speaking engagement may elect to donate their honorarium (cash prize or fee) to one or more of the designated Funds of the IEEE Foundation, including the Life Members Fund.

If you wish to donate your honorarium and avoid the taxable income, you must designate that IEEE (via IEEE conference chair/IEEE conference treasurer/IEEE staff director or IEEE senior administrator) transfer the honorarium directly to the IEEE Foundation. By submitting a request to redirect your honorarium directly to the IEEE Foundation, you will not need to complete a W-8 or W-9 form. If you accept the honorarium check, the honorarium becomes taxable income.

The IEEE Foundation routinely handles arrangements for honorarium recipients who desire to "repurpose" their honorarium for a good cause. If you would like to designate your award/speaker honorarium, you may download and complete either the Award Honorarium Form or the Speaker Fee Form from ieeefoundation.org and send a copy to the IEEE Foundation at donate@ieee.org, fax it to +1 732 981 9515, or send by mail.

The IEEE Foundation will recognize your generosity by publishing your name in the Honoraria Giving section of its annual *Honor Roll of Donors* publication. You may also qualify for recognition in other donor recognition groups. Your donation may remain anonymous at your request.

If you would like more information on how to donate and designate your honorarium, please contact the IEEE Foundation Development Office at +1 732 562 5550 or e-mail: donate@ieee.org.

The Landing of the Transatlantic Cable Commemorative Coaster

A permanent electrical communications link between the old world and the new was initiated at Heart's Content, Newfoundland, with the landing of a transatlantic cable on 27 July 1866. This achievement altered personal, commercial, and political relations between people on the two sides of the Atlantic Ocean. Five more cables between Heart's Content and Valentia, Ireland, were completed between 1866 and 1894. This station continued in operation until 1965. The Landing of the Transatlantic Cable was dedicated as an IEEE Electrical Engineering and Computing Milestone on 15 June 1985.

The limited-edition coaster celebrating the Landing of the Transatlantic Cable.

To celebrate this important milestone, those who donate US$125+ to the IEEE Foundation Life Members Fund (LMF) from October 2013 to September 2014 will receive the limited-edition coaster depicting the Landing of the Transatlantic Cable.

The Landing of the Transatlantic Cable is the seventh coaster in a series of limited-edition coasters commemorating various historic IEEE Electrical Engineering Milestones. The first six depict Telstar, the Panama Canal, Japan's Bullet Train, the ENIAC computer, the Atom Smasher, and Maxwell's Equations. Complete your limited-edition set of coasters. Previous year's coasters are also available for a US$125 donation each.

If you do not yet have your IEEE Life Member pin, a gift of US$200 to the LMF entitles you to both the pin and the coaster. Please allow eight weeks for delivery.

Please support future achievements by giving back to the LMF when you confirm your Life Member profile or visit ieee.org/donate. The LMF provides grants to new and ongoing projects that are beneficial to potential engineers and engineering students. Your gift will both preserve the memory of the Landing of the Transatlantic

Cable engineering achievement and support future technological innovations. For more information, e-mail donate@ieee.org.

Donors will receive notification of the tax-deductible portion of their contribution that exceeds the value of the articles received, in accordance with U.S. IRS regulations.

The IEEE History Committee established the IEEE Milestones in Electrical Engineering and Computing Program during the Centennial year as an ongoing means to honor and commemorate significant technical achievements in the history of IEEE fields. Visit ieeeghn.org to learn more about the IEEE Milestones Program.

A Grand Reception in the Desert

The IEEE Life Members Committee (LMC) and the IEEE Foundation hosted an IEEE Life Members' Reception in Scottsdale, Arizona, on 11 October at the Hilton Scottsdale Resort and Villas. IEEE Life Members (LMs) from the IEEE Phoenix Section were invited, and 40 members and their guests attended. The reception provided LMs and the LMC an opportunity to gather in a social setting and exchange ideas about how LMs can remain active in IEEE.

Hosted by IEEE LMC Chair Louis A. Luceri and IEEE Foundation Director Joseph V. Lillie, the reception included a robust program that was informative, productive, and enjoyable. Luceri shared information about the LMC and the many activities it supports, including the IEEE Life Members Fund (LMF) of the IEEE Foundation, that are of interest to IEEE LMs, potential engineers, and engineering students. Lillie described the important work of the IEEE Foundation and encouraged all LMs to support the LMF so that future generations of engineers and the engineering profession can continue to make an impact.

Joining Luceri and Lillie in the program were IEEE Phoenix Section LM affinity group (LMAG) Chair Les Daviets and IEEE Phoenix Section, Arizona Science Lab Chair Rickie Currens. Daviets encouraged all LMs to remain informed and involved in the activities of the LMAG. Currens shared with the group that the Arizona Science Lab has increased the interest in science among students in grades 5–9 in the Phoenix metro area. One hundred percent volunteer run, the lab offers free one-day, project-based science workshops led by expert scientists and engineers that emphasis the "wow" factor of hands-on learning. Currens appealed to LMs to volunteer. You can find out more about the Arizona Science Lab in an article on page 7, as well as at www.arizonasciencelab.org.

We hope our guests made meaningful contacts that will keep them engaged in LM activities. The next reception of this kind will be held in conjunction with the next LMC meeting. Photos from the event are available if you "like" the IEEE Foundation on Facebook at facebook.com/IEEEFoundation.

For more information about this reception or to make a donation, contact the IEEE Foundation Development Office at +1 732 562 5550 or e-mail donate@ieee.org. To learn more about the IEEE LMF, visit the IEEE LMC at http://www.ieee.org/lmc.

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Special thanks to those who donate to the IEEE Life Members Fund of the IEEE Foundation. Your donations allow us to host gatherings and support activities of interest to Life Members. Your donation may entitle you to receive a Life Members Pin, Milestone Coaster or to become a member of the **IEEE Heritage Circle** *or* **IEEE Goldsmith Legacy League**. *For more information, visit www.ieeefoundation.org.*

IEEE LMs check in at the registration table at the Hilton Scottsdale Resort and Villas in Arizona.

From left: Joe Lillie, Dale Fisher, and Dave Kemp talk about IEEE Foundation activities.

ASL Providing a Helping Hand to Students

The Arizona Science Lab (ASL), operating under the IEEE Phoenix Section, offers student classes in grades 4–9 full-day, project-based science workshops taught by expert volunteer engineers and scientists. This experiential-based learning offers the students a window into the world of science, technology, engineering, and math (STEM) through a unified lesson including scientific principles, social relevance, experimental demonstrations, and hands-on project construction activities. The workshops provide exciting, one-day, hands-on classes in the physics of rocketry, solar power, sail boats, electricity, simple machines, bridges, and other STEM-based subjects.

This program is in direct response to the growing concern that not enough students are adequately prepared to enter into STEM careers. The primary mission of the ASL is to encourage students to become interested in these subject areas through experiential learning. A secondary objective is to provide an opportunity for retired engineers, employed engineers, and university engineering students to become engaged with grade 4–9 students and share their knowledge, expertise, and passion for engineering with them.

ASL also fulfills its mission by providing direct teacher training in STEM-related subjects through its Teacher In Service Program (TISP). These two-to-three-day workshops are designed specifically for teachers who may be trained educators but who have had only limited "hard-science" education. Through these workshops, we teach science with an emphasis on how to use project-based learning techniques in the classroom to motivate students.

Each workshop is conducted by a group of retired, employed, and university student engineers who are highly qualified in math, physics, computers, electronics, power generation and distribution, structures, thermal, chemistry, materials science, and computer software. ASL's instructors are accomplished scientists and engineers with decades of career experience and a love of science and teaching.

The Workshops

Each lesson/workshop plan is in full compliance with the current Arizona State Science Education Standard. Seven workshops are currently being offered, and we plan on adding two new workshops each school year.

- Sail Away—Archimedes principle, forces and moments, Newton's laws; design and build a sail boat.
- Here Comes the Sun—renewable energy, solar cells, electric circuits, sources and loads in series and parallel; build a solar-powered race car.
- Working With Watermills—renewable energy, kinetic and potential energy, simple machines, mechanical advantage; design and build a water wheel.
- All About Electric Motors—magnetism, electromagnetism, electric motors; build an electric motor.
- Popsicle Bridges—structures in compression, tension, shear and torsion; design and build a truss bridge.
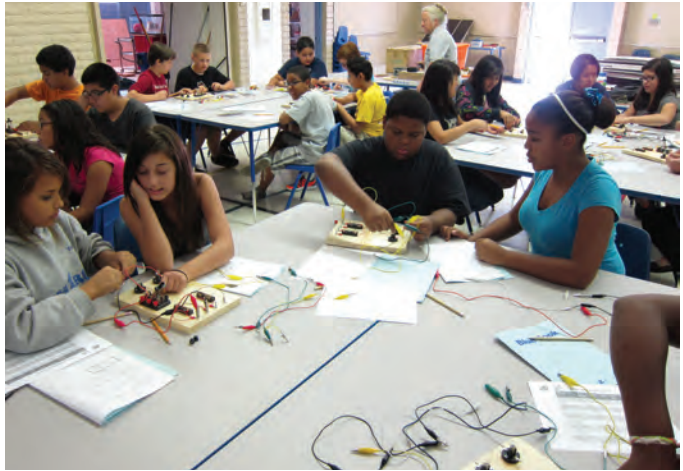
Students in Dr. Bonney's class building test circuits in the "Here Comes the Sun" workshop.

Students testing their solar cars in the "Here Comes the Sun" workshop.

- Rockets—Newton's laws, rocket aerodynamics, using simulations; design, build, and launch an air/water rocket.
- Cracking the Code—Information representation, protection, decoding, secure codes; many exercises in coding and decoding.

The ASL is permanently located at an unused school facility in Tempe, Arizona. Through a generous agreement with the Tempe school district, we have not only a wonderful workshop space but storage and office space for our use as well.

Workshops begin with a lecture/demonstration phase, rich in student/teacher interaction, with a focus on science and engineering. We use two "teachers" at the same time, one to concentrate on the lecture and the teaching of the principles and the other to conduct the demonstrations illustrating the principles. Projection technology and cameras are used to make sure all of the students can see the demonstrations no matter where they are sitting in the room.

Then, after a brief lunch break, we begin the design, build, and test phase, where the students apply the knowledge and theory they have learned in the lecture/demonstration phase. They always work in two-person teams, just like engineers always work in teams, and they are challenged to engineer a working technology solution,

Air/water bottle rockets ready for launch.

We conclude the workshops with a wrap-up session where we have the students explain the different test results for the different designs, discuss tradeoffs, what was learned, and what would they do differently next time. The aim is to reinforce the key concepts they were taught. We also initiate a discussion of careers in STEM fields and emphasize that STEM careers are exciting, fun, and rewarding.

How You Can Help

If you live in Arizona, we need you as a volunteer or teacher. We have enough funding; what we need are retired engineers to join our organization. No volunteer activity, that we know, will be as rewarding as this: teaching young minds to understand and appreciate the wonders of science. If you want to help or get more information for starting a similar activity in your area, please go to our Web site: www.azsciencelab.org.

The Arizona Science Lab operates under the management and partial funding of IEEE. In 2012, the IEEE Arizona Science Lab, a project of the IEEE Phoenix Section TISP, was awarded a US$30,000 grant from the IEEE Life Members Fund of the IEEE Foundation.

Stuart Wecker
Director
Arizona Science Lab

with an emphasis on design, test, re-engineer, and retest to optimize their solution.

We have four additional volunteers joining in this phase to mentor the student teams by leading them toward a design solution. During the testing, the students are encouraged to reflect on their design and how well it worked or didn't work and consider how it could be improved. Modifications or complete rebuilds are encouraged and the design–build–test–modify–retest cycle can be repeated as many times as the available time permits. At the end of the build/test phase, we generally have some sort of competition between the teams and their design solutions to see who has the best design.

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 (LMAG). The list of all our LMAGs can be found at: http://www.ieee.org/societies_communities/geo_activities/life_members/by_region.html.

New LMAGs that have been formed this year include:
• New Jersey Coast Section (Region 1)
• Alabama Section (Region 3)
• San Diego (Region 6).

LMC Supports GE Film Restoration

The IEEE Life Members Committee (LMC) awarded a grant for US$13,133 to the Schenectady Museum, New York, for use in preserving a significant collection of 16-mm films from the General Electric (GE) Corporation. The films, dating from 1915 to 1985, tell the story of the electrification of the United States and include early advertising films, educational science films, and films documenting engineering and manufacturing processes. Funds from the LMC will help the museum produce high-definition digital copies of each of the historic films, improve the long-term preservation of the films, and improve the access of museum visitors and researchers to the films, some of which have not been viewed by the public in over 90 years.

The Schenectady Museum has more than 900 historic 16-mm films relating to the history of GE and the electrical industry. Films include:
• early appliance advertising, including *The Home Electrical* (1915), *Design for Modern Living* (1937), and *Push-Button Magic* (1948)
• rare factory scenes dating to the early 1920s, including promotional films for the Lynn, Philadelphia, and Schenectady Works of GE
• four films featuring Thomas Edison
• the only known film footage of Charles Steinmetz
• GE educational films, including *A Is for Atom, Thunderbolt Hunters*, and *Principles of Electricity*
• more than a dozen episodes of the *General Electric Theater* television program hosted by Ronald Reagan.

IEEE Region 8 Life Members and History Activities

IEEE Region 8 was officially founded at the merger of AIEE and IRE but already had, at the time, two IRE Sections: Israel and Egypt. At the 50th anniversary in 2013, the Region had about 60,000 IEEE members in approximately 60 Sections and subsections. Region 8 has about 1,400 IEEE Life Members (LMs), most of which contributed actively to the technological developments that occurred in the 20th Century and especially in World War II.

IEEE Life Members Activities

In 2002, as I became an IEEE Senior Life Member, I initiated a petition for forming an IEEE Israel LM Affinity Group (LMAG), which I have chaired since. As this was the first LM group in Region 8, I was appointed LM activities coordinator of Region 8 and served in this position from 2003 to 2006, from 2008 to 2010, and again from 2013. I have helped to form LM Groups in UKRI, France, Slovenia, Croatia, and Switzerland. In 2011–2012 Alexandar Szabo was appointed LM activities coordinator, and he managed to form additional LMAGs in Hungary, Greece, Italy, and Spain. The formation of an Egypt LM group is in progress.

In Israel, the Managing Committee of the Association for the Fallen of the Signal Corps allowed us to use its conference hall to hold IEEE technical meetings, and the editor of *The People*—a journal on technical subjects—permitted us to advertise and create a series of "Technical Fridays" sponsored by the IEEE LM group. We held three of these meetings in 2009, each attracting about 200 attendees—IEEE LMs and members, as well as nonmembers from the engineering community. In 2010, the Israel National Engineering Society joined by sponsoring similar meetings on Tuesdays and as of 2013, 15 technical meetings were held, each with five to six speakers, on a various subjects. Two of these meetings were held in 2013, on "Frequency Spectrum" and "Cyber," and several additional meetings are planned. Meetings regularly see an attendance of over 200 people, and participation is free of charge. The IEEE Israel LM group was recognized as an Outstanding Life Member Group for the last four years.

History Activities

At the beginning of the third millennium, as I became an IEEE LM, I became interested in history subjects, the history of electrotechnology in general, as well as the history of Israel Section, Region 8, and IEEE. This subject was discussed at a meeting with past IEEE President Arthur Stern during one of his visits to Israel. Stern was chair of the IEEE History Committee from 2004 to 2006, and I told him that he would be interested in being active in this field. I also met Dick Gowen, History Committee chair from 2007 to 2009, and I was invited to a meeting to discuss the future of the IEEE History Center. In Region 8, I convened a group of officers interested in history activities to a luncheon where we discussed how to act, and we formed a history advisory committee as well as a Region 8 history network on the Web.

As an outcome of these activities, Region 8 decided to have a History activities coordinator on the Regional Committee, and I served in this position from 2008 to 2010. At the same time, I was appointed a member of the IEEE History Committee and served there from 2008 to 2012, five terms of interesting meetings and strong involvement, particularly in the organization of history conferences. In 2007, the Region 8 Committee accepted a proposal to hold a History of Electrotechnology Conference (HISTELCON) in 2008 in Paris, France. With a grant from the IEEE Foundation, the conference was held with an attendance of over 60 people and was followed by HISTELCON 2010 in Madrid, Spain (attendance of 100) and HISTELCON 2012 in Pavia, Italy (attendance of 70). The next HISTELCON has been set for August 2015 and will be held in Tel-Aviv, Israel, in conjunction with ICOHTEC and additional Societies interested in the History of Technology. It is my firm belief that IEEE LMs should be involved in history activities, and a proposal on that subject has been discussed with the IEEE History Committee.

Jacob Baal-Schem
SLM, R8 LM Coordinator

Win a Prize for the Best Norbert Wiener Anecdote

Norbert Wiener had a substantial impact on technology in his day, and that impact is still being felt. For example, his most cited paper, on polynomial chaos expansion (1938), has only gained fame in the past 15 years as computers have become powerful enough to apply the approach.

His views on the need to manage the effect of robots and jobs, on the significant threat of cyberwarfare, and other social impacts are now more relevant than in the time he wrote them. The 2014 IEEE Conference on Norbert Wiener in the 21st Century, in Boston, 24–26 June 2014, will focus on the current developments of his research in control theory, the life sciences and other areas, his foresights regarding the threats and promises of today's technology, and a panel of reminiscences of his life from people who knew him (let us know if you would like to be involved). Confirmed keynotes include social anthropologist Mary Catherine Bateson,

cryptographer Bruce Schneier, and engineering historian David Mindell. IEEE 2013 President Peter Staecker will open the conference.

Sponsoring and supporting organizations include the IEEE Boston Section, IEEE Society on Social Implications of Technology, IEEE Systems, Man, and Cybernetics Society, IEEE Control Systems Society, IEEE History Center, North American Fuzzy Information Processing Society, International Center for Information Ethics, World Organisation of Systems and Cybernetics Conference Organizing Committee, American Society for Cybernetics, and Computer Society of India.

In addition to his technical legacy, Wiener has been the source of a great many anecdotes. For this reason, we are offering free conference registration as a prize to the person who submits the best anecdote. Moreover, you can make multiple suggestions. Please send them to arthur.winston@21stcenturywiener.org.

For more information on the IEEE Conference on Norbert Wiener, please visit http://21stcenturywiener.org/.

From Time to Time

In my somewhat varied career as an electrical engineer, there was a thread, a progression, of one item that consistently reduced as my career progressed. No, it wasn't just my hairline. The time scale of importance kept getting shorter—I was focused on less and less.

My first electrical engineering job began in 1954, about the time of my 22nd birthday. In switchgear and control engineering we did time-current coordination graphs for protective relaying, large circuit breakers, and fusing in the equipment under construction. The logarithmic time scale on the vertical axis covered times to minutes for overloads. The minimum time was set by the clearing time of the circuit interrupter—most often a circuit breaker. Even with dead shorts and "instantaneous" over-current relays, several ac cycles were required for clearing the fault. So a "short time" was 50 thousandths of a second—several cycles of 60 Hz ac. I remember studying current limiting fuses that could interrupt in less than a half cycle—a fuzzy time zone of less than 10 ms.

I progressed to specialize in power conversion equipments and large dc systems, and after a while I was designing variable-speed motor drives for the steel industry, using mercury arc rectifiers—the General Electric Ignitron tube. We developed reversing drives using phase controlled "converters" that both rectified to supply power to the motor and for rapid deceleration, inverted to pass stored energy back to the power system. While inverting, the firing angle could not be retarded more than 180 electrical degrees without causing an inverter short circuit. An additional time margin was required for the ignitron tube to deionize before the 180° point, so we used 30 electrical degrees as the inverter margin angle. As I watched those big wide-flange steel beams going through the rolling mill, driven by 12,000 hp, I always worried about this 30° margin. Now a twelfth of the ac voltage cycle was critical—about 1 ms.

I joined the RCA Solid-State Division and soon we were collaborating with the Television group, where Wolfgang Dietz had a unique two silicon controlled rectifier (SCR) circuit for the horizontal deflection of large color kinescopes. In the Dietz circuit, the available turn-off time for the commutating SCR was as low as 1.5 μs, at a time when 10 μs was the state of the art for fast SCRs. It was a joint development of the circuit, a very fast integrated SCR/rectifier device by John Nielson, and the TV application. After three or four years, the first large-screen color TV with solid-state deflection went into production, capturing about one-third of the United States market and about half of the European market. I suppose 30 or 40 million TV sets used the circuit. The specter of that 1.5 μs, in those millions of TV sets spread all over the world, often gave me pause.

My work proceeded on to power transistors. Metal-oxide-semiconductor (MOS) power transistors replaced bipolar devices, and Frank Wheatley invented the insulated gate bipolar transistor. We focused on reducing turn-off time for inverters, achieving a half microsecond. I remember two irate engineers arriving from Italy, pointing out that our last batch of insulated-gate bipolar transistors was a half-microsecond too slow, messing up their new welder inverter power supplies. A few years later, toward the end of my career, we were at a few hundred nanoseconds. Things were getting pretty short—now a tenth of a microsecond was important.

After formal retirement, I did some work analyzing the performance of dc-dc converters for telecom applications, as affected by various power MOS transistor parameters. Small size was important, which led to high frequency and high efficiency. With a total inverter period of only one or two microseconds, the switching speed and loss of the transistors occurred over only a few nanoseconds. Using MathCAD, I was now doing calculations where ten one-thousandths of one-millionth of a second made all the difference.

So I came to the point where switches in my world were a half-million times faster than when I had begun 40 years earlier—I had been fortunate. But it's a good thing I decided to retire because in a few more years there wouldn't have been time for anything.

Don Burke, LM
Pepperell, MA

We Do a Good Job, Then Leave

During the three-and-a-half years between 1960 and 1963 when the Grumman Aircraft Co. in Bethpage, New York, employed me, my job was avionics liaison engineer for the Navy W2F aircraft AN/ASA-27 airborne computer with its three stations manufactured by Litton Industries. Before Grumman could install the computer in its aircraft, it had to be checked and tested on a workbench along with the software programming. I was one of four liaison engineers that were responsible for this task. Each of us had to complete a five-month Litton training course on the AN/ASA-27 and its three Lite-Pen operator stations at Grumman.

The programming sent with each computer had to be verified. It took two technicians, eight hours a day for two weeks to do the verifications. A way had been found to speed this up. Litton had test equipment that could only print ten 28-b words at a time of any of the 268-word drum channels. In addition it was very costly and too slow.

Grumman management decided to build its own test equipment. One of three colleagues was assigned the task, but he gave up. The task was given to a second colleague, and he couldn't come up with anything either. They then asked me, and I accepted the task. I was determined to succeed and within six months I not only came up with the computer drum-line printer, but in two hours, I could continuously print the computer program in the same format sent by Litton. I could also look at any portion of the computer drum. I set up two identification friend or foe codes and, out of thousands of signals, monitored two aircrafts with these codes all day long. In addition, I modified the computer drum-line printer to print the output of the radar equipment entering the computer. All this in a 5-ft rolling bay containing 100 logic cards, 200 switches, the power supply, and a GMC printer. My task was a complete success and for this I received a US$8-a-week-raise. I tried to get a patent through Grumman but was not successful.

Grumman then gave Manufacturing the job of building a second unit. They built a unit about 10 ft tall, completely ignoring my notes advising of no wire longer than 6 ft. It took a manufacturing engineer and myself two months to get this monster working. A third unit was being built in a 4-ft bay via all my instructions before I left Grumman. Savings to Grumman to successfully evaluate the system, I would estimate, was in the millions of dollars.

There were three reasons I left. I wanted to transfer to the Grumman engineering section. Engineering would accept me, but my managers would not release me; I was bypassed for a promotion. I started looking around and Martin Marietta Co. was looking for logic design engineers, and they made me an offer with a large increase in salary to work in Orlando, Florida. I notified Grumman that I was leaving and received a call from management stating that they agreed to transfer me to engineering but would not match the Martin Co. salary offer. I left Grumman and was hired as a senior engineer in April 1963 by the Martin Co.

Eleven years later, the Martin Co. had a reduction in force. They let go all of their three logic designers, myself included, and kept almost all of their analog designers.

By word of mouth, Melpar, a division of e-systems in Falls Church, Virginia, called me since they were looking for a logic designer. They paid to send me on a trip to their plant in Falls Church, where they explained what the position entailed, and I accepted the job as a principal engineer. I tested a roomful of equipment, wrote test specs, and built test checkout fixtures for future testing. I also redesigned interface equipment that they were having trouble with overseas. I wrote a complete test and checkout for the overseas installers. The work was a complete success, and Melpar received more orders.

Ten months later, the Martin Co. called and wanted me to return, claiming that my layoff was a mistake. I accepted the offer to return since I already had 11 years toward retirement and in addition, still had my house in Orlando, which my wife refused to give up. Melpar was sorry to see me leave but since I successfully helped them out of the several problems they had, they did not ask me to refund the 12 airline round-trips my wife made from Orlando to Falls Church and the two moving trips for which they paid.

I put in another ten years with the Martin Co. and retired. Why did I retire? With almost 21 years of hard work, good work reviews, and more than 20 bosses (some good, some bad), I finally got a promotion from grade 45 to staff engineer grade 47. My work assignments the last few years were not very challenging, and when I wanted an assignment in the main plant they couldn't find one, so they transferred me to the east plant (a 50-mi round-trip, in a cubicle with little to do). They then offered a good retirement package for older engineers, so I accepted and wrote a retirement letter to my department head. All of a sudden, they found a position for me in the main plant. That was it—I was fed up and continued with my retirement plan. I retired from the Martin Co. May 1985.

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Our Mailing List

The *IEEE Life Members Newsletter* is distributed to Life Members and those who are not Life Members but are 1) IEEE Members 65 years and older, 2) retired IEEE members aged 62–64, and 3) members of special boards and committees.

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. The deadline to submit an article for possible inclusion in the next issue is 1 April 2014. Please include your Life grade, town, state, country, phone number, member number, and/or an e-mail address with your piece.

Stopping IEEE Services

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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, or call: +1 732 562 5501, or fax: +1 732 463 3657.

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