

# IEEE life members newsletter



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## Yielding to Temptation

Charles W. Turner, Chair, IEEE Life Member Committee

“I can resist everything but temptation.”

– *Oscar Wilde*

**I**sometimes wonder if the greatest fault of IEEE volunteers is the temptation to change or reorganize our way of working in the hope of achieving greater effectiveness or improved service to members. It is also probably true that we rarely try to measure whether any improvement actually took place as a direct result of the changes made by committees at all levels.

The IEEE Life Members Committee (LMC), of which I am the chair, is also susceptible to this temptation, but I hope that we are learning from past experience. The motivation for change derives, in this case, from the conviction that Life Members (LMs) and post-career professionals are a neglected resource within the IEEE. In the past year, we have given special attention to reviewing the current status of LMs, seeking to find ways of enhancing the membership experience of all long-serving members, many of whom tend to leave the IEEE as their career finishes. This review includes their level of satisfaction as members, the degree to which they feel engaged in the IEEE, and how readily those wishing to remain active or to serve in some capacity as volunteers can do so.

Our task force also conducted a critical review of the role of Life Member Affinity Groups (LMAGs). These groups form the main support mechanism through which resources and administrative services are provided for LMs. Since there are only 87 LMAGs serving over 300 Sections, it begs the question of the



**IEEE Life Members  
Committee Chair  
Charles W. Turner**

quality of the experience of LMs elsewhere.

Two separate reviews were conducted.

- 1) The first, under Past-Chair Aleksandar Szabo, updated the Strategic Plan for the Committee.
- 2) The second was conducted by a special task force led by Joe Cruz (former LMC chair), with a focus on strengthening the role of LMAGs and finding new ways of serving LMs in Sections without an LMAG.

The outcomes of this review are posted on the LMC website ([www.ieee.org/lmc](http://www.ieee.org/lmc)) and contain recommendations that are currently under consideration by the committee, including the following:

- 1) A more active role for the ten LM Regional Coordinators. They will be expected to be in much closer contact with the chairs of the LMAGs in their Regions. These groups should be at the “coal face” of LM activity, in frequent contact with the LMs, learning of their concerns, and helping them to organize projects and events.
- 2) A plan to formally invite members not yet eligible for LM status, such as those who are retired (or are nearing retirement), to participate in the activities of their LMAG. This change would significantly increase the number of older members associated with the local LMAG, typically by a factor of three or four times in most Sections. Over the next decade, a growing pool of these highly experienced members will constitute a valuable potential resource for filling volunteer roles in the Section. The IEEE can entice these long-serving members to renew their



membership by offering new opportunities, products, and services.

- 3) The Sections that do not yet have an LMAG will be asked to support LMs in other, more informal, ways. Every Section will be expected to ensure that its website includes a dedicated webpage for LM news and contact data, and the position of Section's LM coordinator should be created. The task force believes that by raising the profile of LMs in all Sections, increased resources will become available for LM activities. Hopefully, this might also lead to the formation of new LMAGs. For those areas without an LMAG, we urge you to contact your Section to submit a petition to form one.
- 4) Re-energizing the LM community will depend on collaboration with other groups, such as Graduate Student Members and Young Professionals. Involvement by LMs in the next generation of programs developed in recent years, such as the IEEE Special Interest Group on

Humanitarian Technology, IEEE Raising Engineering Awareness through the Conduit of History, EPICS in IEEE, and other humanitarian activities, should be particularly encouraged. There are also plenty of opportunities in the more traditional areas such as history activities (including IEEE Milestones and museum visits), mentoring, technical updating, and industry visits, among others. Growing the LM and older member community would boost the numbers and make these activities more viable.

The LMC would like feedback from our *IEEE Life Members Newsletter* readership to help determine if it is heading in the right direction. The committee also hopes that there is general support for increased engagement by older members in these activities.

To return to the "temptations" theme, can you be tempted to become a volunteer in your Section's LMAG or to help start up a new LMAG? Please let us know.

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## REACH Contributes to the Relevancy of IEEE Life Members

In 2012, Henry Petroski wrote "The Importance of Engineering History" for the Third National Congress on Civil Engineering History and Heritage. It states, "Every profession has a history, and the degree to which that history is known, remembered, preserved, honored, and used determines to a great extent the degree to which the profession knows and understands itself and is acknowledged and respected as a profession outside the confines of its own practice." In other words, engineering history provides not only an understanding of the evolution of technology but also an appreciation of the engineers who played a role in advancing technology. IEEE Raising Engineering Awareness through the Conduit of History (REACH), which provides pre-university teachers with resources that easily incorporate the history of technology in its social context to the classroom, brings knowledge about the history of engineering to a new generation. By focusing on the full range of engineering technologies, REACH conveys relevancy to all engineers and the profession itself. In a small, but meaningful, way, the IEEE REACH program brings relevancy to you, the IEEE Life Members (LMs), and adds value to understanding the influence of engineering on society.

Currently, more than 300 subscribers have signed up for the IEEE REACH program. Among these subscribers, 260 are teachers and 25 are education administrators or supervisors, who have a combined reach of more than 114,000 students. Yet, the IEEE REACH website has only been "live" for a little over a year. As the program grows, imagine how many students will become knowledgeable about engineering history and your legacy. As the program matures, we'll continue to increase the promotion of the profession and advance the knowledge of engineer-

ing history. Furthermore, the students who experience IEEE REACH will understand the impact engineering history has on society, culture, economics, and politics.

To date, IEEE REACH has six inquiry units, which include: Tools of Early Maritime Navigation; Ancient Greek Triremes; the Printing Press and technologies associated with it, such as papermaking and typesetting; Radio; Unmanned Aerial Vehicles or Drones; and the most recent, Refrigerated Railcars. All of these technological histories advance students' knowledge and understanding of how technology impacts society. Some examples include how technological advancements of early maritime navigation impacted trade and Europe's preeminence; what role the ancient Greek triremes played in advancing democracy and empire; how drones impact humanity; and what effect refrigerated railcars had on geography, economics, and the food we put on our tables.

Over the past two years, I (as the IEEE REACH program manager and a nonengineer) have gained significant knowledge about the history of the specific technologies on which REACH has focused thus far. As a result, I feel that I am a better-informed citizen and my technological and cultural literacy skills have improved. I have advanced my understanding of the complex relationship technological advancements and engineering history has with humanity. I am constantly in awe of the parallels that may be drawn from engineering and technology history and life today. Imagine the impact of these skills, knowledge, and understanding on the teachers and their young charges.

IEEE LMs have a tradition of caring about the youth and making sure that an understanding of engineering, its relevance, and its excitement is brought to a new generation. I am honored that I have become part of the IEEE's

efforts in this direction. IEEE REACH resources ensure that engineering history and your legacy are “known, remembered, preserved, and honored...outside of the confines” of the engineering profession. Thank you for all that you have done and continue to do. Your life’s work touches humanity.

To learn more about IEEE REACH, visit: <http://reach.ieee.org>. To donate to the IEEE REACH program, visit: [https://www.ieeefoundation.org/support\\_REACH](https://www.ieeefoundation.org/support_REACH).

Kelly McKenna  
IEEE REACH Program Manager

## The 2017 IEEE TechEthics Conference

The subject of ethics has been a topic of discussion in excess of 25 centuries. One might think that, after all this time, everything worth saying on the subject has already been expressed. History shows, however, that whenever one ethical situation has been thoroughly explored, the ground shifts, the winds veer, and we find ourselves in new territory where the old ethical maps are inadequate. New ethical dilemmas—or polylemmas—emerge, requiring the attention of ethicists and those who must make ethical decisions. Such is the situation created by the accelerating development of artificial intelligence (AI) and autonomous systems.

This topic was a major focus of the IEEE TechEthics Conference ([techethics.ieee.org/DC2017](http://techethics.ieee.org/DC2017)) held at the National Academy of Sciences Building in Washington, D.C., on 13 October 2017. With financial support from the IEEE Life Members Fund of the IEEE Foundation and other IEEE units, the conference brought together authorities in technology and ethics for a full day of exploring the developing ethical challenges. Approximately 75 participants attended the conference.

The initial keynote of the conference was given by Rodney Brooks, chair and chief technology officer of ReThink Robotics, who pointed out that accurately estimating AI progress is difficult. He quoted Amara’s law: “We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run.” This suggests that human resistance to change will slow the adoption of new technologies—such as autonomous automobiles—but eventually the advantages of that technology and the demonstration of its value will lead to its adoption, likely at a level that had not been imagined.

A panel moderated by Mary Ward-Callan, managing director, IEEE Technical Activities, discussed the social and personal impacts of AI. Increasingly, we find computers that have the capability to advise us (dare we say *think* for us) and perhaps even make some minor decisions on our behalf. As computing power continues to increase and the capabilities of AI systems advance, this trend can only accelerate. This then begs the question: who or what is responsible for actions taken on our behalf by our computer? How much control may or should we relinquish? Is it more responsible for us to insist on driving our own car if it is demonstrably safer to turn over control to an on-board computer? In the rapidly approaching future, these are decisions that we will have to make. Are we prepared to do so?



**Attendees gathered at the National Academy of Sciences Building in Washington, D.C., to explore the ethical and societal implications of technology during the inaugural IEEE TechEthics Conference.**

Another panel, chaired by Phil Ross of *IEEE Spectrum*, discussed “Self-Driving Cars and Beyond: Societal Impacts of Autonomous Transportation Systems.” While the focus is currently on autonomous automobiles, AI operation will also extend to other modes of transportation. There are small examples of this, such as the autonomous wheelchairs on call in a Tokyo airport, but there are much more significant examples. One case is the role of robots in operating airplanes. Commercial aircraft have used autopilots for many years and, more recently, computer-aided and computer-controlled take-off and landing. Now the technology has advanced to a point where it is practical to have a robot occupy the copilot’s seat.



**Rodney Brooks discussed the challenges of estimating the progress of AI in his IEEE TechEthics Conference keynote address.**



**The relationship between brain research and AI advancements was explored during one of several panels at the IEEE TechEthics Conference.**

There are, of course, issues of safety associated with this development, but there are also social and economic impacts as well. What will that do to employment patterns for pilots, and how will new pilots, “come up through the ranks” when there are no longer ranks?

Another interesting question arose during a hallway conversation. Currently, there are about 35,000 traffic deaths in the United States every year. It was postulated that conversion to a system of self-driving cars will reduce that number to about 5,000. It is likely, however, that it will be a different 5,000 people who will die: perhaps innocent cyclists and pedestrians instead of law-breaking texters and speeders. How do we explain to those 5,000 the advantage of saving the other 35,000?

While the primary focus of the conference was on AI, it was also interesting and useful to consider how our understanding of animal intelligence (nonartificial?) interacts with the development of autonomous systems. A keynote speech by Danielle Bassett, associate professor in the Department of Bioengineering at the University of Pennsylvania, followed by a panel moderated by Stephanie Bird, coeditor-in-chief of *Science and Engineering Ethics*, explored this issue. Prof. Bassett told of the history of physically treating brains that have been harmed by disease or injury, noting that this often triggers reactions in other parts of the brain. The cause of these reactions has been poorly understood, but the recent application to neuroscience of control theory and network science is starting to shed some light on the problem. Conversely, advances in brain research are informing the development of AI. So

where does this leave us? What are the social and ethical implications of building machines that think like humans or, for that matter, applying what we are learning about AI to influence and “correct” the human brain?

The final panel of the day was moderated by IEEE Life Senior Member Joe Herkert, associate professor emeritus at North Carolina State University. It dealt with what may be the most difficult subject of all, “Influencing the Next Generation of Engineers via Ethics Education.” While this question has been considered ever since engineering ethics became a subject of discussion, it is gaining renewed attention as engineers become involved in designing and implementing technology that approaches human capability. As machines start to make autonomous decisions, what responsibility do engineers bear with respect to the morality of those decisions? What, after all, is machine morality? Can a machine adhere to a code of ethics? All agreed that the least educators can do is to help their students understand that they must do their engineering in context.

The support of the IEEE Foundation and its donors was critical to the success of the conference that helped to define and explore the ethical issues introduced by AI and autonomous systems. This is just the beginning, not the end. The TechEthics program will continue to serve as a focal point for ongoing discussion of this very important issue. More information on the IEEE TechEthics program is available at [techethics.ieee.org](http://techethics.ieee.org).

Lyle Feisel, LF

# Get Involved with IEEE Day 2018

This year, IEEE Members will be celebrating IEEE Day for the ninth consecutive year. IEEE Day 2018 will be held on Tuesday, 2 October, but celebrations are planned for the entire week. Have you considered being a part of this annual global celebration? It's easy to get involved. Here are some ideas to help you get started.

- Share your professional experiences by visiting a local elementary school and holding a science, technology, engineering, or math presentation or discussion. Share why you became an engineer and what makes engineering cool for boys and girls.
- Collaborate with your local Section and Student Branch(es) to organize an event at a local university.

Participate by being one of the technical experts and discuss how the IEEE helped you during your career. Also consider becoming a mentor.

- Hold a humanitarian event. Have you checked out the IEEE Foundation programs?
- Work with your local Section to organize a Senior Member event and serve as a reference for those looking into Senior Membership.

If you are looking for more inspiration, please review the IEEE Day 2017 events map at [www.ieeeday.org](http://www.ieeeday.org) to see how your IEEE colleagues have celebrated in the past. Together we can make IEEE Day 2018 the best one yet.

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## Locating Local Life Member Activities

Are you interested in attending or volunteering at local activities for Life Members? If so, please get in touch with your local Life Member Affinity Group (LMAG). The list of all LMAGs can be found at [www.ieee.org/lmag](http://www.ieee.org/lmag).

The new LMAGs that have been formed this year include:

- Susquehanna (Region 2)
- Central Coast (Region 6).

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## IEEE Life Members Fund 2017 Honor Roll of Donors

The IEEE Life Members Committee (LMC) gratefully recognizes IEEE Members and other friends who have directed their donations to the IEEE Life Members Fund of the IEEE Foundation. Those names are listed here. 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 or similarly mature Members. All listings acknowledge gifts of US\$100 or more made during the calendar year 2017 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 +1 732 562 5446.

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

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LM: Life Member, SM: Senior Member, LSM: Life Senior Member, LF: Life Fellow, M: Member, I: Individual, ORG: organization

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Thomas M. Devanney, LM  
Russell G. Dewitt, LF  
Bliss L. Diamond, LM  
Frederick J. Dickey, LM  
Walter Dietiker, LM  
Donald L. Dietmeyer, LF  
Robin and George Dillard,  
LSM  
David L. Divine, LM

Daniel W. Dobberpuhl, LM  
Joseph B. Dobsa, LM  
Steven R. Doctor, LSM  
John H. Doles, LM  
Robert J. Dompe, LM  
Nicholas M. Donofrio, LF  
Thomas E. Donoho, LM  
C.K. Druzgalski, LSM  
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LSM  
Ronald A. Duclos, LM  
Stephen E. Dunlap, LM  
Raymond D. Dunlop, LM  
Daniel M. Dunoye, LM  
John J. Dunse, LM  
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Charles J. Durkin, Jr., LF  
Joseph A. Durusau, LM  
Dimitri A. Dutoff, LM  
Terrence E. Dwan, LM  
Roger Dworak, LM  
John W. Eadie, LSM  
Antony C. Eaton, LM  
Wayne E. Eberhard, LM  
Thomas P. Edery, LM  
Gilbert S. Edwards, LM  
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LM  
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George A. Etzweiler, LSM  
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J.E. Fagan, LM  
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Ghaffar Farman-Farmaian,  
LM  
Luciano Fazzolari, LM  
William E. Feero, LF  
Jacob Feinstein, LSM  
Eldon D. Feist, LSM  
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W.B. Garrison, LM  
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LM  
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Anthony V. Hattier, LM  
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LM  
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Samir Ismail, LM  
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Mo Iwama, LSM  
Shun-Ichi Iwasaki, LF  
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noritaka kurauchi, LM  
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Richard O. Martin, LSM

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William L. Martino, LM

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Roy W. Meinke, LSM

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John M. Milan, LSM

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Richard E. Miles, LM

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Ralph B. Miller, LM

Roger L. Miller, LM

George C. Milligan, LM

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Kenneth W. Millsteed, LM

William G. Minahan, LM

Edward F. Mitchell, LM

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John K. Miyasaki, LM

Klaus P. Model, LM

Alvin W. Moeller, LSM

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Laurence L. Moon, LM

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LSM

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James B. Murray, LM

Jerome Murray, LM

Mehmet V. Musa, LM

Kalyan K. Mustaphi, LM

Padmanabha Nagenthiram,  
LM

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Philip H. Swain, LSM  
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Tung-Lin Tsai, LM  
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Graham S. Tubbs, LSM  
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## Donor Profile: Focusing on the Future

**D**r. John S. Thompson, IEEE Life Senior Member, says that giving to the IEEE Foundation is a valuable way to “bring some balance to the books.” Thompson first joined the IEEE as a student when he was attending university with support of scholarship donors. For him, it was an easy choice to support the EPICS in IEEE program as it seems like the best way to support today’s students in engineering fields, noting he is “amazed at the level of projects and commitment of these students.”

He has participated in many IEEE conferences and events, and he continues to find the easy access that the IEEE provides to Life Members on developments in his fields of interest to be stimulating. Thompson received the 2017 IEEE Donald O. Pederson Award in Solid-State Circuits



***Thompson welcomes the opportunity to help others join the fields of engineering.***

I welcome the chance to help others join it.”

and repurposed his honorarium to support the IEEE Foundation. “The support of former colleagues for my nomination was a most welcome gift,” he explained. “I felt I was given a unique opportunity to help both the IEEE, and other worthy enterprises, and I should not let this chance go by.”

Thompson, who also supports the IEEE Life Members Fund, encourages others to promote a greater understanding of the crucial need for engineering and science today. “There is too great a danger to our society from ignorance of science and technology to not make an effort at countering this trend,” he expressed. Reflecting back, he added, “The field of engineering has been good to me, and

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## Historical Launch of the *Realize the Full Potential of IEEE* Campaign

**O**n a beautiful day in a magical venue, the IEEE and the IEEE Foundation announced the launch of a first-ever major fundraising campaign at an amiable outdoor celebration during its Board Meeting Series on 15 February in Orlando, Florida. More than 215 IEEE Members from around the globe and IEEE professional staff were in attendance as the IEEE Foundation shared its objective of raising US\$30 million in support of IEEE programs during the *Realize the Full Potential of IEEE* campaign. More than 50% of the total has already been committed—US\$15.14 million had been raised at launch date.

The launch was a festive evening event, held at a canal-side venue with balloons marking the location. Warm and friendly conversations among those interested in IEEE humanitarian and philanthropic efforts preceded the event. What a fitting venue it was for the launch of our campaign that will help drive new levels of technological access, innovation, and engagement through a variety of far-reaching global initiatives designed to transform lives through the power of technology and education. IEEE Members create and deploy technology to advance humanity; inspire science, technology, engineering, and mathematics education; and work to power the future. Disney is an example of one company that uses an abundance of technology—including data-collection technology, radio-frequency identification sensors, robotics, smartphone apps, and much more—to enhance and personal-



***After sharing inspiring words of support for the campaign and the IEEE programs it benefits, with the flick of a symbolic wireless switch, IEEE Foundation Executive Director Karen A. Galuchie, Foundation President John Treichler, IEEE Executive Director Stephen Welby and IEEE President Jim Jeffries officially kicked off the launch and an evening of celebrating philanthropy.***

ize the visitor experience. Furthermore, Disney parks are heavily inspired by IEEE technologies to celebrate history, depict futurism, and otherwise highlight the important role of technology in everyday life.

The campaign was formally launched with the flick of a symbolic wireless switch by IEEE Foundation Executive Director Karen A. Galuchie, IEEE Foundation President John Treichler, IEEE Executive Director Stephen Welby, and IEEE President Jim Jeffries. Each provided brief remarks about the important programs that the IEEE Foundation supports and celebrated our philanthropy. A mouse named Mickey also attended and provided our guests with some fun time to take selfies.

Some notable volunteers in attendance included past IEEE presidents Leah Jamieson, Pedro Ray, and Karen Bartleson; past IEEE secretaries Parviz Fumouri and Marko Delimar; IEEE Treasurer Joe Lillie; Past IEEE Treasurer David Green; IEEE Vice President (VP) Witold Kinsner (Educational Activities Board), past IEEE VPs Gianluca Setti (Publication Services and Products Board) and myself (Technical Activities Board); and Humanitarian Activities Chair Paul Cunningham. My apologies to any other notables for neglecting mention of their attendance.

The goal of the campaign, *Realize the Full Potential of IEEE*, is an aggressive one—to raise US\$30 million by 2020—so that our programs can increase in impact. But, we are already halfway there. We are fortunate to have many successful members in tech fields who appreciate the value that the tech community brings to the world,

support IEEE efforts to advance technology for the benefit of humanity, and financially support the IEEE Foundation's suite of philanthropic efforts.

The IEEE/IEEE Foundation is driving a number of important donor-supported programs. These include, but are not limited to:

- IEEE Smart Village
- EPICS in IEEE
- IEEE Power & Energy Scholarship Plus Initiative
- REACH, Raising Engineering Awareness through the Conduit of History—a program of the IEEE History Center
- MOVE Community Outreach—an IEEE-USA Initiative
- IEEE-Eta Kappa Nu (IEEE-HKN)
- IEEE Awards
- The IEEE History Center
- IEEE Life Members.

For more information about IEEE Foundation partnered programs and the campaign, visit our campaign page at <https://www.ieeefoundation.org/campaign>. You can make a donation online at <https://www.ieeefoundation.org/donate>.

It is only through your support that we are able to truly realize the full potential of the IEEE.

Fred Mintzer, LF  
2018 VP of Programs, IEEE Foundation

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## Does Your IEEE Group Need Money for a Project?

If your IEEE organizational unit has an idea for a project that will increase the public's understanding or appreciation of technology but needs funds to implement it, the IEEE Foundation can help. In 2018, the IEEE Grants Program will invest approximately US\$304,000 in IEEE projects.

The IEEE Foundation and the IEEE Life Members Committee are seeking proposals from IEEE organizational units (Societies, Regions, Sections, Chapters, Affinity Groups, and Student Branches) for projects that promote the public's understanding of how science and technology are being used—or could be used—to address global challenges. These projects can help solve issues in a number of areas, including energy, cybersecurity, health care, and sustainabili-

ty. Applicants should promote an understanding of the technology without advocating for specific solutions. They should also propose ways to measure a project's success and promote the project and report on its results.

The IEEE organizational units are expected to submit photos and a short video conveying the essence of the project once it is complete. It can be helpful to involve members who have social media experience. Grant recipients may partner with other groups, but the chief organizers and financial controllers must be IEEE Members.

Applications are due by 13 July. Recipients will be notified by 14 December. Additional information and the proposal submission portal may be found on the IEEE Foundation website at [www.ieeefoundation.org](http://www.ieeefoundation.org).

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## Give the Gift of IEEE Membership

Want to help someone in your life find their professional home in the IEEE? Start by giving them the gift of IEEE membership, a gift that will impact their professional and social lives for years to come. Membership in the IEEE delivers access to the

industry's technical information, offers career development tools, and provides access to IEEE's discount programs.

Now is a great time to give the gift of IEEE membership for half price. This program is available for an entire half-year period (1 March–15 August). Don't wait; get someone started today!

## Workplace Ethics

In a professional environment, it is important to give credit to others for their ownership of contributions to workplace projects, especially when it results in publications in learned journals or presentations at conferences. (It helps to further careers.) In my experience (and just one instance suffices to point the finger), I have seen young engineers' names not added to an author list when they have been involved significantly in activities resulting in publication. This is unethical; it is essentially the business of copying the work of others without proper acknowledgement. Good managers know how to deal with these matters, but there are others who either "don't know and need to be enlightened" or "don't wish to know and need to be re-educated."

Specifically, I knew of a subordinate being asked to write and publish the results of work that had been carried out by a colleague. The subordinate refused but did not suffer career wise for the stance because the manager realized that the request was morally flawed. If one publishes material, it is important to be mindful of the practice of "scholarly misconduct in the form of wrongful appropriation of the work of others," or *plagiarism*, in short. Such behaviors are

not uncommon, and there is a wealth of information available now in the literature regarding just what constitutes the varying degrees of the practice. Learned organizations like the IEEE have policies that are designed to deter, and just as one has to be mindful about copying the works of others, so too does one have to exercise perhaps even greater vigilance regarding this Janus-headed coin, that is the copying of one's own work by another party.

Like others, I can think of further instances where unethical workplace practices have occurred. My experience tells me that it is best to call them as they arise and try to deal with them on the spot. Sometimes this is not possible, and it is necessary to then take further steps, such as resorting to the human resources department or a higher authority. In this respect, the workplace scenario is no more or no less susceptible to unethical practices than is the tenor of life elsewhere (in the home, for example), and more often than not most such behaviors can be treated successfully without recourse to "heavy guns."

John Mahoney

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## What's the Risk?

During the Cold War, urgency drove weapons development and testing. Parallel efforts were common, increasing cost risks but lowering schedule risk. Often, weaving intricate threads together imposed additional, subtle danger. When do "risks" become ethical dilemmas?

An experience highlighting this challenge came when I worked for a contractor developing a new, air-launched missile. We were chosen for electronics prowess, but the rocket motor was also challenging. The government started the program with a proven motor while we refined guidance and controls. They also chose to develop a new motor and furnish it. My employer supported this division of responsibility; the risks for the new motor were in the hands of the government and the motor vendor.

I led systems testing and integration, with most of my firm's first-hand insights to system buildup and testing. Ordnance assembly teams worked for me. We were cautioned by company executives not to challenge the government motor team. Until the handoff, we were to have "zero opinions" on that subject.

We began to receive the new motors for testing. The government team X-rayed them to ensure the solid grain was undamaged. Damaged rocket motors can explode, and explosions aboard an aircraft are bad.

At first, we used drone launch. After a few shots, the motor team declared the motor "man rated" and moved to aircraft with test pilots aboard. With man-rating, X-ray tests ended. So the first shot with a test pilot was not going to be X-rayed. But

my assembly team witnessed government mishandling of the new motor. They felt it might have internal damage but, with the "no-opinion" rule, they told only me.

We hoped the government team would self-report the risk, but they did not. I had a dilemma: There was risk to the test pilot's life and our contractual relationships. Crying "wolf" would be a setback. The motor might have been ok, and according to government "experts," it was fine. I quietly went to the test pilots' commander. Safety was his top concern, so I explained the issue and asked him to protect me as a source. Since he wanted to hear of other risks, too, he was more than willing to shield me.

But how to bring the issue to a head? We wrote a script; he would ask a series of questions in the safety prebrief and insist on a new X-ray before flight. The motor team objected, but his authority was absolute.

The X-Ray showed a huge crack. That certainly would have cost us the airplane and probably killed the pilot. It might have ended the program, but the trusted relationship fostered by the chief test pilot created a chance to save all three. The missile went on to be a near-perfect program and helped end the Cold War.

Only a few ever knew the credit the chief test pilot deserved, but credit was not what he wanted anyway. His personal reputation for integrity and ability to build trusted relationships were key to solving my ethical dilemma.

Steve Roemer

# Publish Your Ethical Dilemma

The IEEE Society on Social Implications of Technology (SSIT) has partnered with the IEEE Life Members Committee (LMC) to publish accounts of members' experiences grappling with ethical dilemmas in professional contexts. If you have an experience that involved navigating an ethical dilemma, consider sharing it with your colleagues through the SSIT or LMC newsletters.

A joint SSIT/LMC committee will vet all initial submissions, and authors will work with the editors of the two publications to finalize their submissions. Accepted ethical

dilemma articles will be published simultaneously in the June and December issues of both newsletters.

Article submissions must be between 300 and 500 words in Word format and include how an ethical situation conflicted the author or a decision maker. The IEEE Legal Department requires that all articles be fully sanitized to protect the privacy of people and organizations.

Please submit manuscripts to Rosann Marosy, at [r.marosy@ieee.org](mailto:r.marosy@ieee.org)

## tales from the vault

### Kwajalein Tales

In the early 1960s, I spent two years on Kwajalein Atoll in the Pacific Ocean working with the TRADEX radar for MIT Lincoln Laboratory. Our task was to measure the characteristics of intercontinental ballistic missiles launched from Vandenberg Air Force Base in California as they reentered the atmosphere near Kwajalein. We encountered several humorous problems along the way.

An early task was to calibrate the radar sensitivity so that we could accurately measure the radar cross section (RCS) of objects we observed. The plan was to measure the returned signal power and range of a 6-in sphere, whose RCS is easily calculated and independent of viewing angle. The sphere was lofted by a balloon some 40 mi away.

The problem was that the received signal fluctuated periodically by several decibels, too much to provide the calibration accuracy we wanted. What was wrong? The sphere had a small ridge, which should have had no effect at the radar frequency we were using. Nevertheless, we had a sphere carefully brazed and smoothed and ran the test again. The same result was achieved. Maybe the sphere swinging below the balloon was the cause. It was decided to put the sphere inside the balloon to eliminate the swinging. Getting the 6-in sphere through the

3-in mouth of the balloon wasn't easy. I recall watching a half-dozen senior scientists trying to do this, and they finally succeeded. But the test yielded the same fluctuating result.

It was finally realized that the antenna sidelobe signal was reflecting off the smooth lagoon, alternately adding to and subtracting from the direct radar signal at the sphere as its altitude changed, the well-known multipath effect. The solution: wait for the sphere to reach a higher altitude so that the sidelobes were further from the main beam and, therefore, lower.

The TRADEX radar has a large (84-ft) dish antenna, and it acquires targets by mechanically scanning a small region. In missile tests, this acquisition location was teletyped from Vandenberg after the missile launch. It usually worked fine. The target was acquired prior to reentry and tracked to impact in the ocean 20 mi or so short of the radar.

On one test, however, the target suddenly disappeared from the displays. Simultaneously, the antenna elevation-drive motor shut down. What had happened? Analysis of the tracking data showed that rather than impacting 20 mi short of the radar, the target had overflowed the radar at an altitude of 10 mi or so and impacted well behind the radar. This resulted in very-high angle rates, causing the antenna drive to shut down, and the target left the beam. It

was only the next day that someone reviewing the acquisition message from Vandenberg saw the notation following the data: "HEADS UP!"

On another occasion, we were tasked to track a small sounding rocket launched a few miles from the radar. The range was too close to track the missile from the launch pad, so an acquisition point was calculated along the missile trajectory. However, when we scanned around this acquisition point, the radar background noise level increased periodically by tens of decibels, in sync with the scan. What was this? We thought it might be a problem with the radio-frequency rotary joint, but when we looked at other angles, all was fine.

There was no time to calculate another acquisition point, so we decided to send an operator to a small telescope mount to which the radar pointing angles could be slaved. He could follow the target from the calculated acquisition point, and the radar could acquire it later in the trajectory. But the operator immediately reported that this wouldn't work since the acquisition coordinates looked directly into the sun. So it was the thermal noise from the sun that caused the radar noise fluctuations, a well-known phenomenon, but one rarely encountered or expected.

G. Richard (Dick) Curry, LSM  
Santa Barbara, CA

## Drone in the Window

We stood looking out our bay window as the drone headed for runway 3-21 just to our right. I was briefly assigned to the test building at the Point Mugu Naval Air Test Station just south of Santa Barbara, California. We were testing those ingenious Sidewinder air-to-air missiles that used infrared sensors to lock onto the hot jet gases and fly up the tailpipe of the jet before exploding. But this was the 1950s, and our radio control drones were old World War II propeller-driven fighters. With no jet exhaust, the

Sidewinder would pick up the heat of the engine cowling just aft of the propeller. There was no explosive in the test missile, so it would hit and dent the cowling. Often the damage was mild enough so that the chase plane with its radio controls could swoop in, take control, and fly it back to our runway. That was what we were seeing out our bay window.

As we watched, the chase plane turned over control to our ground controller and moved away; only the drone wasn't responding to our ground con-

troller. It was headed not for the runway but for our bay window. We just stood there. Our controller called the chase plane to see if it could regain control. It flew in close to the drone, took control, and flew it out to the islands to crash land. Ever since, I've wondered if we all would have just stood there mesmerized as the nose of the drone smashed through our bay window.

Bruce MacAlister, LSM  
Richmond, VA

## The Global Positioning System

The Global Positioning System (GPS) is a U.S. Department of Defense system that provides precise navigation data to military and civilian users by means of a constellation of NAVSTAR satellites that orbit the earth in 12-h circular orbits. GPS is based on the Naval Research Laboratory (NRL) TIMATION (Time Navigation) research program that began in 1964 by Roger L. Easton. Easton was the branch head of the NRL Space Applications Branch, which was founded in 1958 following the launch of the Soviet Union Sputnik 1 satellite on 4 October 1957. Easton and other scientists then began to design the U.S. Navy Space Surveillance System (NSSS), which would detect, track, and determine the orbits of unannounced satellites and other objects as they crossed the continental United States and the Navy fleet.

In 1960, I started work to optically calibrate the NSSS, and in 1964, I began collateral duties that required the pre-flight evaluation of frequency standards for use in the TIMATION program. Easton and other scientists then engaged in designing the TIMATION 1 satellite that was launched on 31 May

1967. The TIMATION 1 satellite was the first of four satellites designed and built by NRL.

On 3 June 2009, NRL published the *NRL GPS Bibliography: An Annotated Bibliography of the Origin and Development of the Global Positioning System at the Naval Research Laboratory*. The bibliography is available on the NRL website as a special-interest publication.

More than 50 years ago, on 25 October 1967, NRL scientists demonstrated navigation using passive-range measurements taken from the TIMATION 1 satellite using the first space-based chronometer. The demonstration was presented to the U.S. Navy and other officials from the Pentagon at the John Ericsson Statue that is located one block south of the Lincoln Memorial in Washington, D.C. I constructed the graphical line of position passive-range intercept chart. Three of the measurements taken by the NRL timing receiver were then used to graphically determine the position and the clock offset.

The TIMATION 2 satellite was launched on 30 September 1969 into

a 2-h circular orbit. Transatlantic time transfer of better than 1  $\mu$ s was achieved between the U.S. Naval Observatory in Washington, D.C., and the Royal Greenwich Observatory in England.

The TIMATION 3 (Navigation Technology Satellite 1) was launched on 14 July 1974 into an 8-h circular orbit. This third NRL satellite carried a quartz clock and two digitally controlled rubidium atomic clocks—the first atomic clocks in space. Worldwide time transfer as far away as Australia was demonstrated.

The Navigation Technology Satellite 2 was launched on 23 June 1977 into a 12-h circular orbit. The effect of relativity on the onboard cesium atomic clock was measured and corrected so that a GPS receiver on Earth could observe that the rate of GPS time was the same as Coordinated Universal Time. The clock frequency stability specification of two parts in 10<sup>13</sup> was met. NTS 2 was the first operational NAVSTAR GPS satellite.

Thomas McCaskill, LSM  
Monroe, NC

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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, 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 2018. Please include your Life grade, town, state, country, phone number, member number, and/or an e-mail address with your piece.

## Stopping IEEE Services

Life Members who no longer wish to receive mailings or publications should contact the IEEE Contact Center. If you are doing so on behalf of another Life Member, please submit the member’s name, number, grade, address, change date, and your connection (e.g., Section chair) to the Contact Center.

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## 2018 Life Members Committee

Charles Turner  
[c.turner@ieee.org](mailto:c.turner@ieee.org)

Michael Andrews  
[m.andrews@ieee.org](mailto:m.andrews@ieee.org)

Victor Fouad-Hanna  
[victor.fouad@ieee.org](mailto:victor.fouad@ieee.org)

Eleanor Baum  
[eleanor.baum@gmail.com](mailto:eleanor.baum@gmail.com)

John W. Meredith  
[j.meredith@ieee.org](mailto:j.meredith@ieee.org)

Piero P. Bonissone  
[bonissone@gmail.com](mailto:bonissone@gmail.com)

Yong Jin Park  
[yjp@ieee.org](mailto:yjp@ieee.org)

V.K. Damodaran  
[vkdam@ieee.org](mailto:vkdam@ieee.org)

Aleksandar Szabo  
[a.szabo@ieee.org](mailto:a.szabo@ieee.org)

Cecelia Jankowski  
Secretary (staff)  
[c.jankowski@ieee.org](mailto:c.jankowski@ieee.org)

Rosann Marosy  
Manager, Member and Geographic Activities (staff)  
[r.marosy@ieee.org](mailto:r.marosy@ieee.org)

Craig Causer  
Managing Editor (staff)  
[c.causer@ieee.org](mailto:c.causer@ieee.org)

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

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