

# IEEE History Center

ISSUE 96, November 2014



*Trireme Olympias, subject of a lab project in a course on the History of Technology taught by IEEE History Center staff at Stevens Institute of Technology. (Story on page 6) Photo from Wikipedia Creative Commons [http://en.wikipedia.org/wiki/Olympias\\_\(trireme\)#mediaviewer/File:Olympias.1.JPG](http://en.wikipedia.org/wiki/Olympias_(trireme)#mediaviewer/File:Olympias.1.JPG)*

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The newsletter reports on the activities of the IEEE History Center and on new resources and projects in electrical and computer history. It is published three times each year—once in hard copy (March) and twice electronically (July and November) by the IEEE History Center.

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By Michael Geselowitz, Ph.D.

As I mentioned in my column in the last issue ("Static from the Director," IEEE History Center Newsletter July 2014), I was writing literally on the eve of our move from Rutgers University to Stevens Institute of Technology. Well, thanks to team effort involving numerous units at both IEEE and Stevens, the move went off without a hitch, and we are comfortably ensconced at Stevens. The new strategic partnership is already paying off, as can be seen in article about the pioneering new course we have developed (see page 6).

The other strategic initiative that I previewed in July is also moving forward well. As described on page 4, the United Engineering

Foundation project to evolve the IEEE Global History Network into the Engineering & Technology History Wiki is going well, and the UEF has shown its satisfaction with our efforts to date by approving a phase-2 grant for 2015.

Finally, and most excitingly, in response to the IEEE Foundation's call for a "signature program" proposal that I mentioned in July, we responded with a successful idea that will launch in 2015 and be called REACH. Our program development officer from the IEEE Foundation, Natalie R. Krauser McCarthy, gives you a sneak preview on page 3.

The IEEE Foundation's faith in us is based in part on the ongoing activities such as Milestones, oral histories, social media, and book publishing—described throughout this issue—

### SUBSCRIPTION INFORMATION

The IEEE History Center newsletter is available free to all persons interested in technological history – whether engineers, scholars, researchers, hobbyists, or interested members of the public. It is published in hard copy in March, and in electronic form in July and November of each year.

To subscribe to the IEEE History Center's free newsletter, please send your name, postal mailing address, e-mail address (optional if you wish to receive the electronic versions), and IEEE member number (if applicable – non-

members are encouraged to subscribe as well) to [ieee-history@ieee.org](mailto:ieee-history@ieee.org)

Current and past issues of the newsletter can be accessed at: [www.ieee.org/about/history\\_center/newsletters.html](http://www.ieee.org/about/history_center/newsletters.html)

The IEEE History Center is a non-profit organization which relies on your support to preserve, research, and promote the legacy of electrical engineering and computing. To support the Center's projects – such as the Global History Network, Milestones, and Oral History Collection, please click the "Donate Online" tab at [www.ieee.org/donate](http://www.ieee.org/donate) or [www.ieeefoundation.org/](http://www.ieeefoundation.org/)

## NEWSLETTER SUBMISSION BOX

The IEEE History Center Newsletter welcomes submissions of Letters to the Editor, as well as articles for its **Reminiscences** and **Relic Hunting** departments. "Reminiscences" are accounts of history of a technology from the point of view of someone who worked in the technical area or was closely connected to someone who was. They may be narrated either in the first person or third person. "Relic Hunting" are accounts of finding or tracking down tangible pieces of electrical history in interesting or unsuspected places (in situ and still operating is of particular interest). Length: 500-1200 words. Submit to [ieee-history@ieee.org](mailto:ieee-history@ieee.org). Articles and letters to the editor may be edited for style or length.

### THE IEEE HISTORY CENTER NEWSLETTER ADVERTISING RATES

The newsletter of the IEEE History Center is published three times per annum; one issue (March) in paper, the other two (July and November) electronically. The circulation of the paper issue is 4,800; the circulation of the electronic issues is 22,500. The newsletter reaches engineers, retired engineers, researchers, archivists, and curators interested specifically in the history of electrical, electronics, and computing engineering, and the history of related technologies.

|              | <u>Cost Per Issue</u> |
|--------------|-----------------------|
| Quarter Page | \$150                 |
| Half Page    | \$200                 |
| Full Page    | \$250                 |

Please submit camera-ready copy via mail or email attachment to [ieee-history@ieee.org](mailto:ieee-history@ieee.org).

Deadlines for receipt of ad copy are 2 February, 2 June, 2 October.

For more information, contact Robert Colburn at [r.colburn@ieee.org](mailto:r.colburn@ieee.org).

and also on the confidence expressed by you, our loyal supporters. So let me take this opportunity to thank you once again; to wish you and yours a happy holiday season and a healthy and

successful new year; and to ask you to keep us in mind—whether in support of REACH or of our other long-standing programs—when you consider your end-of-year philanthropy.

## HISTORY COMMITTEE ACTIVITIES

### HISTORY COMMITTEE CHAIR’S COLUMN: WHAT HISTORY CAN DO FOR YOU

By David Burger, IEEE History Committee Chair

The successful fulfillment of the History Committee and History Center objectives always appears to be ambitious and keeping to the charter of providing IEEE members and international community of historians with quality material.

Often heard at Sections Congress and at Regional levels, is what does the History Center do for 'us.' The question itself demonstrates an expectation where the History Center is the source of all things historical. While partly true, the IEEE History operation provides a framework where history articles, documents, sound and vision can be captured in a uniform manner.

A major challenge of the IEEE History operation is to empower individuals to present the historical information that we have all been exposed to! Think back to your first job, your major achievements and how others worked around you. Dare I say, sharing some of the disaster stories can be equally empowering, by learning what not to do.

The power available to an individual to influence the recognition and documentation of history was accentuated at the June 2014 Board Meeting in New Brunswick. The IEEE Board effectively challenged the way in which the History Committee deals with the recognition of Milestones. Presently this is a bottom-up program, where Sections and Councils propose milestones into the program. The UKRI Section and Japan Council stand out here with key individuals driving the process.

The IEEE Board highlighted that many countries and really significant Milestones are not represented in the current Milestones program. For example, there are no Milestones recognized in Australia, China, Africa, Middle East or the polar regions, and many worthy candidates exist in all those places. The History Committee and help of the History Center staff plan to address a process change to better address this gap, especially where Sections feel they cannot participate.

I wish you a safe and rewarding festive season.

## CENTER ACTIVITIES

### ENGAGING STUDENTS & DEVELOPING FUTURE ENGINEERS THROUGH REACH

By Natalie R. Krauser McCarthy, Development Officer, IEEE Foundation

The IEEE Foundation is excited to announce that it will partner with the IEEE History Center to raise funding for its Signature Program, REACH: Raising Engineering Awareness & Appreciation through the Conduit of History.

“REACH is the answer to teachers’ oft-spoken desire to have a curriculum that will help them teach and engage pre-university students in the history and role of engineering and technology in their society,” said Michael Geselowitz, Senior Director, IEEE History Center. The Center is seeking funding from individuals, corporations and foundations to create a curriculum that will use IEEE history, Oral Histories, and IEEE Milestones in a multi-media format, including professionally-created videos and complementary field trips. Each resource module will provide a snapshot of a segment of technological history and expand students’ awareness and appreciation of engineers’ roles in our present-day world.

Although not every student who learns about engineering throughout history will enter a technical field, everyone will gain a better understanding of the technology they use daily, and of

how the engineering discipline helped create the world many take for granted. This will help to create a path for those students who do have an interest and/or talent in all engineering fields. History is the perfect conduit to position engineers as technological heroes and social studies/history teachers currently lack the tools to do so effectively and in an exciting way.

Our ultimate goal is to raise \$4 million. These funds will be used to build a network of teacher and administration champions, develop and produce curriculum materials, create supporting marketing collateral, and when possible, expand REACH into middle and even elementary schools and, ultimately, around the world.

You can get involved today by making a donation online, [www.ieeefoundation.org/donate](http://www.ieeefoundation.org/donate), or by making a referral that will link us deeper into the educational community, or by connecting us to a possible source of funding.

Updates on the launch and progress of REACH will be in the March 2015 newsletter. Contact Natalie Krauser McCarthy at [n.krauser-mccarthy@ieee.org](mailto:n.krauser-mccarthy@ieee.org) or 732-562-6065 with any donation questions, or Michael Geselowitz at [m.geselowitz@ieee.org](mailto:m.geselowitz@ieee.org) or 732-562-6022 with curriculum questions.

## UEF FUNDED PROJECT TO HOST HISTORY OF ENGINEERING: STATUS REPORT

The IEEE History Center championed the creation of a consortium of engineering associations with the goal of designing, launching, and running a new history of engineering website. The History Center also won a grant from the United Engineering Foundation to help build the new website, which will be called The Engineering and Technology History Wiki (ETHW). The consortium (AIChE, AIME, ASCE, ASME, IEEE, SPE, and SWE) has approved the ETHW's "look-and-feel" and functions. The design included building a common thesaurus of indexing terms to cover all engineering. Each member of the consortium is preparing content to upload to the new website. The ETHW will launch on 1 January 2015, as planned. IEEE's Global History Network (GHN) will be rolled into this new website. The goal of the ETHW is to become the most comprehensive website on the history of all engineering. To this end, the History Center is

also actively recruiting new partners into the consortium.

Several of the members of the consortium have remarked that participation in this project has provided them with opportunities to expand their historical activities. The Society of Petroleum Engineers (SPE), for example, has launched an ambitious oral history project. The American Society of Chemical Engineers is devoting more energy to making the story of chemical engineering more widely known.

After launching the ETHW in January 2015, much work remains to be done, most notably making the website known to the world. Just recently, the History Center succeeded in winning a second grant from the United Engineering Foundation. This money will assist the consortium in marketing and publicizing the site to all engineers and to the general public.

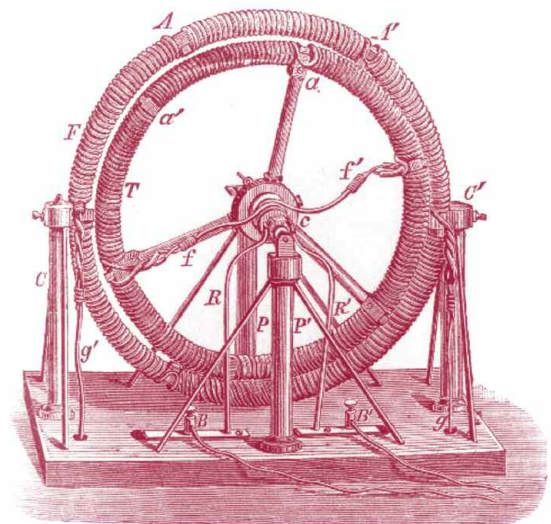
## IEEE HISTORY CENTER SOCIAL INTERACTIONS ON TWITTER AND TUMBLR

The IEEE History Center is bringing history to more people via social networking tools such as Twitter and Tumblr. Follow the activities of the IEEE History Center and others involved in the history of engineering on its Twitter feed at <https://twitter.com/ieeehistory>.

The IEEE History Center maintains a blog on Tumblr in which interesting images related to the history of technology are posted. Featured in Tumblr's history and science categories, the blog has approximately 110,500 followers as of September 2014 and more than 100,000 total social interactions. To date, five of the posted images were featured on Tumblr's *radar*, a feature that allows the Tumblr staff to broadcast selected images to all logged-in users. These posts receive significantly more social interactions, the highest reaching 3,700. To follow the blog or to view the images, go to <http://engineeringhistory.tumblr.com/>.

**THANK YOU  
TO OUR  
HISTORY CENTER  
DONORS!**

Your support helps  
preserve the heritage of  
IEEE's technologies.



*Image courtesy of Smithsonian Institution*

## ARCHIVES UPDATE: ARTIFACTS FOR THE IEEE NEW YORK OFFICE

Earlier this year, IEEE completed a year-long renovation of its New York office on the 17<sup>th</sup> floor of 3 Park Avenue, New York City, and the three groups based there—*Spectrum*, Legal and Compliance, and the Communications Society, moved back into their redesigned space. As part of the new design, the office has a new reception area with seating and two low display cases. But when the staff moved in, the display cases were empty.

IEEE Facilities director John Hunt contacted History Center Institutional Historian and Archivist Sheldon Hochheiser for assistance in solving this problem. Could Hochheiser provide eight or so historical artifacts to fill one of the cases? Hunt presented one additional challenge—in order to fit in the cabinet, all of the artifacts had to be smaller than an eight-inch cube. Hochheiser responded that he would look. Although the bulk of the Archives collection contains material—including artifacts—that document the history of IEEE, it also includes a small collection of artifacts on IEEE technology, stored for exhibit use. He indeed found eight suitable artifacts, and provided them, accompanied by captions, to Hunt, who had



*Display case of artifacts from the IEEE Archives collection, IEEE New York Office*

them shipped to New York, and placed in the display case. The artifacts now on display range widely across older IEEE technologies. There is a telegraph key, two vacuum tubes, an Edison recording cylinder, an ammeter, a bolt from the Goonhilly, England, Telstar ground station, an HP-35 pocket calculator, and a block of four 1983 United States postage stamps honoring prominent American electrical engineers.

In addition, Hunt, while visiting the archives, spied a large bust of Joseph Henry that was stored there. It had formerly been displayed at the IEEE Operations Center in New Jersey. Henry is an important figure in electrical history. He was the one of the most important electrical theoreticians of the first half of the 19<sup>th</sup> Century, as well as the first secretary (that is director) of the Smithsonian Institution, a position he held from 1846-1878. Hunt asked if this bust was available for display. When Hochheiser responded “of course” Hunt arranged for it to be displayed at the New York office as well, on a pedestal purchased for that purpose.

## LIFE MEMBERS COMMITTEE HISTORY PROJECT UPDATE

By Sheldon Hochheiser,  
Archivist and Institutional Historian

In the previous issue of the newsletter, I reported on a new project that the History Center agreed to undertake for the IEEE Life Members Committee to engage a historian to research and write the history of the committee, and then publish that history on the IEEE Global History Network. The project is on schedule toward completion in spring 2015.

The crucial step in the process for Center Director Mike Geselowitz and Center Historian Sheldon Hochheiser was locating and hiring the ideal consulting historian for the project. That person is Dr. Andrew Butrica, a veteran public historian of technology with a thirty-year track record of successful historical consulting with clients including NASA, the MIT Lincoln Laboratory, and several corporations. Both Geselowitz and Hochheiser have long known Butrica and the quality of his work. In addition, Butrica knows IEEE, having



*Dr. Andrew Butrica is writing the history of the IEEE Life Members Committee.*

been a member since 1991. It was fortunate for IEEE that he was available.

Butrica has been hard at work on the project since mid-June. He has collected and analyzed the available documentation, both from internal IEEE sources (the IEEE Archives and the Life Members Committee itself) and from IEEE publications. At the request of the committee, he prepared a preliminary draft of the first part of the history, covering the activities within IEEE predecessor AIEE from the 1920s up until the 1963 merger with the IRE that created the modern IEEE. He also developed an outline, for both his and the committee’s use covering the years through 1993, and has produced a work plan for the remainder of the project that will include oral histories with several key individuals.

You can look forward to reading Butrica’s complete history of the IEEE Life Members Committee early in 2015.

## AN INNOVATIVE COURSE ON HISTORY OF ENGINEERING

Starting in the Fall semester of 2014, the IEEE History Center launched an innovative course on the history of engineering at Stevens Institute. The course, taught by the Center's Senior Historian, Dr. John Vardalas, and Senior Director, Dr. Geselowitz, and assisted by intern Michael McGinn, looks at the story of engineering from prehistoric times to the 18<sup>th</sup> century. The students in this course are juniors and seniors in engineering and science.

What makes this course novel and exciting is the use of "labs" in a humanities course. The purpose of the labs is to give the students a hands-on opportunity to explore problem solving in different historical contexts. In one lab, using only bricks, the students assemble small-scale Roman arches and explore their limits. In another lab, the students are asked to study how people produced practical and portable measures of time, before the advent of the medieval mechanical clock. In both these labs, the students are also challenged to make the connection between engineering solutions and the larger societal context at different times in history.

Traditionally, history courses require that students write term papers. In this course, they are given an engineering problem and they must situate its solution within the larger story of world

history. The problem is to understand the design and performance of the ancient Athenian trireme. This vessel played a crucial role in the history of Western civilization. Students, working in two teams, will produce 3-D CAD drawings of the hull, manufacture a 6 ft. scale version by CNC, and then test the performance of the hull in Steven's world-class tank testing facility, at the Davidson Laboratory. They will then write a report that links the test results with the trireme's role in ancient Greece history.

This new course, which makes history come alive, would not have been possible without the active support of the Deans of Engineering and Arts & Letters at Stevens. Both see the importance of bringing the humanities and engineering closer together. Being in its first year, the course is still in its infancy. Several more years will be needed to flesh out ideas and resources for more labs. Experts in engineering education long have called for including a broader societal awareness in the engineer's undergraduate training. The presence of the IEEE History Center at Stevens has provided the impetus for greater experimentation in the fusion of humanism and engineering in undergraduate teaching. The History Center hopes to export its course to engineering programs around the United States.

## IEEE 2014 CONFERENCE ON NORBERT WIENER IN THE 21<sup>ST</sup> CENTURY

From 24 to 26 June 2014, the IEEE Boston Section and the IEEE Society on Social Implications of Technology held a conference in Waltham, Massachusetts, USA, just outside of Boston, on the theme of "Norbert Wiener in the 21st Century." Wiener was a mathematician who founded the discipline of cybernetics, the study of regulatory systems writ large. He had a huge impact on a range of fields from robotics to neuroscience.

The conference had a large number of technical co-sponsors, including the IEEE Systems, Man & Cybernetics Society, the North American Fuzzy Information Processing Society, the American Society for Cybernetics, and, of course, the IEEE History Center. Organizations such as ASC held a wide range of sessions

on technical topics, given Wiener's long and broad influence. So, as part of the Center's participation, Senior Director Michael Geselowitz organized and chaired a plenary panel of historians to discuss Wiener's contributions in a wider historical context. The meeting was a great success.



*Deborah Douglas, MIT Museum, speaks at Wiener conference as IEEE Past President Arthur Winston looks on*

## STAFF NOTES

### RESEARCH ASSISTANTS 2014-2015

The IEEE History Center is pleased to welcome this year's research assistants. They will be helping us edit and post oral histories to the Global History Network, with research projects, and with the Center's mission to preserve and protect the heritage of electrical and computing technologies.

**Ian Porada** is a first year undergraduate student studying Computer Science and Mathematics at Stevens Institute of Technology. His primary focus is cryptography, and his favorite book is *The Codebreakers* by David Kahn. He is also a graduate

of the IB Program, with an extended essay on the applications of artificial neural networks.

**Romina Ronquillo** is a third-year student at Stevens Institute of Technology studying for a Bachelor of Science in Science, Technology, and Society, and a Bachelor of Arts in Social Sciences. With an interest in both science and the humanities, the work of the IEEE History Center targets two areas of interest that she holds very dear to her. She hopes that work that she does here will help to further these interests and develop her research, writing, and editorial skills.

## CRADLE OF AVIATION MUSEUM, GARDEN CITY, LONG ISLAND

The Cradle of Aviation Museum is an excellent re-use of the former Mitchell Flying Field, the former hangars making spacious and appropriate exhibit halls for the aircraft and spacecraft within. <https://www.cradleofaviation.org/welcome.html>

The aircraft on display are stunning. An original Bleriot monoplane, one of three *Spirit of St. Louis* planes built, the Curtiss JN-4 "Jenny" owned by Charles Lindberg, a World War II Grumman Hellcat, the nose and cockpit of a Boeing 707 (complete with nosewheel), and one of the Lunar Modules, are among the many gems of its collection. There are cockpits to climb in and out of, and the exhibits are thoughtfully designed to allow the visitor to view the aircraft closely and truly see the nuts, bolts, control wires, and rivets that make them work. The aircraft and displays have been lovingly restored by volunteer docents whose expertise and passion bring the history alive. The museum is highly kid-friendly with hands-on activities.

Mitchell Field was the site of the 1929 instrument flight, takeoff, and landing by Lt. (later General) James Doolittle, which has recently been dedicated as an IEEE Milestone in Electrical Engineering and Computing.

[http://www.ieeeeghn.org/wiki/index.php/Milestones:First\\_Blind\\_Takeoff,\\_Flight\\_and\\_Landing,\\_1929](http://www.ieeeeghn.org/wiki/index.php/Milestones:First_Blind_Takeoff,_Flight_and_Landing,_1929)



*Boeing 707 cockpit at Cradle of Aviation Museum*

## HIDDEN TREASURES: NEW ENGLAND WIRELESS AND STEAM MUSEUM

What do steam engines and wireless telegraphy have in common? Off the grid power! By the time you read this, the New England Wireless and Steam Museum (NEWSM, [www.newsm.org](http://www.newsm.org)) will have held its annual "Yankee Steam-Up" in East Greenwich, Rhode Island, USA. That is the highlight of its year's activities, which is not surprising since it involves operating an array of steam engines, boats, cars, and models from the museum's and others' remarkably well-maintained collections. It is the only place you can see a Corliss engine running. Steam engines also powered the early wireless telegraph stations because they were usually located on remote coastlines. Having started collecting in the 1950s, IEEE Life Fellow Robert Merriam and his wife Nancy were among the earliest people to document the early history of wireless communications, acquiring the papers and artifacts of many radio pioneers and researchers, including Karl Ferdinand Braun and Lloyd Espenschied. The Merriams began building this amazing museum in 1964 to display their

collections of these related technologies. They and a dedicated crew of volunteers have developed an amazing array of exhibits, artifacts, and publications in five buildings on a peaceful field not far from Providence, RI. The Merriams' dedication to historic preservation covers not only steam engines but the world's oldest radio station: Walter Massie's "PJ," built in 1907 and closed some seven years later. They rescued the entire building and its contents from demolition at its Point Judith, RI, location in 1982.

IEEE History Center Outreach Historian Alex Magoun had an opportunity to see for himself in August, during a consultation on the museum's library initiated by members of the IEEE Providence section. Even when the engines aren't running, a visit is well worth the time of engineers and their curious children, but first call 401-885-0545 or [emailnewsm@newsm.org](mailto:emailnewsm@newsm.org) to make an appointment, preferably on a Thursday. You'll be fortunate indeed if Bob Merriam is available to show you around.

## HISTELCON 2015

In 2015, the IEEE History Center will again serve as a technical co-sponsor for HISTELCON, the IEEE Region 8 history conference. HISTELCON 2015, the 4<sup>th</sup> in its series (after HISTELCON 2008 in Paris, HISTELCON 2010 in Madrid, and HISTELCON 2012 in Pavia), is being organized by the IEEE Israel Section and will be held at Tel Aviv University in Tel Aviv from 16 to 21 August 2015. This time, it is also being held together with the 42<sup>nd</sup> International Symposium of ICOHTEC, the International Committee for the History of Technology. Center Senior Director Michael Geselowitz is serving as a co-chair of the technical program committee for the HISTELCON track.

The main objective of both conferences (HISTELCON and ICOHTEC) is to analyse the social, cultural, political, economic, scientific as well as military impact of "high-technologies," ranging from recent and contemporary developments such as nanotechnology through to innovations that were state-of-the-art in their own time, such as the steam engine. The campus of Tel Aviv University and the surrounding areas, with their intensive high-tech activities, offer an excellent venue for this meeting.

The specific role of HISTELCON will be to focus on the his-

tory of high-tech within IEEE's areas of interest. As always, HISTELCON will welcome all papers on the history of IEEE's areas of interest, but those casting the subject as relating to being cutting-edge within its temporal and cultural contexts will be particularly welcome. Interested readers of this newsletter are invited to submit their abstracts for presentations to the Conference Secretariat by electronically sending to [m.geselowitz@ieee.org](mailto:m.geselowitz@ieee.org) a 500-words abstract, written in English, with the submission title and the name(s) and affiliation(s) of the author(s) in MS- Word format. The deadline is 2 February 2015. Notification of abstract acceptance will be by 2 April 2015. All abstracts will be reviewed by the program committee. For each presented paper, one presenter will have to register for the Conference. Guidelines for preparation of papers will be provided in due time, as will practical arrangements. A HISTELCON conference website will be established shortly.

Those wishing to learn more about ICOHTEC and their parallel conference can visit

<http://www.icohtec.org/annual-meeting-2015.html>

## GRANTS AND FELLOWSHIPS

### PROGRAMS OF SUPPORT FROM THE IEEE HISTORY CENTER 2015-2016

The IEEE History Center offers two programs of support annually for scholars pursuing the history of electrical engineering and computing: An internship for an advanced undergraduate, graduate student, or recent Ph.D., and a dissertation fellowship for an advanced graduate student or recent Ph.D. The internship and the dissertation fellowship are funded by the IEEE Life Members Committee. The internship requires presence at the IEEE History Center, on the campus of Stevens Institute of Technology in Hoboken, New Jersey, USA; there is no residency requirement for the dissertation fellowship.

#### The IEEE Life Member Fellowship in the History of Electrical and Computing Technology

The IEEE Life Members Fellowship in the History of Electrical and Computing Technology supports either one year of full-time graduate work in the history of electrical science and technology at a college or university of recognized standing, or up to one year of post-doctoral research for a scholar in this field who has received his or her Ph.D. within the past three years. This award is supported by the IEEE Life Members Committee. The stipend is \$17,000, with a research budget of up to \$3,000.

Reimbursable research expenses include economy class travel to visit archives, libraries, historical sites, or academic conferences, either to hear papers or to present one's own work. Hotel stay, meals while travelling, copying costs, reprints of scholarly articles, and books directly pertaining to research are reimbursable. Any research trip expected to cost more

than \$1000 must be approved in advance by IEEE History Center Staff. Examples of non-reimbursable expenses include, but are not limited to: licensing fees for images for book version of thesis (book publisher should pay for those), computers or computer peripherals, digital cameras, clothing, and office supplies (paper, pens, printer cartridges, CDs, memory sticks, etc.).

Recipients are normally expected to take up the Fellowship in the July of the year that it is awarded. Fellowship checks are normally mailed to the Fellow quarterly in July, October, January, and April. For Fellows in the southern hemisphere who follow the southern hemisphere academic year, arrangements can be made to mail the checks in December (two quarters worth), March, and June.

Candidates with undergraduate degrees in engineering, the sciences, or the humanities are eligible for the fellowship. For pre-doctoral applicants, however, the award is conditional upon acceptance of the candidate into an appropriate graduate program in history at a school of recognized standing. In addition, pre-doctoral recipients may not hold or subsequently receive other fellowships, but they may earn up to \$5,000 for work that is directly related to their graduate studies. Pre-doctoral fellows must pursue full-time graduate work and evidence of satisfactory academic performance is required. These restrictions do not apply to post-doctoral applicants.

The Fellow is selected on the basis of the candidate's potential for pursuing research in, and contributing to, electrical history. Application forms are available on-line at [http://www.ieee.org/about/history\\_center/fellowship.html](http://www.ieee.org/about/history_center/fellowship.html).



The deadline for completed applications is 1 February. This completed application packet should be emailed to [ieee-history@ieee.org](mailto:ieee-history@ieee.org) or mailed to the Chair, IEEE Fellowship in the History of Electrical and Computing Technology Committee, IEEE History Center at Stevens Institute of Technology, Castle Point on Hudson, Hoboken, NJ 07030-5991. Applicants will be notified of the results by 1 June.

The IEEE Fellowship in Electrical Engineering History is administered by the IEEE History Committee and supported by the IEEE Life Members Committee.

### IEEE History Center Life Member Internship, 2015

Scholars at the beginning of their career studying the history of electrical technology and computing are invited to contact the Center to be considered for a paid Internship at the Center's offices on the Stevens Institute of Technology campus in Hoboken, New Jersey, USA.

The intern program seeks to provide research experience for graduate students in the history of electrical and computer technologies, while enlisting the help of promising young scholars for the Center's projects. The Intern generally works full-time for two months at the History Center on a Center project that is connected to his or her own area of interest. This time is usually during the summer, but other arrangements will be considered. Interns are also encouraged to consult with the Center's staff and its associates, and guided to research resources in the area. The

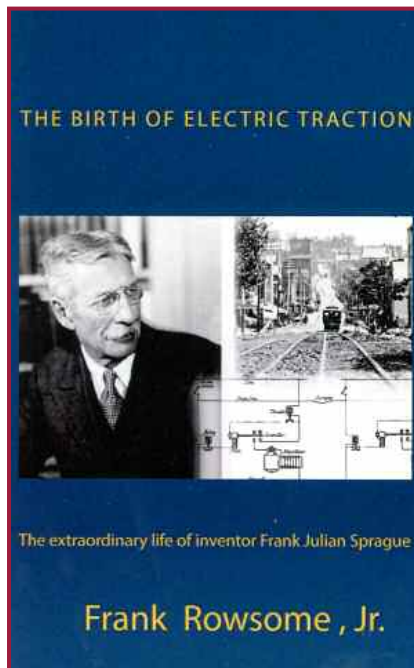
internship is designed for those near the beginning or middle of their graduate careers, but advanced undergraduates, advanced graduates, and, on rare occasions, recent Ph.D.s will also be considered. Special consideration is often given to scholars from outside the United States who might not otherwise have an opportunity to visit historical resources in the United States.

The stipend paid to the intern is US\$3,500, but additional funds may be available to defray travel costs, depending on the intern's circumstances. This internship is supported by the IEEE Life Members Committee.

There is no formal application form. To apply, please mail curriculum vita showing your studies in electrical history along with a cover letter describing the sort of project you would be interested in doing (see contact information below). The deadline for contacting the IEEE History Center is 16 March.

IEEE and Rutgers are AA/E0 employers. Women and minorities are encouraged to apply for all positions. The IEEE History Center is cosponsored by the Institute of Electrical and Electronics Engineers, Inc. (IEEE)—the world's largest professional technical society—and Stevens Institute of Technology. The mission of the Center is to preserve, research, and promote the legacy of electrical engineering and computing. The Center can be contacted at: IEEE History Center, Stevens Institute of Technology, Castle Point on Hudson, Hoboken, NJ 07030-5991, +1 732 562 5450, [ieee-history@ieee.org](mailto:ieee-history@ieee.org), [http://www.ieee.org/about/history\\_center/index.html](http://www.ieee.org/about/history_center/index.html).

## BIBLIOGRAPHY



### THE BIRTH OF ELECTRIC TRACTION: THE EXTRAORDINARY LIFE OF INVENTOR FRANK J. SPRAGUE

by Frank Rowsome Jr., published by the IEEE History Center

Frank Julian Sprague has often been called the inventor of public transportation. In addition to his developments in electric traction, Sprague made enormous contributions in the areas of control and safety, without which mass transit would not be possible. Sprague developed automatic signal and brake control for railroads, and an auxiliary train control to take charge if the driver made a mistake. He was active in the planning and construction of New York City's subway system, and in the electrification of Grand Central Terminal.

Sprague believed that "Transportation is the key of civilization...for without it our existing social structure would collapse." Among Sprague's other achievements are the introduction of electric elevators and of electric power units suitable for machine tools, printing presses, dentist's drills, and labor-saving conveniences in the home.

Rowsome's engaging and colorful biography not only gives a detailed view of Sprague as a person, but also Sprague's approach to design and problem-solving. Numerous personal, and sometimes quite humorous, anecdotes bring Sprague, his assistants, and the early history of electric railroads to life.

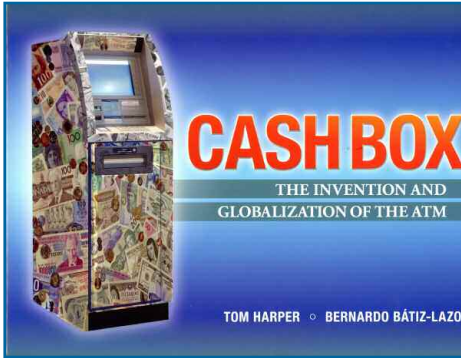
Frank Rowsome Jr. is probably now most famous for *The Verse by the Side of the Road* (1966), but he was also managing editor of *Popular Science Monthly* and later became NASA's chief of technical publications.

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HARPER, TOM and BATIZ-LAZO, BERNARDO, *Cashbox: The Invention and Globalization of the ATM*, Network Media Group, 2013



In *Cashbox: The Invention and Globalization of the ATM* the authors offer a short and simplified history of the ATM revolution. They ask how a 1960s invention became a global phenomenon so widespread, that a cash machine “is installed roughly every

three and a half minutes somewhere in the world.” They hope to describe the network of inventions, innovations, and social transformations that enabled the acceptance of automated cash machines. This intention, however, isn’t fulfilled and *Cashbox* remains a modest coffee table book that touches ever so lightly on the technical and cultural issues that this complicated web of relations entails. As such, it may serve as a source of fun trivia such as when and where was the first cash deposit machine installed (1961, NYC), the first cash dispenser machine (1966, Japan), or the first PIN (personal identification number) was introduced (1967, Sweden).

Available from Network Media Group,  
13100 Eastpoint Park Boulevard, Louisville, KY 40223,  
<http://www.networkmediagroup.com> hardcover, \$49.99,  
ISBN 978-1-935497-62-2, 123 pp, illus.

## RECOGNIZING OUR CONTRIBUTORS

### IEEE FOUNDATION DONORS ELECTRIFY THE CITY OF ANGELS

by Natalie R. Krauser McCarthy

On Sunday, 14 September 2014, long-time IEEE History Center donor and Life Fellow L. Dennis Shapiro, and his wife Susan, hosted an afternoon reception at the Hillcrest Country Club recognizing Los Angeles-area IEEE members whose donations enable the work of the IEEE History Center. While guests sampled hors d’oeuvres and cocktails, Michael Geselowitz, History Center Senior Director, presented the early history of the electric vehicle, and Jeremy Snyder, Tesla Motors, General Manager-Southwest, discussed the history of Tesla and explained how Tesla’s technological breakthroughs will influence the future. Following the presentation, and a spirited question-and-answer session, guests joined members of the Tesla team to explore the Model S, and were invited to an exclusive test drive experience. Illuminating the past to showcase our future is only possible with the generosity of all our attendees. Thank You for your support!



*Life Fellow L. Dennis Shapiro and his wife Susan were recognized for their giving at the Nikola Tesla level of the IEEE Foundation Heritage Circle*



## YOUR YEAR-END CONTRIBUTION TO THE IEEE HISTORY CENTER

The end of the calendar year is upon us and IEEE has opened its dues renewal period. As you are renewing your annual IEEE membership, please consider repeating and increasing your donations to the IEEE History Center of the IEEE Foundation.

The History Center preserves, researches, and promotes IEEE's legacy. The Center serves IEEE members, the broader engineering community, the historical community, and the general public— including journalists, documentary filmmakers, decision-makers, university students, pre-university students, and educators. Your donation to the IEEE History Center Fund supports the Center's efforts to record, archive, and educate about technology and its relationship, both past and present, to society.

There are several ways to make an end-of-year donation to the IEEE History Center Fund:

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There is so much more that we can accomplish together to transform lives through the power of technology and education. Visit [ieeefoundation.org](http://ieeefoundation.org) to learn more about:

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Thank you in advance for supporting the IEEE History Center and the history of the profession with your donation to the IEEE Foundation during dues renewal or any time throughout the year.

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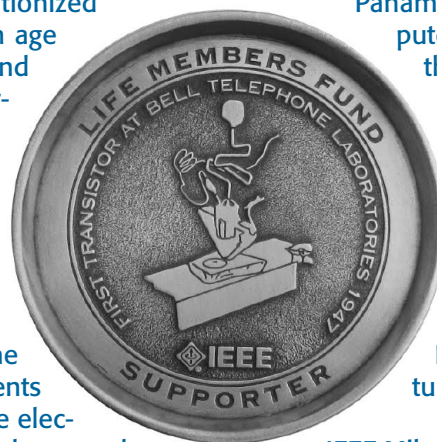
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## THE INVENTION OF THE FIRST TRANSISTOR IS NOW A COMMEMORATIVE COASTER

The Invention of the First Transistor revolutionized electronics and, eventually, the information age with small, low-power electronic devices, and the development of low-cost integrated circuits. Walter H. Brittain and John A. Bardeen, under the direction of William B. Shockley, invented the point-contact germanium transistor at Bell Telephone Laboratories, Inc. at the end of 1947. The transistor replaced existing electronic tube-based electronics devices and has been cited as the most important invention of the 20th century. This led directly to developments in solid-state devices that revolutionized the electronics industry and changed the way people around the world lived, learned, worked and played.

To celebrate this important milestone, those who donate US\$125 or more specifically to the **Life Members Fund (LMF)** of the IEEE Foundation beginning in October 2014 through September 2015 will receive the limited edition coaster depicting the Invention of the First Transistor. Invention of the First Transistor is the eighth coaster in a series of limited-edition coasters commemorating various historic IEEE Electrical Engineering Milestones. The first seven depict *Telstar*, the



Panama Canal, Japan's Bullet Train, the ENIAC computer, the Atom Smasher, Maxwell's Equations and the Landing of the Transatlantic Cable. Complete your limited edition set of coasters. Previous year's coasters are also available for a US\$125 donation each. To donate, please visit <https://www.ieeefoundation.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 Invention of the First Transistor and support future technological innovations.

The IEEE History Committee established The IEEE Milestones in Electrical Engineering and Computing Program, a donor-supported program, during the Centennial year as an ongoing means to honor and commemorate significant technical achievements in the history of IEEE fields. For more information, e-mail [donate@ieee.org](mailto:donate@ieee.org).

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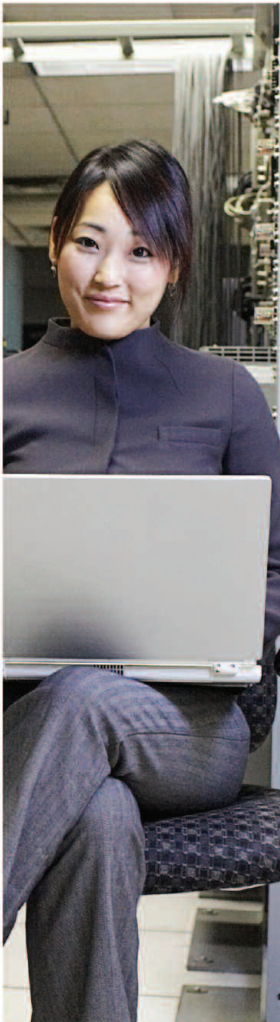
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