The History of IEEE and Electrotechnologies

Prepared by the IEEE History Center

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1884: The American Institute of Electrical Engineers is founded

A small group of individuals met in New York and founded the AIEE to advance the new field and represent the US at the 1884 International Electrical Exhibition in Philadelphia. Norvin Green of Western Union became the first president.

Invitation to the AIEE organizational meeting, Electrical World, 5 April 1884

Program of the 1884 International Electrical Exhibition, Franklin Institute, Philadelphia

Norvin Green, President of Western Union Telegraph and first president of the AIEE
Communications: The first important electrical technology

Samuel Morse’s first US telegraph line connected Washington and Baltimore in 1844. By 1866, a telegraph cable connected the United States and Europe. Alexander Graham Bell followed in 1876 with a telegraph that talked—the telephone.
A New Industry: Electric Power and Light

Electric power and light systems arose primarily from Thomas Edison’s work. Edison opened his first electric power plant in New York in 1882. Within a decade, electric power had spread to every corner of the globe, with many new applications. The AIEE became dominated by power engineers.

1882
Edison’s first commercial plant, Pearl St., NY

Frank Sprague worked for Edison before leaving to develop the first commercially practical electric streetcar.

1906
Using an electric iron by an electric light

Thomas Edison and his incandescent light patent
AC vs. DC Power

In the 1890s, AC power, championed by George Westinghouse working from inventions by Nikola Tesla, became standard because it could be efficiently transmitted over long distances from massive power plants, such as that built at Niagara Falls, which began sending power to Buffalo in 1896.

Nikola Tesla, inventor of the induction motor and a comprehensive system for polyphase AC power.

1905
Power Generation at Niagara Falls

1895
Niagara Falls Power Plant
Edison’s tower of light was a big attraction in Electricity Hall. Ironically, it was Westinghouse that won the bid for powering the fair using 12 of Tesla’s two-phase 1000 HP alternators. Edison actively attacked AC technology as being “unsafe” but AC prevailed.
The Birth of Radio

Radio, a new electrical technology, arose in the first decade of the twentieth century. Wireless telegraphy using spark transmitters was the original application, but particularly after the invention of the vacuum tube amplifier, it began to be used to transmit speech and music.

1901
Guglielmo Marconi and George Kemp with equipment used in transatlantic wireless telegraphy

1912
Radio telegraph operators’ communications with the sinking Titanic demonstrated the power of radio

1922
Triode vacuum tube inventor Lee de Forest with a radio
Formation of the IRE, 1912

With the new industry came a new society in 1912, the Institute of Radio Engineers or IRE, modeled on the AIEE, but devoted to radio, and later increasingly to electronics.

IRE logo

Alfred Goldsmith
IRE Co-founder and first journal editor

IRE annual banquet, NY, 1915. Among those attending were Tesla, Sarnoff, de Forest, and Alexanderson
Media Becomes Electronic

In the 1920s, Radio broadcasting swept the world. Between 1921 and 1930 the number of US households with radios grew from close to zero to almost 14 million. And a still newer technology, television, was moving from experiment to reality. IRE members led the way in these developments.

- **Vacuum tubes**, the first electronic amplifiers, made radio broadcasting and transcontinental telephony possible.

- **1921**
  WJZ Studio, Newark NJ

- **1930s**
  Listening to radio

- **1939**
  RCA President David Sarnoff opening commercial TV service, NY
Governments throughout the world organized their scientists and engineers to devise technologies for use in World War II. This not only contributed to the war effort in areas including radar, computing and weaponry, but produced major advances in technologies from electronics to signal processing that would have broad implications for the succeeding years.

Colossus, one of the first electronic computers, was among the machines used at Bletchley Park, England to break the German codes.

Director Dr. Vannevar Bush (center), an electrical engineer, and other members of the US Office of Science Research and Development. The OSRD mobilized and directed US R&D during World War II.

The OSRD established the Radiation Laboratory at MIT to develop radar into an effective technology for use in World War II.
Solid State Electronics

The transistor and its progeny, the integrated circuit, opened enormous possibilities for new technologies ranging from the iconic portable radio to increasingly powerful computers. Solid state electronics became a hot field in the post war years.

1947
William Shockley, John Bardeen, and Walter Brattain invented the transistor, the first solid state amplifier and switch at Bell Labs

1958
Jack Kilby’s first integrated circuit

1958
Transistor radio

1961
First commercial monolithic integrated circuit, Fairchild
Computers and Computing

By the late 1950s electronic computers had evolved from science fiction to tools for scientific research and large business applications. Alongside rose a new profession, that of the computer engineer.

1943-1946
ENIAC, widely regarded as the first general purpose electronic digital computer. The project was led by J. Presper Eckert and John Mauchly at the University of Pennsylvania.
The idea that there should be one organization for all electrical engineers was an old one, and became more powerful as the profession expanded beyond its separate roots in power and radio. In 1962, the boards and memberships of the two institutes agreed to merge. On January 1, 1963, the IEEE, or Institute of Electrical and Electronic Engineers was born with 150,000 members, 140,000 of whom were in the United States.
IRE Chicago Section Directory

Recognizing IRE Chicago Section 25th Anniversary

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CELEBRATING 125 YEARS
of Engineering the Future
The Columbian Exposition Helped

- It showcased Chicago’s technology strength.
- The International Electrical Congress was also being held at the fair in which the Institute had much interest since international units-of-measure were being decided upon.
- There was a chance for face-to-face meetings with Institute leaders.
- Incoming AIEE president Edwin Houston attended the fair and was impressed.
Western Engineers Petition the Institute

What the Western Engineers Wanted

- They wanted to hold their own meetings in Chicago.
- New York was too far away to make monthly meeting attendance practical.
- Institute members who lived in Chicago wanted to know what value they received from their $10 annual dues.

What New York Said

- This is an old issue that has been kicking around for some time.
- Getting together informally posed no problem but being recognized as an autonomous group would weaken the Institute.
- We cannot have local entities publishing papers of dubious quality.
- If Chicago is made a local chapter – what does that make of New York?
An Institute Committee Responds with a Compromise

• Local meetings can be held as long as 20 members request it.
• Local members will appoint:
  ▪ a honorary secretary as intermediary to the Institute.
  ▪ a chairman for the meeting.
• The Institute will still control papers requiring that they be first read in New York.
• There was no mention of forming local entities such as sections which would come later.
20 Signatures Required to hold first Local Meeting

Signers of Petition for Local Meetings in Chicago

Prepared by: Don Harris     Info from: Francis Cox, George Spisak

Transmitted by Edward Caldwell, February 20, 1894

Charles G. Armstrong .... A '92 (Sept. 27)
B. J. Arnold .......... A '92 (Oct. 25), M '93
F. B. Badt (Lt.) ......... A '92 (Apr. 19)
A. H. Bauer ........... A '90 (Feb. 7), M '91
N. H. Bentley ............. A '93 (Oct. 18)
Lem S. Boggs ............. A '93 (Sept. 20)
Charles A. Brown ....... A '87 (July 12)
Edward Caldwell, Chairman of Committee .......... A '91 (Jan. 20)
Louis K. Comstock ...... A '93 (Dec. 20)
F. W. Cushing ............. A '91 (Nov. 24)
Fred De Laude .......... A '92 (Feb. 16)
C. C. Haskins .......... A '93 (Sept. 20)
Samuel Insull .......... A '86 (Dec. 7)
Elbert F. Norton ....... A '93 (Dec. 20)
S. E. Nutting .......... A '93 (Sept. 20)
R. S. Pierce .......... A '93 (Apr. 18), M '93
William D. Ray ......... A '92 (Sept. 27)
Samuel Rodman, Jr. .... A '90 (Sept. 16)
Henry J. Sage .......... A '93 (Dec. 20)
Leland L. Summers ....... A '92 (Feb. 16)
Charles Wirt ............. A '88 (Sept. 8)
Inaugural Meeting
March 21, 1894

Professor Stine of the Armour Institute offered his lecture room for the meeting.
IEEE Recognizes the Chicago Section

Chicago Section recognized as the first section formed outside of headquarters
Chicago Section Celebrates 100 Years

CHICAGO SECTION
CENTENNIAL

Looking Back
and into the
Future...

1893-1993

IEEE
100 YEARS
CHICAGO
1893 1993

Centennial Celebration
October 9, 1993 • 6:30 P.M.

Museum of Science and Industry
57th Street and Lake Shore Drive
Chicago, Illinois

Celebrate 100 Years of
engineering contributions
by the IEEE —

For more information contact the
IEEE Chicago Section Office,
30 North Michigan Ave., Suite 508,
Chicago, Illinois 60602
312 • 236 • IEEE
1993 Centennial Celebration

Over 400 people dined in the rotunda of the Museum
Engineers as Reenactors

Professor Dugald Jackson chaired the EE departments first at Wisconsin and then at MIT.

March 23, 2004
Illinois Institute of Technology
McCormick Tribune Campus Center
33rd and State Streets, Chicago, Illinois
The IEEE Chicago Section continues to make history

Thank You