The Current Source

Newsletter of the Schenectady Section of the IEEE

Greetings from the Chair

Can you believe the Schenectady Section is now over 100 years old!? One hundred years, wow! That's quite an accomplishment, and one that we can thank many, many members and volunteers for over the years—even through some tumultuous times. I'm proud to be a part of this great institution, and honored to serve as Chair this year.

To think back, 100 years ago my great-grandparents and grandparents joyously witnessed the first powered flight. Today, my children and I are witnessing the very first perfect vision pictures taken from the surface of Mars. Getting there was an engineering feat not thought of—although much dreamed of I'm sure—a hundred years ago. It has certainly captivated the interests of my young sons, who anxiously await the next report and picture. What, I wonder, will my son's grandchildren and great-grandchildren anxiously await a hundred years from now?

What will be the inventions that come about over the next 100 years? How will the field of engineering evolve? How will new engineering discoveries change the way we go about our daily lives? Will alternative modes of transportation be discovered? In what new ways will we be communicating? How will we be transmitting and storing data? Will new ways to harness electricity be found—or will there perhaps be a completely different form of power discovered? Questions such as these have fascinated us as engineers throughout our lives. The wonder, sense of adventure, and endless curiosity is what captivates us, and propels us forward toward that next discovery.

We, as engineers, may have many different fields of focus, but we all share in this common interest and excitement of new discoveries. The collaboration toward achieving these goals, and sharing with fellow engineers the successes and disappointments that come along the way, is what the IEEE is all about, and I don't see this ever letting up.

The experiences of the past, the knowledge of today, and the dreams for the future are part of what has kept this Section vibrant over the past 100 years, and what will keep it vibrant well past the next hundred. We have a great group of volunteers, and a strong membership. This year we build upon our past initiatives and continue to work at enhancing the Section in the best possible way for our members. We look toward continuing to provide interesting and informative noontime lunch talks, and perhaps take you on a field trip or two. We also hope to see the formation of two new Chapters come to fruition—the Engineering Management Chapter and the Neural Network Chapter. At the same time, though, the Microwave Theory and Techniques Chapter is still in need of a Chair and some new life if it is to remain viable within the Section.

If you can contribute in any way to the Section—by volunteering in one of the Chapters or the Section, speaking at a noontime talk, or providing us with new ideas—we welcome it. Every bit helps the Section work to enhance the learning, excitement, and understanding for present, and future, engineers. Please, come join in!

Thank you and best wishes to all.

—Kristin Short

IEEE IEMC 2003 Conference held

The IEEE International Engineering Management Conference IEMC-2003 was held November 2–4 at the Desmond Hotel. The conference was cosponsored by the IEEE Engineering Management Society, Lally School of Business of Rensselaer Polytechnic Institute, the Institute of Electrical Engineers (IEE) of the United Kingdom, and the IEEE Schenectady Section.

The IEMC theme this year was "The Human Side of Innovation and Change." The conference offered a platform for sharing experiences, presenting new ideas and results, and networking with leading experts. IEMC-2003 hosted five plenary sessions, two panel sessions, three workshops, and 30 paper sessions with over 100 papers published in the proceeding. The conference was attended by a large number of academics and professionals.

The paper sessions covered topics on technology management, knowledge management, decision making, modeling and managing technology projects, R&D management, innovation and product development, supply chain, virtual teams, and technology strategy. In addition to the paper sessions, the conference offered an interesting key-speakers program. Prof. Andy Neely from the Advanced Institute of Management Research in the United Kingdom was the opening session keynote speaker. In his speech on "Management Tools for the Business World," he explained the history of the

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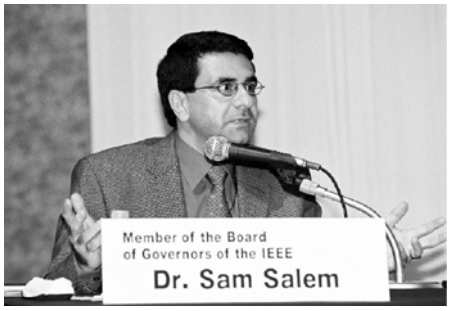
Advanced Institute of Management. He offered his views on the challenges of integrating the agenda of interests of academics, policymakers, and practitioners. Dr. Rolf Smith, managing director of the Virtual Thinking Expedition Company, gave a talk on "Different Thinking for Different Results." Dr. Smith introduced the audience to a range of creative thinking styles and ideas to show how different thinking leads to different results.

Local leaders of GE Affinity Networks—the Women's Network, the African American Forum, the Hispanic Forum, and the Asian and Pacific American Forum—offered a panel session titled "Successes and Challenges for Affinity Group Networks." The panel session explored how such groups can help a global company engage and retain top talent in differing demographic groups. The panel was assembled through the effort of volunteers from the IEEE Schenectady Section.

The IEEE Schenectady Section cosponsored the event, and executive committee members volunteered to organize and chair some of the conference sessions.

IEEE's Sam Salem addresses MOT Symposium

As a member of the Board of the IEEE Engineering Management Society, Dr. Sam Salem was invited to give a talk at the International Management of Technology (MOT) Symposium in Tokyo, Oct. 30–31. The Ministry of Economy, Trade and Industry (METI) of Japan organized the event. The symposium is part of a concentrated effort to promote MOT in Japan. The event featured presentations and panel discussions from Japan, Europe, and the United States.



Dr. Sam Salem at Tokyo MOT Symposium.

Dr. Salem presented a paper on "The Trends in Industry-Academic Cooperation in Managing Technology." He gave an overview of the current environment and challenges that face the development of industry-university partnerships in the United States. Dr. Salem also participated in a panel discussion aimed at promoting MOT education in Japan.

Other participants included Prof. Yasser Hosni, from the International Association for Management of Technology (IAMOT); Prof. William Bygrave, from Babson College; and Prof. Georges Haour, from the Institute for Management Development (IMD) in Switzerland. The symposium was attended by 300 academics and professionals having interest in MOT.

Dr. Salem is a member of the IEEE Schenectady Section Executive Committee.

Region 1 EMS chapters chair workshop in Albany

The Region 1 Engineering Management Society (EMS) Chapters Chair Workshop was held at the Albany Marriott Hotel Nov. 1–2. The workshop preceded the IEMC conference that started on the evening of Nov. 2. The purpose of the workshop was to provide an opportunity for Region 1 EMS chapter chairs to receive and exchange valuable information about EMS chapter activities in the region. Sam Salem was invited from the Schenectady Section to the workshop to give a talk about his trip to Japan and overview the presentation he made there at the International Management of Technology Symposium in October.

Section presents award at 2004 National Future Cities competition in Washington, D.C.

The third annual Capital District Future Cities competition was held at RPI Jan. 10. Twelve middle school teams from area schools competed for an all-expenses-paid trip to the National Future Cities Competition in Washington, D.C. during National Engineer's Week. Area businesses and professional groups provided a number of other cash prizes and awards. The IEEE Schenectady Section sponsored an Award for Excellence in Generation and Conservation of Electrical Energy. The award included a check for $100. In addition, the Section gave general support of $100 to the competition.

Upon entering the competition, each team receives a copy of *Sim City* software with which to design their city. When the design is finished, they must create a tabletop model, a poster, and a group presentation to represent their city during the competition. Cost of the project must be under $100, and recycled materials should be used in its construction. This year's project theme is the use of plastics to aid senior citizens in the future.

Student Activities Chair Peter Sutherland and volunteer Saber Azizi attended the competition to review the projects, interview teams, and make the tough choice of who would receive the IEEE award. The winner of the IEEE award was the team from Maple Hill Middle School in Castleton-on-Hudson, with a city named "Albany." The team had proposed hydro power from the Hudson River for their electrical generation source in addition to solar, wind, and fuel cells for a balanced energy mix. The run of the river hydro plant featured a level of the city that rotated on a vertical shaft, turned by paddles extending out into the river current. The most novel use for electricity was the hydraulic elevator system in the underground portion of the city. Maple Hill was also the overall winner of the competition.

The Schenectady Section will continue its support for the 2005 competition. Activity will begin in August and September of 2004, when mentors and volunteers will be recruited. Mentors meet with the teams, typically for three to four sessions of about three hours, and provide an engineering perspective and advice. Volunteers assist in the planning and "day-of" activities. IEEE volunteers participate in interviewing the teams to determine the recipient of the IEEE Award.

For further information and additional photos, please visit the local competition web site, www.geocities.com/fcalbany/Comp2004/Competition2004.html and the national website www.futurecity.org

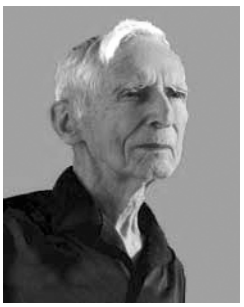
—Peter Sutherland, Student Activities Chair

The Maple Hill Middle School team, their teacher Mr. Kenneth M. Malloy, and engineering mentor George E. Walling, Jr. are shown with the model city, "Albany."

Peter Sutherland, Student Activities Chair, presents the Award for Excellence in Generation and Conservation of Electrical Energy to the Maple Hill Middle School team. Saber Azizi (not shown) assisted in judging.

Remembering Charles Concordia

Charles Concordia (LF) started working at the General Electric Company, in his hometown of Schenectady, in 1926. That event was the beginning of an amazing career that ended with his death on Christmas night, 2003.



Charles Concordia, 1926–2003.

Charlie, as he was known to just about everyone, was unique. He received honorary doctorates from Union College and Iowa State University, and a series of recognitions from IEEE, including the Lamme Medal, the Steinmetz Award, and the Philip Sporn Award, and in 1998 he earned the highest honor offered by IEEE, the Medal of Honor. He wrote a seminal textbook (*Synchronous Machines*, John Wiley & Sons, 1951) in which he translated the arcane theory of Park's equations into the familiar subtransient, transient and synchronous impedance terminology that hundreds of thousands of engineers use every day. He was a consultant to both industrial and utility concerns as well as to governments around the world, and was an advisor to the Johnson administration in the aftermath of the major blackout that affected the Northeastern part of the United States in November 1965.

And the amazing thing is that Charlie never went to college! He was born into a modest family—his parents were both teachers. He graduated from Schenectady High School as an honor student in physics, but rather than pursue a formal college education, he joined GE as a laboratory assistant. Several years later, he requested and received special permission to take the entrance examination for GE's Advanced Engineering Program, an elite series of classes designed for graduate engineers that enabled participants to earn advanced degrees in engineering, and he aced the exam. After completing the program, he later became one of the instructors.

Everyone who knew Charlie has a favorite Concordia story. In 1972, this author was asked to study the performance of synchronous condensers in response to scrap cave-in events in a steel-making arc furnace. The concern was for the case of an unbalanced event that shorted two of the furnace electrodes, and the results of this analysis were to be compared with similar simulations of the performance of a new static reactive compensator for unbalanced fault conditions. A disagreement arose in the course of constructing the models for this analysis: should the analysis be conducted with a model that represented all three phases of the power system, or would it be easier and equally accurate to construct positive and negative sequence models and then interconnect them to represent the unbalanced phenomenon? One of the clients for this activity suggested going to Charlie for advice. I had been aware of Charlie's reputation since reading *IEEE Transactions* while in college, but had never actually encountered him. Naturally, based on his awesome reputation, my response was "can we actually talk to Charlie?" Well, not only did we talk with him, we spent almost an hour in his office. The first five minutes of that time was devoted to the problem at hand (and it was reassuring that he agreed with my preference for the symmetrical component approach to the problem), and the rest of the time was devoted to a conversation about one of Charlie's favorite subjects, cars. He had this unusual ability: he could quickly assess a complex technical subject and get to a solution, while putting everyone around him at ease.

"Charlie's career was focused on electric power, but he was involved in a variety of other engineering subjects as well. One of his first successes at GE was development of a new approach to detecting cracks in train rails. He did a considerable amount of work on the problem of flicker, especially in conjunction with arc furnaces, and contributed significantly to the evolution of the "flicker" curve…."

Charlie's career was focused on electric power, but he was involved in a variety of other engineering subjects as well. One of his first successes at GE was development of a new approach to detecting cracks in train rails. He did a considerable amount of work on the problem of flicker, especially in conjunction with arc furnaces, and contributed significantly to the evolution of the "flicker" curve to reflect the tolerance boundaries of critical loads to periodic voltage disturbances. He recognized the problem of torsional interactions between electrical machines and systems, and wrote a paper predicting that under the right circumstances, torsional stress could lead to failure of the shaft of a generator—two decades before the first instance in which this kind of failure actually happened. In 1947 he chaired an IEEE committee that eventually evolved into the IEEE Computer Society, and in the latter part of his career, he was an advisor to executive management at GE on computer technology.

While he was one of the most brilliant power systems theoreticians of the 20th Century, Charlie remained the guy from a humble background who got his start as a laboratory assistant—and automobiles were one of his passions. A story is told that he did an analysis that concluded that purchasing an expensive car and taking good care of it would be more economical over the long term that buying less expensive vehicles on a more frequent basis. And to prove the point, he purchased a used 1958 Rolls Royce—which he carefully maintained, and drove for more than twenty years!

This article was written by Louie Powell, GE Power Systems Energy Consulting, Schenectady. The author can be reached at. louie.powell@ieee.org

History Report:

Centennial of the IEEE Schenectady Section

In lieu of her regular column "Past, present, future: The history of electrical engineering in our area," Chandra Reis, our Section Historian opted to run an article featuring a talk by Region 1 Historian, Richard Ackley, on the history of the IEEE Schenectady Section. The presentation was made at the IEEE Region 1 summer meeting in Schenectady Aug. 15–17. The talk appears here in its entirety.

Congratulations to the Schenectady Section for reaching that enviable century of Section membership in the IEEE. As most of you know, the IEEE was formed in 1963 as a result of a merger of the American Institute of Electrical Engineers (AIEE), and the Institute of Radio Engineers (IRE). On January 26, 1903, Schenectady was organized as a Branch of the AIEE. All AIEE local entities remained as Branches until 1907, when the designation was changed to "Section." Schenectady had members on many AIEE committees during the formative years. The AIEE had a regional structure that started in approximately 1930 and was very similar to Region 1, with the exception that New York City and Long Island were separate. The name of this entity was the "Geographic District Executive Committee" until 1956. Then the regions were reorganized, and only New York State, without the city and with portions of northern Pennsylvania, were included in a new entity called the "Empire District." Schenectady had district chairs, or secretaries, or both, until the merger with Institute of Radio Engineers (IRE) formed the IEEE in 1963.

I would like to start by congratulating the Schenectady Section for reaching that coveted level of century membership in the IEEE. It is fitting and proper that on their 100th birthday, one of their Fellows, Dr. Michael Adler, was elected 2003 IEEE President! Dr. Adler was with GE for almost 30 years, until his retirement in 2000. He is currently Vice President for Technology at Mechanical Technology Incorporated and a research professor at Rensselaer Polytechnic Institute.

History of the AIEE

Let us now consider the history of the AIEE. The burgeoning electrical industry in the United States prompted the Franklin Institute in Philadelphia to sponsor an International Electrical Exhibition in 1884. There was no organization of electrical engineers in the United States at that time. Leading engineers, including Thomas Alva Edison and Alexander Graham Bell, were concerned that it would be a lasting national disgrace if no American electrical society was in existence to receive foreign electrical dignitaries. In April 1884 a group of these concerned engineers held organization meetings in the headquarters of the American Society of Civil Engineers in New York City, where they formed the AIEE. Norvin Green, president of the Western Union Telegraph Company, was elected the first president, and the first technical meeting was held on Oct. 7 and 8, 1884 at the Franklin Institute as part of the International Electrical Exhibition.

Any discussion of AIEE and Schenectady needs to first address the General Electric Company, which was formed in 1892, only eight years after the formation of the AIEE. This was the result of a merger of the Edison General Electric Company of New York and the Thomson-Houston Electrical Company of Lynn, Massachusetts. The great electrical engineering company and the great electrical engineering society grew together and used some of the same personnel. The chair and secretary for the 60 years of AIEE existence in Schenectady invariably had a GE address. GE grew rapidly, annexing many smaller companies. One of these was Rudolph Eichemayers Manufacturing Company of Yonkers, N.Y., whose chief draftsman was Charles Steinmetz. GE also grew rapidly in Schenectady, where Thomas Alva Edison had transferred his machine works in 1886.

Charles Steinmetz

In 1894, Charles Steinmetz was transferred to Schenectady GE and was elected AIEE president in 1901–02. An Employees Engineering Society was formed at GE in 1898 that grew rapidly and merged with the AIEE on Jan. 26, 1903 to become the AIEE Schenectady Section. Dr. Steinmetz served as the first Schenectady Section chair and held the chairmanship for three years. For those of you who are not familiar with Dr. Steinmetz, he was GE Schenectady's Chief Consulting Engineer, a man to whom all the company's engineers came for advice on difficult problems. A story I heard going the rounds at GE was that Dr. Steinmetz could do complex mathematics in his head!

Schenectady Section formed in AIEE

The Schenectady Section was the seventh formed in the AIEE, and by 1915 there were a total of 31 AIEE sections. In 1915, Schenectady was by far the largest section, with 791 members out of the AIEE total of about 8000. By 1958, there were 58 sections in the AIEE, and the first 10 geographic district committees were formed. The Northeastern District was very similar to our IEEE Region 1, without New York and North Jersey, but with some of northern Pennsylvania. The Schenectady Section elected six different chairs to the Northeastern District. These chairs were also vice-presidents of AIEE. The Section also filled 13 secretary slots on the District Committee. In 1957, the districts were revamped, and all of New York State, without The City and Long Island, became the Empire District. New England continued to be the Northeastern District.

The AIEE had several technical committees, and over the years Schenectady had several committee chairs in areas including power applications, protective devices, data processing, and electrical insulation.

History of the IRE

Now the junior founding society, the Institute of Radio Engineers (IRE), was itself the merger of two other Societies that were having severe membership problems. One, the Society of Wireless Tele-

graph Engineers (SWTE) was started in Boston in 1907, and by 1911 almost ceased to exist. The second, The Wireless Institute (TWI), was formed in New York in 1909, and by 1912 had lost most of its membership. The two ailing societies met in 1912 and merged into the IRE. The founders had strong desires that the IRE be international and therefore left American out of the name. This was further strengthened by the custom of having the vice-president be from outside the United States. The IRE had three Sections in 1916, and only grew to 20 by 1937. The number increased to 50 by 1950, the year Schenectady formed an IRE Section. Since Schenectady was very active throughout the AIEE, one might ask why the IRE Schenectady Section was formed so late. GE was the major electrical company and was building large power equipment in Schenectady that until the late 40s had no real need for a radio society. By the time the IRE Schenectady Section was formed, however, electronics was becoming critical in the power industry.

IRE regions were first formed in 1950, and Schenectady was assigned to Region 2 with New York City. In 1955 more regions were formed, and Schenectady was switched to Region 1, which was basically our current region, without New York City and North Jersey.

Since the formation of IEEE on Jan. 1, 1963, Schenectady has been actively involved in the Region Board of Governors, but has had no officers on this body. The major IEEE involvement has been on technical activities and the Technical Activities Board. Their technical activities are strongly demonstrated by the fact that the Section has 100 members at the Fellow grade. This is an astounding 8.6% of their total membership, which is almost three times the regional average.

We want to honor the 2003 Fellows from the Schenectady Section: Dr. Manoj R. Shah and Dr. Timothy L. Johnson, both from GE; and Prof. George Nagy, RPI.

Awards and new IEEE Fellows

2004 IEEE Nikola Tesla Award Recipient

Professor Sheppard Joel Salon, Rensselaer Polytechnic Institute, Troy
"For pioneering and outstanding contributions to transient finite element computation of electric machines coupled to electronic circuits; and electromechanical devices."

2004 IEEE Fellows

The following three Schenectady Section members were elected to the grade of Fellow as of Jan. 1.

- Dr. Piero P. Bonissone, GE Global Research, Schenectady, "For leadership in the development of artificial and computational intelligence technologies and their applications to real-world problems."
- Mr. Edward La Verne Owen, GE Power Systems, Schenectady, "For contributions to AC adjustable-speed drives."
- Mr. Jay Williams, Power Delivery Consultants, Ballston Lake, "For contributions to underground transmission system design and utilization."

Past year's seminars and events

The following events were offered to the general membership during the past year. Items not in blue boldface type were luncheon lectures, typically offered once a month except during the summer months. All luncheon lectures are open to the public, and are free to IEEE members. Other events vary.

- Jan. 16, Holiday Inn, Schenectady, "Wind Power," James Lyons, Chief Engineer—EE Systems, GE Global Research Advanced Technology Leader, GE Wind Energy
- **Dec. 17, Brandon's Ritz Terrace, Schenectady, Holiday Luncheon**
- Nov. 21, Holiday Inn, Schenectady, "Superconductor Fault Current Limiters," Len Kovalsky, Program Manager of Switchgear Technologies, SuperPower Inc.
- **Nov. 2–4, Desmond, Albany, IEEE IEMC-2003 on "Managing Technologically-Driven Organizations: The Human Side of Innovation and Change"**
- Oct. 17, Holiday Inn, Schenectady, "Benefits of IEEE Membership," Lou Tomaino, Consultant
- **Oct. 13, Union College, Schenectady, 66th Steinmetz Memorial Lecture, "The Future of Information Technology," Dr. Paul M. Horn, IBM Senior VP and Director of Research**
- May 16, Ramada Inn, Schenectady, "Total Architecture: Enterprise Application Integration (EAI) Meets Business Processes," Paul Brown, Principal Software Architect, TIBCO Software, Inc.
- April 15, Ramada Inn, Schenectady, "Cohoes and Niagara: Mills, Canals and Hydropower," Jim Stewart, Consultant
- March 21, Ramada Inn, Schenectady, "Rediscovering William Stanley, Jr.," Edward L. Owen
- **March 18, RPI, "Troy, "Transmission Market Unbalance," Peter Reichmeider, Senior Vice President, ABB**
- Feb. 21, Ramada Inn, Schenectady, "Increasing Power Transfer Capability of Existing Transmission Lines," Jose Daconti, Executive Consultant Power Technologies, Inc.
- **Feb. 20, RPI, Troy, "Pulsed Detonation Engines for Advanced Propulsion," Anthony J. Dean, GE Global Research, Niskayuna**
- **Feb. 12-14, 2003Engineer's Week 2003**

Additional information about these lectures may be found at www.ewh.ieee.org/r1/schenectady/events.html or www.ewh.ieee.org/r1/schenectady/past_events.html.
Anyone wishing to present at a luncheon lecture should contact Lou Tomaino, Meeting Coordinator, at l.tomaino@ieee.org

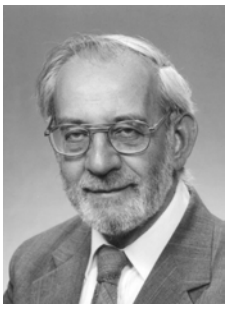
Gerald B. Kliman: In Memoriam

The IAS and the international electric machines community lost one its most creative and respected members when Gerald B. Kliman, 72, of Schenectady was tragically killed in a traffic accident on Jan. 30.

Jerry (as he was known to all his colleagues) was born and raised in Boston. He received all of his electrical engineering degrees from MIT, culminating in his Ph.D. awarded in 1965. After serving in the U.S. Air Force and briefly as a faculty member at Rensselaer Polytechnic Institute, he joined the General Electric Company.

During his long and productive career at GE, Jerry earned wide respect for his expertise in the fields of rotating and linear ac machines, electric traction drives, and electromagnetic pumps. Jerry brought fresh ideas to every technical problem he addressed, generating 88 U.S. patents up to the time of his death, with more than 20 applications pending. His advice was widely sought by researchers both inside and outside GE, and he never learned how to say "no" to these requests. Following his retirement from GE in 2000, Jerry returned to RPI to continue his research activities.

"…Jerry brought fresh ideas to every technical problem he addressed, generating 88 U.S. patents…"



Gerald B. Kliman

Jerry was a Life Fellow of IEEE, reflecting a long history of professional contributions as both an author and active member of technical committees. He was a member of both the Electric Machines and Land Transportation Committees of IAS, as well as the Rotating Machinery Theory Committee of the Power Engineering Society. Jerry also served as an associate editor of the journal *Electric Power Components and Systems.*

When not working on technical problems, Jerry loved to play his violin in local orchestras. He was devoted to his family and to his Jewish faith. Jerry worked tirelessly to build bridges between the various religious communities in the Albany-Schenectady area.

Jerry's many professional colleagues and friends in IAS will always remember him fondly as a unique and special person. We will miss him greatly.

This article was provided by Prof. Thomas M. Jahns, Department of Electrical Engineering, University of Wisconsin, Madison. jahns@engr.wisc.edu

Section volunteers at State MathCounts competition

Six volunteers from the IEEE Schenectady section assisted at the state MathCounts competition March 13 at the Rensselaer Polytechnic Institute. MathCounts (www.mathcounts.org) is a program of the National Society of Professional Engineers (NSPE) to promote math and problem-solving skills among seventh and eighth graders. The winners go on to the nationals in Washington, D.C.

IEEE volunteers helped score papers from more than 300 participants in three fast-paced rounds of mathematical competitions.

Due to the enthusiasm this event has generated, we will be ramping up IEEE participation in MathCounts activities at the start of the new school year. Stay tuned for updates.

—Peter Sutherland, Student Activities Chair

IEEE Volunteers at the 2004 New York State MathCounts Competition. Clockwise from left: Harwant Pannu, Yegao Xiao, Don Allison, Rebecca Shaw, Cory Shaw, and Peter Sutherland.

Senior membership in the IEEE: Who qualifies to be a Senior Member?

An IEEE Senior Member is a person who has 10 years of professional experience. These 10 years can be achieved in several ways.

Three years are counted for a baccalaureate degree, four years for a baccalaureate and a master's degree, and five years for a doctorate. The remaining time can be made up by the experience of the person throughout his or her career.

IEEE bylaw I-105.3 sates: "a candidate shall be an engineer, scientist, educator, technical executive or originator in IEEE-designated fields. The candidate shall have been in professional practice for at least ten years and shall have shown significant performance over a period of at least five of those years."

Some of the benefits of attaining an IEEE Senior Membership are:

- Professional recognition of your peers for technical and professional excellence.
- Attractive fine wood and bronze engraved Senior Member plaque.
- Up to $25.00 gift certificate toward one new Society membership.
- Letter of commendation to your employer on the achievement of Senior Member grade (upon the request of the newly elected Senior Member).
- Announcement of elevation in Section/Society and/or local newsletters, newspapers, and notices.
- Eligibility to hold executive IEEE volunteer positions.
- Qualification to serve as reference for Senior Member applicants.
- Invitation to be on the panel to review Senior Member applications

If you are interested in becoming a Senior Member, contact a member of the IEEE Schenectady Section Executive Committee, and we will be happy to help you fill out the necessary nomination forms and provide you with the required Senior Member references.

The Senior Member Program is described in more detail at: www.ieee.org/organizations/rab/md/smprogram.html

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