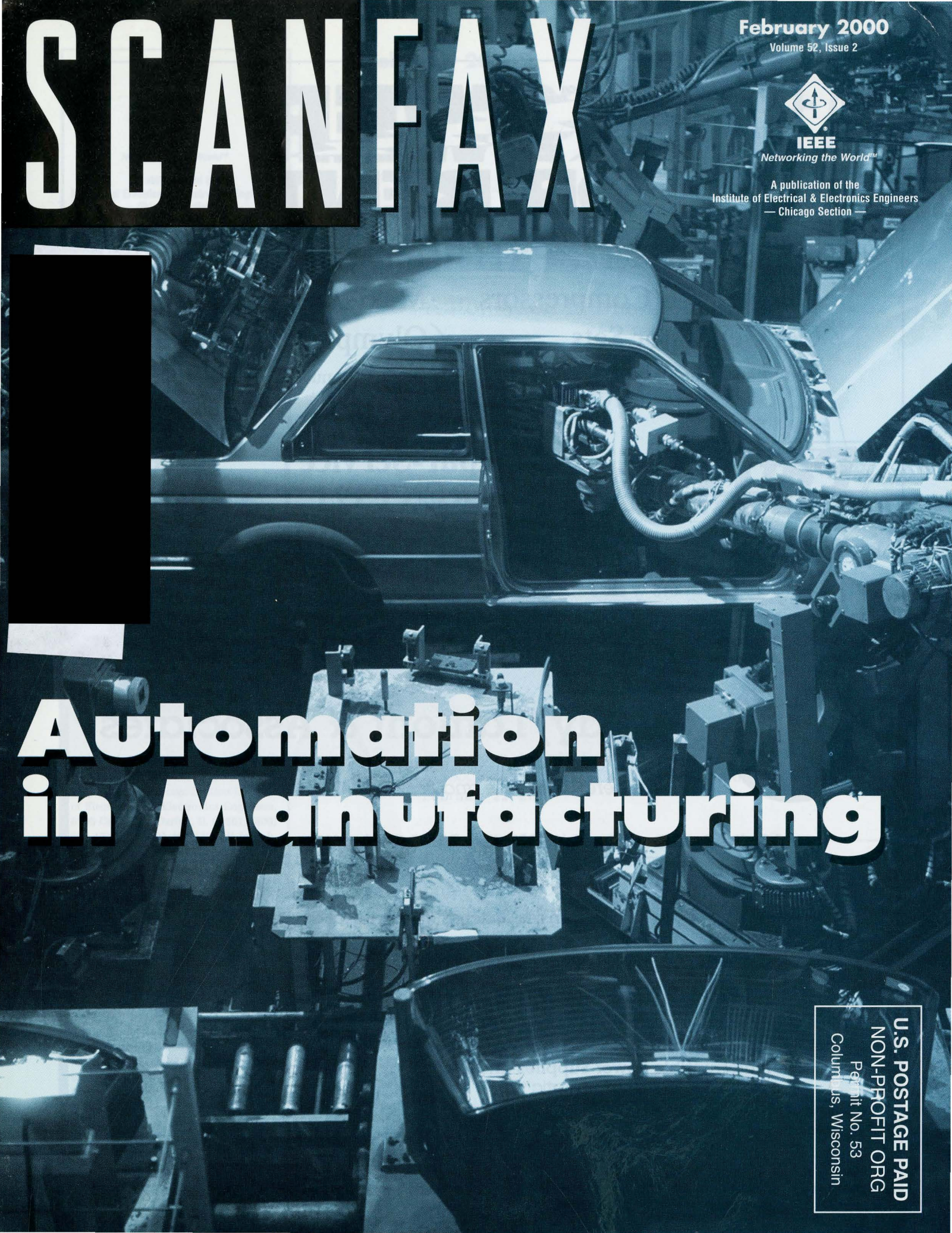
SCANFAX

February 2000
Volume 52, Issue 2

IEEE
Networking the World™

A publication of the
Institute of Electrical & Electronics Engineers
— Chicago Section —



Automation in Manufacturing

IEEE
Networking the World™

A publication of the
Institute of Electrical & Electronics Engineers
— Chicago Section —

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Chairman's Message

Edward G. Bogus, PhD.
IEEE Chicago Section, Chairman

The Chicago Section consists of two subsections and 16 chapters. The chapters exist to address focused technical interests of their members. The technical area of the chapter is identified by its IEEE society affiliation. The subsections cover a broader range of technical interests in order to serve members in specific geographic areas.

Membership in any of the IEEE societies implies membership in the corresponding local chapter, if one exists. Although all IEEE members in the Chicagoland area belong to the Chicago Section, some suburban residents are served by the Fox Valley and Northwest subsections as well.

Below is a list of the subsection and chapter officers with phone numbers and e-mail addresses. Members are encouraged to contact these officers to provide ideas for meeting topics, volunteer for chapter activities, or even complain about chapter inactivity. An active chapter must hold at least two meetings per year. The subsections are required to hold five meetings per year.

Subsections

Fox Valley
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Secretary/Treasurer: Hugh Edfors, 630-355-5134

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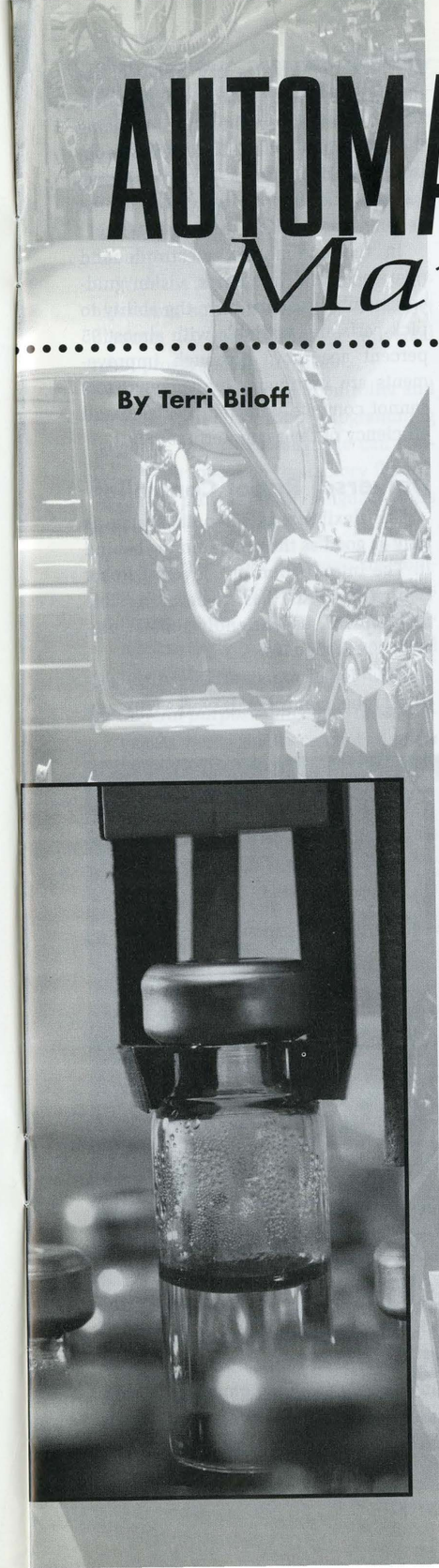
AUTOMATION *in Manufacturing*



By Terri Biloff

Manufacturing operations today face the everyday challenge of producing higher volumes while improving quality and overall plant efficiency.

Scheduling, processes and workflow instruction must all be executed while systems must comply with manufacturing standards and customer requirements for quality.

With the complexity of managing manufacturing information, the need for effective information management is increasing. Luckily, huge strides are being made as modern industrial automation systems have boosted manufacturing productivity, making information management less costly and less labor intensive.

Process Management

With the focus on network standards for factory automation, Programmable Logic Controllers (PLCs) can process data and provide output in a "real time" sequel server network environment, allowing users the capability of performing on-line diagnostics or performing adjustments to processes as though they were being made on the factory floor itself.

But even with built-in diagnostics, it has been difficult for many manufacturers to troubleshoot processing problems before they affect quality standards.

That's why new process management tools are finding ways to manage complex operations while providing an integrated approach to simplifying the monitoring of the process.

To accomplish the improvements in monitoring, new management modules have been added to the process management tools, providing faster transaction speeds, less hardware consumption and better management of complex operational systems.

Industrial thin-clients

Legacy applications have made it difficult to share critical plant floor data. New technical advances, however make it easier for the plant manager to replace proprietary information terminals with networked systems that provide plant to enterprise integration.

While proprietary information terminals display data from one source, the PLCs were never designed to share data across a plant floor. In came Industrial PCs which have the ability to communicate with multiple devices while providing excellent display capabilities.

However, even industrial PCs have their limitations, including cumbersome back up procedures, storage problems and potential hard drive failures.

The advantage of thin-clients is that all data is stored on a central server in a standard format, allowing other applications to retrieve valuable data. Intended to be networked via an Ethernet, industrial thin-clients combine the advantages of Industrial PCs with the benefits of a dedicated terminal.

Add to that the ability to use a browser as the operator interface between the plant floor and the robotic controller, and you've got yourself a full-scaled, fully operational automated process.

Browser software offers many choices such as multiple configurations, plug-ins, expandability and the ability for automation managers to install upgrades and test them using the browser before they hit the factory floor.

Continued on page 6.

Continued from page 5

Today, many factory floor devices are becoming web-enabled to provide information over a web network. Web-enabled devices such as PLCs, sensors and scales allow a browser to communicate one to one with that device.

Vision Based Robotics

Robotics have long promised manufacturers faster and better rates on return while offering better quality and high speed assembly. The most common users of vision based robotics is the automotive industry. With assembly plant product lifecycles reduced, the automotive industry is putting greater pressure on vendors and supplies to meet the productivity demands.

While improved robotics vision systems benefit auto makers the most, a trend in mechanical assembly is demanding many of the same benefits auto makers find in robotic vision systems.

Cell phones, printers even kitchen appliances can be assembled using robotic vision system. Work cells are created for the manufacturing process and once established, individual work cells can be re-deployed faster and with better quality than traditional methods of assembly.

Improving quality of complex product manufacturing is everyone's goal. After all, human operators make mistakes, robots don't. 3-D visual sensor assembly systems emulate the human operators' ability to see and touch components during assembly and with the robots ability to never tire, manufacturers with tight assembly tolerances are finding value in investing in vision based robotic systems.

Assembly lines of large parts may use vision based robotics to navigate by using coordinates provided by the vision mechanism.

These coordinates can allow closer navigation with exact coordinates. Vision assembly systems are interfacing more and more with robotic motion controls, creating greater accuracy using vision guided robotic placement for the assembly processes.

In the automotive, electronic and pharmaceutical industries, vision guided assembly systems have the ability to pick parts and assemble with almost 95 percent accuracy. Although improvements are imminent, human operators cannot compete with the precision and efficiency of their counterpart robots.

Universal Robot Controller

The flexibility of a robotic system is only as good as the programming behind it. The introduction of Universal Robot Controller (URC) has made it possible for standard, user friendly robotic programming language.

URC is an open architecture, PC-based robot controller. It works with any robot providing improved flexibility and capabilities over standard controllers. URC uses Windows NT as its operating system, allowing robotic user to connect the robot controller to an enterprise wide network for data logging and other communication functionality.

With the ability to run existing manufacturing software, URC is a perfect platform for RobotScript (a universal robot programming language).

With URC as the robot controller and RobotScript as the robot programming language, one robot language can control all the robots on the factory floor.

Robot programming language falls into three basic categories.

1) *Specialized robot language:* the commands are mostly motion commands, with minimal logic statements. Early robot languages used this as their basis for programming.

2) *General purpose language:* These languages were initially created as a new general purpose language, then robot specific commands were added.

3) *Existing computer language:* These languages were developed by creating extensions to popular computer programming languages. RobotScript is a good example of this.

Most robot languages require the user to compile the program before running it on the robot controller. This compiling converts human readable source code into a machine readable form.

Interpreters on the other hand, interpret the human readable code to computer readable code as the program is executed, resulting in a significant amount of computer processing time to do the conversion.

The compiling of robot language programs is less used today since there is plenty of computer power available to interpret the program rather than compile. Still, computer programs for the most part continue to be compiled because they run too slowly if they were interpreted.

This is due to the fact that most computer programs contain thousands of lines of code while most robot programs may have only a few hundred lines.

RobotScript, a popular language for robots Using RobotScript to write a robot program is pretty straight forward. There are basically two types of files. A teachpoint file and the RobotScript file.

The teachpoint file is a data file for your RobotScript program. It contains all locations of the teachpoints and records coordinates defined by the user.

The RobotScript file contains the actual commands that make up the robot program. Both file types are text files. To define the locations of various teachpoints, a utility program continually shows the current location of the robot tool center, and once defined as a teachpoint, it appears on a graph on the screen.

After all the teachpoints have been identified, the file is saved into the appropriate format for the robot controller to interpret.

The future of robot programming languages

Robot languages have been changing too frequently. This is one of the biggest problems with robot manufacturers. With every new generation of robot controllers, they make current robot programming language obsolete. Learning new programming languages can be very costly and time consuming for the manufacturer.

Standardizing a language that only requires learning a few new commands between versions is the ultimate goals. RobotScript was designed to be a language used both now and in the future. With its flexible open architecture, RobotScript will remain fundamentally the same over the next generation.

This will help as the demand increases for standard languages that are easy to learn and usable with existing robots. ■

Next month: ELECTRICAL INSULATION

President's Message

Continued from page 4

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Mark your calendar so you will be sure to attend this year's IEEE Chicago Section Annual Awards Banquet on Sat. April 15. The banquet includes dinner, entertainment and an awards presentation. It will be held at Fountain Blue Banquets in Des Plaines. Tickets are $37.50 ($30.00 for students). Contact Joe Feitler 708-383-8773 to order your tickets now and avoid the last minute rush.

Illinois Engineers week will take place February 20-26, 2000. All members are encouraged to participate in the events of the week. They include the following:

- ***Future City design competition***
  Don Wittmer, 312-930-9119
- ***Mathcounts competition***
  Allan Gdalman, 312-666-3535
- ***Essay-Poster competition***
  Deborah Zroka, 773-935-6376
- ***High School Student Bridge Building contest***
  George Krupa, 312-648-9900
- ***Washington Award Banquet***
  Maggie White, 312-913-1730
- ***DuPage Engineers Week***
  Barbara Kozi, 630-682-6040
- ***Engineers Week Exhibit***
  Ryan Issel, 312-831-3163
- ***Discover "E" Program***
  Steven Hill, 847-538-6029
- ***State Science Fair***
  Deborah Zroka, 773-935-6376
- ***Chicago Sun-Times Supplement***
  Mike Streitmatter, 312-603-1718

Additional details about each event can be obtained from the listed contact person. ■

Calendar of Events

Date	Event
February 8	*Chicago Section* EXECUTIVE COMMITTEE MEETING
February 9	*Chicago Chapter of the IEEE Power Engineering Society* MIDWEST INDEPENDENT SYSTEM OPERATOR (ISO)
February 18	*Chicago Chapter of the IEEE Power Engineering Society* CAREERS IN POWER ENGINEERING
February 19	*IEEE-IAS/IES Training Session* *Joint Meeting with Northwest Subsection* SHORT CIRCUIT ANALYSIS
February 20–26	ILLINOIS ENGINEERS WEEK
February 22	*Washington Awards Dinner* DONNA SHIRLEY TO RECEIVE WASHINGTON AWARD
April 15, 2000	IEEE Chicago Section ANNUAL AWARDS BANQUET

IEEE
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CHICAGO CHAPTER OF THE IEEE POWER ENGINEERING SOCIETY

Midwest Independent System Operator (ISO)

Wednesday, February 9, 2000

LUNCH MEETING

Robert A. Schrage, *Manager of Regulatory Projects, Commonwealth Edison*

About the Topic:
The major reasons for developing the Midwest ISO include the following:

1. Provide access to a large regional transmission system.
2. Solve transmission pricing problems: pancaking of rates and loop flow issues.
3. Maintain or improve system reliability and security.
4. Coordinate planning of the transmission system.

This presentation will cover some of the current Midwest ISO implementation issues, as well as the potential impact on Northern Illinois electric service.

About the Speaker:
Robert A. Schrage is a 29 year employee of the Commonwealth Edison Company. Mr. Schrage received his BS Degree in Electrical Engineering from the University of Illinois in 1970 and an MBA from Keller Graduate School of Management. He is a Registered Professional Engineer in the State of Illinois.

Mr. Schrage has attained the level of Senior Member in the IEEE and has held numerous positions in the IEEE Chicago Section over the years. These include positions as Chairman and Vice Chairman of the Chicago Section and Chairman and Vice Chairman of the Chicago Section Chapter of the Power Engineering Society.

Mr. Schrage's career with Commonwealth Edison encompasses a broad level of experience covering assignments in transmission, distribution and generation. His current position is as Manager of Regulatory Projects in the newly formed Transmission Services area. Prior to this position Mr. Schrage was the Department Manager for the Transmission Reliability and Standards Department in the former Transmission System business unit. Previous assignments to these included both supervision and engineering positions in the areas of substation and transmission line design, fossil generating station design and operation, and field engineering, installation and testing assignments in company and customer substations and company generating stations.

Location: Chicago Bar Association, 321 South Plymouth Court (Near Jackson & Dearborn), Chicago, IL 60604.

Time: Social: 11:30 am
Lunch: 12:00 pm
Presentation: 12:15 pm
Adjourn: 1:00 pm

Reservations: Lunch tickets can be purchased in the lobby bookstore ($10.50). Please call the IEEE Business Office at (800) 898-IEEE to make your reservation.

For more information, please visit the Chicago Chapter IEEE PES web site: www.ece.iit.edu/~flueck/chicago_pes/

IEEE Chicago Section / ANNUAL AWARDS BANQUET

SATURDAY APRIL 15, 2000

Fountain Blue Banquets • 2300 S. Mannheim Road • Des Plaines, IL *(Corner of Mannheim & Touhy Avenue)*

— AWARDS —
IEEE Fellow Awards
IEEE College/University Student Chapter Awards
Millenium Awards

Cocktails at 6 pm / Dinner at 7 pm
Entertainment: ***The Magic Wizardry of Will Tremont***
Dance to: ***The Frank K. Orchestra***

TICKET COST: $37.50/person
($30.00 for IEEE Student Members and their guests)

You may want to form a group for a table of 10.

FOR TICKET INFORMATION CONTACT:
Joe Feitler, Ticket Chairperson, PO Box 5072, River Forest, IL 60305, 708-383-8773, e-mail: j.feitler@ieee.org
or IEEE office (800) 898-4333.
Please request any special meals by April 8, 2000.

We Need Your Help!
Our Banquet Committee membership has been shrinking due to retirement of several of our members. We need you to join us in our endeavor to make the 2000 Awards Banquet a great success. Recent graduates are particularly welcome to our monthly dinner meetings where our plans are developed.

CHICAGO CHAPTER OF THE IEEE POWER ENGINEERING SOCIETY

CAREERS IN POWER ENGINEERING

Friday, February 18, 2000

EVENING MEETING

Power/Energy Industry Representatives

About the Topic:
The panel session will feature members of the power/energy industry. The panelists will describe the exciting opportunities for students interested in engineering design, consulting, business, and management in the power/energy related fields.

STUDENTS: Bring your resumes to include in our IEEE/PES career program book.

About the Speakers:

MAIN SPEAKER:
LAWRENCE L. GUZY,
Power Quality Engineer, ComEd

Mr. Guzy is a graduate of the University of Illinois, Urbana, School of Electrical Engineering and The Lake Forest Graduate School of Business, MBA. His work experience includes semiconductor fabrication and training as a microprocessor specialist at Texas Instruments, Inc. While at the Peoples Gas Light and Coke Company, he specialized in corporate computer resource allocation and system planning and subsequently moved into marketing as an energy specialist. During this period, volunteer work included assisting at The American Power Conference and The Midwest Cogeneration Association. More recent experience includes assignments at Engineering Consulting Firms, PCSI Consultants and Engineers, Stanley Consultants, Inc. and High Voltage Maintenance Corporation. Present responsibility is as a Power Quality Engineer at Commonwealth Edison Company, a subsidiary of Unicom Corporation. Unicom's recent merger with PECO Energy promises exciting new engineering opportunities in the years ahead.

MODERATOR:
JENNIFER C. SNOW,
Senior Sales Engineer,
Square D Company

COORDINATOR:
ANGELINE S. SCHAEFER,
Senior Project Electrical Engineer, OWP&P Engineers

ENGINEERS:
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CLIFTON MUHAMMAD
Senior Engineer, Peoples Energy, Engineering

PAUL YOUNG, P.E.
Senior Project Electrical Engineer, WMA Consulting

ALUMNI:
JOHN ECONOMOU,
Electrical Engineer, OWP&P Engineers, Inc.

Location: University of Illinois/Chicago, Engineering Research Facility (ERF), 842 W. Taylor Street (NW corner of Taylor & Halsted), Chicago, IL. UIC has a map of campus on the web:
http://www.uic.edu/depts/avcad/eastmap.htm

Time:
4:30 p.m. *Free refreshments*
4:30 p.m. *Main Speaker*
5:00 p.m. *Topic Careers and Q&A with Students*
5:30 p.m. *Mixing with Power Engineers*
6:00 p.m. *Adjourn*

Cost: Free.

Reservations: Please call the IEEE Business Office at (800) 898-IEEE.

For more information: For IEEE/PES information, call (312) 90-8329, or visite the Chicago Chapter IEEE/PES web site:
www.ece.iit.edu/_flueck/chicago_pes/

ATTENTION: IEEE Chicago Section Chapter Chairpersons

Increase the attendance at your chapter meetings by including a meeting notice in **SCANFAX**.

Meeting Notices and Schedules published *FREE*

Step 1 Submit copy via email to: **scanfax@ieee.fnal.gov**
Text should be sent in the body of the e-mail (not as an attached file). Please include "notice" in the e-mail subject line.

Step 2 Fax a confirming hardcopy of the notice to: **608-222-0262**

If e-mail is not an option, please call Julie Redders at 608-222-7630.

DEADLINES: Jan. 25 for MARCH ISSUE
Feb. 25 for APRIL ISSUE

IEEE

IAS/IES
TRAINING SESSION

JOINT MEETING
WITH NORTHWEST
SUBSECTION

Short Circuit Analysis

**Saturday,
February 19, 2000**

ALL DAY TRAINING SESSION

***Stan Shilling**—Consulting Engineer, ABB Power T&D Company*

About the Topic:
This Saturday course will cover the basics of electrical short circuit analysis. The course will be broken into four basic sections: Short Circuit Theory and Terminology, Electrical Equipment Ratings, Balanced Fault Calculations and the MVA Short Circuit Calculation Method. The course is ideal for engineers looking to brush up on traditional short circuit analysis or for those who want to learn the newer "rule of thumb" MVA method of calculating short circuits. Subsections include basic circuit arrangements, types of circuit protection equipment, one-line diagrams, effects of short circuits, sources of fault currents, machine reactances and symmetrical versus asymmetrical fault currents. Electrical equipment ratings for low voltage protective devices (fuses and circuit breakers), medium voltage protective devices (fuses, circuit breakers and load interrupters) and miscellaneous electrical equipment short circuit withstand and interrupting ratings (cables, busway, MCCs, switches, bus bracing, MCPs and LV power breakers) will also be discussed.

Pre-registration is required for this course. Interest is this course has been extremely positive, so register early! There will be a limited number of seats available.

About the Speaker:
Mr. Shilling graduated from the University of Missouri and has over twenty-two years of combined experience in electrical power systems engineering and analysis for utilities, heavy industry, and petrochemical plants. Mr. Shilling joined the Electric Operations Department of San Diego Gas & Electric in 1978. There he created start-up and test plan for the main substation remote terminals units. He generated online diagnostic programs for computer hardware troubleshooting as well as being an Instructor for RTU maintenance and substation interfacing.
In 1988, Mr. Shilling joined the Construction Services Division of Solar Turbines, Inc. in San Diego, California. There he performed power system design and turbine/generator control interfacing for medium and large-scale co-generation projects. Some of his assignments included the electrical engineering for the Winnebago County Landfill Co-generation Project; the installation of a three-turbine generator system at the Shell Oil Sirikit gas processing plant in Thailand; and development of a flow program for a gas metering unit at the Kapaa Landfill, Oahu, Hawaii.

In 1989, Mr. Shilling joined Rohr Industries in Chula Vista, Ca. He was responsible for the design and equipment specification of electrical projects for the engineering and manufacturing facility. Specific projects included installation of new 150HP fire suction pumps, upgrade of bulk chemical storage pumping control system, and procurement of new 2000kVA unit substation. He provided design for chemical etching tank control systems utilizing two SLC-100 PLC controllers. In addition, he generated in-depth analysis of load shedding scheme and fault study for 9MW co-generation plant.

In 1991 Mr. Shilling joined the Consulting Services Department as an Electrical Engineering Specialist for Saudi Aramco, Dhahran, and Saudi Arabia. Mr. Shilling provided engineering support to projects, operations, and company standards development. He worked on projects such as the electrical design review for the Shaybah Oil Field Development, the development of new corporate material standards for emergency diesel generators and automatic transfer switches, and participated in the creation of a corporate training program for electrical engineers.

Mr. Shilling has also authored the following papers: Transient Stability Analysis for a Large Pump Station, Dynamic Motor Starting Analysis for a 5500HP Shipping Pump on an Offshore Platform, and A Practical Approach to Automating Petrochemical Facility VAR Control. He is also a registered professional engineer, a senior member of the IEEE Power Engineering Society, and a member of Eta Kappa Nu honorary electrical engineering fraternity.

Location: TBA (near western suburbs)

Time:
Registration.....8:30 a.m.
Session I.....9:00 a.m.
Lunch.....12:00 p.m.
Session II.....12:45 p.m.
Q&A.....3:00 p.m.

Cost: Your $50 donation includes all presentation materials and lunch.

Pre-Registration: Please contact the following IEEE/IAS Committee Members for additional information and to pre-register.
Joe Bolsinger—*T&D Products,*
(630) 245-9130, jbolsinger@tdproducts.com
Chris Lovin—*Cutler-Hammer,*
(630) 789-5911, lovincj@ch.etn.com

Note: For P.E. licenses that require continuing education for renewal, attendance at IEEE Technical Meetings is acceptable as one Professional Development Hour (PDH) per meeting. The upcoming 1999-2000 IEEE–IAS meeting dates are: Mar. 15th and April 12th.

WASHINGTON
AWARDS DINNER

Donna Shirley to Receive Washington Award

**Tuesday,
February 22, 2000**

AWARDS DINNER

Donna Shirley, former manager of the $150 million/year Mars Exploration Program Office at the Jet Propulsion Laboratory in Pasadena, CA will receive one of engineering's most prestigious honors, the Washington Award. Ms Shirley managed the team building Sojourner, the Microver, which was landed by the Mars Pathfinder project on the surface of Mars on July 4, 1997.

Ms Shirley, who recently retired from JPL after 32 years, was also the Chief Engineer of the Cassini Project, a $1.6 billion project to explore Saturn. Other positions included Manager of JPL's Space Station Program, Manager of the Mission Design Section, and Project Engineer for the Mariner 10 mission to Venus and Mercury.

The award will be presented to Ms Shirley during National Engineers Week at the banquet to be held Tuesday evening February 22, 2000, at the Union League Club of Chicago. The IEEE is a sponsoring society of this annual event. The Chicago Section in showing support of this prestigious award is arranging tables for our members so we can be seated together.

Location: Union League Club, 65 W. Jackson Blvd., Chicago, IL 60604

Time: Social: 5:30 pm
Dinner: 7:00 pm

Cost: Tickets are $65 each.

Reservations: Please call Dennis Lamont at (847) 398-4510.

Professional and Business Directory

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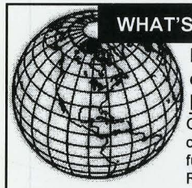

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