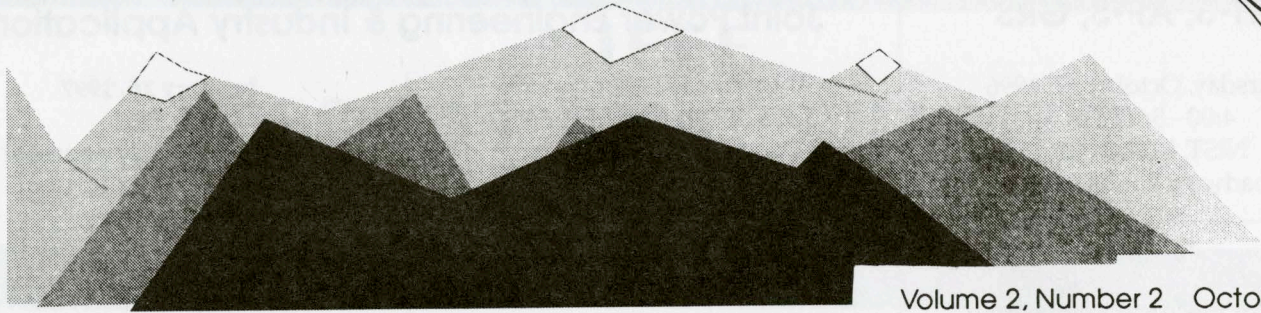


# RockIEEE Overlook



Volume 2, Number 2 October 1996

## Chairman's Message

by David Richmond

Membership is an important requirement for the continued existence of any organization, and IEEE is an organization of approximately 320,000 members worldwide. Overall membership in IEEE is down slightly. This is also true for our Region (5) and our Denver Section. The Region has dropped from 28,206 to 27,480 which is a 2.57% decrease. The Section has declined from 4,157 to 4,119, a less than 1% change. IEEE has thousands of publications, videos, and other technical resources. IEEE puts on hundreds of technical meetings and seminars each year, held throughout the world. There are also technical books as well as technical standards which are used throughout the world daily. IEEE in the U.S., also offers its members insurance packages for health, life, disability and hospitalization.

Almost every electrical engineer's work is affected by the standards IEEE establishes. With all this, it is hard to understand why one would not join and participate in IEEE.

To ask a friend and colleague to join IEEE is to do him/her a favor. To continue a membership in IEEE is to recognize the importance of remaining technically current in our profession. I could be essential for continued employment. Ask a friend today if he/she would like to become a member. We have membership forms available and can make them accessible by mail, or you can pick one up at the next local meeting either chapter or section.

On June 22nd at the Regional Activities Board (RAB) Meeting in Montreal, it was announced that

Charles R. Wright is the recipient of the 1996 William W. Middleton Distinguished Service Award. Charlie was cited for exemplary contributions and dedicated service in preserving the history of electrical engineering, and presenting this history to the public. In 43 years of service, Charlie has served at every level of IEEE, dedicating time and effort to the Denver Section, Conferences, Committees, and the Board of Directors. He has spent 9 years of service on the History Committee, leading the Milestone Program, and has presented History Exhibits at many IEEE Conferences and meetings. Charlie conceived and developed the Georgetown Energy Museum, of which he is Chairman of the Board. Charlie has also been a dedicated advocate of student activities through his presentations at 20 Student Professional Awareness Conferences across the U.S. The William W. Middleton Distinguished Service Award, established in 1990 and presented once every three years, recognizes an individual who has contributed in an exemplary manner to IEEE RAB's goals and objectives over a sustained period. The award will be presented at the Sections Congress '96 in Denver, November 1-4. Congratulations to Charlie.

## Recent Changes in the Professional Engineers Exam Process

Gary L. Blank, Ph.D., President, Engineering Update Institute

There are many good reasons to become professionally registered (or licensed): (1) many companies often favor the P.E. when choosing someone for an advanced technical position, (2) many companies often favor the P.E. when choosing someone for a managerial position, and (3) all fifty states now require P.E. registration to do any form of consulting engineering. There is a common misconception that this requirement applies only to situations where the safety of the public is involved. The Boards of Registration of the states are now becoming more active in identifying consulting engineers who are not registered.

The registration process consists of passing two written eight-hour

*continued on page 3*

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## Meetings

### MTT-S, AP-S, GRS

Thursday, October 17, 1996  
4:00 - 5:00 p.m.  
NIST, Room 4020  
325 Broadway, Boulder, Colorado

#### Speaker

Prof. Edward F. Kuester  
Dept. of Electrical Engineering  
University of Colorado, Boulder  
"Pseudo-TEM Modes"

Classical transmission line theory is described by the telegrapher's equations, which relate the voltage and current along a distributed network of (differential) series impedance and shunt admittance per unit length. Waveguides with two-piece conducting boundaries filled with a homogeneous material support TEM modes which process a voltage and current that correspond exactly to those described by the telegrapher equations. Further, even microstrip, coplanar, and other inhomogeneously filled structures support quasi-TEM modes, which correspond to a voltage and current that satisfy the telegrapher's equations in the limit when the transverse dimensions of the waveguide are small compared to a wavelength.

A class of waveguides exist that do not behave in a quasi-TEM fashion, even though critical portions of the guide cross-section are small relative to wavelength. These may be: (1) quasi-TM mode structures for which current is well-defined, but voltage is not; (2) quasi-TE mode structures for which voltage is well-defined, but not current. These we call "pseudo-TEM" modes. The behavior of such modes is treated by decomposing the guide cross-section into two parts: a quasi-static and package section. A wide variety of pseudo-TEM modes may be analyzed by "mixing and matching" various combinations of package and quasistatic portions of the overall structure. This leads to quick methods for modeling the behavior of these modes and to greater understanding of the physics behind their operation.

### Joint Power Engineering & Industry Application

Thursday, October 29, 1996  
Social 5:30-6:30 Dinner 6:30  
Program 7:00  
Brooklyn's Sports Bar  
2644 W. Colfax Ave. (1 block south of  
McNichols Arena and Mile High)  
Dinner Fee: \$12.00 (Students free)

#### SEE NEWSLETTER INSERT

#### Upcoming PES Events

October 29, 1996  
Seminar  
"Grounding Fundamentals"

November 21, 1996  
Howard Bruner  
"Humor in the Workplace"

December 12, 1996  
Field Trip  
Public Service Co. Lookout Mtn.

January 16, 1997  
Bob Beale  
"Professional Development"  
(Joint Sections Meeting)

February 20, 1997  
Field Trip  
Trigen Cogeneration Facility

March 20, 1997  
"Overvoltage Protection"

April 17, 1997  
Seminar  
"Industrial Grounding"

May 15, 1997  
Tony Jefferson  
"Adaptive Var Compensation"

September 18, 1997  
Jim Gorman  
"Design E Motors"

### Aerospace and Electronic Systems

Wednesday, October 30, 1996 7:00 - 9:00 p.m.  
Lockheed Martin Corporation, Waterton Facility (Tentative)  
Speaker

Dr. James R. Stuart, Staff Consultant, Teledesic Corporation  
"Teledesic: A Global Broadband Satellite Communication Network"

The Aerospace and Electronic Systems Chapter is pleased to host a presentation by Dr. James R. Stuart of the Teledesic Program, a new satellite communications network currently under development and planned for initial launch in 1999 and operations by 2001. Dr. Stuart will discuss the wireless communications "revolution", features of the Teledesic satellite constellation, and the industrial impact of the new LEO satellite communications infrastructure.

Dr. Stuart is the former Vice President for Space Infrastructure for Teledesic Corporation, and now serves as Staff Consultant for Teledesic. He is a recognized authority on broadband communications, small satellite systems, space technologies, and satellite economics and has published over 90 professional papers on these topics. Prior to his involvement with Teledesic Corp. Dr. Stuart served as Chief Scientist and Chief Engineer at Ball Space Systems in Boulder, he was founding Chief Scientist of Orbital Sciences Corp. and served in various capacities at Jet Propulsion Laboratory and on the faculty of CU in Boulder.

This should prove to be an outstanding evening for the AES Chapter. Please call John Tsucalas at (303) 798-5769 by Friday, October 25, 1996 for additional details and to confirm time and location of this meeting.

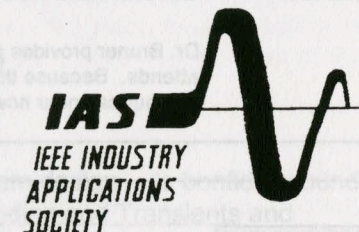
On November 27, 1996 we plan to have Dr. Tom Milligan of Lockheed Martin Corporation speak on microstrip patch antennas and their applications. Watch the November Overlook for the announcement of this meeting.

October 1996

## IEEE PES/IAS JOINT CHAPTER INSERT TO ROCKIEEE OVERLOOK

### Chapter Wins Award

**Y**our chapter, the Denver Chapter, was selected as the IEEE Industry Applications Society's 1996 Outstanding Chapter. This award will be presented at the IAS Annual Meeting Awards Luncheon on October 8, 1996. This event will occur at the IAS Annual Meeting in San Diego. This is the second year in a row that the Denver Section Chapter has been selected as the outstanding chapter for the Society.



**I**t is the desire of the Chapter that the rest of this year will be even better in providing the professional presentations and events that will benefit you and your company or organization. We are open to suggestions for anything you can conceive that will increase participation and provide a better service to our members.

OUTSTANDING CHAPTER

### Calendar of Upcoming Events

**Oct 29**

Event: Technical Meeting - **One Day Seminar on Fundamentals of Grounding**

Where: PSCo Training Facility at 938 Bannock, Downtown Denver (Parking at PSCo Designated Slots in front across the street and back of building.)

Time: 7:30am - 5:00pm

Presentation: **Fundamentals of Grounding Design and Applications**

Speaker: **Dr. Sakis Meliopoulos, Professor of Electrical Engineering, Georgia Institute of Technology. *The recognized authority on grounding -- "the grounding guru."***

Special Vendor displays and presentations will be available on the third floor of Bannock.

Lunch will be served and refreshments will be available at the breaks in the morning and afternoon.

(See the attached expanded announcement for this meeting.)

Note: Advanced reservations with payment will be required for this meeting because the number of attendees will be limited. Fee will be \$95 for IEEE members and \$190 for non members. IEEE Membership Number will be required on the application. (Contact Roya Brown at 793-5147 for information.)



**Nov 21**Event: Meeting - **JOINT MEETING -- DENVER SECTION & ALL CHAPTERS***(This is a night to invite your Spouse/Companion.)*

Where: Ramada Sport Center at 1975 Bryant (Just NE of Mile High Stadium)

Time: 6:00 - 6:45pm Social Time 6:45 - 8:30pm Dinner and Meeting

Presentation: **Effective Use of Humor in the Workplace**Speaker: **Dr. Howard Bruner, Professor Emeritus, Colorado State University**

Dr. Bruner provides a very entertaining and funny evening in presenting a topic that will be beneficial to anyone that attends. Because this is a very special presentation and highly entertaining, it is recommended that you set this date on your calendar now. Members of all chapters and their spouses or companions are invited.

**Dec 12**Event: Technical Meeting - **Tour of Public Service Company of Colorado****Lookout Center**

Where: Golden, CO -- Specific directions will be given when you make the reservations.

Time: Anticipated start between 4:30pm and 5:30pm and will last one hour.

Tour: **Features of the Central Power Control Center for PSCo**

During the tour an explanation of how PSCo controls: Energy dispatch and generation purchases; Monitoring and maintaining the bulk power grid for Colorado; Monitoring and dispatching the crews on outages and transmission failures; etc.

Tour Guide: **Mr. Gerald M. Stellern, PSCo**

**Special note: This tour will be limited to 20 members maximum because of the restrictions of the facility. You should get your reservations into Barbara Linton as early as you can make a positive commitment to be there. Reservations will be closed by December 1st.**

**Jan 29**Event: Meeting - **Professional Development Presentation***(This is a joint meeting with the Denver Section.)*

Where: To Be Announced

Time: 6:00 - 6:45pm Social Time 6:45 - 8:30pm Dinner and Meeting

Presentation: **Engineers --- Fundamentals of Marketing Yourself and Your Company/Organization**Speaker: **Mr. Bob Beale, President, Beale International (Management and Marketing Consultants)**

Mr. Beale has exceptional engineering, management, marketing, and accounting backgrounds. His consulting, speaking, and marketing experiences have taken him worldwide. These endeavors include Russia and other former USSR republics, European countries, as well as every state in the USA. One of his current clients is the Denver Broncos. **Mr. Beale is an excellent speaker and an authority in this field.** It will be an evening well spent in expanding your professional development.

Tuesday, October 29, 1996

## **Fundamentals of Grounding Design and Applications**

**A One Day Seminar By:**

**Dr. Sakis Meliopoulos**  
**Professor of Electrical Engineering**  
**Georgia Institute of Technology**

Dr. Meliopoulos is one of the foremost recognized authorities in grounding system design -- "a bonfide grounding guru". He is the author of two valued books in grounding, Power System Grounding and Transients and Problems and Concise Theory of High Voltage Structures. Other valued contributions to the field include: One Chapter, "Lightning and Overvoltage Protection," to the Standard Handbook for Electrical Engineers; Co-Author of the Standard, "IEEE Guide for Safety in AC Substation Grounding."

**SEMINAR OUTLINE:**

- Basic Concepts and Grounding Techniques
- Grounding System Design Principles
- Computer Based Design Procedures
- Integrated Grounding System Design
- Soil Characteristics
- IEEE Std 80 Design Procedures
- Effects of Grounding Transients

**Time: 7:30am - 5:00pm****Location: 938 Bannock, Downtown Denver, PSCo Training Facility, Main Training Room on first floor.****Parking: Across the street in front of building and behind the building. (PSCo parking slots only).**

<b>FEES:</b>	<b>IEEE Members</b>	<b>\$95</b>
	<b>Non Members</b>	<b>\$190</b>

**APPLICATION:** Please cut off at the dotted line and send this completed registration form with enclosed check no later than October 15, 1996 to address shown below.

**Seminar: Fundamentals of Grounding**

Name \_\_\_\_\_ Company \_\_\_\_\_  
 Home Address \_\_\_\_\_ Business Telephone \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Lunch: (Circle one of the following sandwich choices.)  
 IEEE Membership Number: \_\_\_\_\_  
 (must be entered to get \$95 rate for seminar)

Make checks payable to:

**IEEE PES/IAS JOINT CHAPTER, DENVER SECTION**

Send Check(s) with this completed application to:  
**ROYA BROWN c/o Morrison Knudsen**  
**7100 E. Belleview Avenue, Suite 300**  
**Englewood, CO 80111**

Questions -- Call: **Roya Brown at 303-793-5147**



## Engineers Exam continued from page 1

exams. The first exam is the F.E. (fundamentals of engineering, used to be E.I.T., engineer in training). The second eight-hour exam (called the P.E. exam) is taken after the first one is passed. It is based entirely upon the candidate's major field of engineering. It involves fewer and longer problems.

Until recently, the first exam covered only the general engineering undergraduate courses such as mathematics, statics, thermodynamics, circuits, dynamics, strength of materials, material science, chemistry, engineering economics, and fluid mechanics. There were five choices of answers for each relatively short problem. Candidates had 140 problems in the four-hour morning session, and 70 problems in the four-hour afternoon session.

After the April 1996 examinations the following four significant changes in the F.E. exam went into effect. (1) The general engineering portion now also includes questions on two new subjects, computers and ethics. (2) Instead of five choices for answers to each problem there are now four choices. (3) The morning session includes 120 problems in the 12 general engineering areas. This is mandatory for all candidates. (4) In the afternoon session there are now six options. Regardless of the option chosen there are 60 problems. One may choose either General Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, or Mechanical Engineering. The choice is made at the time of registration. The problems in the afternoon constitute fifty percent of the overall grade.

A report describing more specific details of the exam has been prepared. It includes a list of the numbers and types of problems in each of the 12 general engineering areas and in the specific disciplines. To obtain a copy of the report request a free info-pack from Engineering Update Institute, P.O. Box 70155, Plato Center, IL 60170, (847) 464-4007 (V) (847) 464-4081 (F) e-mail 102220.1406@compuserve.com.

## From the PACE Chair

John C. Tsucalas, IEEE Senior Member

As your Professional Activities Committee for Engineers (PACE) Chair in the Denver Section, it was my duty and pleasure to attend the 1996 PACE Conference and Workshop, which took place in Phoenix during an extended Labor Day weekend. The theme of the conference was *Changing Environments: The Proactive Engineer* recognizing important trends that are taking place in today's engineering work environment from new government policies to corporate streamlining to increasing need for engineers to secure for themselves solid financial well-being as their careers progress. It was a resounding success, with 500 participants including spouses and guests, and a very full schedule of training workshops, plenary meetings, concurrent sessions, and speakers during some of the meals and banquets. It was an energetic and stimulating event, despite the temperature which hovered around 100F during most of the day.

I came away from the conference with a reinforced conviction that more engineers need to be aware and to make use of the innovations developing within the IEEE, as in other professional societies, to enhance engineers' careers through a variety of undertakings. I plan to actively bring these messages to the membership during the coming year by talking directly to as many of you as I can reach in meetings at your work organizations. Also in the Overlook I will cover specific aspects of the various PACE initiatives and report any progress achieved. If any of you are interested in assisting me, I welcome your participation. Call me at (303) 798-5769 or e-mail to [jtsucalas@aol.com](mailto:jtsucalas@aol.com) to share your ideas and abilities and help to really make this an effective activity.


A key theme in the 1996 PACE Conference was the direct involvement of young professionals as a step in making the IEEE relevant and meaningful to engineers with ten or less years in the profession. After all, the vitality of any organization depends on the participants' perception of its value, especially by those who may have the most to gain from a professional support system -- the members who have their greatest growth ahead of them. How can "value" for young professionals be quantified?, you may ask. The answer is not obvious, but a beginning was made by simply asking them their reasons for joining the IEEE. The Ad Hoc Committee for Young Professional Participation in PACE surveyed a group of US IEEE members in this group. The results of the survey indicated strong interest in both career management and personal support, with greatest interest in developing networks, career paths, financial strategies, and skills for negotiating, management and setting priorities, especially balancing career and family. What a revelation! They want all the tools and skills for making them a success in the corporate environment and still have some time for their personal lives. Each IEEE section was encouraged to name at least one Young Professional to attend the PACE Conference this year, so that a significant dialog could occur on these issues. Our section's 1996 Young Professional is Anthony M. Kelker of the Hughes Information Technology Co., here in

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Aurora. Congratulations to Mr. Kelker! In the November issue of the Overlook, Tony will share some of his thoughts about the initiatives put forward at the conference and some of his plans for supporting PACE goals in the coming year.



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