# EDITOR'S PROFILE of this issue

*from a historical perspective …*

with Paul Wesling, SF Bay Area Council GRID editor (2004-2014)

March 1973:

Cover: Shown is the 977-foot Sutro Tower, nearing completion. It will serve as the primary television and FM radio transmission tower for the Bay Area. A tour is planned. More on page 2. Another tour will be at the United Airlines facility at SFO (page 6).

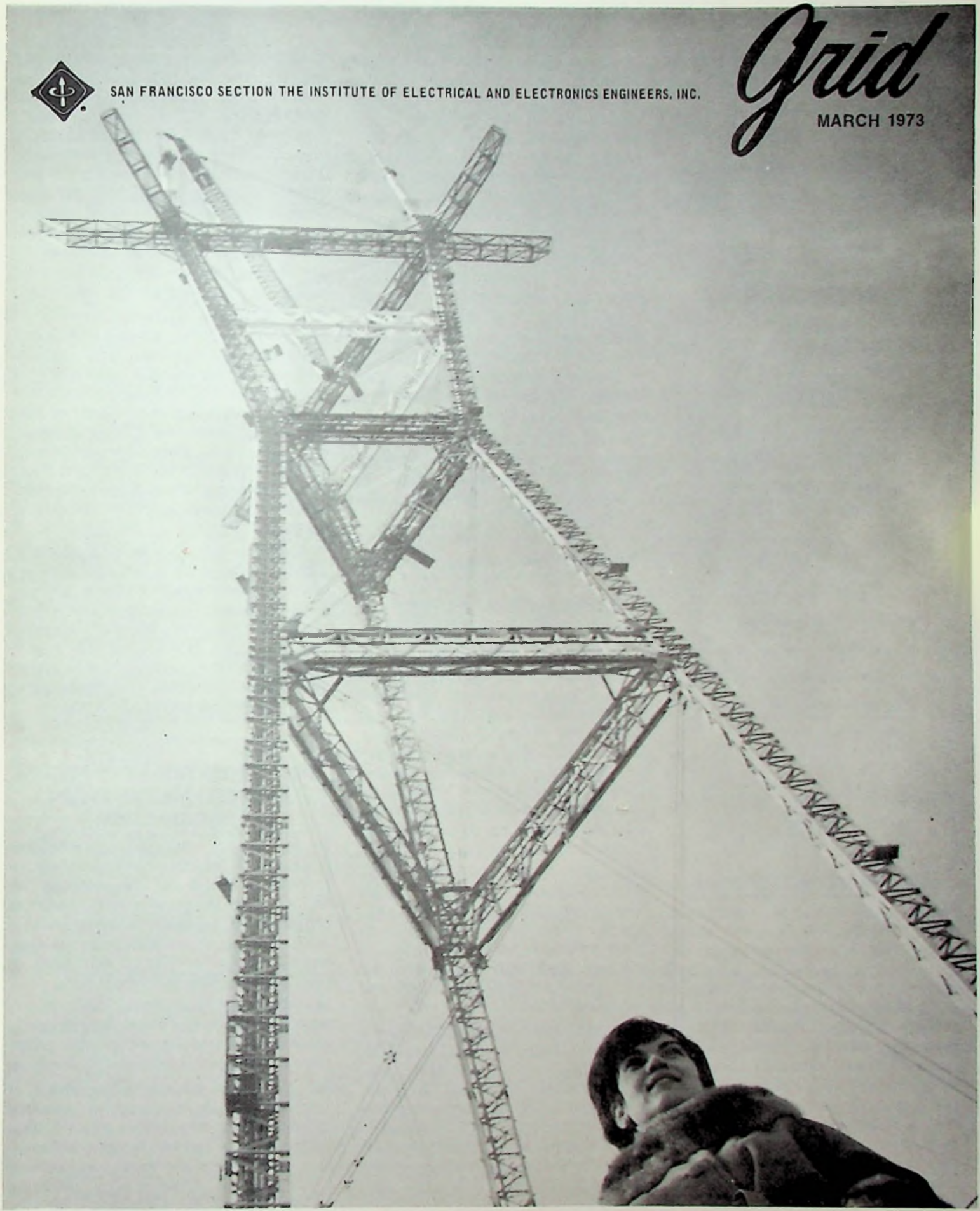

Archive of available SF Bay Area GRID Magazines is at this location:
**https://ethw.org/IEEE_San_Francisco_Bay_Area_Council_History**

At time of scanning, the bound volumes are held by Paul Wesling. April, 2025 Contact p.wesling@ieee.org

SAN FRANCISCO SECTION THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

# Grid

MARCH 1973



Grid

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EDITOR

E. W. Morris
4050 Valente Court
Lafayette, California 94549
(415) 283-8260

Address all mail except address changes to
San Francisco Section Office, IEEE
Suite 2210, 701 Welch Road
Palo Alto, California 94304
Telephone: (415) 327-6622

Jean Helmke, Office Manager

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## A&E – MUSIC FOR EVERYONE

You all are invited by the A & E Group to their meeting, 8PM Thursday, March 8 (no dinner) when the new acoustical and sound equipment design at the First Baptist Church in San Jose will be demonstrated. Location, Ironwood Drive in San Jose. Russell Tinkham, consulting engineer in acoustics, and Howard Lindsay, corporate consultant for Ampex, will demonstrate the equipment. David Harkness, building architect, will be present. The new Allen electronic organ will be played for the first time with this 7,000 watt sound system. Families welcome. Guided tours.

## TRANS-ENGINEERING SOCIETIES MEETING ON PROFESSIONALISM AT NATIONAL LEVEL

Sponsored by the Golden Gate Chapter of NSPE, all engineering societies are invited to attend a joint dinner meeting at the San Francisco Engineers Club, 160 Sansome Street, Wednesday, March 21. A distinguished panel of engineers from NSPE, IEEE, ASCE and ASME will discuss changes in engineering attitudes toward professionalism at the national level.

Panelists will include John Guarrera, Vice Pres. IEEE; Caldwell Wilson, Past Nat'l. Pres. NSPE; Dr. Richard Folsom, Nat'l. Pres. ASME; and John Rinne, Nat'l. Pres. ASCE. Wendell Freeman, President of The Bay Area Engineering Council, and an IEEE member, will moderate this informative meeting.

Cocktails at 6:00 PM, Dinner at 7:00, Meeting at 8:00 PM. Visitors welcome. Reservations, Engineers Club 421-3184 before noon, March 20. Street parking after 6:00 PM.

## JOINT SOCIETY MEETING WHAT YOU NEED TO KNOW ABOUT PENSIONS

A panel discussion covering all aspects of pensions will be presented from 8:30 AM to 12 noon on Saturday, March 10th at the College of San Mateo. Speakers representing industry, Government the employed professional and pension plan administrators will make short presentations on their viewpoints and will then respond to questions from the floor.

The topics of early vesting, portability, eligibility and pension plan funding and others will be discussed. Specific attention will be given to present industry plans, the needs of the employed professional and the prospects for voluntary change and legislative reform.

The discussion is jointly sponsored by the SF Section of IEEE, the ACS, CSPE, AIAA and various other technical societies in the SF Bay Area. Reservations are desirable as attendance is limited. The $2.00 registration fee should be sent to R. Stanley Lord, 480 Sherwood Way, Menlo Park, CA 94025, or call Linda at (408) 275-0500.

## COVER STORY EBSS TO TOUR MT. SUTRO TV TOWER

Now predominating the San Francisco skyline, the new 977 foot Television Transmitting Tower on Mount Sutro, San Francisco, is nearing completion. The new tower and modern adjacent transmitter building will provide facilities and space for numerous TV and Radio stations to blanket the San Francisco Bay Area. It will replace the smaller existing tower, the old Sutro Mansion now used for transmitter spaces, and consolidate the stations now located on Mt. Sutro and Mt. San Bruno.

Mr. Harry Jacobs, Director of Engineering, Mt. Sutro Inc., will conduct a tour for the East Bay Subsection on March 19th at 7:30 P.M. In addition, to complement our recent tour of the Television Operating Center of Pacific Telephone, Mrs. Olympia Byrne, Video Engineer PT&T, will show us the other-end of the studio-to-transmitter links used by the broadcasting station.

In order to ensure that everyone attending will be able to see and hear the tour, the number of people will be limited. Be sure to make your reservations early. No dinner. For reservations call Jim St. Arnaud, San Francisco, 399-4974; or Hadi Monsef, San Francisco, 764-4195. Directions will be given at time of reservations.

## EMC – MAGNETICS JOINT MEETING PROFESSIONAL ENGINEER REGISTRATION

Mr. Kenward S. Oliphant, an electrical engineering member of the State of California Board of Registration for Professional Engineers will speak on professional engineer registration at a joint meeting of the EMC and the Magnetics Group on March 19, 1973 at Rick's Swiss Chalet in Palo Alto.

Mr. Oliphant heads Consultant Engineering, Inc. of San Francisco which is involved directly in mechanical, electrical and acoustical consulting services.

As a member of the State Board of Registration, Mr. Oliphant will provide information on the advantages of, providing for and taking the state examination. A question and answer period will follow the talk. All engineers interested in registration are welcome to attend.

# MEETING CALENDAR

**AEROSPACE & ELECTRONIC SYSTEMS**
**MARCH 15**

Story on page 6

**COMPLETE TOUR OF UNITED AIR LINES FACILITY** at San Francisco International Airport. Wives and children over 16 are welcome.

MARCH 15, Thursday, 7:30 PM, United Airlines building at SF International Airport. See story for instructions. Dinner at 6:30 PM in the UAL Cafeteria. Reservations for tour and dinner: Jerry Hamerman (415) 328-3082 by March 10th.

**ANTENNAS & PROPAGATION**
**MARCH 14**

Story on page 6

**AN AMPLITUDE – STEERED DESPUN ANTENNA**. Fred J. Dietrich, Technical Manager, Philco-Ford, Palo Alto.

MARCH 14, Wednesday, 8:00 PM, Lockheed Research Lab Auditorium Bldg. 202, 3251 Hanover St., Palo Alto. Dinner: 6:15 PM (cocktails 5:30) at Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. No reservations.

**AUDIO & ELECTROACOUSTICS**
**MARCH 8**

Story on page 2

**ACOUSTICAL AND SOUND EQUIPMENT DESIGN OF THE FIRST BAPTIST CHURCH IN SAN JOSE**. Russell Tinkham, Consulting Engineer in Acoustics. Harold Lindsay, Corporate Consultant for Ampex Corp.

MARCH 8, Thursday, 8:00 PM, First Baptist Church of San Jose, Ironwood Drive, San Jose. No dinner. Families welcome.

**COMPUTER SOCIETY**
**MARCH 27**

Story on page 6

**MUSIC FROM NUMBERS**. Leland Smith, Professor of Music, Stanford University. SPOUSES' NIGHT!

MARCH 27, Tuesday, 8:00 PM, Skilling Auditorium, Stanford University. Dinner 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Reservations: Neil Sullivan, (408) 257-6550 x 320 by noon, Mar. 27th.

**CONTROL SYSTEMS**
**MARCH 28**

Story on page 7

**ADOPTIVE CONTROL FOR STOCHASTIC SYSTEMS**. Dr. Edison Tse, Senior Research Engineer, Systems Control Inc.

MARCH 28, Wednesday, 8:00 PM, Basement Conference Room, Systems Control, 260 Sheridan, Palo Alto. No dinner – refreshments will be served at the meeting.

**EAST BAY SUBSECTION**
**MARCH 19**

Story on page 2

**TOUR OF MOUNT SUTRO TV TOWER**. (Directions will be given when reservations are made.)

MARCH 19, Monday, 7:30 PM, TV Transmitting Tower on Mount Sutro. No dinner but reservations must be made for the tour. The number is limited. Call Jim St. Arnaud (415) 399-4974 or Hadi Monsef (415) 764-4195. Reserve early.

**ELECTROMAGNETIC COMPATIBILITY**
**MARCH 19**

Story on page 2

**REGISTRATION OF PROFESSIONAL ENGINEERS**. Mr. Kenward Oliphant, California State Board of Registration for Professional Engineers.

MARCH 19, Monday, 8:00 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Cocktails at 5:30 PM, dinner at 6:30 PM. Reservations: Erlyne Hooper (415) 326-4350 x 4310 by March 16th.

**ELECTRON DEVICES**
**MARCH 22**

Story on page 7

**INTEGRATED OPTICS – PRESENT AND FUTURE**. P. K. Tien, Head Department of Electron Physics Research, Bell Telephone Labs.

MARCH 22, Thursday, 8:00 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Cocktails at 6:00 PM and dinner at 7:00 PM. Reservations: Section office (415) 327-6622.

**ENGINEERING MANAGEMENT**
**MARCH 20**

Story on page 7

**GOVERNMENT SPECIFICATIONS AND RESULTING CONTRACTS**. Joseph Camp, Chief of the Procurement Operations Branch, NASA's Ames Research Center.

MARCH 20, Tuesday, 8:00 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Cocktails: (no host) 6:00 PM; dinner 6:30 PM. For dinner reservations: (Hawaiian Ham Steak @ $5.00) call Phil Steinberg at (415) 326-4350 x 5087 by March 19th, 9 AM.

**ENGINEERING IN MEDICINE & BIOLOGY**
**MARCH 13**

Story on page 6

**ENGINEERING CONTRIBUTIONS IN NEUROBIOLOGY**. Dr. Edward L. Keller, Prof. UC Berkeley.

MARCH 13, Tuesday, 8:00 PM, Stanford Medical Center, Room M 104. Dinner: 6:00 PM, Stanford View, 1921 El Camino Real, Palo Alto. Reservations: Mrs. A. L. Swenson (408) 292-4794 by March 12th AM.

**INDUSTRY APPLICATIONS SOCIETY**
**MARCH 27**

Story on page 4

**APPLICATION OF T-FRAME MOTORS**. Robert J. Parry, District Sales Manager, Louis Allis Company.

MARCH 27, Tuesday, 8:00 PM, Iron Duke (3rd floor) 132 Bush St., San Francisco. 6:00 PM no host cocktails; dinner at 6:30 PM. Reservations: Frank Trayer (415) 431-7701, Ted Bubb (415) 781-1177 or Tom Googin, (415) 982-2442 by March 26th.

**INFORMATION THEORY/ COMMUNICATIONS SOCIETY**
**MARCH 19**

Story on page 8

**JOINT MEETING COMPUTING NETWORKS**. Dr. Kay Magleby, Pres., Cuchman Electronics, Sunnyvale.

MARCH 19, Monday, 8:30 PM, SRI Conference Room B, 333 Ravenswood Ave., Menlo Park. Dinner: 6:15 PM, Velvet Turtle, 325 Sharon Park Drive, Menlo Park. Reservations: Mrs. Kay Eberwine, 321-2300 x 4539 by Mar. 15th.

**MICROWAVE THEORY & TECHNIQUES**
**MARCH 15**

Story on page 7

**THICK-FILM vs. THIN-FILM TECHNOLOGIES FOR MIC's**. David LaCombe, Senior Engineer, Applied Technology, Sunnyvale.

MARCH 15, Thursday, 8:00 PM, Hewlett-Packard Auditorium, 5301 Stevens Creek Blvd., Santa Clara (at Lawrence Expressway). No dinner.

**NUCLEAR & PLASMA SCIENCES SOCIETY**
**MARCH 31**

Story on page 5

**ONE DAY COURSE ON HIGH SPEED PULSE INSTRUMENTATION TECHNIQUES**. Speakers: W. Jackson, Dr. A. Barna, F. Kirsten, Dr. D. I. Porat and T. Henry.

MARCH 31, Saturday, 8:30 AM to 4:30 PM, SLAC Auditorium, 2575 Sand Hill Road, Menlo Park. See story for registration and further information.

**POWER ENGINEERING SOCIETY**
**MARCH 13**

Story on page 4

**OPTIMIZATION APPLICATIONS IN POWER SYSTEMS**. Norris Peterson, Jim Goodrich, Systems Control, Inc.

MARCH 13, Tuesday, 7:30 PM, Engineers Club of S.F., 160 Sansome St., S.F. Cocktails: 5:30 PM; dinner 6:30 PM. Reservations: (415) 421-3184.

**POWER ENGINEERING SOC./GOLDEN GATE SUBSECTION**
**MARCH 19**

Story on page 4

**JOINT MEETING SF-6 GAS INSULATED MINI-SUBSTATION**. W. E. Harper, Allis-Chalmers, Power Breaker Division.

MARCH 19, Monday, 12 noon, PG&E, 77 Beale St., S.F., 3rd floor, Room 301. Select lunch from the Cafeteria. No reservations.

**RELIABILITY**
**MARCH 21**

Story on page 6

**ELECTRONS – THE KEY TO NEUTRON RADIOGRAPHY**. Richard L. Newacheck, Manager Aerotest Operations, San Ramon.

MARCH 21, Wednesday, 8:00 PM, Stanford University Physics Lecture Hall, PH 104. Dinner: 6:30 PM, Stanford View, El Camino & Stanford Ave., Palo Alto. Reservations: Phil Guillot (408) 742-9371 by March 21st.

**SYSTEMS, MAN & CYBERNETICS**
**MARCH 14**

Story on page 5

**VALUATION AND ITS USES IN FUTURES STUDIES AND RESEARCH**. Peter Schwartz, Pacific House Associates, Palo Alto.

MARCH 14, Wednesday, 8:00 PM, SRI Conference Room B, Bldg. 1, 333 Ravenswood Ave., Menlo Park. Dinner: 6:00 PM, Red Cottage, 1706 El Camino Real, Menlo Park. Reservations: Section office (415) 327-6622 by noon, March 12th.

**VEHICULAR TECHNOLOGY**
**MARCH 19**

Story on page 5

**TOUR OF CITY OF SANTA CLARA'S NEW COMMUNICATION CENTER**.

MARCH 19, Monday, 8:30 PM, Town House Restaurant, Grants Plaza Shopping Center, Scott and El Camino, Santa Clara. Cocktails: 6:30 PM, dinner 7:15 PM. Reservations: Pauline Hawkins, (408) 277-4000 x 4533.

TRANS-ENGINEERING SOCIETIES MEETING ON PROFESSIONALISM AT THE NATIONAL LEVEL, sponsored by NSPE Golden Gate Chapter, will be presented by a distinguished panel of national officers of NSPE, IEEE, ASCE and ASME. Place, Engineers Club of San Francisco, 160 Sansome Street, Wednesday, March 21. Cocktails 6:00 PM; dinner 7:00 PM; meeting 8:00 PM. Visitors welcome. Reservations: Engineers Club 421-3184 BEFORE NOON March 20. Street parking after 6:00 PM. See story on page two.

PANEL DISCUSSION jointly sponsored by the SF Section, IEEE, the ACS, CSPE, AIAA will be held on Saturday, March 10, 8:30 AM to 12 noon. Subject: WHAT YOU NEED TO KNOW ABOUT PENSIONS. Place: College of San Mateo, 1700 W. Hillsdale Blvd., San Mateo. Send $2.00 registration fee to R. Stanley Lord, 480 Sherwood Way, Menlo Park, CA 94025 or call Linda at (408) 275-0500. Attendance is limited. Register early. See story on page two.

Two Computer One Day short courses on SOFTWARE STRUCTURES and HYBRID MICROELECTRONICS will be held on March 3 and 24 respectively at the Daly Science Center, Room 207, University of Santa Clara. See stories on page eight for registration and other information.

# SUBSECTION NOMINATIONS

## EAST BAY

For Chairman Jerry H. Parker Senior Engineer, Underground, Pacific Gas and Electric Co., Oakland. Now serving as Vice Chairman, EBSS.

For Vice-Chmn. James A. St. Arnaud Engineer, Pacific Telephone, San Francisco. Now serving as Treasurer EBSS.

For Secretary Terry L. Rossow Electronics Engineer, Lawrence Livermore Laboratory.

For Treasurer A. Dale Johnson East Bay Div. Electric Engineer, Pacific Gas and Electric Company.

## GOLDEN GATE

For Chairman J. Arthur Wells President, Artwell Electric Co. Present Vice Chairman, Golden Gate Subsection.

For Vice Chairman Leon C. Glahn Chief Electrical Engineer, Mining & Metals Div., Bechtel Corporation. Present Secretary, GGSS.

For Secretary Charles L. Ostrofe Engineer, Pacific Telephone, San Francisco. Present Treasurer GGSS.

For Treasurer Kon G. Zaharoff Senior Engineer, Elec. Generation & Transmission Engineering, PG&E.

For Treasurer A. Wayne Ashley Engineering Service Supervisor, Westinghouse Electric Corporation.

## SANTA CLARA VALLEY

For Chairman Robert A. Martin Division Manager of Switching Engineering, Pacific Telephone. Present Vice Chairman.

For Vice Chairman Phillip H. Simpson Supervising Training Foreman, Pacific Telephone. Present Secretary.

For Secretary Cling R. Gilliland Project Engineer for Ionospheric Sounding and Receiving Equipment, Barry Research. Present Treasurer.

For Treasurer John A. Kirtland Senior Staff Electrical Engineer, Ordnance Division, FMC Corporation.

## 1973 RELIABILITY PHYSICS SYMPOSIUM

11th Annual Reliability Symposium is to be held April 3-5, 1973 at the Dunes Hotel, Las Vegas, Nevada. It is jointly sponsored by the IEEE Groups on Electron Devices and Reliability. Reliability Physics in the areas of Failure Modes, Failure Mechanisms, and Reliability Improvements will be described. For more details contact R. E. (Bob) Davies, Burr-Brown Research Corp., 6730 S. Tucson Blvd., Tucson, Ariz. 85706. Phone (602) 294-1431.

## PES – OPTIMIZATION APPLICATIONS IN POWER SYSTEMS

A number of powerful optimization procedures are being successfully applied to power system problems. The March meeting of the S.F. Chapter of the Power Engineering Society will hear Jim Goodrich and Norris Peterson of Systems Control, Inc. discuss two such applications.

Jim Goodrich will discuss recent developments in Production costing with emphasis on improved modeling of energy interchange agreements. He is manager of the Energy Systems Division of SCI and is a PhD candidate at Stanford in the Nuclear Engineering Dept. He also holds a MS degree in Engineering Economics from Stanford and a MS in Engineering Science from George Washington University.

Norris Peterson will discuss the Optimum Power Flow program and its application to system planning and system operation with special emphasis on handling engineering constraints. He is the Assistant Manager of the Electric Power Division of SCI and holds a BEE degree from the University of Minnesota.

## PES – GGSS JOINT MEETING SF-6 GAS INSULATED MINI-SUBSTATION

As part of the IEEE Regional Outstanding Lecture Tour the S.F. Chapter of the Power Engineering Society and the Golden Gate Subsection are hosting a lecture by Mr. W. E. Harper on compact or mini-substations.

The "Mini-Sub" provides a method of solving site procurement, environmental and cost problems in development of High Voltage and EHV substation in metropolitan areas.

Mr. Harper is Manager-Marketing Development for the Power Breaker Division of Allis-Chalmers. He is a Senior member of IEEE and holds a BSEE degree from Kansas State University and a MS Engr. Management degree from Northeastern University. He has worked for many years in the development of conventional and SF-6 substation equipment.

## IAS – APPLICATION OF T – FRAME MOTORS

The Industrial Applications Society will benefit from a discussion March 27 by Robert J. Parry regarding the Louis Allis T-Frame industrial motor.

Mr. Parry will cover all facets of industrial motor application, mechanical and electrical design, insulation systems, and performance. He also will discuss applications, method of connecting to the load, operation and maintenance. Special applications will be considered. Various methods of starting will be discussed. A question and answer period will follow the talk.

Mr. Parry, a native of Chicago, attended school in Milwaukee, and received a BSME degree from Marquette University. He has been with the Louis Allis Co. for 21 years. Industries served include pumping, machine tool, conveyors, laundry, woodworking, crane and hoist, mining, food processing and military.

## SMC – VALUATION AND ITS USES IN FUTURES STUDIES AND RESEARCH

Are you an "exister", "protector", "warrior", "follower", "exhibitionist", "achiever", "changer", "mover", "unfolder", or "echoer"? These are the different "valuator" types to be discussed by Mr. Peter Schwartz at the March SMC meeting. He will deal with the thorny issue of values in decision-making in general, and in particular as it effects futures study and research. Central to his thesis is that values are not things in themselves, but rather, properties attributed to needs and desires. The proposed Valuator Typology ("exister" to "echoer") attempts to define the different perspectives that might be taken on valuation in our society. Mr. Schwartz's brief presentation will be followed by an open discussion.

Mr. Schwartz is affiliated with Pacific House Associates in Palo Alto, where he is responsible for data management and analysis, as well as participating in the execution of policy studies and planning programs. He is a graduate of Rensselaer Polytechnic Institute, and prior to coming to Pacific House was Assistant Dean of Students for Housing at the University of California at Davis.

## BOOK AVAILABLE

"Optimum Utilization of Scientific and Engineering Manpower", – by William G. Torpey (ASEE), Manpower Specialist, Executive Office of the President of the United States, 1959-1969, and Lecturer, George Washington University, Washington, D.C. For information contact Dr. William G. Torpey, 810 Grandview Drive, Alexandria, Va. 22305. 324 pages, $10.50.

## VT – CITY OF SANTA CLARA'S NEW COMMUNICATIONS CENTER

Santa Clara has recently made a major change in the Police Department radio system and the Communications Center operation. The Police radio system employs satellite receivers and multiple mobile relay stations to provide extended range for portable radios. The operational center has been combined with all emergency services being controlled from the one location to better utilize the personnel assigned to this service.

A walk through of the operational center, with questions and answer sessions, will be led by the director, Max Watson. Mr. Watson has been with the City of Santa Clara for four years and was with the County of Santa Clara Communications Department for the previous twenty years, beginning as a dispatcher and progressing to the position of Senior Communications Engineer. He attended Weber State College, University of Santa Clara and Coyne School.

## NPSS – ONE DAY COURSE: HIGH SPEED PULSE INSTRUMENTATION TECHNIQUES

The IEEE Nuclear and Plasma Sciences Society will present a one-day course, "High Speed Pulse Instrumentation Techniques" at the SLAC Auditorium, 2575 Sand Hill Road, Menlo Park, on Saturday, March 31, 1973, from 8:30 AM to 4:30 PM.

The primary purpose of this course is to explore a number of basic analog and digital measurement techniques for 1 nsec ($10^{-9}$ sec) rise-time pulses. The lectures are tutorial in nature and aimed at a broad segment of practicing engineers, engineering associates and students. Sessions and speakers are:

1. "Amplitude and Area Measurement of Nanosecond Pulses"
– W. Jackson, Lawrence Berkeley Lab, U.C.

2. "Nanosecond Trigger Circuits"
– Dr. A. Barna, Hewlett-Packard Co.

3. "Nanosecond Time Coincidence Techniques"
– F. Kirsten, Lawrence Berkeley Lab, U.C.

4. "Nanosecond Time Interval Measurement"
– Dr. D. I. Porat, SLAC, Stanford University.

5. "High Speed A/D and D/A Converters"
– T. Henry, Motorola Semiconductor Corp., Phoenix.

Lectures will be 1 hour plus a discussion period. Fees include lunch and handouts. Fees: IEEE or APS members $15.00. Non-members $20.00. Student or unemployed $4.00 without lunch, $6.00 with lunch.

Sponsors: IEEE-NPSS S.F. Chapter (R. S. Larsen, Chm.), NPSS AdCom, IEEE S.F. Section.

MARCH 31, 1973, COURSE ON HIGH SPEED PULSE TECHNIQUES

(Mail before March 20, 1973)

Mail to: IEEE-NPSS
c/o L. Burch, A/E Room 102
SLAC, Bin 26
Stanford University
Stanford, Ca. 94305

Name: _____

Address: _____

_____
(City, State, Zip)

Telephone: _____

___Member IEEE or APS ___Student

___Unemployed Member ___Non-member

Enclosed is check (Payable to IEEE-NPSS) in the amount of $_____

## C – MUSIC FROM NUMBERS

The Computer Society Chapter will hear Prof. Leland Smith discuss MUSIC FROM NUMBERS at their March meeting. Professor Smith taught at Mills College and the University of Chicago, and since 1958 he has been with Stanford University where he is now Professor of Music, teaching composition and computer music. During the past year he has given presentations of computer music in Paris, Zagreb, Belgrade and several American Universities.

The computer is capable of creating any combination of sounds without recourse to electronic musical synthesizers. However, a vast amount of numerical data must be organized for even one second of musical sound. The task of the pioneers in this field has been to devise the means for making the great potential of the computer as a musical instrument readily available to musicians. A computer music "language" has been developed at Stanford which can easily be learned by musicians.

The next step in this field is to develop computer music systems which will run on relatively inexpensive minicomputers. Several taped examples of computer music will be presented.

## RELIABILITY CHAPTER RECEIVES RECOGNITION

The Reliability Chapter of the San Francisco IEEE Section has received 3rd place in the Reliability Group Chapter Award in IEEE worldwide competition. Lew Finch received this award for the Chapter while attending the 1973 Annual Reliability and Maintainability Symposium held in Philadelphia. Lew was Vice Chairman of Programs at this event. The award was received based on a report of the Chapter's activities in the 1971-72 season, submitted by Phil Guillot, who was Secretary at that time.

## AP – AMPLITUDE STEERED DESPUN ANTENNAS

Electronically despun antennas are conventionally steered by varying the relative phase of adjacent elements. On a spinning satellite, beam despinning can be accomplished by the same means, but the antenna phase center goes through periodic motions which can be detrimental to the transmission of phase-modulated data. The amplitude steering concept to be described avoids this problem while providing the appropriate despinning.

Dr. Dietrich received his B.S. at the Missouri School of Mines, M.S. at Purdue, and his Ph.D. in 1968 from Ohio State University where he was employed in the Electro-Science (Antenna) Laboratory. His dissertation research was concerned with the development of a broadband antenna system for ionospheric mode selection.

At Philco-Ford since June, 1969, he currently is technical manager of the communication antenna subsystem for the SMS spacecraft. Past responsibilities at Philco-Ford include the development of high gain spacecraft antennas for millimeter wavelengths, earth station feeds and frequency-selective subreflectors.

## AES – TOUR OF UAL

The AES Chapter will sponsor a tour of United Airlines facilities at the San Francisco International Airport on March 15th. This will be a complete tour of the entire operation; electronics, engine rebuilding and , aircraft rebuilding. Wives and children over 16 are welcome to attend. Take the San Bruno turnoff from Bayshore (101) to the deadend in front of UAL. Jog right to the Guard House, where they will instruct you for parking. Meet in the lobby of the building entrance. Reservations must be made for both the tour and the dinner by March 10th.

## R – ELECTRONS – THE KEY TO NEUTRON RADIOGRAPHY

Here's an excellent opportunity to both improve your background and also determine practicality of using neutron radiography for investigative or process control work. Dick Newacheck, the speaker, will provide exposures of submitted samples, if no larger than a cigarette pack (contact Bob Karpen, (415) 965-6162, before March 9th to submit samples).

Mr. Newacheck, presently the Manager of Aerotest Operations, a Division of Aerojet-General, has been with Aerojet since 1957 where he has continued in his field of NDT using nuclear techniques since 1950. Mr. Newacheck pioneered many applications using radioisotopes for NDT during the period of 1950 to 1960 which resulted in a number of papers and several patents.

## EMB – ENGINEERING CONTRIBUTIONS IN NEUROBIOLOGY

Neurobiology (study of the structure and function of the nervous system) seeks to explain the physical basis of our experiences involving sensation, learning, memory and the coordinated actions/responses of the animal body that we describe as behavior. Many diverse approaches are used in this interdisciplinary field in the continuing search for behavioral understanding.

After a generalized tutorial on the nervous system, Dr. Edward L. Keller will focus on examples of current research being done at UC Berkeley in the Department of Electrical Engineering and Computer Sciences:

– organization and function of the vertebrate retina as a specialized transduction and information handling network of the peripheral brain.

– structure of the motion and position transduction receptors of the inner ear as viewed by scanning electron microscopy.

– function of the eye movement control system of the alert primate brain.

A new era is dawning and there is a a place for the engineer among the vanguard seeking answers at these complex levels.



See CALENDAR for Program Arrangements

# IEEE INTERCON/73

*March 26-30*

# he difference is the dimension

the IEEE International Convention and Exposition there will be
ndreds of new and innovative product demonstrations – all live and
iving color – at the New York Coliseum.

The new equipment is there – in all three dimensions (even the
lk-wiring). And *you're* there tuning the new boxes for yourself, and
king your own direct questions to the company representatives.

A few blocks away, at the Americana Hotel, the world's leading
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IEEE 73 INTERCON

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Phone: (212) 752-6800

# Technical Program at a Glance

All sessions at Hotel American

## Monday, March 26

(No sessions Monday morning. Program begins at 2 pm.)

### 2 p.m.-4:30 p.m.

1
Progress in Solid State Imaging
2
Semiconductor Main Frame Memories
3
Precision Marketing/Can Computers Help?
4
Computers in Public Systems
5
Satellite Multiple Access—The Key to Effective Utilization
6
Prospecting for Energy
7
Optical Computing

### 8 p.m.

A
The Energy Crisis

## Tuesday, March 27

### 9:30 a.m.-12 noon

8
Computer Applications in the Manufacturing Environment
9
Archival and Mass Memories
10
Interior Information Transfer—Application of Multiplexing
11
The Evolution of Large Government Computing Systems
12
Communication Satellite Systems – Extending Our Horizons
13
Energy Storage
14
Information Theory After 25 Years

### 2 p.m.-4:30 p.m.

15
Minicomputers: Boon or Blight? A Workshop Panel
16
Video Storage: Impact on Communications, Information Retrieval, Display
17
Maintaining Competitive Edge in International Markets
18
Hybrid Simulation: What is it—and How Viable?
19
Bus Organized Interconnection Techniques
20
Power System Control
21
Implementing Random Logic with Microprocessors

## Wednesday, March 28

### 9:30 a.m.-12 noon

22
EDP as a Business Opportunity
23
LSI – MOS Circuits
24
Outlook for Purchasing Components for '73
25
State of Computing Outside the U.S.
26
Projection Display Systems
27
Can Direct Interaction with a Computer Serve You?
28
The Philosophy and Methodology of Technological Forecasting
C
Industrial Application of Power Semiconductors

### 2 p.m.-4:30 p.m.

29
The Transistor—Yesterday, Today and Tomorrow
30
High Packing Density Bipolar Technology for LSI
31
Control—Utilizing Light Sensitive Devices
32
Electro-Mechanical Versus Solid State
33
Matrix Displays
34
New Developments in Signal Generators
35
Technology Assessment and Applications

### 8 p.m.

B
Limits to Growth

## Thursday, March 29

### 9:30 a.m.-12 noon

36
Environmental Electroacoustics
37
Electronics for the Visually Handicapped
38
Instruments for Computer-Controlled Test Systems
39
Television
40
Cybernetics and Man-Machine Systems
41
Resistor Trimming
42
Surface Acoustic Wave Devices in Real Systems

### 2 p.m.-4:30 p.m.

43
Numeric and Alpha-Numeric Displays for Instruments
44
Engineering and Purchasing; Allies or Adversaries
45
Program Generation for Automatic Test Equipment
46
What Detroit Really Needs From the Electronic Industry
47
Role of Communications in Development of Nations
48
Microwave Solid-State Amplifiers and Oscillators – 2 or 3 Terminal Devices
49
Advances in Transducer Design

## Friday, Mar 30

### 9:30 a.m.-12

50
Advanced Micr electronic Pack for Cost, Reliab and Field Servi
51
Solid State for Consumer Elect
52
Applying Comp Controlled Test Systems
53
Semiconductor Marketing Goes Multinational
54
Automated Ma Control Techn
55
MIC's in Instrumentation
56
Impact of New Technologies o Silicon Devices and Circuits

(No sessions Friday afterno

Play:
Barbara's Polar Bears – 8:30 am-9:15 Tuesday and Wednesday

## EM – GOVERNMENT SPECS, AND RESULTING CONTRACTS

Bidding Government contracts? Beware booby trapping yourself because you didn't respond properly to the advertised criteria is the advice of the March 20 speaker for the Engineering Management group meeting.

Mr. Joseph Camp, Chief of the Procurement Operations Branch at NASA's Ames Research Center will discuss Government Specifications and resulting contracts. Joe has been with NASA-Ames Research for 7 years, prior to that he was with the AFPRO at Lockheed Missiles and Space as the Procurement Methods Analyst. In that position he reviewed the entire Procurement Operation and made recommendations to Lockheed for improvement. Before that he was with DOD in Ordnance and Medical procurement. The importance of this discussion has increased during recent months due to the increasingly keen competition for the limited amount of aerospace business currently available.

## GMTT/1973 INTERNATIONAL MICROWAVE SYMPOSIUM

The IEEE 1973 G-MTT International Microwave Symposium will be held at Boulder, Colorado, June 4-6, 1973. Theme, "Microwave Applications in the 70's." Papers describing original work in the development of new microwave theory, techniques and applications will be presented. Conveniently located exhibits. Further information from Bureau of Conferences and Institutes, 217 Academy Building, Univ. of Colorado, Boulder, Colo. 80302. Telephone (303) 443-2211 ext. 6485.

## CSS – ADAPTIVE CONTROL FOR STOCHASTIC SYSTEMS

In stochastic systems different philosophical approaches lead to different classes of adaptive control laws. The basic differences between open-loop, closed-loop and open-loop feedback control will be discussed. Emphasis is on the conceptual understanding of stochastic dynamic programming which leads to the design of an actively adaptive control system. The actively adaptive control law, also referred to as dual control, has the characteristic of regulating its learning as required by the control objective, and thus the control input is active in learning as well as in control.

Edison Tse received the Ph.D. degree in 1970 in Electrical Engineering from Massachusetts Institute of Technology. He was a consultant for the State Street Bank of Boston, where he applied optimal control to banking problems. Since 1969 he has been with Systems Control, Inc., Palo Alto, California where he is now a Senior Research Engineer. His current research interests include optimal control theory, dynamic allocation, and stochastic estimation, identification, and control. Dr. Tse is a member of Sigma Xi, Eta Kappa Nu, and Tau Beta Pi.

## MTT – THICK-FILM VS. THIN-FILM TECHNOLOGIES FOR MIC'S

Techniques and design approaches using thick-film technology to achieve performance comparable to that of thin-film circuits when designing MIC's will be discussed by Mr. David LaCombe. Using thick-film technology, microwave integrated circuits have been fabricated for the frequency range of 100 MHz to 12 GHz. Circuits reflecting various degrees of design sophistication include limiter-detectors, power dividers, and isolators. Data is presented comparing performance achieved using thick-film techniques with the performance of identical circuits made using thin-film subtractive technology. Circuits exclusively restricted to thin-film due to process limitations associated with thick-film will also be presented.

Mr. LaCombe is currently a Senior Engineer at Applied Technology, Inc., a division of Itek Corporation. For nearly two years he has worked on R&D as well as product development in the MIC area with particular design emphasis on limiter-detectors, modulators, switches, mixers, attenuators and ferrite devices. Prior to joining Applied Technology, he worked for Monsanto developing MIC Gunn oscillators and doppler radar front ends, and at Emerson Electric, doing research and development on MIC phased-array radar modules.

## ED – INTEGRATED OPTICS – PRESENT AND FUTURE

Integrated optics is a new science devoted to the use of thin-film technology for optical devices and circuits. Since its inception three years ago, a host of thin-film optical components has been invented. They include thin-film prisms, lenses, lasers, modulators, polarizers, and film-beam couplers. A series of color slides will be used to illustrate the principles involved in these devices. In spite of rapid progress made both in materials and fabrication techniques, formation of an optical circuit complete with devices presents a multitude of problems. To alleviate some of the difficulties, a new method of forming light-guiding interconnections will be described. The paper is a review and a preview of this new and exciting field – integrated optics.

P. T. Tien received the Ph.D. degree from Stanford in 1951, and in 1952 he joined the Electronics Research Laboratory of Bell Telephone Laboratories. At present, he is the Head of the Department of Electron Physics and is concerned primarily with the research of semiconductor and organic thin films, optoelectronics, and integrated optics.

## C – ONE DAY SHORT COURSE "SOFTWARE STRUCTURES"

The IEEE Computer Society and the Division of Continuing Education, University of Santa Clara, jointly present a one day short course on "Software Structures" at Daly Science Hall, Room 207, University of Santa Clara, on March 3, 1973 from 9:00 AM to 4:15 PM.

Fees: IEEE or ACM members $20.00. Non-members $25.00. Fees include notes and lunch on campus. Student Members or Unemployed Members $4.00 without lunch, or $6.00 with lunch.

More and more of todays systems are computer-based requiring engineers, designers, and scientists who use and build these systems to have an understanding of both hardware and software concepts. On March 3, 1973, a course will be offered to examine a variety of software concepts at the block diagram and functional organization levels. Software will be introduced at the component level. The various types of code modules and data structures used to construct software systems will be described. This introduction will be followed by two complimentary lectures covering programming language translation and run-time facilities for supporting high-level languages. The last lecture will discuss various types of operating system organizations which provide general services for programs written in a variety of programming languages.

COURSE SCHEDULE:

Registration – 9:00 to 9:30 a.m.
Morning – 9:30 to 12:30 a.m.
SOFTWARE COMPONENTS
(Speaker to be announced)
Execution Modules,
Data Structures
LANGUAGE TRANSLATORS
Mr. Terry Opdendyk, Hewlett-Packard
Classes of language translators, Major translator subsystem functions, Implementation techniques.
Lunch – 12:30 to 1:30 p.m.
Afternoon – 1:30 to 4:15 p.m.
RUN-TIME ENVIRONMENTS
Mr. Justin Rattner, Hewlett-Packard
Operand access, Sequencing and control, Methods for interpretive language execution.
OPERATING SYSTEMS
Mr. Marc Kaufman, Stanford Univ.
Processes, Memory Management, File Organization and I/O.

Chairman:
Ken Rothmuller 257-7000 x 2598
Hewlett-Packard, Cupertino

Lecturers:
Terry Opdendyk 257-7000 x 2154
Justin Rattner 257-7000 x 2710
Marc Kaufman 321-3300 x 363

IEEE Computer Society
March 3, 1973, One Day Short Course on "Software Structures"

(If possible, mail before February 28)

Enclosed is check (Payable to University of Santa Clara) in amount of $_____

Name:_____

Address:_____
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(City, State, Zip)

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Mail this form and payment to:
IEEE Computer Society Seminar
Division of Continuing Education
University of Santa Clara
Santa Clara, California 95053

## ARE YOU AN UNEMPLOYED IEEE MEMBER?

The IEEE office in Palo Alto is receiving occasional calls from employers requesting referrals from qualified engineers for specific positions. If you are now an unemployed member of IEEE, San Francisco Section, it is suggested that you send your resume to Mrs. Jean Helmke, at the office address shown on page 2.

## IT – COM – JOINT MEETING COMPUTING NETWORKS

Data communication and computing systems are joining to create an exciting new market. The voice communication network is required to handle increasing amounts of data traffic. Since the network was designed primarily for voice, a new standard of maintenance is necessary for digital traffic. Several design techniques are now in use for data communication systems which can greatly reduce operating costs and improve network utilization. The presentation will summarize the trends in data communication systems, network characteristics, and correct data communication design techniques.

Dr. Kay Magelby is president of Cuchman Electronics, Sunnyvale, and formerly was director of Communications Programs at Hewlitt-Packard. He received his BSc degree at the University of Utah, and his MS and PhD at Stanford.

## C – ONE DAY SHORT COURSE "HYBRID MICROELECTRONICS"

The IEEE Computer Society and the Division of Continuing Education, University of Santa Clara, jointly present a one day short course on "Hybrid Microelectronics" at Daly Science Hall, Room 207, University of Santa Clara on March 24, 1973 from 8:30 AM to 4:00 PM.

This is the third in a series of one day short courses to be presented in 1972-73, to provide the practicing engineer and scientist with recent developments in the continuing changing field of computer technology. Program chairman and organizer of the March 17 course is Pat Fasco, of Sylvania, Mountain View.

Fees: IEEE or ACM members $20.00. Non-members $25.00. Fees include notes and lunch on campus. Student Members or Unemployed Members $4.00 without lunch, or $6.00 with lunch.

IEEE Computer Society
March 24, 1973, One Day Short Course on "Hybrid Microelectronics"

(If possible, mail before March 19)

Enclosed is check (Payable to University of Santa Clara) in amount of $_____

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