Technology Internation Bridge

VII International
Conference
of
Women Engineers
and
Scientists

1984

Presented by
The Society of Women Engineers
June 17-24
Washington, D.C.

# VII ICWES

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# VII ICWES

### OPENING KEYNOTE SPEAKER

"SUPER COMPUTING AS AN INTERNATIONAL TECHNOLOGY"



Dr. Ruth M. Davis

Ruth M. Davis is President and Founder of The Pymatuning Group, Inc., which specializes in industrial modernization strategies and technology development. Technological areas of concentration include microelectronics, computers, information, automation, and robotics. The company also assists synthetic fuel commercialization projects.

Dr. Davis currently serves on the Boards of The Aerospace Corporation, Commercial Credit Corporation, Consolidated Edison Company of New York, United Telecommunications, Inc., and Varian Associates.

Dr. Davis has been Assistant Secretary of Energy for Resource Applications (1979-1981), and Deputy Under Secretary of Defense for Research and Advanced Technology (1977-1979). Prior to 1977 she served as Director of the Institute for Computer Sciences and Technology at the National Bureau of Standards; as the first Director of the National Center for Biomedical Communications in the Department of Health, Education, and Welfare; and as Staff Assistant for Intelligence and Reconnaissance in the Office of the Secretary of Defense.

Dr. Davis is also Adjunct Professor and Chairman of the Computer Advisory Committee in the School of Engineering, University of Pittsburgh. She is a member of the Council of Library Resources, the Board of Trustees of Thayer School at Dartmouth University, and the School of Engineering and Applied Sciences of the University of Pennsylvania.

Dr. Davis' honors, awards, and commendations include:

Department of Energy Distinguished Service Medal, 1981;

Department of Defense Distinguished Service Medal, 1979;

Honorary Doctorate of Engineering, Carnegie Mellon University, 1979;

Computer Science Man-of-the-Year for 1979;

National Civil Service League Award, 1976;

Rockefeller Public Service Award for Professional Accomplishment and Leadership, 1973;

Federal Woman of the Year Award, 1972;

Department of Commerce Gold Medal, 1972;

Fellow, American Institute of Aeronautics and Astronautics;

Fellow, Society for Information Display; and

Fellow, American Association for the Advancement of Science.

The National Academy of Engineering and the National Academy of Public Administration have also elected Dr. Davis to membership.

Dr. Davis received all her degrees summa cum laude in mathematics. She obtained Ph.D. and M.A. degrees from the University of Maryland, and a B.A. degree from American University.

# EVENTS OF THE DAY MONDAY JUNE 18, 1984

7:00 - 8:00	CONTINENTAL BREAKFAST	REGENCY BALLROOM
7:00 - 8:00	SPEAKERS BREAKFAST (INVITATION ONLY)	CALVERT ROOM
8:00 - 6:00 PM	REGISTRATION	WEST LOBBY
8:00 - 1:00	SIGN UP FOR EVENING EVENTS & JOB FAIR	INFORMATION BOOTH
8:15 - 9:00	OPENING CEREMONIES & KEYNOTE ADDRESS	REGENCY BALLROOM
9:00 - 11:00	SWE STUDENT REGIONAL MEETINGS	
Show at the table of	REGION I	BOARD
	REGION II	CLUB ROOM A
	REGION III	COUNCIL ROOM
	RECION IV	CLUB ROOM B
	REGION V	CABINET
0-00 10-15	REGION VI	ROOM 163
9:00 - 10:15	TECHNICAL SESSIONS	
	WOMEN IN ENGINEERING AND SCIENCE	BLUE ROOM
	MEDICINE	DIPLONAT ROON PALLADIAN ROON
0:15 - 10:30	UNDERGRADUATE EDUCATION BREAK	PALLADIAN KUUN
0:30 - 11:40	TECHNICAL SESSIONS (Continued)	THEODMATTON DOOTH
1:45 - 1:00	ON YOUR OWN LUNCH	INFORMATION BOOTH
2:45 - 10:00	SWE STUDENT TRIP TO THE US NAVAL ACADEMY	BLUE ROOM
2:00 - 5:15	TECHNICAL TOURS	BLUE ROOM
12:00 - 5:15	BETHLEHEN STEEL	
12:00 - 5:15 1:15 - 4:45	CONSTRUCTION OF THE FORT MCHENRY TUNNEL US AGRICULTURAL RESEARCH SERVICE	
1:15 - 4:45	PAUL E. GARBER (AIRCRAFT RESTORATION) FACILITY	
1:30 - 2:45	INTERNATIONAL COMMUNICATION SATELLITE	
2:30 - 5:00	THE PENTAGON	
1:00 - 4:00	PROFESSIONAL DEVELOPMENT WORKSHOPS	
1:00 - 2:00	EFFECTIVE SPEAKING FOR PROFESSIONALS	BOARD ROOM
1:00 - 2:00	ASSERTIVENESS AND POWER: STAYING IN CONTROL EMPLOYMENT CONTRACTS AND PATENTS	CAUCUS ROOM
1:00 - 2:00 1:00 - 3:00	ROLE OF TECHNOLOGY IN GOVERNMENT	DIRECTORS ROOM EXECUTIVE ROOM
1:00 - 3:00	THE GRANT SEEKING WORKSHOP	CALVERT ROOM
2:00 - 4:00	MEETINGS MADE SIMPLEAND PRODUCTIVE	BOARD ROOM
2:30 - 4:00	SCHOLARSHIP MANAGEMENT PROGRAM	DIRECTORS ROOM
3:00 - 4:00	ALTERNATIVES TO FULL-TIME EMPLOYMENT	EXECUTIVE ROOM
1:00 - 6:00	MEETINGS	
2:00 - 4:00	CAREER GUIDANCE COMMITTEE	CAUCUS ROOM
3:15 - 6:00	SWE SECTION LEADERSHIP TRAINING	CALVERT ROOM
1:00 - 5:00	FILMS	THE FORUM
1:00 - 1:30	WOMEN'S ROLE IN FLIGHT SUPPORT	
1:30 - 2:15	RESEARCH TO REALITY	
2:30 - 3:00 3:30 - 4:00	UONDERFUL WORLD OF FLAVOR GENERATING SYSTEMS	
4:30 - 5:00	RESEARCH TO REALITY	
1:00 - 6:00	ON YOUR OWN TOURS	INFORMATION BOOTH
6:00 - 8:00	INVITATION ONLY RECEPTION	THE FORM
0.00 - 0:00	(SUE CORPORATION MEMBERS, SECTION PRESIDENTS, 6 STUDENT REPRESE	THE FORUM
6.30 - 10.70	SELECTED EVENING EVENTS IN WASHINGTON	Turn 17 phonograph on all appropri
6:30 - 10:30	OFFICIED FAFIATION FAFIATION THE AUDITIONAL	INFORMATION BOOTH

MONDAY JUNE 18, 1984
BLUE ROOM
WOMEN IN ENGINEERING AND SCIENCE
Dr. A. Kulshrestha, Session Facilitator
Gujarat Women's Economic Development Corp.
India

### A STUDY AND ANALYSIS OF FACTORS INFLUENCING PROFESSIONAL WOMEN ENGINEERS' ATTITUDES & MOTIVATION

## Alla P. Gakuba Doctoral Candidate, George Washington University

The subject of this study is professional women engineers. The objectives of the study is to design factors influencing women engineers' motivation and attitudes toward professional growth and discrimination in organizations.

The Exploratory Model: Utilization of Women Engineers was developed. The Model consists of three parts.

Part I is classified into Opportunity and Ability factors. Opportunity factors are volume of human energy, development of household technology and communications information, government, economic and social. Ability factors are women's performance in engineering schools and engineering fields, and women's possible double role: occupational and maternal.

Part II, Motivational and Attitudinal factors are divided into internal and external. Internal factors are Bachelor's degree field, employment status, primary responsibility, highest degree completed, type of education involved, age group, years of professional experience, marital status, number of children and their ages, salary range, and professional registration. External factors are type of employer, size of employer, number of women engineers in organization, and existence of mentor.

Part III of the Model is utilization of women engineers, and consists of professional growth and discrimination factors.

All parts of the Model are interrelated. Motivational and attitudinal factors acting on opportunity and ability will produce a certain amount of output or utilization of women engineers in organizations.

### TODAY'S PROFILE OF THE WOMAN ENGINEER

### Haydee Hetrick Batelle Memorial Institute USA

A discussion of "The Profile of the Woman Engineer", a biannual publication of the Society of Women Engineers will be given. How SWE gathers statistics of women engineers all over the USA will be explained. The statistics will be used to explain past changes in membership interests and activities, analyze trends, and program for future changes.

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### Jacqueline Julliard Consultant Switzerland

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Lydia G. Tansinsin
National Science and Technology Authority
Phillipines

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### MONDAY JUNE 18, 1984 DIPLOMAT ROOM MEDICINE

Dr. S. V. Bhide, Session Facilitator Cancer Research Center India

### MECHANISMS OF ACTION OF DIETARY FIBERS

Dr. Marie Cassidy George Washington University USA

Epidemiological evidence from diverse societies suggest strong relationships between dietary feeding patterns and the occurrence or absence of so-called "Western diseases" such as arteriosclerosis, colon cancer, diabetes and various gastrointestinal disorders. Based on the premise that the vast array of putative effects on a number of different body systems must originate in stimuli perceived by and acted upon by the only known source of contact, i.e. the gastrointestinal system, we have studied the anatomical, biochemical and physiological features of this system in a rat model. Results obtained to date indicate that the intestinal absorption and hence blood levels of important metabolites such as glucose, cholesterol, amino acids, inorganic ions and trace elements can be significantly modified by fiber ingestion. Underlying mechanisms include structural and functional adaptation of the lining of the stomach and the small and large intestine.

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### Professor Daphne F. Jackson University of Surrey England

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Elaine Golda, Session Facilitator
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## ENGINEERS CAN STRENGTHEN EDUCATION: THE ROOTS OF TECHNOLOGY

Jean Richardson
Jean Richardson and Associates, Inc.
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Industry can loan technically trained people to the schools, retired persons can share their knowledge and we can utilize the by-products of a technical society, such as computers and other video equipment.

A sound educational system is a necessity for our country's survival as a leader in industry. We must insure a great technical future by enacting and participating in educational programs for our country's greatest resource our youth.

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### BETHLEHEM STEEL BALTIMORE, MD S.L. Condon, Host

This bus tour to Baltimore, which is limited to forty people, will visit a steel manufacturing and processing plant. During this heavy industry tour, you will have the opportunity to see close-hand such processes as refining of molten iron in the open hearth furnaces, the casting process, and ingot breakdown into useful shapes. The tour focuses on the basic steel-making processes and the restructuring of the industry through technology modernization to regain the US competitive position. This tour is available on Tuesday afternoon as well.

# FORT McHENRY TUNNEL BALTIMORE, MD K. Merrill, Host

The 1.7 mile (2.8 kilometers) tunnel is under construction to connect highway I-95 under Baltimore's inner harbor. The tunnel, considered to be an engineering achievement, cost almost one billion dollars and will be open to traffic in 1985. This tour is offered Tuesday afternoon as well. Each bus tour to Baltimore is limited to forty people.

### US AGRICULTURAL RESEARCH SERVICE BELTSVILLE, MD M. Fellows, Host

This event is limited to twenty people to take a mini-bus tour of a nationwide research center located on 7,000 acres and divided into institutes for agricultural, animal, horticultural, plant genetics, plant protection, and human nutrition. The tour is offered on Wednesday and Thursday as well.

# PAUL E. GARBER AIRCRAFT RESTORATION WASHINGTON, DC M. Feik. Host

This bus tour is limited to thirty people to visit a facility dedicated to the restoration and preservation of 90 historically significant aircraft from World War I through the Space Age. The tour includes a behind-the-scene look at the restoration workshop for preserving aircraft and other Smithsonian objects. This tour is a must for the mechanical and aerospace engineers as well as the history buffs.

# INTERNATIONAL COMMUNICATIONS SATELLITE WASHINGTON, DC G. Trevitt, Host

A Metro subway tour to this global satellite organization which serves more than 100 countries in transoceanic communication such as: telephone calls, telegrams, telex, transmission of computer data, and international television. The forty-five minute tour includes a film and a tour of the computer facilities. The attendance is limited to 18 people and is offered Monday through Friday. The tour is timed such that you can follow this tour with the Pentagon tours.

### THE PENTAGON WASHINGTON, DC Multiple Hosts

A Metro Subway tour to the executive headquarters of the Department of Defense which is one of the world's largest office buildings. The tour will remove the mystique surrounding the Pentagon and show the wide range of work conducted at this facility. It has army collections, the Hall of Heroes, military women's exhibition, and 17 miles (28 kilometers) of executive officers' corridors. The attendance is limited to thirty-five people and is offered Monday through Friday.

# SWE STUDENT TOUR OF THE US NAVAL ACADEMY AND HISTORIC ANNAPOLIS DEPARTURE FROM THE BLUE ROOM AT 12:45 PM

DEPARTURE FROM THE BLUE ROOM AT 12:45 PM ARRIVE AT THE US NAVAL ACADEMY AT 2:00 PM

### US NAVAL ACADEMY TOUR FROM 2:15 TO 4:30

IN ADDITION TO SEEING THE CADETS, YOU WILL SEE BANCROFT HALL, THE CHAPEL, THE MUSEUM, RICKOVER HALL, AND THE ENGINEERING LABS.

# DINNER AT HUBBARD HALL ON THE SEVERN RIVER FROM 5:00 TO 6:00 HOSTED BY STONE AND WEBSTER ENGINEERING CORPORATION

ROAST BEEF & SLICED BREAD, HAM & HOT BISCUITS, CHEESE & CRACKERS, FRESH VEGETABLES & DIP, PRETZELS & DIP, COOKIES, AND BEVERAGE

# TOUR HISTORIC ANNAPOLIS FROM 6:00 TO 8:30 ROAM THROUGH THE PICTURESQUE STREETS OF THE STATE CAPITOL, VISIT THE HARBOR AREA. SEE THE MARKET HOUSE, MANY SHOPS, AND THE 18TH CENTURY HOMES.

DEPARTURE PROMPTLY AT 8:45 PM FROM GATE 1 OF THE US NAVAL ACADEMY (VISITOR'S ENTRANCE)
AT THE CORNER OF RANDALL STREET AND KING GEORGE STREET.

ARRIVE AT THE SHOREHAM AT 10:00 PM

# MONDAY JUNE 18, 1984 PROFESSIONAL DEVELOPMENT WORKSHOPS Session Facilitators

Suzanne Nagel, AT&T Bell Laboratories Evelyn Weiss, Rockwell International

### ROLE OF TECHNOLOGY IN GOVERNMENT Dr. Gretchen Kolsrud (Moderator) Office of Technology Assessment - US Congress

To meet the challenge of rapidly changing technologies, government programs must be kept responsive, this panel will explain the impact that technology has made on government policies and programs. The prominent women engineers/scientists on the panel will present their views on this subject based on their personal experiences in working for government. A question and answer period will follow after all panel members have spoken.

### ALTERNATIVES TO FULL-TIME EMPLOYMENT Karen Mackall, NASA Lynn Bertuglia, Franklin Associates, Ltd.

There are a number of alternatives to full-time employment which women engineers may consider in order to make time for parenting, pursuit of graduate degrees, or stress relief. These options and the financial, career advancement, child care, and other implications of alternative employment will be discussed by women engineers employed in government and private practice.

### EFFECTIVE SPEAKING FOR PROFESSIONALS

### Paul Beaudry, Beaudry Associates

The Effective Speaking Workshop will cover preparation, organization, use of voice, persuasion and effective reading of papers. It will give you the technique of the 'One-Minute Speech'-how to prepare an extemporaneous speech in one minute. And, if time permits, some tips will be given on the use of audio-visuals, video feedback and microphone techniques.

### MEETINGS MADE SIMPLE...AND PRODUCTIVE

### Karen Archer, AT&T Bell Laboratories

This workshop will explore the skills needed to organize and run effective meetings. It will also cover some enhanced skills and techniques that will make your meetings more participatory and directed. While the topics covered will be applicable to many situations, the focus will be on informal meetings of 2 to 12 people interacting — like a SWE officers' meeting or a project planning meeting on the job.

### ASSERTIVENESS AND POWER: STAYING IN CONTROL

### Sharon Fountain, Performance Development Corporation

Your responsibility is to get the task accomplished! Your job will be easier if you know and understand how to use

your own power to stay in charge of where you are going and how you are going to get there. This workshop will assist you in:

- \* being in control of situations rather than being controlled by them;
- \* saying what you think and feel in a way that others can hear and act on;
- \* accomplishing your goals calmly and effectively through increased awareness of the dynamics of personal and position power.

### THE GRANT SEEKING WORKSHOP Victor Medina, University of Maryland Terry Gideon, SWE Grants Committee

This session entails a brief discussion of SWE's past experience with grant seeking. Additional discussion includes the proper procedure that SWE sections should follow when preparing grant requests. There will be a one-hour presentation on grant seeking and applications, to be followed by a question and answer period.

# WHAT ENGINEERS NEED TO KNOW ABOUT EMPLOYMENT CONTRACTS AND PATENT RIGHTS Stanford Berman, Berman, Alsenberg and Platt

Frequently, engineers do not own or even benefit from their own creative ideas and designs. Corporations often require engineers to sign away their present and future rights. Are these arrangements legal? Enforceable? Fair? This session will address these issues and time will be allocated for questions.

### SCHOLARSHIP PROGRAM MANAGEMENT

### Connie King, Exxon

This program will provide a forum for discussion of the elements of successful scholarship programs. Chairs of section scholarship programs and SWE members interested in starting section scholarship programs are invited to attend.

### CAREER GUIDANCE COMMITTEE MEETING

### Cheryl Collarini, SWE Career Guidance Committee

Annual Career Guidance Meeting to evaluate 1983 programs and formulate 1984 Committee goals. General discussion of section programs, problems, solution. All are welcome to attend.

### SECTION LEADERSHIP TRAINING MEETING

### Barbara Wollmershauser, SWE President

Two delegates from each Section are invited to participate in the Section Leadership Session. This session is planned to develop a better understanding of SWE's national and local goals, resources, organization and programs.

## CASSETTE TAPES OF VII ICWES ARE AVAILABLE !!!

AUDIO-STATS EDUCATIONAL SERVICES IS PLEASED TO OFFER ITS SERVICES FOR CASSETTE DUPLICATION OF THE TECHNICAL SESSIONS AND SELECTED PROFESSIONAL DEVELOPMENT SESSION PRESENTATIONS. CASSETTE DUPLICATES WILL BE AVAILABLE FOR SALE WITHIN ONE HOUR OF THE CLOSE OF THE SESSION. CHECK THE INFORMATION BOOTH FOR MORE DETAILS.

# EVENTS OF THE DAY TUESDAY JUNE 19, 1984

10	ESDAY JUNE 19, 198	3 4
7:00 - 8:00	CONTINENTAL BREAKFAST	PALLADIAN ROOM
7:00 - 8:00	SPEAKERS BREAKFAST (INVITATION ONLY)	CALVERT ROOM
7:00 - 8:00	SWE PAST PRESIDENT'S BREAKFAST (INVITATION ONLY)	COUNCIL ROOM
8:00 - 6:00 PM	REGISTRATION	WEST LOBBY
8:00 - 1:00	SIGN UP FOR EVENING EVENTS & JOB FAIR	INFORMATION BOOTH
9:00 - 10:00	SWE STUDENT REGIONAL MEETINGS	IN GWATTION BOOTH
9:00 - 10:00	REGION I	BOARD
	REGION II	CLUB ROOM A
	RECION III	COUNCIL ROOM
	REGION IV	CLUB ROOM B
	REGION V	CABINET ROOM 163
The second second section is a second section of the second second second second section second seco	REGION VI	KUUN 103
8:15 - 10:00	TECHNICAL SESSIONS	DI HE DOOM
	DEFENSE COMPUTER APPLICATIONS	BLUE ROOM DIPLOMAT ROOM
	ENERGY	PALLADIAN ROOM
10:00 - 10:15	BREAK	
10:15 - 11:25	TECHNICAL SESSIONS (Continued)	
10:15 - 11:00	SWE STUDENT GENERAL MEMBERSHIP MEETING	EXECUTIVE ROOM
11:30 - 1:00	ON YOUR OWN LUNCH	INFORMATION BOOTH
12:00 - 6:00	TECHNICAL TOURS	BLUE ROOM
12:00 - 5:15	CONSTRUCTION OF THE FORT MCHENRY TUNNEL	
12:00 - 5:15	BETHLEHEN STEEL	
12:15 - 6:00 1:00 - 4:00	NATIONAL BUREAU OF STANDARDS  THE GEORGE WASHINGTON UNIVERSITY HOSPITAL	
1:15 - 4:45	CONSERVATION ANALYTICAL LAB	
1:15 - 4:45	DAVID W. TAYLOR NAVAL SHIP RED CENTER	
1:30 - 2:45 2:30 - 5:00	INTERNATIONAL COMMUNICATION SATELLITE THE PENTAGON	
1:00 - 4:00		
1:00 - 2:00	PROFESSIONAL DEVELOPMENT WORKSHOPS SHOULD YOU START YOUR OWN CONSULTING BUSINESS?	EXECUTIVE ROOM
1:00 - 2:00	CAREER TRANSITIONING - ENTRY LEVEL	BOARD ROOM
1:00 - 2:30	CONTINUING TO GROU	CAUCUS ROOM
1:00 - 2:30 2:00 - 3:00	GEARING UP FOR CAREER GUIDANCE I INTERPERSONAL EFFECTIVENESS	DIRECTORS ROOM EXECUTIVE ROOM
2:00 - 3:00	CAREER TRANSITIONING - EXPERIENCED	BOARD ROOM
2:30 - 4:00	GEARING UP FOR CAREER GUIDANCE II	DIRECTORS ROOM
2:30 - 4:00 3:00 - 4:00	CAREER ADVANCEMENT THROUGH PUBLISHING PEOPLE 6 TECHNOLOGY	EXECUTIVE ROOM
3:00 - 4:00	SUCCESSFUL INTERVIEWING	BOARD ROOM
1:00 - 5:00	MEETINGS	
1:00 - 3:00	STRATEGIC PLANNING "SPEAK OUT" SESSION	CLUB ROOM A
1:00 - 5:00	SWE ADVISORY BOARD (INVITATION ONLY) SWE STUDENT TECHNICAL PRESENTATION COMPETITION PRACTICE	CLUB ROOM B TUDOR ROOM
1:00 - 5:00 1:00 - 9:00	JOB FAIR	EMPIRE ROOM
1:30 - 5:00	FILMS	THE FORUM
1:30 - 2:00	IS ANYBODY LISTENING ?	
2:30 - 3:00	STEEL MAKERS	
3:30 - 4:00 4:30 - 5:00	BEYOND HORIZONS AUTONATED MANUFACTURING	
1:00 - 6:00		INFORMATION BOOTH
5:00 - 7:00	MOTOROLA HOSPITALITY SUITE	INFORMATION BOOTH
7:00 - 10:00	HUGHES AIRCRAFT HOSPITALITY SUITE	INFORMATION BOOTH
6:30 - 10:30	TAKE A STUDENT TO DINNER	INFORMATION BOOTH
6:30 - 10:30	SELECTED EVENING EVENTS IN WASHINGTON	INFORMATION BOOTH

TUESDAY JUNE 19, 1984
BLUE ROOM
DEFENSE

Angela Iannuzzeillo, Session Facilitator Transit Office Downsview, Ontario Canada

### A SAFE WAY TO LAND - RAST HELICOPTER HAULDOWN

Elizabeth J. Stanley DAF Indal Ltd. Canada

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# THE EVOLUTION OF THE HERCULES - THE INTERNATIONAL AIRPLANE Kay C. Cornelius

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TUESDAY JUNE 19, 1984
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ENERGY

Marianne A. Musella, Session Facilitator Mobile Research & Development Corporation Princeton, NJ USA

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# HERS: POLUTION CONTROL/ENERGY GENERATION FOR THE CITY OF LOS ANGELES

Margaret B. Umphres James M. Montgomery Consulting Engineers, Inc. USA

Historically, the City of Los Angeles has disposed of sludge generated at the Hyperion Treatment Plant through its 7 mile Metropolitan Area outfall to Santa Monica Bay. As a result of the Los Angeles and Orange County Metropolitan Area (LA/OMA) Sludge Study, the City has designed the Hyperion Energy Recovery System (HERS) not only to remove the sludge from the ocean, but also to make the Hyperion Plant a net energy producer rather than a net user. Currently under construction, the HERS project will dewater 265 tons per day of sludge using solid bowl centrifuge, dehydrate the sludge using the Carver-Greenfield process, combust the dried product in a fluidized bed combustor producing steam, and produce electricity through use of gas and steam turbine units. In addition to eliminating sludge discharge to the ocean, it is estimated that the project will produce a net 7 MW of power.

### METALLIC CONTACTS TO HEAVILY DOPED SI-GE ALLOYS

Dr. K.P. Suleebka University of Roorkee India

The metallic contacts to thermoelectric materials have to be ohmic, possess low resistance, be stable at operating temperatures, have low diffusion into semiconductor material and vice versa and provide high rate of heat conduction. The pollycrystalline Si-Ge thermoelectric generator's operating temperatures are high (up to  $1100^{\circ}\text{C}$ ), and they are heavily doped (carrier concentration  $10^{20}\text{cm}^{-3}$ ). The mechanical contacts are difficult to make because of the requirement of very low contact resistance and of poor adherence of metals to Si-Ge alloy. Out of the many metals tried, sputtered Mo-Au contacts gave promising results.

## WASTE HEAT RECOVERY AND USE FROM COMMERCIAL TRANSFORMERS

Mary Ann Huff Chute Engineering USA

The potential for recovery and use of waste heat from transformers is explored in this report by the Project Design Engineer for the first commercial transformer waste heat recovery project at the Broad Street substation of Seattle City Light. An extensive monitoring system was designed to study the operation and energy saving potential of this waste heat source. Three 75 KVA and four 50 KVA transformer units are fitted with seven oil-to-water heat exchangers which feed a hot water district heating system that will initially supply heat to the Pacific Science Center and expanded to serve other public buildings of Seattle Center. The paper discusses design parameters, challenges, and preliminary data from the two-year monitoring program, as well as looks at the future potential for transformer waste heat recovery.

## ROLE OF WOMEN FOR OPTIMUM UTILIZATION OF SOLAR ENERGY FOR DEVELOPING COUNTRIES

Dr. A. Kulshrestha

Gujarat Women's Economic Development Corporation India

Women form nearly fifty percent of world population and about 45 percent of energy requirement comes from domestic sector stressing the importance of role of women in optimum utilization of solar energy specially for developing countries.

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DEFENSE
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# HERS: POLUTION CONTROL/ENERGY GENERATION FOR THE CITY OF LOS ANGELES

Margaret B. Umphres James M. Montgomery Consulting Engineers, Inc. USA

Historically, the City of Los Angeles has disposed of sludge generated at the Hyperion Treatment Plant through its 7 mile Metropolitan Area outfall to Santa Monica Bay. As a result of the Los Angeles and Orange County Metropolitan Area (LA/OMA) Sludge Study, the City has designed the Hyperion Energy Recovery System (HERS) not only to remove the sludge from the ocean, but also to make the Hyperion Plant a net energy producer rather than a net user. Currently under construction, the HERS project will dewater 265 tons per day of sludge using solid bowl centrifuge, dehydrate the sludge using the Carver-Greenfield process, combust the dried product in a fluidized bed combustor producing steam, and produce electricity through use of gas and steam turbine units. In addition to eliminating sludge discharge to the ocean, it is estimated that the project will produce a net 7 MW of power.

### METALLIC CONTACTS TO HEAVILY DOPED SI-GE ALLOYS

Dr. K.P. Suleebka University of Roorkee India

The metallic contacts to thermoelectric materials have to be ohmic, possess low resistance, be stable at operating temperatures, have low diffusion into semiconductor material and vice versa and provide high rate of heat conduction. The pollycrystalline Si-Ge thermoelectric generator's operating temperatures are high (up to 1100°C), and they are heavily doped (carrier concentration  $10^{20} {\rm cm}^{-3}$ ). The mechanical contacts are difficult to make because of the requirement of very low contact resistance and of poor adherence of metals to Si-Ge alloy. Out of the many metals tried, sputtered Mo-Au contacts gave promising results.

### WASTE HEAT RECOVERY AND USE FROM COMMERCIAL TRANSFORMERS

Mary Ann Huff Chute Engineering USA

The potential for recovery and use of waste heat from transformers is explored in this report by the Project Design Engineer for the first commercial transformer waste heat recovery project at the Broad Street substation of Seattle City Light. An extensive monitoring system was designed to study the operation and energy saving potential of this waste heat source. Three 75 KVA and four 50 KVA transformer units are fitted with seven oil-to-water heat exchangers which feed a hot water district heating system that will initially supply heat to the Pacific Science Center and expanded to serve other public buildings of Seattle Center. The paper discusses design parameters, challenges, and preliminary data from the two-year monitoring program, as well as looks at the future potential for transformer waste heat recovery.

## ROLE OF WOMEN FOR OPTIMUM UTILIZATION OF SOLAR ENERGY FOR DEVELOPING COUNTRIES

Dr. A. Kulshrestha

Gujarat Women's Economic Development Corporation India

Women form nearly fifty percent of world population and about 45 percent of energy requirement comes from domestic sector stressing the importance of role of women in optimum utilization of solar energy specially for developing countries.

# EVENTS OF THE DAY WEDNESDAY JUNE 20, 1984

	DIVERDIAL COME TO, 190	
7:00 - 8:00	CONTINENTAL BREAKFAST	AMBASSADOR ROOM
7:00 - 8:00	SPEAKERS BREAKFAST (INVITATION ONLY)	CALVERT ROOM
8:00 - 6:00 PM	REGISTRATION	WEST LOBBY
7:00 - 6:00 PM	EXHIBITS (LOCATED THROUGHOUT THE BIRD CAGE WALK 6 AMBASSADOR ROOM)	AMBASSADOR ROOM
8:00 - 1:00	SIGN UP FOR EVENING EVENTS IN WASHINGTON	INFORMATION BOOTH
8:00 - 12:00	SWE STUDENT TECHNICAL PRESENTATION COMPETITION	TUDOR ROOM
8:15 - 10:00	TECHNICAL SESSIONS	
	EDUCATION 6 TRAINING POTPOURRI	BLUE ROOM DIPLOMAT ROOM
	NUCLEAR ENGINEERING	PALLADIAN ROOM
10:00 - 10:15	BREAK	
10:15 - 11:25	TECHNICAL SESSIONS (Continued)	
11:30 - 1:00	ON YOUR OWN LUNCH	INFORMATION BOOTH
12:00 - 5:15	TECHNICAL TOURS	BLUE ROOM
12:00 - 5:15	BALTINORE HARBOR TOUR: PLANETARIUM OR AQUARIUM	ococ noon
1:00 - 4:00 1:15 - 4:45	THE GEORGE WASHINGTON UNIVERSITY HOSPITAL	
1:15 - 4:45	U S AGRICULTURAL RESEARCH SERVICE NASA, GODDARD SPACE FLIGHT CENTER	
1:15 - 4:45	POTONAC ELECTRIC POWER	
1:30 - 2:45 2:30 - 5:00	INTERNATIONAL COMMUNICATION SATELLITE THE PENTAGON	
1:00 - 4:00		
1:00 - 2:00	PROFESSIONAL DEVELOPMENT WORKSHOPS IMPLEMENTING A FINANCIAL PLAN	EXECUTIVE ROOM
1:00 - 2:00	EFFECTIVE RESUME WRITING	CAUCUS ROOM
1:00 - 2:00	OPPORTUNITIES FOR WOMEN IN COVERNMENT	DIRECTORS ROOM BOARD ROOM
1:00 - 3:00 2:00 - 3:00	TECHNICAL OR HANAGERIAL ?  INVESTMENT DRESSING FOR SUCCESS	EXECUTIVE ROOM
2:00 - 3:00	BUSINESS & BED & BREAKFAST	CAUCUS ROOM
2:00 - 3:30 3:00 - 4:00	GEARING UP FOR CAREER GUIDANCE III	DIRECTORS ROOM
3:30 - 4:00	CREATIVE FINANCING FOR BUSINESS SKIN CARE	BOARD ROOM DIRECTORS ROOM
1:00 - 5:00	MEETINGS	DIRECTORS ROUT
1:00 - 2:45	SWE FACULTY ADVISORS	The state of the s
1:00 - 5:00	INTERNATIONAL BUSINESS MEETING (PLENARY SESSION)	COUNCIL ROOM CALVERT ROOM
3:00 - 4:00 3:00 - 4:00	WOHEN IN GOVERNMENT COMMITTEE	ROOM 117
3:00 - 4:00	WOMEN IN ACADENIA COMMITTEE SUE MEMBER-AT-LARGE MEETING	CAUCUS ROOM
	THE RESERVE THE PARTY OF THE PA	ROOM 163
1:30 - 5:00	FILMS CONSTRUCTION OF THE FORT MCHENRY TUNNEL (SHOWN ONCE EACH HOUR)	REGENCY BALLROOM
2:00 - 5:00	VISIT YOUR SENATOR OR REPRESENTATIVE (SIGN UP FOR AN APPOINTMENT MONDAY THROUGH WEDNESDAY)	INFORMATION BOOTH
2:00 - 5:00	VISIT THE EMBASSIES (SIGN UP FOR AN APPOINTMENT MONDAY THROUGH THURSDAY)	INFORMATION BOOTH
1:00 - 6:00	ON YOUR OWN TOURS	INFORMATION BOOTH
5:00 - 7:00	MARTIN MARIETTA HOSPITALITY SUITE	INFORMATION BOOTH
5:00 - 7:00	MOTOROLA HOSPITALITY SUITE	INFORMATION BOOTH
6:30 - 7:30	SWE STUDENT BANQUET RECEPTION	AMBASSADOR ROOM
7:30 - 10:30	SWE STUDENT BANQUET	REGENCY BALLROOM
6:30 - 10:30	SELECTED EVENING EVENTS IN WASHINGTON	INFORMATION BOOTH

WEDNESDAY JUNE 20, 1984
BLUE ROOM
EDUCATION & TRAINING
Veronica Gliniak, Session Facilitator
Atlanta, Georgia
USA

## INSTRUCTIONAL TELEVISION (ITV) - THE WAVE OF THE FUTURE

Marilyn Berman University of Maryland, College Park USA

Since the Fall of 1980, the University of Maryland at College Park has offered courses via live television. The ITV system is the only one in the state of Maryland, and only one of a dozen such systems in the nation. The system allows live instruction to be delivered up to a thirty-mile radius of College Park. Additional relay towers can be built or satellites can be utilized to beam the signal to greater distances.

Classes are broadcast live from the campus to on-site specially designed classrooms, and displayed to students on monitors in the ITV on-campus classrooms. Television cameras focus on all facets of the teaching operation so that the classroom atmosphere is successfully created miles away from the actual classroom.

ITV also allows employers to offer employees a continuing education program that is university quality but convenient. There are savings in employee time and travel costs. There is flexibility in the system to accommodate all agency and company needs.

There is the potential to offer degree programs in engineering and other high technology areas to remote regions where this instruction is presently unavailable.

## TRAINING: A KEY TO SUCCESSFUL TECHNOLOGY TRANSFER

Carol L. Aton Georgia Institute of Technology USA

The successful transfer of new technology to a developing country depends heavily on a high quality, well-planned training program. This paper describes the five major steps of training-needs analysis, program design, course and materials development, implementation, and evaluation. The example used is a program conducted by The Georgia Institute of Technology for the Industrial Technology Application Project (ITAP), funded by the U.S. Agency for International Development at the request of the Government of Egypt. Supporting the overall project objective of improving productivity in industry, the training program is designed to increase the trainees' capacities and skills to provide diagnostic and technical services to a variety of Egyptian industries.

## WOMEN ENGINEERS IN INDIA & IMPACT OF WOMEN'S POLYTECHNICS

Ila Ghose Women's Polytechnic India

The technological capability of a nation has great significance for the economic prosperity of the country. As such, technological education and training of a scientific and technical personnel is vital for the economic development of a country and is regarded as an area of high priority in economic planning.

But for a handful of girls from affluent and enlightened families in the urban areas, women's participation and involvement in India's effort in technological development were disappointing in spite of the fact that women were given equal rights and access to all facilities. The vast majority of women remained disinterested due to traditional conservatism of Indian society and other socio-economic factors.

The establishment of women's polytechnics paved the way for the technical education of women in India. The con-

cept of women's polytechnics, where women are joining in great numbers, is rather new.

## THE CONTINUING EDUCATION OF A THOUSAND WOMEN ENGINEERS

Dr. Dormer Ellis, P. Eng. University of Toronto Canada

A questionnaire survey of Canadian women engineers has revealed the salient role played by both formal and self-directed continuing education in facilitating the combination of successful engineering career and satisfying family life. As well as their participation in education al programmes intended for practicing engineers, many women described their personal solutions to the problems peculiar to women in a traditionally masculine profession.

While each woman's experience is unique, there are recurring themes of versatility, determination, and a sense of humour. The women engineers of any nation could easily relate to these Canadian solutions to our common problem of being engineers who are also women.

### TRAINING SYSTEMS FOR DEFENSE PREPAREDNESS

Annette Gethwright Honeywell, T&CSO USA

The biggest challenge facing the Military today in defense preparedness is training equipment operators and maintenance personnel. One solution to providing adequate training for today's sophisticated equipment is to use training pilots, navigators, sonar and weapons operators, and maintenance personnel for this equipment. A basic training system consists of a computer system and appropriate input and output equipment that monitors the actions of the trainee and responds to those actions using algorithms and mathematical models describing the system being simulated. Training systems include physical aspects such as aural and visual stimuli as well as environmental and mechanical simulation depending on the degree of realism required to provide appropriate training cues.

WEDNESDAY JUNE 20, 1984 DIPLOMAT ROOM POTPOURRI

Gail Worthington, Session Facilitator Boeing Aerospace Corporation Seattle, WA USA

### **WOMEN SCIENTISTS IN INDIA 1947 - 1984**

Dr. S.V. Bhide Cancer Research Center India

The last fifty years have seen a dramatic change in womens' status in India. In the first quarter of this century women were confined to cooking and house-keeping chores. They were entirely dependent on the menfolk in the family. However, with the advent of education in India both men and women had access to modern education, science and technology. From 1945 till 1970 women still chose humanities, few of them science, at the universities. However, the last decade has seen Indian women working in all branches of science and technology which includes conventional branches of engineering, space technology, technology, computer and bio-medical technology. Irrespective of the type of specialization women engineers and scientists constitute 25% of the workforce. Many of them are leaders of scientific and technological personnel working at times in field services. Data on the above will be presented with special reference to socio-economic effects of the society.

## APPLICATION OF PARTICIPATORY WORK SCHEMES IN A RESEARCH AND ENGINEERING ENVIRONMENT

Mary Ann Zimmerman Cummins Engine Company, Inc. USA

This paper describes the effects of strategies used to implement participatory work schemes in the Research and F.-gineering Division of a multinational corporation association.

ted with the Automotive industry. The implications of their "New Standards of Excellence" philosophy on the manner in which work is done to design the Company's main product, diesel engines, is described.

#### **PROGRAMMABLE CONTROLLERS**

Deborah A. Kaylo Bechtel Power Corporation USA

The Programmable Controller (PC) is a solid state control system which has a programmable memory which stores instructions thereby implementing specific functions. The functions include: I/O control logic, timing, counting, arithmetic and manipulation of data.

The PC is composed of a central processor, I/O interface, memory, and programming devices. The PC was designed precisely for industrial control system applications and performs much the same as a relay panel or a hard wired solid state logic system. The utilization of the PC will allow the manufacturing and the power industry to achieve greater control.

### TECHNOLOGICAL CONDITIONS OF MODERN ARCHITECTURE

Olga Vujovic Yugoslavia

Changes in architectural expression appeared with the coming of the Industrial Revolution at the end of the last century. The invention of reinforced concrete and steel were a great challenge for architects. Technological possibilities of moulding the new materials were the basis for a new architectural expression which is universal. The technology was improving and developing: the Crystal Palace of Paxton, P. L. Nervi's shells, glass skyscrapers...However, for the architecture to be of lasting value besides the technical achievements a spark of humanity and harmonious design are necessary. A thorough knowledge of technology and the technical possibilities are a prerequisite of successful, valuable and up-to-date architectural design. The above is going to be illustrated with examples of Yugoslav modern architecture.

### ADJUSTABLE SPEED DRIVES FOR EXISTING MOTORS

MANNI WONG
Bechtel Power Corporation
USA

Most of today's motor drives, expecially drives for fans and pumps, were designed to operate at rated speed regardless of changes in the load. Controlling the operating speed of the equipment to meet the load demand offers advantages such as energy savings and increased equipment life. Recent developments in power electronics have made adjustable speed drives more efficient and cost competitive.

This paper will discuss adjustable speed drives for existing motors as follows:

INTRODUCTION: Energy savings, increased equipment life and other operating characteristics have renewed the interest in adjustable speed drives.

THEORY OF OPERATIONS: Three types of solid state drives and two types of electromechanical drives will be discussed and compared.

RECENT DEVELOPMENTS: Recent developments in power electronics have improved the designs for current source inverters, voltage source inverters with PWM and GTO inverters.

FUTURE TRENDS

WEDNESDAY JUNE 20, 1984
PALLADIAN ROOM
NUCLEAR ENGINEERING
Ada Pressman, Session Facilitator
Bechtel Power Corporation
USA

# OECD LOFT PROJECT: BUILDING AN INTERNATIONAL NUCLEAR RESEARCH PROGRAM Kristen R. Thompson EG&G Idaho, Inc.

In 1983, the Organization for Economic Cooperation and Development (OECD) in conjunction with the United States Department of Energy (DOE) organized an international consortium. This consortium established the OECD Loss-of-Fluid Test (LOFT) Project at the Idaho National Engineering Laboratory (INEL). This project would undertake research that is intended to improve the understanding and predictability of transient behavior in pressurized water reactors (PWRs) for the international nuclear community. Common experimental goals have been established that will enhance the reliability, availability, economics, and safety of PWRs. This paper will discuss the research program being conducted and the communication skills necessary to cross the international technology bridge in nuclear power development.

### HIGH LEVEL RADIOACTIVE WASTE TREATMENT

Karen L. Williams EG&G Idaho, Inc. USA

An important and controversial aspect of the U.S. nuclear energy program is proper management of the high-level radioactive waste created by nuclear facilities. This paper presents the current status and future plans for waste treatment in the U.S., and compares our program with programs of other nations.

The U.S. Department of Energy, here at its Idaho National Engineering Laboratory (INEL), is actively pursuing waste management alternatives. The INEL's recently completed (September, 1982) calcining facility is the nation's only full-scale production plant to solidify high-level liquid radioactive wastes. The new fuel dissolution and storage plant (expected 1984 completion) at the INEL will also include valuable technological advances in radioactive waste treatment methods, and will pay for itself within five years of operation. The paper will discuss these new facilities and their contribution to state-of-the-art treatment of radioactive wastes in the U.S. These treatment processes pave the way for future long-term (i.e. thousands of years) storage capability.

# NUMERICAL MODELING OF WELDING IN THE NUCLEAR POWER INDUSTRY Carolyn J. Einerson EG&G Idaho, Inc. USA

Welding procedures for use in the nuclear power industry are expensive to develop. Optimization of procedure development presently depends strongly on the skill and intuition of the resident welding engineer. This method is critical because errors have the potential of causing ex-

### A SPECIAL THANKS

U. S. POST OFFICE - HANOVER, MARYLAND

IN RECOGNITION FOR THE SUPPORT AND ADVICE WITHOUT WHICH THE VII ICWES COMMITTEE COULD NOT HAVE SURVIVED.

pensive system failures. Computer aided design (CAD) techniques would greatly benefit the nuclear industry in terms of safety, increased productivity, and cost savings, but have not been fully developed due to a lack of critical basic information. There are several fundamental parameters involved in welding processes which need to be understood in order to develop a model that predicts the outcome of a weld. The parameter that has been studied in this work is the shape of the heat flux distribution across the workpiece from a gas tungsten arc. The shape of the flux is important because it plays a large role in determining weld bead width and penetration. Experiments have been performed to determine the heat flux distribution by striking the front surface of a very thin anode with a gas tungsten arc. An AGA thermovision camera records the amount of infra-red radiation leaving the backside of the anode from which the heat flux distribution can be derived by numerical analysis.

### NUCLEAR ENERGY AND THE THIRD WORLD

### Nezhat N. Vaziri Iran

The last decade has seen an increasing worldwide commitment to the utilization of nuclear power plants as a source of electricity. Nuclear generating capacity is projected to grow from the current lovel of about 169000 MW(e) to over 1500 GW (e) by the year 2000.

Annual fuel requirements are projected to increase from about 45000 t.  $U_3O_8$  to almost 160,000 by the year 2000. Reasonably assured resources of US \$ 800kg  $U_3O_8$  have been estimated at 1747,000 and estimated additional resources at the same cost total about 1605,000t.

About 98.7% of the world nuclear electricity is produced by 15 industrial and centrally planned economy countries (excluding China). Latin-America, Africa and Asia (excluding China, Japan, and USSR) produce about 44.2% of estimated resources of US\$ 80/kg U308, and 36% of world annual production which produces only 1.3% of the world's nuclear electricity.

Present evidence on the distribution of uranium deposits show that the majority occur in association with precambrian rocks or in tectonically distributed phanerozoic rocks immediately overlying the basement. Most of the known uranium deposits in the world were formed before the continental drift. These deposits are located within the feological environment of the huge ancient continent of Gondwana. Most of the third World countries are located in Gondwana-Land, and nearby regions. Geological setting, metallogenic history, and structural processes show that there are favourable conditions for different types of uranium mineralization.

By considering the explored uranium in Europe and North America and their time-capital investment the necessity for more exploration activities should be planned in the Third World.

It is hoped that scientifically planned exploration programmes in carefully selected areas may bring to light larger potential deposits of uranium, and bring about a very important role in energy policy for the Third World in the future.

## POSTIRRADIATION EXAMINATION OF EXPERIMENTALLY TESTED PWR FUEL BUNDLE

Lois C. Van Deusen EG&G Idaho, Inc. USA

A thirty-two rod experimental, pressurized water reactor fuel bundle was tested in the Power Burst Facility at the Idaho National Engineering Laboratory as part of the International Severe Fuel Damage Research Program. After testing, the bundle was examined in a shielded, remote handling facility to determine the condition of the bundle after a severe reactor transient. This paper presents a description of the specially designed remote handling tools and techniques used in the postirradiation examination of this bundle. This equipment and procedures will be used in subsequent in-reactor tests in this internationally funded test series.

### TECHNICAL TOURS

THESE TECHNICAL TOURS ARE DESIGNED TO SHOW WHAT HAS BEEN DONE IN THE LAST QUARTER CENTURY TO BENEFIT TECHNOLOGICAL DEVELOPMENT AND TO INCREASE THE STANDARD OF LIVING. EACH TOUR IS UNIQUE AND EACH SHOWS THE DIFFERENT TRENDS IN FUTURE DEVELOPMENTS. THE TOURS ARE DESIGNED TO OFFER A GOOD INDUSTRIAL OR SCIENTIFIC PERSPECTIVE OF THE INDUSTRY TO THE NOVICE AS WELL AS PROVIDE A FORUM FOR DETAILED EXAMINATION AND INTERACTION FOR THE EXPERT IN THE FIELD. THE TOURS IN THE BALTIMORE AREA ALSO OFFER A LOW COST OPPORTUNITY TO VISIT BALTIMORE'S FAMOUS HARBORPLACE PAVILIONS - AN INDOOR FESTIVAL OF 140 SHOPS AND RESTAURANTS LOCATED IN THE SCENIC INNER HARBOR.

### HARBORPLACE/MARYLAND SCIENCE CENTER BALTIMORE, MD Multiple Hosts

The tour to the Baltimore Inner Harbor includes an on your own lunch at the famous Harborplace with its 140 shops and restaurants coupled with the Maryland Science Center and the Davis Planetarium. The planetarium offers a broad range of programs ranging from the traditional constellation shows to an innovative glimpse of the universe. This tour is also offered on Thursday.

### HARBORPLACE/AQUARIUM BALTIMORE, MD Multiple Hosts

A second tour to the Baltimore Inner Harbor includes an on your own lunch at the famous Harborplace with its 140 shops and restaurants and the Baltimore Aquarium. The aquarium is the largest and the most sophisticated aquarium in the US. It has a 7 story structure, houses over 5000 creatures, and contains over one million gallons (3.8 million liters) of water. As you spiral through the structure, you are surrounded by a dazzling array of aquatic life; you can stop in the petting zoo, stand side-by-side brilliant macaws, whitefaced tree ducks, and

unflappable two-toed sloths in the Rain Forest, and enter the silent depths of the 220,000 gallon Open Ocean Tank where you'll gaze in wonderment at Lemon sharks, Bull sharks, Tiger sharks, Sandbar sharks, and large game fish all swimming endlessly around you. You must see it to believe it. This tour is also offered Thursday.

If space permits, you may purchase a bus ticket and spend all your time shopping and eating at Baltimore's Harborplace. Check at the Information Booth.

# GEORGE WASHINGTON UNIVERSITY HOSPITAL WASHINGTON, DC M. Bombaci, Host

A tour through the various hospital departments, including the computers, will focus on where the high technology equipment can be found in a medical application. Computer analysis and instrumentation associated with blood analysis, cardiology, EKG and stress, radiology and cancer virus will be featured.

# EVENTS OF THE DAY THURSDAY JUNE 21, 1984

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7:00 - 8:00	CONTINENTAL BREAKFAST	AMBASSADOR ROOM
7:00 - 8:00	SPEAKERS BREAKFAST (INVITATION ONLY)	CALVERT ROOM
7:00 - 8:00	SWE FELLOWS BREAKFAST (INVITATION ONLY)	COUNCIL ROOM
8:00 - 6:00 PM	REGISTRATION	WEST LOBBY
7:00 - 6:00 PM	EXHIBITS (LOCATED THROUGHOUT THE BIRD CAGE WALK & AMBASSADOR ROOM)	AMBASSADOR ROOM
8:00 - 1:00	SIGN UP FOR EVENING EVENTS IN WASHINGTON	
8:15 - 9:00 PM	SWE BOARD OF TRUSTEES MEETING	INFORMATION BOOTH
		ROOM 463
8:15 - 10:00	TECHNICAL SESSIONS  EFFECTS OF TECHNOLOGY ON SOCIETY	BLUE ROOM
	SOFTWARE ENGINEERING	DIPLOMAT ROOM
41 15 y met assettus 'el	OUR PLANET EARTH	PALLADIAN ROOM
10:00 - 10:15	BREAK	
10:15 - 11:25	TECHNICAL SESSIONS (Continued)	
11:30 - 1:00	ON YOUR OWN LUNCH	INFORMATION BOOTH
12:00 - 5:15	TECHNICAL TOURS	BLUE ROOM
12:00 - 5:15	DIETHOR THROW, TOWN, TERRETHEATH ON PROPERTOR	BLUE RUUN
1:15 - 4:45 1:15 - 5:15	US AGRICULTURAL RESEARCH SERVICE NATIONAL BUREAU OF STANDARDS - FIRE RESEARCH	
1:15 - 4:45	DAVID W. TAYLOR NAVAL SHIP RGD CENTER	
1:15 - 4:45 1:30 - 2:45	NATIONAL INSTITUTE OF HEALTH INTERNATIONAL COMMUNICATION SATELLITE	
2:30 - 5:00	THE PENTAGON	
1:00 - 4:00	PROFESSIONAL DEVELOPMENT WORKSHOPS	
1:00 - 2:00 1:00 - 2:30	FIELD ASSIGNMENTS ENGINEERING/CONSTRUCTION INDUSTRY SEXUAL HARASSMENT AT THE WORKSITE	DIRECTORS ROOM
1:00 - 3:00	DUAL CAREER ISSUES	BOARD ROOM EXECUTIVE ROOM
1:00 - 3:00 2:00 - 3:00	EFFECTIVE COMMUNICATIONS WORKSHOP ASME CODES 6 STANDARDS	CAUCUS ROOM DIRECTORS ROOM
2:30 - 3:30	THIS THING CALLED STRESS	BOARD ROOM
3:00 - 4:00 3:00 - 4:00	ASSESSING THE MANAGEMENT FAST TRACK ASSERTIVENESS 6 POWER: STAYING IN CONTROL	EXECUTIVE ROOM
3:00 - 4:00	RULES OF ENVIRONMENTAL PROTECTION IN THE US EPA	CAUCUS ROOM DIRECTORS ROOM
1:00 - 3:30	MEETINGS - PROVISIONAL REGION	Thought The Market St.
1.00 5.50	REGION A CABINET ROOM REGION F PALLADIAN ROOM	A
	REGION B CLUB ROOM A REGION G PALLADIAN ROOM REGION C CLUB ROOM B REGION H ROOM 117	8
	REGION D COUNCIL ROOM REGION I ROOM 163	
THE PERSON NAMED IN COLUMN	REGION E DIPLONAT ROOM REGION J TUDOR ROOM	
1:30 - 5:00	FILMS AUTOMATED MANUFACTURING	THE FORUM
1:30 - 2:00 2:30 - 3:00	BEYOND HORIZONS	
3:30 - 4:00	IS ANYBODY LISTENING?	
4:30 - 5:00 2:00 - 5:00	STEEL MAKERS VISIT THE EMBASSIES	
Cinoni bearing to the	(SIGN UP FOR AN APPOINTMENT HONDAY THROUGH THURSDAY)	INFORMATION BOOTH
1:00 - 6:00	ON YOUR OWN TOURS	INFORMATION BOOTH
7:30 - 9:30	TEKTRONIX HOSPITALITY SUITE	THE FORUM
5:30 - 7:30	FOPW RECEPTION HONORING WOMEN IN AEROSPACE	INFORMATION BOOTH
5:00 - 7:00	EG&G IDAHO HOSPITALITY SUITE	INFORMATION BOOTH
6:30 - 10:30	SELECTED EVENING EVENTS IN WASHINGTON	INFORMATION BOOTH

THURSDAY JUNE 21, 1984
BLUE ROOM
EFFECTS OF TECHNOLOGY ON SOCIETY
Sharon Henderson Babb, Session Facilitator
Atlanta, Georgia
USA

### ENGINEERING, WORK, AND NEW TECHNOLOGY

### Rosemary West Loughborough University England

More than anything else, the practical utility of the products of engineering skill has contributed towards a higher living standard with less toil. In earlier centuries less toil must have been an almost unmitigated blessing but continued erosion of the number of man-hours of paid work due to faster and more pervasive developments in electronic technology require a more fundamental re-appraisal of the various social and technological factors. To quote from A. E. Cawkell, "Engineers should make it their business to understand the issues and publicize the accumulating evidence about trends in this revolution."

Various stages in the electronic revolution, both existing and projected, are charted with emphasis upon the part which women engineers and scientists have to play in accentuating the positive contributions and minimizing the harmful effects of the new technology.

## EVOLUTION OF COMPETITIVE TELECOMMUNICATIONS IN THE USA

# Becki Wright AT&T Communications USA

Gone are the days when you could just drop by "the phone company", and get your phone equipment, your local and your long distance service all from one company. Today you can buy a phone at your local department store, order your local phone service from one company, and order long distance service from any number of other companies.

This session will present a brief history of the events in the telecommunications industry leading up to the breakup last January of A.T.& T. - "the biggest company in the world" and discuss what the future may hold for you and your phone in the United States.

# RECENT DEVELOPMENT OF COMMUNICATIONS & SOCIOLOGICAL ASPECTS OF THIS DEVELOPMENT PARTICULAR REFERENCE TO IRAN

### M.M. Rahmani International Centre of Theoretical Physics Iran

It is indeed an interesting exercise to correlate the growth of the modern civilization with landmarks of discoveries, inventions in electronics and telecommunication. The range of human communication has expanded through many orders because of the successful developments in telegraph, telephone, radio, TV and now satellite systems. The present status of telecommunication is easily visualized by going through the progress made in the last two decades.

The changing social needs and the development of new technology are bringing the evolution of new communication capabilities, e.g., Videotex, Electronic Mail, Teleconferencing and interview CATV. These are also leading to automated offices and wired homes, where most of the future information will be generated, processed and utilized for running the industries, businesses and the government, and for education and recreation.

Sociological aspects of modern communication are of great importance and are discussed with special reference to Iran.

### A BRIDGE TO THE FUTURE

B.K. Krenzer USA

Revolutions come and go. The current High-Tech Revolution is beginning to cause problems like those generated by its predecessor, the Industrial Revolution. Before those problems become solidified into the system we need to seek out and define the undesirable side effects of the technology revolution; to consider how serious these side effects may be; to decide what "fixes" are possible and profitable to pursue; and finally to determine how, when, and where to implement those "fixes."

### COMPUTERS: TODAY & TOMORROW

### Kamala Balaraman Bohabha Atomic Research Centre India

Computers, one of the most spectacular developments in the fields of science and technology of this century, have come to stay, both in the developed and the developing Their use, if ever, is on the increase in every field of human endeavour, such as communication, information handling, mining, medicine, engineering, etc., not to talk of basic research in the sciences where it is an essential component. In the recent past, computers have been tried successfully as educational aids in primary and secondary schools, not only in USA and other developed nations but in India, too. Computer experts come up every day with newer and newer avenues for the exploitation of the 'computer potential'. The 'tomorrow' computers is, at once, fantastic and staggering; at times, even worrying. The impact of such giant strides in this field has necessarily an effect on the economic and sociological structures of any society. An attempt is made to discuss all these aspects, particularly from the point of view of a developing nation vis-a-vis that of a developed one.

THURSDAY JUNE 21, 1984
DIPLOMAT ROOM
SOFTWARE ENGINEERING
Sharon Loeffler, Session Facilitator
Dowell Inc.
Tulsa, OK USA

### SOFTWARE ENGINEERING

Diane B. Revell Mitre USA

Software engineering is one of the newest fields of engineering. As computers have become more commonplace and as their capabilities have increased, the need for software engineers has grown. The software engineer applies the principles of computer science to the design, implementation, testing, and maintenance of computer programs.

Three main points are covered: the need for software engineers, the work performed by software engineers, and the education and certification of software engineers.

### FUNDAMENTALS OF COMPUTER SECURITY

### Dr. Francis M. Berting Westinghouse Hanford USA

Protection of an organization's data must now include the protection of mini and microcomputers, software, stored data and printed reports. Management, as well as users, must become aware of potential vulnerabilities and available safeguards. These vulnerabilities are surveyed, from minor equipment failure to major disasters, from accidental errors to large-scale vandalism. An approach to estimating the probability of pertinent threats and harms is described. Preventive measures involving physical environment, operating system and organizational procedures are presented with emphasis on cost/benefit evaluation.

### AN OVERVIEW OF SOFTWARE TESTING

Marilee J. Wheaton
The Aerospace Corporation
USA

Software has become a major component in aerospace systems, comprising almost eighty percent of the total cost of the system. It is imperative that the software be completely reliable in order to meet mission requirements. Only through extensive software testing, can one be assured that the software will perform its intended functions. An overview of software testing is presented and five major areas are covered: the philosophy of software testing, software testing strategies, program test methods, automated test tools, and current research and future trends in the area of software testing. An alternative approach to the current method of ensuring software quality is emphasized. Instead of checking the final product for software quality, assure that the quality is initially built into the product by introducing software testing methodologies earlier in the software development cycle.

### ADA - PAST, PRESENT, AND FUTURE

Elizabeth Strong Honeywell USA

This paper will present an overview of Ada, the new programming language sponsored by the U.S. Department of Defense. The paper will discuss the origins, the current status, and a scenario of the future for Ada.

The software crisis was the motivation for the development of Ada. A standard, high-order programming language was perceived to be a solution to the crises, and thought to provide a tremendous cost savings through the portability and re-usability of standardized software. An engineering approach was taken to the process of designing this new language. This paper will provide a brief history of the development of Ada, and will highlight the international aspects of the Ada effort.

Ada is a state-of-the-art programming language with features that address the issues of software reliability and maintainability, and support modern software design principles. Standardization is the cornerstone of the Ada effort, and it extends beyond the language itself and into the area of the software tool environment. Ada is currently an ANSI standard. A validation test suite has been established and a few validated compilers are available.

The future for Ada? Perhaps the beginnings of a software components industry.

## COMPUTER SYSTEMS ANALYSIS - AN EXERCISE FOR SHERLOCK HOLMES

Shivran Siddhu

Stone & Webster Engineering Corporation USA

Manpower turnover in the computer system design and programming causes junior programmers to have the responsibility to maintain systems. This results in a frustrating experience and a question common to both management and the computer system users. The question: What is the scope of the system? Sherlock Holmes, the computer systems analyst, is called in to investigate and give a report. The simplified and the comprehensive method used by the author to analyze the system are dealt with.

Section I deals with the detailed documentation which includes summary, flow charts, file description, off data sets, data dictionary of key terms, sample input documents, and report samples.

Section II deals with a comprehensive method to subgroup the systems developed by the author. It also deals with relationship charts between reports and programs, and reports and procedures. Thus it summarizes for the computer system users the detailed system documentation.

Section III is a comprehensive report of Sherlock Holmes to the management.

THURSDAY JUNE 21, 1984
PALLADIAN ROOM
OUR PLANET EARTH
Helen Grenga, Session Facilitator
Georgia Institute of Technology
USA

### RECENT TRENDS IN WATER WAVE RESEARCH

Dr. Helene R. Schember TRW USA

Progress in the familiar environmental field of water waves has taken the form of a number of diverse trends. This paper describes a selection of exciting theoretical, numerical and experimental advances in our understanding of waves in water. Included in this presentation will be a discussion of the following active research topics: Satellite measurements of ocean waves using active microwave sensors such as the scatterometer, altimeter and synthetic aperature radar; the effects of non-linearity and weak non-linearity on waves through wave-wave interactions and bottom topography; the generation of waves by wind and wind-wave coupling; very steep waves and breaking waves.

# TOXIC CHEMICAL WASTE DUMPS IN AN INDUSTRIAL CIVILIZATION; PLANET EARTH, USA, MASS. Yee Cho

Massachusetts Dept. of Environmental Quality Engineering USA

High technology industries (i.e., electronics, computers) have grown rapidly in Massachusetts. The number of identified abandoned hazardous waste sites has also grown to over 100 in the state. Sixteen of these sites are on the national priority list for federal cleanup actions. In this nation of 50 states, Massachusetts has the eleventh largest number of sites in this priority list. In comparison, this industrial state has one of the smallest land areas in the nation.

This report will analyze first what these abandoned toxic dump sites are, especially in their relationshiop to the number and types of industries in the state. Secondly, it will reveal the nature of these toxic sites—are they abandoned drums and barrels dangerously oozing toxic and reactive chemicals? Or, are they ponds and lagoons of hazardous and toxic chemicals in open fields? Or, are they simply layers of rainbow colored soil resting on top of underground drinking water systems and bordering the recreational lake and river systems? And, finally, it will examine the technologies available to address gross contamination of this planet, and the technologies Massachusetts has employed in addressing these sites.

### HIGH PERFORMANCE LIQUID CHROMATOGRAPHY: ITS APPLICATION IN ENVIRONMENTAL ANALYSIS N. Thakkar & V.H. Kondawar

National Environmental Engineering Research Institute India

To the Environmental Scientist HPLC (High Performance Liquid Chromatography) is a technique for separating organic pollutants from complex mixtures occuring in air, water or soil. HPLC can help determine the number of pollutants in a mixture, how much of each pollutant is present and the purity of the sample. It is a fast, precise and economical technique for detecting organic pollutants. A basic HPLC system is illustrated. An example of the application of HPLC is the analysis of carbamates without the additional complexity of a derivitization step. A reversephase liquid chromatographic method with UV detection is described for the trace determination in water of selected carbamate class agricultural pesticides. A UV 254 detector is operated. Calibration curves are linear over a wide range of sample concentration (ppb to ppm). Detection limits in the range of 150-400 pg (signal/noise ratio 2:1) have been obtained for test carbamates, corresponding to sample concentration of nearly 10-15 ppb. Detection limits are controlled by "pump" noise resulting from fluctuations in background current.

### GEOLOGY, THE CORNERSTONE OF A CITY

### Mary Ellen Russell Consultant, University of Washington

USA Modern cities develop where a balance of geological factors related to agriculture occur, such as water supply, transportation and natural resources. Industrialization, based on cheap energy, introduced suburban living. Cities expanded into areas having resources necessary for growth and often unfavorable geologic conditions. The move underground to tunnels for sewers and water supply, then parking, transportation and shopping malls, aggravates the problem. Man's advanced technology has enabled him to perform engineering feats, formerly thought to be impossible, but emphasis has been on accomplishment with little heed to conditions lending to an environmental aftermath.

A few North American cities have comprehensive geological studies. More information is available in public agencies and should be retrieved before it is destroyed. Computer technology could develop and update a data base to be used by Geologists working with Engineers for competent planning. Expanded country-wide, indeed Geology would become the Cornerstone of all cities.

### WISCONSIN INTEGRATED EMERGENCY MANAGEMENT SYSTEM (IEMS) Sharon A. Carroll

Wisconsin Department of Administration

A narrative and slide presentation on the program developed in Wisconsin by the Division of Emergency Government.

This is a Nationwide program that is Federally funded. Wisconsin has taken the lead in establishing an integrated system of emergency management. The presentation describes Wisconsin's program and types of emergencies that occur in the state and throughout the world.

### ELAIOGRAPHICAL INVESTIGATIONS OF AUTOCHTONOUS CULTIVARS OF OLIVES IN SUBREGION OF BOKA

KOTORSKA

Dr. Ksenija Miranovic Agricultural Institute Yugoslavia

The region of olives in Montenegro is composed of two specific subregions, differing from each other by the ecological conditions, structure of cultivars and by the level of applied agrotechniques. Territorially, the subregion of Bar consists of the following communities: Budva and Ulcinj with 56% of the total number of trees, and the region of Boka Kotorska with the following communities: Herceg Novi, Kotor and Tivat, with 44% of trees.

In the entire Adriatic coastal area of olives, it is necessary to extend the structure of sortiment including also some quality cultivars, which are being examined in groves - collections. In that, the more valuable domestic sorts, which are well adapted to existing ecological conditions, should also in future be represented in the assortment.

### TECHNICAL TOURS

THESE TECHNICAL TOURS ARE DESIGNED TO SHOW WHAT HAS BEEN DONE IN THE LAST QUARTER CENTURY TO BENEFIT TECHNOLOGICAL DEVELOPMENT AND TO INCREASE THE STANDARD OF LIVING. EACH TOUR IS UNIQUE AND EACH SHOWS THE DIFFERENT TRENDS IN FUTURE DEVELOPMENTS. THE TOURS ARE DESIGNED TO OFFER A GOOD INDUSTRIAL OR SCIENTIFIC PERSPECTIVE OF THE INDUSTRY TO THE NOVICE AS WELL AS PROVIDE A FORUM FOR DETAILED EXAMINATION AND INTERACTION FOR THE EXPERT IN THE FIELD. THE TOURS IN THE BALTIMORE AREA ALSO OFFER A LOW COST OPPORTUNITY TO VISIT BALTIHORE'S FAMOUS HARBORPLACE PAVILIONS - AN INDOOR FESTIVAL OF 140 SHOPS AND RESTAURANTS LOCATED IN THE SCENIC INNER HARBOR.

### HARBORPLACE/MARYLAND SCIENCE CENTER BALTIMORE, MD **Multiple Hosts**

The tour to the Baltimore Inner Harbor includes an on your own lunch at the famous Harborplace with its 140 shops and restaurants coupled with the Maryland Science Center and the Davis Planetarium. The planetarium offers a broad range of programs ranging from the traditional constellation shows to an innovative glimpse of the universe.

### HARBORPLACE/AQUARIUM BALTIMORE, MD Multiple Hosts

A second tour to the Baltimore Inner Harbor includes an on your own lunch at the famous Harborplace with its 140 shops and restaurants and the Baltimore Aquarium. The aquarium is the largest and the most sophisticated aquarium in the US. It has a 7 story structure, houses over 5000 creatures, and contains over one million gallons (3.8 million liters) of water. As you spiral through the structure, you are surrounded by a dazzling array of aquatic life; you can stop in the petting zoo, stand side-by-side brilliant macaws, whitefaced tree ducks, and unflappable two-toed sloths in the Rain Forest, and enter the silent depths of the 220,000 gallon Open Ocean Tank where you'll gaze in wonderment at Lemon sharks, Bull sharks, Tiger sharks, Sandbar sharks, and large game fish all swimming endlessly around you. You must see it to be-

If space permits, you may purchase a bus ticket and spend all your time shopping and eating at Baltimore's Harborplace. Check at the Information Booth.

### US AGRICULTURAL RESEARCH SERVICE BELTSVILLE, MD M. Fellows, Host

This event is limited to twenty people to take a mini-bus tour of a nationwide research center located on 7,000 acres and divided into institutes for agricultural, animal, horticultural, plant genetics, plant protection, and human nutrition.

### NATIONAL BUREAU OF STANDARDS GAITHERSBURG, MD S. Davis, Host

The fire research tour will feature the test tunnel where performance of materials against fire and heat is studied to determine the optimum resistivity and economical thickness of material. The computer facility where analytical models are being developed for exotic materials will also be shown. The laboratory develops information on the rate of heat, the flame spreading characteristics, and the movement of smoke and toxic gases during the performance of materials in the fire environment.

### DAVID W. TAYLOR NAVAL SHIP RESEARCH BETHESDA, MD Capt. Gauthey, Host

The center conducts research on ship's performance, design of high strength materials, construction of new models, instrumentation, improvements in aerodynamics,

# EVENTS OF THE DAY FRIDAY JUNE 22, 1984

7:00 - 8:00	CONTINENTAL BREAKFAST	PALLADIAN ROOM
7:00 - 8:00	SPEAKERS BREAKFAST (INVITATION ONLY)	CALVERT ROOM
7:00 - 8:15	"FY 84 CHARTERED SECTIONS" BREAKFAST (INVITATION ONLY)	COUNCIL ROOM
8:00 - 3:00 PM	REGISTRATION	WEST LOBBY
8:00 - 1:00	SIGN UP FOR EVENING EVENTS IN WASHINGTON	INFORMATION BOOTH
8:15 - 10:00	TECHNICAL SESSIONS	
	APPLIED MATHEMATICS	BLUE ROOM
	MANUFACTURING	DIPLONAT ROOM
10:00 - 10:15	TRANSPORTATION	PALLADIAN ROOM
10.00 10.15	BREAK	
10:15 - 11:25	TECHNICAL SESSIONS (Continued)	
11:30 - 12:30	MEET SWE'S LEGAL COUNSEL (AN INVITATION TO CSR MEMBERS)	PRESIDENT'S SUITE
11:30 - 1:00	ON YOUR OWN LUNCH	INFORMATION BOOTH
11:45 - 5:00	POTOMAC EXCURSION	BLUE ROOM
1:15 - 5:00		Ni durban dorata
1:15 - 4:45	TECHNICAL TOURS  NASA, GODDARD SPACE FLIGHT CENTER	BLUE ROOM
1:15 - 4:45	NATIONAL INSTITUTE OF HEALTH	
1:30 - 2:45	INTERNATIONAL COMMUNICATION SATELLITE	
2:30 - 5:00	THE PENTAGON	
1:00 - 6:00	ON YOUR OWN TOURS	INFORMATION BOOTH
6:30 - 7:30	AWARDS BANQUET RECEPTION	AMBASSADOR ROOM
7:30 - 10:30	AWARDS BANQUET	REGENCY BALL ROOM
6:30 - 10:30	SELECTED EVENING EVENTS IN WASHINGTON	A THE RESTAURANCE AND A SECOND
10.50	OFFERITING FAFIALS THE ANDUTHOLINE	INFORMATION BOOTH

# LAST CHANCE!!! NEW YORK CITY— THE BIG APPLE

MID-TOWN MANHATTAN SHOPPING - SIGHTSEEING - CRUISE AROUND THE ISLAND DINNER AT THE WORLD FAMOUS "TAVERN ON THE GREEN" IN CENTRAL PARK TICKETS TO THE BROADWAY MUSICAL - 1983 TONY AWARD WINNER - "MY ONE AND ONLY" THE GERSHWIN, TAP DANCING EXTRAVAGANZA WITH TOMMY TUNE & TWIGGY WHIRLWIND TWO NIGHT & THREE DAYS IN ONE OF THE WORLD'S MOST EXCITING CITIES

# DISNEYWORLD- EPCOT CENTER

EXPERIMENTAL PROTOTYPE COMMUNITY OF TOMORROW - SEE TOMORROW TODAY

WORLD SHOWCASE - INTERNATIONAL VILLAGES HOSTED BY 9 NATIONS

FANTASYLAND - TOMORROWLAND - FRONTIERLAND - ADVENTURELAND - MAIN STREET USA

NASA & JFK SPACE FLIGHT CENTER

THREE NIGHTS & FOUR DAYS IN A PLACE THAT'S LIKE NO OTHER PLACE ON EARTH

FRIDAY JUNE 22, 1984
BLUE ROOM
APPLIED MATHEMATICS
Margaret Hickel, Session Facilitator
3M Company
USA

## SEPARATING FACT FROM FICTION: THE ROLE OF THE STATISTICIAN IN MANUFACTURING AND R&D

Beverly Newton Hewlett Packard USA

In today's world of complicated technical problems, it is important that an engineer have access to all tools necessary for effective problem solving. The statistician is just such a tool. With proper training, a statistician can enhance the engineer's problem solving abilities by supplying methods of experimental design and data analysis which are a) more efficient in time and/or money, and b) more likely to yield concrete results. It is often mistakenly assumed that, as more problems are identified, more engineers are needed to solve these problems. In reality, a more productive engineering department may be created simply with the addition of a well-chosen statistician instead of the addition of more engineers. This paper describes the many aspects of choosing and training a statistician for the manufacturing and R&D environ-ments. It also answers the questions: When is a statistician needed?; What information should be collected in preparation to work with a statistician?; What are the pitfalls to avoid.

## PROBABLISTIC RISK ASSESSMENT AS AN ANALYTICAL TOOL

Diane L. Acey
Pickard, Love, and Garrick, Inc.
USA

Probabilistic risk assessment is an analytical tool in use for a multitude of industries on an international scale. This tool represents a method for exhaustively determining what failure scenarios can occur at a facility and their consequences in terms of health and financial considerations. Currently, the "state of the art" for this technology encompasses: the use of facility specific component failure information to supplement industry generic data bases, consideration of the human response element and explicit inclusion in the analysis of how common causes, either external (i.e., floods, fires, etc.) or internal (component, system design deficiencies, etc.) can incapacitate a system. The results of the analysis are presented in the form of the probability that with a certain frequency, a specific event sequence will occur, resulting in some range of potential consequences.

### PARAMETRIC COST ESTIMATION IN CONSTRUCTION

Christine J. Wilson EG&G Idaho, Inc. USA

This paper provides an introduction to and application of the Freiman Analysis of System Technique (FAST) parametric cost estimating methodology. EG&G Idaho, Inc., under the direction of the Department of Energy (DOE), is the FAST Project Office whose role is to provide evaluation, development, and implementation of the FAST models. The FAST-Construction model was designed to calculate costs, schedules and risks or uncertainties for engineering, project management, and construction. It can process the effort for site work, construction projects, buildings, and utilities in either a macro or micro manner. Accurate costing of projects in the planning and the conceptual design stage is a current concern of both government and industry. With the advent of the construction parametric methodology, we now have the capability to identify unforeseen costs due to design growth and unidentified detail in the early stages of design.

### ASPECTS OF PRECIPITATION RELEVANT TO LANDSLIDES

Charlotte I. Muchow Consultant USA

Precipitation may trigger landslides directly during precipitation and indirectly through vegetation, weathering, and surface or subsurface erosion.

The determination of precipitation thresholds for land-slides requires site-specific rainfall data. This paper discusses the aspects of precipitation that affect the calculation of thresholds. First, rainfall may not be accurately measured. Wind causes significant measurement error, especially on hillslopes. Second the variability of rainfall in time and space affects both prediction for advance warning and estimation of site-specific data after a storm.

A numerical model of raindrops in wind is used to evaluate potential measurement error on a hillslope. The model showed that the vertical component of wind significantly affected the amount of rainfall measured on a hillslope. As a topographic example of this model, a coastal bluff failure in Malibu, California, is used.

# OPTIMAL DESIGN STUDY OF THE TRANSIENT BEHAVIOUR OF SUPERCONDUCTING ALTERNATORS

Dr. Sohier M. Sakr Ain Sham University Egypt

The paper presents a method to calculate the transient analysis of superconducting alternators with two damper shields. The optimal design study is carried out through a computer program to determine the optimum reactances that would produce minimum transient effects. Also, the optimum time constants for the two shields are determined to minimize their eddy currents induced under fault conditions.

It was found that the optimum conditions are obtained when the machine has the following reactances: a) the smallest possible values of the direct axis components of the mutual reactances between the armature and each of the field, the first and the second shield respectively; b) the direct axis component of the self armature reactance is in the order of one per unit; c) the direct axis component of the self field reactance is between 0.9 and 1 per unit.

A reasonable compromise for the primary and secondard shields time constants is 2 and 0.5 respectively.

FRIDAY JUNE 22, 1984
DIPLOMAT ROOM
MANUFACTURING
Partricia Shamamy, Session Facilitator
Lawrence Institute of Technology
Warren, MI USA

# MANUFACTURING AS THE 20TH CENTURY ENDS -NEW ROLES FOR ENGINEERS & SCIENTISTS Martha J. B. Thomas GTE Products Corporation USA

As the world spins on toward the later part of the 20th century, it carries with it totally new concepts of manufacturing technology. Evolving from the assembly-production line manufacturing processes of the early part of the century, followed by the on rush of computer technology and engineers' adaptation of this technology to manufacture, all has lead to CAD (Computer Aided Design), CAM (Computer Aided Manufacture) and CIM (Computer Integrated Manufacture). Even robotics has merged with manufacturing process. What role will Scientists and Engineers have during these changes? Where next?

# CONTROLLING MULTINATIONAL ELECTRONIC TYPEWRITER MANUFACTURING Cecilia D. Craig Xerox

USA

Manufacturing five hundred electronic typewriters per day is a complex problem for any manufacturing site. Now, add an international dimension which requires over 100 more to be built per day in Europe using the identical typewriter design.

Building in two locations - Dallas, Texas, and Lille, France - required the Xerox Office Products Division to tightly control all design and process changes from Dallas. The Dallas site has had to effectively balance worldwide inventories, meet increasing volume requirements and continue to reduce manufacturing costs. Import charges drove Xerox to procure from European as well as US vendors.

To structure the system, Xerox developed the Managing Unit(Dallas)/Affected Unit(Lille) concept. In addition to controlling all aspects of manufacturing, this MU/AU concept was used to direct a phased implementation while introducing to the market place a successful new product. Photographs of both semi-automated production lines will illustrate the talk.

# IMPROVING PRODUCT RELIABILITY THROUGH MANUFACTURING AUTOMATION

Marilyn Rae Schnell Printronix Corporation

USA

To retain its competitive edge in the dot matrix line printer market, PRINTRONIX needed to revise and improve its final testing procedures for its P300 (300 lines per minute) printers.

This presentation is a case study of the methodologies used to determine the optimal set of computerized tests used for the P300 printers. Included in this discussion is: the relationship between objective (machine) and subjective (human) tests and how each type of test improves product reliability; time efficiency; ease of use for test operators; results and acceptance.

## COMBINED X-RAY/BETA SENSOR ADVANCES NUCLEAR GAUGING TECHNOLOGY

Dawn E. Holt Fife Corporation USA

A combination sensor utilizing two isotopes, one of which emits low-energy X-rays and the other mid-energy beta particles, has been developed to gauge foil laminates and magnetic films (floppy disks, tapes, etc.). The measurement technique takes advantage of the preferential X-ray absorption of metallic coatings and provides automatic compensation for substrate thickness variation. The sensor is designed for on-line monitoring and functions under microprocessor control.

### QUALITY MANUFACTURING - A MANAGEMENT PERSPECTIVE

Shirley Gliege Drazba Honeywell USA

We are all faced with the challenge of change and the crunch of the 80's. Quality manufacturing of software and hardware must be kept at a profitable yet reliable level. Can our existing production techniques be applied successfully to meet the need of new technology? Various methods will be discussed including Just-In-Time Manufacturing processes and Manufacturing Quality Workteams to improve our production quotas. New techniques will be highlighted which are becoming a necessity to manufacture software to meet the needs of our customers.

FRIDAY JUNE 22, 1984
PALLADIAN ROOM
TRANSPORTATION

Terry Kann, Session Facilitator City of Seattle Engineering Department USA

## SPACE SHUTTLE: INTERNATIONAL COOPERATION IN ORBIT

Anita E. Gale Rockwell International USA

Although the Space Shuttle is an American innovation, over 40% of its planned missions include major international payloads. Payloads have been flown, and more are planned, for Canada, Germany, Indonesia, India, and the nations of the European Space Agency (ESA). Future payloads are also planned for Saudi Arabia, Mexico, Australia, the United Kingdom, Italy, Luxembourg, Japan, Brazil, and the member nations of Intelsat. Although most of these international payloads are communications satellites, they do include major scientific research projects for ESA, Germany, and Japan. Some of these payloads represent major milestones for the Space Shuttle itself.

Indeed, international participation in Space Shuttle development has provided systems that make possible some of its unique capabilities. Most notable of these are the Canadian-developed Remote Manipulator System (RMS), essential for satellite retrieval and repair missions, and the ESA Spacelab, which greatly improves the Space Shuttle's usefulness for conducting scientific experiments in space.

# A TRANSIT SUBWAY FOR SEATTLE: AN ENGINEERING AND A LOCAL CHALLENGE Elaine Guillot

Municipality of Metropolitan Seattle USA

Conceptual engineering for the North Corridor Alternatives Analysis has costed a CBD transit subway. Its design could handle either electric articulated buses or light rail trains.

The operator favors the CBD Subway mainly for its carrying capacity and service expansion potential. Running long buses or trains in mixed traffic has many operational constraints. Even a dedicated transit street cannot fully tap in modern bus or rail technologies. Local opposition to a CBD subway does exist among some circles. Revival of a 15-year-old debate is taking place with somewhat new arguments.

Layout of the subway route presents engineering design problems. Their treatment at the conceptual phase uses both proven and innovative construction methods. Timing for the proposed subway project bears upon its total construction cost. Availability of Federal capital funds remains a key factor in the local decision making.

### WIND TUNNEL FOR FULL-SCALE AUTOMOTIVE AERODYNAMICS - GMAL

Lydia B. Lazurenko, P.E. General Motors USA

The design and operation of the wind tunnel constructed by General Motors in 1980 is presented. Flow path design criteria, special features (boundary layer control and heat exchanger systems), test instrumentation (two balance system) and data acquisition and reduction are discussed. The wind tunnel was designed for the aerodynamic testing of full-scale models of passenger cars, vans and trucks and reduced scale models of larger vehicles.

### MICROPROCESSOR-BASED CENTER OF GRAVITY CONTROL SYSTEM FOR FLIGHT TESTING COMMERCIAL TRANSPORT **AIRPLANES**

Liana M. Rowe **Boeing Airplane Company** USA

During drag and cruise testing, the location of an airplane's Center of Gravity (CG) is critical to optimum performance. In the past, CG has been maintained by transferring water between tanks in the forward and aft sections of the airplane. The operator used outputs from analog sensors to monitor tank status (Full/Empty), with the only option being to transfer full tanks when a change was required.

CG can now be maintained with inputs to a microprocessor that has gross weight and CG tracking capabilities. The Water Encoder Transfer System (WETS) is part of an incremental water ballast system which changes water moment by transferring selected quantities of water between forward and aft tanks. Now, instead of relying on full/empty sensors to monitor tank status, the operator can move water in less-than-full tank quantities while WETS tracks weight, water moment, and CG. The ability to move less than a full tank of water allows the operator to maintain airplane CG location to within 0.1%.

### HOLOGRAPHIC AIDS FOR INTERNAL COMBUSTION FLOW **STUDIES**

Carolyn A. Regan NASA - Lewis Research Center USA

Worldwide interest in improving the fuel efficiency of internal combustion (I.C.) engines has sparked research efforts designed to learn more about the flow processes of these engines. The flow fields must be understood prior to fuel injection in order to design efficient valves, piston geometries, and fuel injectors. Knowledge of the flow field is also necessary to determine the heat trans-fer to combustion chamber surfaces. Computational codes can predict velocity and turbulence patterns, but experimental verification is mandatory to justify their basic assumptions.

Due to their non-intrusive nature, optical methods are ideally suited to provide the necessary velocity verification data. Optical systems such as Schlieren photography, laser velocimetry, and illuminated particle visualization have been used in I.C. engines, and now their versatility has been improved by employing holography. These holographically enhanced optical techniques are described in this paper. this paper, with emphasis on their application in I.C.

### TECHNICAL TOURS

THESE TECHNICAL TOURS ARE DESIGNED TO SHOW WHAT HAS BEEN DONE IN THE LAST QUARTER CENTURY TO BENEFIT TECHNOLOGICAL DEVELOPMENT AND TO INCREASE THE STANDARD OF LIVING. EACH TOUR IS UNIQUE AND EACH SHOWS THE DIFFERENT TRENDS IN FUTURE DEVELOPMENTS. THE TOURS ARE DESIGNED TO OFFER A GOOD INDUSTRIAL OR SCIENTIFIC PERSPECTIVE OF THE INDUSTRY TO THE NOVICE AS WELL AS PROVIDE A FORUM FOR DETAILED EXAMINATION AND INTERACTION FOR THE EXPERT IN THE FIELD.

### NASA/GODDARD SPACE FLIGHT CENTER GREENBELT, MD D. Ihilt. Host

One of the largest facilities for near-earth type satellites, space-flight tracking and worldwide communication for scientific and technological exploration into outer space. Goddard has been responsible for major advances in communications, weather and climate research, earth resources, space physics and space astronomy. These accomplishments were achieved concurrently with unprecedented worldwide ground support roles for the Mercury, Gemini, Apollo, Skylab, and Space Shuttle manned flight missions.

### NATIONAL INSTITUTE OF HEALTH ROCKVILLE, MD P. Brandenburg, Host

The tour of the National Institute of Health is being specifically designed to address the interests of ICWES. There are tours of the engineering facilities with a special emphasis on the development of high technology instrumentation which extends beyond the health applications. The theme of the tour discussions will be basic and applied research and specific industrial and health applications.

### INTERNATIONAL COMMUNICATIONS SATELLITE WASHINGTON, DC G. Trevitt, Host

A Metro subway tour to this global satellite organization which serves more than 100 countries in transoceanic communication such as: telephone calls, telegrams, telex, transmission of computer data, and international television. The forty-five minute tour includes a film and a tour of the computer facilities. The attendance is limited to 18 people and the tour is timed such that you can follow this tour with the Pentagon tours.

### THE PENTAGON WASHINGTON, DC **Multiple Hosts**

A Metro Subway tour to the executive headquarters of the Department of Defense which is one of the world's largest office buildings. The tour will remove the mystique surrounding the Pentagon and show the wide range of work conducted at this facility. It has army collections, the Hall of Heroes, military women's exhibition, and 17 miles (28 kilometers) of executive officers' corridors. The attendance is limited to thirty-five people.

### **FY84 CHARTERED SECTIONS BREAKFAST**

### Barbara Wollmershauser, SWE President

In honor of the Sections chartered during the 1983-1984 year, a champagne breakfast will be held with those sections chartered last fiscal year as host. All Section members of each, as well as the Executive Committee and Membership Committee, are invited to attend.

### INVITATION TO CSR REPRESENTATIVES TO MEET SWE'S LEGAL COUNSEL Barbara Wollmershauser, SWE President

You are invited to come to the President's suite to join the Executive Committee and the Board of Trustees meeting

with Mr. Howie Presant, SWE's legal counsel. This is an opportunity to discuss problems of a legal nature with Mr. Presant that you have encountered or antici-

Mr. Presant will also be on the Potomac Cruise and will be

available for Section questions during that time.

pated encountering in the coming year.

# EVENTS OF THE DAY SATURDAY JUNE 23, 1984

7:00 - 8:00 8:00 - 1:00 8:30 - 11:30	CONTINENTAL BREAKFAST  SIGN UP FOR EVENING EVENTS IN WASHINGTON SWE COUNCIL OF SECTION REPRESENTATIVES (OPEN TO SUE HENBERS ONLY)	PALLADIAN ROOM INFORMATION BOOTH PALLADIAN ROOM
10:00 - 11:30 11:30 - 1:00 1:00 - 5:00	VII ICWES CLOSING SESSION ON YOUR OWN LUNCH SWE COUNCIL OF SECTION REPRESENTATIVES (Continued) (OPEN TO SHE MEMBERS ONLY)	ROOM 263 INFORMATION BOOTH PALLADIAN ROOM
1:00 - 6:00 6:30 - 10:30	ON YOUR OWN TOURS SELECTED EVENING EVENTS IN WASHINGTON	INFORMATION BOOTH INFORMATION BOOTH

# EVENTS OF THE DAY SUNDAY JUNE 24, 1984

7:00 - 7:30	DEPARTURE FOR POST-ICWES TOURS	MAIN LOBBY
9:30 - 10:00	SWE MEMBERSHIP BRUNCH	THE FORUM
10:00 - 12:00	SWE MEMBERSHIP MEETING	THE FORUM

# COUNCIL OF SECTION REPRESENTATIVES MEETING

OPEN TO SWE MEMBERS ONLY

CSR DISCUSSION FROM 8:30 TO 11:30 AM
A short review of the Bylaws proposals which have been presented to the CSR will be made, followed by a discussion among the CSR of their questions, concerns, and comments.

BUSINESS MEETING FROM 1:00 TO 5:00 PM

The CSR Business Meeting will include reports by the National Officers and consideration of old and new business.

# MEMBERSHIP MEETING

The 1984 SWE Convention business is concluded at the Membership Meeting following the brunch. The meeting features various awards and presentations, and reports by National Officers. A skit by the Minnesota Section will also be presented. Installation of SWE's 1984-85 National Officers and Executive Committee completes the 1983-84 business year.