THE SOCIETY FOR TECHNOLOGY IN ANESTHESIA

PRESENTS ITS

1993 STA-ISCAIC ANNUAL MEETING

"HUMAN PERFORMANCE AND ANESTHESIA TECHNOLOGY"

FEBRUARY 17-19, 1993
SHERATON NEW ORLEANS HOTEL
NEW ORLEANS, LOUISIANA

CO-SPONSORED BY THE ANESTHESIA PATIENT SAFETY FOUNDATION
Welcome to
"Human Performance and Anesthesia Technology"

Dear Registrant:

I am pleased to tell you that we have brought together a truly distinguished international multidisciplinary faculty to educate, entertain, and challenge you. There will be a variety of opportunities for you to interact with the faculty including panel presentations/discussions, debates, workshops, poster discussion sessions, breaks, exhibits, meals, and other social activities (e.g., carousing on Bourbon Street). The scientific program of the 3rd STA Annual Meeting and the 7th International Symposium on Computing in Anesthesia and Intensive Care meeting has been co-sponsored by the STA and the Anesthesia Patient Safety Foundation. I personally want to thank the APSF and all of the industry sponsors for helping to make this meeting possible.

Recent research has brought to light the ways in which human, environmental, equipment, and system factors may affect anesthesiologists’ performance and the potential role these factors could play in the occurrence of anesthetic mishaps, particularly during high workload or critical situations. New anesthesia technologies are being developed which, if designed and implemented properly, have the potential to greatly improve anesthesiologist performance. However, as has been shown in other fields, if advanced technology is introduced prematurely or incorrectly, it can actually adversely affect performance. Only by gaining a better understanding of the impact of these factors on anesthesiologist performance can clinicians and scientists objectively guide industry in the development of new anesthesia equipment which will improve patient safety.

Thus, the objectives of the scientific program will be to explore: 1) the role that human, environmental, equipment, and system factors play in anesthesiologist performance, particularly during high workload or critical situations; 2) the ways in which the application of new technologies could either improve or hinder performance; 3) how data from other fields might apply to the anesthesiologists’ work environment; and 4) the importance of ergonomics in the design of future anesthesia equipment.

In addition to the faculty giving formal presentations, we have invited a number of distinguished human factors specialists to enhance the dialogue between the anesthesia and ergonomics communities. Mike Lewis from the University of Pittsburgh and Paul Milgram from the University of Toronto are highly respected experts with previous experience in the medical field. I suspect that in the course of the meeting they will be a tremendous source of information and inspiration. It should be noted that Alex Kirlik from the Georgia Institute of Technology has graciously agreed to fill in for David Woods who had to cancel at the last minute for personal reasons. Col. Gerald Kreuger will be helping Carl Englund discuss the effects of sleep deprivation on performance. I also want to thank Jan Van der Aa from the University of Florida at Gainesville and Christine M. Mitchell from the Georgia Institute of Technology for kindly agreeing to fill in for Jan Beneken and Earl Wiener (respectively), who unfortunately could not attend the meeting.

Overview: Day One

The first panel of the meeting will examine “The OR Environment” and will include the ergonomics of the operating room, the anthropology of anesthesiologist-surgeon-nurse interactions, and the impact of standards on equipment design. During lunch, Dr. Allen Ream, a member of the APSF board, will present the new APSF white paper, “Critical Issues in Enhancing the Use of Technology to Increase Patient Safety During Anesthesia.” The afternoon poster discussion session will focus on technology and the respiratory system. A panel on future anesthesia technology, moderated by Jerry Calkins, will include a discussion of automation and new display technologies. The first day will conclude with the STA annual business meeting followed by a cocktail reception.

Overview: Day Two

The morning panel will address problems in resident selection and anesthesiology training. The role of simulation in anesthesia education and research will also be discussed. This panel will be followed by an anesthesia crisis resource management (ACRM) workshop run by David Gaba and Jan Ehrenwerth. ACRM is a technique for enhancing teamwork and communication during critical events or other high-workload situations. A poster discussion section will run concurrently and will focus on technology and the cardiovascular system.
At lunch, Dr. Carlos Parsloe, Past President of the World Federation of Societies of Anesthesiologists, will present the STA Distinguished Lecture, "The Introduction of Technology in the Third World: Problems and Solutions." In the afternoon, I will moderate a panel on factors affecting anesthesiologist performance. We will be emphasizing sleep deprivation and fatigue. To complete the day, Alan Grogono will moderate an open discussion of the potential advantages and disadvantages of reading or listening to music in the operating room. I encourage you to voice your opinion so that we can get everyone involved in the discussion. Later that evening, the annual STA dinner will feature a talk by Dr. Jens Rasmussen, Professor Emeritus of the Technical University of Copenhagen (Denmark), a world-renowned expert in the role of human error in accident formation, on "What Can We Learn from Disasters in Other Fields?"

**Overview: Day Three**

The final day's program will begin with an exciting panel on technology and medical decision making, moderated by John Zelcer. Topics will include clinical decision making algorithms, decision making models, decision aids, and artificial intelligence. This will be followed by a workshop on how to obtain grant support for research in anesthesia technology (presented by Dwayne Westenskow, Jeff Cooper, and Nick Gravenstein). The concurrent poster discussion session will focus on human factors in anesthesia. The meeting will conclude with what I hope will be a lively debate on alarms. The debate will be moderated by Frank Block and will be divided into two sections, the first on fully integrated visual alarms and the second on standardized auditory alarm tones.

Once again, I want to thank you for attending. It is my hope that this conference will be an intimate, informal forum to investigate topics of potentially great importance to all clinicians, academicians, and industry. I hope that you use this time to learn some new things, interact with colleagues, and most importantly, have a lot of fun. Please let me know if I can be of any assistance (especially when it comes to having fun).

Sincerely,

*Matthew Weinger, MD*

Program Chairman
Course Objectives

- To understand the important role that human, environmental, equipment, and system factors play in the performance of anesthesiologists, particularly during high workload or critical situations.
- To understand the ways in which the application of new anesthesia technologies can either improve or hinder an anesthesiologist’s performance.
- To examine how ergonomic data from other fields may be applicable to the anesthesiologist and the operating room environment.
- To understand the vital role of ergonomics in the design of future anesthesia equipment.
Meeting Program

Tuesday, February 16

0800-1000
STA Board of Directors Meeting  Bayside B

1000-1200
Committee and Task Force Meetings  Bayside A
Ellendale
Oakley

1400-1600
STA Board of Directors Meeting  (reconvened)  Bayside A

1800-2100
Registration  Ballroom Foyer

Wednesday, February 17

0700-1730
Registration  Ballroom Foyer

0700-0745
Continental Breakfast with Exhibits  Ballroom C

0745-0815
Welcome and Introduction  Ballroom A

N. Ty Smith
Alan W. Grogono
Matthew B. Weinger

0815-0955
Panel: The OR Environment  Ballroom A
Moderator: Robert G. Loeb
Ergonomics of the Anesthesia Workplace (page 13)
Robert G. Loeb
Enthnography in the Operating Room (page 14)
William Gild
The Impact of Standards and Regulations (page 15)
M. Sue Bogner
Toward the Unified European Anesthesia Interface (page 16)
Alistair Lack

0830-1100
Spouse Continental Breakfast  Presidential Suite
Sponsored by Via Medical Corporation

0955-1000
Introduction of the Scientific Program  Ballroom A
Paul Barash

1000-1030
Break with Exhibits  Ballroom C

1030-1230
Poster Discussion  Ballroom C
(see schedule on page 45)

1230-1400
Lunch and APSF Presentation: Critical issues in Enhancing the Use of Technology to Increase Patient Safety During Anesthesia (page 17)
Allen K. Ream

1400-1600
Panel: Design Issues for Future Anesthesia Technology  Ballroom A
Moderator: Jerry M. Calkins
Machine Centered vs. Human Centered Automation (page 18)
Christine M. Mitchell
Pitfalls of Automation in Anesthesia (page 19)
Gavin N. C. Kenny
Novel Display Systems (page 20)
Kazuyuki Ikeda
Update on STA ‘92: The Anesthesia Workstation (page 21)
Jerry M. Calkins

1600-1615
Break with Exhibits  Ballroom C

1615-1730
STA Business Meeting  Ballroom A
(Announcement of New Officers)

1730
Reception with Cash Bar and Exhibits  Ballroom C
Meeting Program
(continued)

Thursday, February 18

0700-1700
Registration Ballroom Foyer

0700-0800
Continental Breakfast with Exhibits Ballroom C

0800-1000
Panel: Improving the Anesthesia Provider
Moderator: David M. Caba
- Resident Selection and Personality Issues (page 22) M. Frances Rhoton
- Problems in Provider Education and Training (page 23) J. S. Gravenstein
- Simulation (page 24) Jeffrey B. Cooper

1000-1030
Break with Exhibits Ballroom C

1030-1200
Concurrent Sessions
(Select One)
A-Poster Discussion Ballroom C
(see schedule on page 59)
Jan Ehrenwerth

1200-1400
Lunch and STA Ballroom D
Distinguished Lecture:
The Introduction of Technology in the Third World: Problems and Solutions (page 26) Carlos Parsloe

1400-1545
Panel: Performance Shaping Factors Ballroom A
Moderator: Matthew B. Weinger
- Sleep and Fatigue: What We Know From Other Fields (page 27) Carl E. Englund
- Sleep and Fatigue: Studies in Medicine (page 28) J. Lance Lichtor
- Other Performance Shaping Factors (page 29) Matthew B. Weinger

*Attendance may be limited

Friday, February 19

0700-1715
Registration Ballroom Foyer

0700-0800
Continental Breakfast with Exhibits Ballroom C

0800-1000
Panel: Technology and Medical Decision Making
Moderator: John Zelcer
- Automation and Computers: Their Impact on Clinical Practice (page 32) Michael Roizen
- Decision Making Models (page 33) Alex Kirkik
- Decision Aids and Clinical Judgment (page 34) John Zelcer
- Artificial Intelligence (page 35) Dwayne R. Westenskow

0830-1100
Spouse Continental Breakfast Presidential Suite
Sponsored by Via Medical Corporation
Meeting Program
(continued)

1000–1030
Break with Exhibits

1030–1230
Concurrent Sessions
(Select One)

A–Poster Discussion
(see schedule on page 72)

B–Workshop: How to Obtain Funding
for Technology in Anesthesia*
Moderator: Dwayne Westenskow
Identifying a Fundable Research
Topic and Defining a Hypothesis (page 36)
Jeffrey B. Cooper
Preparing and Directing the
Research Proposal (page 37)
for Funding
Dwayne R. Westenskow
Publishing the Results (page 38)
J. S. Gravenstein

1230–1400
Lunch
Sponsored by Diatek

1400–1600
Debate: Alarms—What Do We Want When?
Moderator: Frank E. Block, Jr.
Fully Integrated Visual Alarms
PRO:
Yasuhiro Fukui (page 39)
CON:
Johannes Van der Aa, PhD (page 40)
Standardized Auditory Alarms
PRO:
Roy Patterson (page 41)
CON:
Gregory L. Welyczko (page 42)

1600–1615
Meeting Summary and Future Plans
N. Ty Smith
Jerry Calkins

1615
Adjournment

Please do not leave your belongings in the conference rooms
Faculty

FRANK E. BLOCK, Jr., MD
Assistant Professor of Anesthesiology
The Ohio State University

Marilyn Sue Bogner, PhD
Public Health Advisor
Food and Drug Administration

Jerry Calkins, MD, PhD
Chairman and Professor
Department of Anesthesiology
Maricopa Medical Center

Jeffrey B. Cooper, PhD
Associate Professor of Anesthesia
Director, Anesthesia Technology
Massachusetts General Hospital

Jan Ehrenwerth, MD
Professor of Anesthesiology
Department of Anesthesiology
Yale University School of Medicine

Carl E. Englund, PhD
Head, Information and Decision Management Branch
Naval Ocean Systems Center

Yasuhiro Fukui, PhD
Professor of Applied Electronic Engineering
Tokyo Denki University

David M. Gaba, MD
Associate Professor of Anesthesiology
Stanford University School of Medicine

William Gld, MB, ChB, JD
Acting Assistant Professor of Anesthesiology
University of Washington School of Medicine

Joachim S. Gravenstein, Sr., MD
Graduate Research Professor
Department of Anesthesiology
University of Florida College of Medicine

Alan W. Grogono, MD, FFARCS
Professor and Chairman
Anesthesia Department
Tulane University Medical School

Kazuyuki Ikeda, MD
Professor of Anesthesiology
Hamamatsu University School of Medicine
Hamamatsu, Japan

Gavin N. C. Kenny, BSc (Hons), MD, FFARCS
Senior Lecturer and Honorary Consultant
University Department of Anesthesia
Royal Infirmary of Glasgow Scotland

Alex Kirlik, PhD
Assistant Professor of Industrial and Systems Engineering
Georgia Institute of Technology

Col. Gerald Kreucger, PhD
Commanding Officer
US Army Research Institute of Environmental Medicine

Alastair Lack, MD, FRCA, DIC
Consultant Anaesthetist
Anaesthetic Department
Salisbury Health Care Unit
Oatstock Hospital
Salisbury, England

Mike Lewis, PhD
Assistant Professor of Information Science
University of Pittsburgh

J. Lance Lichtor, MD
Assistant Professor
Department of Anesthesia and Critical Care
The University of Chicago

Robert Loeb, MD
Assistant Professor of Anesthesiology
University of California, Davis

Paul Milgram, PhD
Associate Professor
Department of Industrial Engineering
University of Toronto
Toronto, Ontario Canada

Christine M. Mitchell, PhD
Associate Professor
School of Industrial and Systems Engineering
Georgia Institute of Technology
Atlanta, GA

Carlos Parsloe, MD
Past President, World Federation of Anaesthesiologists
Hospital Samaritano
São Paulo, Brazil

Roy Patterson, PhD
Professor
Cambridge University and the MRC Applied Psychology Unit
Cambridge, England

Jens Rasmussen, PhD
Professor Emeritus
Technical University of Copenhagen
Smorum, Denmark

Allen K. Ream, MD
Associate Professor of Anesthesiology (retired)
Stanford University

Mary Frances Rhoton, PhD
Associate Professor of Anesthesiology
Case Western Reserve Medical School

Michael Roizen, MD
Professor and Chairman
Department of Anesthesiology
The University of Chicago

N. Ty Smith, MD
Professor of Anesthesiology in Residence
University of California, San Diego and the San Diego VA Medical Center

Johannes van der Aa, PhD
Courtesy Assistant Professor
Department of Anesthesiology
University of Florida

Matthew B. Weinger, MD
Assistant Professor of Anesthesiology
University of California, San Diego and the San Diego VA Medical Center

Gregory L. Welyczko
Manager, Medical and Industrial Standards
Ohmeda, The BOC Group

Dwayne R. Westenskow, PhD
Professor of Anesthesiology
The University of Utah

John Zelen, MB, BS, BMedSc (Hons), FFARACS
Specialist Anaesthetist
St. Vincent’s Hospital
East Melbourne, Australia

APSF Representative
ISCAIC Representative
Computerized Collection and Analysis of Postoperative Oxyhemoglobin Saturation Data, Anthony H. Ilsley, PhD, John L. Plummer, PhD, Harry Owen, MD.

VARS - Visual/Auditory Relaxation and Sedation, Eric S. Silverman, MD, R. Watt, MSEE, Mohammed J. Navabi, PhD, E. Maslana, BSME, S. Hameroff, MD.

Incidence of Hypoxemia Due to a Hypoxic Mixture in Low Flow Anesthesia When Using Nitrous Oxide, Patricia D. Deshane, SRNA, CCRN, David W. Edsall, MD.

Stability of Pressurized Calibration Gases, Carl F. Wallroth, PhD, H. Hattendorff, PhD, R. Best-Timmann, PhD, K. L. Gippert, PhD, D. Westenskow, PhD.

A Respiratory Flowmeter Based on a Modified Mainstream CO2 Cuvette, Joseph A. Orr, PhD, Scott A. Kofoed, BS, Dwayne R. Westenskow, PhD.

Standards for the Anesthesia Workstation, Carl. F. Wallroth, PhD, Dwayne Westenskow, PhD.

Refractometry as a Calibration Standard for Gas Monitors and Vaporizers, Carl F. Wallroth, PhD, K. L. Gippert, PhD, M. Ryschka, PhD, W. Falb, MSc, H. Hattendorff, PhD, B. Schramm, PhD, R. Torge, PhD, K. H. Mahrt, PhD, W. Kroebel, PhD, D. R. Westenskow, PhD.

A Unified Pharmacokinetic Model for Intravenous and Inhalant Drugs, Khaled Khodr, BS, James Philip, ME, (E), MD.

Transfer Function from Inspired to Expired Agent Tension, XB Ji, PhD, ID Calalang, BS, James Philip, ME (E), MD.


Transcutaneous CO2 (Ptco2) Monitoring in Adults: Comparison Between 41 and 44° C, Nitin K. Shah, MD, David H. Wong, PharmD, MD, June Zaccari, BS, Sara Clack, RA, Steven J. Barker, PhD, MD.

Clinical Application of Constant Flow Ventilation in Anesthetized Patients, Yan-Lin Wang, MD, De-Lin Wan, MD, Shen-Li Zhen, MD.

Elective Use of Pressure Limited Oxygen Insufflation, Thomas Scanlon, MD, James K. York, MD, Scott Augustine, MD.
ASPECT MEDICAL SYSTEMS
Booth 42
The Aspect™ A-1000™ EEG Monitor is the first monitor to incorporate Bispectral Analysis, an advanced signal processing technology which captures subtle changes in the EEG waveform that cannot be quantified with previously available techniques. Plus, this compact, easy-to-use monitor displays real-time EEG waveforms, trends and CSA/DSA plots.

BECTON DICKINSON
VASCULAR ACCESS
Booth 31
Introducing the latest technology in pressure monitoring. The Innersense™ disposable microtransducer measures pressures within an indwelling intravascular catheter. Patient systolic, diastolic and mean pressure status is more precisely reflected with improved waveform fidelity and reduced artifact. Elimination of the fluid column improves response time, signal to noise, maintenance of line integrity, and quality of pressure measurements.

CAE-LINK CORPORATION
Booth 32
CAE-Link’s focus is Advancing Human Performance. At STA, CAE-Link will discuss the Virtual Anesthesiology™ Training Simulation System—full anesthesia training in a realistic, interactive clinical environment; TeleMedicine remote examination and diagnosis; and demonstrate Virtual Heart™ software.

DATASCOPE CORPORATION
Booth 41
Datascopes will feature its Passport multifunction patient monitor and VISA central station monitor. The Passport is ideal for clinical situations requiring a large-screen portable monitor. Recent enhancements include electro luminescent display and CO₂. The VISA is ideal for ER, L & D and PACU, and displays data from Passport, 3000A and Accutorr monitors.

DATEX MEDICAL INSTRUMENTATION, INC.
Booth 22
Stop by the Datex Booth to see the first modular color monitor designed to meet the specific needs of anesthesia—the AS/3 Anesthesia System. The system’s user interface and physical ergonomics uniquely address the challenges of the anesthesia environment. Begin designing your workstation of the future with Datex products today.

DIATEK PATIENT MANAGEMENT SYSTEMS, INC.
Booth 20/30
Arkive Patient Information Management Systems

HEWLETT-PACKARD
Booth 13
Hewlett-Packard will exhibit the component monitoring system for OR applications with data interfaces to auxiliary devices.

LITTLE, BROWN AND COMPANY
Booth 21
Little, Brown and Company is the publisher of the official society journal, Journal of Clinical Monitoring. Please stop by our booth to pick up your sample copy and see our display of new and classic anesthesiology titles.

MARQUETTE ELECTRONICS
Booth 40
Marquette Electronics Inc., headquartered in Milwaukee, Wisconsin, designs, manufactures and markets computerized electrocardiographic diagnostic and management systems, ICU and anesthesia patient monitoring systems, cardiac catheterization, defibrillators, respiratory and anesthetic gas monitoring systems. In 1992 Marquette and Gambro-Engström of Stockholm, Sweden announced a joint venture to design, produce and market advanced systems for anesthesia.

NORTH AMERICAN DRAGER
Booth 10
North American Drager will be exhibiting our line of anesthesia delivery systems and patient monitors. Among the equipment being exhibited are the Narkomed 4, Vitalert 2000, Vitalert 3000 and the OR Data Manager.

OHMEDA
Booth 23
Modulus® CD Anesthesia System with optional integrated cardiovascular monitoring, Arkive Patient Information Management System, Excel-MRI Compatible Anesthesia Machine, 7800 Ventilator and Tec 5 Vaporizers. Also, a full range of patient safety monitoring equipment from standalone pulse oximeters to a total gas analysis system capable of identifying anesthetic agents, and a complete line of adhesive oximetry probes.

ORGANON, INC.
Booth 11
Norcuron®

SPACELABS MEDICAL, INC.
Booth 33
SpaceLabs Medical provides a complete line of patient monitors and clinical information systems to provide patient care from the ED through transport, surgery, recovery and critical care. Products include the PC, PC2 and PC Express monitors, UltraView, which allows simultaneous viewing of TEE and vital signs, and Flexport® interfaces to ancillary devices.