



**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

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University of California, San Diego
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Accreditation

Tulane University Medical Center's Office of Continuing Education is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians.

Tulane University Medical Center's Office of Continuing Education designates this CME activity as meeting the criteria for 20.5 credit hours in Category 2 of the Physician's Recognition Award of the American Medical Association.

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.

Audience

Anesthesiologists, nurse anesthetists, anesthesia technicians, human factors researchers and practitioners, engineers involved in clinical instrumentation, design engineers, and executives in the clinical device industry.

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*

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** *Ballroom D*
(page 17)
Allen K. Ream

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

Ethnography 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

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

Ballroom A

Moderator: David M. Gaba

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

(see schedule on page 59)

*B-Workshop: Crisis Resource
Management* (page 25)*

David M. Gaba

Jan Ehrenwerth

Ballroom C

Ballroom A

1200-1400

Lunch and STA

Distinguished Lecture:

The Introduction of Technology in the

Third World: Problems and Solutions (page 26)

Carlos Parsloe

Ballroom D

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

1545-1600

Break with Exhibits

Ballroom C

1600-1700

**Open Discussion: Music and
Reading in the OR: Help or Hindrance**

Ballroom A

Moderator: Alan W. Grogono

1700

Adjournment

1900

STA Dinner

Ballroom D

**What Can We Learn from Disasters
in Other Endeavors? (page 31)**

Jens Rasmussen

Friday, February 19

0700-1715

Registration

Ballroom Foyer

0700-0800

Continental Breakfast with Exhibits

Ballroom C

0800-1000

**Panel: Technology and
Medical Decision Making**

Ballroom A

Moderator: John Zelcer

Automation and Computers:

Their Impact on Clinical Practice (page 32)

Michael Roizen

Decision Making Models (page 33)

Alex Kirlik

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

*Attendance may be limited

Meeting Program

(continued)

1000-1030

Break with Exhibits

Ballroom C

1030-1230

Concurrent Sessions

(Select One)

A-Poster Discussion

(see schedule on page 72)

Ballroom C

**B-Workshop: How to Obtain Funding
for Technology in Anesthesia***

Ballroom A

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

Ballroom D

Sponsored by Diatek

*Attendance may be limited

1400-1600

**Debate: Alarms—What
Do We Want When?**

Ballroom A

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

Ballroom A

N. Ty Smith

Jerry Calkins

1615

Adjournment

**Please do not leave your
belongings in the
conference rooms**

Faculty

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■ **APSF Representative**
● **ISCAIC Representative**

Poster Abstracts
Wednesday, February 17, 1993
Focus on the Respiratory System
Moderators: Jeffrey M. Feldman, MD and Robert G. Loeb, MD

Computerized Collection and Analysis of Postoperative Oxyhemoglobin Saturation Data, Anthony H. Ilsley, PhD, John L. Plummer, PhD, Harry Owen, MD.
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VARs - Visual/Auditory Relaxation and Sedation, Eric S. Silverman, MD, R. Watt, MSEE, Mohammed J. Navabi, PhD, E. Maslana, BSME, S. Hameroff, MD.
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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.
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Stability of Pressurized Calibration Gases, Carl F. Wallroth, PhD, H. Hattendorff, PhD, R. Best-Timmann, PhD, K. L. Gippert, PhD, D. Westenskow, PhD.
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A Respiratory Flowmeter Based on a Modified Mainstream CO₂ Cuvette, Joseph A. Orr, PhD, Scott A. Kofoed, BS, Dwayne R. Westenskow, PhD.
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Standards for the Anesthesia Workstation, Carl F. Wallroth, PhD, Dwayne Westenskow, PhD.
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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.
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A Unified Pharmacokinetic Model for Intravenous and Inhalant Drugs, Khaled Khodr, BS, James Philip, ME, (E), MD.
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Transfer Function from Inspired to Expired Agent Tension, XB Ji, PhD, ID Calalang, BS, James Philip, ME (E), MD.
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FT-IR Spectrum of Desflurane, S. D. Walker, Jagdeesh Bandekar.
pg. 55

Transcutaneous CO₂ (P_{tc}CO₂) 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.
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Clinical Application of Constant Flow Ventilation in Anesthetized Patients, Yan-Lin Wang, MD, De-Lin Wan, MD, Shen-Li Zhen, MD.
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Elective Use of Pressure Limited Oxygen Insufflation, Thomas Scanlon, MD, James K. York, MD, Scott Augustine, MD.
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Exhibits

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.

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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

Datascope 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 electroluminescent 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

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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®
Arduan®

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.