The 8th Annual Medicine Meets Virtual Reality Conference

Envisioning Healing:
Interactive Technology and the Patient-Practitioner Dialogue

Jointly sponsored by
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JANUARY 27 – 30, 2000
NEWPORT BEACH HOTEL & TENNIS CLUB
NEWPORT BEACH, CALIFORNIA
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University of Witten/Herdecke

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Stanford University Medical Center

Faina Shtern MD
Beth Israel Deaconess Medical Center

Don Stredney
Ohio Supercomputer Center

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General Electric Research & Development

Dave Warner MD
Institute for Interventional Informatics & MindTel LLC

Suzanne J. Weghorst
University of Washington

Brenda K. Wiederhold PhD MBA BCIA-C
CSPP Research and Service Foundation
Conference Information

Course Description

MMVR2000 provides a forum for exchanging, developing, and disseminating innovative ideas for interactive computer-based tools in healthcare. These ideas are considered in a context supporting minimally invasive clinical care that is both medically and economically advantageous. For firms that create and market these tools, this conference provides the opportunity to demonstrate their products to an informed audience.

The program consists of three half-day general sessions, eight half-day parallel sessions, four workshops, three evening educational events, exhibits, and an exhibitor reception. All events are designed to promote open dialogue between presenters and participants.

MMVR2000 features the following topics:

- Clinical Assessment & Diagnostics
- Computer-Assisted Surgery
- Haptics
- Medical Education
- Mental Health
- Public Health
- Rehabilitation
- Robotics
- Sensors
- Simulation
- Technology & Complementary Care
- Telemedicine
- Telesurgery
- Training & Performance Assessment
- Visualization
- WWW & Intranet Networks

MMVR2000 is designed to educate and inform:

- Physicians & Surgeons
- Physician Assistants & Nurses
- Medical Educators & Administrators
- Mental Health Professionals
- Computer Hardware & Software Developers
- Medical Technology Entrepreneurs & Investors
- Military Medicine Specialists
- Information Network Designers

The conference organizers are solely responsible for the design and production of the conference, including final selection of topics and speakers. Because the conference's goal is to promote education, all speakers are asked to present information, answer questions, and interact with participants in a manner that is both educational and free of commercial bias.

The conference organizers encourage feedback from medical professionals, educators, industry, and conference participants. The course evaluations, including suggestions and criticism, will be welcomed and carefully analyzed to determine content and organization of future meetings.

Course Objectives

MMVR2000 has three primary goals:

- To share clinical data and experience that support the informed clinical use of interactive computer-based tools by physicians and other healthcare providers
- To nurture an educational partnership with industry to promote improved, lower-cost products that enhance clinical care and medical education
- To define visionary goals that will guide medicine into a future of (a) improved minimally invasive diagnosis and treatment, (b) significantly enhanced educational methods, (c) expanded communication and research networks for providers and patients, and (d) greater efficiency in delivering optimal patient care

Upon completion of this course, MMVR2000 participants should be able to:

- Make informed decisions about interactive computer-based tools for diagnosis, treatment, rehabilitation, and education
- Know the goals, methods, successes, and limitations of products currently available and make educated evaluations of their relevance to day-to-day clinical care and training
- Understand the development process of technologies likely to aid healthcare in the near future, including economic and timeframe realities
Accreditation

This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of University of California, Irvine, College of Medicine, and Aligned Management Associates, Inc. University of California, Irvine, is accredited by the ACCME to provide continuing medical education for physicians and takes responsibility for the content, quality and scientific integrity of this CME activity.

University of California, Irvine, College of Medicine designates this continuing medical education activity for a maximum of 25 hours Category 1 credit toward the Physicians’ Recognition Award of the American Medical Association. Physicians should claim only those hours of credit that they actually spend in the educational activity.

AMA, Inc. Mission Statement

Aligned Management Associates, Inc., a biomedical communications company, aims to transform medicine through communication. Its mission is to create exceptional opportunities for healthcare providers and supporting biomedical firms to share medical and scientific experience, technology, ideas, and vision. AMA, Inc. has offices in San Diego and San Luis Obispo, California, and New London, Connecticut.

Acknowledgement

We express our sincere appreciation to:

- GE Corporate Research & Development for its generous financial support of this conference;
- Barco Projection Systems America and EON Reality for their stereoscopic projectors and software.

Disclosures

The following speakers receive support from, or may have a financial interest in, one or more organizations, which could be perceived as a real or apparent conflict of interest in the content or the subject of their presentation:

Yuichiro Akatsuka: Olympus Optical Co., Ltd.
Paul Bach-y-Rita: Wicab, Inc. / high-tech development
Thomas M. Baer: Arcturus Engineering, Inc. / PixCell II laser capture microdissection instrument
David C. Balch: Telemedicine Technologies Co./ consulting & integration services
David A. Benaron: Xenogen Corporation / drug discovery services to the pharmaceutical industry & Spectros Corporation / imaging tools for surgical and invasive procedures
Niels Boye: CSC Research & Development / (no financial interest; cooperation only)
Richard Bucholz: Medtronic / Stealth Station
Bruce M. Cameron: Biomedical Imaging Resource / Analyze, AnalyzePC, AVW
Howard R. Champion: SimQuest International & TechMed
Clifford L. Corman: Universal Attention Disorders, Inc. / Test of Variables of Attention (T.O.V.A.)
Patrick Cregan: Med E Serve / internet service provider & Ansell Medicare / surgical courses, etc.
Anthony M. DiGioia: CASurgical, Inc. / HipNav
Andy B. Dobrzeniecki: Silicon Graphics / Virtual Reality Systems
Gerald M. Fried: Autosuture Canada, US Surgical Corp., TYCO Healthcare / educational grant (unrestricted)
James G. Fujimoto: Coherent Diagnostic Technology / Optical coherence tomography for internal body imaging
W. Peter Geis: Ethicon Endosurgery / Trucards, Harmonic Scalpel & CMI / AESOP
Walter Greenleaf: Greenleaf Medical / rehabilitation technology
Randy S. Haluck: Medical Education Technologies, Inc. / Full Human Patient Simulator
Larry F. Hodges: Virtually Better, Inc. / VR Exposure Therapy Software
Branislav Jaramaz: CASurgical, Inc. / HipNav
Joel F. Jensen: Intuitive Surgical Corporation / telesurgery Systems
M. Kukuk: Siemens Corp. Research
Richard Moberg: Moberg Research, Inc. / The Grateful Head
Barrett Moncrief: VidiMedix Corporation / Video medical care software and systems
Yoshikazu Nakajima: Mitsubishi Electric Corp./computer-assisted surgery system
Peter Oppenheimer: US Surgical / laparoscopic surgical equipment
Siegfried Orthner: EEG Spectrum (Neurocybernetics) / neurofeedback instrumentation
Ramani Pichumani: Immersion Corporation / (customer only for custom force feedback devices)
Karl Reinig: Touch of Life Technologies / surgical simulators
Richard A. Robb: AnalyzeDirect.com / Analyze software
James C. Rosser, Jr.: Stryker Endoscopy, US Surgical, Cook Surgical, Computer Motion & Optimize
Jay H. Sanders: The Global Telemedicine Group / telemedicine consulting services & IMED / telemedicine services
Richard M. Satava: US Surgical Corp. / grant supporting laparoscopic surgery center & Med Cases, Inc. / web-based medicine education
David W. Shaffer: Mitsubishi Electric / ICTS (consultant only; no financial interest)
Ramin Shahidi: CBYON, Inc. / image guidance during surgery
N. Ty Smith: Advanced Simulation, Inc. / flight and medical simulation
Victor M. Spitzer: Touch of Life Technologies / medical simulators & Anatomic Visualization, Inc. / anatomical renderings, data, and software
Mikio Suga: Special Coordination funds of the Science and Technology Agency of the Japanese Government / Research on network applications for medical research using the Inter-Ministry Research Information Network
Christopher Sutton: Virtual Presence, Ltd. / Frame-set, MIST VR (employee)
Nitish Swarup: Intuitive Surgical / DaVinci Surgical System
Zoltan Szabo: Karl Storz Endoscopy / laparoscopic video equipment & surgical instruments
Joseph L. Tasto: HT Medical Systems, Inc. / PreOp™ Endoscopy Simulation
Kirby G. Vosburgh: General Electric Co. / diagnostic imaging equipment
Jaye Wald: Imago Systems, Inc. / (consultant relationship)
Alan I. West: Assurance Medical, Inc. / Breast-View™ Electronic Palpation System
All presenters have been instructed to disclose at the beginning of their presentation any discussion or description of the use of a medical device or pharmaceutical classified by the FDA as investigational for the intended use or "off-label" (i.e., a use not described on the product's label).

All physicians should fully investigate any new product or device before implementing it in their practice.
Presentation Schedule

Thursday Morning

Pacific Ballroom, Salons A-C

General Session

Interactive Technology and the Patient-Practitioner Dialogue
Moderator: Ian Alger MD

8:30 Karen S. Morgan
President,
Aligned Management Associates, Inc.

Keynote: Mehmet C. Oz MD (via video)
Irving Assistant Professor of Surgery,
Dept. of Cardiothoracic Surgery
Columbia University School of Medicine
Welcome & Introduction

8:40 Gerald M. Roth MD
Assistant Dean, Continuing Medical Education/Assistant Professor, Dept of
Radiological Sciences, College of Medicine,
Univ of California, Irvine
Welcome

8:45 Wm. LeRoy Heinrichs MD PhD
Professor (Emeritus) & Past Chair, Dept of
Gyn & Ob, Stanford Univ
Introduction: Interactive Technology and the
Patient-Practitioner Dialogue

8:55 Kirby G. Vosburgh PhD
Corporate Research & Development,
General Electric Co.
Improving Care and Caring: How Technology Will Enhance the Physician-
Patient Relationship

9:10 Muriel D. Ross PhD
Ctr for Bioinformatics, NASA Ames
Research Ctr
The Virtual Collaborative Clinic: Health Care Over Distance

9:25 Walter J. Greenleaf PhD
Greenleaf Medical Systems
Rehabilitative Medicine and Virtual Reality: An Overview

9:40 Suzanne J. Weghorst
HIT Lab, Univ of Washington
Wearable Sensory Enhancement Aids for Parkinson’s Disease

9:55 Jon C. Bowersox MD PhD
Univ of California, San Francisco
Eldernet Link: Using Personal Information Technologies for Life Enrichment and
Health Maintenance

10:10 Break

10:30 Faina Shtern MD
Beth Israel Deaconess Medical Center
Technology Transfer: Image-Guided Diagnosis and Treatment of Prostate Cancer

10:45 Richard A. Robb PhD
Biomedical Imaging Resource,
Mayo Clinic & Fdn
VR and the Heart: Exploring the 4th Dimension and Beyond

11:00 Panel Discussion on Interactive Technology &
the Patient-Practitioner Dialogue

Panelists:

Wm. LeRoy Heinrichs MD PhD
SUMMIT & Dept of Gyn & Ob, Stanford Univ

Greg T. Mogel MD, Panel Chair
US Army Medical Research & Materiel Command

Barrett Moncrief RN
Moncrief Dialysis Center & VidiMedix

Richard A. Robb PhD
Biomedical Imaging Resource,
Mayo Clinic & Fdn

Jay H. Sanders MD
The Global Telemedicine Group

Dave Warner MD
Inst for Interventional Informatics & MindTell LLC

12:15 Session ends
THURSDAY AFTERNOON

Pacific Ballroom, Salons A-B

SESSION A

Computer-Assisted Surgery

Moderator: Henry Fuchs PhD

1:30 Henry Fuchs PhD
Dept of Computer Science,
Univ of North Carolina
Augmented Reality Displays for Surgery:
Promises, Problems, and Alternatives to
Head-Mounted Displays

1:42 Ela Sjoelie
Ultrasound Dept, SINTEF Unimed
An Ultrasound-Based Navigation System for
Minimally Invasive Surgery

1:54 Nitish Swarup
Intuitive Surgical, Inc.
Recent Progress with the Intuitive Computer-
Enhanced Surgical System

2:06 Elliot Levy MD
ISIS Ctr, Georgetown Univ
Software Development for Registration of
Digital Subtraction Angiography Images in
Uterine Artery Embolization

2:18 (Prof.Dr.-Ing.) Heinz Wöhn
Inst for Real-Time Computer Systems Robotics,
Univ of Karlsruhe
Computer-Aided Planning Device for
Preoperative Bending of Osteosynthesis Plates

2:30 Luc Soler PhD
I.R.C.A.D./ E.I.T.S. Civil Hosp
An Automatic Virtual Patient Reconstruction
from CT-Scans for Hepatic Surgical Planning

2:42 Ramin Shahidi PhD
Image Guidance Laboratories / Neurosurgery, Stanford Univ Medical Ctr
A Comparative Statistical Analysis for
Intraoperative Tracking and Guidance

2:54 John S. McDonald MD
Dept of Ob-Gyn, Univ of California, Irvine
Computer-Driven Needle Probe Enables
Therapy for Painful Neuropathies

3:06 Yuichiro Akatsuka MS
Advanced Technology Research Ctr,
OLYMPUS Optical Co., Ltd.
Navigation System for Neurosurgery with
PC Platform

3:18 Break

Moderator: Ramin Shahidi PhD

3:38 Richard Bucholz MD FACS
Div of Neurosurgery, St. Louis Univ
Sch of Medicine
Automated Rejection of Contaminated
Surface Measurements for Improved Surface
Registration in Image-Guided Neurosurgery

3:50 Paul J. Gorman MD
Dept of Surgery, Stanford Univ
A Prototype Haptic Lumbar Puncture Simulator

4:02 Anthony M. DiGioia MD
Ctr for Medical Robotics & Computer-
Assisted Surgery, Carnegie Mellon Univ &
UPMC Shadyside Hosp
Inaccuracies in Mechanical Acetabular
Alignment Guides

4:14 (Prof. Eng.) Alberto Rovetta
Dept of Mechanics, Politecnico di Milano
Surgical Robotics of Breast Biopsy for
Ambulatory Applications: Reduction of
Risks of Infections

4:26 Ramin Shahidi PhD
Image Guidance Laboratories / Neurosurgery, Stanford Univ Medical Ctr
Intraoperative Volumetric Data and
Video Fusion

4:38 Anthony M. DiGioia MD
Ctr for Medical Robotics & Computer
Assisted Surgery, Carnegie Mellon Univ &
UPMC Shadyside Hosp
HipNav: A Surgical Navigation System for
Image-Guided Surgery

4:50 Frederic Picard MD
Grenoble Orthopaedic Univ Hosp &
Northwestern Univ & Shadyside Medical Ctr
The Rational, Surgical Technique and
Preliminary Results of a Computer-Assisted
Total Knee System

5:02 (Dipl.-Inform.) Wolfgang Mueller
Dept Visualization & Virtual Reality,
Fraunhofer-Institut fuer graphische
Datenverarbeitung
Planning System for Computer-Assisted Total
Knee Replacement

5:14 Roger Phillips PhD
Dept of Computer Science, Univ of Hull
Computer- and Robotic-Assisted Osteotomy
around the Knee

5:30 Session ends
THURSDAY AFTERNOON (CONT.)

Pacific Ballroom, Salon C

SESSION B

Telemedicine

Moderator: David C. Balch MA

1:30 Deborah P. Birkmire-Peters PhD
Dept of Surgery, Tripler Army Medical Ctr
Teleproctored Functional Endoscopic
Sinus Surgery

1:45 Michael R. Hoitel MD
Dept of Surgery, Tripler Army Medical Ctr
A Comparative Study of Hand-Held
Otoscopy, Binocular Microscopy, and Video-
Otoscopy for Five Etiologies

2:00 Joel F. Jensen MSEE
Innovative Product Engineering &
Technologies, SRI International
Telepresence Microsurgery System
Development

2:15 James C. Rosser, Jr. MD FACS
Yale Endo-Laparoscopic Center Yale
University School of Medicine
The Effect of Bandwidth Modifications on
Performance Outcomes in a Laparoscopic
Surgery Teleprocedure Model

2:30 Barrett Moncrief RN
Moncrief Dialysis Ctr & Vidimedix
A New Approach to the Use of Telemedicine
in Renal Dialysis and Other Remote Patient
Management Applications

2:45 Kevin Dalton LLM PhD
Obstetrics & Gynaecology, & Legal
Medicine, Univ of Cambridge
Legal Aspects of Tele-Surgery

3:00 Break

WWW & Networked Systems

Moderator: Dave Warner MD

3:20 Rainer M. M. Seibel MD
Inst. of Diagnostic & Interventional
Radiology, Univ of Witten/Herdecke
Telemedicine with Fast Internet

3:35 David C. Balch MA
The Telemedicine Ctr, East Carolina Univ
IP Video for Telemedicine on Next-
Generation Internet

3:50 Zhuming Ai PhD
VRMedLab, Univ of Illinois at Chicago
Radiological Tele-Immersion for Next-
Generation Networks

4:05 Yew Nam Lee
Medical Informatics Program, National Univ
of Singapore
A Networked Virtual Reality System for Home
Health Care

4:20 Gary J. Grimes PhD
Ctr for Telecommunications Education &
Research, Univ of Alabama at Birmingham
WWW-Based Telerehabilitation Services

4:35 Don Stredney
Ohio Supercomputer Ctr
Interactive Medical Data On Demand: A
High-Performance Imaged-Based Warehouse
Across Heterogeneous Environments

Sensors

4:50 Eric J. Lind PhD
SPAWAR San Diego
The Second Skin: An Artificial Nervous System

5:05 Grigore Burdea PhD
The Human-Machine Interface Laboratory,
Rutgers Univ
Orthopedic Rehabilitation Using the Rutgers
Ankle Interface to Virtual Environments

5:20 Session ends

Newport North Room

SESSION C

Workshop: Simulating Minimally Invasive Surgical
Procedures in Virtual Environments: From Tissue
Mechanics to Simulation and Training

A Half-Day Tutorial on Medical Simulation and Training

1:30 PM - 5:25 PM

Organizer: Cagatay Basdogan PhD
Massachusetts Institute of Technology
THURSDAY AFTERNOON (CONT.)

Presenters:
Mandayam A. Srinivasan PhD, MIT
Mark Ottensmeyer MSME, MIT
Cagatay Basdogan PhD, MIT
Thomas Krummel MD, Stanford University

Summary:
Simulation of minimally invasive procedures in virtual environments involves (1) the construction of 3D anatomical models from medical images, (2) modeling of tissue characteristics and behavior, (3) design of electromechanical devices for recording and displaying tissue properties, (4) graphical and haptic rendering of soft tissue behavior for simulating instrument-tissue interactions, and (5) design of simulation scenarios and training procedures.

Until recently, the research groups working in this area have focused on a subset of these topics and in restricted application domains. The first component, the construction of anatomical models from medical images, has been extensively covered in the literature and generic 3D anatomical models generated from Visible Man/Woman data are now available in the market through various sources.

But our progress in understanding the behavior of living tissues, the design of mechanical devices for recording and simulation of tissue behavior, real time graphical and haptic rendering of soft tissue behavior, and the simulation principles for training is still inadequate. The particular questions that arise include:

- What are the important characteristics of living tissues that can be perceived by the trainee and which ones need to be included in our models?
- How can we obtain tissue properties through in vivo measurements?
- Which degrees of freedom are more important to consider in designing force-reflecting robotic devices for simulating minimally invasive procedures?
- What programming and modeling techniques can we follow to run our physically based models in real-time?
- How can we integrate haptic feedback into our simulators?
- How should we design the simulation scenarios to achieve our training goals?
- How can we measure training effectiveness?

This tutorial will focus on answering some of these questions and providing the participants with the technical details and practical answers.

1:30  Cagatay Basdogan PhD
Introduction and Overview

1:45  Mandayam A. Srinivasan PhD
Understanding and Modeling Biomechanical Properties of Living Tissues
- Principles of tissue mechanics
- Basic properties of living tissues and their measurement
- Tissue models and approximations
- Human perceptual issues as applied to medical simulation

2:35  Mark Ottensmeyer MSME
Notes: M. Ottensmeyer, J.K. Salisbury PhD
Design of Electromechanical Devices for Measurement and Display
- Design principles of robotic devices for measuring tissue properties
- Design principles of robotic devices for displaying tissue properties

3:25  Break

3:45  Cagatay Basdogan PhD
Simulation of Instrument-Tissue Interactions, and System Integration
- Collision detection and computational models of surgical instruments
- Physically-based modeling for simulating soft tissue behavior in real-time
- Haptic rendering of deformable objects
- Integration of hardware and software components for developing a simulator

4:35  Thomas Krummel MD
Design of Simulation Scenarios and Training
- Part-task versus team training environments
- Modeling and measuring human performance
- Measurement of training effectiveness

5:25  Session ends
THURSDAY EVENING

California Ballroom

The Poster Reception*

6:00 PM - 7:30 PM

Poster Presentations:

Mariano Alcañiz PhD
Univ Politécnica de Valencia
A New Efficient Method for 3D Registration
Using Human Brain Atlases + Mustiresolution Segmentation of 3D Images Using
Mathematical Morphology Techniques

Paul Bach-y-Rita MD
Dept of Rehabilitation Medicine, Univ of Wisconsin, Madison
Tongue Man-Machine Interface

Jon Bosman MS
Ctr Adv Multimedia Psychotherapy, CSPP
Research & Service Fdn
The Effect of Visual Input on EEG Monitoring in a Virtual Environment

Niels Boye MD
Inst of Experimental Clinical Research, Univ of Aarhus
Ontology-Based, Medical Domain-Specific, Use-Case Driven EMRs for Use in Clinical
Quality Assurance and Passive Decision Support

John Coleman PhD
Fraunhofer Ctr for Research in Computer Graphics
Development of a Generalized Atlas for Visualization and Registration of Multi-Modal Datasets

Clifford L. Corman MD
Universal Attention Disorders, Inc.
The Assessment of Medication Effects in ADHD Using the Test of Variables of Attention (T.O.V.A.®)

Patrick Cregan MD FRACS
Nepean Hospital
A Virtual Congress for the Royal Australasian College of Surgeons

Lucio Gamberrini MS
Dept of General Psychology, Univ di Padova
Cyberergonomy: How to Study the Influence of the Net on Research and Medicine

W. Peter Geis MD FACS
Minimally Invasive Services Training Inst, St. Joseph Medical Ctr
Models for Super-Skill Building in Minimally Invasive Cardiac Surgery

Gary R. Gilbert PhD
US Army Telemedicine & Advanced Technologies Research Ctr
Model for an Intelligent Global Grid Telemedicine Consultation Broker

Lars G. Gilbertson PhD
Musculoskeletal Research Ctr, Univ of Pittsburgh
Magnetic Tracking/Virtual Reality Based System for Comprehensive Assessment of Overall Cervical Spine Kinematics

Oxana Gronskaya-Palesh MA
Ctr Adv Multimedia Psychotherapy, CSPP
Research & Service Fdn
Physiological Responses to Virtual Environments

Randy S. Haluck MD
Depts of Surgery & Anesthesia, Penn State College of Medicine
Simulator and Internet Based Education for the Advanced Trauma Life Support Course

(Dipl.-Inform.Med.) Volker Heid
Deutsches Krebsforschungszentrum
Design of a CORBA Based Image Processing Server

Anders Hyltander MD PhD
Dept of Surgery, Sahlgrenska Univ Hosp
Clinical Impact and Methodological Aspects Using 3D-Endosonography in Surgery

Branislav Jaramaz PhD
Ctr for Orthopaedic Research, UPMC Shadyside
Computer-Assisted Measurement of Acetabular Cup Orientation from Radiographs

Nigel W. John PhD
Manchester Visualisation Ctr, Univ of Manchester
The Virtual Pelvis Museum + An Interactive Computer Model of Proton Eye Radiotherapy

* Please note: CME credit is not offered for this session.
Kiho Kim MS
Electronics & Telecommunications Research Inst
A Mixed Reality Scheme for Hand
Acupuncture Supporting System

Masaru Komori PhD
Dept of Medical Informatics, Kyoto Univ Hosp
Sensible Human Project(SHP): Development of
Haptic Applications based on In Vivo
Modulus Distribution

Jeong H. Ku
Dept of Biomedical Engineering, College of
Medicine, Hanyang Univ
Augmented Reality Visualization System
with Occlusion and Collision Detection
in Neurosurgery

John H. Lockwood PhD
Div of Medical Education, Association of
American Medical Colleges
Taking on the Web: Using Web-Based
Data Collection to Track the Quality of
Medical Education

Jay D. Mabrey MD
Dept of Orthopaedics, Univ of Texas Health
Science Ctr at San Antonio
Development of the Virtual Reality
Arthroscopic Surgical Simulator

Renee L. Marshall MD
Penn State Univ Sch of Medicine
The Application of Advanced Technology in
Surgical Training

Carlos Monserrat-Aranda
Univ Politecnica de Valencia
Parallel Segmentation and Rendering Using
Clusters of PCs

Susan V. Montgomery RN BSN
Family Risk Assessment Program, Fox Chase
Cancer Ctr
Facilitating Cancer Risk Counseling with
Interactive Technology

Yoshikazu Nakajima PhD
Information Technology R & D Ctr, Mitsubishi
Electric Corp
Enhanced Video Image Guidance for Biopsy
Using the Safety Map

Constantinos Nikou MS
Carnegie Mellon Univ
Image Overlay: A 3D Visualization Device
for Computer-Aided Medicine

Peter Oppenheimer MS
Human Interface Technology Lab,
Univ of Washington
Laparoscopic Surgical Simulator and Port
Placement Study

Peter J. Passmore PhD
Sch of Computing Science, Middlesex Univ
Effects of Perspective and Stereo on Depth
Judgements in Virtual Reality Laparoscopy
Simulation

(Dipl.-Inform.) Arno Pernozzoli
Universitätssklinikum Heidelberg,
MKG-Chirurgie
Choice and Positioning of Landmarks in CT-
Data—an Important Task to Generate 3D
Norm Data + A Real-Time CORBA Based
System Architecture for Robot Assisted Cran-
iofacial Surgery + Texture Mapping
Based Visualisation Methods for the Manipu-
lation of CT Data Interaction and Ergonomics

Roger Phillips PhD
Dept of Computer Science, Univ of Hull
3D Registration Through Pseudo X-Ray
Image Generation

Giuseppe Riva PhD
Applied Technology for Neuro-Psychology
Lab, Ist Auxologico Italiano
Presence in Clinical Virtual Environments: From
Technology to Culture

Cameron N. Riviere PhD
The Robotics Inst, Carnegie Mellon Univ
Intraoperative Tremor Monitoring for Vitreo-
Retinal Microsurgery

(Prof. Eng.) Alberto Rovetta
Dept of Mechanics, Politecnico di Milano
Computer-Assisted Surgery with 3D Models
of Robots and Visualisation of Telesurgical
Action

Anatoliy Shevelev
Kyiv Hosp for Builders
telemedicine of Ukraine
Sakti Srivastava MD
Stanford Univ
Lucy 2.1: Advanced 3D Organ Models from a 32-Year-Old Reproductive Age Human Female

(Dipl.-Ing.) Malte Stien
Charite - Campus Virchow Klinikum
A More Efficient Method of Texture Use in Surgical Robot Simulation

Christopher Sutton MSc
Virtual Presence Ltd.
FrameSET: A Modular Framework for the Delivery of Computer-Based Surgical Education & Training

Ioannis Tarnanas MSc
A Virtual Environment for the Assessment and Rehabilitation of Visuo-Constructural Ability in Dementia Patients

Bharti Temkin PhD
Dept of Computer Science, Texas Tech Univ
G2H: Graphics-to-Haptic Virtual Environment Development Tool for PC's

Michael R. Tracey MS
The Catholic Univ of America & AnthroTronix
Using Virtual Reality and Vibrotactile Stimulation to Achieve Functional Goals

Cheryl Trepagnier PhD
Assistive Technology Research Ctr, National Rehabilitation Hosp
Application of Virtual Reality Display for Assessment and Rehabilitation of Nonverbal Communicative Interaction

Massimiliano Tuveri MD
Ctr for Advanced Studies, Research, & Development in Sardinia
Catheter Insertion Simulation with Co-Registered Direct Volume Rendering and Haptic Feedback

Francesco Vincelli MS
Applied Technology for Neuro-Psychology Lab, Istituto Auxologico Italiano
Virtual Reality as a New Imaginative Tool in Psychotherapy

Jaye Wald MEd
Dept of Educational & Counselling Psychology & Special Education, Univ of British Columbia

The Use of Virtual Reality in the Assessment and Rehabilitation of Driving Ability Following Brain Injury

Marjorie Wells PhD ARNP
Biobehavioral Nursing & Health Systems, Univ of Washington
Use of a Virtual Pain Questionnaire (PAINReportIT)

(Dipl.-Inform.) Christoph Wick
German National Research Ctr for Information Technology
An Echocardiographic Teleconsultation Environment Using a Virtual Heart Model for Visual Guidance

(Prof.Dr.-Ing.) Heinz Wöhr
Inst for Real-Time Computer Systems Robotics, Univ of Karlsruhe
A Pattern Catalogue of Surgical Interventions for Computer-Supported Operation Planning

Clement Yeh BS
Image Guided Laboratories, Dept of Neurosurgery, Stanford Univ Sch of Medicine
Error Analysis in an Optical Tracking System for Neurosurgical Navigation

Eun J. Youn
Dept of Biomedical Engineering, Hanyang Univ
Automatic Path-Planning with Centerline in Virtual Endoscopy
FRIDAY MORNING

Pacific Ballroom, Salons A-C

GENERAL SESSION

Simulation

Moderator: Kevin Montgomery PhD

8:30  Jannick P. Rolland PhD  
Sch of Optics & CREOL,  
Univ of Central Florida  
Recent Developments of Augmented Reality  
Technology for the Virtual Reality Dynamic  
Anatomy (VRDA) Tool

8:42  (Dipl.-Inform.) Tobias Salb  
Inst for Process Control & Robotics,  
Univ of Karlsruhe  
Interactive Simulation of Tooth Cleaning with  
an Interdental Brush

8:54  Joseph L. Tasto MD  
HT Medical Systems, Inc.  
PreOp™ Endoscopic Simulator: From  
Bronchoscopy to Ureteroscopy

9:06  Nigel W. John PhD  
Manchester Visualisation Ctr,  
Univ of Manchester  
Surgical Simulators Using the WWW

9:18  Richard M. Satava MD FACS  
Yale University School of Medicine  
Virtual Colonoscopy

9:30  (Dipl.-Inform.) Markus Kukuk  
Siemens Corporate Research, Inc.  
Registration of Real and Virtual Endoscopy  
(VE)—A Model and Image Based Approach

9:42  Karl D. Reinig PhD  
Univ of Colorado Health Sciences Ctr  
at Fitzsimons  
Assessment of a Simulator for Corneal Incision

9:54  (Dipl.-Inform.) Arne Radetzky  
ISM-Austria  
Improvement of Surgical Simulation Using  
Dynamic Volume Rendering

10:06  Dean P. Inman PhD  
Oregon Research Inst  
Teaching Orientation and Mobility Skills to  
Blind Children in Virtual Reality

10:18  Break

Moderator: Don Stredney

10:28  Gregory J. Wiet MD  
Children's Hosp Columbus OH  
Virtual Temporal Bone Dissection Simulation

10:40  Kevin Montgomery PhD  
National Biocomputation Ctr,  
Stanford Univ / NASA Ames Research Ctr  
An Augmented Reality Environment for  
Intraoperative Assistance

10:52  Victor M. Spitzer PhD  
U of CO Health Sciences Center  
at Fitzsimons  
The Next Generation Visible Human

11:04  Robert Rice PhD  
Dynoverse Corp.  
Human Simulation for the 21st Century: The  
Virtual Human Program

11:16  Richard C. Ward PhD  
Computational Physics & Eng Div, Oak  
Ridge Natl Lab  
Creating a Human Phantom for the Virtual  
Human Program

11:28  Keynote: Michael Zyda  
MOVES Academic Group, Naval  
Postgraduate Sch  
Modeling, Virtual Environments and  
Simulation: The Future of Networked  
Entertainment and the Future of Defense

12:15  Session ends

FRIDAY AFTERNOON

Pacific Ballroom, Salons A-B

SESSION A

Education

Moderator: Helene M. Hoffman PhD

1:30  David Shaffer PhD  
CIMIT, Massachusetts General Hosp  
Simulation-Based Learning in  
Procedural Medicine
1:45  Richard Moberg  
Moberg Research, Inc.  
*Integrating Real and Virtual Worlds for More Effective Medical Training*

2:00  Luc Soler PhD  
I.R.C.A.D./ E.I.T.S. Civil Hosp  
*Virtual Surgical University: New Tools in Use from Teleeducation to Telemanipulation*

2:15  Ramani Pichumani PhD  
SUMMIT Lab, Stanford Univ Sch of Medicine  
*Instruction of Anatomy with Haptically Enhanced, Web-Based High Resolution Photographic Images*

2:30  W. Peter Geis MD FACS  
Minimally Invasive Services Training Inst, St. Joseph Medical Ctr  
*Use of Multiple Visual Fields to Educate Surgeons in Minimally Invasive Surgery*

2:45  Helene M. Hoffman PhD  
Learning Resources Ctr, Sch of Medicine, Univ of California, San Diego  
*Implementing Anatomic Visualizer R Learning Modules in Anatomy Education*

3:00  Renee L. Marshall MD  
Penn State Univ Sch of Medicine  
*End User Analysis of a Force Feedback Virtual Reality Based Surgical Simulator*

3:15  Break

*Moderator: Wm. LeRoy Heinrichs MD PhD*

3:35  Wm. LeRoy Heinrichs MD PhD  
SUMMIT & Dept of Gyn & Ob, Stanford Univ  
*Instruction Frames for Guiding the Learning of the ‘Hidden Technical Curriculum of Endoscopic Surgery’*

3:50  Warren D. Smith PhD  
Biomedical Engineering Prog, California State Univ, Sacramento  
*A Virtual Instrument Ergonomics Workstation for Measuring the Mental Workload of Performing Video-Endoscopic Surgery*

4:05  Jacob Rosen PhD  
Dept of Electrical Engineering, Univ of Washington  
*Hidden Markov Models of Minimally Invasive Surgery*

4:20  Stephane Cotin PhD  
Ctr for Innovative Minimally Invasive Therapy  
*ICTS: An Interventional Cardiology Training System*

4:35  Reinhard Friedl PhD  
Dept Cardiac Surgery, Univ of Ulm  
*Cardea-OP: An Integrated Approach to Teleteaching in Cardiac Surgery*

4:50  Anne-Claire Jambon MD  
Hôpital Jeanne de Flandre, Centre hospitalier et universitaire de Lille  
*A Training Simulator for Initial Formation in Gynecologic Laparoscopy*

5:05  Robert C. Hubal MS PhD  
Ctr for Digital Systems Engineering, Research Triangle Inst  
*The Virtual Standardized Patient: Simulated Patient-Practitioner Dialogue for Patient Interview Training*

5:20  Session ends

**Friday Afternoon**

Pacific Ballroom, Salon C

**Session B**

**Workshop: Performance Assessment Using Surgical Simulation**

1:30 PM - 5:30 PM

Computed-based simulation technology can be used to assess the cognitive, perceptual and motor skills of surgeons and other medical personnel. Several groups are working on the development of performance metrics in general and laparoscopic surgery that can be implemented within the surgical simulation environment. Task analysis is being used to deconstruct surgical procedures into elemental actions, and provide the "syntax and grammar" of surgical movements. Performance metrics can include general characteristics such as timing, accuracy, and outcome as well as more specific features of the surgical or interventional procedure being assessed. Simulation-based performance assessment is being integrated into the medical training curriculum and adopted by professional credentialing organizations. Speakers will include physicians, engineers and human factors experts who are working to develop metrics that can be used for assessment of surgical skills using simulation technology.
Howard R. Champion FRCS (Edin.),
Workshop Chair
SimQuest International, Inc.
Introduction

Richard Satava MD FACS
Yale University School of Medicine
Introduction

Section 1: General Approaches

Howard R. Champion, FRCS (Edin.)
SimQuest International, Inc.
Role for Simulation Training in General Surgery

Lawrence J. Hettinger PhD
Arthur D. Little, Inc.
Assessing Skilled Performance of Complex Tasks: Challenges for Developing Effective Medical VE Training Systems

Robert B.E. Johnston PhD
Ciné-Med, Inc.
A Survey of Research in the Field

Section 2: Trauma Training

Gerald A. Higgins PhD
SimQuest International, Inc.
Simulation Technologies for Medical Skills Training

Christoph Kaufmann MD MPH
Uniformed Services Univ of the Health Sciences
Limitations of Virtual Reality Surgical Testing

Section 3: Laparoscopic Skills Training

Sir Alfred Cuschieri FRSE, Section Chair
University of Dundee
Surgeon’s View on Surgical Competence

Zoltan Szabo PhD FICS
MOET Institute
Laparoscopic Surgical Skills Acquisition & Evaluation

Gerald M. Fried MD
McGill University
The “Mistels” Program: The McGinimate System for Training and Evaluation of Laparoscopic Skills

James C. Rosser, Jr. MD
Yale University School of Medicine
Objective Evaluation of a Laparoscopic Surgical Skill Program for Residents and Senior Surgeons

Christopher Sutton MSc
Virtual Presence Ltd.
Performance Assessment Using the Minimally Invasive Skills Trainer

Section 4: Setting the Agenda
Panel and Group Discussions

FRIDAY AFTERNOON

Newport North Room

SESSION C
Workshop: Researching & Developing Commercial Potential*
1:30 PM - 3:30 PM

Sponsored by the Orange County Business Council

Organizer: Jay De Long
Executive Director, Venture Point: Tech Coast SBDC

In the earliest stages of research & development, you must pay attention to your strategy for commercializing your product. This two-hour session will communicate several strategies, traditional and non-traditional, that will help you find the most applicable and rewarding commercialization method. The goal is that your product help people and also provide an optimal return on your investment.

The session is led by experienced life science CEOs and service providers. They will explain current trends that you should understand and incorporate as your product is designed, produced and distributed.

This workshop is presented and moderated by Venture Point, the only high tech and high growth-oriented SBDC in the country. Venture Point is based in Irvine, California.

*Please note: CME credit is not offered for this session.

FRIDAY EVENING

Pacific Ballroom, Salons D-F

The Exhibitor Reception*
6:00 PM to 7:30 PM

Join our exhibitors for refreshments and let them demonstrate their technology to you. We welcome all attendees to this popular event.

*Please note: CME credit is not offered for this session.
SATURDAY MORNING

Pacific Ballroom, Salons A-C

GENERAL SESSION

Looking into the Future

Moderator: Richard M. Satava MD FACS

8:30 Richard M. Satava MD FACS
Yale University School of Medicine
The Biointelligence Age: Medicine after the Information Age

8:45 Alan I. West
Assurance Medical, Inc.
Development and Evaluation of a Computer-Enhanced Breast Palpation Device

9:00 Medical Readiness Trainer Team
(Dag von Lubitz, Tim Fletcher & Jim Freer)
Lab of Emergency Medicine Simulation & Modeling Research, Univ of Michigan Health System
Immersive Virtual Reality Platform for Medical Education: Introduction to the Medical Readiness Trainer

9:15 Greg T. Mogel MD
US Army Medical Research & Materiel Command
Non-Traditional Defense Research in Advanced Medical Technologies

9:30 Charles Doarn
Medical Informatics & Technology Applications Consortium, Virginia Commonwealth Univ, Medical College of Virginia
Medical Informatics—Smart Systems for Medicine: Space Station and Beyond

9:45 Break

Optical Technologies: A Leading Edge in Cellular, Subcellular and Molecular Biology

Moderator: Faina Shtern MD

10:10 Faina Shtern MD
Beth Israel Deaconess Medical Center
Introduction

10:15 James Fujimoto PhD
Optics & Devices Group, Research Laboratory of Electronics, Massachusetts Inst of Technology
Biomedical Imaging Using Optical Coherence Tomography

10:35 Thomas M. Baer PhD
Arcturus Engineering, Inc.
Molecular Analysis of Pure Cell Populations from Solid-Tissue Samples Using Laser Capture Microdissection (LCM)

10:55 Steven D. Colson PhD
Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory
A Composite NMR/Optical Instrument for Microscopy and Spectroscopy of Living Cells

11:15 Vickie J. LaMorte PhD
Beckman Laser Inst & Medical Clinic
Structural Knockouts: Laser Microbeam Ablation of Nuclear Bodies

11:35 David A. Benaron MD
Sch of Medicine & Dept of Physics, Stanford Univ & Spectros Corp
Imaging Brain Function, Tumors, Infection and Gene Expression Using Light

11:55 Discussion

12:15 Presentation of the Sixth Annual Satava Award
For outstanding accomplishment in the field of interactive, computer-based technology for healthcare, the Satava Award was created in 1995 to acknowledge the many contributions of Dr. Richard Satava. This year’s award will be presented to an individual who has been responsible for noteworthy advances in the field.

12:30 Session ends
SUNDAY AFTERNOON

Pacific Ballroom, Salons A-B

SESSION A

Education, Part 2

Moderator: Greg T. Mogel MD

1:30 Dorothy Knox RN EdD
College of Nursing, Univ of Southwestern Louisiana
Virtual Reality Based Experiential Learning for Nursing Students

1:45 (Dipl.-Inform.) Gerrit Voss
Dept Visualization & Virtual Reality, Fraunhofer-Institut fuer graphische Datenverarbeitung
Lahystotrain—Intelligent Training System for Laparoscopy and Hysteroscopy

2:00 Michael A. J. Sawyer MD LTC MC
Dept of Surgery, Tripler Army Medical Ctr
Telementored Laparoscopic Cholecystectomy: A Pilot Study

2:15 Nuha El-Khalili PhD
Sch of Computer Studies, Univ of Leeds
WebSter: A Web-Based Surgical Training System

2:30 Ying Li MSc
Sch of Computer Studies, Univ of Leeds
Web-Based VR Training Simulator for Percutaneous Rhizotomy

2:45 Christoph Kaufmann MD MPH
National Capital Area Medical Simulation Ctr, Uniformed Services Univ of the Health Sciences
DTI Autostereographic Display: Initial Evaluation

3:00 Break

Haptics

Moderator: Suzanne J. Weghorst

3:20 Andrew Bzostek MS
Ctr for Computer Integrated Surgical Systems & Technology, Johns Hopkins Univ
Force vs. Deformation in Soft Tissue Puncture

3:35 (Prof.Dr.-Ing.) Heinz Wörm
Inst for Real-Time Computer Systems Robotics, Univ of Karlsruhe
Intuitive Operation Planning Based on Force Feedback

3:50 Mark P. Ottensmeyer MSME
Artificial Intelligence Lab, MIT
Input and Output for Surgical Simulation: Devices to Measure Tissue Properties in Vivo and a Haptic Interface for Laparoscopy Simulators

4:05 Martin Rydmark PhD
Mednet, Goteborg Univ
Modelling and Modification of Medical 3D Objects: The Benefit of Using a Haptic Modelling Tool

4:20 Mikio Suga MSc
Information Technology Ctr, NARA Inst of Science & Technology
Sensible Human Projects: Haptic Modeling and Surgical Simulation Based on Measurements of Practical Patients with MR Elastography—Measurement of Elastic Modulus

4:35 Session ends

SUNDAY AFTERNOON

Pacific Ballroom, Salon C

SESSION B

Diagnostic Tools

Moderator: Kirby G. Vosburgh PhD

1:30 John J. Bauer MD
US Army Medical Research & Materiel Command
3-D Computer Visualization and Interactive Prostate Biopsy Simulation Leads to an Improved Systematic Technique for the Detection of Prostate Cancer: Clinical Correlation

1:45 Jianchao Zeng PhD
ISIS Ctr, Dept of Radiology, Georgetown Univ Medical Ctr
Investigating 3D Tumor Distribution for the Diagnosis and Staging of Prostate Cancer
2:00  David R. Holmes III  
Biomedical Imaging Resource, Mayo Clinic  
*Novel Imaging Methods for Visualization and Analysis of the Prostate and Associated Tissues*

**Visualization**

2:15  Steven Senger PhD  
Dept of Computer Science, Univ of Wisconsin La Crosse  
The Design and Implementation of a Highly Interactive Visualization/Segmentation System for Use over the Next Generation Internet

2:30  Bruce M. Cameron  
Mayo Foundation  
*An Axial Skeleton Based Model Deformation Algorithm*

2:45  Jeffrey Berkley  
Human Interface Technology Lab, Univ of Washington  
*Creating Fast Finite Element Models from Patient-Specific Data*

3:00  Break

Moderator: Richard A. Robb PhD

3:20  Wei-Te Lin  
Mayo Foundation  
*Patient Specific Physics-Based Model for Interactive Visualization of Cardiac Dynamics*

3:35  Dipl-Inform.Med.) Volker Heid  
Deutsches Krebsforschungszentrum  
5D Interactive Realtime-Visualization of the Heart

3:50  Terry S. Yoo PhD  
Office of High Performance Computing & Communications, National Library of Medicine  
The Visible Human Toolkit: A New Research Program in Medical Image Data Processing

4:05  Bryan Stephens MS  
Dept of Computer Science, Texas Tech Univ  
Virtual Body Structures: 3D Structure Development Tool from Visible Human Data

4:20  (Dipl-Inform.) Arno Pernozzoli  
Universitätsklinikum Heidelberg, MKG-Chirurgie  
Clinical Evaluation of a Highly Accurate Algorithm for CT Bone Contour Segmentation

4:35  Session ends

**Saturday Afternoon**

California Ballroom, Salons 1-2

**Session C**

**Workshop: The Virtual Human Initiative**

1:30 PM - 4:00 PM

Sponsored by Oak Ridge National Laboratory

The Virtual Human Initiative will result in the human simulation environment of the 21st century—an integrated system of biological and biophysical models, data, and computational algorithms supported by advanced computational platforms. Eventually, each person may have their own clinical model. This simulation environment will have a research portion and clinical applications.

The Virtual Human Workshop will provide an opportunity to learn about this Initiative, still in its infancy. It will include expert presentations on its current status, including analysis of how it affects broader healthcare issues.

At the end of the workshop, agency representatives will have an opportunity to discuss their interests, and participants can give feedback to aid the Initiative's development process.

Presentations will include:

- **Clay E. Easterly PhD**  
  Oak Ridge National Laboratory  
  *What is the Virtual Human?*

- **Victor M. Spitzer PhD**  
  University of Colorado Health Sciences Center  
  The Visible Human Relationship to the Virtual Human

- **N. Ty Smith MD**  
  Univ of California, San Diego  
  Populating the Virtual Human with Data

- **James Bassingthwaighte MD PhD**  
  University of Washington  
  What Is the Value of Integrating Models?

- **Richard C. Ward PhD**  
  Oak Ridge National Laboratory  
  Issues and Approaches to Integrating Models

- **Richard M. Satava MD FACS**  
  Yale University  
  Applications of the Virtual Human
**SATURDAY AFTERNOON**

*California Ballroom, Salons 1-2*

**Demonstration: Stereoscopic Projection Technology***

5:00 PM - 6:00 PM

Participants:
- Wm. LeRoy Heinrichs MD PhD,
  Demonstration Chair
- Nigel W. John PhD
- Kevin Montgomery PhD
- Ramani Pichumani PhD
- Sakti Srivastava MD

About the projector and software sources:

BARCO Projection Systems is a world leader in large-screen projection, and a virtual pioneer in the field of 3D display systems. BARCO offers a series of complete state-of-the-art Virtual Reality and stereoscopic 3D display solutions, providing a broad range of display systems for virtual and augmented reality applications, from Virtual Surgery Tables to Reality Centers and other immersive systems. BARCO has the answer. BARCO Projection Systems maintains a specialized worldwide network of subsidiaries and distributors in more than 95 countries. This global scope is backed up by an efficient worldwide customer support infrastructure.

BARCO Projection Systems America
Contact: Andrew Joel
Market Development Manager, Virtual and Augmented Reality
3240 Town Point Drive
Kennesaw, GA 30144 U.S.A.
Phone: 1-770-218-3278
Fax: 1-770-218-3250
Email: Andrew.Joel@barco.com
www.barco.com/projecti/bsp

EON Reality delivers a high-performance software development tool for creating interactive, real-time 3D simulations. Users may design behaviors in the model to enhance the interactive effect. Users may also test simulations and change parameters, all in real-time. The EON product suite brings the power and versatility of advanced, high-end simulation technology to the PC platform.

EON Reality, Inc.
Contact: Mats W. Johansson, President
6 Morgan, Suite 116

Irvine, CA 92618
Email: mats@EONreality.com
Phone: (949) 609-1550, x16
E-fax: (520) 395-3320
www.EONreality.com

*Please note: CME credit is not offered for this session.

**SATURDAY EVENING**

*Pacific Ballroom, Salons A-C*

**The Medified Cyberarium: From the Decade of the Brain to the Millennium of the Mind***

6:00 PM
Lecture by Dave Warner MD

Physio info metrics for Anthrotronic systems. A Reference architecture for interfacing anthrotronic systems with physiologic mechanisms which modulate the Neuro matrix for Extending perceptual dimensionality and Enhancing expressive capacity.

6:45 PM - 9:00 PM
**Demonstrations/Interactions/Synergy Sessions**

The Medified Cyberarium is an ecological glimpse of some leading fringe thinking in instrumentation for wellness. A cyberpod of self-confessed media-driven stunt scientists will co-explore the physio-info-metrics of anthrotronic systems optimized for experiential interaction with hyperdimensional information. The intent is to extend perceptual state space and human function into new dimensions—and new opportunities—and to language the future of medicine while participating in the global knowledge convergence.

In the Cyberarium, you will conjecture possible futures within the context of cybersocial engineering and the new modes of empowerment generated by human-computer interaction. You will see the development of an operational interfacing architecture derived from Physio info metric principles. The cyberpod of medical infaunts will share their collaborative encounters with interactive experience stations and an emergent opportunity space where the “just conjured prototypes” of modified cybertronic wonders can be shared—from the medical infaunt’s “intelli-med-com vest” and wearable telemedical care-ports, to the hyperspectral cybernetic tissue function modulator.

Contact information is available at:
www.pulsar.org/contactus/emails.html


**SATURDAY AFTERNOON**

Newport North Room

**Symposium: VR & Mental Health**

**Co-Chairs:** Brenda K. Wiederhold MBA PhD & Ian Alger MD

**Moderators:** Giuseppe Riva PhD & Larry Hodges PhD

8:30  Brenda K. Wiederhold MBA PhD  
Welcome & Introduction—VR in the 90s: What Did We Learn?

8:45  Consa Perpiñá PhD  
Universidad de Valencia  
Presence and Reality Judgment in Virtual Environments: A Unitary Construct?

9:05  Michael Kahan MD  
Adult Ambulatory Care Clinic, Hillside Hosp  
Virtual Reality-Assisted Cognitive-Behavioral Treatment for Fear of Flying: Acute Treatment and Follow-up

9:25  Milton Huang MD  
Psychiatric Informatics Prog, Univ of Michigan Health System  
Who Will Experience a Virtual Experience?

9:45  Gabriele Optale MD  
Assoc of Medical Psychotherapists, Venice  
How and Where Does Virtual Reality Immersion Affect Brain and Mind?

10:05  Robert Stoerner MD  
Biosignals and Neuroimaging, Ctr of Applied Technologies in Mental Health, Univ of Basel  
Monitoring Human-VR Interaction: A Time Series Analysis Approach

10:25  Break

**Moderators:** Cristina Botella PhD & Brenda Wiederhold MBA PhD

10:35  Giuseppe Riva PhD  
Applied Technology for Neuro-Psychology Lab, Ist Auxologico Italiano  
VR in the Treatment of Obesity and Eating Disorders: Two Controlled Trials

*Please note: CME credit is not offered for this session.*
<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker/Institution/Title</th>
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<tbody>
<tr>
<td>10:55</td>
<td><strong>Brenda Wiederhold MBA PhD</strong>&lt;br&gt;Ctr for Advanced Multimedia Psychotherapy, CSPP Research &amp; Service Fdn&lt;br&gt;<em>Lessons Learned from 600 Virtual Reality Therapy Sessions</em></td>
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<tr>
<td>11:15</td>
<td><strong>Larry F. Hodges PhD</strong>&lt;br&gt;College of Computing, Georgia Inst of Technology&lt;br&gt;<em>Use of Virtual Reality as a Distractor for Painful Procedures in Pediatric Cancer Patients</em></td>
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<tr>
<td>11:35</td>
<td><strong>Mariano Alcainiz PhD</strong>&lt;br&gt;Medical Image Computing Lab, Univ Politecnica de Valencia&lt;br&gt;<em>A New Realistic 3D Body Representation in Virtual Environments for the Treatment of Disturbed Body Image in Eating Disorders</em></td>
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<td>11:55</td>
<td><strong>Hiroshi Oyama MD</strong>&lt;br&gt;National Cancer Center Hosp&lt;br&gt;<em>Virtual Forest Walk System Relieves Emesis-Like Symptoms During Our Patient’s Chemotherapy</em></td>
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<td><strong>Moderators: Ian Alger MD and Norm Alessi MD</strong></td>
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<td>1:30</td>
<td><strong>Ian Alger MD</strong>&lt;br&gt;New York Presbyterian Hospital/Weill Medical College of Cornell University&lt;br&gt;<strong>Welcome—Doctor/Patient Communication and Technology</strong></td>
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<td>1:45</td>
<td><strong>Francesco Vincelli MS</strong>&lt;br&gt;Applied Technology for Neuro-Psychology Lab, Istituto Auxologico Italiano&lt;br&gt;<em>Experiential Cognitive Therapy for the Treatment of Panic Disorders with Agoraphobia</em></td>
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<td>2:00</td>
<td><strong>Andreas Roessler ME</strong>&lt;br&gt;Competence Ctr Virtual Reality, Fraunhofer Inst for Industrial Engineering&lt;br&gt;<em>A Rapid Prototyping Framework for the Development of Virtual Environments Accessing Parameters of Mental Processes</em></td>
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<td>2:15</td>
<td><strong>Max M. North PhD</strong>&lt;br&gt;Virtual Reality Technology Lab, Clark Atlanta Univ&lt;br&gt;<em>Virtual Reality Therapy Combats Obsessive-Compulsive Disorders</em></td>
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<td>2:30</td>
<td><strong>Sun I. Kim PhD</strong>&lt;br&gt;Dept of Biomedical Engineering, Hanyang Univ</td>
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SUNDAY MORNING

Newport North Room

Symposium: VR & Mental Health, continued
Moderators: Morris Steffin MD & Alex Bullinger MD

8:25 Brenda K. Wiederhold MBA PhD
Welcome

8:30 Toshimitsu Musha (Doct.Sc.i.)
Brain Functions Laboratory, Inc.
Emotion Spectrum Analysis Method (ESAM)
for Monitoring the Effects of Art Therapy
Applied on Demented Patients

8:45 Siegfried Othmer PhD
EEG Spectrum, Inc.
Implementation of Virtual Reality in
EEG Biofeedback

9:00 Rita K. Addison MA
Development of the Empathy Learning
Virtual Environment System (ELVES)™:
1993 – The Present

9:15 Jaime Sanchez PhD
Dept of Computer Science, Univ of Chile
Usability and Cognitive Impact of the
Interaction with 3D Virtual Interactive
Acoustic Environments by Blind Children

9:30 Timothy R. Manning PhD
System Health Science Ctr, Texas A&M Univ
Signal Delay Effects on Rapport
in Telepsychiatry

9:45 Morris Steffin MD
Bridging the Gap Between Real Reality and
Virtual Reality: Intelligent Human-Machine
Therapeutic Interaction in Patient Videospace

10:00 John D. Hestenes PhD
Univ of California at San Diego
Cognitive Stress Tests in Virtual Environments:
Instrumentation Issues

10:15 Break

Moderators:
Milton Huang MD & Andy Dobrzeniecki PhD

10:25 Ralph Mager MD
Ctr of Applied Technologies in Mental Health,
Univ of Basel
Monitoring Brain Activity During Use of
Stereoscopic Virtual Environments

10:45 Rodney L. Myers MD
Kaiser Rehabilitation Center
Virtual Reality and Left Hemineglect

11:05 Andy B. Dobrzeniecki PhD
Panum Inst, Univ of Copenhagen & Harvard
Medical Sch & SGI A/S
Results of Clinical Trials with a Virtual
Environment for Cognitive Assessment and
Rehabilitation of Stroke

11:25 Tibor I. Kesztyues MD PhD
Div of Medical Informatics, Univ Goettingen
Pre-Clinical Evaluation of a Virtual Reality
Neuropsychological Test System: Occurrence of
Side Effects

11:45 Jocelyn Shealy McGee MSG MA
Alzheimer's Disease Research Center
Riding the Wave Into the Future of
Neuropsychological Assessment: The Use of
Virtual Environments to Assess Visuospatial
Abilities in Older Adults

12:05 Mark D. Wiederhold MD PhD FACP
Science Applications International Corp.
VR in the New Millennium: What's Next?

12:20 Session ends