

**MEDICINE  
MEETS  
VIRTUAL REALITY**

**Discovering Applications  
for 3-D Multi-Media Interactive Technology  
in the Health Sciences**

**June 4-7, 1992**

**San Diego, California**

# **MEDICINE MEETS VIRTUAL REALITY**

## **Discovering Applications for 3-D Multi-Media Interactive Technology in the Health Sciences**

A Symposium Sponsored by:  
The Plastic Surgery Research Foundation

and

Office of Continuing Medical Education  
University of California, San Diego

June 4-7, 1992  
San Diego, California

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*Discovering Applications for 3-D Multi-Media Technology in the Health Sciences*  
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**THURSDAY, June 4**

- 12:00 Registration Opens
- 1:15 Bus Departs for San Diego Supercomputer Center
- 2:00 **INTRODUCTORY TUTORIAL**  
to  
5:00 *Interactive Media, Cyberspace, and Virtual Environments: Creating Realities for Medical Education and Research*
- Joseph V. Henderson, M.D., Director, Interactive Media Lab, Dartmouth Medical School
- Joseph M. Rosen, M.D., Division of Plastic Surgery and Thayer School of Engineering, Dartmouth-Hitchcock Medical Center
- 5:00 Tour of San Diego Supercomputer Center
- 6:00 Bus Departs for Marriott

**FRIDAY, June 5**

- 7:00 Registration
- 8:00 **Welcome & Introduction**  
Ralph E. Holmes, M.D., Associate Professor of Plastic Surgery, UCSD
- OPERATING IN THE NEW PARADIGM**
- Moderator: Joseph V. Henderson, M.D.
- 8:05 *Imaging-Guided Stereotactic Tumor Diagnosis & Treatment*  
Faina Shtern, M.D., Head, Imaging Division, National Cancer Institute
- 8:30 *Advanced Imaging Techniques in Endoscopic Surgery: A Multi-Specialty Approach*  
Glenn M. Preminger, M.D., Associate Professor, Urology/Radiology, Southwestern Medical Center, Dallas
- 8:55 *Fast 3-D Imaging for the Interventional Radiologist*  
Harvey Eisenberg, M.D., Advanced Health Care, Brea, California
- 9:20 **FEATURED SPEAKER**  
*Virtual Reality in Medical Imaging: the Lunatic Fringe or the Ultimate Display... or Just a Good Dog Gone Bad?*
- Henry Fuchs, Ph.D., Federico Gill Professor of Computer Science, University of North Carolina, Chapel Hill
- 10:00 - 10:30 Break and Exhibits

**Moderator: Philip S. Green**

- 10:30 *Image-Directed Robotic Surgery*  
Howard A. Paul, D.V.M., Integrated Surgical Systems, Sacramento, California
- 11:00 *From Computer-Aided Design to Computer-Aided Surgery*  
Joseph M. Rosen, M.D., Department of Plastic Surgery, Dartmouth Medical School
- 11:30 *Tactile & Visual Simulation: A Realistic Endoscopy Experience*  
David Hon, President, IXION, Seattle
- 12:00 *Computer Interactive Neurosurgery*  
Patrick J. Kelly, M.D., Professor of Neurosurgery, Mayo Clinic
- 12:30 Lunch
- Moderator: Joseph M. Rosen, M.D.**
- 1:30 *Dataglove & Datasuit for Medical Applications*  
Walter Greenleaf, Ph.D., President, Greenleaf Medical Systems, Palo Alto, California
- 2:00 *Telepresence: Advanced Teleoperator Technology For Enhanced Minimally Invasive Surgery*  
Philip S. Green, Director, Bioengineering Research Laboratory, SRI International
- 2:30 *Surgery 2001: A Technologic Framework for the Future*  
Col. Richard Satava, M.D., Chief, General Surgery Service, Fort Ord
- 3:00 Break
- Moderator: Col. Richard Satava, M.D.**
- 3:20 *Dexterity Enhancement in Microsurgery Using Telemicrorobotics*  
Steven T. Charles, M.D., Vitreoretinal Surgeon, Memphis, Tennessee
- 3:45 *The Ultimate Insight: Automated Interpretation of Images of the Ocular Fundus*  
Michael Goldbaum, M.D., Ophthalmic Digital Imaging Laboratory, UCSD School of Medicine
- 4:10 *Cyberspace Representation of Vietnam War Trauma*  
Joseph V. Henderson, M.D., Director, Interactive Media Laboratory, Dartmouth Medical School
- 4:35 *Telemanipulation in Real and Virtual Environments*  
Paul J. Schenker, Ph.D., Group Supervisor, Man-Machine Systems, JPL, Pasadena, California
- 5:00 *Art & Physics: Parallel Visions in Space, Time & Light*  
Leonard Shlain, M.D., Laproscopic General and Vascular Surgery, San Francisco
- 5:30 Adjourn
- 5:30 to 6:30 Reception

Saturday, June 6

## WHEN IDEAS BECOME REALITY

**Moderator:** Suzanne Weghorst

8:00 *Diagnostic/Rehabilitation System Using Force Measuring and Force Feedback Dextrous Masters*  
Grigore Burdea, Ph.D., Assistant Professor, Rutgers University College of Engineering

8:20 *Biocontrollers: A Direct Link From the Nervous System to the Computer*  
Hugh S. Lusted, Ph.D., Stanford University School of Medicine  
R. Benjamin Knapp, Ph.D., San Jose State University

8:50 *Re-enabling Technologies: Immediate Medical Applications for VR*  
Dave Warner, Neurology Research Center, Loma Linda University Medical Center

9:15 *VR: The Next Step in Habilitation Technology*  
L. Scott Helmes, AIA, Skadden-Helmes Architects, Inc., Edina, Minnesota

### 9:40 **FEATURED SPEAKER**

*How Long Can Medicine Avoid User-Interfaces?*

Jaron Lanier, Founder & CEO, VPL Research, Inc., Redwood City, California

10:15 - 10:45 Break and Exhibits

**Moderator:** Walter J. Greenleaf, Ph.D.

10:45 *Innovations at the Human-Computer Interface: A Medical-Informatics Perspective*  
Eric J. Horvitz, Ph.D., Stanford University School of Medicine, Palo Alto, California

11:10 *Virtual Reality Surgical Simulator*  
Col. Richard Satava, M.D.

11:35 *3-D HDTV for Use in Medical Imaging: Theatre Presentation and Discussion*  
Jeffrey Birnbach, Sales & Marketing Manager, SONY Medical Systems

12:00 Lunch

**Moderator:** Steven T. Charles, M.D.

1:00 *Voice-Actuated Robotic Instrumentation*  
Marc D. Liang, M.D., Department of Plastic Surgery, University of Pittsburgh

1:25 *Using VR in Scientific Investigation: Human-Machine Interface Issues*  
Philip J. Mercurio, Visualization Specialist, San Diego Supercomputer Center

1:50 *Supercomputer Processing for 3-D Brain Visualization*  
Don Stredney, Assistant Professor, Advanced Computing Center for the Arts and Design,  
Ohio State University

2:15 *Pre-Surgical Neuromagnetic Mapping of Human Cortical Activity*  
Christopher Gallen, M.D., Ph.D., Scripps Clinic & Research Foundation, La Jolla

2:40 to 3:00 Break

3:00 to 5:00    **Abstract Presentations**

**Moderator: Dave Warner**

- 3:00            *Actuation and Force Sensing for Cable-Driven, Teleoperated Manipulators*  
D. Curtis Deno, M.D., Ph.D., Postdoctoral Research Engineer, University of California Berkeley
- 3:15            *Virtual Reality and the Sense of Touch*  
Paul S. Cutt, Vice President of Engineering, XTensory, Inc.
- 3:30            *Laparoscopic Colectomy and its Implications for the Use of Virtual Reality in Abdominal Surgery*  
Anthony V. Coletta, M.D., Associate Attending Surgeon, Bryn Mawr Hospital
- 3:45            *Experimental Analysis of Problems in Perception and Manipulation in Endoscopic Surgery*  
Frank Tendick, Research Assistant, University of California, San Francisco and Berkeley Joint Program in Bioengineering
- 4:00            *3-D Endoscopy in Neurosurgery*  
Volker Urban, M.D., Department of Neurosurgery, University Clinic Mainz, Germany
- 4:15            *In Silico Life, and the Art of Data-Animation*  
Hans B. Sieburg, Ph.D., Assistant Professor, HIV-Neurobehavioral Research Center University of California, San Diego
- 4:30            *The Neuro-Station: A Physician's Workstation for Analysis, Quantitation, and Visualization of Multimodality Neuro-Imaging*  
Kurt R. Smith, Sc.D., Director, Sound and Vision Research Laboratory, Southern Illinois University
- 4:45            *The Somascope: A Tool for Guided Self-Healing Using Medical Imaging*  
Alan B. Scrivener, Senior Corporate Technical Consultant, Kubota Pacific Computer, Inc.
- 5:00            *Current Research into the Medical Applications of Stereosynthesis and Cybersomatic Visualization*  
David M. Geshwind, President and Technical Director, Latent Image Development Corporation
- 5:15            *Remote Manipulation Interfaces: The Case of a Telepathology Workstation*  
Catherine Plaisant, Human-Computer Interaction Laboratory, Center for Automation Research, University of Maryland
- 5:30            **Adjourn**

Sunday, June 7

## MEDICINE IN A VIRTUAL WORLD

**Moderator:** Ralph E. Holmes, M.D.

- 8:00 *Medical Education in the '90s: Developing Network-Compatible Instructional Resources for UCSD's Core Curriculum*  
Helene Hoffman, Ph.D., Director, Learning Resources Center  
UCSD School of Medicine
- 8:25 *Inclusive Computing In Medicine*  
Suzanne Weghorst, Human Interface Technology Laboratory, Seattle, Washington
- 8:50 *Remapping the Human-Computer Interface for Medical Knowledge Visualization*  
Dave Warner, Neurology Research Center, Loma Linda University Medical Center
- 9:15 *Whose Reality? The VR Technology Agenda in Medicine*  
Michael S. Nilan, Ph.D., Associate Professor, School of Information Studies, Syracuse University
- 9:45 Break
- 10:00 **Conference Synthesis & Summary: Panel Discussion**  
**Moderator:** Jack C. Fisher, M.D., Professor of Surgery, UCSD  
President, Plastic Surgery Research Foundation
- Y. T. Chien, Ph.D., Director, Division of Information, Robotics & Intelligent Systems,  
National Science Foundation, Washington DC
- Ben Delaney, Publisher, CyberEdge Journal, Mill Valley, California
- Henry Fuchs, Ph.D., Federico Gil Professor of Computer Science,  
University of North Carolina, Chapel Hill
- Walter J. Greenleaf, Ph.D., President, Greenleaf Medical Systems,  
Palo Alto, California
- Col. Richard Satava, M.D., Chief, General Surgery Service, Fort Ord, California
- Faina Shtern, M.D., Head, Imaging Division, National Cancer Institute,  
Rockville, Maryland
- 12:00 **Adjourn**