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:
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University of California, San Diego

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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., Laparoscopic 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, Skåden-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
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