THE 13TH ANNUAL
MEDICINE MEETS
VIRTUAL REALITY
CONFERENCE

THE MAGICAL
NEXT
BECOMES
THE
MEDICAL
NOW

ORGANIZED BY
AMA, Inc. Aligned Management Associates, Inc.

IN PARTNERSHIP WITH:
TATRC Telemedicine & Advanced Technology Research Center,
U.S. Army Medical Research & Materiel Command
DARPA Defense Advanced Research Projects Agency
METI Medical Education Technologies, Inc.

JANUARY 26-29, 2005

THE WESTIN LONG BEACH HOTEL
LONG BEACH, CALIFORNIA
MMVR 13 Organizing Committee

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Human Interface Technology Lab, University of Washington

Mark D. Wiederhold MD PhD FACP
The Virtual Reality Medical Center

* Abstract Review Committee member
CONFERENCE INFORMATION

WELCOME

Welcome to the 13th annual Medicine Meets Virtual Reality conference.

The Magical Next Becomes the Medical Now: participation and contribution at the forefront of medical progress. At MMVR, the magical scenarios created by visionaries are realized through the relentless daily progress of engineers. Clinicians and educators guide application to patient care and medical training. Every year, conference participants make real what was once “magic.” At MMVR, we not only transform the magical next into the medical now, we turn vision into proficy.™

Once again, the MMVR program again reflects the state of the art for surgical simulation and its supporting technologies, modeling and haptics. Presenters will cover a wide gamut of tools, creating a more realistic and useful virtual patient. Simulation is on the verge of revolutionizing surgical training. We are excited that, after years of promise, its potential to make better surgeons is being realized.

There are also diverse presentations on imaging, robotics, and medical data networking. These technologies are helping providers meet the health needs of an expanding and aging global population. Progress in these areas means that economic stringency can be balanced with improved access to medical resources. Patients, physicians, and payers all benefit.

When warfare and terrorism threaten, advanced technologies offer new tools for safety. The best defense is intelligence networks and rapidly focused medical attention. We are pleased to host many presentations that support defense needs.

Lectures, posters, workshops, panels, exhibits, and informal conversation: these means of sharing new ideas are integral to your educational experience during the next few days. Many people have worked long hours to share here what they’ve learned. We hope you gain many new ideas and experiences from them.

COURSE DESCRIPTION & OBJECTIVES

MMVR13 is designed as a forum for encouraging and sharing innovative research on information-based tools for clinical care and medical education. The program consists of two general sessions, nine parallel sessions, six panel/workshop activities, one poster session, one exhibitor reception, and one full-day adjunct symposium.

Presentations are chosen with the objective of educating participants on:

- State-of-the-art for surgical simulation and its enabling technologies: haptics, tissue modeling, and simulation
- Emerging tools for clinical diagnosis and therapy: imaging tools, data visualization and fusion techniques, and robotics
- Intelligence networks for medical decision-making and patient care

TARGET AUDIENCE

MMVR13 is designed to educate and inform:

- Physicians, surgeons, and other healthcare professionals interested in emerging and future tools for diagnosis and therapy
- Educators responsible for training the next generation of doctors and scientists
- Computer technologists designing systems for gathering, processing, and networking medical intelligence
- IT and medical device engineers who develop and market state of the art imaging, simulation, robotics, and communication tools
- Military medicine specialists addressing the challenges of warfare and defense health needs
- Biomedical futurists and investors who need to understand where medicine is headed

ACKNOWLEDGMENTS

The conference organizers wish to thank our colleagues at TATRC/USAMRC for their extensive participation in the conference. The MMVR educational curriculum continues to benefit from their interest and enthusiasm.

Similarly, we acknowledge our colleagues at DARPA for their significant contribution to the program.

We thank Medical Education Technologies, Inc. (METI) for its generous sponsorship of the Satava Award as well as its assistance with program content.

We are grateful to the Organizing Committee for its ongoing encouragement and guidance. We especially thank committee members who review abstracts and thus contribute an extra portion of energy and critical judgment to MMVR. We give additional thanks to the Proceedings editors for giving us their time and expertise.

Last but certainly not least, we thank to all the researchers who present their work here at MMVR. Their shared magic—the magic of discovery—makes this conference possible.

EVALUATION

We welcome the input of all conference participants. Please complete your conference evaluation before you leave. We carefully take note of your criticism and suggestions when we create next year’s program. Please take a few minutes to write down your reactions, negative and positive, to the conference.
SATAVA AWARD

The 11TH annual Satava Award will be presented at MMVR13. Established in 1995, the award acknowledges the work of Dr Richard M. Satava, its first recipient. It is presented each year to an individual or research group that demonstrates unique vision and commitment to the improvement of medicine with advanced technology. Past recipients of the award are:

Steve Dawson MD (2004)
Richard Robb PhD (2003)
SUMMIT Lab, Stanford University (2002)
HIT Lab, University of Washington (2001)
Dave Warner MD PhD (2000)
Faina Stern MD (1999)
Gerhard Buess MD (1998)
Henry Fuchs PhD (1997)
Victor Spitzer PhD and Michael Ackerman PhD for the Visible Human (1996)
Richard Satava MD FACS (1995)

Medical Education Technologies, Inc. (www.meti.com) is sponsoring the 11th annual Satava Award with a prize of $2500.

DISCLAIMER

The information provided at this conference is intended for general medical education purposes only. All physicians should fully investigate any new product or device before implementing it in their practice. In no event will the conference organizer assume responsibility for any decision made or action taken as a result of the information provided through this activity.

ORGANIZER CONTACT INFO

Medicine Meets Virtual Reality c/o
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San Luis Obispo, CA 93405 USA
Phone 1.805.534.0300
Fax 1.805.534.9030
mmvr13@nextmed.com
http://www.nextmed.com/mmvr_virtual_reality.html
Presentation Schedule

WEDNESDAY, January 26, 2005

8:00am–5:30pm
PRINCIPAL INVESTIGATORS' REVIEW 2005
Telemedicine & Advanced Technology
Research Center
US Army Medical Research & Materiel Command
(TATRC/USAMRMC)

[Please see separate TATRC agenda for details.]

6:00pm–7:30pm
TATRC Networking Social

THURSDAY MORNING, January 27, 2005

GENERAL SESSION

8:00 Welcome
James D. Westwood and Karen S. Morgan
Aligned Management Associates, Inc.

8:05 Beyond VR: Creating the Augmented Physician
Kirby G. Vosburgh PhD
CIMIT/Massachusetts Gen Hosp/Harvard Medical Sch

CURRENT ADVANCED INITIATIVES IN THE DoD – THE DARPA PORTFOLIO

Moderator:
Richard M. Satava MD FACS

8:25 Introduction
Richard M. Satava MD FACS
Surgery, Univ Washington; DARPA

8:30 Intelligent Multimodal Volume Angio CT (IM-VAC)
Harvey C. Eisenberg MD
HealthView Inc.

8:45 Virtual Soldier
Brian D. Athey PhD
Michigan Ctr for Biological Information, Univ Michigan

9:00 Trauma Pod
Pablo Garcia PhD
SRI Intl

9:15 Virtual Autopsy
CDR Craig T. Mallak MD JD
Off Armed Forces Medical Examiner
Armed Forces Inst Pathology

9:30 Intelli-Cath: Toward Automated Needle-Insertion Systems and Intelligent Catheters
Thomas L. Ferrell PhD & François G. Pin PhD
Oak Ridge Natl Lab

9:45 Auto Anesthesia
S. Ward Casscells MD & Jodie L. Conyers PhD
Univ Texas Health Science Ctr - Houston

10:00 Break - Exhibits Open

When Does the Magical Next become the Medical Now? A Brief History of NIST Investment in VR
Omid Omidvar PhD
Advanced Technology Program,
Natl Inst Standards and Technology (NIST)

10:40 When Does the Magical Next become the Medical Now? A Brief History of NIST Investment in VR
Omid Omidvar PhD
Advanced Technology Program,
Natl Inst Standards and Technology (NIST)

11:00 Brain and Mind - Therapy and Change
Ian Alger MD
New York Presbyterian Hosp; Weill Medical Coll of Cornell Univ

11:20 The Effect of Videogame “Warm-Up” on the Performance of Video-Endoscopic Surgery Tasks
James “Butch” Rosser, Jr. MD FACS
Advanced Medical Technology Inst, Beth Israel Medical Center

11:40 Remote Presence Robotics: Multiplying Physician Capabilities
Yulun Wang PhD
InTouch Health Inc.

12:00 Break

THURSDAY MORNING, January 27, 2005

SESSION B

10:10am–12noon
PANEL/WORKSHOP:
EMERGING TRENDS IN MEDICAL SIMULATION:
IDENTIFYING THE NEEDS OF THE MEDICAL COMMUNITY AND METHODS TO ADDRESS THEM

Presenters:
Alan Liu PhD
Natl Capital Area Medical Simulation Ctr,
Uniformed Services Univ

Mark Bowyer MD
Natl Capital Area Medical Simulation Ctr,
Uniformed Services Univ

Mark W. Scerbo PhD
Psychology, Old Dominion Univ

Dale C. Alverson MD
Ctr for Telehealth, Univ New Mexico Sch Medicine
### THURSDAY AFTERNOON, January 27, 2005

#### SESSION A - HAPTICS

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
<th>Speaker(s)</th>
<th>Affiliation(s)</th>
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<tbody>
<tr>
<td>1:10</td>
<td>Moderator's Welcome</td>
<td>Roger Phillips PhD</td>
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<tr>
<td>1:15</td>
<td>A Dynamic Friction Model for Haptic Simulation of Needle Insertion</td>
<td>Yinghui Zhang</td>
<td>Computer Science, Univ Hull (UK)</td>
</tr>
<tr>
<td>1:30</td>
<td>A Real-Time Haptic Interface for Interventional Radiology Procedures</td>
<td>Thomas Moix, Dipl-Ing</td>
<td>LSRO, Ecole Polytechnique Federal de Lausanne</td>
</tr>
<tr>
<td>1:45</td>
<td>In Vivo Force during Arterial Interventional Radiology Needle Puncture Procedures</td>
<td>Andrew Healey MBChB</td>
<td>Royal Liverpool Univ Hosp</td>
</tr>
<tr>
<td>2:00</td>
<td>Dynamic Augmented Reality for Haptic Display in Robot-Assisted Surgical Systems</td>
<td>Takintope Akinbiyi BS</td>
<td>Mechanical Engineering, Johns Hopkins Univ</td>
</tr>
<tr>
<td>2:15</td>
<td>Stiffness and Texture Perception for Teledermatology</td>
<td>Christopher Enedah MS</td>
<td>Mechanical Engineering, Stanford Univ</td>
</tr>
<tr>
<td>2:30</td>
<td>Real-Time Haptic Interface for VR Colonoscopy Simulation</td>
<td>Dejan Ilic, Dipl-Ing</td>
<td>LSRO, Ecole Polytechnique Federal de Lausanne</td>
</tr>
<tr>
<td>2:45</td>
<td>Break</td>
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#### SESSION A - VISUALIZATION

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<tr>
<td>3:00</td>
<td>Spherical Mechanism Analysis of a Surgical Robot for Minimally Invasive Surgery - Analytical and Experimental Approaches</td>
<td>Jacob Rosen PhD</td>
<td>Electrical Engineering, Univ Washington</td>
</tr>
<tr>
<td>3:15</td>
<td>Improving In Vivo Robot Vision Quality</td>
<td>Jason Dumpert</td>
<td>Mechanical Engineering, Univ Nebraska – Lincoln</td>
</tr>
<tr>
<td>3:30</td>
<td>Development of a Navigation Function for an Endoscopic Robot Surgery System</td>
<td>Asaki Hattori PhD</td>
<td>Inst High Dimensional Medical Imaging, Jikei Univ Sch Medicine</td>
</tr>
<tr>
<td>4:00</td>
<td>Development of a 3D Visualization System for Surgical Field Deformation using Geometric Pattern Projection</td>
<td>Mark Rentschler MS</td>
<td>Mechanical Engineering, Univ Nebraska – Lincoln</td>
</tr>
<tr>
<td>4:15</td>
<td>The Use of the Synchrotron to Generate 3D Computer Models of Anatomical Structures</td>
<td>Eric Herbranson DDS</td>
<td>Endodontics, Univ Pacific Sch Dentistry</td>
</tr>
<tr>
<td>4:30</td>
<td>Dynamic Visualization of Pelvic Floor Contractility of the Female Derived from Multi-Planar MR Imaging</td>
<td>Chris Constantinou PhD</td>
<td>Urology, Stanford Univ Medical Sch</td>
</tr>
<tr>
<td>4:45</td>
<td>Hybrid CT and 3D Scanner Models for Orthognathic Surgery Planning</td>
<td>Jonas Chapuis MSc</td>
<td>Surgical Instruments, ME Muller Research Ctr for Orthopaedic Surgery</td>
</tr>
<tr>
<td>5:00</td>
<td>Integration of a Real-time 3D Image-Guided Breast Surgical System based on 2D Ultrasound Machine</td>
<td>Yan Kang PhD</td>
<td>Neurosurgery, Stanford Univ</td>
</tr>
<tr>
<td>5:15</td>
<td>Break</td>
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#### SESSION A - ROBOTICS

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<td>Inst High Dimensional Medical Imaging, Jikei Univ Sch Medicine</td>
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#### SESSION B - SIMULATOR TRAINING FUNDAMENTALS

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<tr>
<td>1:10</td>
<td>Moderator's Welcome</td>
<td>Randy S. Haluck MD FACS</td>
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</tr>
<tr>
<td>1:15</td>
<td>Virtual Training Improves Students’ Knowledge Structures of Medical Concepts</td>
<td>Susan M. Stevens</td>
<td>Psychology, Univ New Mexico</td>
</tr>
<tr>
<td>1:30</td>
<td>The Effect of Knowledge Transfer on the Acquisition of Intracorporeal Suturing Skill</td>
<td>Paul Lynch MD</td>
<td>Advanced Medical Technology Inst, Beth Israel Medical Ctr</td>
</tr>
<tr>
<td>1:45</td>
<td>Does Haptic Feedback Enhance Performance in Invasive Image Guided Simulator Training?</td>
<td>Pär Ström MD</td>
<td>Div of Orthopedics, Ctr for Surgical Sciences and Ctr for Advanced Medical Simulation, Karolinska Inst</td>
</tr>
</tbody>
</table>
2:00 Learning to Use a Simulated Angled Laparoscope: How Practice Moderates Individual Differences
Madeleine Keehner PhD
Psychology, Univ California, Santa Barbara

SESSION B - SIMULATOR DEVELOPMENT TOOLS

2:15 Dynamic Generation of Surgery Specific Simulators - A Feasibility Study
Eric Acosta MS
Computer Science, Texas Tech Univ

2:30 Assessing Surgical Skill Training under Hazardous Conditions in a Virtual Environment
Mark W. Scerbo PhD
Psychology, Old Dominion Univ

2:45 Laparoscopic Task Recognition using Hidden Markov Models
Aristotelis Dosis MSc
Surgical Oncology and Technology, Imperial Coll London

3:00 Simulating Surgical Incisions without Polygon Subdivision
Yogendra Bhasin MSEE
Natl Capital Area Medical Simulation Ctr, Uniformed Services Univ

3:15 Break

SESSION B - SURGICAL MODELING

Moderator:
Makoto Nonaka MD PhD

3:30 A GPU Accelerated Spring Mass System for Surgical Simulation
Jesper Mosegaard MSc
Computer Science, Univ Aarhus

3:45 Enhanced Pre-Computed Finite Element Models for Surgical Simulation
Hua liang Zhong PhD
Advanced Imaging Labs, Roberts Research Inst

4:00 FEM-Based Soft Tissue Destruction Model for Ablation Simulator
Naoto Kume PhD (Cand)
Graduate Sch Informatics, Kyoto Univ

4:15 Tearing of Membranes for Interactive Real-Time Surgical Training
Johannes Grimm
ICM-Inst Computational Medicine, Univ Mannheim

4:30 Development of a Method for Surface and Subsurface Modeling using Force and Position Sensors
Thenkurussi Kesavadas PhD
Mechanical and Aerospace Engineering, State Univ New York at Buffalo

4:45 Towards Real-Time Interventional Simulation of Balloon Angioplasty and Stenting
Patricia Debergue PhD
Industrial Materials Inst, Natl Research Council Canada

5:00 A Mechanical Contact Model for the Simulation of Obstetric Forceps Delivery in a Virtual/Augmented Environment
Rudy Lapeer PhD
Sch Computing Sciences, Univ East Anglia

5:15 Break

THURSDAY AFTERNOON, January 27, 2005

SESSION C

1:10pm-5:00pm

PANEL - NATIONAL SECURITY AND VIRTUAL REALITY

Presentations:

Overview of Virtual Reality and National Security
Joseph Rosen MD
Surgery, Dartmouth-Hitchcock Medical Ctr
Thayer Sch Engineering, Dartmouth Coll

Tele-Immersion and Command and Control for National Security
Jaron Lanier
SGI; Intl Computer Science Inst

Training of First Responders for CBRNE
Joseph Henderson MD
Interactive Media Lab, Dartmouth Medical Sch

Visualization of CBRNE Response Scenarios using Wide Area Virtual Environment (WAVE)
Alan Liu PhD
Natl Capital Area Medical Simulation Ctr, Uniformed Services Univ

Disaster Management at a Distance using Teleoperations and enabling First Responders with Hand-Held Devices
Ronald Merrell MD FACS
Medical Informatics and Technology Applications Consortium; Surgery, Virginia Commonwealth Univ

Point of Care Devices for Disaster Response
Alex Demas
Middlebury Coll

Understanding the Response to 9/11 at the Pentagon and How We Will Respond to Future Medical Disasters
COL James A. Geiling MD FACP
Assoc Prof Medicine, White River Junction Veterans Administration Medical Center
THURSDAY EVENING POSTERS

5:15pm–6:30pm

POSTER SESSION

Virtual Reality Colonoscopy Simulation: A Compulsory Practice for the Future Colonoscopist?
Gunnar Ahlberg MD
Surgery, Karolinska Hosp, Stockholm

Desktop and Conference Room VR for Physicians
Zhuming Ai PhD
Biomedical and Health Information Sciences, Univ Illinois at Chicago

An Augmented Reality System to Enhance Intraoperative Visualization for Computer Assisted Neurosurgery
Mohammed E. Alam MS
Neurosurgery, Wayne State Univ

Can the Minimally Invasive Surgical Trainer Discriminate between Levels of Surgical Experience?
Dimitrios V. Avgerinos MD
Surgery, Tufts-New England Medical Ctr

Surface Scanning Soft Tissues
Nick Avis PhD
Sch Computer Science, Cardiff Univ

Predicting Cognitive Performance of Deploying Health Teams
Bettina A. Babbitt PhD
UsabilityMDx

Validation of a Bovine Rectal Palpation Simulator for Training Veterinary Students
Sarah Baillie MSc MRCVS
Computing Science, Univ Glasgow

Facial Plastic Surgery Planning using a 3D Surface Deformation Tool
Fernando Bello PhD
Surgical Oncology and Technology, Imperial Coll London

3D Real-Time FEM-Based Guide-Wire Simulator for Neuro-Endovascular Surgery
Suraj Bhat MS
Mechanical and Aerospace Engineering, State Univ New York at Buffalo

Tracking Physiological Models by Kalman Filters
Fred Bookstein PhD
Univ Michigan

Validation of SimPL - A Simulator for Diagnostic Peritoneal Lavage Training
Mark Bowyer MD
Natl Capital Area Medical Simulation Ctr, Uniformed Services Univ

A Web-Based Remote Collaborative System for Visualization and Assessment of Semi-Automatic Diagnosis of Liver Cancer from CT Images
Alexandra Branzan Albu PhD
Electrical and Computer Engineering, Univ Laval

3D Video Assisted Thoracoscopic Surgical (VATS) Training Model: Comparison of Error Rates and Task Completion Times using Zero Latency, High Resolution 3D Display vs. 2D Video Display
Derek Brinster MD
Surgery, Brigham and Women’s Hosp

A Haptically Enabled Dental Simulator
W. Paul Brown DDS
Natl Biocomputation Ctr, Stanford Univ

Application of a Collaborative Virtual Environment for Learning Molecular Biology
Cesar Bustos MS
Virtual Reality Laboratory, Univ Colima

Heterogeneous Displays for Surgery and Surgical Simulation
Jesus Caban BA
Computer Science, Univ Kentucky

Visualization of Treatment Evolution using Hardware-Accelerated Morphs
Bruno Carvalho PhD
Computer Science, Stevens Inst Technology

Shape Statistics Mumford-Shah Model for Outer Contour Segmentation of the Left Ventricle MR Image
Qiang Chen PhD (Cand)
Computer Dept, Nanjing Univ Science and Technology

Real-time Rendering of Radially Distorted Virtual Scenes for Endoscopic Image Augmentation
Min Si Chen MSc
Sch Computing Sciences, Univ East Anglia

Can 3D Imaging System be Used as a Tool in the Learning Process of the Young Minimal Invasive Surgeon?
Amir Cohen MD
Surgery, Chaim Sheba Medical Ctr

Continued
THURSDAY EVENING POSTERS (Cont.)

Tracking the Domain: The Medical Modeling and Simulation Database
C. Donald Combs PhD
Natl Ctr for Collaboration in Medical Modeling and Simulation

Development of Simulation Technology for Microgravity Emergency Medical Procedures
C. Marsh Cuttino MD
Emergency Medicine, Virginia Commonwealth Univ Medical Ctr

Real-Time Interactions with Reconstructed Deformable Organs
Lucio Tommaso De Paolis PhD
Innovation Engineering, Univ Lecce, Italy

Structural Flexibility of Laparoscopic Instruments: Implication for the Design of Virtual Reality Simulators
Adam Dubrowski PhD
Surg., Univ Toronto

Intraoperative Augmented Reality: The Surgeon’s View
Georg Eggers MD DMD
Cranio-Maxillofacial Surgery, Heidelberg Univ

Analytic Simulation of Penetrating Wounds to the Heart
Robert Eisler, Engr.
Applied Mechanics and Material Sciences Group, ATK Mission Research Corporation

Haptic Simulation of the Milling Process in Skull Bone Operations - Modeling of Contact Forces
Magnus Eriksson PhD (Cand)
Mechatronics, Dept of Machine Design, Royal Inst Technology - KTH

E-Learning Experience: Teaching Model with Undergraduate Surgery Students in a Developing Country
Andres Espinosa-Bode MD
Medical Education, Univ Colegio Mayor de Nuestra Señora del Rosario

A Real-Time Ultrasonography Simulator based on CT-Scan Images
Clément Forest PhD
VIRTUALS, IRCAD

Modeling Biologic Soft Tissues for Haptic Feedback with a Hybrid Multi-Resolution Method
Antonio Frisoli PhD
PERCRO (PERCuptual ROBotics), Scuola Superiore Sant’Anna

Face Validity a Full Procedural Virtual Reality Training System with Haptics for Carotid Stenting: The Vascular Interventional System Trainer (VIST) for Carotid Stenting
Anthony Gallagher PhD
Endosurgery Unit, Emory Univ

Global Treatment Protocol Course via Advanced Distributive Learning and Deployable Simulation Training for Operational Medical Personnel: Making Training Cost-Effective and Innovative
Roberta S. Gearhardt RN
JXT Applications Inc.

Control of Laparoscopic Instrument Motion in an Inanimate Bench Model: Implications for the Training and Evaluation of Technical Skills
David Gonzalez PhD (Cand)
Kinesiology, Univ Waterloo

Interactive Real-Time Simulation of an Endoscopic Polyp Removal
Johannes Grimm
ICM-Inst Computational Medicine, Univ Mannheim

VR Headset-Based eICU
Curt Grob BS
Advanced Technologies Laboratory, VRSurgeon Inc.

Determining the Efficacy of an Immersive Trainer for Arthroscopy Skills
Hope S. Hanner-Bailey MS
Psychology, Old Dominion Univ

Dynamic Data Collection Platform using VR Training Software and Inanimate Simulator
Brett M. Harnett BS
Ctr for Surgical Innovation, Univ Cincinnati

Using an Approximation to the Euclidean Skeleton for Faster Collision Detection and Tissue Deformations in Surgical Simulators
Matthew Harris
Computer Science, Millersville Univ

Surgical Robot Setup Simulation with Consistent Kinematics and Haptics for Abdominal Surgery
Mitsuhiro Hayashibe MS
Inst High Dimensional Medical Imaging, Jikei Univ Sch Medicine

Collaborative Biomedical Data Exploration in Distributed Virtual Environments
Zhiyu He PhD
Ctr for Visualization and Interactive Systems (CVIS), California Inst Telecommunications and Information Technology (Cal-IT2); Univ California, Irvine

Continued
THURSDAY EVENING POSTERS (Cont.)

An Augmented Reality System to Evaluate the Effects of Monocular Visual Feedback Delay on Telesurgical Task Performance
Barry Herman MSE (Cand)
Computer Science, Johns Hopkins Univ; Walter Reed Army Medical Ctr

The Use of CD-ROM Patient Education Modules to Assist in Accomplishing Informed Consent for Minimally Invasive Procedures: An Initial Evaluation
Bjorn Herman
Beth Israel Medical Ctr

Image Analysis for Preoperative Planning in Neck Surgery
Ilka Hertel
ORL Innovation Ctr Computer Assisted Surgery (ICCAS)

3D Finite-Element Quantification of Echocardiogram Data: A Study in Pediatric Heart Disease
Don Hilbelink PhD
Anatomy, Univ South Florida

The Virtual Pediatric Standardized Patient Application: Evaluation Findings
Robert Hubal PhD
Technology Assisted Learning Div, RTI Intl

A Networked Haptic Virtual Environment for Teaching Temporal Bone Surgery
Matthew Hutchins PhD
ICT Centre, CSIRO Australia

A Cyber Infrastructure to Support Physics Based Organ Geometries for Surgical Planning
Thomas J. Impelluso PhD
Mechanical Engineering, San Diego State Univ

Adaptive Soft Tissue Deformation for a Virtual Reality Surgical Trainer
Lenka Jerabkova, Dipl-Ing
Virtual Reality, Ctr for Computing and Communication, RWTH Aachen Univ

Simulation of Color Deficiency in Virtual Reality
Bei Jin MS
Biomedical and Health Information Sciences, Univ Illinois at Chicago

ChiroSensor - An Array of Non-Invasive sEMG Electrodes
Edmond Jonckheere PhD
Electrical Engineering & Mathematics, Univ Southern California

Visualization of Surgical 3D Information with Projector-Based Augmented Reality
Lüder Alexander Kahrs, Dipl-Phys
Inst Process Control and Robotics, Univ Karlsruhe (TH)

Fullscale Simulation in Interventional Cardiology
Erhard Kaiser MD
Medical Departement, Cardiology, Johannes Gutenberg Univ Mainz

The Haptic Kymograph: A Diagnostic Tele-Haptic Device for Sensation of Vital Signs
Thenkurussi Kesavadas PhD
Mechanical and Aerospace Engineering, State Univ New York at Buffalo

A Realistic Dental Simulation via Haptic Interface
Laehyun Kim PhD
System Research Div, Korea Inst Science and Technology

International Telemedicine using Next Generation Internet Technologies and Digital Video Transport System
Young-Woo Kim MD PhD
Ctr for Gastric Cancer, Natl Cancer Ctr

Aligning Expectations in Strategic Alliances for Disruptive Technology
Sharon Klein JD
Pepper Hamilton LLP

A Study of Displaying Video Images for the Manipulation of Forceps under Video Images
Soichi Kono BSE
Information Science and Electrical Engineering, Kyushu Univ

Innate Tremor Measurements Predict Laparoscopic Performance
James R. Korndorffer, Jr MD
Surgery, Tulane Health Sciences Ctr

A CT-Based System to Calculate Range of Motion of the Hip Joint and to Simulate the Femoroacetabular Reshaping
Monika Kubiak-Langer PhD (Cand)
Müller Research Ctr for Orthopaedic Surgery, Inst Surgical Technology and Biomechanics, Univ Bern

The VREST Learning Environment
Eduard E. Kunst PhD
Kunst & van Leerdam Medical Technology bv

MVL: Medical VR Simulation Library
Yoshihiro Kuroda MS
Graduate Sch Informatics, Kyoto Univ

Instant Electronic Patient Data Input during Emergency Response in a Major Disaster Setting
Christophe Laurent MD
Emergency Medicine, Monica General Hosp

Continued
Haptic Device for Colonoscopy Training Simulator
Doo Yong Lee PhD
Mechanical Engineering, Korea Advanced Inst Science and Technology

In PACS System, Breast Cancer Diagnosis using Ultrasound Image
Jeanhyoun Lee PhD
Development, Marotech Inc.

Predicting the Cognitive Readiness of Deploying Health Teams
Joseph B. Lyons MS
JXT Applications Inc.

Laparoscopy Surgery Simulation and Training with Telementoring
Ramesh Makam DNB
Laparoscopy, Bangalore Endoscopic Surgery Training Inst and Research Centre

Low Cost Telemedicine Delivery in a Military and Veteran Environment
Ann Martin
Univ Queensland; Centre for Military and Veterans Health

Real-time Visualization of Cross-sectional Data in 3D
Terrence Mayes BS
Concept Exploration Laboratory, NASA/JSC, Barrios Inc.

LapSim: A Learning Environment for Both Experts and Novices
James J. McGinty MD
Surgery, St. Luke’s-Roosevelt Hosp Ctr

Representing the Holomer on Digital Media: Challenges and Opportunities for Data Representation and Compression
Thomas G. Menten PhD
Crowley Davis Research

Clinical Information from Telemedicine on the Field of Oriental Traditional Medicine
Iwane Mitsui MD
Alternative Medicine, Mitsui Medical Clinic

Use of Virtual Environments and VR Technology in Behavioral Health: Is the Bang Worth the Bucks?
Sarah Miyahira PhD
Intramural Research, Pacific Telehealth & Technology Hui

From Puma of Unimation 6000 Robot to Tonatiuh Robot
José Luis Mosso MD
ISSSTE / IMSS / CONACY

Interactive 3D Region Extraction of Volume Data Using Deformable Boundary Object
Megumi Nakao PhD
Medical Informatics, Kyoto Univ Hosp

Virtual Surgical Telesimulations in Otolaryngology
Andrés A. Navarro Newball MSc
Computer Science, Univ Javeriana, Cali

Evaluation of 3D Airway Imaging of Obstructive Sleep Apnea with Cone-Beam Computed Tomography
Takumi Ogawa PhD
Oral Medicine Div of Diagnostic Science, Sch Dentistry, Univ Southern California

A Deformer-Based Surgical Simulator Program for Cleft Lip and Palate Surgery
Aaron Oliker MS
Inst Reconstructive Plastic Surgery, New York Univ Medical Ctr

PC Simulated Patients for Training Difficult Diagnosis and Treatment Protocols
Dale Olsen PhD
SIMmersion LLC

Multi-Sensory Surgical Support System Incorporating Tactile, Visual and Auditory Perception Modalities
Sadao Omata PhD
NEWCAT Inst, Nihon Univ

A Web Service-Based Computational Environment for Biomedical Computing
Line Pouchard
Computer Science and Mathematics Div, Oak Ridge Natl Laboratory

Surgical Task Execution in Microgravity
Azhar Rafiq MD MBA
Surgery, Medical Informatics and Technology Applications Consortium

Smart Catheter Vascular Access Training Concepts
Robert C. Read MBA
Clinical Applications Div, TATRC, USMRMC

A Wireless Vital Signs System for Combat Casualties
Peter Rhee MD MPH FACS
Navy Trauma Training Ctr, LA County Hosp & Univ Southern California

3D Model for Haptic Rendering of Blood-Tissue Interaction
Sugeng Rianto MD
Medical Imaging, Curtin Univ Technology

A Novel Drill Set for the Enhancement and Assessment for Robotic Surgical Performance
Charles Ro MD
Surgery, St. Luke’s-Roosevelt Hosp Ctr

Continued
THURSDAY EVENING POSTERS (Cont.)

Advanced Modeling and Visualization of Cardiothoracic Electrical Fields
Frank B. Sachse, Dr-Ing
Nora Eccles Harrison Cardiovascular Research and Training Inst, Univ Utah

COCCON: Building Knowledge Driven and Dynamically Networked Communities within European Healthcare Systems
Alberto Savoldelli
Management Engineering, Politecnico of Milan

Visualizing Volumetric Data Sets using a Wireless Handheld Computer
Steven Senger PhD
Computer Science, Univ Wisconsin - La Crosse

Affordable Virtual Environments: Building a Virtual Beach for Clinical Use
Andrei Shershtuky PhD
Telehealth Research Inst, Univ Hawaii

Analysis of Masticatory Condition using the 4D Muscle Model for a Patient with a Square Mandible
Yuhko Shigeta DDS DDSc
Fixed Prosthodontics, Tsurumi Univ Sch Dental Medicine

Automated Renderer for Visible Human and Volumetric Scan Segmentations
Jonathan Silverstein MD
Surgery, Univ Chicago

Assessment of Brain Activities in Immersive Environments
Jeff Singleton
CSIS, Kennesaw State Univ

Monitor Height Affects Surgeons’ Stress Level and Performance on Minimally Invasive Surgery Tasks
Warren Smith PhD
Electrical and Electronic Engineering, California State Univ, Sacramento

The Physiology and Pharmacology of Growing Old, as Shown in Body Simulation
N. Ty Smith MD
Univ California, San Diego

Instrumentation and Software of an EIT System
Manuchehr Soleimani PhD
SUBQIVIEW Inc.

Electrical Resistance Tomography of a Two Phase Material
Manuchehr Soleimani PhD
SUBQIVIEW Inc.

A Web-Based Virtual 3D World for Team Training in Trauma Management
Sakti Srivastava MBBS MS
SUMMIT, Stanford Univ Sch Medicine

An Automatic Robust Meshing Algorithm for Soft Tissue Modeling
Gunther Sudra, Dipl Wi-Ing
Computer Science - IRF, Univ Karlsruhe (TH)

Emotional and Performance Attributes of a VR Game: A Study of Children
Evan Suma
Mathematics and Computer Science, Ithaca Coll

Development of a Virtual Surgery System using Volume Data
Takahiro Takimoto BS
Graduate Sch Science and Engineering, Waseda Univ

Haptic Interaction and Visualization of Elastic Deformation
Farnoosh Tavakkoli Attar MESc
Canadian Surgical Technologies and Advanced Robotics (CSTAR) and Electrical and Computer Engineering, Univ Western Ontario

Haptic Laparoscopic Skills Trainer with Practical User Evaluation Metrics
Bharti Temkin PhD
Computer Science, Texas Tech Univ

Segmenting Deformable Surface Models using Haptic Feedback
Praveen Thiagarajan PhD
Electrical and Computer Engineering, Univ Delaware

Parametric Model of the Scala Tympani for Haptic-Rendered Cochlear Implantation
Catherine Todd BEE
Sch Electrical, Computer and Telecommunications Engineering, Univ Wollongong

Image Analysis-Based Approach for Localization of Endoscopic Tools
Oliver Tonet PhD
CRIM - Centre for Research in Microengineering, Scuola Superiore Sant’Anna

Tangible Interfaces for Facilitating Collaborative Medical Visualizations
Brygg Ullmer PhD
Visualization, Zuse Inst Berlin (ZIB)

Simulation-Based Training for Laparoscopic Intracorporeal Suturing in Medical Students: Can We Predict Their Performance?
Kent R. Van Sickle MD
Surgery, Emory Univ

Continued
### THURSDAY EVENING POSTERS (Cont.)

- **Simulating the Curvilinear Capsulorhexis Cataract Procedure on the EYESI System**
  - Roger Webster PhD
  - Computer Science, Millersville Univ

- **Validation/Dissemination of Temporal Bone Dissection Simulation**
  - Gregory Wiet MD
  - Otolaryngology, Children’s Hosp-Columbus

- **Virtual Surgical Planning and CAD/CAM in the Treatment of Cranial Defects**
  - John Winder PhD
  - Applied Medical Sciences & Sports Studies, Univ Ulster

- **CAD Generated Mold for Preoperative Implant Fabrication in Cranioplasty**
  - Joerg Wulf MD
  - Anatomy, Univ Luebeck

- **Effect of Binocular Stereopsis on Surgical Manipulation Performance and Fatigue when using a Stereoscopic Endoscope**
  - Yasushi Yamauchi PhD
  - Inst Human Science & Biomedical Engineering, AIST

- **Cardiac Magnetic Resonance Images Automatic Segmentation based on MRF Models and Clustering incorporating a Shape Function + Cardiac MR Image Segmentation and Left Ventricle Surface Reconstruction based on Level Set Method**
  - Jianjie You MS
  - Computer Dept, Nanjing Univ Science and Technology

### FRIDAY MORNING, January 28, 2005

- **SESSION A - INFORMATION-GUIDED THERAPIES**

  - **Moderator:**
  - Ramin Shahidi PhD

  - **8:00**
    - Moderator’s Welcome
    - Kirby G. Vosburgh PhD
      - CIMIT/Massachusetts General Hosp/Harvard Medical Sch

  - **8:20**
    - Tumor Detection through Optical Tomography Methods in a 3D Depth Extraction Endoscope
    - Henry Fuchs PhD
      - Computer Science, Univ of North Carolina

  - **8:35**
    - Estimation of Dislocation after Total Hip Arthroplasty by 4D Hip Motion Analysis
    - Yoshito Otake MS
      - Inst High Dimensional Medical Imaging, Jikei Univ Sch Medicine

  - **8:50**
    - vizDrive: A Novel Hand-Immersed Paradigm for Interactive Medical Image Acquisition
    - Rakesh Mullick PhD
      - Imaging Technologies, GE Global Research Ctr

  - **9:05**
    - The Mini-Screen: An Innovative Device for Computer-Assisted Surgery Systems
    - Benoit Mansoux PhD (Cand)
      - IIHM Team, CLIPS-IMAG

  - **9:20**
    - First Clinical Tests with the Augmented Reality System INPRES
    - Gunther Sudra, Dipl Wi-Ing
      - Computer Science - IRF, Univ Karlsruhe (TH)

  - **9:35**
    - Construction of a High-Tech Operating Room for Image-Guided Surgery using VR
    - Naoki Suzuki PhD
      - Inst High Dimensional Medical Imaging, Jikei Univ Sch Medicine

  - **9:50** Break

### THURSDAY EVENING January 27, 2005

- **6:30 – 7:30 PM**

  - **EXHIBITOR RECEPTION**

- **9:35**
  - Construction of a High-Tech Operating Room for Image-Guided Surgery using VR
  - Naoki Suzuki PhD
  - Inst High Dimensional Medical Imaging, Jikei Univ Sch Medicine

- **9:50** Break

- **10:10 AM – 12 Noon**

  - **PANEL WORKSHOP - MEDICAL MEMETICS MODULATING THE MODERN MEDICAL MIND**
FRIDAY MORNING, January 28, 2005

SESSION B - SIMULATION APPLIED: VR TO OR A REVIEW OF PROJECTS IN SURGICAL SIMULATION

Moderator
Gerry Moses PhD
TATRC/USAMRMC

8:00 Welcome and Introduction
Gerald R. Moses PhD
TATRC/USAMRMC

Part One: Validation Studies

8:10 VR to OR for Laparoscopic Cholecystectomy
David McClusky III MD
Surgery, Emory Univ

8:20 VR to OR for Flexible Ureteroscopy and Laser Lithotripsy
Kenneth Ogan MD
Urology, Emory Univ

8:30 Proficiency-Based Simulation-Based Training for Suturing and Knot Tying in Nissen Fundoplication
Matt Ritter MD
Natl Capital Area Medical Simulation Ctr, Uniformed Services Univ

8:40 VR to OR for Endoscopic Sinus Surgery
Marvin Fried MD FACS
Montefiore Medical Ctr; Albert Einstein Coll Medicine

8:50 VR to OR for CATH Lab for Carotid Angiography
Christopher U. Cates MD
Cardiology, Emory Univ

9:00 VR to OR: A Multicenter Trial for L.C.
Anthony G. Gallagher PhD
Endosurgery Unit, Emory Univ

9:10 Intravenous Catheter Insertion by 91W Army Medics: Simulation Training and Assessment
Howard R. Champion MD
SimQuest International

9:20 Simulation for Training and Assessment of BNOC Airway Management
Matt Ritter MD
Natl Capital Area Medical Simulation Ctr, Uniformed Services Univ

9:30 Preliminary Results of the Carotid Stenting VR Simulation Training Program
Christopher U. Cates MD
Cardiology, Emory Univ

9:40 Simulation for Teaching Decision Making in Medicine: The Next Step
Bruce E. Jarrell MD
Surgery, Univ Maryland

9:50 Proficiency-Based Training on Simulators: Implications for Definition and Measurement of Competency
Anthony G. Gallagher PhD
Endosurgery Unit, Emory Univ

10:00 Break

Moderator:
Gerry Moses PhD

10:15 Simulation Augmented Decision Support in the Operating Room: The Next Step
Dwight Meglan PhD
SimQuest International LLC

10:25 Haptic/VR-Enabled Patient-Specific Surgical Planning in Cardiac MIS: Prospects and Progress
Glenn A. Myers PhD
Immersion Medical Inc.

10:35 VR to OR for Camera Navigation
Neal Seymour MD FACS
Baystate Health System

10:45 High Stakes Assessment Using Simulation - An Australian Experience
Patrick C. Cregan FRACS
Nepean Hosp, Wentworth Area Health Service

10:50 VR to OR Training for Intracorporeal Suturing
Daniel J. Scott MD
Surgery, Tulane Univ Sch Medicine

11:00 Break

Panelists:
Gerald R. Moses PhD
TATRC/USAMRMC

Gerald B. Healy MD
Children's Hosp/Harvard Univ

Richard M. Satava
Surgery, Univ Washington; DARPA

Steven L. Dawson MD
CIMIT/Massachusetts Gen Hosp/Harvard Medical Sch

Suzanne J. Weghorst MA MS
HIT Lab, Univ Washington
### FRIDAY MORNING, January 28, 2005

<table>
<thead>
<tr>
<th>Time</th>
<th>Session C - TISSUE &amp; SYSTEM MODELING</th>
<th>Speaker</th>
<th>Institution</th>
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</thead>
<tbody>
<tr>
<td>8:00</td>
<td>Moderator’s Welcome</td>
<td>Richard A. Robb PhD</td>
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<tr>
<td>8:05</td>
<td>Implicit Anatomical Modeling</td>
<td>Jim Miller PhD</td>
<td>GE Global Research</td>
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<tr>
<td>8:20</td>
<td>A Biologically Derived Computational Approach to Tissue Modeling</td>
<td>Tim Andersen PhD</td>
<td>Computer Science, Boise State Univ</td>
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<tr>
<td>8:35</td>
<td>Creating Models from Segmented Medical Images</td>
<td>William Lorensen MS</td>
<td>GE Global Research</td>
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<tr>
<td>8:50</td>
<td>Soft Tissue Deformation using a Nonlinear Hierarchical Finite Element Model with Real-Time Online Refinement</td>
<td>Alessandro Faraci MS</td>
<td>Surgical Oncology and Technology, Imperial Coll London</td>
</tr>
<tr>
<td>9:05</td>
<td>Multiple Contact Approach to Collision Modeling in Surgical Simulation</td>
<td>Bhautik Joshi ME</td>
<td>BioMedIA Lab, ICT Centre, CSIRO</td>
</tr>
<tr>
<td>9:20</td>
<td>Improved Virtual Surgical Cutting based on Physical Experiments</td>
<td>Suvrnanu De PhD</td>
<td>Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Inst</td>
</tr>
<tr>
<td>9:35</td>
<td>Haptic Inguinal Herniorrhaphy Simulation with a Robust and Fast Collision Detection Algorithm</td>
<td>Venkat Devarajan PhD</td>
<td>Electrical Engineering, Univ Texas at Arlington</td>
</tr>
<tr>
<td>9:50</td>
<td>Dynamic Medical 3D imaging at the Arctic Region Supercomputing Ctr</td>
<td>Boris R. Bracio PhD</td>
<td>Ctr for Nanosensor Technology, Univ Alaska Fairbanks</td>
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<td>10:05</td>
<td>Break</td>
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### FRIDAY AFTERNOON, January 28, 2005

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<tr>
<td>10:35</td>
<td>Computational Simulation of Penetrating Trauma in Biological Soft Tissues using the Material Point Method</td>
<td>Irina Ionescu PhD</td>
<td>Scientific, Computing and Imaging Inst, Bioengineering, Univ Utah</td>
</tr>
<tr>
<td>10:50</td>
<td>3D Electromechanical Model of Porcine Heart with Penetrating Wound Injury</td>
<td>Taras Usyk PhD</td>
<td>Bioengineering, UC San Diego</td>
</tr>
<tr>
<td>11:05</td>
<td>The Cardiac Morphometric Markup: A Template for Experimental Cardiology</td>
<td>Fred Bookstein PhD</td>
<td>Univ Michigan</td>
</tr>
<tr>
<td>11:20</td>
<td>Amending Dynamic Physiological Models to Represent Pathophysiological States</td>
<td>Daniel L. Cook MD PhD</td>
<td>Physiology &amp; Biophysics, Univ Washington</td>
</tr>
<tr>
<td>11:35</td>
<td>A Highly Integrated Physiology (HIP) Cardiovascular/Respiratory Model Used to Simulate Cardiac Injury</td>
<td>Maxwell Neal BS</td>
<td>Bioengineering, Univ Washington</td>
</tr>
<tr>
<td>11:50</td>
<td>Predictive Biosimulation and Virtual Patients in Pharmaceutical R&amp;D</td>
<td>Alex Bangs MS</td>
<td>Entelos Inc.</td>
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<tr>
<td>12:05</td>
<td>Break</td>
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<tr>
<td>2:05</td>
<td>The Medical Now Becomes the Artifact of the Future: On Building the National Medical Collections</td>
<td>Adrianne Noe PhD</td>
<td>Natl Museum of Health and Medicine; Armed Forces Inst Pathology</td>
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Continued
FRIDAY AFTERNOON, GENERAL SESSION (Cont.)

2:15  Presentation of the 11th Annual Satava Award

2:45  Break

Moderator:
Richard M. Satava MD FACS

NEXTMED: SYNTHESIZING HUMANS

3:00  Introduction
Richard M. Satava MD FACS
Surgery, Univ Washington; DARPA

3:10  Restoring Sight with Artificial Vision
James D. Weiland PhD
Doheny Retina Institute; Univ Southern California

3:35  New Horizons for Orthotic and Prosthetic Technology: Merging Body and Machine
Hugh M. Herr PhD
Herr Inst Human Rehabilitation; AI Lab, MIT; Harvard Med Sch

4:00  Replacing Damaged Brain Regions with Biomimetic Microelectronic Neural Prostheses to Restore Cognitive Function
Theodore W. Berger PhD
Biomedical Engineering, Univ Southern California

4:25  Altermune: Chemically Programmable Immunity
Kary B. Mullis PhD
Nobel Laureate in Chemistry, 1993

4:50  Discussion

5:00  Adjourn

SATURDAY MORNING, January 29, 2005

SESSION A - EDUCATION & TRAINING

8:00  Moderator's Welcome
Helene M. Hoffman PhD

8:05  The Visible Human and Digital Anatomy Learning Initiative
Parvati Dev PhD
SUMMIT, Stanford Univ Medical Sch

8:20  Immersive Visualization for Radiotherapy Treatment Training
Roger Phillips PhD
Computer Science, Univ Hull (UK)

8:35  Emphatic, Interactive Volume Rendering to Support Variance in User Expertise
Don Stredney
Interface Lab, OSC - Ohio Supercomputer Ctr

8:50  Physiologic and Chemical Simulations of Cyanide and Sarin Toxicity and Therapy
N. Ty Smith MD
Univ California, San Diego

Continued
SATURDAY MORNING, SESSION A (Cont.)

9:05  Add-On Features in the Simulation of Nerve Gas Casualties: Enhancement of Medical Preparedness for Chemical Warfare Casualties  
Amir Vardi MD  
Israel Medical Simulation Ctr

9:20  Developing a Simulation-Based Training Program for Medical First Responders  
Fuji Lai  
Aptima Inc.

9:35  Triage Simulator for Emergency Preparedness Training  
Paul Kizakevich MS PE  
Technology Assisted Learning, RTI Intl

9:50  Validation of a Web-Based VR Simulation for Training Trauma Teams  
Patricia Youngblood PhD  
SUMMIT, Stanford Univ Sch Medicine

10:05  Break

Moderator:  
Brenda K. Wiederhold PhD MBA BCIA  
Virtual Reality Medical Ctr

SESSION A - MENTAL HEALTH

10:20  Welcome  
Brenda K. Wiederhold PhD MBA BCIA  
Virtual Reality Medical Ctr

10:25  Luring Patients’ Minds Away from their Bodies during Painful Procedures  
Hunter Hoffman PhD  
Univ Washington

10:40  VR and the Internet for Eating Disorders and Obesity  
Giuseppe Riva PhD  
Ist Auslogico Italiano

10:55  Virtual Reality Testing of Multi-Modal Integration in Schizophrenic Patients  
Anna Sorkin PhD (Cand)  
Interdisciplinary Ctr for Neural Computation, Hebrew Univ

11:10  Military Mental Health Applications  
Mark D. Wiederhold MD PhD FACP  
Virtual Reality Medical Ctr

11:25  Design and Development of a VR Therapy Application for Iraq War Veterans with PTSD  
Albert “Skip” Rizzo PhD  
Inst Creative Technologies, Univ Southern California

11:40  Cognitive Flexibility (Physical and Mental Rehabilitation)  
Walter J. Greenleaf PhD  
Greenleaf Medical Systems

11:55  VR Exposure in Anxiety Disorders Treatment  
Brenda Wiederhold PhD MBA BCIA  
Virtual Reality Medical Ctr

12:10  Break

SATURDAY MORNING, January 29, 2005

SESSION B - MEDICAL SIMULATION – A GLIMPSE OF THE NEXT GENERATION  
[From Publish or Perish to Collaborate or Perish]

Moderator:  
David M. Hananel

8:00  Systems Integration: Issues and Challenges  
Jay Anton  
Government Systems and Engineering, Medical Education Technologies, Inc.

8:15  Simulators and the Medical School Curriculum: Assessing Student Needs  
Carla Pugh MD PhD  
Surgery, Northwestern Univ

8:30  Quantitative Procedural Skill Analysis via Vector Quantization and Hidden Markov Modeling  
Jacob Rosen PhD  
Electrical Engineering, Univ Washington

8:45  Objective Quantification of Proficiency in Robotic Laparoscopy with Bimanual Inanimate Tasks  
Kenji Narazaki BS  
Sch HPER, Univ Nebraska at Omaha

9:00  Fuzzy Classification: Towards Evaluating Performance on a Surgical Simulator  
Jeffrey Huang  
Sch Engineering Science, Simon Fraser Univ

9:15  Using an Ontology of Human Anatomy to Inform Reasoning with Geometric Models  
Daniel Rubin MD  
Stanford Medical Informatics, Stanford Univ

9:30  Quantifying Risky Behavior in Surgical Simulation  
Christopher Sewell PhD (Cand)  
AI Lab, Stanford Univ

9:45  Improving the Visual Realism of Virtual Surgery  
Suvaranu De PhD  
Mechanical, Aerospace, and Nuclear Engineering, Rensselaer Polytechnic Inst

10:00  Break

Continued
SATURDAY MORNING, SESSION B (Cont.)

Moderator:
Suzanne J. Weghorst MA MS

10:15  A Vision-Based Surgical Tool Tracking Approach for Untethered Surgery Simulation and Training System
John C. Hu PhD
Energid Technologies

10:30  Smart Tutor: A Pilot Study of a Novel Adaptive Simulation Environment
Thai Pham MD
Surgery, Penn State Coll Medicine

10:45  BrainTrain: Brain Simulator for Medical VR Application
Bundit Panchaphongsaphak MEng MSc
Automatic Control Lab, Swiss Federal Inst Technology (ETHZ)

11:00 Discussion - Developers' Forum
Chair:
David M. Hananel
Surgical Prog, Medical Education Technologies, Inc.

Panelists:
Randy S. Haluck MD FACS
Surgery, Penn State Coll of Medicine

Jan Sigurd Røtnes MD PhD
SimSurgery AS

12:00 Break

SATURDAY MORNING, January 29, 2005

8:00 AM - 12 Noon

SESSION C
WORKSHOP: VR INTERVENTIONAL RADIOLOGY TRAINING

8:00  Introduction and Training Issues
Derek A. Gould
Royal Liverpool Univ Hosp

8:30  Medical Applications of Virtual Environments
Nigel W John PhD
Sch Informatics, Univ Wales, Bangor

8:50  Medical Applications of Virtual Environments
Fernando Bello PhD
Imperial Coll London

9:15  VR Training in Interventional Radiology: The US Experience
Steven L. Dawson MD
CIMIT/Massachusetts Gen Hosp/Harvard Medical Sch

10:00 Break

10:30 Academic and Commercial Projects: Work in Progress Presentations
Andrew Healey MBChB
Royal Liverpool Univ Hosp

Andrew Bulpitt PhD
Leeds Sch Computing

Roger Phillips PhD
Univ Hull (UK)

William E. Lewandowski MS
Immersion Medical Inc.

9:15  VR Training in Interventional Radiology: The US Experience
Steven L. Dawson MD
CIMIT/Massachusetts Gen Hosp/Harvard Medical Sch

10:00 Break

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Univ Hull (UK)

William E. Lewandowski MS
Immersion Medical Inc.

11:00 Discussion - Developers' Forum
Chair:
David M. Hananel
Surgical Prog, Medical Education Technologies, Inc.

Panelists:
Randy S. Haluck MD FACS
Surgery, Penn State Coll of Medicine

Jan Sigurd Røtnes MD PhD
SimSurgery AS

12:00 Break

SATURDAY AFTERNOON, JANUARY 29, 2005

SESSION A - TELEMEDICINE / INTELLIGENCE NETWORKS

Moderator:
Michael J. Ackerman PhD

1:10  Moderator’s Welcome

1:15  The VICCU Project - Achieving Virtual Presence using Ultrabroadband Internet in a Critical Clinical Application using Novel Soft and Hardware - Initial Results
Patrick C. Cregan FRACS
Nepean Hosp, Wentworth Area Health Service

1:30  The Use of Low Bandwidth and High Bandwidth Telemedical Applications to Accomplish Mass Pre-Participation Cardio-Pulmonary Screening in Athletes
James “Butch” Rosser, Jr. MD FACS
Advanced Medical Technology Inst. Beth Israel Medical Ctr

1:45  Application Level QoS Control for Telemmedicine System
Masato Mori PhD
Medical Informatics, Kyoto Univ Hosp

Continued
**SATURDAY AFTERNOON, SESSION A (Cont.)**

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<tr>
<td>2:00</td>
<td>Remote Console for Virtual Telerehabilitation</td>
<td>Jeffrey A. Lewis</td>
<td>Physical Therapy, UMDNJ</td>
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<tr>
<td>2:15</td>
<td>Crew Medical Interface System (CMIS): VR and Medicine Integrated for Medical Care on Long-Duration Spacelight</td>
<td>Kevin Montgomery PhD</td>
<td>Natl Biocomputation Ctr, Stanford Univ</td>
</tr>
<tr>
<td>2:30</td>
<td>Challenges of Presenting High Dimensional Data to Aid in Triage in the Virtual Soldier Project</td>
<td>Andrew Boyd MD</td>
<td>Psychiatry, Univ Michigan</td>
</tr>
<tr>
<td>2:45</td>
<td>Knowledge-Based Anatomical Dynamic Scene Generation in X3JD</td>
<td>Wayne V. Warren BA</td>
<td>Biomedical and Health Informatics, Univ Washington</td>
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<tr>
<td>3:00</td>
<td>Break</td>
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<tr>
<td>3:15</td>
<td>Grid Enabled Remote Visualization of Medical Datasets</td>
<td>Nick Avis PhD</td>
<td>Sch Computer Science, Cardiff Univ</td>
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<td>3:30</td>
<td>Distributed Radiological Visualization using Access Grid</td>
<td>Jonathan Silverstein MD</td>
<td>Surgery, Univ Chicago</td>
</tr>
<tr>
<td>3:45</td>
<td>Linking Human Anatomy to Knowledgebases: A Visual Front End for Electronic Medical Records</td>
<td>Richard Ward PhD</td>
<td>Computational Sciences and Engineering, Oak Ridge Nat Lab</td>
</tr>
<tr>
<td>4:00</td>
<td>A Middleware-Based Computing Architecture for Virtual Medicine</td>
<td>Line C. Pouchard</td>
<td>Computer Science and Mathematics Div, Oak Ridge Nat Lab</td>
</tr>
<tr>
<td>4:15</td>
<td>Multimedia Digital Surgical Record: Toward Comprehensive, Layered Data Archives</td>
<td>Azhar Rafiq MD MBA</td>
<td>Surgery, Medical Informatics and Technology Applications Consortium</td>
</tr>
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<td>4:30</td>
<td>Adjourn</td>
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**SATURDAY AFTERNOON, JANUARY 29, 2005**

**SESSION B - MEDICAL SIMULATORS**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:10</td>
<td>Moderator’s Welcome</td>
<td>Patricia Youngblood PhD</td>
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<tr>
<td>1:15</td>
<td>A Prototype of Ventricular Shunt Insertion Simulator</td>
<td>Bundit Panchaphongsaphak MEng MSc</td>
<td>Automatic Control Lab, Swiss Federal Inst Technology (ETHZ)</td>
</tr>
<tr>
<td>1:30</td>
<td>A New Platform for Laparoscopic Training and Education</td>
<td>Jan Sigurd Retnes MD PhD</td>
<td>SimSurgery AS</td>
</tr>
<tr>
<td>1:45</td>
<td>Tele-Surgical Simulation System for Training in the Use of da Vinci Surgery</td>
<td>Shigeyuki Suzuki MS</td>
<td>Inst High Dimensional Medical Imaging, Jikei Univ Sch of Medicine</td>
</tr>
<tr>
<td>2:00</td>
<td>An Interactive Simulation Environment for Craniofacial Surgical Procedures</td>
<td>Daniel Morris PhD (Cand)</td>
<td>Computer Science, Stanford Univ</td>
</tr>
<tr>
<td>2:15</td>
<td>A Haptic-Enabled Simulator for Cricothyroidotomy</td>
<td>Alan Liu PhD</td>
<td>Natl Capital Area Medical Simulation Ctr, Uniformed Services Univ</td>
</tr>
<tr>
<td>2:30</td>
<td>New Approaches to Computer-Based Intervention Neuroradiology Training</td>
<td>Xunlei Wu PhD</td>
<td>The Simulation Group, CIMIT MGH, Harvard Univ</td>
</tr>
<tr>
<td>2:45</td>
<td>Break</td>
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<tr>
<td>3:15</td>
<td>Teaching Intravenous Cannulation to Medical Students: Comparative Analysis of Two Simulators and Two Traditional Educational Approaches</td>
<td>Mark Bowyer MD</td>
<td>Natl Capital Area Medical Simulation Ctr, Uniformed Services Univ</td>
</tr>
</tbody>
</table>

Continued
SATURDAY AFTERNOON, SESSION B (Cont.)

3:30 Role of Virtual Reality in Precision Laparoscopic Surgery Training
Ramesh Makam DNB
Laparoscopy, Bangalore Endoscopic Surgery Training Inst and Research Centre VR2OR:

3:45 The Paradigm Shift in Training for Procedural-Based Medicine
Anthony Gallagher PhD
Endosurgery Unit, Emory Univ

4:00 Adjourn

SATURDAY AFTERNOON, JANUARY 29, 2005

SESSION C

1:10 – 4:30 PM

PANEL - USE AND VALUE OF AN OPEN 3D STANDARD FOR MEDICAL APPLICATIONS: IMPACT, PLANS AND PROGRESS OF THE MEDICAL WORKING GROUP OF THE WEB3D CONSORTIUM

Presentations:

Standards Consortia: The Good, Bad and Ugly
Sandy Ressler
Web3D Board of Directors;
Natl Institute of Standards and Technology (NIST)

TATRC’s Interest in Imaging and M&S Standards – Why You Should be Interested, Too
Kenneth C. Curley MD
TATRC/USAMRMC;
Emergency Medicine/Biomedical Informatics, USUHS

Dissemination of Educational and Certification Curriculum
Jeffrey M. Taekman MD
Educational Technology/ Human Simulation and Patient Safety Ctr/Anesthesiology, Duke University Medical Ctr

Use Cases for MedX3D: Clinical and Business Implications
Michael Aratow MD
PureSense Environmental Inc.;
NASA/Ames Research Center

Distributed, Networked Surgical Simulation: Real-Time Rendering of Geometry and Haptics using the Spring Platform
Kevin Montgomery PhD
Natl Biocomputation Ctr, Stanford Univ

Procedures Training - Is It Possible using Web3D?
Nigel John PhD
Sch Informatics, Univ Wales, Bangor

Towards Open Source, Standardized Resources for Digital Anatomy
James F. Brinkley MD PhD
Computer Science and Engineering, Univ Washington