# Preliminary Conference Program

Please note: This preliminary program is subject to change in order to accommodate presenters' needs, educational objectives, and logistical necessities. Plenary sessions remain under construction. Please check back for updates.

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## Conference at a Glance

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* Details pending
Thursday, February 20

**Morning Poster Session & Breakfast**

7:30 - 8:30 AM

During the morning poster session, presenters will stand with their posters and share their research with fellow attendees. Continental breakfast will be served.

Thursday posters stay up until the end of the afternoon parallel sessions.

Thursday posters are listed on pages 5 & 6.

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**Morning Plenary Session**

8:30 AM - 12 Noon

The Thursday morning plenary session is under construction. It will feature invited lectures on a range of topics at the forefront of medical technology.

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**Exhibits Open**

Exhibits will open during the mid-morning break. Coffee will be served in the exhibit hall.

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**Lunch**

12 Noon - 1:10 PM

Thursday's lunch will be served in the exhibit hall.

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**Thursday Afternoon, Track A**

1:10 Moderator's Welcome

**Rehabilitation & Aging**

1:15 Zach McKinney  
*Center for Advanced Surgical and Interventional Technology & Dept of Bioengineering, University of California, Los Angeles*

*Initial Biomechanical Evaluation of Portable Tactile Biofeedback System for Gait Rehabilitation in Peripheral Neuropathy*

1:30 Gregorij Kurillo  
*Department of Electrical Engineering and Computer Sciences, University of California at Berkeley*

*Kinect-based Tele-Medicine Tool for Remote Motion and Function Assessment*

1:45 Josh Pickhink  
*Nebraska Biomechanics Core Facility, University of Nebraska at Omaha*

*Varying the Speed of Perceived Self-Motion Affects Postural Control during Locomotion*

2:00 Giuseppe Riva  
*Applied Technology for Neuro-Psychology Lab, Istituto Auxologico Italiano*

*Virtual Reality as Egocentric Technology for the Assessment of Cognitive Decline in the Elderly*

2:15 Howard Rose  
*Firsthand Technology Inc.*

*The Metascope: A Low-Cost, High-Immersion VR Display for Pain Control*

**Psychology & Technology**

2:30 J. Galen Buckwalter  
*Institute for Creative Technologies, University of Southern California*

*Stress Resilience in Virtual Environments: Preliminary Findings on Allostatic Load*

2:45 Andrea Gaggioli  
*Applied Technology for Neuro-Psychology Lab, Istituto Auxologico Italiano*

*A Decision Support System for Real-Time Stress Detection During Virtual Reality Exposure*
3:00 Albert "Skip" Rizzo  
Institute for Creative Technologies, University of Southern California  
Expansion of a VR Exposure Therapy System for Combat-Related PTSD to Medics / Corpsman and Persons Following Military Sexual Trauma

3:15 Break

Independently Organized Session

Integrating Intelligent Tutoring Systems (ITS) in Virtual World (VW) Training/Learning

3:30 - 5:00

Parvati Dev, Organizer  
Innovation in Learning, Inc.

In this tutorial, we will present the use of Intelligent Tutoring Systems (ITS) technology as an alternative to live facilitator training in well-prescribed situations such as triage of victims in a mass casualty disaster. We will begin by reviewing two well-developed technologies, learning environments simulated in virtual worlds, and natural language-based intelligent tutors used in tightly circumscribed learning contexts, and will show how we have constructed an integrated solution where the intelligent tutor becomes available within the virtual world. The presentation will include the results of preliminary evaluation comparing the use of the virtual world alone with that using the intelligent tutor in the virtual world.

Presenters:

Parvati Dev  
Innovation in Learning, Inc.

Keith Shubeck  
Department of Psychology, University of Memphis

Mae-Lynn Germany-Shubeck  
Department of Psychology, University of Memphis

Xiangen Hu  
Department of Psychology, University of Memphis

Thursday Afternoon, Track B

1:10 Moderator's Welcome

Surgical Simulator Design

1:15 Timothy Kelliher  
SimQuest Solutions Inc.

Open Surgical Simulation (OSS) - A Community Resource

1:30 Lauren Davis  
Center for Education in Medicine, Feinberg School of Medicine, Northwestern University  
The Evolution of Design: A Novel Thoracoscopic Diaphragmatic Hernia Repair Simulator

1:45 Yang Yang  
Department of Computer & Information Sciences, University of Delaware  
A Real Time Immersive Surgery Training System using RGB-D Sensors

2:00 Bertram Unger  
Laboratory for Surgical Modeling, Simulation and Robotics, University of Manitoba  
Design and Validation of 3D Printed Complex Bone Models with Internal Anatomic Fidelity for Surgical Training and Rehearsal

Surgical Simulation Metrics

2:15 Timothy Coles  
The Australian e-Health Research Centre & Surgical Simulation and Planning Team, CSIRO  
Outside Observer, an Enhanced Training Methodology: Bringing Back the Expert’s Eye Whilst Training Alone

2:30 David Rojas  
The Learning Institute, The Hospital for Sick Children  
The Impact of Secondary-Task Type on the Sensitivity of Reaction-Time Based Measurement of Cognitive Load for Novices Learning Surgical Skills using Simulation

2:45 Christopher Roche  
Center for Modeling, Simulation and Imaging in Medicine, Rensselaer Polytechnic Institute  
Kinematic Measures for Evaluating Surgical Skills in Natural Orifice Translumenal Endoscopic Surgery

3:00 Break

Surgical Simulation Validation

3:15 Ngan Nguyen  
Department of Electrical and Computer Engineering, Western University  
Realism, Criterion Validity, and Training Capability of Simulated Diagnostic Cerebral Angiography

3:30 Sudanthi Wijewickrema  
Department of Otolaryngology, University of Melbourne  
A Virtual Reality Temporal Bone Surgery Simulator with Automated Real-Time Feedback for Effective Learning of Surgical Technique

3:45 Lee White  
Bioengineering Department, University of Washington  
Validation of a Crowd-Sourced Assessment of Technical Skills (C-SATS) with Application to Measuring Warm-Up Benefit in Robotic Surgery
Independently Organized Session

GLSIM: Highly Demanded Full-VR Simulator as an Endoscopic Laser Surgery Curriculum

4:00 - 5:00

Robert M. Sweet, Organizer
Medical School Simulation Programs, University of Minnesota

Yunhe Shen, Organizer
Center for Research in Education and Simulation Technologies, University of Minnesota

This session describes a process by which a VR procedural trainer has successfully been integrated into a comprehensive training program for practicing surgeons prior to doing their first cases. Over 120 of these simulators have been deployed in North America and worldwide for doctors and medical school students’ practice, and dozens of rotating units are routinely used by faculty of urologic surgery in workshops and conferences. These facts show that, at this point, there should be no doubt that full-VR simulators are being volume-produced and are serving as powerful and reliable tools meeting today’s medical training needs.

Presentations:

Michael R. Kujak
Prostate Health, American Medical Systems
AMS—A Medical Device Company’s Interest in VR Simulation

Robert M. Sweet
Medical School Simulation Programs, University of Minnesota
Backward Design—Not Only a Simulator but a Virtual Trainer with Valid Curriculum

Yunhe Shen
Center for Research in Education and Simulation Technologies, University of Minnesota
Robust Solutions to the Challenges — Needs-Driven R&D

American Medical Systems Officer, TBD
GLSIM Curriculum—Worldwide Greenlight ™ Simulation Sites for Doctors and Students

Thursday Afternoon, Track C

Independently Organized Session

The Federal Medical Simulation and Training Consortium

1:10 - 5:00

Alan Liu, Organizer
National Capital Area Medical Simulation Center, Uniformed Services University of the Health Sciences

The FMSTC is a partnership between nine medical education institutions of the Army, Navy, Air Force, Department of Defense, and the Department of Veteran’s Affairs. The mission of the FMSTC is to enhance the medical education and training mission of its partners. This mission rests on five pillars: Education, Curriculum, Validation, Research & Development, and Strategic Partnerships. The consortium plans to accomplish this through knowledge sharing, collaboration toward common goals, and participation in joint training initiatives.

Collectively, the FMSTC provides simulation-based medical instruction to more than 90% of all military medical healthcare personnel. In this workshop, we present the perspective of each of the military services on medical simulation. The FMSTC’s ongoing efforts toward establishing a curriculum training repository, as well as developing technology standards for medical simulation devices will be highlighted.

Presenters will include representatives of:

• The U.S. Air Force Medical Modeling and Simulation Training (AFMMAST) Program Office
• The Central Simulation Committee (CSC-A)
• The Army Medical Department Center and School Department of Emergency Medicine (AMEDDC&S), US Army EMS Programs Office
• The Navy Medicine Central Simulation Committee (CSC-N)
• The TECOM Ground Training Division Medical Programs Office (Marine Corps Health Services)
• The TRICARE Management Activity Patient Safety Program Office (TMA)
• The Medical Education Training Campus (METC)
• The National Capital Area Medical Simulation Center (SimCen), Uniformed Services University of the Health Sciences (USUHS)
Thursday Posters

Rehabilitation & Aging

Jurgen Broeren  
Department of Physiotherapy and Occupational Therapy, Sahlgrenska University Hospital  
Coordinated Healthcare Across the Post-stroke Continuum to Support Community Integration

Malcolm Chan  
Family Practice Health Centre, Women’s College Hospital & Faculty of Medicine, University of Toronto  
Do Not Forget the Oldest Old: Design Principles for the 80+

Troy McDaniel  
Department of Computer Science and Engineering, Arizona State University  
Augmented Motor Learning and Rehabilitation using Vibrotactile Feedback

Martin Rydmark  
Mednet, Institute of Biomedicine, The Sahlgrenska Academy & University of Gothenburg  
Remote Communication, Examination and Training in Neurological Care and Rehabilitation - Work in Progress Testing Kinect and Leap Motion for MDS-UPDRS Part III: Motor Examination in Parkinson’s Disease

Susan Truong  
Family Practice Health Centre, Women’s College Hospital & Faculty of Medicine, University of Toronto  
Assessing the Interest in Using Social Networking from the Perspective of Older Adults Aged 80+

Alvaro Uribe Quevedo  
Industrial Engineering, Nueva Granada Military University  
Anthropomorphic Passive Mechanism for Performing Hand Exercises

Sergio Valdivia  
Multimedia Engineering, Nueva Granada Military University  
Serious Game Strategy for Lower Member Rehabilitation

Psychology & Technology

Georgina Cárdenas-López  
School of Psychology, National Autonomous University of Mexico  
Virtual Reality for Improving Body Image Disorders and Weight Loss after Gastric Band Surgery: A Case Series

David Cawthorpe  
Departments of Psychiatry & Community Health Sciences, The University of Calgary  
A Modular Self-Education Tool for Tracking Patient Response to Treatment Changes: A Naturalistic Study of ADHD Treatment in Adolescents

Bruce John  
Institute for Creative Technologies, University of Southern California  
Self-Reported Differences in Personality, Emotion Control, and Presence Between Pre-Military and Non-Military Groups in a Pilot Study using the STress Resilience in Virtual Environments (STRIVE) Program

Andrea Gaggioli  
Applied Technology for Neuro-Psychology Lab, Istituto Auxologico Italiano  
A Virtual Reality Procedure For Assessing Deficit in the Mental Frame Syncing: Feasibility Study

Giuseppe Riva  
Applied Technology for Neuro-Psychology Lab, Istituto Auxologico Italiano  
A Virtual Reality Platform for Assessment and Rehabilitation of Neglect using a Kinect

Laura Serra Oliva  
Institute for Creative Technologies, University of Southern California  
Preliminary Psychophysiological Findings During Resilience Training

Networking & Telemedicine

Ben Boedeker  
University of Nebraska Medical Center  
Development of a Tele ENT Program to Support Distant Military Treatment Facilities for the European Regional Medical Command

Allan Okrainec  
Department of Surgery & Temerty Chang International Center for Telesimulation and Innovation in Medical Education, Toronto Western Hospital & University of Toronto  
Software Based Videoconferencing Software for Use in Telementoring Laparoscopic Surgery

Angelika Peer  
Institute of Automatic Control Engineering, Technische Universität München  
Towards a Remote Medical Diagnostician for Medical Examination

Ali Turabi  
Anesthesia Prep Unit, Post Anesthesia Care Unit, and Pre Procedure Unit, Landstuhl Regional Medical Center, Germany  
Development of a Tele-Anesthesia Preoperative Clinic to Support Distant Military Treatment Facilities for the European Regional Medical Command

Karthik Venkatraman  
University of Texas at Dallas  
Tele-Rehabilitation with a 3D Augmented Virtual Reality and Haptic Devices
Surgical Simulator Systems

Ryan Armstrong
Biomedical Engineering Graduate Program, University of Western Ontario
Patient-Specific Pipeline to Create Virtual Endoscopic Third Ventriculostomy Scenarios

Lauren Davis
Center for Education in Medicine, Feinberg School of Medicine, Northwestern University
A Low-Cost Tissue Replica for Simulation of Thoracoscopic Tracheoesophageal Fistula Repair

Christopher Guerra
Aerospace Electronics, Systems Engineering, and Training Division, Southwest Research Institute
Real-Time Passive Tracking for Multi-Touch Medical Modeling and Simulation

Ellie Hawkinson
Center for Education in Medicine, Feinberg School of Medicine, Northwestern University
Design and Development of a Laparoscopic Gastrostomy Tube Placement Simulator

Ellie Hawkinson
Center for Education in Medicine, Feinberg School of Medicine, Northwestern University
Design and Development of a Duodenal Atresia Simulator

Nikoo Saber
Centre for Image Guided Innovation and Therapeutic Intervention, The Hospital for Sick Children
Development of a Patient-Specific Surgical Simulator for Pediatric Laparoscopic Procedures

Yasushi Yamauchi
Faculty of Science and Engineering, Toyo University
Smart Dry Lab: An Augmented Reality (AR) Based Surgical Training Box

Peter Weyhrauch
Charles River Analytics, Inc.
Tourniquet Master Training for Junctional and Inguinal Hemorrhage Control (TMT)

Surgical Simulator Design

Woojin Ahn
Center for Modeling, Simulation and Imaging in Medicine, Rensselaer Polytechnic Institute
Development of a Virtual Reality Simulator for Natural Orifice Transluminal Endoscopic Surgery (NOTES) Cholecystectomy Procedure

Brian Allen
Center for Modeling, Simulation and Imaging in Medicine, Rensselaer Polytechnic Institute
Toward the Development of a Virtual Electrosurgery Training Simulator

Andrew Dickinson
Medical Computing Laboratory, Queen’s University
Overall Wrist Biomechanics Are Conserved By Phenol-Based Embalming

Toma Kato
Haptic Vision Lab, Ritsumeikan University
Evaluation of Haptic Teaching Approaches for Laparoscopic Surgery Training

Jason Lee
Center for Modeling, Simulation and Imaging in Medicine, Rensselaer Polytechnic Institute
Developing Extracorporeal Suturing Simulation in Virtual Basic Laparoscopic Skill Trainer (VBLaST)

Krzysztof Rechowicz
Department of Modeling, Simulation, and Visualization Engineering, Old Dominion University
Developing Clinically Relevant Aspects of the Nuss Procedure Surgical Simulator

Ganesh Sankaranarayanan
Center for Modeling, Simulation and Imaging in Medicine, Rensselaer Polytechnic Institute
A Framework for Providing Cognitive Feedback in Surgical Simulators

Ravikiran Singapogu
Haptic Interaction Lab, Clemson University
Endovascular Seldinger Needle Placement: A Simulator for Examining Haptic Skills

Pierre-Fréderic Villard
LORIA, Lorraine University
Toward a Realistic Simulation of Organ Dissection

Surgical Simulator Validation

Chung Hyuk Park
Department of Electrical and Computer Engineering, New York Institute of Technology
Supplementing Surgical Training for Medical Students Using a Low-Cost Virtual Reality Simulator

Ka-Chun Siu
Center for Advanced Surgical Technology, University of Nebraska Medical Center
Virtual Laparoscopic Surgical Skills Practice Using a Multi-Degree of Freedom Joystick
Friday, February 21

Morning Poster Session & Breakfast
7:30 - 8:30 AM
During the Friday morning poster session, presenters will stand with their posters and share their research with fellow attendees. Continental breakfast will be served.
Friday posters will stay up until the end of the afternoon parallel sessions.
Friday posters are listed on pages 9 - 11.

Morning Plenary Session
8:30 AM - 12 Noon
The Friday morning plenary session is under construction. It will feature invited lectures on a range of topics at the forefront of medical technology. The 19th Satava Award will be presented at the close of the session.

Exhibits Open
Exhibits will open during the mid-morning break. Coffee will be served in the exhibit hall.

Lunch Break
12 Noon - 1:10 PM
Friday lunch is on your own.

Friday Afternoon, Track A
1:10   Moderator's Welcome

Imaging & Visualization
1:15   Nadezhda Radeva  
Department of Computer Science, The George Washington University
Visualization of Tissue Removal using Focus + Context Techniques
1:30   Deyu Sun
Biomedical Imaging Resource Lab, Mayo Clinic
Anatomic Surface Reconstruction from Sampled Point Cloud Data and Prior Models
1:45   Anand Santhanam  
Department of Radiation Oncology, University of California, Los Angeles
Modeling and Visualizing Cardiovascular Deformations under Normal and Altered Circulatory Conditions
2:00   Shamima Yasmin
Center for Simulation Visualization and Real-time Prediction, University of Texas at San Antonio
A Haptic-enabled Novel Approach to Cardiovascular Visualization
2:15   Mohamed Hefny
School of Computing, Queen's University
A Matrix Lie Group Approach to Statistical Shape Analysis of Bones
2:30   Hadrien Courtecuisse
Institut Hospitalo-Universitaire, Strasbourg
Constraint-Based Simulation for Non-Rigid Real-Time Registration

Information-Guided Therapies
2:45   Thorsten Brennecke
Institute for Process Control and Robotics, Karlsruhe Institute of Technology
An Ultrasound-Based Navigation System for Minimally Invasive Neck Surgery
3:00   Break
3:15 Hugo Talbot  
*INRIA*  
*Interactive Planning of Cryotherapy using Physics-Based Simulation*

3:30 Naoki Suzuki  
*Institute for High Dimensional Medical Imaging, The Jikei University School of Medicine*  
*A Concept for Overlaid-Type Surgical Navigation System with Organ Modification Functions using Non-Contact Type Surface Measurement*

### Robotics

3:45 Deanna Glassman  
*University of Washington School of Medicine*  
*Raven Surgical Robot Training in Preparation for da Vinci Use: a Randomized Prospective Trial*

4:00 Gyusung Lee  
*Department of Surgery, Johns Hopkins University School of Medicine*  
*Physical and Cognitive Ergonomic Workload Assessment with Robotic and Laparoscopic Surgeries*

### Interfaces

4:15 Stanislas Mauser  
*Faculty for Informatics, Reutlingen University*  
*Touch-Free Gesture Based Control of Medical Devices and Software Based on the Leap Motion Controller*

### Haptics

4:30 Jun Wu  
*Computer Graphics & Visualization Group, Technische Universität München*  
*Real-Time Haptic Cutting of High-Resolution Soft Tissues*

4:45 Dirk Fortmeier  
*Institute of Medical Informatics, University of Lübeck*  
*An Image-based Multiproxys Palpation Algorithm for Patient-Individual VR-Simulation*

5:00 Tobias Piilc  
*Electrical Engineering and Information Technologies, Innovative Surgical Training Technologies, HTWK Leipzig University of Applied Sciences*  
*Pulsed Ultrasound Approach for the Measuring of Tension and Compression at Nerve Fibre Structures in Surgical Training Simulators*

5:15 Adjourn

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**Friday Afternoon, Track B**

1:10 Moderator's Welcome

### Simulator Validation

1:15 John Quarles  
*Department of Computer Science, University of Texas at San Antonio*  
*Virtual Humans for Inter-Ethnic Variability Training in Sedation and Analgesia*

1:30 Myutan Kulendran  
*Division of Surgery, Imperial College London*  
*3D Simulation of a Hospital Environment and Ward Round to Augment a Summer School Program for Pre-Medical Students*

### Simulator Systems

1:45 Anna Galea  
*Vivonics, Inc.*  
*PATIENT: Physical Anatomical Trainer Instrumented for Education and Non-Subjective Testing*

2:00 Li Liu  
*Dept of Biomedical Engineering, Worcester Polytechnic Institute*  
*Personal Training Simulator for Asynchronous Learning of Obstetric Ultrasound*

2:15 Piotr Slawinski  
*Department of Mechanical and Materials Engineering, University of Nebraska - Lincoln*  
*Intestinal Biomechanics Simulator*

2:30 Shujath Syed  
*Department of Electrical Engineering, University of South Florida*  
*Sensing and Visualization Tools for Objective Assessment and Debriefing of High-Risk Neonatal Resuscitation Training Scenarios*

### Simulator Design

2:45 Bryan Bergeron  
*Archetype Technologies, Inc.*  
*Modular Simulator Building Blocks: Physiologic Signaling Requirements*

3:00 Break

3:15 Shlomi Lauffer  
*Department of General Surgery & Department of Electrical Engineering and Computer Science, University of Wisconsin - Madison*  
*Multimodality Approach to Classifying Hand Utilization for the Clinical Breast Examination*
Learning & Technology

3:30 David Rojas
*The Learning Institute, The Hospital for Sick Children*
**The Effect of Contextual Sound Cues on Visual Fidelity Perception**

3:45 Victoria Roach
*Corps for Research in Instructional and Perceptual Technologies, Western University*
**The Path More Travelled: Defining a Gaze-Based Approach to Analyzing Spatial Reasoning**

4:00 Bryan Bergeron
*Archetype Technologies, Inc.*
**Application of Learning Record Stores and Other Forms of Electronic Competency Records in Modeling Competency Degradation**

4:15 [Remainder of session to be determined]

Friday Afternoon, Track C

Independently Organized Session

**Novel Approaches to the Study of Medical Skill Decay**

1:10 - 5:15

Ray S. Perez, Organizer
*Office of Naval Research*

Anna Skinner, Co-Chair
*AnthroTronix, Inc.*

The session will begin with a brief review, summarizing what we currently know from the research literature on skill decay. This will be followed with each panel member presenting a summary of their research. They will cover approach, procedures/methods, results, and a discussion/conclusion for this research. The discussant will then provide a discussion of the presentations and future research needed for medical training and implications for practice.

Presentations:

Ray S. Perez
*Office of Naval Research*
**Introduction**

Peter Weyhrauch & James Niehaus
*Charles Rivers Analytics, Inc.*
**Laparoscopic Surgery Skill Models for Refresher Training**

Carla M. Pugh
*Department of Surgery, University of Wisconsin*
**Psycho-Motor and Error Enabled Simulations: Modeling Vulnerable Skills in the Pre-Mastery Phase**

Anna Skinner
*AnthroTronix, Inc.*
**Retention and Retraining of Integrated Cognitive and Psychomotor Skills**

Harry B. Burke
*National Naval Medical Center*
**Intelligent Systems to Assess and Maintain Cognitive Skills to Improve Safety and Quality of Care**

Steven Schwitzberg
*Cambridge Health Alliance*
**Validated Skills are Very Important, but Experience Minimizes Bile Duct Injury**

Harry O’Neil
*Department of Educational Psychology and Technology, Curry School of Education, University of Southern California*
**Summary by Discussant**

Friday Posters

Learning & Technology

Bryan Bergeron
*Archetype Technologies, Inc.*
**The Confluence of Experiential Databases, MOOCs and The Internet of Things: Promise for Medical Simulation Developers**

Johan Creutzfeldt
*CLINTEC, Center for Advanced Medical Simulation and Training, Karolinska Institutet & Karolinska University Hospital*
**Using Virtual World Training to Increase Situation Awareness during Cardiopulmonary Resuscitation**

Ross Dworkin
*Blue Grotto Technologies, Inc.*
**Methods and Techniques for Use of Medbiquitous Standards and Concepts to Facilitate the Functional Integration of Competency, Learning, MOC, and Training Systems**

Lars Enochsson
*Department of Surgical Gastroenterology, Karolinska University Hospital*
**Gender Specific Differences and Value of Simulator Training in Medical Students?**

Troy McDaniel
*Department of Computer Science and Engineering, Arizona State University*
**Geo-Social Mobile Health Gaming**

Marcus Schlickum
*CLINTEC, Karolinska Institute*
**The Role of Motivation in Surgical Simulator Training**
Simulator Design & Development

Wolfgang Fink  
Departments of Electrical & Computer Engineering, and Biomedical Engineering, University of Arizona  
Visual Perception of Intraocular Inclusions from a First-Person Perspective using the simEye 3D Ray Tracing Environment

Thomas Kaltofen  
Research Unit Medical-Informatics, RISC Software GmbH  
Computer-Based Simulation of the Prism Cover Test with the Biomechanical Eye Model SEE-KID

Kevin Kunkler  
Joint Program Committee 1, U.S. Army Medical Research & Materiel Command & University of Maryland School of Medicine  
Military Medical Simulation and Training: A Strategic Plan to Expedite Future Success

Calvin Kwan  
Department of Surgery, University of Wisconsin - Madison  
Validity of a Newly Developed Tri-axial Sensor for Clinical Breast Examination Skills Assessment

Calvin Kwan  
Department of Surgery, University of Wisconsin - Madison  
Application of a New Adaptable Thyroid Model for Ultrasound and Hands-On Skill Assessment

Mark Ottensmeyer  
Simulation Group, Dept of Radiology, Massachusetts General Hospital & Harvard Medical School  
Conversion of Stereo Surgical Microscope for Augmented Reality Application in an Eye Trauma Simulator

Information-Guided Therapies

Manal Alassaf  
Department of Computer Science, School of Engineering and Applied Science, The George Washington University  
Computer-Based Planning System for Mandibular Reconstruction

Jin Hyeok Choi  
Biomedical Research Institute, Korea Institute of Science and Technology  
Automatic Detection of Inferior Alveolar Nerve Canal from Cone-Beam Computed Tomography Images for Dental Surgery Planning

Matthew Kramers  
Biomedical Engineering Graduate Program & Robarts Research Institute, University of Western Ontario  
Towards Evaluation of a Mobile Augmented Reality Application for Image Guidance of Neurosurgical Interventions

Naoki Suzuki  
Institute for High Dimensional Medical Imaging, The Jikei University School of Medicine  
Development of AR Surgical Navigation Systems for Multiple Surgical Regions

Imaging & Visualization

Hossein Arabalibeik  
Research Center for Science and Technology in Medicine, Tehran University of Medical Sciences  
A Method for Semi-Automatic Nuchal Translucency Thickness Measurement

Adrian Johnson  
Robot Perception and Action Lab, University of South Florida  
Unobtrusive Augmentation of Critical Hidden Structures in Laparoscopy

Ashkan Maccabi  
Department of Electrical Engineering, University of California, Los Angeles  
Ultrasound-Stimulated Vibro-Acoustography for High-Resolution Differentiation of Benign and Malignant Tissue of the Head and Neck

Arun Nemani  
Center for Modeling, Simulation and Imaging in Medicine, Rensselaer Polytechnic Institute  
Monte Carlo Based Simulation for Evaluating Optode Fiber Placement in Prefrontal Cortex Imaging of Motor Skills during Surgical Training

Robotics

James Goldie  
Vivonis, Inc.  
Actively Compliant Parallel End-Effector Mechanism for Medical Interventions

Simulator System

Elvis Chen  
Robarts Research Institute, Western University  
Navigated Simulator for Spinal Needle Interventions

Calvin Kwan  
Department of Surgery, University of Wisconsin - Madison  
Modification of the Pelvic Examination Simulator for the Developing World

Anthony LaPorta  
Rocky Vista University  
From Trauma in Austere Environments to Combat or Medical School: How Blended Hyper-Realism in the Real and Virtual Worlds Can Better Prepare Surgeons

Lisbet Meurling  
Division of Anaesthesia and Intensive Care & CLINTEC, Karolinska Institutet  
High-Fidelity Pediatric Simulation Team Training Makes a Difference: A Case Control Study
Sensors

Anne-Lise Maag
Department of General Surgery, University of Wisconsin - Madison

Sensor-Based Assessment of Cast Placement and Removal

James Goldie
Vivonics, Inc.

Deployable Automated Analgesia Unit (DAAU)

Rustam Nabiev
Department of Clinical Science Intervention and Technology, Karolinska Institutet

ShifoSound System for the Lung Status Remote Monitoring of People Suffering from COPD

Pankaj Sharma
Clinical Anatomy, Department of Surgery, Stanford University

Hand Motion Tracking System Using Inertial Measurement Units

Haptics

Seong Pil Byeon
Division of Mechanical Engineering, Korea Advanced Institute of Science and Technology

Cut Surface Generation and Haptic Feedback for Interactive Cutting Simulation

Saurabh Dargar
Center for Modeling, Simulation and Imaging in Medicine, Rensselaer Polytechnic Institute

A Decoupled 2 DOF Force Feedback Mechanism for the Virtual Transluminal Endoscopic Surgical Trainer (VTEST)

Rozaliya Gabidullina
Laboratory of Mechanoreceptor Diagnosis, Lomonosov Moscow State University

Haptic Devices in Endoscopy

Byron Perez-Gutierrez
VR Center & Davinci Research Group, Nueva Granada Military University

Liver Biomechanical Model for Virtual Palpation

Stefan Suwelack
Humanoids and Intelligence Systems Lab, Institute for Anthropomatics, Karlsruhe Institute of Technology

Towards Open-Source, Low-Cost Haptics for Surgery Simulation

Andrés Velandia-Suárez
Multimedia Engineering, Nueva Granada Military University

Human Eye Haptics-Based Multimedia

Modeling

Tansel Halic
Computer Science Department, University of Central Arkansas

pWeb - A High Performance Parallel Computing Framework for Web Browser-Based Medical Simulation

Heinz Lemke
University of Southern California & International Foundation of CARS

3D++ Visualisation of MEBN Graphs and Real Time Interaction with Screen Representations of Patient Models (PIXIE II)

Nobuhiko Mukai
Tokyo City University

Particle Based Simulation of the Aortic Valve by Considering Heart’s Pulsation

Tuan Trung Nguyen
Division of Mechanical Engineering, Korea Advanced Institute of Science & Technology

A Hybrid Contact Model for Cannulation Simulation of ERCP

Sebastian Ullrich
SenseGraphics AB

Real-time Simulation of Transesophageal Echocardiography
Saturday, February 22

Morning Plenary Session

8:30 AM - 12 Noon

The Saturday morning plenary session is under construction. It will feature invited lectures on a range of topics at the forefront of medical technology.

Lunch Break

12 Noon - 1:10 PM

Saturday lunch is on your own.

Saturday Afternoon, Track A

1:10 Moderator's Welcome

Modeling

1:15 Alexandre Bilger
SHACRA Team, INRIA
Computation and Visualization of Risk Assessment in Deep Brain Stimulation Planning

1:30 John Neylon
Department of Radiation Oncology, University of California, Los Angeles
Simulating High-Resolution Bio-Mechanical Head and Neck Model using a Multi-GPU Framework

1:45 Stefan Suwelack
Humanoids and Intelligence Systems Lab, Institute for Anthropomatics, Karlsruhe Institute of Technology
The Medical Simulation Markup Language - Simplifying the Biomechanical Modeling Workflow

2:00 Igor Peterlik
Institut Hospitalo-Universitaire, Strasbourg
Complete Real-Time Liver Model Including Glisson's Capsule, Vascularization and Parenchyma

2:15 Myeongjin Kim
Division of Mechanical Engineering, Korea Advanced Institute of Science and Technology
Multi-Rate Contact Resolution for an Explicit Meshless Deformable Model

2:30 Brian Jo
Salisbury Biorobotics Lab, Stanford University
Using Total Lagrangian Implicit Dynamics FEM to Model the Airway

2:45 Anand Santhanam
Department of Radiation Oncology, University of California, Los Angeles
Cardiovascular Blood Flow Analysis under Normal and Open Injury Conditions

3:00 Break

Independently Organized Session

Extending Extensible 3D (X3D): from Haptic-Based Medical Training to Clinical Applications

3:15 - 5:15

Felix G. Hamza-Lup, Organizer
Computer Science and Information Technology, Armstrong Atlantic State University
Nicholas F. Polys, Co-Chair
Advanced Research Computing, Virginia Tech

Medical applications developed using the open and royalty-free X3D standard range from simulation and training tools for concept/procedure teaching and skill assessment to applications that directly support and improve the clinical stage. MedX3D is an extension to the X3D standard (Web3D, ISO) to support advanced medical visualization functionality and medical data exchange. This focus session will explore X3D applications in the medical field as well as provide information on the current updates and features on the MedX3D standard and the H3D haptics API.
Presentations:

Michael Aratow  
*Medical Informatics, CEP America*  
**A Health IT Perspective on X3D**

Nigel John  
*Wales Research Institute of Visual Computing, Bangor University*  
**X3D in Medical Training & Simulation**

Tommy Forsell  
*SenseGraphics AB*  
**Haptic Rendering with H3D**

Nicholas F. Polys  
*Advanced Research Computing, Virginia Tech*  
**Volume Rendering and Lossless Metadata with X3D**

Felix G. Hamza-Lup  
*Computer Science and Information Technology, Armstrong Atlantic State University*  
**Radiation Therapy Training with X3D**

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**Saturday Afternoon, Track B**

Independently Organized Session

**The Wide Area Virtual Environment - Lessons Learned**  
1:10 - 5:15

Alan Liu, Organizer  
*National Capital Area Medical Simulation Center, Uniformed Services University of the Health Sciences*

The Wide Area Virtual Environment (WAVE) is the world’s largest immersive virtual reality theater. It encompasses 1,000 sq. ft. of usable training area. The WAVE blends virtual reality, live patient actors, human patient simulators, and part task trainers to provide an unprecedented realism. The WAVE supports medical teams training continuously over a period of up to four days to simulate the rigors of military field medicine. In this workshop, We describe the purpose, design, implementation, and use of the WAVE. Our experience with providing training support for both graduate medical education as well as the 579th medical group will be highlighted.

Presenters will include representatives of:

- The Medical Readiness Training Center, Camp Bullis
- The Uniformed Services University of the Health Sciences

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**Saturday Afternoon, Track C**

Independently Organized Session

**3D Printing for Rapid Prototyping**  
1:10 - 3:15

Bryan Bergeron, Organizer  
*Archetype Technologies, Inc.*

Additive manufacturing, such as 3D printing, is a game-changer when it comes to rapid prototyping, especially when the design and printing are done in-house. The goals of this workshop are to introduce participants to 3D printing, in the context of the required prototype durability, size, resolution, and cost. Participants will learn whether in-house 3D printing or design is appropriate for them or is part of a multi-part prototyping process. This workshop will cover:

- Basics of 3D printing
- Purchase and upkeep costs for affordable models
- Printing material properties, cost, and selection
- Print times, resolution, color, and durability
- Post-printing processing
- Software tools and file standards
- Online libraries and open source files
- 3D image capture tools
- High-end printer features and characteristics