POLYTRAUMA CONFERENCE 2006

Dartmouth College Presents
The 2006 Polytrauma Conference

3-5 December 2006 Hanover, New Hampshire

The goal of the conference is to develop improved treatments for soldiers suffering from severe multiple wounds, referred to as polytrauma.

Dartmouth College
Hanover, NH 03755 USA

"During our conference at Dartmouth, we intend to bring together experts from multiple fields in order to consider how best to address the Polytrauma challenge."

Contents

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www.dartmouth.edu

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http://www.synthes.com/html/

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Dudley Childress	Rehabilitation Center of Chicago
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Local Accommodations

Hanover Inn
2 S Main St
Hanover, NH 03755
(603) 643-4300
www.hanoverinn.com

Hampton Inn
104 Ballardvale Dr
White River Jct, VT 05001
(802) 296-2800
www.newenglandhamptoninns.com

Norwich Inn
325 Main St
Norwich, VT 05055
(802) 649-1143
www.norwichinn.com

Residence Inn Hanover Lebanon
32 Centerra Parkway
Lebanon, New Hampshire 03766 USA
Phone: 1-603-643-4511
Fax: 1-603-643-0546
http://marriott.com/property/abouthotel/default/lebri

Fireside Inn
25 Airport Rd # 1
West Lebanon, NH
Phone: 603-298-5900
http://www.afiresideinn.com/index.html

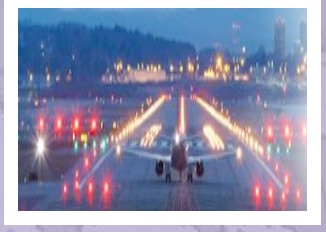
Chieftain Motor Inn
84 Lyme Rd, Hanover, NH
(603) 643-2550
http://www.chieftaininn.com/hanabout.htm

For more information on Hanover area lodging please visit
http://www.dartmouth.edu/apply/visiting/lodging.html

Traveling to Hanover

Lebanon Airport
5 Airpark Road
West Lebanon, NH 03784
Phone: 603-298-8878
Fax: 603-298-5845

This airport is 10 miles from Dartmouth. Served by several flights daily from New York (LaGuardia).
http://www.flyleb.com/Home_Lebanon_Airport.aspx



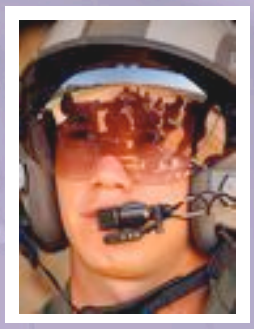
Manchester N.H., Airport
This airport is 90 minutes south, with bus service to Hanover from Manchester.
http://www.flymanchester.com/

Boston International Airport
http://www.massport.com/logan/default.aspx

Dartmouth Coach
Phone: 800-637-0123
The Dartmouth Coach offers daily service between the Dartmouth campus, Boston's South Station and Logan Airport and occasional service between Dartmouth and the Manchester, N.H., airport.
http://www.concordtrailways.com/dartmouth_coach.htm

Amtrak's "Vermonter"
Service from Washington and New York arrives daily in nearby White River Junction, Vermont.
http://www.amtrak.com

For more information about traveling to the Hanover area please visit
http://www.dartmouth.edu/apply/visiting/directions.html



"In the U.S. alone, the number of servicemen currently suffering from severe Polytrauma is well over 100."

Background and Introduction

Improvised explosive devices (IEDs), in Iraq or Afghanistan, are the primary cause of injuries to servicemen who become Polytrauma patients. These devices consist of explosives such as 155 mm artillery shells that are hidden and remotely detonated against dismounted servicemen or their convoys. In the U.S. alone, the number of servicemen currently suffering from severe Polytrauma is well over 100. This number grows substantially when considering the issue of Polytrauma in a larger context.

In prior wars, servicemen often did not survive the events capable of causing such severe multiple injuries. However, in this war, new body armor, improved combat casualty care, and more rapid evacuation procedures have caused a substantial improvement in the survival rate of wounded servicemen. For instance, the ratio of WIA to KIA in prior wars averaged 3 to 1, at present the ratio is roughly 8 to 1. Moreover, in accordance with this shift in the ratio of WIA to KIA, there has been a shift in the severity of the injuries. The Polytrauma injuries often include injuries to the hands, feet, arms, legs, face, and brain; as well as impairment of vision and hearing. Additionally, severe brain injuries from blasts, fragment penetration of the skull, and severe facial disfigurement are not uncommon. Severe facial disfigurement can sometimes lead to degraded speech function, limited and distorted facial expression, and excessive drooling.

At present, there is no treatment or rehabilitation approach that is adequately matched to these Polytrauma patients. Although there are exceptions, current approaches are generally focused on a single problem, such as limb loss or hearing loss, and are overwhelmed by the Polytrauma patient. During our conference at Dartmouth, we intend to bring together experts from multiple fields in order to consider how best to address the Polytrauma challenge.

Current Assumptions of the Envisioned Polytrauma Program

The purpose of the proposed conference is to outline a program for treatment and rehabilitation of Polytrauma patients. The following paragraphs outline some current assumptions about the program (assumptions that may be altered or supplemented at the proposed conference).

Assumption A

Independent of one's political views about policies and events that have led to the existence of these Polytrauma patients, and independent of the number of such patients that exist and choose to be rehabilitated, it is assumed that it is worth making a serious effort to develop an effective Polytrauma program to help such patients.

Assumption B

In order for such a program to be effective, it must contain efforts at two levels. First, there must be a near-term clinical effort to rehabilitate current Polytrauma patients by exploiting to the fullest extent possible existing physical and psychological treatment modalities. Second, there must be a serious long-term research effort to develop more effective treatments than those now readily accessible.

Assumption C

Rehabilitation and treatment programs for Polytrauma patients constructed by applying independent, already existing single-trauma programs will be vastly inferior to a Polytrauma program developed specifically for Polytrauma patients. This inferiority arises from two sources. First, many of the treatments for single-trauma patients are critically dependent on the normal functioning of the systems not being addressed. Second, the use of independent treatments fails to capitalize on the extent to which economies of treatment, like economies of scale, can be realized with an integrated approach.

Assumption D

The envisioned Polytrauma program will extend current work on the Polytrauma problem not only by considering all the injuries of each Polytrauma case in a unified fashion, but also by engaging and integrating organizations, disciplines, facilities, and personnel that cover a broad range. In addition to components in the medical and rehabilitation domains (concerned with psychological as well as physical problems), scientific and engineering components (biology, physics, chemistry, mechanical engineering, and electrical engineering) will also be well represented. It is anticipated that any successful program will involve individuals from academia, industry, and government, and individuals focused on program administration and funding as well as on the content of the Polytrauma program.

Assumption E

Despite the assumption that a robust Polytrauma program is worth pursuing even if it only helps the population of Polytrauma patients, it is expected that results achieved in this program will have substantial "spin-off" for other populations. In particular, it is believed that the program will lead to significant benefits for the aged and for patients of diseases such as cerebral palsy, muscular dystrophy, and spinal cord injuries that lead to multiple failures in normal functioning.

The Dartmouth Polytrauma Conference

The MacLean Engineering Sciences Center (ESC) is a state of the art facility that provides "a window into the ingenuity and creativity of engineering."

The conference is scheduled to take place on December 3-5 at the Thayer School of Engineering at Dartmouth College in the new McLean Engineering Sciences Center. Among the available facilities is a telecommunications system to enable individuals at other sites to participate in the conference virtually if they cannot attend physically. Participants will be expected to pay their own expenses, except in special cases that will be determined on an individual-needs basis.

FOR MAPS AND DIRECTIONS PLEASE VISIT

http://engineering.dartmouth.edu/~Simon_G_Shepherd/seminars/maps/maps.html

Detailed Program
Sunday, December 3, 2006

day one **POLYTRAUMA INJURIES**

The conference will start on the afternoon of December 3rd. Following introductory remarks, presentations and discussions will focus on a description of Polytrauma injuries, the problems faced by individuals with these injuries, and the physical/biological mechanisms by which the injuries occur (i.e. technically how various parts of the human body respond to blasts). All the presentations will be held in **Spanos Auditorium (Cummings 100)** in the Thayer School of Engineering.

Opening Remarks by Organizers 1:00 - 1:30 PM
Joseph Rosen and Former Surgeon General C. Everett Koop

Introductory Remarks 1:30 - 2:00 PM
Dean Joseph Helble and Dean Stephen Spielberg

Key Note Address on Blast Injuries 2:00 - 2:30 PM
Howard Champion

Physics of Blast Injuries 2:30 - 3:00 PM
Alex Greer

Psychological Sequelae 3:00 - 3:30 PM
Paula Schnurr

Secondary Injuries - Burns 3:30 - 4:00 PM
Matt Klein

Brain Injuries 4:00 - 4:30 PM
Richard Granger

Panel: From Combat Casualty Care and Operational Medicine to Surgical Reconstruction in CONUS 4:30 - 5:00 PM
Jon Bowersox

The View from the Battlefield 5:00 - 5:30 PM
Tom Crabtree (Tele-Conference)

Dinner - Atrium, Maclean 5:30 - 7:00 PM

Keynote Speaker: Research and Technologies of the Future and how they can Address Polytrauma 7:00 - 8:00 PM
Rick Satava

From Robotics to Regenerative Medicine 8:00 - 10:00 PM
David Hanson (Robotics) and Geoffrey Gurtner (Reg Med)

Detailed Program
Monday, December 4, 2006

day two TECHNOLOGIES

Sessions throughout the day will describe the state of rehabilitation and treatment for single-trauma patients, as well as provide an overview of current efforts directed towards Polytrauma patients. Break out sessions during the afternoon will provide an opportunity for groups to meet and consider methodologies, technologies, and scientific/engineering research projects that are likely to be critical to success of the envisioned Polytrauma program. In the evening, there will be a special session of patient testimonials that will be moderated by Susan Dentzer, of the Jim Lehrer show on PBS.

Breakfast
On your own

Session 1: From Benchtop to Bedside (Cummings 200)
Moderated by Kirby Vossburgh

"The Story of bone Morphogenic Protein (OPI)" 8:00 - 9:00AM
Jamie Kemmler (Stryker)

Session 2: Brain Machine Interface, Sensory and Motor Prosthesis (Cummings 200)
Moderated by Mandayam Srinivasan

"Neural Interfaces"
Alik Widge 9:00 - 9:30 AM

"Cochlear Implant: Clinical Challenges" 9:30 - 10:00 AM
Glenn Johnson

"Auditory-System Implants: State of Research" 10:00 - 10:30 AM
Robert Shannon

"Motor Prostheses" 10:30 -11:00 AM
Dudley Childress

"Retinal Implants" 11:00 - 11:30 AM
Joe Rizzo (teleconference)

Break 11:30 - 12:00 PM

Session 3: From Surgical Repair to Replacing Biological Tissues (Cummings 200)
Moderated by Geoff Gurtner

"Replacing Organs: from Tissue Engineering to Transplantation" 12:00 - 12:30 PM
Joe Paydarfar

"Surgical Reconstruction of the Face and Limbs" 12:30 - 1:00 PM
Andy Friedman

Detailed Program
Monday, December 4, 2006 Continued

day two **TECHNOLOGIES**

Session 4: Robotics - From the Battlefield to the VA
(Cummings 200)
Moderated by David Hanson

Boxed Lunches (Cummings 200) 1:00 - 2:00 PM
TELE-TALK: "Exoskeleton for Rehabilitation and Independence"
Steve Jacobson

"Autonomous and Semi-Autonomous Robotic Systems" 2:00 - 2:30 PM
Chris Jones (iRobot)

"Micro: Robotic Wound Dressings and Information Systems" 2:30 - 3:00 PM
Jung-Chih Chao

Session 5: Virtual Reality, Simulation (Cummings 200)
Moderated by Nat Durlach

"Simulation of the Human Body and its Reactions to Surgical Procedures"
Steve Marra
3:00 - 3:30 PM

"Speculations on the Use of Virtual Reality in the Treatment of Polytrauma Patients"
Mel Slater
3:30 - 4:00 PM

Open Mike Session (Cummings 200)

Break Out Sessions
Groups will develop a short-term research agenda, less than five years, and a long-term research agenda, more than five years, for an envisioned Polytrauma program. 4:00 - 7:00 PM

Detailed Program
Monday, December 4, 2006 Continued

day two **TECHNOLOGIES**

Biology (MacLean BO1)
Surgery to regeneration

Robotics and Prostheses (Cummings 105)
Sensory, motor and neural interfaces

Simulation (Cummings 202)
Surgical simulation, virtual reality, brain injuries, and psychological issues

Pizza and Soda will be provided during the break out sessions

Testimonials by Patient (Spanos Auditorium, Cummings 100) 7:00 - 8:00 PM
Susan Dentzer Presents PBS Special
Patient Jeffrey Mittman describes his experience

Panel Discussion (Spanos Auditorium, Cummings 100) 8:00 -10:00 PM
Panel of reconstructive surgeons discuss difficult patient problems:
Chris Demas, Andy Friedman, Benoit Gosselin, Robert Cantu, Dennis Orgill and Bohdan Pomahac

Detailed Program
Tuesday, December 5, 2006

day three SOLUTIONS

On the morning of Day Three, at the conclusion of the conference, participants will report on the prior evenings work and outline the next steps to be taken in the development of the Polytrauma program. This discussion will include not only further specification of the program itself, but also the planning of a proposal for the acquisition of funds to support the program. The conference will terminate at noon. All presentations will be held in **Cummings 200** in the Thayer School of Engineering.

Breakfast
On your own

Closing Remarks 8:00 - 8:30 AM
President Jim Wright

Present Short Term Solution and Research Plan for the Future Polytrauma Program 8:30 - 10:00 AM
Each groups presents their short-term (less than 5 years) solution and research plan in 20 minutes, with 10 minutes remaining for discussion.

Break 10:00- 10:30 AM

Present Long Term Solution and Research Plan for the Future Polytrauma Program 10:30 - 12: 00 PM
Each group presents their long-term (more than 5 years) solution and research plan in 20 minutes, with 10 minutes remaining for discussion.

Final Words 12:00 - 12:30 PM
CLOSING OF MEETING

FIELD TRIPS

Tour of Stryker Facility
Tour of M2S Facility