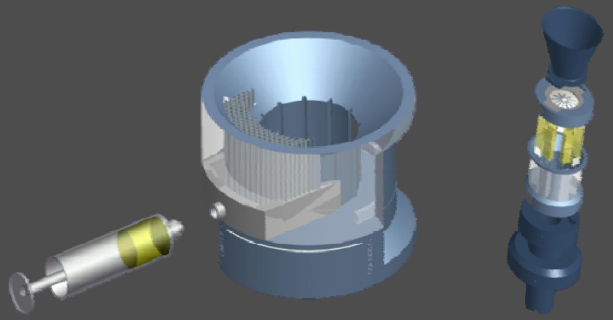
Team Taurus - Bioengineering Senior Design 2009

BONE REMODELING MONITOR

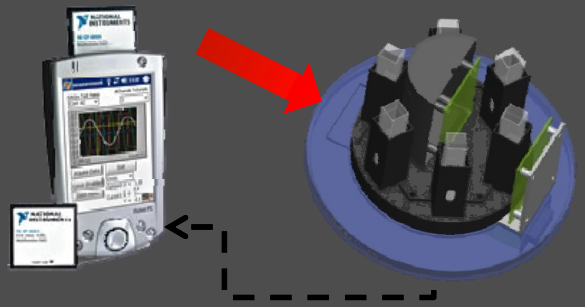
Student CF , Student LG, Student BH, Student SM, StudentEW

PURPOSE:

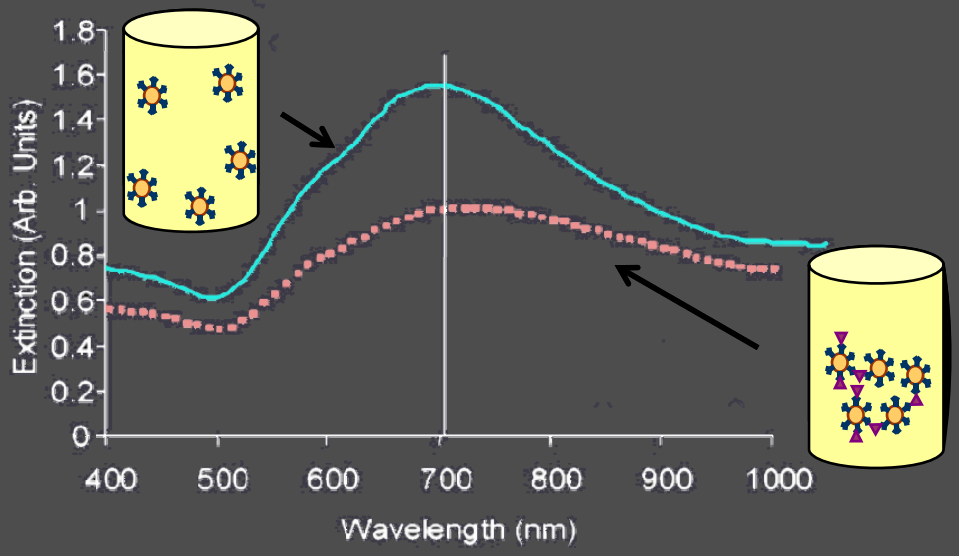
Develop a novel, non-invasive, highly-sensitive, portable, intuitive, and low-powered device to measure bone resorption levels in 'real time' to provide rapid & individualized feedback to maximize the efficacy of bone loss countermeasures in space



Urine Specimen collected from device integrated with the space toilet



Absorbance level measure by an optical device and results displayed on PDA



Agglutination of DPD with DPD-specific antibody conjugated with nanoshells causes a change in absorbance level in mixture

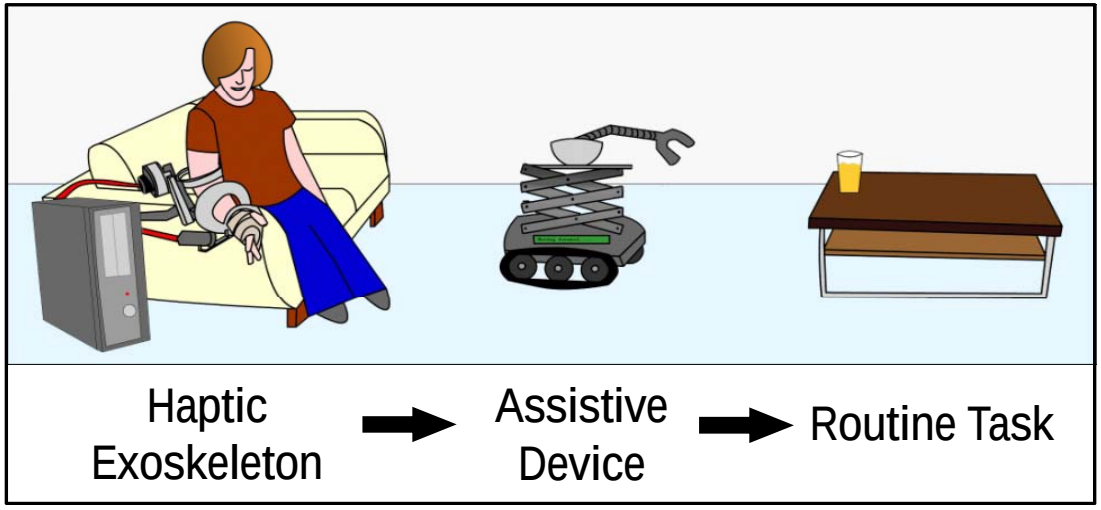
RoboRehab: Assistive Robotics Design for Upper-Limb Rehabilitation

Goals

- Motivate older stroke and spinal cord injury victims to continue rehabilitation exercises at home
- Interface with existing technology to create controlled rehabilitation environment
- Improve patient motor function and quality of life

Assistive Robotic Device

- Patient arm motion within Haptic Exoskeleton
- Exoskeleton motion translated to assistive robot movements
- Robot performs useful tasks around the home.



Team Members: Claire Krebs[1], David Meyer[1], Christine Moran[2], Austin Mueller[2], Beth Rowan[1]
Faculty Advisors: Dr. Maria Oden[2], Dr. Marcia O'Malley[1]
1 Department of Mechanical Engineering; 2 Department of Bioengineering

The Transesophageal Echocardiogram Force Monitor

WARNING:
CHOKING HAZARD -

M. Bjornson, R. Chun, R. Gibb
G. Lozier, K. Montgomery

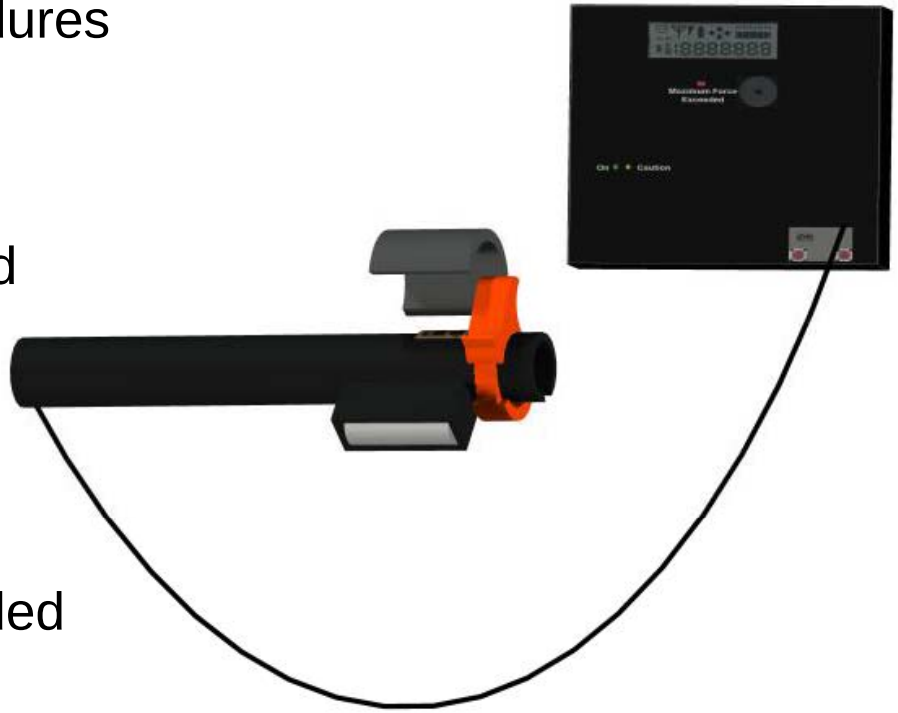
The Transesophageal Echocardiogram

is used when traditional echocardiograms are insufficient

can result in esophageal bruising or perforation if excess force is used in passing the probe

involves unquantified forces, impairing knowledge and training of TEE procedures

- The TEE Force Monitor
  - fits around the TEE probe and measures the pushing force exerted by the physician
  - displays and records forces used during the procedure
  - sounds an alarm alerting user if maximum force threshold is exceeded



Optimized Neonatal Incubators for the Developing World

Team HTB: *Student Names*
Rice University, Department of Bioengineering

Goal: Optimize the hot cot neonatal incubator as a viable complement to Kangaroo Care and disseminate instructions to build and operate the device in a developing world environment.

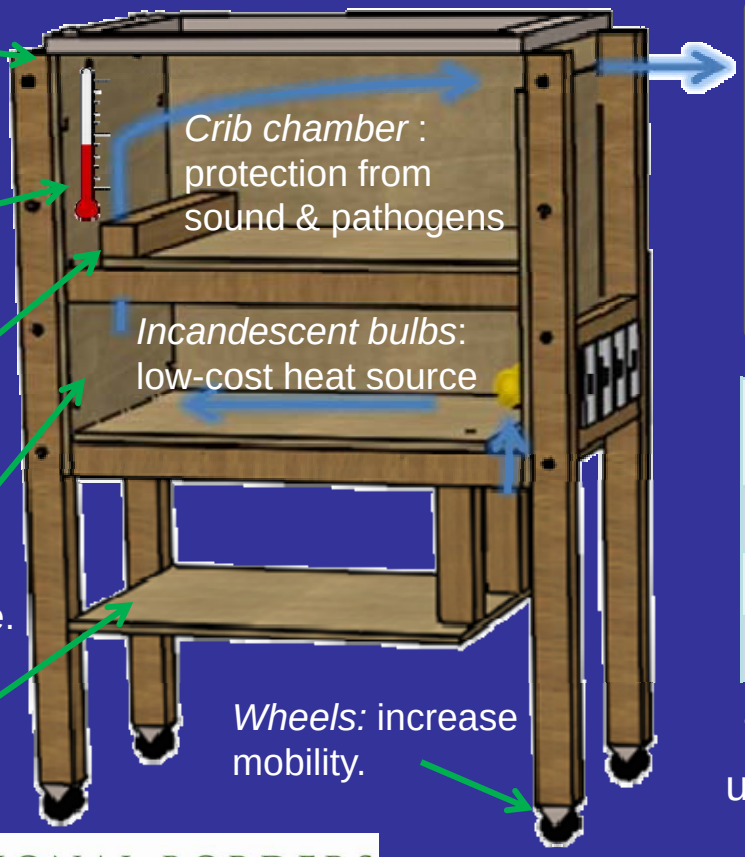
Plexiglass lid: visual monitoring and light therapy.

Thermometer: for internal temperature.

Raised lip: safety precaution

Plywood ½" pine: inexpensive & effective.

Shelf: storage space



Convective airflow
Four 100W bulbs controlled by individual switches warm incoming air, which rises to the crib chamber.

	15°C Ambient	20°C Ambient
2 Bulbs	24 °C	30 °C
3 Bulbs	28 °C	34 °C
4 Bulbs	32 °C	37 °C

The hot cot neonatal incubator makes use of cheap, locally available materials and is easy to assemble and repair.

BEYOND TRADITIONAL BORDERS

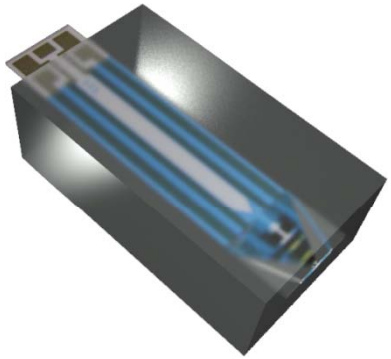
Less Costly Glucose Monitor

Increasing access to glucose monitoring in the developing world

Glucose monitoring costs 1 dollar per test
and up to 5 dollars a day

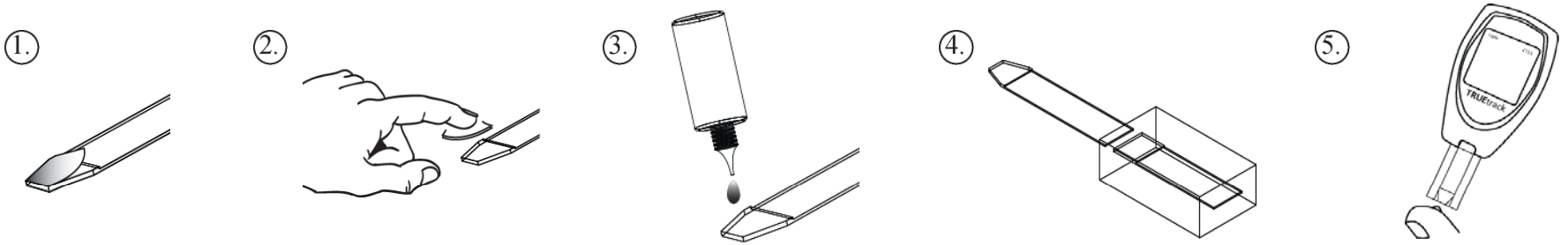
3 billion live on less than 2.50$ a day

We aim to increase access to glucose monitoring by
decreasing the per-use cost by 99%



Custom housing block augments durability and renews capillary action on the test strip.

Our method:



Leveraging existing technology, with small modification to an OTC glucometer system, we can reconstitute and recycle test strips. We have shown it is possible to clean test strips, reapply reagents, and reuse them in a minimum of easy to follow steps.