Research at RIC: Integrating Research with Clinical Care
1. Areas of research at RIC
2. How RIC collaborates with the Northwestern University and affiliate community
3. The vision for RIC’s new Research Hospital
Research Collaborations (regional)
Northwestern University
- Physiology
- Neuroscience
- Physical Therapy & Human Movement Science
- Biomedical Engineering
- Mechanical Engineering
- Electrical Engineering and Computer Science

University of Illinois Chicago
- Physical Therapy
- Bioengineering

Illinois Institute of Technology
Research Collaborations - Companies

1. Otto Bock – Max Nader Center - newly established Technology Outcomes Testing Center
2. Hocoma Zurich
3. Honda Japan
4. Ekso (Berkely) - exoskeletons for walking
5. Barrett Technologies - WHAM cable robots
6. Kinea Design
Robotics at RIC

Use of robotics or simpler technology to understand how the brain acquires, organizes and executes motor behaviors

• T-Wrex (Armeo®)
• Manus (MIT)
• Haptic Master
• WHAM (Barrett Technologies)
• Virtual Reality (VROOM)
• KineAssist™
• Advanced Controllers for Lokomat
• Novel Hand Robotics
Designated Federal Research Centers

1. Spinal Cord Injury Model System (NIDRR)
2. Brain Injury Model System (NIDRR)
3. Stroke Rehabilitation and Research Training Center (NIDRR)
4. Rehabilitation Outcomes Research and Training Center (NIDRR)
5. Rehabilitation Engineering Research Center on Robotics in Rehabilitation (NIDRR)
6. Rehabilitation Engineering Research Center For Severe Orthopedic conditions in Childhood (with Marquette University) (NIDRR)
7. Engineering for Neurologic Rehabilitation (NIH)
8. Center for Neural Engineering (NSF)
Man Machine Interface
Postural Robotics

• Focuses on neuromuscular control mechanisms underlying the simultaneous control of walking and balance
  – KineAssist
    ▪ Three devices exist
    ▪ Used clinically and in research
“Bionic Arm”

- Pioneered procedure call **Targeted Muscle Reinnervation (TMR)** that allows an amputee to control a prosthetic device with his/her own neural impulses – or thoughts.
  - More than 40 patients worldwide
  - Harnessing not only motor, but sensory feedback.
  - DARPA Revolutionizing Prosthetics
  - Offering TMR procedure clinically at RIC
Design and development of electro-mechanical components, control sources and transducers necessary to interface these electro-mechanical components to the user, and

- Implantable myoelectric sensors (IMES) developed to inductively relay a muscle’s activity information to the prosthesis controller.
Harnessing Sensory Feedback
Advanced Prosthetics
2011 Research Highlights

370 Approved Research Protocols

200 Research Staff

32 Principal Investigators

Renewal of SCI Model Systems Grant

Dr. Kuiken on TED Global

Geron Trial a model for the future

7 Federal Designations

1. Spinal Cord Injury Model System (NIDRR)
2. Brain Injury Model System (NIDRR)
3. Nation’s Only Stroke Rehabilitation and Research Training Center (NIDRR)
4. Nation’s Only Rehabilitation Outcomes Research and Training Center (NIDRR)
5. Rehabilitation Engineering Research Center (NIDRR)
6. Neurologic Rehabilitation (NIH) — Bionic Medicine
7. Technologies for Children with Orthopedic Disabilities (NIDRR)
2012 RIC Research Ranking

#1 NIH

$75 million in single and multi-year grants

$20 million annual portfolio — FY2011

Rehabilitation Institute of Chicago
RIC Vision

To Advance Human (Patient) Ability

RIC will serve as the world’s leading scientific hospital for the innovation and testing of new and more hopeful treatments that improve and eliminate the effects of injury, disease, and debilitating health conditions.
The majority of RIC’s human subject and applied research will be physically embedded with medical care around the patient.
Opened
JAN 3, 2012
RIC’s newest patient recovery unit:

• Added 24 more beds to the 9th floor of RIC’S current hospital

• A “Test-Bed” for ideas, experimentation, and novel space concepts that will inform the design of RIC research hospital

• The world’s first and only Ability Lab — a prototype
Ability Laboratory
RIC’s New Research Hospital...

...a building that will enable the integration of science and clinical care in a futuristic medical model that promotes patient recovery better than any other place in the global market.
RIC will be focused around ‘Centers of Distinction’

RIC is designing its new research hospital from the *inside* out.

brain  spinal cord  neuro-musculoskeletal  pediatrics  cancer
A Glimpse into the Inpatient Levels

Centers of Distinction

ABILITY LABS™
Artist’s Schematic View: Ability Lab from First Floor
Artist’s Schematic View: Ability Lab from Second Floor
Artist’s Schematic View: From the Street Looking South
Artist’s Schematic: An External View
Artist’s Schematic: An External View
Artist’s Schematic View: The New RIC Research Hospital
Thank You!