Application of New Technologies in Rehabilitation

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Rehabilitation Institute of Chicago
Academy
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Wesley M. & Suzanne S. Dixon
Education and Training Center

and

NORTHWESTERN UNIVERSITY
FEINBERG
SCHOOL OF MEDICINE
Department of Physical Medicine & Rehabilitation

October 4-5, 2012
Rehabilitation Institute of Chicago
345 East Superior Street
Chicago, IL 60611

Rehabilitation Institute of Chicago has been ranked “Best Rehabilitation Hospital in America" every year since 1991 by U.S. News & World Report
Application of New Technologies in Rehabilitation

THE BEST REHABILITATION HOSPITAL... MEANS THE BEST REHABILITATION EDUCATION.

The Rehabilitation Institute of Chicago (RIC) is ranked the “Best Rehabilitation Hospital in America,” in part because it fully integrates research, clinical care, and education, through the Continuing Education (CE) programs offered by the RIC Academy.

The RIC Academy CE programs help you keep abreast of changes in your field. The curriculum is grounded in evidence-based practice when appropriate as well as based on the collective clinical experience of our staff. RIC Academy courses are taught by interdisciplinary teams of recognized specialists from RIC and visiting experts from across the country and around the world.

COURSE DESCRIPTION

Over the past 15 years, there has been an upsurge of new technologies in rehabilitation care, including advanced robotics systems for retraining a range of motor and sensorimotor deficits. These systems target locomotion recovery (Lokomat®), upper extremity function (IMT Manus®, and ArmeoSpring®), improving hand function, and reducing spasticity. In addition, there are available surface or implanted electrical stimulation systems for upper extremity (Bioness) and lower extremity retraining. Several new powered exoskeletal systems have been introduced to promote walking recovery in spinal cord injured persons (e.g. Ekso® and Rewalk®). Finally, there have been a number of wearable sensors introduced to allow clinicians and researchers to track the evolution of disease, its natural history and response to therapy. There has also been increasing use of virtual reality systems, often combined with robotic devices to enhance functional recovery.

These various technologies are still quite new, and many therapists and clinicians have not been instructed in their use and in their potential applications for providing therapy. This course will describe some of these new devices and systems, summarize the evidence regarding their efficacy, and help clinicians evaluate their therapeutic potential and cost effectiveness.

WHO SHOULD ATTEND

Physiatrists, Physical Therapists, Occupational Therapists, Rehabilitation Nurses, Neuroscientists, Engineers and Others Interested in Promoting Recovery from Neurological Illness

COURSE OBJECTIVES

Upon completion of this course, participants will be able to: Describe the range of new technologies available for diagnosis and rehabilitation of disabling neurological disorders
Describe the medical and rehabilitation treatment indications for the use of these novel engineering technologies
Discuss the research applications of virtual reality systems
Outline the technological resources available to individuals with stroke, spinal cord injury, and brain injury and their family members
Explain the concepts of neuroplasticity of recovery and the implications for neurorehabilitation in relation to the use of new robotic systems
Summarize the new technologies available for rehabilitation of upper and lower extremity impairment and their impact on clinical case management
Describe indications and potential benefits to be derived from the use of new robotic and sensor technologies
Identify techniques for managing upper and lower motor limb problems
Discuss the importance of these technologies in the context of extending rehabilitation in the clinic or in the home

COURSE CHAIR

William Z. Rymer, MD, PhD
Vice President for Research, Rehabilitation Institute of Chicago; Professor, Department of Physical Medicine and Rehabilitation, Northwestern University Feinberg School of Medicine

GUEST FACULTY

Paolo Bonato, PhD
Dr. Bonato is Director of the Motion Analysis Laboratory, Spaulding Rehabilitation Hospital; Assistant Professor, Department of Physical Medicine and Rehabilitation, Harvard Medical School, Boston, MA; Affiliated Faculty Member of the Harvard–MIT Division of Health Sciences and Technology, Cambridge, MA and Adjunct Professor of Biomedical Engineering at the Massachusetts General Hospital Institute of Health Professions, Boston, MA. He is the Founding and Current Editor-in-Chief of the *Journal on NeuroEngineering and Rehabilitation* and the Associate Editor of the *IEEE Transactions on Information Technology in Biomedicine*. Dr. Bonato’s research interest is focused on rehabilitation technology with special emphasis on wearable technology and robotics. He served as Chair of the IEEE EMBS Technical Committee on Wearable Biomedical Sensors and Systems in 2008 and has been a member of this committee since its inception in 2006.

David J. Reinkensmeyer, PhD
Dr. Reinkensmeyer is Professor in the Departments of Mechanical and Aerospace Engineering, Anatomy and Neurobiology, and Biomedical Engineering University of California, Irvine. Dr. Reinkensmeyer received his B.S. and Ph.D. degrees from Massachusetts Institute of Technology and University of California Berkeley, respectively, in electrical engineering, and was a post-doctoral fellow at RIC before joining the faculty at U.C. Irvine. His research group seeks to understand how to improve sensory motor recovery following neurologic injury and disease, and develops robotic and sensor-based training devices toward this goal.
FACULTY FROM THE REHABILITATION INSTITUTE OF CHICAGO, AND NORTHWESTERN UNIVERSITY

Meghan Buell, OTR/L
Research Occupational Therapist, Sensory Motor Performance Program; Clinical Occupational Therapist, Inpatient Neuro-Rehabilitation Unit, Rehabilitation Institute of Chicago

Assaf Dvorkin, PhD
Research Assistant Professor, Department of Physical Medicine and Rehabilitation, Northwestern University Feinberg School of Medicine; Research Scientist, Sensory Motor Performance Program, Rehabilitation Institute of Chicago

Heidi Fischer, MS, OTR/L
Clinical Research Coordinator, Hand Rehabilitation Laboratory, Sensory Motor Performance Program, Rehabilitation Institute of Chicago

T. George Hornby, PT, PhD
Associate Professor, Department of Physical Therapy and Kinesiology & Nutrition, University of Illinois at Chicago; Research Scientist, Sensory Motor Performance Program, Rehabilitation Institute of Chicago

Arun Jayaraman, PT, PhD
Assistant Professor, Departments of Physical Medicine and Rehabilitation and Medical Social Sciences, Northwestern University Feinberg School of Medicine; Director, Rehabilitation Technologies & Outcomes Lab, Center for Bionic Medicine, Research Scientist, Rehabilitation Institute of Chicago

Derek Kamper, PhD
Associate Professor, Department of Biomedical Engineering, Illinois Institute of Technology; Research Scientist, Rehabilitation Institute of Chicago

Chandramouli Krishnan, PT, PhD
Assistant Professor, Department of Physical Medicine and Rehabilitation, University of Michigan; Director, Neuromuscular and Rehabilitation Robotics Laboratory (NeuRRo Lab), University of Michigan; Adjunct Assistant Professor, Department of Physical Medicine and Rehabilitation, Northwestern University Feinberg School of Medicine; Research Scientist, Rehabilitation Institute of Chicago

James L. Patton, PhD
Director, Robotics Lab and Associate Director, Center for Rehabilitation Robotics, Rehabilitation Institute of Chicago; Associate Professor, Department of Bioengineering, University of Illinois at Chicago
AGENDA

THURSDAY, October 4, 2012

8:00 AM  Registration
1st Floor Lobby
Rehabilitation Institute of Chicago

Continental Breakfast
16th Floor Lobby, RIC Academy

8:20  Welcome and Introduction to the Program
Anita S. Halper, MA, CCC-SLP, Board Certified-ANCDS
William Z. Rymer, MD, PhD

8:30  Keynote Address: Wearable Sensors to Monitor Response to Therapy
Paolo Bonato, PhD

9:45  Novel Robotic Therapies Promoting Upper Extremity Recovery After Stroke
James L. Patton, PhD

10:45  Break

11:00  New Robotic Approaches for Treatment of Hand Impairment Following Stroke
Derek Kamper, PhD

12:00 PM  Panel Discussion
Faculty

12:30  Lunch (on your own)

1:45  Robotic Technology for Home Use
Heidi Fischer, MS, OTR/L

2:45  Visuo-Haptic Virtual Environments for Assessment and Rehabilitation of Attention Following Brain Injury
Assaf Dvorkin, PhD

3:45  Break

4:00  Panel Discussion: Technology for Upper Extremity Recovery
Faculty

5:00  End of Day One
**FRIDAY, October 5, 2012**

8:00 AM  **Continental Breakfast**  
16th Floor Lobby, RIC Academy

8:30  **Keynote Address: New Algorithms for Upper Extremity Robotic Therapy**  
David J. Reinkensmeyer, PhD

9:30  **Armeo Therapy – Experience from the Clinical Floors**  
Meghan Buell, OTR/L

10:30  **Break**

10:45  **Neurophysiology and Neuroplasticity of Locomotor Recovery after CNS Injury**  
T. George Hornby, PT, PhD

11:45  **Q & A**

12:00 PM  **Lunch (on your own)**

1:00  **Novel Applications for New Lokomat® Controllers**  
Chandramouli Krishnan, PT, PhD

2:00  **Ekoskeltons for Gait Assistance**  
Arun Jayaraman, PT, PhD

3:00  **Looking Forward – Robotics in 20 Years**  
William Z. Rymer, MD, PhD

3:30  **Conclusion of the Course**

**TUITION**

To qualify for the group discount rates (group members do not have to be from the same facility), students must mail, fax or enter online the group’s registrations together. Group members cannot receive the discounted rate if the registrations are received separately.

<table>
<thead>
<tr>
<th>Number of Students</th>
<th>Tuition</th>
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<tbody>
<tr>
<td>Single</td>
<td>$495</td>
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<td>2 to 4</td>
<td>$475</td>
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<tr>
<td>5 or more</td>
<td>$465</td>
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**LOCATION**

The program will be held at the Rehabilitation Institute of Chicago, 345 East Superior Street, Chicago, Illinois. The conference site is wheelchair accessible. Accessible materials, sign language interpretation and personal assistance are available with at least 45-days advance notice.
HOUSING

Rooms have been reserved at the Hyatt Chicago Magnificent Mile (formerly the Wyndham), 633 North St. Clair, Chicago, Illinois. The Hyatt Chicago is located 2 ½ blocks from RIC. Please contact their reservation agent from 9:00 am until 5:00 pm at (312) 787-1234 and indicate that you are attending this course in order to receive the corporate rate of $199 for a Deluxe King Non-Smoking (single or double occupancy) or a Double-Double Non-Smoking (two queen beds – single or double occupancy) plus 16.4% tax. The daily rate for parking at the Hyatt Chicago is $54.00/day. The cut-off date for room reservations is September 2, 2012.

The room block could reach its maximum before the above cut-off dates. Rooms and rates revert to a space-available basis after the room block has reached its maximum or after the cut-off date.

REFUND POLICY

All cancellations must be in writing. Refunds less a 20% administrative charge will be given until September 27, 2012. RIC reserves the right to cancel or change any programs for due cause. Cancellation of a program by RIC will result in a full refund of tuition. RIC is not responsible for the refund of travel or hotel expenses under any circumstance.

IMPORTANT REGISTRATION INFORMATION

Registrations will be taken in the order in which tuition checks or credit card information is received. We highly encourage you to register online as these are processed more quickly than mailed or faxed registrations. Full tuition must accompany the registration form in order to confirm a place in this course. Until you receive your confirmation letter, you are not officially registered for the course. For online registrations you will receive email confirmation within one hour of the date you registered. For registrations received by standard mail or fax, the confirmation may take up to 3 weeks after we receive your registrations. If you do not receive confirmation within this time period, please call 312-238-6042.

Do not make airline reservations that have cancellation penalties until we confirm your registration. However, you should make hotel reservations as soon as possible.

One week prior to the course only internet registrations and faxed registrations that include an email will be accepted. Please note that the course could reach its maximum enrollment before this time.

CONTINUING EDUCATION CREDIT

CME

Accreditation Statement

The Northwestern University Feinberg School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.
Credit Designation Statement
The Northwestern University Feinberg School of Medicine designates this live activity for a maximum of 12.5 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Nursing
The Rehabilitation Institute of Chicago Academy is an approved provider of continuing nursing education by the Illinois Nurses Association, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation.

This CNE activity is being offered for 12.5 contact hours.

Occupational Therapy
The Rehabilitation Institute of Chicago is an approved provider for the American Occupational Therapy Association to offer continuing education in occupational therapy. This intermediate level program awards occupational therapists 1.25 CEUs or 12.5 contact hours. The assignment of AOTA CEUs does not imply endorsement of specific course content, products, or clinical procedures by AOTA.

Physical Therapy
This course has been approved by the Illinois Physical Therapy Board for 12.50 Contact Hours.
Approval #216-000069

Other
Other professionals will be awarded 12.50 Contact Hours or 1.25 CEUs.
REGISTRATION ONLINE at www.ric.org/education
or clip and return this form with payment

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Group Discount Policy
To qualify for group discount rates (you do not have to be from the same facility), registrants
must mail, fax or enter online the group’s registrations together. Group members cannot
receive the discounted rate if the registrations are received separately.

☐ Single Registration Tuition: $495
☐ 2 to 4 - Tuition per Registrant: $475
☐ 5 or more - Tuition per Registrant: $465

Make check payable to: REHABILITATION INSTITUTE OF CHICAGO

Mail to: RIC Academy
345 E. Superior Street, Suite 1641
Chicago, Illinois 60611

Please TYPE or PRINT your name and professional initials (PT) as you would like them to
appear on your continuing education certificate.

Name ____________________________________________ First Name __________________________ Last Name ________________

Home Phone ( ) ____________________________ Prof. Initials ________________________________

Home Address _______________________________________________________________

City ____________________________ State __________ Zip __________

Organization/Facility ________________________________________________________________

Work Address _______________________________________________________________

City ____________________________ State __________ Zip __________

Work Phone ( ) ____________________________ Fax ( ) ____________________________

Position _______________________________________________________________

E-mail _______________________________________________________________

(We encourage you to use email – it allows us to respond much faster to your registration. Thank You)

Please note: registration will not be processed without full payment.

Method of Payment: ☐ Check enclosed  ☐ Credit Card
Credit Card Users Must Complete the Following Information:

1) □ Personal Credit Card □ Corporate Credit Card

2) □ MasterCard □ VISA

Credit Card # __ __ __ - __ __ __ - __ __ __ - __ __ __

Expiration Date __ / __

Name on Card__________________________________________

Billing Address_________________________________________

City________________________ State_________________ Zip__________

Cardholder’s Signature_________________________________________

Credit card registrations may be faxed to: 312-238-4451. If you fax your registration, do not send another registration by mail.

For official use #________________________ CC_AH201301____

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