

Rehab *progress*

News from the University of Pittsburgh Medical Center Institute for Rehabilitation and Research

Fall/Winter 2008

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From the Director's Desk



Dr. Boninger

In the summer issue of *Rehab Progress*, I mentioned current trends in academic medicine that favor collaborative efforts. I praised the ingenuity of positioning the UPMC Institute for Rehabilitation and Research (IRR) on a broad foundation that encourages contributions from multiple disciplines through every mode of inquiry.

This is the framework that defines our work at hospital bedsides, physical therapy departments, and physicians' offices. It is why IRR faculty and staff members are scrutinizing data sets and spread sheets, engineering assistive devices and virtual environments, teaching medical students, supervising clinical interns, instructing residents, and mentoring young researchers.

In this issue of *Rehab Progress*, we introduce a few of the young researchers who represent the progress and future of rehabilitation science. Their work was highlighted at our annual festival of research, IRRDay. This year, we joined the Pennsylvania Academy of Physical Medicine and Rehabilitation (PAPM&R) in a shared day that combined the PAPM&R Annual Meeting and IRRDay₂₀₀₈.

Also in this issue, read about our National Research Service Award, an NIH-funded T32 training program designed to prepare rehabilitation clinicians for careers in clinical outcomes research. Meet the four medical students chosen as the first scholars in the Rehabilitation Research Experience for Medical Students scholarship program directed by our department colleague, Brad Dicianno, MD.

Read about the work of distinguished researcher Dr. Malcolm McNeil who is using technology that may prove useful in the treatment of post-stroke apraxia of speech.

Our faculty continue to share their expertise with colleagues through their participation at national, international, and web-enabled conferences, including the web-based Virtual State-of-the-Science Conference on Telerehabilitation offered by the University of Pittsburgh Rehabilitation Engineering Research Center on Telerehabilitation. Faculty members made presentations at the American Academy of Physical Medicine and Rehabilitation Annual Assembly and other events and our researchers continue to publish their findings in peer-reviewed journals.

It's thrilling to feel the energy and creativity of our researchers, physicians, and therapists who've chosen the field of rehabilitation and it's inspiring to see so many patients recover from illness or injury to health and participation. This is truly an exciting time for our specialty.

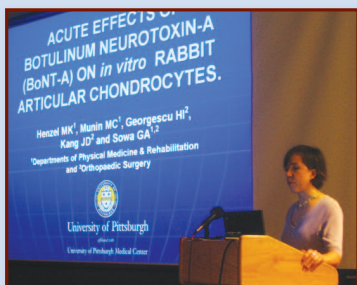
Michael L. Boninger, MD

Director, UPMC Institute for Rehabilitation and Research
Associate Dean for Medical Student Research
University of Pittsburgh School of Medicine
Professor and Interim Chairman
Department of Physical Medicine and Rehabilitation

IRRD₂₀₀₈ Winners' Circle

Best Rehabilitation Research by a Resident in Physical Medicine and Rehabilitation — Kristi Henzel, MD, PhD

Acute effects of botulinum neurotoxin-A (BoNT-A) on *in vitro* rabbit articular chondrocytes



Kristi Henzel, MD, PhD, is a second-year resident in the Department of Physical Medicine and Rehabilitation. She graduated with honors from Vanderbilt University with a degree in biomedical engineering and earned a PhD in physiology and biophysics from the University of Louisville, where she was a University Fellow

from 1995 to 2000, and where she also earned her medical degree. Dr. Henzel is associated with the Ferguson Laboratory for Orthopaedics and Spine Research; her faculty mentor is Gwendolyn Sowa, MD, PhD. Dr. Henzel is planning a career in academic medicine.

Best Rehabilitation Research by an Undergraduate — Tara Lane

The relationship between vascularity and fibrosis formation following a skeletal muscle injury



Tara Lane is a senior majoring in rehabilitation science at the University of Pittsburgh. She received credit through the Office of Experiential Learning, working in the Clinical Translational and Rehabilitation Laboratory of the Stem Cell Research Center. Her faculty mentor is Fabrisia Ambrosio, PhD,

assistant professor of physical medicine and rehabilitation. Ms. Lane plans to attend medical school.

Best Rehabilitation Research by a Predoctoral Student — David Wert

Predictive validity for mortality of self-report and performance-based measures of functional status in community-dwelling older women

David Wert holds a master of physical therapy (MPT) degree from Slippery Rock University and is currently enrolled in the doctoral program in rehabilitation science in the School of Health and Rehabilitation Sciences. He is associated with the Pittsburgh Claude D. Pepper Older Americans Independence Center, specifically, with the Senior Mobility, Aging, and Research Training Center. Mr. Wert received the 2008 American Physical Therapy Association Adopt-A-Doc Award for outstanding doctoral student committed to physical therapy for aging adults, and an Honorable Mention for a predoctoral abstract at last year's IRRDay2007. He plans to continue pursuing research in the context of a physical therapy faculty position at a major research university. Mr. Wert's faculty mentors are Jennifer Brach PhD, PT, GCS, assistant professor of physical therapy; and Jessie VanSwearingen PhD, PT, FAPTA, associate professor of physical therapy.

Best Rehabilitation Research by a Postdoctoral or Fellow — Joo Han Kim, MD, PhD

Activated macrophage-like THP-1 cells modulate annulus fibrosus cell production of inflammatory mediators in response to cytokines"



Joo Han Kim, MD, PhD, is a visiting fellow at the Ferguson Laboratory for Orthopaedic and Spinal Research. He received both his medical degree and his PhD at the College of Medicine, Korea University, Seoul. He is working under the direction of faculty mentor James D. Kang, MD, professor of orthopaedic and neurological surgery, and director of the Ferguson Laboratory

for Spine Research in the Department of Orthopaedic Surgery, University of Pittsburgh School of Medicine. Dr. Kim intends to establish a spinal research lab on his return to Korea, where he is a practicing neurosurgeon.

Honorable Mention

Undergraduate

Rashid Ahmed, mentored by Anthony Kline, PhD, associate professor of physical medicine and rehabilitation, for the project, "A combinational therapy paradigm consisting of 8-OH-DPAT and environmental enrichment facilitates the recovery of function after experimental brain trauma."

Joshua Plassmeyer, mentored by Fabrisia Ambrosio, PhD, assistant professor of physical medicine and rehabilitation, for his study, "The effects of mechanical strain on muscle-derived stem cell proliferation."

Predoctoral

Barrett Woods, Ferguson Laboratory for Orthopaedics and Spine Research, School of Medicine, for the study, "The use of serum biomarkers to assess intervertebral disc degeneration in a rabbit model."

Ibrahim M. Al Tubasi, Department of Physical Therapy, School of Health and Rehabilitation Sciences, for his paper, "Knee joint laxity, as measured by stress radiograph, does not alter the relationship between strength and function in patients with knee OA."

Steve O'Connell, DO, Ferguson Laboratory for Orthopaedics and Spine Research, Department of Physical Medicine and Rehabilitation, School of Medicine, for his study, "Toxicity of bupivacaine on human intervertebral disc."

Postdoctoral/Fellowship

Chia-Lin Chung, PhD, Department of Physical Medicine and Rehabilitation, School of Medicine, for the study, "Influence of baseline hand impairment on functional recovery after botulinum toxin A injections and post-injection therapy."

Edward Westrick, MD, Ferguson Laboratory for Orthopaedics and Spine Research, Department of Orthopaedic Surgery, School of Medicine, for his work, "Improving the safety of gene therapy for intervertebral disc degeneration: Evaluation of a novel gene regulation system."

Department joins PAMP&R to expand IRRDay2008

As a multidisciplinary clinical and academic enterprise, the UPMC Institute for Rehabilitation and Research (IRR) annually recognizes the achievements of young investigators in all aspects of rehabilitation science. IRRDay provides an opportunity for young researchers to compete for awards by submitting abstracts of completed research for consideration by a rehabilitation science review board.

IRRDay2008 was expanded to a full day so it could join the Annual Meeting of the Pennsylvania Academy of Physical Medicine and Rehabilitation (PAMP&R). The PAMP&R meeting occupied the morning hours, while the afternoon was reserved for IRRDay2008. The interim period featured IRRDay Poster Grand Rounds, during which Honorable Mention winners presented their work to guest faculty of both sessions and to the IRRDay2008 review board.

Mendel Kupfer, MD, assistant professor at Thomas Jefferson Medical College and attending physician at Magee Rehabilitation Hospital, both in Philadelphia, was the course director for the PAMP&R portion of the event. The Annual Meeting featured guest faculty presentations, including a talk on "Diagnosis and Treatment of Complex Regional Pain Syndrome" by Mitchell Freedman, DO, clinical assistant professor and member of the consulting staff at Thomas Jefferson University Hospital; and a discussion of "Lumbar Zygapophyseal Joint Pain" by Jeremy Simon, MD, attending physician at the Rothman Institute, also in Philadelphia.

Following guest faculty lectures, the PAMP&R held a competition for the Rex Newton and Emory Stoner awards. Three residents, chosen from Pennsylvania's five physical medicine and rehabilitation programs, made presentations in the competition. The 2008 Rex Newton Award went to Steven O'Connell, DO, for his presentation of "Toxicity of Bupivacaine on Human Intervertebral Disc." His work was completed in the Ferguson Lab of the University of Pittsburgh Department of Orthopaedic Surgery. Dr. O'Connell's faculty mentor is Gwendolyn Sowa, MD, PhD, assistant professor of physical medicine and rehabilitation. Dr. O'Connell is a second-year resident in physical medicine and rehabilitation at the University of Pittsburgh.

The afternoon was devoted to IRRDay2008 activities. Amy Wagner, MD, associate professor and associate director of research for the Department of Physical Medicine and Rehabilitation, served as course director for IRRDay2008.

IRRDay2008 formal presentations began with guest speaker Michael Mueller, PT, PhD, remarking on the importance of forums such as IRRDay and his honor at being invited to address the meeting. Dr. Mueller discussed research in prevention of skin breakdown and amputation in people with diabetes and peripheral neuropathy.

Martin Childers, DO, PhD, associate professor of Neurology and Regenerative Medicine, Wake Forest University School of Medicine, Winston-Salem, N.C., applauded the caliber of science represented in the audience and addressed the importance of strengthening the connection between bench science and clinical trials in his talk, "Translational Research in Rehabilitation Medicine."

Announcement of the winning abstracts followed the guest presentations. The response to this year's mid-April "call for abstracts" surpassed that of previous years. A total of 54 abstracts were submitted (there were 35 submissions last year and 38 in 2006). To level the field for the younger scientists this year, submissions from undergraduates were judged separately from pre- and postdoctoral entries.

Sixteen undergraduates submitted abstracts on topics ranging from neuroscience and brain chemistry to transplanting muscle-derived stem cells into injured skeletal muscle. Twenty-four predoctoral students entered the competition from university departments such as bioengineering and physical therapy and research labs such as the Human Engineering Research Laboratories and the Safar Center for Resuscitation Research. Nine postdoctoral students and five physical medicine and rehabilitation residents also submitted abstracts, covering topics from the mechanics of shoulder pain in manual-wheelchair users to biomarkers of inflammation.

The winners in all categories are listed on Page 2.

Review Board, 3rd Annual IRRDay

Michael L. Boninger, MD

Associate Dean for Medical Student Research
University of Pittsburgh
School of Medicine

Interim Chairman
Department of Physical Medicine and Rehabilitation

Joseph Ricker, PhD

Associate Professor

Associate Director of Research
Department of Physical Medicine and Rehabilitation
University of Pittsburgh
School of Medicine

Anthony Delitto, PhD

Professor and Chairman
Department of Physical Therapy
University of Pittsburgh
School of Health and Rehabilitation Sciences

Vice President for Education and Research
UPMC Centers for Rehabilitation Services

Save the Date

IRRDay2009
May 28, 2009

Keynote speaker:

John Whyte, MD, PhD

- Director, Moss Rehabilitation Research Institute (MRRRI)
- Director of Attention Research (MRRRI)
- Director of Brain Injury Research
Drucker Brain Injury Center, MossRehab

Dr. Sowa wins scholars award for research



Dr. Sowa

Gwendolyn A. Sowa, MD, PhD, is one of only nine physician researchers nationwide selected this year by the American Geriatrics Society (AGS) and the AGS Foundation for Health in Aging to receive a Dennis W. Jahnigen Career Development Scholars Award. The two-year Jahnigen awards help promising academic specialists begin and sustain education and research careers that focus on issues relevant to aging.

The award will help support Dr. Sowa's study, "Investigation into the use of serum biomarkers as an improved diagnostic tool for active pain generators in aging patients with low back pain."

In recognition of her award, Dr. Sowa received accolades from Catharine Baker Knoll, lieutenant governor of Pennsylvania; Mark Nordenberg, chancellor of the University of Pittsburgh; and Martin Cadwallader, dean of the Graduate School of the University of Wisconsin, where Dr. Sowa earned her PhD in biochemistry; and Robert Golden, MD, dean of the University of Wisconsin School of Medicine and Public Health, where she earned her degree in medicine.

Dr. Sowa is an assistant professor in the Department of Physical Medicine and Rehabilitation and has a secondary appointment in the Department of Orthopaedic Surgery. She is codirector of the Ferguson Laboratory for Orthopaedic Research, and has an active research program investigating the role of mechanical forces in disc degeneration.

Kudos to Dr. Kline

Congratulations to Anthony E. Kline, PhD, who was promoted to associate professor in the Department of Physical Medicine and Rehabilitation. In addition to his position in the Department of Physical Medicine and Rehabilitation, Dr. Kline is associate director for rehabilitation research at the Safar Center for Resuscitation Research and is a member of the training faculty at both the Center for the Neural Basis of Cognition and the Center for Neuroscience at the University of Pittsburgh. He also has a secondary appointment in the Department of Psychology.

Dr. Kline's research interests are in the area of functional and cognitive recovery after experimental traumatic brain injury (TBI) and the manipulation of various neurotransmitter systems via pharmacological agents in the pursuit of effective pharmacotherapies that attenuate deficits or enhance recovery. The long-term goals of his research are to develop therapies that facilitate functional recovery after human TBI and to elucidate potential mechanisms for the observed effects.

Dr. Cooper leads disabled veterans community response symposium



Dr. Cooper

Rory A. Cooper, PhD, was master of ceremonies for the Pennsylvania Disabled Veterans Rehabilitation/Vocational-Retraining Project Third Annual Community Response Symposium on Aug. 14 in Johnstown, Pa. He also presented "Rehabilitation Technology: Promise for a Brighter Future." Dr. Cooper, himself a U.S. Army veteran with a spinal cord injury, is distinguished professor and chair of the Department of Rehabilitation Science and Technology, University of Pittsburgh School of Health and Rehabilitation Sciences; director, Human Engineering Research Laboratories; and director and VA senior research career scientist, Center for Wheelchairs and Associated Rehabilitation Engineering. Dr. Cooper currently serves on the U.S. Secretary of Veterans Affairs Prosthetics and Special Disability Programs Advisory Committee; he also advises the Indian Spinal Injuries Centre in Delhi and the Artificial Limbs of India Manufacturing Company in Kanpur on increasing access to quality services and devices for people with disabilities in India.

The symposium was held to identify best practices in providing for the needs of service members returning from Operation Iraqi Freedom and Operation Enduring Freedom.

Other faculty members participated, including the following:

Michael McCue, PhD, associate professor and vice chairman, Department of Rehabilitation Science and Technology; and Michael Pramuka, PhD, associate professor of rehabilitation science: Discussion of the Cognitive Skills Enhancement Program.

George Zitnay, PhD, adjunct professor, Department of Rehabilitation Science and Technology, and co-founder, Defense and Veterans Brain Injury Center: Discussion of Community of Caring for Veterans with Traumatic Brain Injury.

The symposium was sponsored by Veteran Community Initiatives, Inc.; Veterans Leadership Program of Western Pennsylvania; the Hiram G. Andrews Center; and the University of Pittsburgh Department of Rehabilitation Science and Technology.

Biofeedback treatment for apraxia of speech following stroke

Apraxia of speech (AOS) is a motor deficit involving speech motor planning and/or programming impairments and typically presents with slow rate of speech, extended segment and intersegment durations, disordered prosody, and consonant and vowel distortions.¹ The disorder is notoriously difficult to diagnose from among other neurogenic speech-production disorders, particularly the dysarthrias and phonological paraphasia, and is traditionally considered difficult to treat. Nevertheless, the application of motor learning principles to its treatment has provided new optimism for clinicians.^{2,3}

One treatment method currently under investigation involves providing augmented feedback of articulatory movements by means of an electromagnetic articulography (EMA) system.

EMA is a noninvasive method for tracking speech movement, including movements of the tongue, using low field-strength magnetic fields. Previously used in the study of speech physiology and the nature of speech pathologies, when used in interventional applications, EMA shows the patient the position and movement of the articulators during intended movements that represent accurate articulatory productions.

While preliminary case studies reported that treatment with an EMA system produced improved articulatory accuracy in two individuals with AOS,^{4,5} those studies employed quasi-experimental research designs that make the observed improvement difficult to attribute to the treatment alone.

Our VA Rehabilitation Research and Development-funded work led by Dr. Malcolm McNeil at the University of Pittsburgh, and the work of William F. Katz, PhD, at the University of Texas at Dallas, have used carefully controlled, within-subject experimental designs to study the efficacy of this kinematic on-line augmented feedback on the acquisition, generalization, and maintenance of correct speech movements.

We have reported substantively improved speech production with this form of augmented biofeedback in a series of patients with apraxia of speech.⁶⁻¹⁰

Dr. McNeil is a distinguished service professor and chairman of the Department of Communication Science and Disorders, University of Pittsburgh School of Health and Rehabilitation Sciences; professor of otolaryngology, and a Research Career Scientist in the Speech Pathology and Audiology Service, VA Pittsburgh Healthcare System.

References

1. McNeil MR, Robin DA, Schmidt RA. Apraxia of speech: Definition, differentiation, and treatment. In: McNeil MR, ed., *Clinical Management of Sensorimotor Speech Disorders*. New York: Thieme Medical Publishers; 1997:311-44.
2. Ballard KJ, Granier JP, Robin DA. Understanding the nature of apraxia of speech: theory, analysis, and treatment. *Aphasiology*. 2000;14:969-95.
3. McNeil MR, Doyle PJ, Wambaugh J. Apraxia of speech: A treatable disorder of motor planning and programming. In: Nadeau S, Rothi L, Crosson B, eds., *Aphasia and Language*. New York: Guilford;2000:221-66.
4. Katz W, Bharadwaj S, Carstens B. Electromagnetic articulography treatment for an adult with Broca's aphasia and apraxia of speech. *JSLHR*. 1999; 42: 1355-66.
5. Katz W, Bharadwaj S, Gabbert G, Stettler M. Visual augmented knowledge of performance: treating place-of-articulation errors in apraxia of speech using EMA. *Brain Lang*. 2002;83:187-9.
6. Katz W, Garst D, Carter G, Fossett RTD, McNeil MR, Doyle PJ, Szuminsky N. "Effects of visually augmented kinematic feedback for the treatment of apraxia using word-variable practice: A single-subject experiment." Presentation at the 37th Clinical Aphasiology Conference, May 22-26, 2007, Scottsdale, Arizona.
7. Katz W, Garst D, Carter G, Fossett RTD, McNeil MR, Doyle PJ, Szuminsky N. "Treatment of an individual with aphasia and apraxia of speech using EMA visually-augmented feedback." Presentation at the 45th Academy of Aphasia, October 21-23, 2007, Washington, D.C.
8. McNeil MR, Fossett TRD, Katz W, Garst D, Carter G, Szuminsky N, Doyle PJ. "Acquisition, generalization, and maintenance of visual on-line movement feedback for the treatment of apraxia of speech." Presentation at the 5th Asia-Pacific Conference on Speech, Language, and Hearing, July 9-13, 2007, Brisbane, Australia.
9. McNeil MR, Fossett TRD, Katz W, Garst D, Carter G, Szuminsky N, Doyle PJ. "Effects of on-line kinematic feedback treatment for apraxia of speech." Presentation at the 45th Academy of Aphasia, October 21-23, 2007, Washington, D.C.
10. McNeil MR, Fossett TRD, Katz W, Garst D, Carter G, Szuminsky N, Doyle PJ. "Effects of augmented kinematic feedback with constant practice for the treatment of apraxia of speech: a single-subject experiment." Presentation at the 37th Clinical Aphasiology Conference, May 22-26, 2007, Scottsdale, Arizona.

Medical students tackle research



Arun Rajasekhar

The Association of Academic Physiatrists and the Foundation for PM&R proudly announce the first recipients of the Rehabilitation Research Experience for Medical Students (RREMS) scholarship program. Developed for medical students with strong research interests, the RREMS program offers a solid introduction to the research experience and to some of the most successful and respected faculty mentors in the field of rehabilitation medicine. The program is directed by Brad Dicianno, MD.

The four recipients of the 2008 RREMS scholarship and the titles of their winning research proposals are listed below.

- Investigation into the utility of inflammatory serum biomarkers to assess intervertebral disc degeneration, proposed by Arun Rajasekhar, a student at the University of Pittsburgh School of Medicine, mentored by Gwendolyn Sowa, MD, PhD, at the University of Pittsburgh.

- Noninvasive cerebellar stimulation to improve hand skill learning, proposed by Kopal Kulkarni, a student at the Johns Hopkins University School of Medicine in Baltimore, mentored by Dr. Pablo Celnik at Johns Hopkins.
- Determining parameters affected by use of power assist wheels in persons with spinal cord injury, proposed by Roger Mignosa, a student at Touro University College of Osteopathic Medicine in Vallejo, California, under the mentorship of Dr. B. Jenny Kiratli at the VA Palo Alto Health Care System.
- Identifying modifiable risk factors for stress fractures in young female distance runners, proposed by Adam Tenforde, a student at Stanford University School of Medicine, where he is working under the mentorship of Dr. Michael Fredericson.

The Rehabilitation Research Experience for Medical Students scholarship program is generously supported by the Ernest W. Johnson Fund, the Roosevelt Warm Springs Foundation, the Foundation for PM&R (Education Research Fund), and the Association of Academic Physiatrists. Recruitment of sponsor institutions and proposals from medical students will soon be solicited for the 2009 academic year. For more details, see the Association of Academic Physiatrists website at www.physiatry.org.

Recent contributions by IRR faculty

Following is a sampling of topics covered in recent presentations by IRR faculty members.

American Academy of Physical Medicine and Rehabilitation

Annual Assembly and Technical Exhibition

San Diego, Calif.

Nov. 20 to Nov. 23

Instruction

Brad Kurowski, MD, course director, and Mary Louise Russell, MD, moderated discussion in a course on Rehabilitation of the Adolescent and Adult Patient with Spina Bifida. As part of the dialogue, Dr. Kurowski discussed Secondary Conditions: Evaluation and Treatment, and Brad E. Dicianno, MD, presented a talk on Future Directions and Gaps in Research.

Amy K. Wagner, MD, co-directed a course on Capitalizing and Leveraging Diversity for Progress in Physical Medicine and Rehabilitation. Jacinta M. McElligott, MD, of the Department of Physical and Rehabilitation Medicine, National Rehabilitation Hospital, Dublin, Ireland, was the other co-director. The instruction team also included Ann Steinecke, PhD, of the Division of Diversity Policy and Programs, Association of American Medical Colleges, Washington, D.C.; Naomi Lynn H. Gerber, MD, of the Center for Study of Chronic Disease and Disability, George Mason University, Fairfax, Va.; and Consuella Lewis, PhD, of the Department of Administrative and Policy Studies, University of Pittsburgh.

Louis E. Penrod, MD, contributed to a course on Stroke and TBI Research and Clinical Pearls. Other members of the instruction team were Arthur M. Gershkoff, MD, of Moss Rehab Hospital, Elkins Park, Pa.; Michael Saulino, MD, PhD, of Thomas Jefferson University, Philadelphia; Richard D. Zorowitz, MD, of Johns Hopkins Bayview Medical Center, Baltimore; Eric L. Altschuler, MD, PhD, of the University of Medicine and Dentistry of New Jersey, Newark; and Barry M. Rodstein, MD, MPH, of Baystate Medical Center, Springfield, Mass.

Research

Acute effects of botulinum neurotoxin-A (BoNT-A) on in vitro rabbit articular chondrocytes, presented by Kristi Henzel, MD, PhD, who is a resident in the Department of Physical Medicine and Rehabilitation. Gwendolyn A. Sowa, MD, PhD, and Michael C. Munin, MD, also of the Department of Physical Medicine and Rehabilitation, were co-authors of the study, as were Helga I. Georgescu and James D. Kang, MD, of the Department of Orthopaedic Surgery.

Bupirone and environmental enrichment enhance the acquisition of spatial learning after experimental traumatic brain injury. Authors: Anthony E. Kline, PhD, Jeffrey P. Cheng, and Ann N. Hoffman.

Upper-limb function following botulinum toxin A injections and post-injection rehabilitation therapy: Effect of baseline impairment measured by the Chedoke-McMaster assessment. Authors: Chia-Lin Chang, PhD, PT; Elizabeth R. Skidmore, PhD, OTR/L; Douglas J. Weber, PhD; Christian Niyonkuru, MS; Lynne M. Huber, OTR/L; and Michael C. Munin, MD. Dr. Chia-Lin Chang is a trainee in the T32 National Research Service Award, Training Rehabilitation Clinicians for Research Careers (article on Page 8). Wei Wang, MD, PhD, assistant professor of physical medicine and rehabilitation, is her faculty supervisor.

38th Annual Meeting of the Society for Neuroscience

Neuroscience 2008

Washington, D.C.

Nov. 15 to Nov. 19

Environmental enrichment confers long-lasting cognitive benefits even after a relatively brief exposure after experimental brain trauma. Authors: Jeffrey P. Cheng, Christopher N. Sozda, Adam S. Olsen, Ann N. Hoffman, Kaitlyn E. Shaw, and Anthony E. Kline, PhD.

State of the Science Workshop: Research to Clinical Practice in Polytrauma Medicine

Walter Reed Army Medical Center

Washington, D.C.

Nov. 7

Rory Cooper, PhD, distinguished professor and chairman, Department of Rehabilitation Science and Technology, University of Pittsburgh; and Allison Franklin, DO, of Walter Reed Medical Center, presented an Overview of the 2008 Paralympics and Upcoming Plans for 2012.

Donald Spaeth, PhD, RET, VA Rehab Research & Development Service Center of Excellence, Pittsburgh, talked about Technology for Veterans with Polytrauma.

Katya Hill, PhD, CCC-SLP, associate professor, Department of Communication Science & Disorders, University of Pittsburgh, discussed Enhancing Communication for Veterans with Polytrauma.

Michael Pramuka, PhD, assistant professor of rehabilitation science, University of Pittsburgh, discussed a Cognitive Skills Enhancement Program.

Institute of Electrical and Electronics Engineers

12th Annual International Symposium on Wearable Computers Pittsburgh

Sept. 28 to Oct. 1

Rory Cooper, FISA and Paralyzed Veterans of America (PVA) Chairman and distinguished professor, Department of Rehabilitation Science and Technology, and director of the VA Center for Excellence in Wheelchairs and Associated Rehabilitation Engineering, gave a keynote speech, "The Feasibility of Affordable Wheelchair Technology Featuring On-board Computers."

State of the Science Symposium: Ultrasound

Walter Reed Army Medical Center

Washington, D.C.

Sept. 25

Michael Boninger, MD; and Brad Impink, MS, University of Pittsburgh School of Engineering, gave a presentation on Research Applications and Quantification of Musculoskeletal Ultrasound.

American Association of Neuromuscular and Electrodiagnostic Medicine

55th Annual Meeting

Providence, R.I.

Sept. 17 to Sept. 20

Michael Munin, MD, gave a poster presentation on Comparison of Localization Techniques for Upper-Limb Botulinum Toxin Injections. Authors: Michael C. Munin, MD; Christian Niyonkuru; and Douglas J. Weber, PhD, of the University of Pittsburgh Department of Physical Medicine and Rehabilitation; Elizabeth R. Skidmore, PhD, OTR/L, of the UPMC Department of Occupational Therapy; and Ross D. Zafonte, DO, of Spaulding Rehabilitation Hospital, Boston.

American Association of Naturopathic Physicians

American Holistic Medical Association

Annual Convention and Exposition

Phoenix, Ariz.

Aug. 13 to Aug. 16

Shailen Greene, MD, presented the results of The Effects of Mindfulness-based Stress Reduction (MBSR) on Health: a Questionnaire-based Study. Authors: Shailen Greene, MD, and Karl Liebe, MD.

continued

26th Annual National Neurotrauma Society Symposium

Orlando, Fla.

July 27 to July 30

Validation of spatial novelty task as a sensitive paradigm to cognitive deficits resulting from controlled cortical impact. Authors: Julie Dobos, Shaun Darrah, Laura Mohler, and Amy Wagner, MD.

Cognitive and behavioral effects of Dilantin administration after controlled cortical impact. Authors: Laura Mohler; Erin Cummings; Shaun Darrah; Amy Wagner, MD; Xiangbai Chen; Gary Galang; and Jerry Chuang.

Evaluation of BCL-2 levels in cerebrospinal fluid following severe traumatic brain injury. Authors: Brett Postal; Emily Rogers; Xiangbai Chen; Anthony Fabio, MPH, PhD; Zhifang Yuan; Christian Niyonkuru; and Amy Wagner, MD.

Evaluating the relation of cortisol levels, gender, and depression in traumatic brain injury patients. Authors: Emily H. Rogers; Tammy L. Loucks; Anthony Fabio, MPH, PhD; Alicia Hines; Zhifang Yuan; C. Edward Dixon, PhD; Sarah L. Berga; and Amy K. Wagner, MD.

Effect of Dilantin therapy on hippocampus cell survival and regional neuroplasticity after controlled cortical impact. Authors: Shaun Darrah, Jerry Chuang, Xiangbai Chen, and Amy K. Wagner, MD.

Recently published

A small sample of representative papers by IRR faculty members

Peer-reviewed papers

Brewer BR, Klatzky R, Matsuoka Y. Visual feedback distortion in a robotic environment for hand rehabilitation. *Brain Res Bull.* 2008;75:804–13. Epub 2008 Feb 4.

Collinger JL, Boninger ML, Koontz AM, Price R, Sisto SA, Tolerico ML, Cooper RA. Shoulder biomechanics during the push phase of wheelchair propulsion: a multisite study of persons with paraplegia. *Arch Phys Med Rehabil.* 2008;89:667–76.

Cooper RA, Cooper R, Boninger ML. Trends and issues in wheelchair technologies. *Assist Technol.* 2008;20:61–72.

Cooper RA. Quality-of-life technology. A human-centered and holistic design. *IEEE Eng Med Biol Mag.* 2008;27:10–1.

Cowan RE, Boninger ML, BJ, Mazoyer BD, Cooper RA. Preliminary outcomes of the SmartWheel Users Group database: a proposed framework for clinicians to objectively evaluate manual wheelchair propulsion. *Arch Phys Med Rehabil.* 2008;89:260–8.

Denlinger RL, VanSwearingen JM, Cohn JF, Schmidt KL. Puckering and blowing facial expressions in people with facial movement disorders. *Phys Ther.* 2008;88:909–15. Epub 2008 Jul 10.

Dicianno BE, Aguila ED, Cooper RA, Pasquina PF, et al. Acute mountain sickness in disability and adaptive sports: preliminary data. *J Rehabil Res Dev.* 2008;45:479–88.

Godges JJ, Anger MA, Zimmerman G, Delitto A. Effects of education on return-to-work status for people with fear-avoidance beliefs and acute low back pain. *Phys Ther.* 2008;88:231–9. Epub 2007 Dec 4.

Hanks RA, Millis SR, Ricker JH, Giacino JT, et al. The predictive validity of a brief inpatient neuropsychologic battery for persons with traumatic brain injury. *Arch Phys Med Rehabil.* 2008;89:950–7.

Hoffman AN, Malena RR, Westergom BP, Luthra P, Cheng JP, Aslam HA, Zafonte RD, Kline AE. Environmental enrichment-mediated functional improvement after experimental traumatic brain injury is contingent on task-specific neurobehavioral experience. *Neurosci Lett.* 2008;431:226–30.

Hubert MG, Vadalà G, Sowa G, Studer RK, Kang JD. Gene therapy for the treatment of degenerative disk disease. [Review]. *J Am Acad Orthop Surg.* 2008;16:312–9.

Jan YK, Brienza DM, Geyer MJ, Karg P. Wavelet-based spectrum analysis of sacral skin blood flow response to alternating pressure. *Arch Phys Med Rehabil.* 2008;89:137–45.

Kalmar K, Novack TA, Nakase-Richardson R, Sherer M, Frol AB, Gordon WA, Hanks RA, Giacino JT, Ricker JH. Feasibility of a brief neuropsychologic test battery during acute inpatient rehabilitation after traumatic brain injury. *Arch Phys Med Rehabil.* 2008;89:942–9.

Karmarkar A, Cooper RA, Liu HY, Connor S, Puhlman J. Evaluation of pushrim-activated power-assisted wheelchairs using ANSI/RESNA standards. *Arch Phys Med Rehabil.* 2008;89:1191–8.

Kim J, Brienza DM, Lynch RD, Cooper RA, Boninger ML. Effectiveness evaluation of a remote accessibility assessment system for wheelchair users using virtualized reality. *Arch Phys Med Rehabil.* 2008;89:470–9.

Kim JH, Studer RK, Sowa GA, Vo NV, Kang JD. Activated macrophage-like THP-1 cells modulate annulus fibrosus cell production of inflammatory mediators in response to cytokines. *Spine.* 2008;33:2253–9.

Kochanek PM, Berger RP, Bayir H, Wagner AK, Jenkins LW, Clark RS. Biomarkers of primary and evolving damage in traumatic and ischemic brain injury: diagnosis, prognosis, and personalized exercise programme [APEP] trial. *BMC Musculoskelet Disord.* 2008;14:135–41.

Majerske CW, Mihalik JP, Ren D, Collins MW, Reddy CC, Lovell MR, Wagner AK. Concussion in sports: postconcussive activity levels, symptoms, and neurocognitive performance. *J Athl Train.* 2008;43:265–74.

McDonough SM, Liddle SD, Hunter R, Walsh DM, et al. Exercise and manual auricular acupuncture: a pilot assessor-blind randomised controlled trial. (The acupuncture and personalised exercise programme [APEP] trial). *BMC Musculoskelet Disord.* 2008;9:31.

Pearlman J, Cooper RA, Krizack M, Lindsley A, et al. Lower-limb prostheses and wheelchairs in low-income countries. [Review]. *IEEE Eng Med Biol Mag.* 2008;27:12–22.

Sowa G, Agarwal S. Cyclic tensile stress exerts a protective effect on intervertebral disc cells. *Am J Phys Med Rehabil.* 2008;87:537–44.

Sowa GA, Vadalà G, Studer R, Kompel J, Iucu C, Georgescu H, Gilbertson L, Kang J. Characterization of intervertebral disc aging: Longitudinal analysis of a rabbit model by MRI, histology, and gene expression. *Spine.* 2008;33:1821–8.

Spaeth DM, Mahajan H, Karmarkar A, Collins D, Cooper RA, Boninger ML. Development of a wheelchair virtual driving environment: trials with subjects with traumatic brain injury. *Arch Phys Med Rehabil.* 2008;89:996–1003.

Sparto PJ, Aizenstein HJ, VanSwearingen JM, Rosano C, Perera S, Studenski SA, Furman JM, Redfern MS. Delays in auditory-cued step initiation are related to increased volume of white matter hyperintensities in older adults. *Exp Brain Res.* 2008;188:633–40. Epub 2008 Jun 11.

Studer RK, Gilbertson LG, Georgescu H, Sowa G, Vo N, Kang JD. p38 MAPK inhibition modulates rabbit nucleus pulposus cell response to IL-1. *J Orthop Res.* 2008;26:991–8.

Vadalà G, Studer RK, Sowa G, Spiezia F, Iucu C, Denaro V, Gilbertson LG, Kang JD. Coculture of bone marrow mesenchymal stem cells and nucleus pulposus cells modulate gene expression profile without cell fusion. *Spine.* 2008;33:870–6.

VanSwearingen J. Facial rehabilitation: a neuromuscular re-education, patient-centered approach. *Facial Plast Surg* [Review]. 2008;24:250–9.

Books and book chapters

Cortazzo MH, Fishman SM. "Major opioids and chronic opioid therapy." In: Benzon HT, Rathmell JP, Wu CL, Turk DC, Argoff CE (eds). *Raj's Practical Management of Pain*. Philadelphia: Mosby-Elsevier, 2008.

Pacek CA, Sowa GA, Kang JD. "Gene therapy for intervertebral disc repair and regeneration." In: Yue JJ, Bertagnoli R, McAfee PC, An HS (eds). *Motion Preservation Surgery of the Spine: Advanced Techniques and Controversies*. Philadelphia: Saunders-Elsevier, 2008.

Grant funds research training for rehab clinicians

The University of Pittsburgh Department of Physical Medicine and Rehabilitation has been awarded a National Institutes of Health T32 Institutional National Research Service Award training grant designed to address the need for qualified clinical researchers in rehabilitation science and medicine.

The Department is seeking applicants for this prestigious program. An aging population, increased survival rates from once-fatal conditions, and rising expectations in quality-of-life issues justify a redoubled research effort in rehabilitation medicine, however, a dearth of physician scientists and growing financial pressure on academic medical centers where such physician scientists train, work, and teach threaten to hamper research progress.

Moreover, physicians are not traditionally taught research methods that provide adequate preparation for academic careers. The same is true of many doctoral-level training programs for nonphysician clinicians, such as clinical psychologists, physical therapists, and occupational therapists.

The T32 training program, Training Rehabilitation Clinicians for Research Careers, aims to increase the number of qualified rehabilitation researchers by providing intensive postdoctoral training in multidisciplinary rehabilitation research. Training focuses on clinical outcomes research that will further the science of rehabilitation practice. Michael L. Boninger, MD, is principal investigator.

The program of study is based on a challenging curriculum of didactic instruction, clinical exposure, and research experience. The program pairs each trainee with a principal research mentor, chosen from among senior faculty of the University of Pittsburgh School of Medicine; School of Health and Rehabilitation Sciences; Graduate School of Public Health; School of Engineering; or the College of Arts and Sciences.

RERC on Telerehabilitation holds the virtual conference

The University of Pittsburgh Rehabilitation Engineering Research Center (RERC) on Telerehabilitation held its first Virtual State of the Science Conference on Nov. 17 to Nov. 20. Participants visited the World Wide Web each day for live, interactive sessions on current issues related to telerehabilitation.

Topics discussed included:

- Nov. 17: Convergence in Telerehabilitation Infrastructure and Services
- Nov. 18: State of the Science of Telerehabilitation for the Provision of Wheeled Mobility and Seating Services
- Nov. 19: Telerehabilitation Technologies: Accessibility and Usability
- Nov. 20: Telerehabilitation and Public Policy: The State of the Science and Policy Analysis

The directors were David M. Brienza, PhD; and Michael McCue, PhD. This conference was supported by a grant from the National Institute on Disability and Rehabilitation Research.

For more information about the University of Pittsburgh Rehabilitation Engineering Research Center on Telerehabilitation, visit the website at www.rerctr.pitt.edu.

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