



# NSBRI Explorer

National Space Biomedical Research Institute • July 2006

## Chiao Appointed User Panel Chair

Leroy Chiao, Ph.D., Commander and Science Officer of International Space Station Expedition 10, is the new chair the NSBRI User Panel. Working closely with Jonathan Clark, M.D., Executive Secretary of the Panel and NSBRI/NASA Space Medicine Liaison, Chiao plans to further engage astronauts and flight surgeons in NSBRI activities. The Panel represents NSBRI's main customer base for deliverables in the countermeasure development process and also is instrumental in connecting the Institute's investigators with NASA's operational community. This process helps ensure successful implementation of NSBRI products in current and future human space flight missions supporting the Vision for Space Exploration.

Chiao is the second User Panel Chair. He succeeds David C. Hilmers, M.D., a veteran of four shuttle missions. Hilmers continues to serve on the Panel. As Chair, Chiao will also serve as an *ex officio* member of the NSBRI External Advisory Council. ([News Release](#)) ♦

## Graduate Education Program Funded

NSBRI recently funded an innovative Graduate Education Program in Space Life Sciences to be conducted jointly at Texas A&M University and Massachusetts Institute of Technology through the Harvard-MIT Division of Health Sciences and Technology. The program will develop modules to augment current graduate curricula at these two institutions enabling students to experience advanced courses in biomedical science and engineering, specifically as these fields relate to the space program.

The lead investigator at A&M is Joanne Lupton, Ph.D., Nutrition, Physical Fitness and Rehabilitation Team Leader, and the lead investigator at MIT is Laurence Young, Sc.D., Sensorimotor Adaptation Team member. William Thomson, Ph.D., Education Program Leader (Baylor College of Medicine), will oversee the integration and evaluation of program modules. The program is expected to enroll students within three to six months.

Once fully developed, it is hoped that the program's educational modules will be applicable to many accredited doctoral programs across the nation. ♦

## Galvanic Vestibular Stimulation Countermeasure Demonstrated to Astronauts

Steven T. Moore, Ph.D., Smart Medical Systems Team (Mount Sinai School of Medicine), held a successful demonstration of his project, "Galvanic Vestibular Stimulation (GVS) Augmented Training for Exploration Class Missions," at the newly established NSBRI Integration Facility near NASA Johnson Space Center. The demonstration drew 26 participants ranging from astronauts and flight surgeons to biomedical engineers and other space program support personnel.

Moore's GVS device recreates the postural, locomotor and perceptual effects of Entry and Landing Syndrome. The wearable system uses small electric currents applied via surface electrodes behind each ear to activate the balance system with computer-generated waveforms that mimic the postflight experience. Trials with veteran astronaut subjects have verified that the system generates not only the physiological effects of gravity transitions and readaptation to Earth, but also the illusory sensations of motion that, until now, have been unique to space flight.

GVS-augmented training is being explored by NASA as a tool to enhance crew performance and improve operational readiness of astronauts during piloted entry, post-landing egress and planetary exploration. Moore also presented the results of his research at NASA JSC's Aerospace Medicine Grand Rounds and at the recent Annual Scientific Meeting of the Aerospace Medical Association. ♦

## Postdoctoral Fellowship Deadline Nears

NSBRI is soliciting applications for the Postdoctoral Fellowship Program. Two-year fellowships are available in any U.S. laboratory carrying out space-related biomedical or biotechnological research that supports the NSBRI's goals. The Request for Proposals, NSBRI-RFP-06-01, contains detailed program and application submission information. Applications are due July 20. ♦

## Interns Gain Summer Research Experience at JSC

Eleven interns are working at NASA Johnson Space Center for 10-to-15 weeks through NSBRI's Summer Internship Program. Open to undergraduate, graduate or medical students, the program pairs students with mentors working on projects assessing lunar dust toxicity, cardiovascular regulation, balance and mobility after space flight, and new techniques for biomedical research data analysis. Interns are also installing hardware on the Crew Exploration Vehicle Mockup. The students represent nine universities – Cornell University, Duke University, Texas A&M University, University of Houston, University of Minnesota, University of Notre Dame, University of Rochester, University of Texas and University of Virginia. ♦

## Students Explore Safety of Space Travel at Brookhaven Lab

Fifteen graduate students, postdoctoral fellows and working scientists from Baltimore to Bedford Park, Australia, participated in the third annual NASA Summer Student Program at the U.S. Department of Energy's Brookhaven National Laboratory (BNL), June 8-29. Working in BNL's Medical Department and the NASA Space Radiation Laboratory – a unique facility that simulates the harsh radiation environment of outer space – the group studied the possible risks astronauts face during long-term space flights. Co-directed by Marcelo E. Vazquez, M.D., Ph.D., NSBRI/ NASA Space Radiation Liaison, the program is designed to provide a pipeline of researchers for the field of space radiobiology. ♦

## Recent Publications

Hamilton, S. A., M. J. Pecaut, D. S. Gridley, N. D. Travis, E. R. Bandstra, J. S. Willey, G. Nelson, and T. A. Bateman. A murine model for bone loss from therapeutic and space-relevant sources of radiation. *J Appl Physiol* 2006 Jun 1 [Epub] (Bone Loss Team) ♦

Hanifin, J. P., K. T. Stewart, P. Smith, R. Tanner, M. Rollag, and G. C. Brainard. High-intensity red light suppresses melatonin. *Chronobiol Int* 23(1-2):251-68, 2006. (Human Performance Factors, Sleep and Chronobiology Team) ♦

Indic, P., K. Gurdziel, R. E. Kronauer, and E. B. Klerman. Development of a two-dimension manifold to represent high dimension mathematical models of the intracellular mammalian circadian clock. *J Biol Rhythms* 21(3):222-32, 2006. (Human Performance Factors, Sleep and Chronobiology Team) ♦

Monahan, K. D., U. A. Leuenberger, and C. A. Ray. Effect of repetitive hypoxic apneas on baroreflex function in humans. *J Physiol* 2006 May 18 [Epub] (Cardiovascular Alterations Team) ♦

Kosslyn, S. M. You can play 20 questions with nature and win: Categorical versus coordinate spatial relations as a case study. *Neuropsychologia* 44(9): 1519-23, 2006. (Neurobehavioral and Psychosocial Factors Team) ♦

MacDougall, H. G., S. T. Moore, I. S. Curthoys, and F. O. Black. Modeling postural instability with Galvanic vestibular stimulation. *Exp Brain Res* 172(2):208-20, 2006. (Smart Medical Systems Team) ♦

Maurer, R. H., J. D. Kinnison, and D. R. Roth. Neutron production from 200-500 MeV proton interaction with spacecraft materials. *Radiat Prot Dosimetry* 116(1-4 Pt 2):125-30, 2005. (Technology Development Team) ♦

Wan, X. S., J. H. Ware, Z. Zhou, J. J. Donahue, J. Guan, and A. R. Kennedy. Protection against radiation-induced oxidative stress in cultured human epithelial cells by treatment with antioxidant agents. *Int J Radiat Oncol Biol Phys* 64(5):1475-81, 2006. (Immunology, Infection and Hematology Team) ♦

## Accolades

NSBRI Board Member, **Larry D. Milne, Ph.D.**, (University of Arkansas for Medical Sciences), received a Distinguished Alumni Award from the University of Iowa College of Pharmacy. He earned his doctorate in medicinal chemistry from University of Iowa. ♦

## Calendar Update

NSBRI External Advisory Council Meeting  
September 7, Houston

NSBRI Board of Directors Meeting  
September 21, Houston ♦

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