

HPT&B



HUMAN PERFORMANCE, TRAINING, AND BIOSYSTEMS DIRECTORATE



ISSUE 2 JUNE 2014

IN THIS ISSUE

Welcome

From the Desk of
Dr. Patrick Mason,
Director HPT&B
Page 2

Focus

HPT&B Operating
Framework:
Reliance 21
Page 5

Outreach

Neuroscience Across
the DoD
Page 7

Understanding
Technology Needs for
Amputees: Visit to the
Amputee Clinic
Page 9

National Capital Area
Modeling Simulation
Center Hosts HPT&B
Page 10

Technology
Demonstration at
the Naval Research
Laboratory (NRL)
Page 11

International Human
Systems Collaboration:
Singapore Ministry of
Defense (MINDEF)
Page 12

Office News

The People of HPT&B
Page 13

Community Spotlight

Naval Air Station
Patuxent River
Page 16

Prioritizing
Collaboration at Naval
Medical Research
Unit (NAMRU)—
Dayton
Page 17

Events

Upcoming Activities,
Conferences,
and Workshops
Page 18

Biological Sciences: An Opportunity for the DoD

By Dr. Bindu Nair

Discovery and innovation are the foundations of the US economy and defense. Scientific discoveries in the physical sciences in the early part of the 20th century have been critical to the DoD's technological superiority over the past century. As such, we can expect that the next generation of ground-breaking technologies that will ensure US military technological dominance in the 21st century will build on the scientific innovations of the last fifty years. The excerpt (Figure 1 on page 3) shows a crowd sourced (wikipedia) list of some of the most important scientific discoveries of the past one hundred years.

A quick look at this list (and other similar lists) shows broad consensus that discoveries are increasingly in the biological sciences. DoD medicine, along with the greater US and international medical community, is already exploiting these advances in biotechnology and medicine. The HPT&B Directorate is encouraging and fostering the development of

Continued on page 3

HPT&B TECHNOLOGY FOR HUMANS

In the Human Performance, Training, and BioSystems (HPT&B) Directorate, we believe that Department of Defense (DoD) technologies are developed to extend the capabilities of the human, enhance the capabilities of the human, sustain the human, or repair the human.

Visit www.acq.osd.mil/rd/hptb for more information on the HPT&B Directorate.

WELCOME

From the Desk of Dr. Patrick Mason, Director HPT&B



Patrick A. Mason, Ph.D.

Director

Human Performance, Training,
and BioSystems Directorate

Thank you for taking the time to read the second edition of the HPT&B Newsletter. A primary goal during the past year has been to enhance coordination, collaboration, and communication across the DoD research enterprise and with other federal agencies, industry, and academia. Consistent with this goal, the current edition of the HPT&B Newsletter provides information on Reliance 21 which is the overarching framework of the DoD's Science and Technology (S&T) joint planning and coordination process.

During the last year, we were honored by being invited to visit numerous DoD research organizations, including the Military Advanced Training Center (MATC) at Walter Reed National Military Medical Center; National Capital Area Modeling Simulation Center, and the Naval Research Laboratory (NRL). We enjoy interacting with the leadership and researchers during these visits and eager to learn how we can help your organization.

I encourage you to be innovative, design technologies to enhance human potential, and strengthen collaborations amongst researchers in government, industry, and academia. I invite you to send us your comments and success stories.

NEW HPT&B WEBSITE

The HPT&B Directorate Website has a new home and a new look. Please visit our new website at <http://www.acq.osd.mil/rd/hptb>. Be sure to take a look at our vision of what the future of Warfighting could look like; a video that shows possible future capabilities that current and future technology development in the Human Systems area could provide to the Warfighter.



*Screen shot of the new
HPT&B website*



*Still shot from the HPT&B
Envisioning Future Human
Systems Capabilities video*

FEATURES

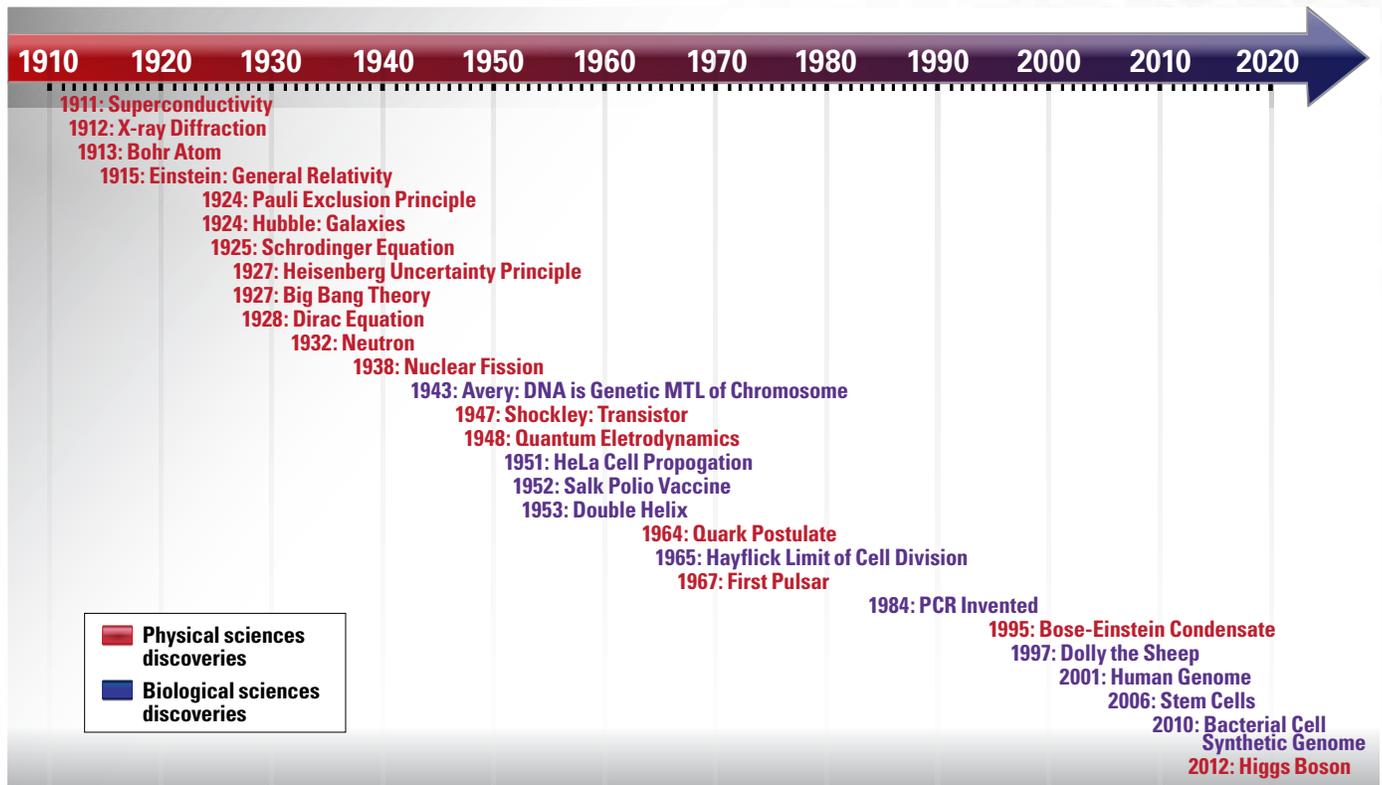


Figure 1. Crowd-sourced list of scientific discoveries

Biological Sciences: An Opportunity for the DoD

Continued from the cover

non-medical applications for innovations in biology in order to achieve the next generation of technological surprise for US military systems. DoD sponsored research must exploit the potential of the biological revolution currently underway.

The military technological “surprises” in the 20th century were fueled by physical science discoveries of early 20th century. Some of these “surprise” innovations such as radar, night vision, ballistic missiles, nuclear technologies, jet engines, digital photography, the Internet and global positioning systems technologies were developed by sustained and substantial

investment by the DoD, but many have shown to have broad ranging applications in the civilian sector. These transformative technologies have some common features. They are usually disruptive and are developed outside the “requirements” program cycle. They are often based on large investments in specific areas to achieve specific goals. These technological surprises emerge from the synthesis of basic research findings with clear stretch technology goals. These findings give us some insights on how to develop the next generation of “surprise” using our expanding understanding of biology and biological processes.

Continued on next page

Biological Sciences: An Opportunity for the DoD

Continued from previous page

Biological and life sciences research, however, does not always have a comfortable home in the DoD physical science and engineering (PSE) research enterprise. A report from the American Academy of Arts and Sciences (Advancing Research in Science and Technology (ARISE) 2 Report, 2013) posits two different models of technology development taken by the PSE in contrast to the life science and medical community (LSM). PSE advancements come from dramatic statements of national need with inspiring new research (e.g., Manhattan Project, Apollo Mission). The solution to the need statement comes from the integration of unexpected advancements in many different fields. As such, PSE communities generally demonstrate a more integrated approach between basic research and applied research. The DoD acquisition process is modeled on this process with capability or requirement driven innovation.

In contrast, according to the ARISE 2 Report, LSM culture innovates almost entirely from investigator-led

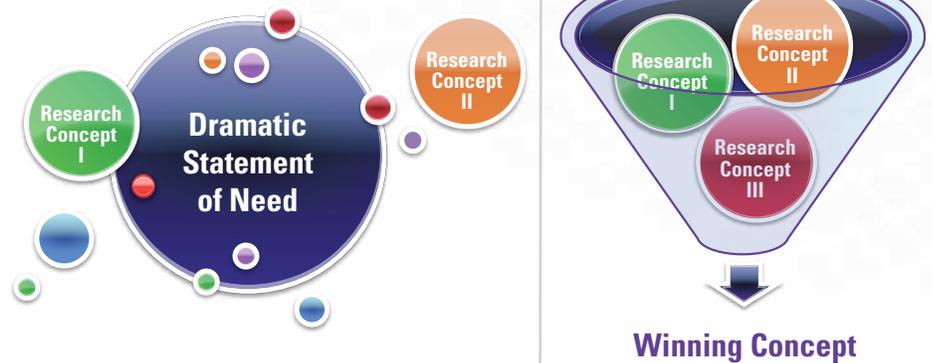


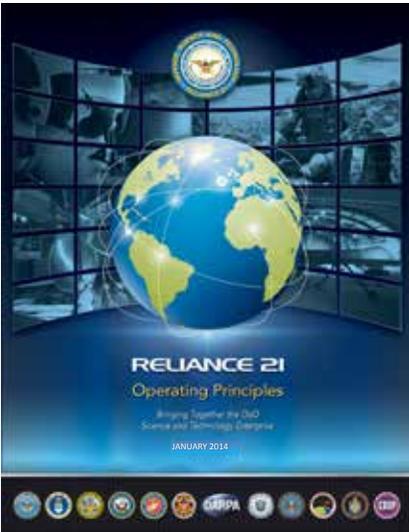
Figure 2: Two different models of scientific advancement: Need-Based Innovation for Physical Sciences and Engineering (PSE (left)) and Individual Investigator Led Discovery for Life Sciences and Medicine (LSM) (right). Goal: To Include Research Concepts from LSM into “need statements” from the DoD.”

areas as opposed to “grand challenge” statements. As such, professional success for researchers is based on “investigator-initiated” grants. This model leads to the flourishing of basic science with applications of discoveries achieved by “crossover” efforts with PSE. Research in LSM, therefore, often occurs with little non-biomedical application context, and is therefore not pulled into the mainstream of the defense technology development stream. In order for this the development of the next generation of DoD technological “surprise,” this paradigm needs to change.

The HPT&B Directorate is developing a set of “Guiding Visions,” a series of stretch goals that will require innovations from many different fields to include biological sciences. These types of challenges will be presented to the DoD research community, as well as academic and industrial partners to

push biological technologies into the DoD technology mainstream. These visions are designed to both push innovations into new capabilities, and also to reduce overall system costs. Since some of the human science advancements provide opportunities to change DoD processes in training, leader development, logistics, organizational structure, and personnel, as well as opportunities to design and employ systems more effectively, these innovations have the potential to meet some of the goals of the DoD Acquisition leadership.

The opportunities afforded by the biological revolution could provide both the technological surprises and cost savings to the DoD Acquisition system. As such, the proponents for LSM research within the DoD are looking for ways to systematically integrate biological innovation into DoD PSE technology development.



Reliance 21 Operating Principles

HPT&B Operating Framework: Reliance 21

The HPT&B Directorate strives to ensure that research and engineering efforts in the diverse HPT&B domain are focused, relevant, coordinated, and capable of meeting current and anticipated defense operational needs and objectives. In this section we provide insights into how HPT&B operates within the overarching Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) joint planning and coordination process, Reliance 21.

ASD(R&E) Perspective: DoD's S&T Planning and Coordination Process

In January 2014, ASD(R&E) published, *Reliance 21 Operating Principles*, a living document that describes the overarching

framework of the DoD S&T joint planning and coordination process. The goal of Reliance 21 is to ensure that the DoD S&T community provides solutions and advice to the Department's senior-level decision makers, warfighters, Congress, and other stakeholders in the most effective and efficient manner possible. While the Reliance process is not new, Reliance 21 focuses on streamlining the overall process to increase value and efficiency and address the time-consuming constraints of previous planning processes. The document, which can be viewed online at <http://www.acq.osd.mil/chieftechologist/reliance21.html>, consists of two sections; the

Continued on next page

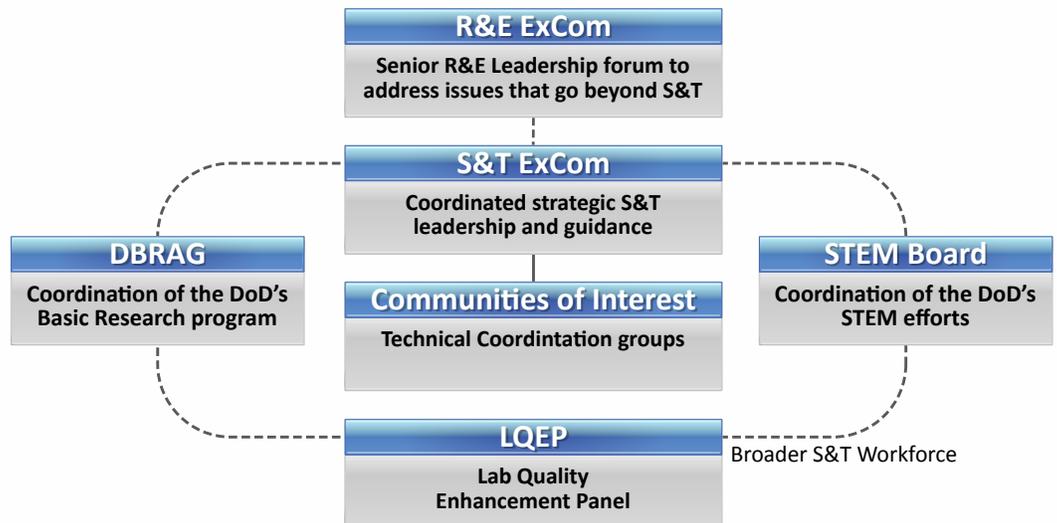


Figure 1. Primary Teams of the Reliance 21 process

HPT&B Operating Framework: Reliance 21

Continued from previous page



Figure 2. Current Configuration of COIs

first section describes the various teams that make up the Reliance 21 process and the second section describes the process by which the teams will work throughout the year and the expected output. Figure 2 provides an overview of the Reliance 21 structure.

The S&T Executive Committee (S&T ExCom) identifies and drives cross-cutting S&T priorities, establishing which technical coordination groups are needed to formulate S&T strategies to address emerging DoD challenges and threats. These technical coordination groups, or Communities of Interest (COIs) serve as enduring groups that address specific technical focus areas with broad multiple-component investment. Each COI is led by a Steering Group consisting of senior

S&T leaders with specific technical expertise including representatives from the Services, Joint Staff, Defense Agencies, Office of the Secretary for Defense (OSD), and the Acquisition community. The COIs are typically divided into sub-groups that cover specific technical areas and are staffed by subject matter experts from across the DoD. The output of the COIs can range from information sharing activities to the deliverance of formalized Joint S&T roadmaps which drive project developments.

There are 17 COIs that cover areas from Advanced Electronics to Biomedical to Ground and Sea Platforms (see Figure 2). Each COI will brief their Portfolio to the S&T ExCom.

Promoting Coordination, Collaboration, and Communication

One of the top priorities of the HPT&B Directorate is to promote coordination, collaboration, and communication within the DoD, between the DoD and other Federal agencies, with the civilian community, and in the international arena. The following highlights recent HPT&B outreach activities.

Neuroscience Across the DoD

By Dr. Jill McQuade and Ms. Jennifer Coughlin

With the rapid pace of scientific discoveries and technology development in the field of neuroscience, the time is ripe for significant breakthrough in neuroscience research. The importance and potential of neuroscience was recently highlighted with the announcement of President Obama's Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, which is an ambitious, interagency plan to map the activity of the human brain. In the DoD, neuroscience has been identified as one of six basic research areas with transformative

potential. Furthermore, the DoD has substantial efforts in neuroscience research that span from understanding the mechanisms of traumatic brain injury to the enhancement of learning and decision making to the optimal design of autonomous and robotic systems. As the DoD's neuroscience-related priorities and investment grows, the importance of characterizing and mapping the future of that investment increases as well.

On December 12, 2013, the inaugural meeting of the DoD Neuroscience Working Group was held in Arlington, Virginia. The Neuroscience Working Group is an initiative of the HPT&B Directorate and the Basic Research Office within ASD (R&E) under the Human Systems COI. Specific objectives of the working group include the following:

- Baseline current DoD S&T activities and investment (6.1-6.3) in neuroscience and assess the gaps, overlaps and collaboration opportunities
- Develop a taxonomy for neuroscience research areas in the DoD

Continued on next page



Modular Prosthetic Limb courtesy of the Johns Hopkins University Applied Physics Laboratory

Neuroscience Across the DoD

Continued from previous page

- Work with the operational community to identify near-, mid-, and far-term neuroscience capability requirements
- Develop S&T roadmaps based on identified capabilities; from these, identify research gaps and develop plan to address these gaps
- Facilitate coordination and collaboration of research agendas to leverage diminishing resources
- Identify and strengthen the DoD neuroscience research community
- Act in an advisory role for neuroscience-related topics within DoD and the wider Federal Government

At the December meeting, neuroscience researchers from the Services, Defense Advanced Research Projects Agency (DARPA) and ASD(R&E) shared past and ongoing projects in neuroscience, as well as thoughts on future directions for DoD's investment in the field of neuroscience. In addition, group members participated in smaller brainstorming breakout sessions

where they discussed a number of pressing questions such as those found in the textbox on the right hand side of the page. As for next steps, the HPT&B directorate is currently compiling and analyzing the input gathered from the meeting to help identify key research gaps, prioritize research areas, and explore opportunities for collaboration to meet the DoD Neuroscience Working group objectives discussed above.

Key DoD Neuroscience Research Areas

- Traumatic Brain Injury (TBI)/ Post Traumatic Stress Disorder (PTSD)
- Spinal cord injury
- Cognition/learning/memory/ decision-making/training
- Neuro-imaging
- Neuro-diagnostics (including biomarkers)
- Neuro-prosthetics

Why should DoD continue to invest in neuroscience research and how should DoD's investment differ from other government agencies (National Institutes of Health / NIH)?

What are the near (2-5 years), mid (5-10 years) and far (10+years) term DoD-relevant applications in neuroscience?

How can the DoD better leverage the current and past neuroscience investments to facilitate or speed up innovation in this area?

What are the most pressing technical challenges in your focus area of neuroscience?

What is the desired end state/objective capability?

Where do you see most momentum for potential innovation/ groundbreaking change in your area of neuroscience research?

Where can basic research have an impact? Where can applied research have an impact?

If you could solve 1 major scientific feat in this area, what would it be (personal and global)?

Understanding Technology Needs for Amputees: Visit to the Amputee Clinic—Military Advanced Training Center (MATC) at the Walter Reed National Military Medical Center

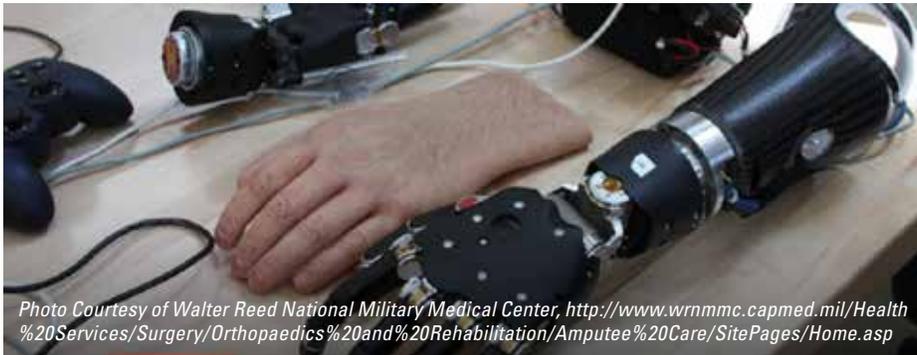


Photo Courtesy of Walter Reed National Military Medical Center, <http://www.wrnmcc.capmed.mil/Health%20Services/Surgery/Orthopaedics%20and%20Rehabilitation/Amputee%20Care/SitePages/Home.asp>

On November 21, 2014, the HPT&B Directorate had the privilege of visiting the Amputee Clinic at the Walter Reed National Military Medical Center. Dedicated to the care and rehabilitation of our warfighters with the goal of restoring pre-injury capabilities, the MATC features the latest athletic equipment and custom-made prosthetics.

The MATC uses a Sports Medicine model, offering much of the same

sports and exercise equipment as found in sports rehabilitation training rooms so that Service Members can perform some of the same fitness drills practiced by professional athletes to work on balance and stability. Physical and occupational therapists follow the Service Members from their initial evaluations through their rehabilitation and return to either active duty or civilian life. Included in their rehabilitation

is a community re-integration program offering experiences outside the clinic setting such as scuba diving, horseback riding, cycling, running and hunting which allow the patients to be challenged.

Prosthetic devices are created and fitted in the Orthotics and Prosthetics Service adjacent to the MATC. This allows the creator of the prosthetic to work closely with the physical and occupational therapists as well as the patient to ensure the best possible utilization of the prosthetic. In addition, MATC provides a safe, controlled setting where patients can work on balance using these new prosthetics to achieve functional, everyday tasks. The Gait Lab of the Center for Performance and Clinical Research (CPCR) uses sophisticated motion analysis equipment (27 infra-red cameras, reflective markers and six force plates) to quantify the patients' movement. The information gained through motion analysis helps care providers to evaluate or modify physical therapy programs and prosthetic and orthotic components.

In an effort to transition from the Lab to everyday life, patients interact with a virtual world projected onto a life-sized screen. They are connected to this virtual world by sensors worn on their bodies linked to specialized cameras and computers. By shifting their weight on a motion platform with an embedded treadmill, recovering patients are able to perform everyday activities such as steering a boat, running up and down trails in woods, or walking through city streets.

National Capital Area Medical Simulation Center Hosts HPT&B



Photo courtesy of Val. G. Hemmings Simulation Center

On November 21, 2014, the HPT&B Directorate had the opportunity to tour The National Capital Area Medical Simulation Center or Val G. Hemmings Simulation Center (SimCenter). The SimCenter, part of the Uniformed Services University of the Health Sciences (USUHS) located in the Forest Glen Annex Silver Spring, Maryland, specializes in the development, as well as application of medical simulation programs. The purpose is to augment medical learning opportunities,

particularly in military relevant situations not found in training at trauma centers here in the United States. The simulations allow healthcare personnel to develop and maintain the cognitive and psychomotor skills necessary to perform life-saving, time-critical medical tasks safely and effectively for our warfighters in battlefield situations.

Working with the DoD, the center uses a wide array of training techniques including live patients for simulated clinical examination, high-fidelity computerized mannequins, simulated surgical suites with task trainers (3-D replications of body parts such as a chest cavity or abdomen), and a 1,000 square foot immersive virtual reality theater (Wide Area Virtual Environment or WAVE) for team training of combat medical and surgical teams.

The SimCenter provides 34,000 hours of simulation programming each academic year to medical and nursing students, interns, residents, and other health care professionals in the USU community. By graduation, learners will have participated in up to 40 different simulations allowing them greater confidence in their medical procedural skills.

Technology Demonstration at the Naval Research Laboratory (NRL)



Photo courtesy of NRL

NRL's Human Systems Interaction Laboratory



Photo courtesy of NRL

*NRL Reconfigurable High Bay—
Operation of ground and air vehicles
and human interaction*

On 10 January 2014, NRL hosted a technology demonstration which allowed researchers from across NRL, including the Systems Directorate, Materials Science and Component Science Directorate, and Ocean & Atmospheric Science Directorate, to share and demonstrate current research of interest to a broader DoD Community including representatives from the HPT&B Directorate, as well as scientists and engineers from the Office of Naval Research (ONR), and the Naval Medical Research Center (NMRC). Posters and demonstrations from approximately 20 different projects across a variety of scientific disciplines were presented. The focus of the research ranged from biomedical sensor and materials development to the characterization of the helmet-skull-brain interaction for TBI Prevention. In addition to the technology demonstration, NRL provided a tour of the Laboratory for Autonomous Systems Research (LASR), one of their newer facilities providing a venue and capabilities for multidisciplinary research in areas such as intelligent autonomy, human-system interactions, trust and assurance, mobility, and power and energy. Within LASR, attendees toured

a variety of high bays which offer simulated environments, including the desert, underwater, tropical, and forest, for system demonstration and validation. Attendees also explored the Human Systems Interaction Labs, which allow for experimentation of interaction between people and teams of autonomous systems and include Multi-user, multi-touch displays, a variety of high-resolution displays, eye-tracking equipment, overhead mounting pipework above ceiling, and metals shutters that can be lowered to protect glass or to perform remote operation experiments, or opened for control of experiments. The NRL technology demonstration, in addition to highlighting key progress in HPT&B relevant research areas, emphasized the multidisciplinary nature of HPT&B research and the need to improve and increase opportunities for both intra- and inter-service collaboration.

International Human Systems Collaboration: Singapore Ministry of Defense (MINDEF)



Photo courtesy of Josiah Tan, TAN_Chung_Huat_Josiah@defence.gov.sg

The HPTB Directorate had the privilege of working with leaders (Mr. QUEK Tong Boon (Chief Defence Scientist, MINDEF), Rear Admiral CHAN Harris (Future Systems & Technology Architect), Dr. CHAN Yew Wing (Deputy Future Systems & Technology Architect), and COL NGOH Charles (Head, Systems & Capability Group 3, Future Systems & Technology Directorate)) within the Singapore Ministry of Defense (MINDEF) to organize the United States – Singapore Defense Cooperation Committee – Human Systems Workshop. Representatives of the HS COI participated in this workshop from March 11-13, 2014 in

Singapore. The goal of the workshop was to identify collaborations of mutual benefit to both countries and in line with recent guidance issued to the US COIs.

The presentations by the US delegates represented efforts within the HS COI sub areas. Corresponding briefings were made by the Singaporean researchers. The Singaporeans shared their research as well as prepared laboratory demonstrations and tours of their facilities. At the National University of Singapore, Centre of Life Sciences (SINAPSE), the US contingent met researchers performing work in the areas of prosthetics and cognitive sciences. In addition,

our US scientists interacted with the Singaporeans scientists at the Institute for InfoCom Research, A*STAR-I2R, one of 16 institutes that makes up Fusionopolis, a research and development complex located in Singapore. There was a robust discussion on the basic science research needed in human-machine interaction.

Following three days of presentations and discussions, potential areas agreed upon by the US and Singapore for research collaboration include the following:

- Cognitive Performance (Making better decisions faster)
- Autonomy (Human and Machine/ Robot Teaming)
- Combat Protection and Performance (Stress; Exoskeletons)
- Biomedical Research (Prosthetics; Infectious Diseases)

Follow-on activities will be coordinated through the Human Systems and Armed Services Biomedical Research Evaluation and Management (ASBREM) COI and will include further refinement of joint research roadmaps.

The People of HPT&B

The HPT&B portfolio encompasses a diverse range of research and academic disciplines executed throughout the many arms of the DoD. It is no surprise then, that in order to successfully provide the technical leadership and oversight of the HPT&B portfolio, the people of HPT&B possess varied expertise, backgrounds and experience. HPT&B staff members may comprise S&T representatives or detailees from each of the Services eager to offer their specific Service perspectives while gaining a DoD wide understanding of core competencies and research capabilities. American Association for the Advancement of Science (AAAS) Science and Technology Policy Fellows may rotate through the HPT&B office contributing their specific expertise and analytical skills while learning first-hand about science and technology policy making and implementation. Neuroscientists, Aerospace Experimental Psychologists, Veterinarians, Dermatologists, Biochemists, Biophysicists, Polymer Scientists, and Civil Engineers; the HPT&B directorate has seen it all. Just as the HPT&B research priorities

emerge and change, so do the people of HPT&B. Below are some of our recent staff arrivals and departures:

Arrivals:

Commander Joseph Cohn (PhD, Neuroscience) is an Aerospace Experimental Psychologist (AEP) in the U.S. Navy's Medical Service Corps currently assigned as Associate Director to OUSD (AT&L)'s Human Performance Training and BioSystems Directorate. During his previous tour, he served in ONR's Human and Bioengineered Systems Division, as a Military Deputy and Program Officer. He also served as ONR's first Deputy Director of Research, for Science, Technology, Engineering and Mathematics (DDoR - STEM). Over the course of his 15 year military career he has managed over \$300M in S&T funds, ranging from basic to advanced development projects. He has transitioned over two dozen S&T products to customers across the DoD, delivering cutting edge biomedical and information technology products, including: in-theater brain-imaging / TBI diagnosis technologies, advanced brain-system interfaces, technologies that inoculate warfighters against

PTSD, and a Digital Tutoring system that reduced by an order of magnitude the time required to train novices to perform at the expert level. He also developed all aspects of the Department of the Navy's only Human Systems - focused Unmanned Aircraft Systems (UAS) program, in coordination with the Army and Air Force.

LTC Dawn Fitzhugh is a Veterinary Corps Officer currently serving as the Associate Director for Animal Research, Development, Test, and Evaluation (RDT&E) Protection Programs in the HPT&B Directorate. LTC Fitzhugh holds a Veterinary Medical Doctorate (VMD) from the University of Pennsylvania, School of Veterinary Medicine and a Master of Public Health (MPH) from the USUHS. She is board certified in Laboratory Animal Medicine and Veterinary Preventive Medicine. LTC Fitzhugh's assignments include Chief, Veterinary Medicine at the US Army Public Health Command; Chief, Veterinary Medicine and Surgery at the US Army Medical Research Institute for Chemical Defense; Director,

Continued on next page

The People of HPT&B

Continued from previous page

Air Force Animal Use Programs; and Deputy Director, Laboratory Animal Medicine at the USUHS. Her military awards include the Defense Meritorious Service Medal, Meritorious Service Medal, and Army Commendation Medal (2 OLC). LTC Fitzhugh recently earned Lean Six Sigma Green Belt level certification.

Dr. Farah Abdulla, MD, Fellow of the American Academy of Dermatology (FAAD) is currently a S&T Policy Fellow with AAAS with placement in the HPT&B Directorate. Prior to this, she worked at the Southern California Permanente Medical Group (SCPMG) as a dermatologist, dermatopathologist and led the first Regional Center for Cutaneous Lymphoma in Southern California within the Southern California Permanente System. She also served as the Assistant Medical Director at Al-Shifa Free Medical and Dental Clinic in San Bernardino County as well as part of the Community Clinic Association of San Bernardino County. In addition, she has completed training in conflict resolution training through the LA-based Jewish-Muslim New Ground Fellowship. During her medical training, she also was selected for the Kossuth-Paine International Medical Exchange in an effort to learn about international systems of healthcare delivery.

Departures:

Dr. Dylan Schmorrow retired as Deputy Director of the HPT&B Directorate as well as retired as a U.S. Navy Captain after 20 years of service. He provided technical leadership, management oversight, policy guidance, and coordination for over \$3 billion in research and engineering programs in the DoD and was the OSD Human Social, Culture, Behavior Modeling Program Manager. While serving as a Program Manager at DARPA, Dr. Schmorrow led the research community in the development of technology in augmented human cognition which focused on revolutionary human-computer interactions using principals rooted in psychology, ergonomics, and neuroscience.

Continued on next page



Dr. Dylan Schmorrow greets Mr. Al Shaffer, Principal Deputy, Assistant Secretary of Defense for Research and Engineering



Dr. Dylan Schmorrow accepts a token of appreciation from HPT&B Director, Dr. Patrick Mason

The People of HPT&B

Continued from previous page

Colonel Annette Hildabrand retired as the Associate Director of Animal Use Programs in the HPT&B Directorate, as well as retired as a Colonel in the Air Force. She had oversight and responsibility for policy development, implementation and compliance of 32 biomedical research and training programs within DoD. She also acted as an advisor to the Secretary of Defense for policy and authored all correspondence and reporting to Congress, the media, and constituents related to animal welfare and use by the military. She chaired a North Atlantic Treaty Organization (NATO) workshop on leveraging technology for medical training for special forces medics that hosted 17 nations and over 60 participants. She was also the Chair of the Joint DoD Animal Use Working Group that serves to advise DoD leadership on research priorities and conservation of resources.

Dr. Fred Pearce retired as the Associate Director for Medical Research and Engineering for the HPT&B Directorate. Dr. Pearce's outstanding accomplishments and leadership in the course of his 23-year career within DoD contributed significantly to the Defense Department and defense acquisition. His accomplishments have had a remarkable impact on Defense S&T, as well as on the health and readiness of military personnel. Dr. Pearce served as the Defense Department's leading technical expert for research, engineering, and advanced technology development for biomedical capabilities. He provided strategic planning, coordination, and oversight for more than \$2 billion annually in biomedical research and engineering programs in the Military Services and Defense Agencies, including TBI, prosthetics, combat casualty care, and health information systems technologies. He ensured the Department had robust programs, policies, processes, and skilled workforces to meet its medical research, engineering, and capability needs by providing advocacy for resources through the Department's annual planning, programming, budgeting, and execution process. Dr. Pearce is currently volunteering part-time as an Emeritus Fellow within the HPT&B directorate and his expertise and experience are valued greatly.



Retired LTC Annette Hildabrand



Dr. Fred Pearce receives an award from Dr. Patrick Mason, HPT&B Director



Photo courtesy of NAMRU-D

Research on spatial disorientation is a top NAMRU-D priority. Shown here: the Spatial Disorientation Dome at the Command's Spatial Disorientation Laboratory

Naval Medical Research Unit – Dayton (NAMRU-D): Prioritizing Collaboration

In 2010, NAMRU-D was established as a result of a decision to merge the Naval Aerospace Medical Research Laboratory with the Naval Environmental Health Effects Laboratory. To retain the missions of the original commands, the new organization is organized into two directorates, Aeromedical Research and Environmental Health Effects Research. As one of the outcomes of the merger, NAMRU-D shares facilities with the Air Force Research Laboratory, 711th Human Performance Wing (711th

HPW). The proximity of the two groups, along with other factors, has led to increasing areas of coordination and collaboration.

In the Aeromedical Research Directorate, researchers are focused on five major areas: detection and prevention of hypoxia, spatial disorientation, motion sickness countermeasures, fatigue migration, and vision sciences. Examples of fruitful collaborations can be seen in all of these areas. NAMRU-D works closely with ONR and the Air Force to develop cockpit sensors for

naval aircraft to detect and prevent pilot hypoxia. To support their “robust and growing” programs in spatial disorientation, NAMRU-D and the 711th HPW will acquire and share a large multi-access disorientation research device (DRD), a high-G human centrifuge and several hypobaric chambers. Collaboratively, the groups hope to address larger human systems integration questions, such as those surrounding the integration of helmet-mounted displays.

Naval Air Systems Patuxent River

In the fall of 2013, the HPT&B staff visited NAS Patuxent River. NAS Patuxent River is home to the Naval Air Systems Command (NAVAIR) headquarters, the Naval Air Warfare Center Aircraft Division (NAWC-AD), numerous test and operational squadrons, and Navy Test Pilot School. In addition to exciting research and development activities, the base also boasts some unique test beds and integration into Programs of Record.

Scientific Development Squadron One (VXS-1):

This squadron provides airborne research platforms for NRL, the United States Navy, U.S. Government, and its contract agencies. VXS-1 maintains a fleet of five uniquely-configured, research-modified NP-3D Orion aircraft, two RC-12s, one MZ-3A airship, and numerous ScanEagle UAVs. VXS-1 is primarily responsible for the planning, engineering, installation, coordination, and execution of airborne Science and Technology projects.

Tactical Auxiliary Ground Station (TAGS):

The NAS Patuxent River TAGS supports the Persistent Maritime

Unmanned Aircraft Systems (PMA-262) program office and Broad Area Maritime Surveillance RQ-4 (being replaced by the Triton, currently in testing and evaluation). Imagery and surveillance data feeds into the Navy ground segment consisting of a mission control element, a launch and recovery element, and the TAGS, from which mission progress and limited data feeds are monitored.

NAVAIR Human Systems Department:

The NAVAIR Human Systems Department is a cross-site organization with a staff of over 800 civilian, military, and contractor personnel, with primary sites in Patuxent River, Orlando, and China Lake, as well as offsite support and in service engineering offices at 41 other locations. The department provides resources, products, and services to optimize human performance and survivability in all Naval warfighter and weapons systems. Its core capability areas include human performance assessment and modeling, human systems design and decision, virtual environments and training technology, distributed live, virtual and constructive synthetic

training, and warfighter protection, performance and survivability. The department has 26 labs at its Pax facilities, with another 16 located in Orlando. Some of the lab capabilities include environmental physiology and human performance, the horizontal accelerator facility, oxygen systems, hearing protection, night vision devices, augmented reality, and unmanned aerial systems interface design.

Upcoming Activities, Conferences, and Workshops

Unmanned Patient Evacuation Workshop

When: August 12 and 13, 2014

Where: Strategic Analysis, Inc. in Arlington, VA

POC: Farah Abdulla, MD
(farah.r.abdulla.ctr@mail.mil)

What: Most active combat situations create significant challenges for combat medics at the point of injury (POI). Medical “first responders” have often become casualties themselves while trying to rescue or treat their comrades. As part of ASD (R&E)’s ‘Guiding Vision’ for enabling and extending human capabilities with their technologies for mission effectiveness, the HPT&B team will be hosting an Unmanned Patient Evacuation Workshop. This DoD only workshop is intended to bring together the ASBREM, Human Systems, Autonomy, Air Platform, and Ground/Sea Platform COIs to discuss the path forward in the creation of unmanned systems that can potentially conduct extraction and/or retrieval of combat casualties on behalf of the first responder and deliver the wounded Soldier (within a short distance) to a safer location. This would thereby decrease the combat medic’s role in patient extraction from the battlefield and allow the medic to focus more on the treatment of the casualty. The workshop will focus on discussion of the development of platforms that are capable of safely and effectively carrying a wounded

warfighter and that are integrated with the latest medical technology.

Biomechanical Modeling Workshop

When: August 27–28, 2014

Where: Strategic Analysis, Inc. in Arlington, VA

POC: Dr. Bindu Nair
(bindu.r.nair.civ@mail.mil)

What: HPT&B and US Special Operations Command (SOCOM) are hosting a two day workshop to discuss the different types of biomechanical models that are currently being used or developed by DoD and their ability to address concept and design of an exoskeleton suit. As most of you are aware, SOCOM is in the middle of a prototyping event where they are looking at concepts and designs for a “Tactical Assault Suit”, or TALOS. As a part of their program development, SOCOM would like to come up with strategies to quickly assess different designs and concepts. OSD wants to understand the state of the art and the gaps in our understanding of three specific areas: motion around a joint, stability, and gait. We are interested in motion models, injury models, and environmental models that address these areas. To guide the workshop, a SOCOM-designed use scenario for the TALOS suit will allow us to stress the models and examine their competencies and limitations. The output of the workshop will be

an understanding of the state of the art in biomechanical models for the DoD community as well as list of capabilities and gaps for further investigation.

NATO S&T Organization

When: October 13–15, 2014

Where: Vilnius, Lithuania

POC: TBD

What: HFM-239 Symposium on “State-of-the-Art in Research on Medical Countermeasures Against Biological Agents”. This Symposium is open to citizens from NATO, Partnership for Peace (PfP), Mediterranean Dialogue (MD), and Contact Nations. Enroll online at: <http://www.cso.nato.int>

Individualized Training for Accelerating Expertise Development Workshop

When: Fall 2014

Where: Arlington, VA

POC: CDR Joseph Cohn
(joseph.v.cohn.mil@mail.mil)

What: As part of ASD (R&E)’s ‘Guiding Vision’ for developing adaptive, individualized training capabilities, the HPT&B team will be hosting an Individualized Training for Accelerating Expertise Development Workshop. This HS COI -based workshop will include component S&T Program Managers, leading Academicians, and innovative

Continued on next page

Continued from previous page

businesses (including small businesses) and will center on in-depth discussion focusing on understanding current and future trends / requirements necessary to develop digital training technologies that replicate the very best instructors' educational techniques. The workshop will draw from many different S&T domains, which collectively converge on providing technologies and methodologies that reduce individual warfighter's performance variability and quickly prepare them to outperform adversaries through advanced training technologies.

Natural Human-Technology Interactions Workshop

When: Fall, 2014

Where: TBD

POC: CDR Joseph Cohn
(joseph.v.cohn.mil@mail.mil)

What: As part of ASD (R&E)'s 'Guiding Vision' for enabling optimal integration of humans with their technologies for mission effectiveness, the HPT&B

team will be hosting a Natural Human-Technology Interactions Workshop. This HS COI - based workshop will include component S&T Program Managers, leading Academicians, and innovative businesses (including small businesses). The workshop will center on in-depth discussion focusing on understanding current and future trends and requirements necessary to develop truly natural human/system interactions. The workshop will draw from many different S&T domains, which collectively converge on providing technologies to enable faster responding and more accurate "hybrid human machine teams", requiring less manpower to achieve increased mission effectiveness.

NATO S&T Organization

When: April 20–22, 2015

Where: Warsaw, Poland

POC: Dr. David Baer
(david.g.baer.civ@mail.mil)

What: HFM-249 Symposium on

"Emerging Technological Advances in Tactical Casualty Care". This Symposium is open to citizens from NATO, Partnership for Peace (PfP), Mediterranean Dialogue (MD), and Contact Nations. Deadline for receipt of abstracts in 19 September 2014. Call for Papers is available via the CSO website:

www.cso.nato.int

HPT&B

ISSUE 2 JUNE 2014

NEWSLETTER

Mention of any commercial product in this paper, does not imply DoD endorsement or recommendation 22 2013 4 for or against the use of any such product. No infringement on the rights of the holders of the registered trademarks is intended.

Editor Ms. Jennifer Coughlin
Strategic Analysis, Inc.

Layout and Design Ms. Amy Cauffman
Strategic Analysis, Inc.