

# PNNL GLOBAL SECURITY

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Pacific Northwest National Laboratory  
...delivering breakthrough science and technology

## PNNL and UW Form Institute for Global and Regional Security Studies



**Professor Christopher Jones, acting IGRSS director.**

The Institute for Global and Regional Security Studies (IGRSS), jointly launched in September of 2000 by the Pacific Northwest National Laboratory (PNNL) and the University of Washington (UW), has enjoyed an active first year. The objective of the Institute is to expand UW programs for teaching, research, and outreach on global security issues from both global and regional perspectives. While the new institute conducts research and hosts events pertaining to a wide range of security issues, a primary focus is nuclear weapons proliferation and prevention.

Professor Christopher Jones, acting director of IGRSS and professor at the UW's Jackson School of International Studies (JSIS), describes the Institute as an "innovative collaboration on the part of the University of Washington and PNNL to increase... the level of expertise and knowledge in areas concerning nuclear proliferation."

The Institute provides support for a number of projects, including preparation of Ambassador Thomas Graham's unique memoir on US arms control policy, covering the period from the SALT I and ABM treaties of 1972 to the renewal of the Nuclear Non-Proliferation Treaty in 1995 and negotiation of the Comprehensive Test Ban Treaty in 1996. Ph.D. candidate in Political Science, Toby Dalton, received funding from the Institute to edit the manuscript, which will be published by the University of

Washington Press and IGRSS. IGRSS funded a workshop and edited a volume on civil-military relations in emerging democracies, a project directed by Professor Mary Callahan of JSIS. The Institute has also contributed to establishing the UW Center on Ethnic Conflict and Conflict Resolution, which received a major grant from the Mellon Foundation for continued study of violent ethnic conflict.

Other first year IGRSS activities include co-sponsoring a lecture series, *Putin and the New Russian Foreign Policy*, and establishing a conference partnership to begin next year with the Program on New Approaches to Russian Security, which receives most of its funding from the MacArthur Foundation and the Carnegie Endowment for International Peace.

IGRSS initiated three new courses at the UW: *The Two Koreas in the New Millennium*, *Arms Control and International Law*, and *International Law and Multilateral Intervention in the Balkans*. The Institute also contributed to a year-long lecture series in which various security experts from around the country participated.

IGRSS is managed by a three-person board consisting of acting director, Professor Jones; Political Science Professor Steve Hanson, chair of the UW's Russia, East Europe and Central Asia Studies (REECAS) program; and Mark Leek, political scientist at the Pacific Northwest Center for Global Security (PNWCGS) at PNNL, which has contributed funding to IGRSS. Leek is also Adjunct Professor in the UW's Department of Political Science.

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## About This Publication...



**Jim Fuller, Director of the Pacific Northwest Center for Global Security.**

I am pleased to introduce the first issue of *PNNL Global Security*, a publication to represent the full spectrum of global security work performed by PNNL. A comprehensive view of PNNL's work in the arena of global security is reflected in the mission of the Pacific Northwest Center for Global Security (PNWCGS), established in October 1998 with support from the Department of Energy as a major outreach activity.

The mission of the Center is to:

**Coordinate** the arms control, proliferation prevention, emergency response, and regional security activities of PNNL, serving as point of contact to the DOE/NNSA Office of Defense Nuclear Nonproliferation, and providing a window to the Laboratory's scientific and technical resources;

**Partner** with organizations throughout the Pacific Northwest, particularly universities and nongovernmental organizations, on nonproliferation and global security activities;

**Position** the National Nuclear Security Administration (NNSA) and the Pacific Northwest National Laboratory to respond to the changing conditions of the post-cold war environment by emphasizing the broader issues of global security and addressing both traditional and nontraditional aspects of proliferation prevention and regional stability; and

**Inform** the Laboratory about the current state of global security and nonproliferation, introducing

scholars and policy makers to Laboratory and NNSA programs and staff through seminars, workshops and conferences.

Because of the core capabilities of PNNL and its relationship to the US government and Battelle Memorial Institute, the Laboratory is well suited to engage with counterparts around the world to strengthen security through non-military means. This is a fundamental premise for PNNL's involvement in global security activities.

The Laboratory and the PNWCGS pursue *nontraditional*, as well as *traditional* security activities, all of which promote a more stable world. This range of activities can be divided into four categories: 1) reduction of the production capabilities and stockpiles of nuclear and other weapons of mass destruction (WMD) in the Former Soviet Union and around the world; 2) promotion of regional stability through tension reduction—entailing nontraditional activities such as promoting environmental and energy security; 3) prevention of the transfer of WMD technology and expertise from the Former Soviet Union to other countries; and 4) safe storage and disposition of nuclear and other WMDs. Each represents a crucial pathway to reducing proliferation and augmenting regional stability, thereby enhancing global security. You will notice, throughout this publication, various articles about projects and partnerships that highlight these four components of global security and related efforts.

Partnerships are a crucial component of PNNL's efforts to address the full spectrum of security issues. This first issue of *PNNL Global Security* includes an article on PNNL's partnership with the University of

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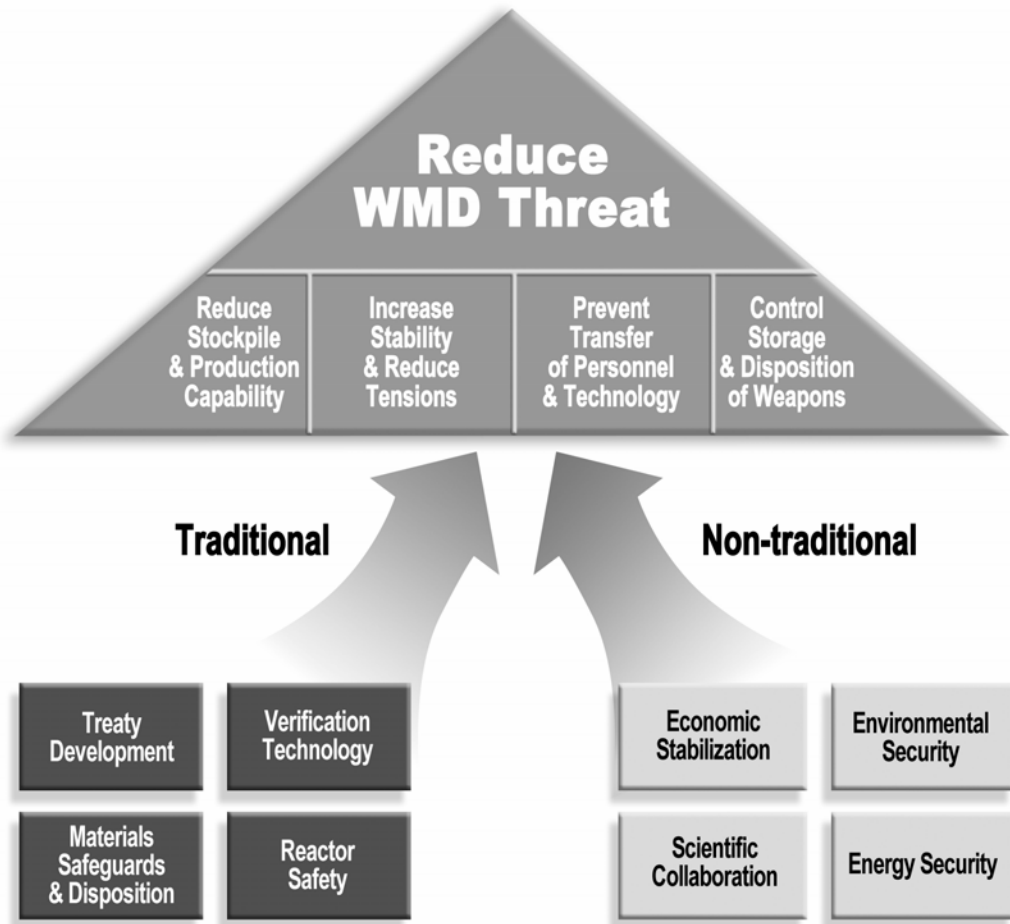
Washington (UW) to form the Institute for Global and Regional Security Studies, intended to broaden the selection of security-related courses offered at the UW, and provide outreach on global and regional security issues.

Debt for nonproliferation, a new concept being studied by PNNL, examines the possibility of using London Club and Paris Club debt swaps to help finance activities that reduce the proliferation threat. You will also read about the International Development Center Project, which is part of the NNSA Nuclear Cities Initiative program to help create alternative employment for Russian nuclear weapons scientists in the country's closed nuclear cities.

In order to promote information sharing, the PNWCGS has sponsored a seminar series that has featured a number of scholars and policy makers. John M. Shalikashvili, former Chairman of the Joint Chiefs of Staff, presented his views on the importance of the Comprehensive Test Ban Treaty to nonproliferation efforts. Dr. Robert Gallucci, former Department of State Ambassador at Large, spoke about the reemergence of the nuclear energy debate. Dr. Richard Ellings, President and co-founder of the National Bureau of Asian Research, gave a speech which included insights into the security dynamics of Asia. In addition, this autumn PNWCGS sponsored a four-part lecture series, *Islam, Afghanistan and the Issue of Terrorism*, to help laboratory staff understand the circumstances

contributing to the rise of Al Qaeda and the events of September 11th.

I hope you enjoy this first edition of *PNNL Global Security*. Please feel free to contact the publication staff or me with your ideas and thoughts for future program activities.



*Jim Fuller is the founding Director of the Pacific Northwest Center for Global Security at PNNL, and Sector Leader for Defense Nuclear Nonproliferation at Pacific Northwest National Laboratory. As director, Jim leads PNNL efforts to involve state government, foundations and other non-governmental organizations in US Department of Energy and other US government efforts to reduce the threat of nuclear, chemical, and biological weapons, and to promote world peace.*

## Featured Projects...



# Improving Nuclear Reactor Safety in Ukraine



***This full-scope simulator was designed to enhance operational safety of the Rivne site's Soviet-designed MWe VVER-1000 Unit 3 reactor.***

Pacific Northwest National Laboratory (PNNL) recently completed two projects for the National Nuclear Security Administration (NNSA) that made significant contributions toward improving nuclear safety in Ukraine. These were the completion of a full-scope simulator for the Rivne Nuclear Power Plant (NPP) Unit 3, and completion of a heat plant for the Chornobyl NPP.

In May, the NNSA and Ukraine's nuclear utility, Energoatom, recognized completion of the full-scope simulator for Rivne Unit 3. In June, the NNSA and Ukrainian counterparts (the Ministry of Fuel and Energy and Ukraine Energoatom (government organizations), Chornobyl NPP, Ukrenergoprom (Design Institute), Yuzhteploenergomontazh (General Construction Contractor), and EnergoPromInvest (General Startup Contractor) completed construction of a heat plant to be used to facilitate the decommissioning of Chornobyl. Both projects helped Ukraine meet international nuclear reactor safety standards thereby reducing the threat of nuclear accidents and the consequences such an event would have for neighboring countries and the environment.

At the acceptance ceremony of Rivne's Unit 3 simulator, Joe Cleary, manager of the Rivne project said, "Training on this new simulator will advance the capabilities of Rivne Unit 3 operators and will lead to major improvements in the overall safety of the plant."

Full-scope simulators are complete-size physical replicas of nuclear plant control rooms, equipped with exact replicas of the switches, controllers, indicators, and other operational and safety devices found in reactor

control rooms. Each simulator is designed to replicate a specific plant control room and is used to train reactor operators and supervisors to handle both regular and emergency plant operations. The Rivne simulator was designed for the site's only Soviet-designed 950 MWe VVER-1000. The \$11.5 million simulator has been on order and on schedule for installation and operation since January 1996. GSE Power Systems of Columbia, Maryland was the prime contractor on the project, with Russian and Ukrainian sub-contractors participating in construction and installation of the simulator. Rivne is scheduled to receive another simulator next year for the Rivne Unit 2 Reactor, a VVER-440/213.

Completion of the Chornobyl heat plant facilitates decommissioning of the Chornobyl NPP by removing reliance on a smaller, "back up" heat plant designed primarily for emergency heating. The back up plant was equipped to provide only for critical needs, and had been used since the December 2000 shutdown of the Unit 3 Reactor. The new heat plant will keep pipes from freezing and cracking, preventing leakage of contaminated water, and will help meet the operational needs of decommissioning facilities to be built in the near future.

The new heat plant contains all auxiliary systems necessary for safe and efficient operation. The newly completed plant consists of three 57 Mwt hot water boilers and three 40 Mwt steam boilers. It is connected to the Chornobyl heat network piping and receives electrical power from the site distribution system. The plant is primarily fueled by natural gas but can use Mazute, a heavy oil, as an alternative fuel source if necessary. The heat plant's design permits the future addition of generators to allow generation of electrical power from the plant's excess steam.

In October 1997, following a review of the heat plant's original design and the development of a preliminary cost estimate for completion, Ukraine and the DOE entered into an agreement to complete the plant. Work on the plant had been halted in 1991 at 20 percent completion due to insufficient Ukrainian funding.

The United States and Ukraine provided \$32.5 million and \$7.5 million, respectively, to finish the project. Full scale construction recommenced in 1998, and in April 2001 the boiler-testing phase began with the successful ignition of Boiler No. 4. Construction was completed in June. Testing by the final Ukrainian State Acceptance Commission was scheduled for fall of 2001, at which time US involvement in the project ended.

*(Continued on page 14)*

## Featured Projects...



The International Development Center (IDC) Project recently completed its second year of successful operations. The IDC project was launched in 1999, when the Department of Energy (DOE) tasked the Pacific Northwest National Laboratory, in partnership with the Foundation for Russian American Economic Cooperation (FRAEC), to establish IDCs in three selected Russian closed nuclear cities.

There are currently two IDCs; the original center is in Zheleznogorsk, and the second, established last year, is in Snezhinsk. The mission of the centers is to improve business infrastructure and promote diverse, local economic growth. While the mission of the IDCs is unique, the basic challenges they face are similar to those faced throughout Russia: to adapt to a fundamentally changed economy, and attract business investment and capital. The approach of the IDCs has been to take the time necessary to lay the groundwork for long-term economic diversification and to promote the types of partnerships needed for sustainable economic progress.

The IDCs are an essential part of the National Nuclear Security Administration's (NNSA) Nuclear Cities Initiative (NCI), a program that helps nuclear cities of the Former Soviet Union move into the commercial sector and away from weapons production. The IDCs communicate daily with PNNL and FRAEC, the founders of the Centers, and serve as clearinghouses of information on economic development projects. They also bring together all NCI constituents on a US-Russian board to plan the future course of the IDCs. IDCs provide valuable training, consulting, and computer and internet access, and are focal points of their communities, bringing together key

## Promoting Economic Transition in Russia's Nuclear Cities

decision makers, and helping to build needed infrastructure, and create jobs and investment for continued economic growth. They also serve to keep the NNSA abreast of economic developments and challenges, and facilitate direct investment in the cities they represent.

The Russian reception to the centers in Zheleznogorsk and Snezhinsk has been enthusiastic. The use of services and facilities has been extensive, and their provision is viewed as proof of the NNSA's commitment to fostering economic success in Russia.

"We believe that the IDC-Zheleznogorsk is opening broad possibilities for the development of business and the creation of new industries in our city and that is the first step on the path towards establishing joint Russian-American projects in Zheleznogorsk," said the Mayor of Zheleznogorsk in a letter to Russia's Deputy Minister of Atomic Energy.

In its second year of operations, the IDC of Zheleznogorsk has provided over 80 organizations with consulting services, trained 2,400 individuals in business planning and management, and created 150 jobs. Zheleznogorsk received \$17 million for investment from the Russian government in 2000, attracted \$1.5 million in investment and loans, and created \$346,000 in revenues. The Center is currently taking the lead in the development of a technopark, working with a Russian software company to create a software development center, and aiding a local



*The IDCs are focal points of their communities, serving as clearinghouses for economic development projects.*

wood processing plant in its efforts to expand into foreign markets.

The Snezhinsk center has served 1,200 clients, provided consulting services for 232 individuals and business training for 70, supported seven Snezhinsk technology firms in their participation in the International Forum on High Technologies of the Defense Industry, resulting in the sale of one million natural gas leakage detectors and 200 boilers, and provided important assistance to other NCI projects and US national laboratories.

"The International Development Centers by all accounts have been successful," says PNNL program manager, Ron Nesse. "They have not only provided significant investment and jobs for the closed cities, but are the nexus of activity in the cities, and help the City Administrations and Minatom to agree on a vision and future strategy for the cities."

PNNL and FRAEC are in the initial phases of planning a strategy that removes IDC reliance on NNSA funding, ensuring the Centers' sustainability.

## Featured Projects...



# Enhancing Transparency in Warhead Dismantlement

PNNL has been engaged in warhead dismantlement verification and transparency research for several years. The Lab's support work in this area, in concert with US nuclear weapons design laboratories, includes cooperative technical information exchanges with Russian weapons specialists to develop physical monitoring technology. Most recently, this work has been conducted as part of the Lab-to-Lab Program on Warhead and Fissile Materials Transparency, under the auspices of the Warhead Safety and Security Exchange (WSSX) Agreement, signed by former Presidents Clinton and Yeltsin in 1994. WSSX is intended to promote the exchange of unclassified technical information relating to the safety and security of nuclear warheads and their components during dismantlement "through the exchange of accumulated experience." The technical knowledge that is shared under WSSX is unclassified and parties may designate information as sensitive in accordance with domestic laws and practice.

In December 1997, PNNL signed contracts to conduct information exchanges under the Lab-to-Lab Program with the Institute of Automatics (VNIIA) in Moscow, the Institute of Technical Physics (VNIITF, formerly Chelyabinsk-70), and the Institute of Experimental Physics (VNIIEF, formerly Arzamas-16), the latter two of which were closed nuclear cities during the Soviet era and are now part of the Russian nuclear weapons complex. Collaborations are facilitated through periodic Joint Technical Interchange Meetings and US-Russian Work Reviews. PNNL-Russian collaboration focuses on information barriers, non-nuclear measurement technologies, nuclear archaeology and irreversibility.

Information Barriers are used with measurement/monitoring systems on sensitive items and materials to protect classified information while still providing an authentic measurement. These hardware and software barriers can be applied to devices such as gamma spectrometers to protect classified weapons design information by delivering a simplified response such as "yes" or "no."

Non-Nuclear Measurement Technologies are being pursued to enhance transparency in warhead dismantlement by employing methods that are inherently faster and less intrusive than the use of ionizing radiation indicators. For example, thermal methods might be able to determine if containers hold heat-generating fissile materials by checking the temperature of the container's exterior. PNNL researchers are investigating electromagnetic methods that might be able to provide unclassified, unique measurements of containerized

components. Other methods, such as vibro-acoustic approaches being developed by Russian colleagues, might be able to determine whether containers are full or empty, similar or dissimilar.

Nuclear Archeology uses records, power production histories, analytical methods, and other tools to help validate plutonium and highly enriched uranium production levels declared by host countries. Analytical tools include the graphite isotope ratio method, originally developed by PNNL, which examines specific isotopic impurity ratios to determine the accuracy of plutonium production estimates in graphite-moderated reactors. If these tools were more fully developed and understood by Russian counterparts, they could help to verify complete production inventories.

Irreversibility processes ensure that weapons dismantlement and the cessation of weapons material production cannot be quickly or easily reversed to provide one weapons state with a strategic advantage over another. Measurements of physical parameters and administrative procedures (e.g., chain-of-custody procedures) can be used in this area. PNNL staff members have gained experience in this field through collaborations with US contractors during the irreversible dismantlement of production reactors and processing facilities at the US Department of Energy's Hanford Site.

Dr. John L. Smoot, who manages the Lab-to-Lab exchange for PNNL, says that cooperation through the programs has been a real success. He also states, "If policy-makers in the Russian and US governments agree to nuclear warhead reductions, these technologies would be available to assist monitored warhead dismantlement transparency according to the provisions of future agreements."

Last year, the US and Russia extended WSSX, originally a five-year agreement, through 2005. The exchanges under WSSX strengthen global security by reducing the nuclear threat and fostering US-Russian cooperation. Exchanges also contribute to the development of technologies to enable implementation and verification of future arms control agreements that could reduce US and Russian stockpiles to levels which, with the proper physical assurances, would prevent either country from having a strategic advantage over the other.



**US-Russian technical information exchange meeting, October 2001.**

# Featured Projects...



## Debt for Nonproliferation A New Approach to Stabilizing Russia's Nuclear Cities

The following excerpts are from a paper entitled "Debt for Ecology: A Concept to Help Stabilize Russian Nuclear Cities," by James L. Fuller and Mark Leek of Pacific Northwest National Laboratory, PNNL-SA-34546.

During the fifty years of the cold war, the Soviet Union and the United States developed the largest nuclear weapons complexes in the world. One of the greatest post-cold war challenges for both countries has been the drawing down of their nuclear arsenals and production capabilities. This entails the irreversible dismantlement of thousands of nuclear warheads and cessation of the production of nuclear materials. It also requires remediation of extreme environmental problems and finding non-weapons related employment for Soviet weapons scientists and the very specialized weapons production workforce of the cold war era.

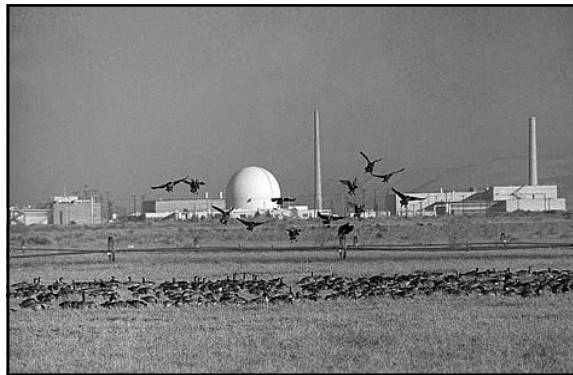
In the United States, the government has played a leading role in financing economic diversification and environmental cleanup around its own nuclear cities. Environmental restoration on the Hanford nuclear reservation has been the foundation of economic stabilization of Richland, Washington, a US nuclear city. The so-called "Richland Model" for nuclear city economic stabilization involves many factors, but primarily focuses on ecological remediation of cold war nuclear wastes and facilities. Environmental clean-up at the Hanford site has not only provided new jobs and skills for former nuclear weapons workers, it is also making the city and the region much more desirable for commercial development.

Given the magnitude of problems facing Russian nuclear cities, creativity involving both public and private sectors will be necessary to achieve substantive solutions. Debt conversion offers one avenue for obtaining both the public and private capital required to address some of Russia's most pressing needs. Debt conversion, or "debt swapping," is a financial transaction whereby debt is essentially sold back to a debtor nation at a discount, and in local currency. The proceeds go to a designated domestic fund. Debt swapping dates to the early 1980s when debt-for-nature exchanges were introduced as a means to fund environmental preservation programs while relieving developing nations of a portion of their foreign debt, thus

creating a win-win situation for creditor and debtor nations alike. Creditor nations are able to obtain commitments of domestic expenditures for programs that can have local, regional, and international benefits. Debtor nations are able to reduce their financial burden while supporting programs with local currency, thereby preserving the debtor country's national hard currency reserves.

The March 1991 Polish-Paris Club Agreement is often cited as an example of a successful debt swap arrangement involving official bilateral debt. In this arrangement, Paris Club members agreed to forgive 50 percent of Poland's \$35 billion bilateral debt. This amount was later increased by another 10 percent to be used for debt-for-nature swaps. A key to the success of the agreement was the 1992 establishment of the Polish EcoFund, a well-managed body responsible for overseeing the debt-swap proceeds and projects. Along with the Polish Government, representatives of governments that contribute to the fund participate directly, choosing projects and determining how they are administered. A 1998 report by the OECD describes the internationally acclaimed Polish EcoFund as a model for environmental financing institutions.

Debt conversion can, as a program, help to promote economic stabilization and diversification in Russia's closed nuclear cities. It can focus on issues such as public health and environmental conditions that must be addressed to make closed cities attractive for commercial development. It can and should also be employed to deal with pressing proliferation problems. Russia's nuclear cities possess an unusually high concentration of technical talent and scientific facilities that cannot easily be relocated or reproduced, but which have great potential for creating technical goods for which there are national and international demands. The aim is to creatively underwrite and manage activities in ways that substantially leverage and increase the funds available to help solve US and world security problems while at the same time improving economic, security, social, and health conditions.



**Environmental clean-up at Hanford has been the source of economic stabilization of Richland.**

## Featured Projects...



### Building A Conceptual Model of Regional Stability *The Workshop Series on Stability in Northeast Asia*

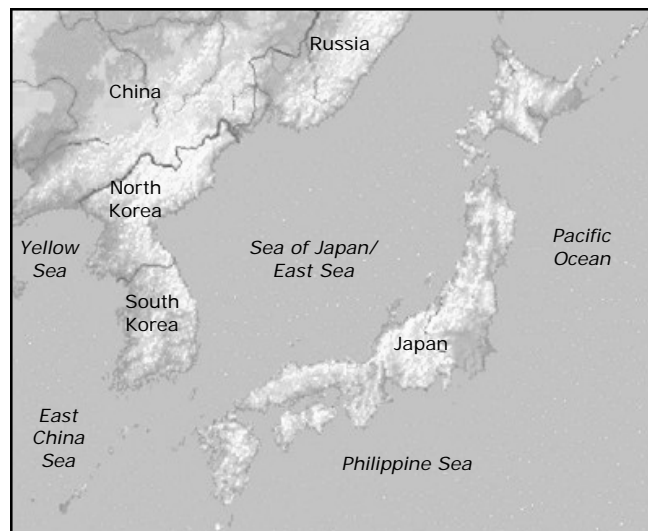
In June, the last of the three-part Workshop Series on Stability in Northeast Asia took place in Falls Church, Virginia. The series was a collaborative effort led by the Office of the Undersecretary of Defense (Acquisitions, Technology & Logistics), with the assistance of the US Pacific Command, Defense Threat Reduction Agency, US Air Force and US Department of Energy to create a conceptual model of regional stability for Northeast Asia, applicable to other regions. The workshops built upon an earlier study conducted by PNNL on the connections between environmental issues and security in the Sea of Japan region. The study sought to enhance understanding of regional dynamics in Northeast Asia through identifying the full spectrum of factors that influence regional stability, their variables, and interactions. The resulting conceptual model is intended to identify foci particularly susceptible to change within the region, gain a comprehensive understanding of the potential impacts of policy and actions in the region, and provide insight useful in the development of effective confidence and security-building measures. Also, baseline information from the workshops can be used to develop regional simulations and war games.

For the purpose of the workshops, Northeast Asia is defined as North Korea, South Korea, Japan, northeastern China and the Russian Far East. Northeast Asia was chosen as the region of focus because of its strategic importance to the US: the region plays an important role in the

US' \$500 billion per year Asia trans-Pacific trade; two of the world's largest economies are located in Northeast Asia; and the region is host to high-profile issues such as the possible unification of the Korean Peninsula, China-Taiwan relations, and implementation of the Agreed Framework in North Korea.

In addition, the US has security agreements with South Korea and Japan under which 100,000 US troops are stationed in the region. Northeast Asia contains two of the world's five recognized nuclear powers. And, Russia and China both hold permanent seats in the UN Security Council.

The Workshop Series on Stability in Northeast Asia focused on regional stability as a means of strengthening global security. This was done because unlike during the cold war, security can no longer focus on superpower military parity and rely on nations to base their policy and strategy on alignment with a superpower. In today's multipolar world, the key to security is the maintenance of regional stability through addressing the root causes of instability *before* crises erupt. This means addressing military and nonmilitary issues, with especial focus on the following "six pillars," which have been identified as being integral to stability: military



**The workshops defined Northeast Asia as North Korea, South Korea, Japan, northeastern China, and the Russian Far East.**

parity, national and regional politics, economics, environmental issues, culture, and demographics. These six pillars and their variables are interconnected with issues or events in one pillar creating spill over into the other pillars and, in turn, shaping regional outcomes and (directly or indirectly) impacting global security.

The environment provides an example of how nontraditional security factors can impact regional stability. While the environment is not a *root cause* of instability, environmental issues can contribute to tensions that can result in conflict. This was demonstrated in a PNNL study sponsored by the National Nuclear Security Administration (NNSA) to determine whether environmental factors contribute to regional tensions in the Sea of Japan region and whether there are links between regional environmental and proliferation issues. Study results were affirmative on both counts, providing demonstrations of how tensions over regional air and



## Featured Projects...

water pollution, violence over fisheries competition, and conflicting territorial claims related to gas and oil reserves all exacerbate regional tensions. More specifically, the report supported the “theory that mitigation of the environmental vulnerabilities identified as having the most significant influence on security issues would help to reduce regional tensions and contribute to the prevention of proliferation of weapons of mass destruction.” It also stated that “regional cooperation in addressing these challenges would... simultaneously accomplish the tasks of improving environmental quality... building cooperation and trust... which would serve to strengthen regional stability.” For workshop organizers, these results gave rise to more questions, highlighting the need for a broader understanding of stability: *To what extent do other pillar groups and the interactions of their variables affect regional stability, and how do they interact?*

The objective of the Northeast Asia Workshop series was to improve understanding of regional stability so that these questions could be answered. During the first workshop, held in fall of 2000, participants identified the variables and interactions of the six pillar groups, and their impacts on stability. Participants used this information to create a regional baseline and to form a conceptual model of regional dynamics within the time frame of the next three to five years. During the second workshop, effective policies to promote US interests in Northeast Asia were formulated with an appreciation of regional dynamics. In addition, consequences stemming from the actions of important extra-regional actors like the United States and Taiwan were incorporated into

the conceptual model. During the third workshop, participants explored a scenario in which the United States announced its decision to deploy Theater Missile Defense in Northeast Asia, examining the potential regional impacts of such a course of action.

A wide array of individuals with expertise on Northeast Asia and each of the six pillar groups participated in the workshops. They included members of academic institutions, think tanks, national laboratories, and various agencies of the US government. Participants examined issues, offered input, and evaluated interactions between the six pillars and impacts on stability from the perspective of their own and other areas of expertise. This strategy was used to ensure a wide variety of experience and perspectives.

The Situational Influence Assessment Model (SIAM) was used to facilitate this process. SIAM uses diagramming techniques and Bayesian mathematics, allowing inclusion and quantification of both “expert opinion” and factual data. Participants also used SIAM to capture discussion by building a database of regional information, recording observations, tracing the complex interactions of pillar groups and their variables; determining their relative impacts on stability; and creating a “logic trail.” While the ability to run the computer model and receive quantified and ranked consequences of specific US policies and actions within the region is useful for risk analysis and identifying outcomes of varying probabilities, the focus of the workshops was the conceptual framework of the computer model. The process of building the

conceptual model and the challenge of looking at the region systematically in order to identify areas of weak understanding, or the tendency to overlook certain issues or connections between issues, was the primary goal of the workshops.

The in-depth discussions and data gathering by cross-disciplinary groups of professionals throughout the workshops proved useful in identifying regional “pressure points.” The larger regional issues such as the success of the Korean Energy Development Organization, China’s perceptions of the US’ intentions in the region, Japanese demographics, and the link between natural resources and energy demand were highlighted. Trigger events, defined as events with the potential to have widespread ramifications throughout the region with unknown timing or precursors, were identified. Participants also determined that destabilization was most likely to occur, not due to one regional event, but in response to multiple events occurring simultaneously.

The next steps of the effort to build a conceptual model for regional instability will be to further refine the Northeast Asia model, and to then apply the conceptual model to other geographic regions with the aid of SIAM. Areas currently being considered are the Caspian Sea region, Pakistan and India, and Indonesia.

*The Sea of Japan Environmental Instability Analysis*, conducted by PNNL, is available at: <http://pnwccgs.pnl.gov/NEA/Start.htm>.

## Applied Technology...

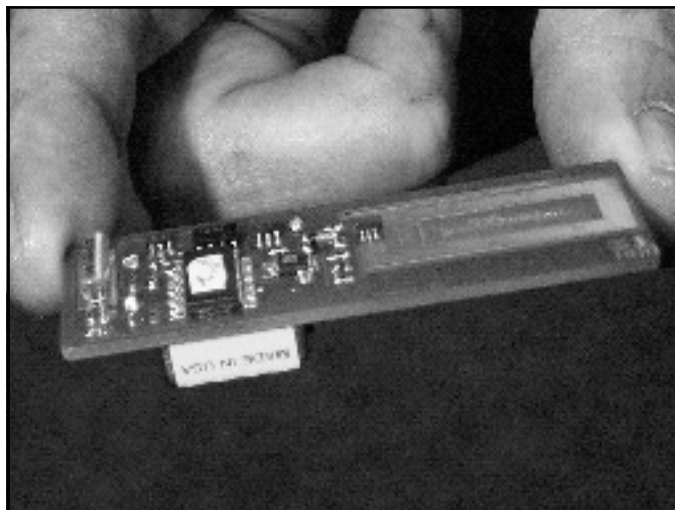
# PNNL Receives R&D 100 Award for Radio-Frequency Tags

On June 29, PNNL received acknowledgement as one of this year's recipients of the R&D 100 Award from *R&D Magazine* for its latest breakthrough in radio-frequency identification (RFID) technology. The system that received the award is a long-range, semi-passive radio-frequency tag that can identify, locate and assess the condition of items to which it is attached. The system significantly reduces the time necessary to locate, count, or monitor military equipment and personnel in the field, as well as commercial goods. The RFID system reduces the time necessary for high-volume inventory from days to minutes, and the location of specific items can be found instantly.

RF tags have been used for nearly twenty years for applications like identifying automobiles or lost pets and deterring clothing theft in retail stores. A basic RF tag consists of a small, electronic circuitry board containing an antenna, and stores and relays data. The device relies on modulated backscatter, which is similar to radio waves, and, as explained by Steve Stein, PNNL's Smart Sensor System Technology Platform Leader, is "like a mirror in that it reflects back information" by bouncing back radio frequency energy instead of creating its own energy to communicate. Presently, there are three types of radio-frequency (RF) tag technology:

**Passive RF Tags** have no battery and are activated by an "interrogator" device, which transmits radio-frequency energy to read the information contained by tags. Passive systems have limited read and write memory that can be relayed to up to ten meters. The tags can be as small as a grain of rice, are inexpensive, and have a long operating life. Up to 500 tags can be read per second. They do not require line of sight and can be remotely monitored, giving them an advantage over bar-coding and similar inventory-tracking systems.

**Semi-Passive RF Tags**, such as the system which received the R&D 100 Award, use a battery, but still only reflect radio frequency energy to relay data. The tags can monitor sensor outputs such as temperature, pressure and tamper detection devices, use a watch-size battery, and have an operational life of five or more years. They are capable of activating or deactivating items remotely, can be read through walls, file cabinets and other barriers, and have a read and write range up to 100 meters. They offer highly efficient



**2450 MHz Semi-Passive Radio-Frequency Tag**

inventory control, detect security breaches, and can perform functions such as deactivation of a weapon if obtained by an individual without proper authorization. They can also assess whether an item risks damage due to surrounding physical conditions.

**Active RF Tags** are larger, more expensive and powerful, and rely on larger batteries to send and receive information. They initiate communication, have a read and write distance up to hundreds of kilometers, and can update and monitor information from other tags and systems. They can connect to multiple sensors, control valves and switches, and have decision-making capability. Active tags can be used for monitoring, real-time assessments, and notifications like providing an alert when mechanical equipment needs repair or replacement. Due to their reliance on a larger battery, self-activation capability and their possibility of being activated more often—even non-stop—active RF tags have a shorter lifespan.

According to Stein, PNNL is about two years ahead of commercial competitors in the RFID field. Lab scientists have improved upon existing circuitry making it more power efficient, enabling greater relay distance, and accelerating reading speed. Most of the customer interest in this PNNL technology so far has been from the defense sector.

Last November, a large-scale demonstration of a  
(Continued on next page)

## Applied Technology...

# \$100,000 Grant Awarded for Development of Mine Detection Device

On June 12, Richard A. Craig of PNNL's Engineering Physics Group received a \$100,000 grant from the Christopher Columbus Foundation through the 2001 *Discover Magazine* Technology Innovation Awards for his work on a mine detection device, called the Timed Neutron Detector (TND). The TND is a marked achievement because it detects both metal and plastic landmines, is portable, easy to use and inexpensive, making it financially accessible to developing countries, where most undetected landmines are located.

Landmines are a major global concern. On average, about 22,000

individuals are maimed or killed by landmines each year and, according to the United Nations, approximately 110 million landmines remain undetected in 64 countries around the world.

Development of the TND draws on many years of experience in radiation detection and arms control treaty verification at PNNL. The TND works by detecting hydrogen, found in the explosive material and casings of both plastic and metal landmines, by timing the rate at which Californium-252 neutrons projected from the TND exit and return to the device; neutrons that interact only with soil exit and return at roughly the same speed, while those encountering hydrogen slow

down.

The TND can either be used alone or with other sensor devices such as the slant-angle holographic imaging system (SAHI), or ground penetrating radar



**Richard A. Craig developed the Timed Neutron Detector, a light, hand-held, portable device that locates plastic and metal landmines.**

holographic imaging system (GPRHI), which create real-time, 3-D images to aid visual detection of landmines. The \$100,000 grant received by Craig is being used to further refine the TND. A mock landmine field test for the device took place this winter.

This year's *Discover Magazine* award ceremony was held at the Manhattan Center in New York City and is the twelfth consecutive annual ceremony to recognize science and technology achievements to be held by the magazine. Robert Wind, a member of PNNL's Biomolecular Networks Initiative team, was also among the 2001 winners. Wind received an award for creating an optics and magnetic resonance microscope enabling new insight into cellular activity. The PNNL winners were featured with the other award recipients in *Discover Magazine's* July 2001 issue.

## PNNL Receives R&D 100 Award for Radio-Frequency Tags *(Continued from previous page)*

prototype RF dog tag was staged for the US Navy. The prototype was developed in collaboration with the Naval Aerospace Medical Research Laboratory in Pensacola, Florida with a \$100,000 grant from the Office of Naval Research, which has funded much of PNNL's research in this area. The tags are intended to serve various functions. They can store medical information like blood type and allergies, record treatment history, and transmit information on an individual's condition. They can also connect to global positioning systems to locate personnel and provide information to help coordinate the transportation of soldiers to medical facilities depending on the severity of their condition.

PNNL is also pursuing a RF sensor to monitor the temperature of the brakes of F-16s and provide an

alert if the temperature surpasses operable conditions or renders the brakes unreliable. Scientists have even created RF tags small enough to attach to honey bees because bees pick up trace amounts of materials from their environment, including TNT released by landmines, which can alert soldiers to the presence of mines and facilitate their detection.

There are also numerous civilian applications for RFID technology, including supply chain management—enabling just-in-time delivery, asset management, security, and use in consumer products from appliances and automobiles to alarms and entertainment sensors.

"One of the challenges with this technology is that there is so much you can do with it," says Stein. "It's hard to focus on one application."

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## Forging Alliances...

# PNNL Hosts NATO Intern from Uzbekistan

Dr. Umar Salikhibayev, former senior physicist at the prestigious Dubna Research Institute, near Moscow, and, now, Deputy Director of Uzbekistan's Nuclear Physics Institute, returned home earlier this year after completing a NATO Internship with PNNL. The Science Policy and Management Internship, which lasted two months, provided practical training and experience in the design, development, and market application of new science, and project management. Salikhibayev and PNNL colleagues used the opportunity of working together to identify possible areas of future collaboration between their institutions.

Such cooperation would be mutually beneficial. As expressed by Ghuzal Badamshina of the Battelle/PNNL Seattle Research Center, who orchestrated much of Salikhibayev's internship activities, "Vast changes are taking place in Central Asia and it is important for the Lab to form a presence in the region and foster relations." Conversely, Central Asian science and business communities are eager to increase interaction with their Western counterparts. As Salikhibayev stated in his internship report, "Newly Independent States are aggressively seeking new ways and systems for science management, different from the obsolete Soviet practices. Science and technology policies are being newly defined and shaped by the challenges... to enter new markets and remain competitive in them." His principal internship goals were to study methods of commercializing new science and technologies, and to lay the groundwork for a long-term relationship with PNNL. His desire to intern with the Lab developed through contacts with PNNL scientists visiting Uzbekistan, and familiarity with the

Lab's experience in "assisting their US and foreign clients in technology and commercialization and building institutions to support this."

Salikhibayev developed an understanding of Lab strategy, planning and management while with PNNL. He was also introduced to institutions in Seattle such as the



***"I've enjoyed the feeling of being part of the team and got as close as one could to experiencing what it is like to be working for this historical institution."***

Washington Technology Center, which unites science and industry in order to bring new developments to the marketplace, and the University of Washington, where he forged relationships with individuals such as Professor Ilse Cirtautas of the Near Eastern Languages and Civilizations Department, and Professor Henry Lubatti of the Physics Department. Salikhibayev also took advantage of his US visit to attend an arms control conference at the Sandia National Laboratory in Albuquerque, New Mexico to hear American and European perspectives on current arms control issues, and to meet policymakers and security experts from around the world.

An important part of Salikhibayev's internship was his week

at PNNL's main campus in Richland, Washington during which he learned about the Lab's extensive capabilities and explored possible areas of future collaboration. He met with 26 staff members and toured five facilities, including the Environmental Molecular Sciences Lab, the Radiological Standards and Calibration Laboratory, and the Hanford "B Reactor."

During the visit, Associate Laboratory Director, Walter Apley, expressed willingness to host another intern from Uzbekistan for three to six months. Director of the Pacific Northwest Center for Global Security, Jim Fuller, who, in Salikhibayev's words, has been "a particularly strong supporter of expanded collaboration between PNNL and the Uzbekistan scientific community," demonstrated openness to "hosting interns and developing wider ties."

Salikhibayev and PNNL scientists also explored the possibility of conducting a study on global warming in Central Asia using climate modeling. According to Salikhibayev, "Similar PNNL studies are in progress in Russia, Bulgaria, Poland and other countries... the results would forecast the impact of global warming and other environmental changes of the region's ecology for the next 10 to 50 years." He was also impressed to learn that the Lab hosts 900 student interns each year to participate in projects, stating, "The statistics on the US Government funding for educational programs of this kind are striking and, from my point of view, it would be very exciting for students in Uzbekistan to be able to consider similar opportunities."

## Featured Seminar...

# John Shalikashvili Voices Support for the Comprehensive Test Ban Treaty

"The single greatest danger in history since the cold war is the danger posed from the proliferation of nuclear weapons," stated John M. Shalikashvili during his spring visit to PNNL as a guest speaker for the Pacific Northwest Center for Global Security's seminar series. Shalikashvili, former Chairman of the Joint Chiefs of Staff during the Clinton Administration, during which he served as principal military advisor to the president, the secretary of defense, and the National Security Council, reiterated his strong support for the Comprehensive Test Ban Treaty (CTBT), as expressed in his January 5<sup>th</sup> 2001 report to the president. The report, preceded by a 10-month long review, offered insights and recommendations regarding the CTBT and its significance to global and national security.

The goal of the CTBT is to deter non-nuclear states from developing nuclear weapons and to constrain the ability of countries already possessing nuclear weapons to develop new types of weapons by prohibiting all nuclear explosions. This prohibition would create a scenario in which production or possession of nuclear bombs is not illegal, but detonating them is. By December 2000, the CTBT had been signed by 160 countries and ratified by 69. However, the Treaty cannot enter into force until it has been ratified by 44 specified nations recognized as possessors of nuclear weapons or research reactors. Currently, the CTBT has been signed by all of these states with the exception of India, Pakistan and North Korea, and has been ratified by 30 of the required 44. Countries that have ratified the CTBT include Britain, France and Russia. Those that have not include China and the United States. The United States Senate was divided along party lines on the issue, and consequently rejected the Treaty in October of 1999. The Senate's rejection of the Treaty raised much concern around the world over what would happen to global nonproliferation efforts should the United States abandon its leadership role in this capacity.

Shalikashvili expressed his support for the CTBT and his belief that the Treaty represents an important part of an integrated non-proliferation strategy made up of an intricate and fragile web of bilateral, regional, and global agreements. In attempt to "bridge the differences" of opinion over the Treaty, Shalikashvili stated that he'd "quietly met with the directors of national weapons labs, senators, scientists, opinion shapers, and representatives from former Presidents' Reagan, Bush, and Clinton administrations" and that he took very seriously "every concern as valid... working hard to mitigate issues."

In his final report, Shalikashvili identified four impediments to the United States Senate's ratification of the CTBT:

1. There is doubt as to whether the Treaty has a genuine non-proliferation value.
2. Some fear that the verification regime required by the Treaty is not reliable enough to ensure sufficient compliance.
3. It is uncertain whether the United State's nuclear stockpile can be adequately maintained without conducting nuclear explosive testing.
4. There is reluctance to "freeze" the United States into a Treaty that does not have a specified time duration.

Scientific opinion has been split on the question of whether verification regimes to ensure compliance with the CTBT are sufficient. In 1998, however, PNNL scientists developed two verification technologies which would enable a major leap in verification power through their ability to detect nuclear detonations by analyzing the atmosphere for traces of radioactive material. The devices, ARSA, the Automated Radioxenon Sampler/Analyzer, and RASA, the Radionuclide Aerosol Sampler/Analyzer, are considerably more sophisticated than other available monitoring devices. They have greater sensitivity, full automation, near real-time reporting, and highly capable nuclear radiation detectors.

"Although President Bush has said the CTBT would be difficult to enforce, his administration is still

*(Continued on page 14)*



**The Radionuclide Aerosol Sampler/Analyzer (RASA) unit can be used to confirm nuclear detonations anywhere in the world.**

## Improving Nuclear Reactor Safety in Ukraine

(Continued from page 4)

“My time in Slavutych has been challenging in many ways, but overall it has been very rewarding,” said Jim Hartley, senior project manager with the International Nuclear Safety Program (INSP), who has lived in Slavutych, Ukraine for the past two years to oversee construction of the \$40 million heat plant project. “It has been challenging integrating Western practices into a Ukrainian managed project, but everyone has been dedicated to keeping the project on track and staying on schedule and within budget.”

In September, PNNL began aiding Bechtel, Électricité de France, and Battelle, which manages PNNL,

to fulfill a \$22 million contract to manage the Shelter Implementation Plan (SIP). SIP is a project to enclose Chornobyl Reactor Unit 4 in an environmentally secure structure until the radiation level of fuel contained within the reactor dissipates enough to permit safe removal and storage.

PNNL offers regular support to the National Nuclear Security Administration’s Office of International Nuclear Safety and Cooperation. The office conducts and participates in comprehensive, cooperative efforts to reduce the risks from Soviet-designed nuclear plants through correcting major safety deficiencies and establishing safe, self-



**Construction of the Chornobyl replacement heat plant was completed June 2001.**

sustaining operational and maintenance infrastructures. This work is done in cooperation with other G-7 countries and international organizations. ■

## UW and PNNL Form IGRSS

(Continued from page 1)

“In our first year we have developed a core group of faculty committed to expanding the Institute’s work within the UW, and externally with PNNL and other organizations,” stated Director Jones.

The new institute draws the participation of many professors with expertise in regions from Northeast, South and Central Asia, to the Middle East, and Europe, as well as the REECAS program. One of the Institute’s long-term goals is to bring faculty into regular communication with PNNL Staff providing scientific and technical support to the US Government.

The Institute is preparing a public lecture series built around the arms control course that Ambassador Graham will teach in the spring of 2002. IGRSS is also collaborating with the University of Washington Press to publish additional security studies, including one on the missile technology control regime.

On November 29-30, IGRSS sponsored a conference on NATO Enlargement and the Baltic States on the UW campus. Participating speakers included: Ambassadors Vygaudas Usackas of Lithuania, and Aivis Ronis of Latvia; Deputy Undersecretary for Political Affairs Vaino Reinart of Estonia; and Director of the Moscow Office of the Center for Defense, Ivan Safranchuk. Other participants included representatives from the academic, government and think tank communities, including US Ambassador Robert Hunter, Dr. Ron Asmus of the Council on Foreign Relations; and Ted Galen Carpenter of the Cato Institute. ■

## Shalikashvili Voices Support for CTBT

(Continued from page 13)

undecided about how it stands on the CTBT,” stated Shalikashvili. “My hope is that the Bush administration will take appropriate actions on fixing these identified concerns.” Shalikashvili also urged, “We need to weigh the risks and advantages of ratifying the agreement and realize that the CTBT is one of the tools necessary for a comprehensive arms control strategy.”

As expressed in his report submitted to the president, Shalikashvili’s great concern is that the longer entry into force is delayed, the more likely it is that other countries will move to acquire nuclear weapons, or significantly improve their current nuclear arsenal, and that it will become increasingly difficult to mobilize international support against such activities. As also made clear in his report, Shalikashvili believes it is strongly in the interest of the United States to participate in the final negotiations of the Treaty, stating that, “The outcomes just aren’t as good when the US doesn’t lead.” ■

# PNWCGS Seminars...

*The Pacific Northwest Center for Global Security sponsors seminars, conferences and workshops to benefit the global security community and its leaders. These events promote interaction between policymakers, laboratory science and technology staff and government officials, offering an opportunity for them to discuss and share ideas about the security issues of today.*

**The following is a description of this year's PNWCGS seminars:**

**11/27/01 Dr. Frederick Lorenz, Professor of International Law, University of Washington/ Seattle University**

**Part IV: Islam, Afghanistan and the Issue of Terrorism  
Response to Terrorism: Military Force and International Law**

Dr. Lorenz is an expert on international law and security, and a former Marine colonel. He was a US military judge advocate for 27 years, and has served as a legal affairs officer for the United Nations. Dr. Lorenz addressed the legality of the United States' retaliation against Afghanistan under the UN Charter, spoke about the law of war under current international standards and the Koran, and addressed the conditions promoting a radical, militant interpretation of the word "jihad."

**11/13/01 Dr. Resat Kasaba, Professor of International Studies, University of Washington**

**Part III: Islam, Afghanistan and the Issue of Terrorism  
Do They Really Hate Us?**

Dr. Kasaba is a professor at the University of Washington's Jackson School of International Studies, and co-founder of the UW Center on Ethnic Conflict and Conflict Resolution. He has also written extensively on the Ottoman Empire, Turkey and the Middle East. Dr. Kasaba provided a thoughtful analysis of the events of September 11th, including commentary on the stereotypes of "Western culture" and "Muslim militants," and the need for increased tolerance and communication between cultures.

**10/23/01 Dr. Ellis Goldberg, Director of the Middle East Center, University of Washington**

**Part II: Islam, Afghanistan and the Issue of Terrorism  
Jihad, Terror, War and Justice: Four Words for the 21<sup>st</sup> Century**

Dr. Ellis is Professor of the Jackson School of International Studies at the University of Washington (UW), and director of the UW's Middle East Center. Dr. Goldberg explained the connection between Islam and political extremism, the conditions which support these connections, and commented on the evolution of war during the last five centuries.

**10/11/01 Dr. Frank Conlon, Professor of South Asia Studies, University of Washington**

**Part I: Islam, Afghanistan and the Issue of Terrorism  
Afghanistan and Pakistan's Relation to Islam**

Professor of South Asia Studies and co-founder of an international discussion website on South Asia, Dr. Conlon presented the first of the four-part PNWCGS seminar series, *Islam, Afghanistan and the Issues of Terrorism*. The series was organized to provide information in response to many of the questions that have arisen in the United States since the September 11<sup>th</sup> attacks on the World Trade Center and the Pentagon. Dr. Conlon provided insight into the cultural and political influences of Islam in Afghanistan and Pakistan, and a brief overview of Islam.

**08/29/01 Dr. Richard Ellings, President, National Bureau of Asian Research**

**Asian Security Dynamics**

Dr. Ellings is President and co-founder of NBR, a nonprofit, nonpartisan institution conducting advanced research on Asian policy issues and serving as a global clearinghouse for Asia research. Ellings, who specializes in the political economy of international relations and national security, is founding editor of the *NBR Analysis* publication series. His recent publications include *Southeast Asian Security in the New Millennium* (1996), which he co-edited, and *Private Property and National Security* (1991), which he co-authored. Dr. Ellings spoke to his PNNL audience about the dynamics of Asian security.

**07/26/01 Dr. Robert Gallucci, Dean, Edmund A. Walsh School of Foreign Service, Georgetown University**

**Nuclear Power and Nuclear Proliferation: Some Things Never Change... and Other Things Do**

Dr. Gallucci has spent more than 21 years in government service. Posts have included that of Department of State Ambassador at Large, Special Envoy, and division chief of the Bureau of Intelligence and Research. He received the Department of the Army's Outstanding Civilian Service Award in 1991, and the Pi Sigma Alpha Award from the National Capital Area Political Science Association in 2000. Dr. Gallucci spoke about the connection between nuclear energy and proliferation, and the re-emergence of the popularity of nuclear power. He also discussed current events in North Korea.

**06/15/01 Dr. Victor E. Alessi, President and CEO, United States Industry Coalition**

**Nonproliferation: The Role of the National Labs and IPP**

As President and CEO of the US Industry Coalition (USIC), Dr. Alessi helps to represent 81 small and large US businesses, consortiums and universities participating in the Initiatives for Proliferation Prevention program (IPP). IPP, founded in 1994, promotes joint projects between scientific institutes of the Former Soviet Union (FSU), US National Labs, and American companies with the goal of promoting peace through finding commercial applications for the expertise of FSU weapons scientists and engineers. Dr. Alessi spoke to his Richland audience about the vital role of US National Labs to the nonproliferation process, providing examples of recent IPP successes and insight into current and future IPP challenges.

**05/24/01 Dr. Guy Wilson-Roberts, Deputy Director of the Centre for Strategic Studies: New Zealand, Victoria University of Wellington**

**Multilateralising, the Phased Approach: How New Zealand has helped Construct the Language of Nuclear Arms Control**

Dr. Wilson-Roberts is Deputy Director of the Centre for Strategic Studies, New Zealand's only security-focused think tank. The Centre is a vocal participant in national debates on New Zealand's international policy and national security policy, and is responsible for coordinating New Zealand's representation in the Council for Security Cooperation in the Asia-Pacific (CSCAP), an important regional forum. Dr. Wilson-Roberts spoke about New Zealand's contributions as a facilitator in global nuclear disarmament negotiations and the importance of this role in forging a clearer identity for New Zealand in the world community.

**05/11/01 Admiral Richard W. Mies, Commander-in-Chief, United States Strategic Command**

**The Future of Deterrence and Non-proliferation**

As Commander-in-Chief of the United States Strategic Command, Admiral Mies is responsible for all US Air Force and US Navy strategic nuclear forces supporting the nation's strategic deterrence policy. His decorations include the Distinguished Service Medal, Defense Superior Service Medal (two awards), Legion of Merit (four awards), and Meritorious Service Medal (two awards). Admiral Mies spoke to PNNL staff members about the challenges of sustaining and extending the life of nuclear submarines, aircraft and infrastructure without conducting nuclear testing, and the daunting task of maintaining national security in an age of uncertainty and change. He also spoke about the threat of weapons of mass destruction and the difficulties involved in detecting chemical and biological weapons production facilities and neutralizing their threat.

**04/26/01 Professor G. John Ikenberry, Peter F. Krogh Professor of Global Justice at Georgetown University**

**America's Liberal Grand Strategy: World Order After The Cold War**

Professor Ikenberry is the Peter F. Krogh Professor of Global Justice at Georgetown University, with an appointment in both the Edmund A. Walsh School of Foreign Service and the Government Department. He has taught at Princeton and worked for the Department of State in various posts. He is a Non-Resident Senior Fellow at the Brookings Institute and recently published, *After Victory: Institutions, Strategic Restraint, and the Rebuilding of Order after Major Wars*, which explores the politics of major historical postwar settlements and the formation of institutional order. The subject of Professor Ikenberry's seminar presentation was the challenge of building global stability and the importance of multilateral global institutions and US influence to the process.

**03/20/01 Mr. John M. Shalikashvili, former Chairman of the Joint Chiefs of Staff**

**Comprehensive Test Ban Treaty: The Way Forward**

John M. Shalikashvili is Visiting Professor with the Stanford University Institute for International Studies (CISAC) and will be a senior advisor to the Stanford-Harvard Preventive Defense Project, led by former Secretary of Defense, William Perry, and former Assistant Secretary of Defense, Ashton Carter. As 13th Chairman of the Joint Chiefs of Staff, during the Clinton Administration, Shalikashvili served as principal military advisor to the president, secretary of defense and National Security Council. On January 5 of this year, after a 10 month-long review process, Shalikashvili provided a report to the President that voiced strong support for the Comprehensive Test Ban Treaty (CTBT) and outlined measures to build bipartisan support for the Treaty. Shalikashvili spoke to PNNL staff about this report and the importance of the CTBT to global security.

# Upcoming Events...

**December 18**

**My Vision for Defense Nuclear Nonproliferation**

1:00-2:00 p.m., EMSL Auditorium, PNNL  
Ambassador Linton Brooks, Deputy Administrator of Defense Nuclear Nonproliferation for the National Nuclear Security Administration explains his vision to PNNL's National Security Division.  
Information: (509) 372-6896, PNWCGS

**January 17**

**Security and the Role of International Trade**

1:30-3:00 p.m., Columbia River Room, PNNL  
Bill Center, former senior advisor to the Joint Chiefs of Staff and President of the Washington Council on International Trade will present his views on the role of commerce in improving international relations and global security.  
Information: (509) 372-6896, PNWCGS

**February 21**

**Serbia Since 1989**

Call for time and location.  
Eric Gordy of Clark University, Vjerman Pavlakovic and Biljana Bijelic of the University of Washington, Phillip Lyon of John Hopkins University, and others will participate in a roundtable discussion on Serbian society and history.  
Information: (206) 543-4852

**March 7**

**Making Sense of Post-Colonial Violence**

7:00 p.m., Communications 226, University of Washington  
As a part of the Human Agency in a Globalizing World lecture series, Professor Mahmood Mamdani, Professor of Anthropology and Political Science at Columbia University, will provide historical background and explanation of the connections between current events and colonial history.  
Information: (206) 616-1190

**April 29**

**Back to the Front: Russian Interests in the New Eastern Europe**

3:30-5:00 p.m., Room TBA, University of Washington  
The Donald W. Treadgold Memorial Lecture Series presents Janusz Bugajski, Director of the Eastern Europe Project at the Center for Strategic and International Studies, in Washington, D.C. Dr. Bugajski will offer his ideas on Russia today, and its interests and intentions toward its former territories in Eastern Europe.  
Information: (206) 543-4852

**May 9**

**Asian Cities of Power**

7:00 p.m., Communications 226, University of Washington  
Professor Aihwa Ong of Berkeley will speak about Asian cities of power and influence as part of the Human Agency in a Globalizing World series.  
Information: (206) 616-1190

**May 22**

**Eastern Europe: Human Rights and Public Policy in Emerging Democracies**

Call for time. Kane Hall, Walker-Ames Room, University of Washington  
The Jackson School of International Studies and Center for International Business Education and Research present an International Update dinner-lecture on the state of human rights in the Newly Independent States of Eastern Europe.  
Information: (206) 543-4852

**Information on upcoming PNWCGS seminars is available at:**  
<http://pnwccgs.pnl.gov/>

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