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## Letter from the Editor

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## From the Editor's Desk

Dear Readers,

The voices you will hear in this issue of our journal—IJNS Volume 2, Number 1—come from scholars and educators, scientists, engineers, and consultants, as they discuss issues of vital importance to international nuclear security. Also in this issue we hear, for the first time, from winners of the first IJNS Student Writing Competition. As you will see, the student scholars add important perspectives to discussions going on among professionals in nuclear security, especially in terms of thinking about international cooperation in the fight against terrorist threats.

The major themes addressed by articles appearing in this issue fall into four major categories; we've organized our presentation of the articles accordingly:

- Specific vulnerabilities regarding nuclear security assets (and proposals for reducing those vulnerabilities)
- International cooperation, plans, and problems with strengthening the worldwide nuclear security regime
- The science of nuclear security
- Education in nuclear security

We lead off with a major article by Sherrell R. Greene, founder and president of Advanced Technology Insights, based in Knoxville, Tennessee, USA. His article, "Nuclear Power: Black Sky Liability or Black Sky Asset," addresses the worrisome scenario of a Black Sky event in the US—a widespread electrical blackout that could result from natural causes, cyber attacks, or physical attacks. He then analyzes the complex "system of systems" that makes up The Grid, and wherein nuclear power plants currently constitute an important but vulnerable element. He goes on to discuss how NPPs could become The Grid's greatest asset, capable of jump-starting our nation's electrical supply.

The following article continues our conversation about challenges and proposed solutions for international cooperation in nuclear security. "Implementation of the 1995 Middle East Resolution: A Vital Lifeline to the Extension and Success of the Non-Proliferation Treaty," by Haidy Yehia Ghoname and Howard L. Hall of the University of Tennessee Institute for Nuclear Security, examines the world's "core of non-proliferation dilemmas"—the most pressing dilemma being in the Middle East—and they explain the real danger of a Middle Eastern exodus from the Non-Proliferation Treaty. The lifeline that can pull us out of this disaster, they argue, is serious implementation of a resolution that was passed two decades ago at an NPT Review Conference: the 1995 Middle East Resolution.

Also entering upon the discussion about international cooperation is Francesca Giovannini's article, "A New Pathway To Enhance the Global Nuclear Security Regime? Lessons Learned from Southeast Asia." Giovannini ponders weaknesses in the global nuclear security regime and advocates an increased role for DPRMOs—disaster preparedness and risk management organizations—as a vital element in strengthening the security regime.

The conversation then turns to scientific aspects of nuclear security, with "Modern Advancements in Post-Detonation Nuclear Forensic Analysis" by S. Adam Stratz, Jonathan A. Gill, John D. Auxier II, and Howard L. Hall — representatives of the Department of Nuclear Engineering, Radiochemistry Center of Excellence, and Institute for Nuclear Security at the University of Tennessee, Knoxville, USA. They review advances in technical nuclear forensics (TNF) and outline specific areas where more extensive research is needed. As in every application of forensics—but with immeasurably more at stake—experts must be able to rapidly and accurately identify perpetrators and weapons sources when attacks occur—as well as serve as deterrents to crime due to the reputation of their sleuthing powers.

A related article follows: “Evaluation of Covert Plutonium Production from Unconventional Uranium Sources.” Its authors, from the University of Tennessee Department of Engineering, are Tyrone Harris, Ondrej Chvala, Steven E. Skutnik, and Emily Frame. They examine one of the particularly alarming avenues whereby terrorists or rogue states might acquire nuclear materials such as weapons-grade plutonium: by secretly producing it themselves, using nuclear reactors “based on relatively primitive early designs”—published designs, readily available.

We then turn to the theme of education in nuclear security, with “Developing and Promoting a Nuclear Security Curriculum at Amity University, India: Beginnings, Successes, and Challenges” by Kawalpreet Kalra, Archana Yadav, and Alpana Goel of the Amity Institute of Nuclear Science and Technology. We read here about important developments at Amity in teaching and inculcating the vital consciousness and support structure we call nuclear security culture.

### *Student Scholars*

Our conversation continues as we listen to winners of the first IJNS Student Writing Competition. The first article in the student section—“Addressing the Tunnel Threat at Nuclear Facilities: A Case Study”—was written by two students in the Department of Engineering at the University of Dhaka, Bangladesh: Md. Mobasher Ahmed and Omar Ahmed—with input from their professor, Md. Shafiqul Islam, whom they recognize as third author. This article, much like Greene’s article on black sky and nuclear power plants, addresses a particular kind of threat to NPPs—in this case, the danger of terrorist attack via tunneling through the earth to breach an NPP. The authors argue that defense against tunnel threat is not currently taken into sufficient account by NPP designs, and they describe and advocate a sensor-based physical security system for detection of this threat.

The following three student articles address the major theme of international cooperation in nuclear security. The first of these is Viet Phuong Nguyen of the Department of Nuclear and Quantum Engineering, Korea Advanced Institute of Science and Technology, whose article is entitled “Improving Nuclear Safety, Security, and Nonproliferation in Northeast Asia Through a Multinational Approach.” This author analyzes “the common need for better safety, security, and nonproliferation of nuclear materials and facilities” in Northeast Asia, then endorses existing “cooperation mechanisms”—and proposes ways of strengthening and expanding them.

In a similar vein, Muhammad Umer Khan—a student at the Middlebury Institute of International Studies at Monterey, California, USA—examines the “Prospects for Cooperation on Tackling Nuclear and Radiological Terrorism in South Asia: India-Pakistan Nuclear Detection Architecture.” He discusses not simply the problematic relations between Pakistan and India and the dangers facing both countries, but also the nature of their collaboration in defending against nuclear terrorism—and prospects for even stronger collaboration.

The final student paper also addresses the theme of international collaboration for nuclear security, but it focuses on public involvement therein, specifically via modern communication technologies. “Janus Realized: The Use of Social Media as a Means of Transparent Nuclear Communication to the Public,” by Frances Nichols Bachstein, a graduate student in public policy at the University of Tennessee, examines the extremely important issue of public trust for the nuclear industry—trust that can be built most effectively via intelligent use of social media. Rightly used, she argues, social media can help build an ethos of transparency for agencies and institutions involved in the nuclear enterprise—while still maintaining necessary security.

Welcome then, readers of IJNS, to this second issue, and to an ongoing, stimulating discussion about challenges, developments, and proposed solutions in the extraordinarily important field of global nuclear security. Professionals, educators, and students alike: please join the conversation! In this issue, and on

our website, see the invitations and deadlines for submissions to the next issue of IJNS and for the next student writing competition.

We look forward very much to our ongoing discussion with all of you.

Best regards,

Dr. Russel Hirst

Managing Editor, *International Journal of Nuclear Security*