BROOKHAVEN NATIONAL LABORATORY

Laboratory Link

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Working to Safeguard Russian Nuclear Material

- Nuclear materials at numerous sites in Russia are now vulnerable to potential theft and misuse as a result of the economic and political upheavals that followed in the wake of the disintegration of the Soviet system.
- Scientists at Brookhaven Lab have been working to reduce the threat of nuclear proliferation and nuclear terrorism by improving the security and safeguarding of all weapons-usable nuclear material (in forms other than nuclear weapons) in Russia. Brookhaven has worked with many Russian sites to improve their material control and accounting capabilities.
- Another important activity is a project to consolidate highly enriched uranium (HEU) in fewer buildings and at fewer sites in Russia, and, where possible, eliminate it as a proliferation concern by converting it to low-enriched uranium (LEU). The Lab is collaborating with two nuclear facilities in Russia to help them convert HEU to LEU.

Revising Guidelines for Voting Systems

Cognitive Psychologist John O'Hara

- John O'Hara, a Lab scientist, has been helping the Federal Election Commission review and revise the human-factors aspects of federal voting guidelines.
- O'Hara's studies are designed to minimize human error through the use of better design features, provide guidance on how people will interpret voting system rules, and how people perceive and group information in the ballot display.
- Some of O'Hara's recommendations included:
  - Voters should be able to review all their votes prior to final submission; a means for correcting a vote response should be readily available.
  - Provisions should be made to accommodate the unique demands of all voters, such as seated locations for elderly or disabled voters.
  - A feedback system should indicate whether or not a vote was properly registered, and the system should prevent unacceptable voter inputs, such as voting for too many candidates.
  - The voting system must allow voters to control the pace and sequence of their candidate selections.

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Inhalants and Why They May Be So Addictive

Researchers Madina Gerasimov and Stephen Dewey

- Inhalant abuse, also known as "huffing," is a rapidly growing health problem, particularly among young people. However, little is known about how inhaled chemicals affect the brain and body.
- Scientists at the Laboratory — inspired by schoolchildren who wanted to know more about huffing —have produced the first-ever images showing which parts of the brain and body are most affected by toluene, a commonly inhaled solvent. "This study was really born out of my going to elementary schools, where I've been giving talks about Brookhaven's addiction research since 1995," said Dewey. During his talks, children as young as fourth and fifth graders would sometimes ask him about huffing.
- The fumes from glue, lighters, liquid correction fluid, and other solvents that children and young adults inhale go straight to the same brain regions that are stimulated by cocaine and other drugs. Brain scans show that chemicals such as toluene move very quickly to pleasure centers — then move out to other brain cells, causing the damage that can make sniffers lose their memory, suffer vision problems, and eventually develop serious mental defects.
- In addition to offering insight into the nature and effects of inhalant abuse, said Madina Gerasimov, a Brookhaven chemist, this study was the first time chemists labeled and purified a solvent for imaging. This may open up a whole new field of study into the effects of a wide array of solvents found in common, everyday products from cleaning fluids to hairsprays. "There isn't a person among us who isn't exposed to solvents," Dewey said.

Silicon Detector Development at Brookhaven

- Silicon radiation detectors of ever-increasing complexity are important components of nuclear and high-energy physics experiments around the world. Large arrays of these detectors, similar to those currently in use at the Lab's Relativistic Heavy Ion Collider, will soon be employed as trackers and detector systems at the Large Hadron Collider at CERN, the European laboratory for particle physics research.
- Brookhaven Lab's Instrumentation Division has unique capabilities in designing, developing, and fabricating novel silicon detectors that are not available commercially. Brookhaven's state-of-art processing capabilities, for example, allow the Lab to employ photolithography on both sides of a silicon wafer, resulting in very high detector resolution.
- The Lab has also collaborated in developing damage-resistant silicon detectors for use in extremely high-radiation environments.

Upcoming Events Open to the Public

Ruth Bennett, Harpist, May 29, Noon, Berkner Hall. Ms. Bennett is a senior music performance major at the State University of New York at Potsdam. She will perform solo works for the concert harp. Free.

Due to heightened security, everyone who enters the Laboratory site must have a photo ID.