Science for a More Secure World

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Agenda

- How does applied science and technology affect security?
- What are some of today’s major challenges?
- How can scientists and engineers help meet these challenges in the future?
Federation of American Scientists

• Founded as the Federation of Atomic Scientists in 1945 by Manhattan Project scientists

• Social responsibility
  – Nuclear science
  – Biological science
  – Computer science
  – Transparency
  – Arms sales
The “responsible” use of science and technology today

Dual use materials and technologies:
- Nuclear technology
- Recombinant DNA
- Pharmaceuticals
- Chemicals
- Robotics
- Drones
- Satellites
- Cybersecurity
Look at Three Major Challenges Ahead

• Nuclear safety and security

• Bio-safety and security

• Water and energy security
Harnessing the power of the atom

- Approximately 20% of electrical power in the U.S. and approximately 13% in the world.
- Uranium is the key ingredient for nuclear energy.
- Jordan has approximately 140,000 tons of uranium.
- Plans for 30% of electricity from nuclear energy by 2040.
Nuclear safety and security challenges

• Safety and environmental concerns, for example, Fukushima accident

• Technology originally developed for nuclear weapons: uranium enrichment and reprocessing/recycling of plutonium → dual use

• Possible theft and smuggling of fissile material
FAS nuclear safety and security efforts

• Performing science-based education and analysis

• Educating the next generation of leaders

• Demanding transparency and accountability
Biological sciences and biotechnology

• Lifesaving treatments

• Improved crop yields and food supplies

• Wastewater treatment

• Conservation and ecosystem preservation

• Biofuels
Not without its risks

- Dual-use technology
- Falling cost of gene sequencing and synthesis
- Researchers less accustomed to security culture
- Requires an international effort
What is biosecurity?

Prevention, detection, and response to natural, accidental, or intentional disease outbreaks

- One Health philosophy (plant, animal, and human)
- Biosafety measures
- Safe life science research
FAS biosecurity efforts

• Dual-use research training

• Virtual Biosecurity Center

• International collaboration

Communication – Education - Collaboration
Death renews biosecurity debate

The suicide of a biodefense researcher who was being investigated in connection with the 2001 anthrax attacks has raised questions about the US government's regulation of research on dangerous pathogens — even as Congress considers a bill to improve oversight.

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WHO applauds and welcomes the announcement of donations of pandemic vaccine made today by the...

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Promoting Dual Use Education in the Life Sciences

The meeting is being sponsored by the InterAcademy Panel on International Issues (IAP), the International...
Water and energy security

• “Non-traditional” security issue that affects everyone

• Connectedness to other social and political issues

• Technology can play a crucial role in meeting challenges
International Science Partnership

• Science diplomacy 2.0

• Solve issues that threaten social and environmental security

• Next generation of scientists and engineers

• Diverse stakeholders
International Science Partnership’s goals

Short-term:

• Joint research and knowledge sharing
• Find practical solutions to challenges
• Advance careers of participants

Long-term:

• Build capacity
• Engage civil society and the government
• Develop local population-focused projects
Why Yemen?

• Security challenges

• Need to build nation’s capacity

• Shared environmental concerns → especially shortages of water and energy

• Resource management challenges
FAS 2010 Exploratory Visit to Sana’a
2011 Recruitment of Scientists

- United States
  - Harvard
  - University of California, Davis
  - Georgia Tech

- Yemen
  - Sana’a University
2012 Workshop in Amman

- Collaborative investigation to design one or more projects on energy and water issues
- Systems modeling and business development training
- Site visits to Environmental Monitoring and Resource Central Unit (EMARCU)