



# INDUSTRIALIZATION OF BIOLOGY

## *Technical Challenges in Safety and Biocontainment*

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**THE NATIONAL ACADEMIES**

*Advisers to the Nation on Science, Engineering, and Medicine*

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# Enforcement of U.S. Laws

## U.S. Criminal Code, Title 18 (Crimes)

### Biological crimes

<b>18 USC 175(a)</b>	Crime to knowingly possess a biological agent, toxin, or delivery system for use as weapon → establishes BWC violations as crime
<b>18 USC 175(b)</b>	Crime to knowingly possess a biological agent, toxin, or delivery system if not for peaceful research purposes
<b>18 USC 175b</b>	Crime to knowingly possess select agent, regardless of intent, if not registered with Select Agent Program
<b>18 USC 175c</b>	Crime to produce, engineer, or synthesize smallpox

### WMD crimes

<b>18 USC 806</b>	Enhances ability to seize assets of those with WMD intent
<b>18 USC 842</b>	Crime to teach or demonstrate the making or use of a WMD
<b>18 USC 2332a</b>	Crime to use (or conspire, threaten, or attempt to use) a WMD





# ***Looking Ahead***



# **The Challenge**





## Al Qaeda Cleric's Call From Grave: Attack With Bio Weapons

May 3, 2012

By RANDY KREIDER and BRIAN ROSS via [GOOD MORNING AMERICA](#)

"The use of chemical and biological weapons against population centers is allowed and is strongly recommended," U.S.-born Anwar al-Awlaki is quoted as saying in one of two new issues of the Inspire magazine.





# Cyber Security

## Hacking of DuPont, J&J, GE Were Undisclosed Google-Type Attacks

**Chronicle**  
SAN FRANCISCO

Tuesday, March 8, 2011

The incidents described in the stolen e-mails portray industrial espionage by hackers. U.S. law enforcement agencies say the attacks have intensified in number and scope over the past two years.

"We are on the losing end of the biggest transfer of wealth through theft and piracy in the history of the planet," said Democratic Senator Sheldon Whitehouse of Rhode Island, who chaired a U.S. Senate Select Committee on Intelligence task force on U.S. cyber security in 2010.





# Harvard scientists to make LSD factory from microbes

Simple microbes such as those found in baker's yeast can be modified to make LSD, suggests research by Harvard scientists



Students on a bread making course. But did the tutor remember to warn them about the other things that yeast turn into? Photograph: Fabio De Paola

Ian Sample Tuesday 21  
June 2011 15.55 BST  
[guardian.co.uk](http://guardian.co.uk)





# DHS: Hackers Mounting Organized Cyber Attack on U.S. Gas Pipelines



By JASON RYAN (@JasonRyanABC)  
May 8, 2012

For the past six months, an unidentified group of hackers has been mounting an ongoing, coordinated cyber attack on the control systems of U.S. gas pipelines, prompting the Department of Homeland Security to issue alerts.





Article from **future**  **tense**  
ASU | NEW AMERICA | SLATE

# The Military's Push To Green Our Explosives

Environmentally friendly weapons, synthetic biology, and international law.



167

By Rob Carlson and Daniel Grushkin



Are environmentally friendly weapons the wave of the future?

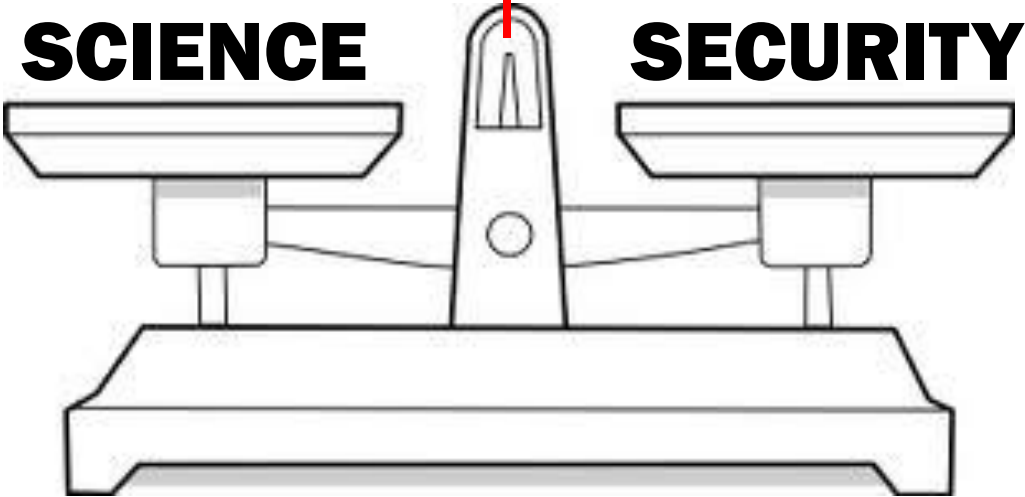
Photograph by Thinkstock.







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**THANK YOU**

