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# Synthetic Biology and National Security

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Federal Bureau of Investigation  
Weapons of Mass Destruction Directorate  
Biological Countermeasures Unit  
PPS William So, Ph.D.

Synthetic Biology Forum  
National Academy of Sciences  
Washington, DC  
October 21, 2013

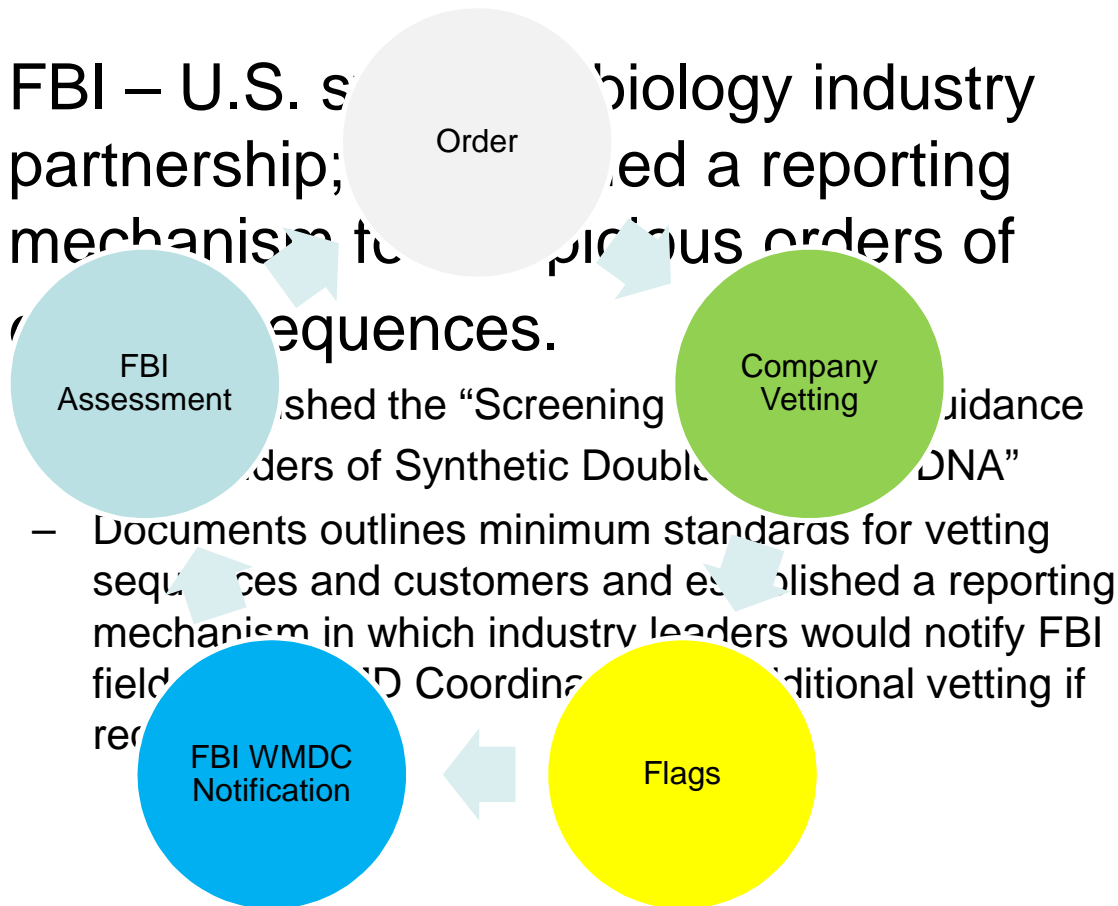
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# Synthetic Biology Tripwire Initiative

- FBI – U.S. synthetic biology industry partnership; established a reporting mechanism to respond to suspicious orders of DNA sequences.



Above referenced document are available at: <http://www.phe.gov> - key words: Screening Framework

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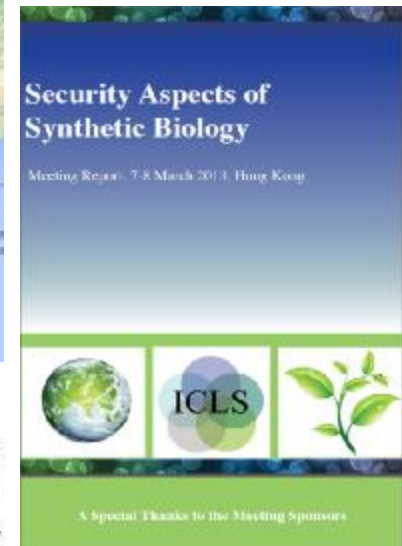


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# International Engagements



Map obtained from Woodrow Wilson Center's Synthetic Biology Project



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# Culture of Security

- International Genetically Engineered Machine (iGEM) Competition
  - Largest synthetic biology competition
  - FBI has been a Gold-Tier sponsor since 2009
- Do-It-Yourself Biology (DIYbio)
  - Persons conducting biological research outside of institution setting
- ✓ Outreach conducted with these two communities raises their awareness for safety and security concerns and prevent their potential exploitation by nefarious actor(s)



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# Present and Future



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## OUR PRODUCT FOCUS

Amyris's initial portfolio of commercial products is based on Biofene®, Amyris's brand of farnesene, a long-chain branched hydrocarbon, manufactured using our engineered microbes in fermentation.



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# Criminal Exploitation?



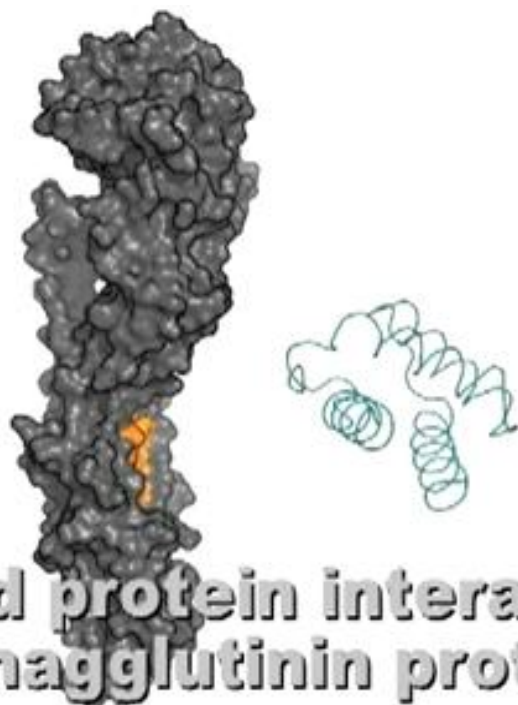
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# Computer Aided Design



Designed protein interacts with hemagglutinin protein

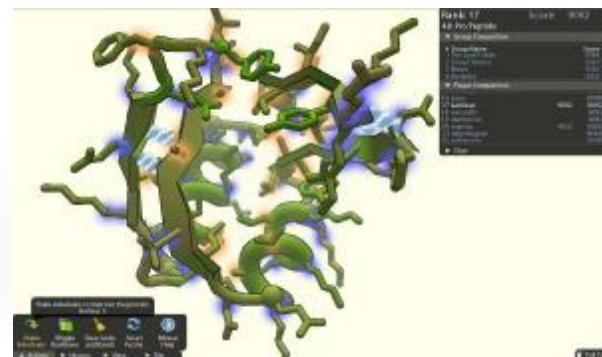
Computational Design of Proteins Targeting the Conserved Stem Region of Influenza Hemagglutinin

Sarel J. Fleishman, *et al.*

*Science* **332**, 816 (2011);

**Rosetta@home**

Protein Folding, Design, and Docking



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# Thank You

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