

September 14, 2010
DIYbio: Origin, Activities,
& Scenarios for the Future

Presented to the President's
Commission for the Study of
Bioethical Issues

Philadelphia, PA

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Negative Framing of Amateur Biology

“Welcome to the age of synthesized life, built from scratch. Soon, it may be so cheap and simple a teen hacker could do it. Or a terrorist.” *The Globe and Mail* (Canada), 2005.

“Many a computer business has started in a garage or a teenager's bedroom. So, though, has many a computer virus. And where computing led, biotechnology may follow.” *Economist*, Sept. 2, 2006.

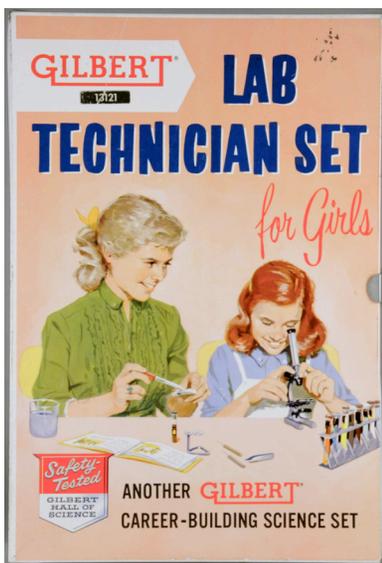
“...with DNA hacking far more widespread, what if your friendly local terrorist decided to take up the hobby?” *The Times* (London), Sept. 16, 2006.

“The ability to create nasty pathogens like your hybrid rabies virus in your bathroom is becoming easier and easier...this is much easier than trying to get enough fissile material to make a nuclear bomb...” *Homeland Security Today*, Dec 10, 2009

Hype versus Reality

Vibrant Amateur Communities

CHEMISTRY



Lab Technician Set for Girls
c. 1958

PERSONAL COMPUTING



Homebrew Computer Club
September 1976

ASTRONOMY



Hanny's Voorwerp discovered
August 13, 2007

ROCKETRY

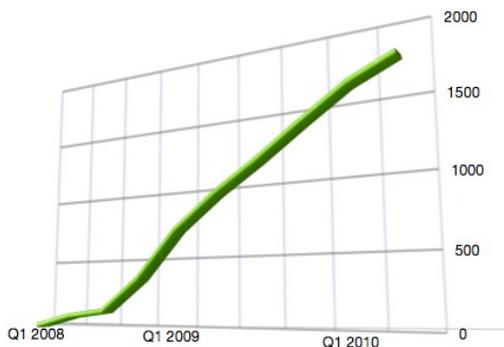


Amateur Saturn V launch in MD
April 25, 2009

Global DIYbio Community



individuals on global mailing list 2008-current



An informal network of ~2000 amateur biologists, DIYbio is fast becoming an organizational hub, uniting the movement's participants through its website, online forums, local chapters & community labs.

Cities w/ active chapters that host local events, seminars, workshops, lectures, etc.

United States:

- Baltimore, MD
- Boston, MA
- Cambridge, MA
- Chicago, IL
- Los Angeles, CA
- New York, NY
- San Francisco, CA
- Seattle, WA

International:

- Bangalore, India
- Copenhagen, DK
- London, UK
- Madrid, Spain
- Paris, France

Scope of Activities

Exploratory Biology



Constructive Biology



Environmental Sensing



Personal BioMonitoring



Re-imagining Laboratory Devices



Genetic Engineering

Community Labs

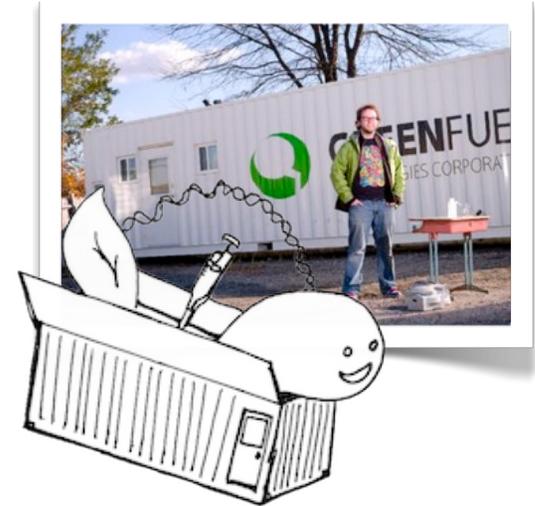


BioCurious
Bay Area, CA



A community lab is a shared workspace where individuals:

- collaborate on projects
- incubate new businesses
- prototype devices & tinker
- learn new skills & access expertise
- pool resources for capital equipment



BOSSLab
Boston, MA



Genspace
Brooklyn, NY

Informal Science, Technology, Engineering, Math (STEM) Education: 2010 workshops & lectures @ BioCurious in San Francisco, CA

Jan 23: Design a gene in software and order it from the web (John Schloendorn PhD)

Feb 6: DIYbio for/in developing countries: what can be done, what will help (Guido Núñez-Mujica)

Feb 20: Making Algae, the Crop of the Future, DIY and Personal (Aaron Wolf Baum PhD)

Mar 7: Backyard Brains: Neuroscience for Everyone! SpikerBox Demo (Timothy Marzullo PhD)

Apr 10: Interleukin expression in E. coli Part I (John Schloendorn PhD)

Apr 24: Art from the Biocurious (Kathryn Gritt & Marnia Johnston)

May 29: Clotho: the new bioCAD platform for synthetic biology (Chris Anderson PhD)

Jun 22: The Business of Drug and Device Development (Srihari Yamanoor)

Jun 27-28: Gel Electrophoresis & PCR Techniques, Build a Gelbox (Eri Gentry)

Jul 10: The material aesthetics of biotechnology (Phil Ross MFA)

Aug 21: For love of the crush: The art and science of wine from...an Engineer! (Tom Moller)

The New York Times

Inventors Wanted. Cool Tools Provided.



Jim Wilson/The New York Times

Mark Hatch, left, and Jim Newton started TechShop to bring expensive tools to everyday tinkerers. Members pay a fee and can use any of the equipment. [More Photos »](#)

By **ASHLEE VANCE**

Published: April 10, 2010

Innovation Engine: Small Start-Ups Creating Low-Cost Kits & Devices



Open GelBox 2.0



Microbial Fuel Cell



OpenPCR



Dremelfuge



LavaAmp

Promoting “bio-citizenship” & culture of responsibility in DIYbio community



DIYbio & Woodrow Wilson Center Collaboration

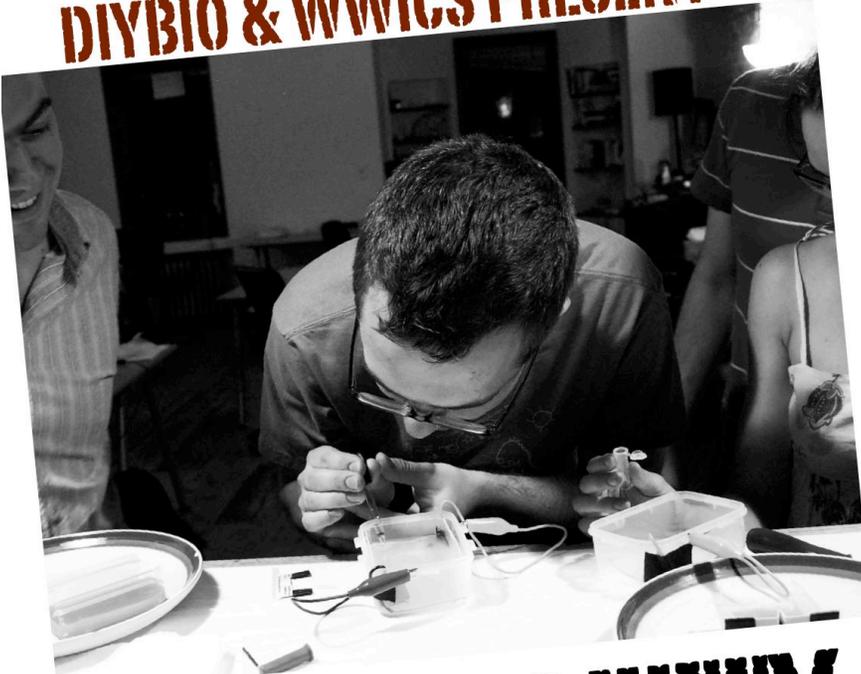
Funded by Sloan Foundation, we are working with the DIYbio community to:

- scope the development of appropriate biosafety resources for amateurs based on level expertise, areas of practice & surveys of need

- establish codes of conduct & norms for responsible practice

DIYBIO DONE RIGHT

DIYBIO & WWICS PRESENT



DIYBIOSAFETY

DIYBIO.ORG || SYNBIOPROJECT.ORG

RESPONSIBLE SCIENCE FOR DO-IT-YOURSELF BIOLOGISTS

The Synthetic Biology Project at the Woodrow Wilson Center is partnering with DIYbio.org on a project to ensure safety within the rapidly expanding community of amateur biologists. The project will identify relevant biosafety guidance and work with members to distill that information into user-friendly guidelines. In addition, basic codes of conduct will be developed, discussed, and disseminated in the community. Email todd.kuiken@wilsoncenter.org for more information or to get involved.

PHOTO BY MACKENZIE COWELL



Longer term goals & wishlist

- Develop best practices for safety & oversight of community labs and other workspaces
- Biosafety training targeted specifically for amateurs, dealing with important practical issues like proper waste disposal
- Organize network of experts, advisors, mentors and service providers
- Set positive pattern early for environmentally benign practices

THANKS

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