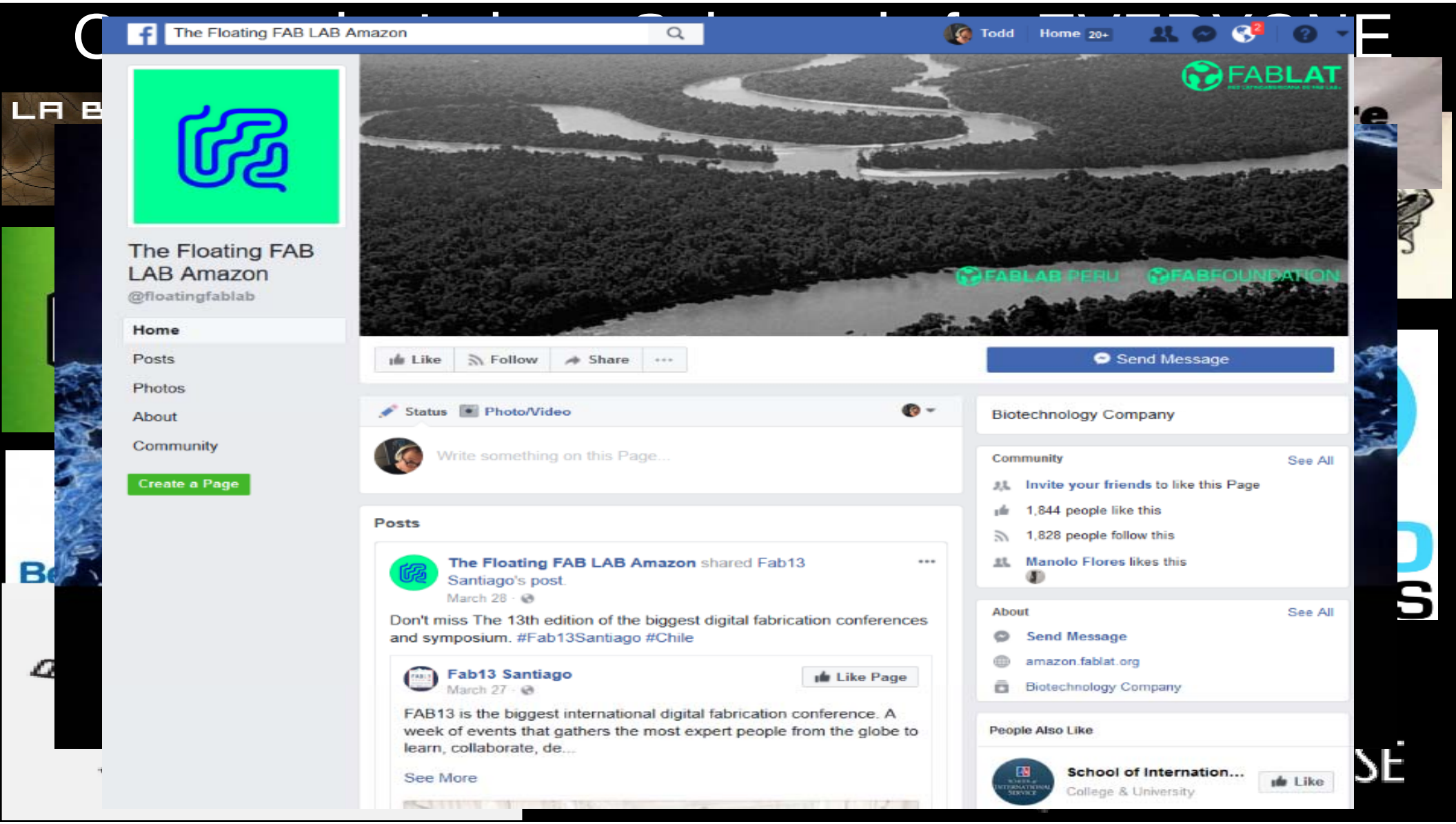
Establishing Safety Standards Across the Growing Community Biotech Lab Landscape

Todd Kuiken – NC State

Dan Grushkin – Genspace

May 2008 – 1st DIYbio meet-up

Pre-community labs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FABLAB PERU
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Write something on this Page...
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The Floating FAB LAB Amazon shared Fab13 Santiago's post.
March 28
Don't miss The 13th edition of the biggest digital fabrication conferences and symposium. #Fab13Santiago #Chile
Fab13 Santiago
March 27
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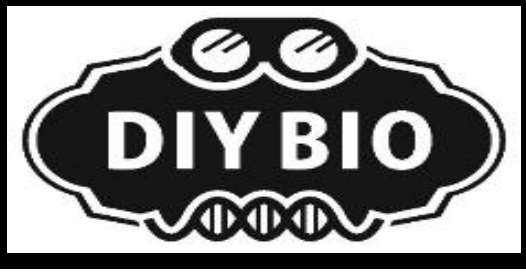
global
community
bio summit
september 22, 2017 - september 24, 2017
community biotechnology initiative @ mit media lab
APPLICATION CLOSED

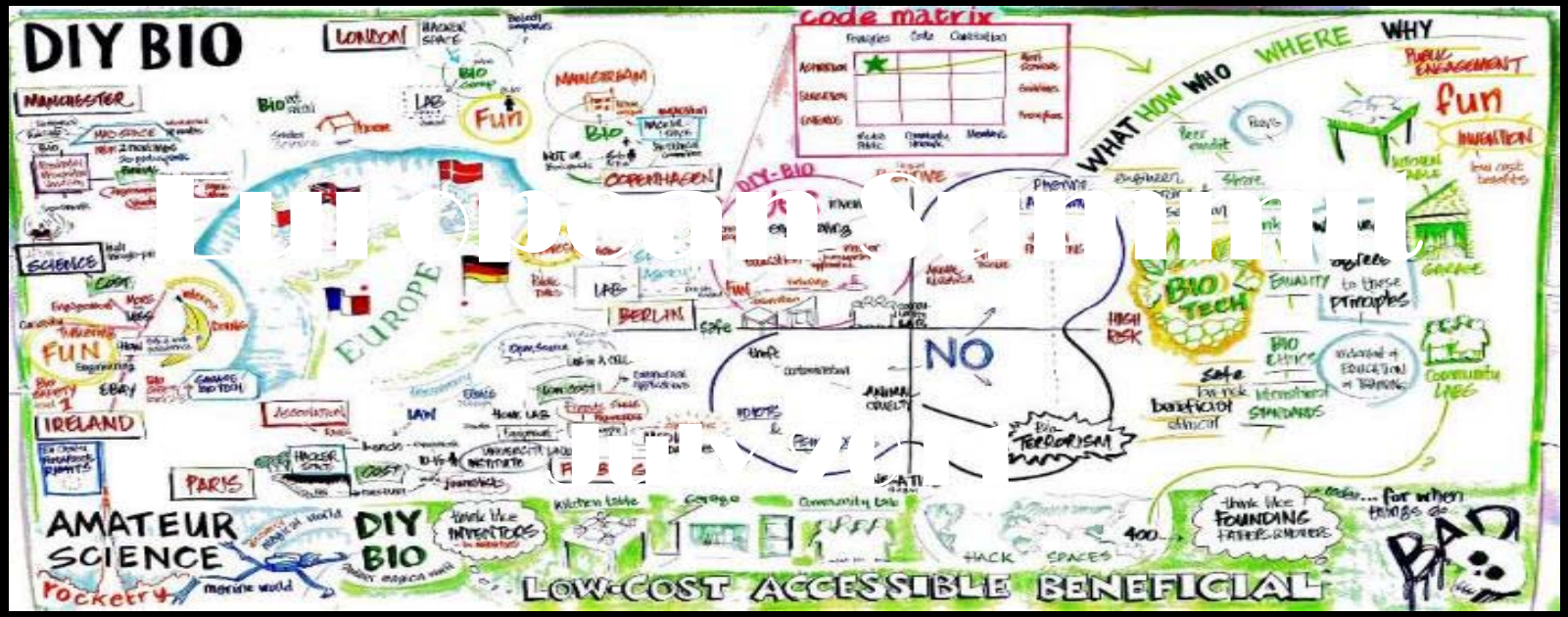
DIYbio Codes: Origins & Future

May 2011 – European Summit
July 2011 – U.S. Summit



Purposes for Codes

- raise awareness
- suggest considerations for reflection
- foster norms
- clarify individual and collective responsibilities
- increase public trust
- establish minimal ethical standards
- influence decision-making on future issues


DIY BIO
LONDON
MANCHESTER
Fun
code matrix
WHAT HOW WHO WHERE WHY
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INVENTION
SCIENCE
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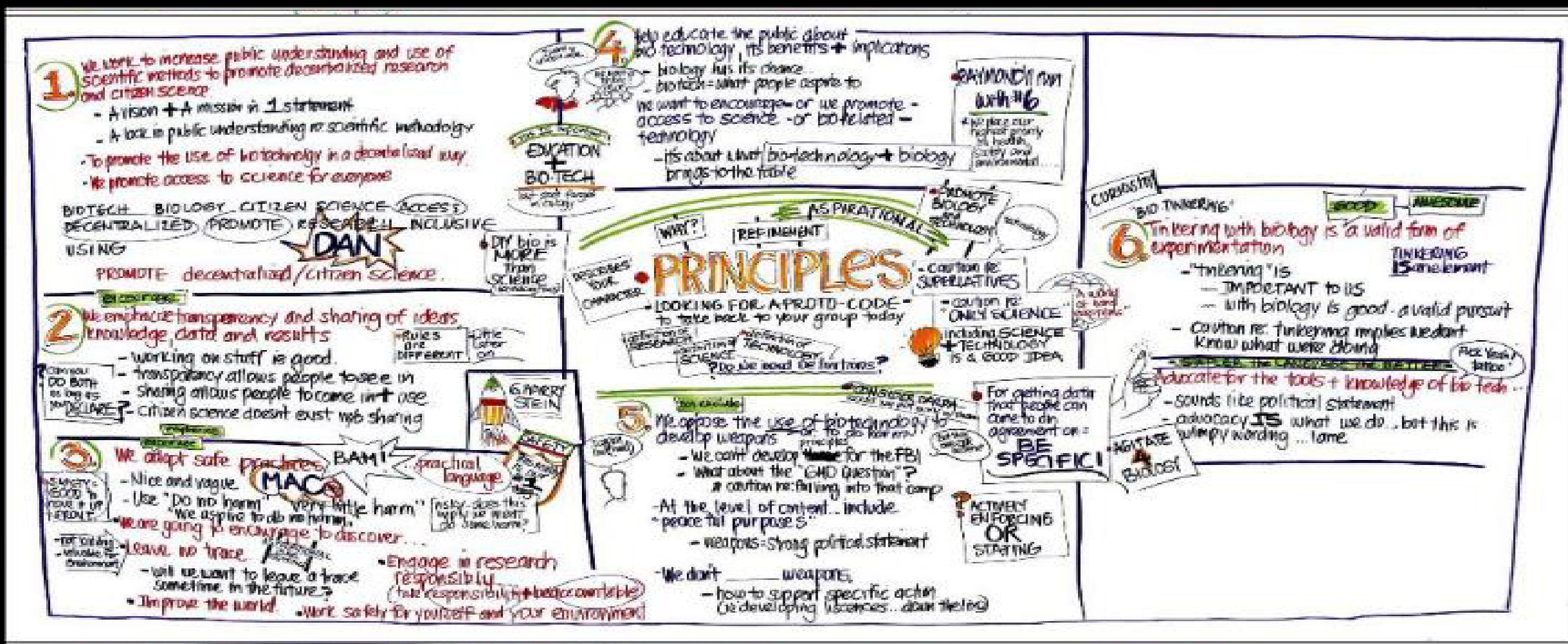
BERLIN
NO
BIO TECH
EQUALITY
to these PRINCIPLES
HIGH RISK
FUN
IRELAND
PARIS
AMATEUR SCIENCE
DIY BIO
think like FOUNDING FATHERS-INVENTORS
HACK SPACES
LOW-COST ACCESSIBLE BENEFICIAL
BAD



PRINCIPLES
ASPIRATIONAL
WHY?
REFINEMENT
DESCRIBES YOUR CHARACTER
LOOKING FOR A PROTO-CODE to take back to your group today
? Do we need definitions?
caution re: SUPERLATIVES
caution re: "ONLY SCIENCE"
including SCIENCE + TECHNOLOGY IS A GOOD IDEA
PROMOTE BIOLOGY AND TECHNOLOGY
1. We work to increase public understanding and use of scientific methods to promote decentralized research and citizen science
- A vision + A mission in 1 statement
- A lack in public understanding re scientific methodology
- To promote the use of biotechnology in a decentralized way
- We promote access to science for everyone
BIOTECH BIOLOGY CITIZEN SCIENCE ACCESS DECENTRALIZED PROMOTE RESEARCH INCLUSIVE USING
DAN
PROMOTE decentralized/citizen science.
DIY bio is MORE than SCIENCE
2. We emphasize transparency and sharing of ideas, knowledge, data and results
- working on stuff is good.
- transparency allows people to see in
- Sharing allows people to come in + use
- citizen science doesn't exist w/o sharing
Rules are different
Can you DO BOTH as long as you DECLARE?
GARRY STEIN
3. We adopt safe practices
BAM!
MAC
practical language
- Nice and vague
- Use "Do no harm" "very little harm"
"We aspire to do no harm."
We are going to encourage to discover...
Leave no trace
- will we want to leave a trace sometime in the future?
Improve the world!
Engage in research responsibly
Work safely for yourself and your environment
4. Help educate the public about biotechnology, its benefits + implications
- biology has its chance
- biotech = what people aspire to
We want to encourage — or we promote — access to science — or bio-related — technology
- it's about what bio-technology + biology brings to the table
EDUCATION + BIO-TECH
RAYMOND run with #6
5. We oppose the use of biotechnology to develop weapons
- We can't develop for the FBI
- What about the "GMO Question"?
caution re: falling into that camp
- At the level of content... include "peaceful purposes"
- weapons = strong political statement
- We don't ____ weapons;
- how to support specific action (i.e. developing licences... down the line)
For getting data that people can come to an agreement on: BE SPECIFIC!
ACTIVELY ENFORCING OR STATING
AGITATE 4 BIOLOGY
CURIOSITY
BIO TINKERING
GOOD
AWESOME
6. Tinkering with biology is a valid form of experimentation
- "tinkering" is
- IMPORTANT to us
- with biology is good. a valid pursuit
- Caution re: tinkering implies we don't know what we're doing
TINKERING IS an element
Advocate for the tools + knowledge of bio tech...
- sounds like political statement!
- advocacy IS what we do... but this is wimpy wording ... lame

DIYbio Code of Ethics

Draft from the European Delegation
09/07/2011

Transparency
Emphasize transparency and the sharing of ideas, knowledge, data and results.

Safety
Adopt safe practices.

Open Access
Promote citizen science and decentralized access to biotechnology.

Education
Help educate the public about biotechnology, its benefits and implications.

Modesty
Know you don't know everything.

Community
Carefully listen to any concerns and questions and respond honestly.

Peaceful Purposes
Biotechnology must only be used for peaceful purposes.

Respect
Respect humans and all living systems.

Responsibility
Recognize the complexity and dynamics of living systems and our responsibility towards them.

Accountability
Remain accountable for your actions and for upholding this code.

draft DIYbio Code of Ethics

as agreed by U.S. delegates

July 2011

OPEN ACCESS

Promote citizen science and decentralized access to biotechnology.

TRANSPARENCY

Emphasize transparency, the sharing of ideas, knowledge and data.

EDUCATION

Engage the public about biology, biotechnology and their possibilities.

SAFETY

Adopt safe practices.

ENVIRONMENT

Respect the environment.

PEACEFUL PURPOSES

Biotechnology should only be used for peaceful purposes.

TINKERING

Tinkering with biology leads to insight; insight leads to innovation.

DIY BIO

local projects blog

Ask a biosafety professional your question

Submitted questions are sent to a panel of professional biosafety experts and members of the American Biological Safety Association (ABSA.org).

How it works

Ask Now

I have read the disclaimer

Previously answered questions

Are there any special safety issues to consider when planning to work with amphibian or reptilian cells?
January 28, 2013

What safety practices we should have in place prior to transforming or transfecting plants?
February 3, 2013

Home Updates 47 Backers 8,433 Comments 860 San Francisco, CA Technology

Funded! This project was successfully funded on June 7, 2013.

Share 982 Tweet Embed

Create GLOWING PLANTS using synthetic biology and Genome Compiler's software - the first step in creating sustainable natural lighting

8,433
backers

$484,013
pledged of $65,000 goal

0
seconds to go

Project by
Antony Evans
San Francisco, CA

First created · **22 backed**
Antony Evans 1132 friends
glowingplant.com

See full bio | Contact me

Pledge $5 or more
426 backers
You'll get a 2"x3" sticker showing the

Open Insulin

By Anthony Di Franco, Josiah Zayner, Yilan Shi, Maureen Muldavin, Tania Chakrabarty, David Anderson, Catherine Soneda, Ryan Bethencourt, Jaime Sotomayor, Andrés Ochoa (aka Don), Patrik D'haeseleer, Sasha Nealand, Alex Alekseyenko, Tom Eberhard, Maria Chavez, and Kathy Buehmann

Backed by Dave Morin, Calvin Ashmore, Pieter Iserbyt, John Arnold, Sean Van Der Linden, Patrik D'haeseleer, Adrian J. Moreno, Pete Schwamb, Ethan Perlstein, David S. H. Rosenthal, Jonas V Butkus, Jeanne Amistoso, Eugenio Polanski, Zoran Knezevic, Dima Kislovskiy, **and 224 other backers**

$16,656
Raised

277%
Funded on 12/04/15

Successfully Funded

How does this work?

Finding a Cure for Batten Disease

By Charlotte And Gwenyth Gray Foundation

Backed by Liat & Mark Ciardi, Jennifer Lawrence, Gero M Bauknecht, Gary Tekulsky, Lauren Santo Domingo, Barry Hoeven, Kirsten M Maltas, NORMAN LEAR, GORDON KING, Talia Gart, **and 18875 other backers**

$2,641,086
Raised

264%
Funded on 10/24/15

Successfully Funded

How does this work?

The Charlotte and Gwenyth Gray Foundation | Medicine | Neuroscience | Tax Deductible

DOI: 10.18258/5082

Amateurs Are New Fear in Creating Mutant Virus

SIDE EFFECTS

D.I.Y. Biology, on the Wings of the Mockingjay

SECTIONS SEARCH

Chicago Tribune

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FRIDAY FEB. 19, 2016 EDITORS' NOTE SPORTS BREAKING TRENDING BUSINESS SUBURBS ENTERTAINMENT ADVERTISING 49°

Biologist's gene-editing kit lets DIYers play God at kitchen table

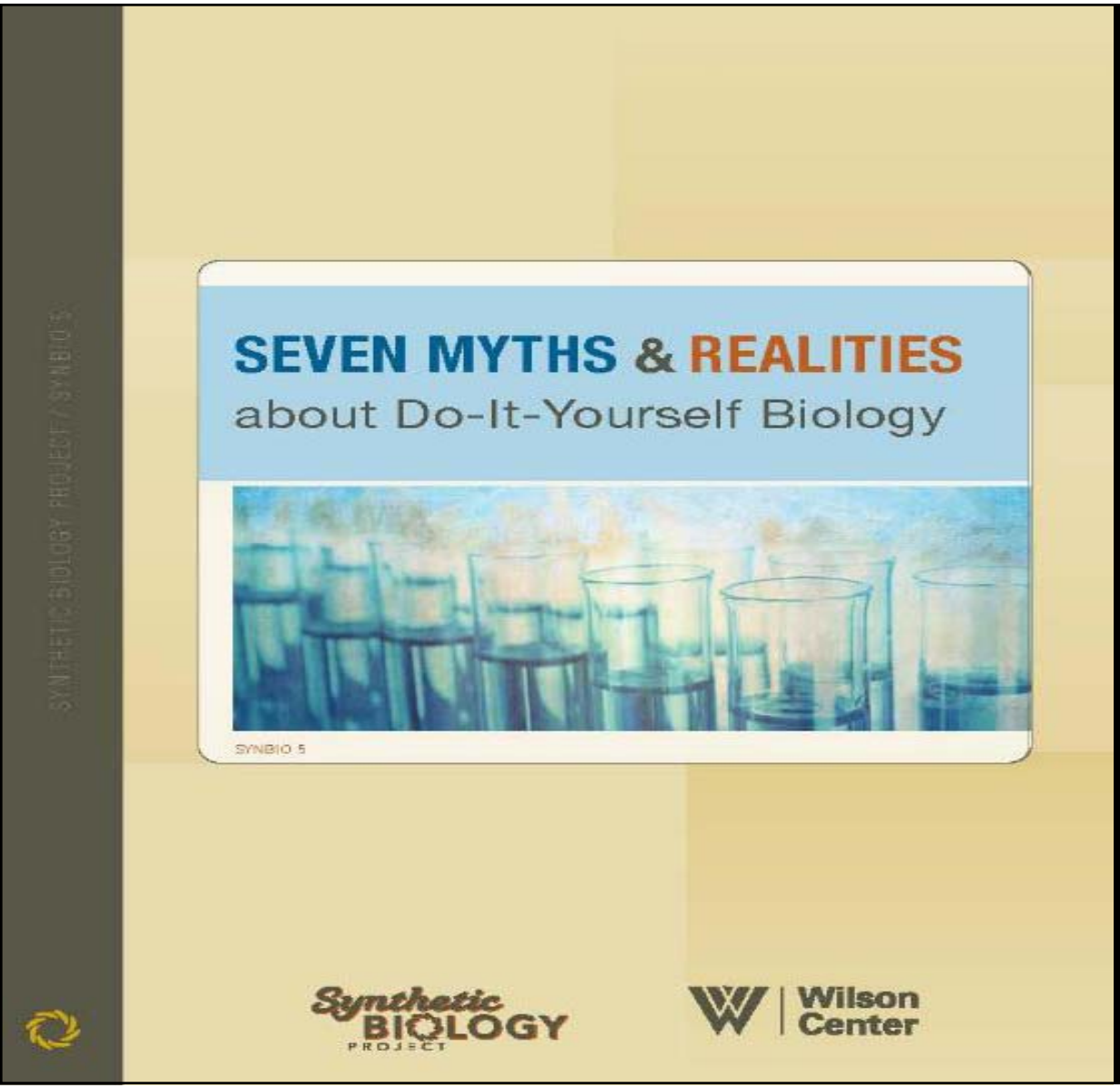
Scientist Josiah Zayner, 34, works in his home lab in Burlingame, Calif. (John Green / San Jose Mercury News)

By **Lisa M. Krieger**

ercury News

instructions

BY MARGARET MUNRO, POSTMEDIA NEWS MAY 3, 2012



http://www.synbioproject.org/publications/6676/

Learn from DIY biologists

The citizen-science community has a responsible, proactive attitude that is well suited to gene-editing, argues **Todd Kuiken**.

One of the top science stories of 2012 involved a furore about the wisdom

Users of the Baltimore Under Ground Science Space are not yet using CRISPR–Cas9.

expertise needed to create a deadly insect or virus are far beyond the capabilities of

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iGEM)
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around

the world — received CRISPR–Cas9 plasmids in their starting kits. These kits contain more than 1,000 standard biological parts known as BioBricks, the DNA-based building blocks that participants need to engineer a biological system for entering into the competition. Other components of the CRISPR–Cas9 system are also available from the iGEM registry (http://parts.igem.org/CRISPR).

Yet few DIY biologists seem to be using the technology. Both Tom Burkett, founder of the Baltimore Under Ground Science Space in Maryland, and Ellen Jorgensen, executive director of Genspace — a community lab in Brooklyn, New York — say that their users are interested in CRISPR–Cas9, and Genspace will be offering a workshop on it in March. But none of the projects currently being pursued in these spaces require it. Users of the La Paillasse community lab in Paris are similarly focused on projects that do not need CRISPR–Cas9.

The materials might be available, but the knowledge and understanding needed to make edits that have the desired effects

http://www.nature.com/news/governance-learn-from-diy-biologists-1.19507

Tipping point

- How do we help ensure safe and responsible research and build new innovation models?
  - We could drive these emerging communities underground or out of existence
  - New oversight (and not necessarily top down) approaches are needed to support responsible innovation in these distributed networks

Developing and promoting accessible safety resources

We will be visiting labs across the U.S. & abroad to review the state of DIYbio as it relates to capabilities, trends, and needs around biosafety and security.

The next phase involves recruiting fellows to embed into community labs for a year. There, they will work side-by-side with/as lab managers and members, learning about their needs and developing pilot programs around biosafety and security protocols.

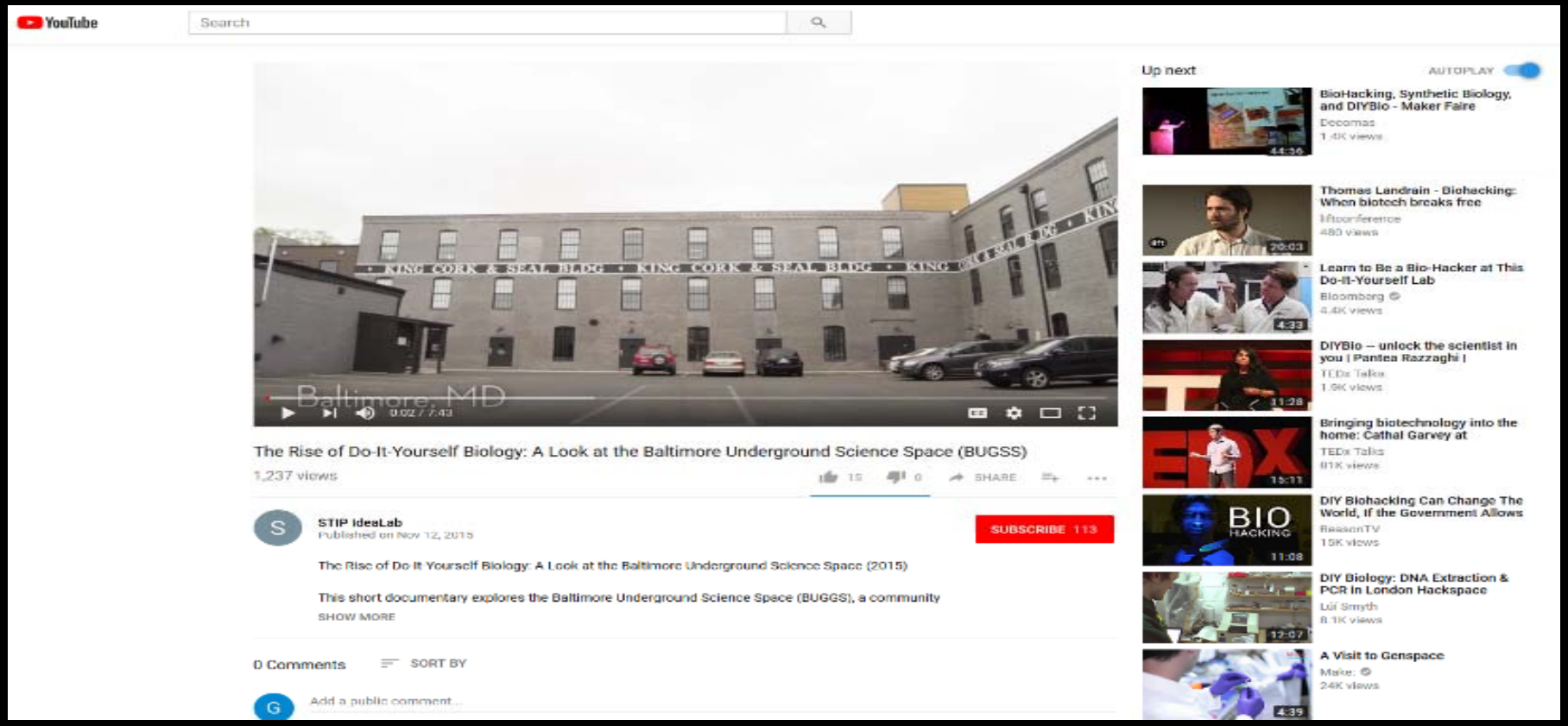
We're seeking your input, advice and partnership

- Looking for people interested in participating in the fellows program to help develop accessible and adaptable biosafety protocols for the diverse and expanding DIYbio community
- Interested in hearing about new models or ideas for how the program could work
  - New WHO lab safety model?
  - Partnership with ABSA/IFBA?
  - Explore accreditation programs?
- Fellowship program: $70,000 stipend – expected to start in spring/summer 2018

Contact info

- We will be hanging out right after this session and tomorrow.
- Could set up a side meeting for anyone interested in talking more.
- Dan Grushkin - dgrushkin@genspace.org
- Todd Kuiken – tkuiken@ncsu.edu
  - Office : 919-515-2593
  - @drtoddoliver

Inside BUGSS



https://www.youtube.com/watch?v=o5zU6Vh2uAs