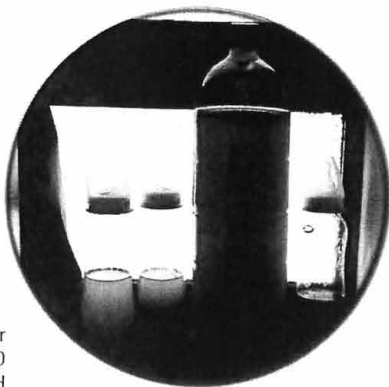
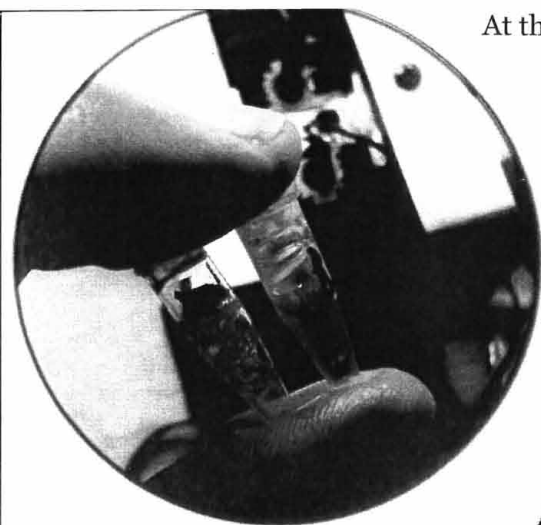


At the seams: DIYbio and public engagement with science

Stacey Kuznetsov¹, Alex S. Taylor²,
Tim Regan², Nicolas Villar², Eric Paulos¹

Carnegie Mellon University¹
Human-Computer Interaction Institute
{stace, paulos}@cs.cmu.edu

Microsoft Research?
Cambridge, UK
{ast, timregan, nvillar}@microsoft.com



DIYbio (Do It Yourself Biology)

a growing community of scientists, artists and hobbyists tinkering, playing, experimenting with biology outside of professional settings

DIYbio.org, founded by Mackenzie Cowell and Jason Bobe in 2008, serves as a meeting point for practitioners around the world, with over 1900 members, from professional scientists to artists and hobbyists.



As expressed by DIYbio.org, the community values “making biology an accessible pursuit for citizen scientists, amateur biologists, and do-it-yourself biological engineers who value openness and safety”

DIYbio projects worldwide cover a spectrum of art, science and engineering, including DNA extraction, developing biosensors, culturing bioluminescent bacteria, designing microbial fuel cells, or replicating lab equipment with off-the-shelf parts, to name a few.



DIYbio + the general public

DIYbio encourages people to participate in ‘hands on science’ through workshops, classes, etc., while also navigating the many public concerns regarding its practices. Its outward-facing efforts, from a code of ethics to mechanisms that make lab work more transparent, publically address questions of safety and ethics.

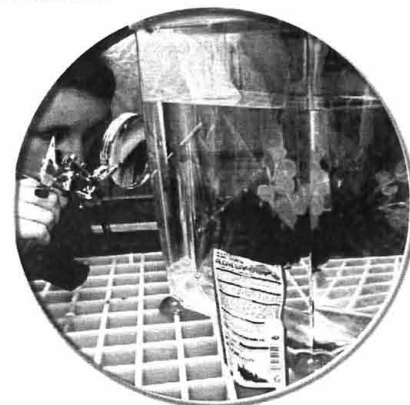
What technologies and practices can support *transparency* and ‘demystify science’?



DIYbio + professional scientists

DIYbio has intentionally positioned itself as a movement outside of and in some ways opposed to professional biology. From its motivations (to ‘open source’ science), to the aesthetics of tinkering with organic materials and its close associations with existing hackspaces, DIYbio’s agenda is not one of academic research. At the same time, material constraints, safety concerns and the complexity of the science necessitate biologists to remain at the core of DIYbio.

How can information and materials be shared more fluidly across professional and DIY domains?



Organic + digital materials

Common electronics—Arduino, sensors, servo motors, etc.—are combined with more professional lab equipment to culture, study or modify organic specimens such as *e. coli*, *c. elegans*, zebrafish or snails. The underlying seam—between living organisms and digital technologies—results in imaginative, innovative and sometimes strange workarounds across issues such as storage, disposal, time and uncertainty.

What then are the challenges and implications of these emerging *hybrids*, which leverage living organisms as inputs and outputs into digital systems?