Science Exchange and The Reproducibility Initiative: Improving the Efficiency & Impact of Academic Research

Sept. 12, 2012
**About FasterCures**

*FasterCures* is not just our name - it's our mission. We are an 'action tank' that works to improve the medical research system - so that we can speed up the time it takes to get important new medicines from discovery to patients.
Webinar speakers

**Presenter**

Elizabeth Iorns  
Co-Founder  
Science Exchange

**Contributors**

Elizabeth Silva  
Associate Editor  
PLoS

Josh Sommer  
Founder  
Chordoma Foundation

**Moderator**

Kristin Schneeman  
Program Director  
FasterCures
Introduction:
What is Science Exchange?

- Science Exchange is a marketplace for scientists to list, discover, access and pay for scientific services from any institution in the world.

**Company vitals**
- **Inception:** May 2011  
- **Headquarters:** Palo Alto, CA  
- **Investors:** Andreessen Horowitz, Angel investors

**Company metrics**
- +1200 experiment types  
- +1000 providers  
- +250,000 visits
Science Exchange Mission

Our mission is to improve the efficiency of scientific research by making it easy for researchers to access the global network of scientific resources and expertise.

• Saw the need for improved efficiency in research through access to leading research infrastructure.
• Acutely apparent in the US: little concerted effort to coordinate investment in research infrastructure or provide access to this infrastructure.
Science Exchange providers

• Science Exchange provides open access to specialized research infrastructure and expertise at top research institutions
• Currently >1,000 providers from >300 US research institutions

Sample facilities
Science Exchange for researchers

1. Search for an experiment type
Science Exchange for researchers

2. Choose a service provider
Science Exchange for researchers

3. Submit a service request

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Price</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affymetrix RNA microarray</td>
<td>$500.00 USD per Sample</td>
<td>[View Details]</td>
</tr>
<tr>
<td>Affymetrix microRNA microarray</td>
<td>$150.00 USD per Sample</td>
<td>[View Details]</td>
</tr>
<tr>
<td>Affymetrix DNA microarray</td>
<td>$284.00 USD per Sample</td>
<td>[View Details]</td>
</tr>
<tr>
<td>Illumina RNA microarray</td>
<td>$470.00 USD per Sample</td>
<td>[View Details]</td>
</tr>
</tbody>
</table>
Science Exchange for researchers

4. Accept a service quote
Science Exchange for researchers

5. Communicate with your provider
Science Exchange for researchers

6. Easily pay for services
Science Exchange for providers

1. List your services and instruments
Science Exchange for providers

2. Manage projects
Science Exchange for providers

3. Free scheduling tools
Science Exchange for providers

4. Free management software
Business model

• free for scientific service providers (e.g. cores)
• free for all internal transactions (e.g. projects between researcher and provider at same institution)
• when a researcher agrees to purchase a service from an external provider we add a service fee (3-5%) to the provider’s estimate
• pricing is entirely transparent, there are no hidden costs or fees
Why does this matter?

Science Exchange promotes open access to expert providers at core facilities and CROs

Improves efficiency of research spend
- No requirement to purchase duplicate equipment
- No need to learn highly specialized one-off techniques

Improves quality of research results
- Specialists enhance the quality of research
- Distribute research among multiple sites ➔ prevents single investigator bias
- Replicate key data at independent sites
Using Science Exchange to assess reproducibility
Why/how do we measure impact?

Need to assess the **impact** of research funding
- traditionally measured by impact factor, more recently by article level metrics like citations and downloads

These metrics are not associated with **quality**
- retraction rates correlate strongly with impact factor
- citations don’t stop even after a retraction

Metrics to measure the **impact** of research funding
- **quality**: high quality reproducibly research
Problem: Quality of academic research

Quality of academic research is under scrutiny:
• 47 of 53 “landmark” oncology studies not reproduced (Amgen)
• 43 of 67 cardio/oncology publications were contradictory (Bayer)
• 431 of 432 ms/oncology publications not reproduced (Ionaddis)

Implications for quality:
• Lack of academic reproducibility results in lack of new therapies
• Bayer halted 65% of target validation projects in 2011
• Drug development estimated at >$1B per NME
Cause: Academic incentive structure

Academic incentives not aligned with efficient high-quality research:

- Incentives to compete over publications, not collaborate / share
- Incentives to acquire publications, not validate results / findings

Need: A platform to track metrics of efficiency and quality in academic research
Solution: Scientific services marketplace

Science Exchange provides access to a network of experts who operate outside current academic incentive structure

- fee for service model with reputation / rating system: incentive only to produce high quality data
- 1000+ expert providers including academic core facilities & commercial vendors
- 1000+ experiment-types accessible from expert providers

**Key value:** A central portal for efficient access to specialized core facilities, that can be used to validate academic research
The Reproducibility Initiative

Initiative to reward high quality research

• studies are submitted for independent validation through Science Exchange’s expert provider network
• studies are matched to Science Exchange providers by the Reproducibility Initiative Scientific Advisory Board in a blind manner
• a ‘Certificate of Reproducibility’ is provided
• original studies are acknowledged as independently replicated
• independently replicated results are published in the PLOS ONE ‘Reproducibility Collection’
The Reproducibility Initiative

Scientific Advisory Board

• Bruce Booth (Atlas Ventures)
• Lee Ellis (University of Texas MD Anderson Cancer Center)
• John Ioannidis (Stanford University)
• Victoria Stodden (Columbia University)
• Brian Nosek (University of Virginia)
• Bernard Munos (InnoThink)
• George Robertson (Delhouise University)
• Heather Piwowar (total-impact)
• G. Sitta Sittampalam (NIH NCATS)
• Elizabeth Iorns (Science Exchange)
The Reproducibility Initiative

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The Reproducibility Initiative

PLOS

FasterCures
The Reproducibility Initiative
Our Vision:
Improved Quality = Greater Translation
How can you help?

- Research Scientists
- Advisory Board
- Core facilities and CROs
- Publication incentives
- Wide support incl. press

FasterCures
How can you help?

Funding Agencies
- Fund your researchers to take part in the initiative
- Reward them for validating their research
How can you help?

Promote a cultural change towards efficient and high-quality academic research
- Fund researchers to take part in the Reproducibility Initiative
- Reward researchers who produce high quality, reproducible research

End goal: Cultural shift towards high quality reproducible research that identifies robust drug targets

Contact us: team@reproducibilityinitiative.org
Q&A

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View an archive of this Webinar
www.fastercures.org/train
PARTICIPATE in outcomes-oriented dialogue on solving the challenges that slow medical progress

DISCOVER new and scalable models for improving research efficacy and efficiency

PARTNER with others who share your goals and could advance your programs

CONSULT with strategy and regulatory experts onsite, for FREE, on tailored advice on your initiatives

PRESENT your transformative multi-sector partnership/project to potential collaborators and supporters
IT TAKES TOO LONG.

1 of every 10,000 scientific discoveries make it to market.

80-90% of drug development projects fail before they get tested in humans.

15 years - that's how long it takes to turn a scientific discovery into a new medical solution that could improve and save lives.

We can't wait 15 years.

TIME = LIVES

15 YEARS
$1 BILLION
1 IN 3
AMERICANS
NO TIME TO WASTE

DISEASE WON'T WAIT.

Every...

68 SECONDS
someone develops Alzheimer's disease.

24 SECONDS
someone is diagnosed with cancer.

18 SECONDS
someone is diagnosed with diabetes.

And, the list goes on...

IT COSTS TOO MUCH.

$100 BILLION - per year spent on R&D.

Only 5¢ of every U.S. health dollar goes to medical research.

>$1 BILLION to bring one new therapy from lab to market.

IT'S ABOUT SAVING LIVES.

We all know someone who could use a faster cure.

To save lives, we need to save time.

timeequalslives.org

FasterCures
@fastercures

follow  like  read  add  link  watch

connect