Science Gateways Community Institute

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What is a science gateway?
And why is this talk in this BOF?

science gateway /sī′ əns gāt′ wā′/ *n.*
1. an online community space for science and engineering research and education.
2. a Web-based resource for accessing data, software, computing services, and equipment specific to the needs of a science or engineering discipline.

- We use gateways (or web portals, apps) throughout our daily lives

- Scientists use them too

- If designed well, they can be really enabling

Science Gateways

Recent survey of 5000 indicates how these are being used by NSF PIs, CIOs, CTOs

Specialized Resources	Percent
Data collections	75%
Data analysis tools, including visualization and mining	72%
Computational tools	72%
Tools for rapidly publishing and/or finding articles and data specific to my domain	69%
Educational tools	67%
Platforms for fostering group or community collaboration	63%
Simplified interfaces that eliminate the need to learn coding	62%
Citizen science and other public engagement resources	47%
Workflows that automate or capture tasks or processes	42%
Scientific instruments, such as telescopes, microscopes, or sensors	39%

Science Gateways

n=4,004, or 88% of 4,538 researcher/educators. Percentage indicates these resources are "somewhat" or "very" important to their work.

NSF has even suggested the use of gateways in their programs
This is the right direction to go! Gateways as cost-effective infrastructure

National Science Foundation
4201 Wilson Boulevard
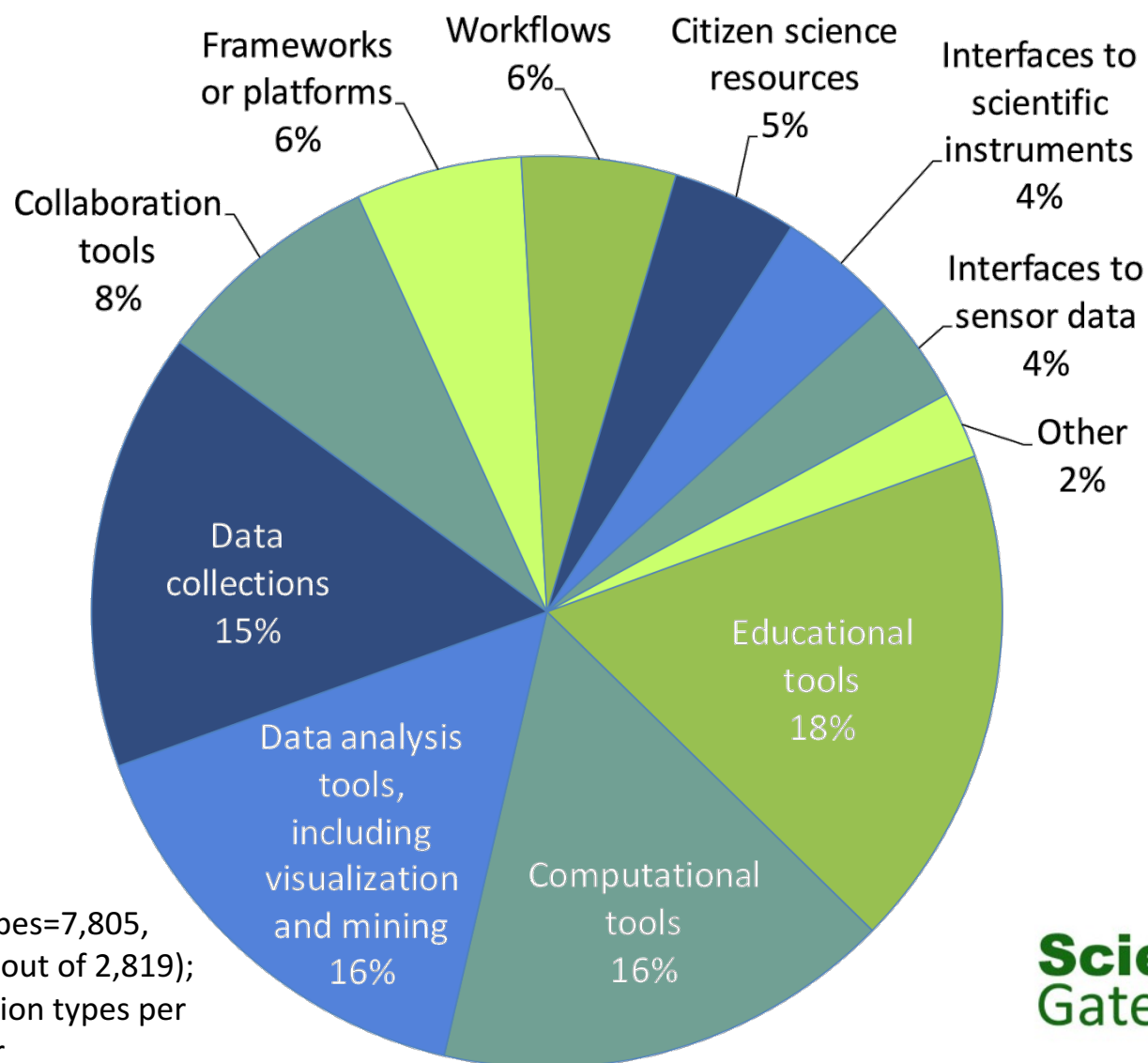**Arlington, Virginia 22230**

NSF 14-044

Dear Colleague Letter: BRAIN EAGERs to Enable Innovative Neurotechnologies to Reveal the Functional and Emergent Properties of Neural Circuits Underlying Behavior and Cognition

Date: March 7, 2014

This Dear Colleague Letter is aimed at identifying opportunities to leverage and synthesize technological and conceptual innovation across disciplines and scales to accelerate progress toward an integrated understanding of neural circuits in behavior and cognition, or more simply "catching circuits in action". The neuroscience research community and specialists in other areas including, but not limited to genetics, physiology, synthetic biology, engineering, physics, mathematics, statistics, behavior and cognition are encouraged to work across disciplines to develop new approaches and neurotechnology focused at understanding the properties of circuits that underlie behavior and/or cognition in any organism. Projects that take advantage of existing DBI investments in informatics, computing and other infrastructure, such as the Neuroscience Gateway, in novel ways are also eligible.
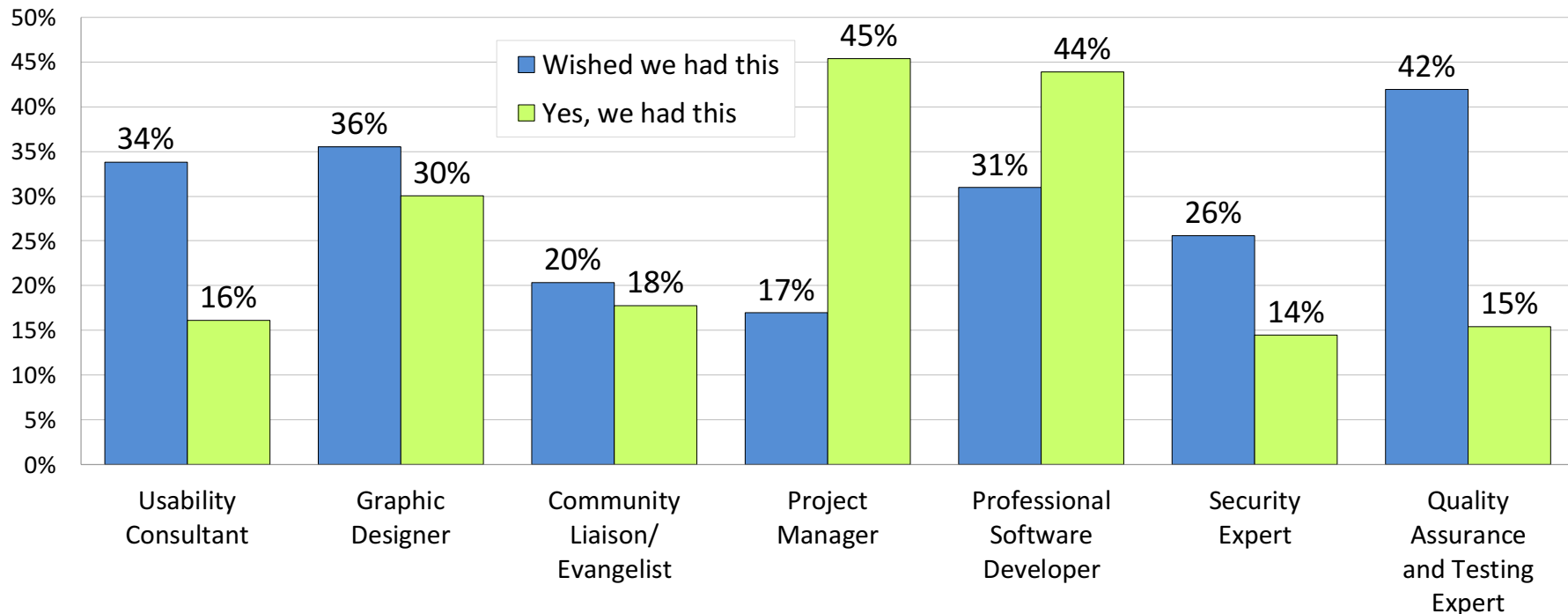
57% of respondents also create gateways

- Frameworks or platforms 6%
- Workflows 6%
- Citizen science resources 5%
- Interfaces to scientific instruments 4%
- Collaboration tools 8%
- Interfaces to sensor data 4%
- Other 2%
- Data collections 15%
- Educational tools 18%
- Data analysis tools, including visualization and mining 16%
- Computational tools 16%

n of application types=7,805, by 2,756 creators (out of 2,819); mean=2.8 application types per application creator

Science Gateways

But "it takes a village" to be successful

Legend:
- ■ Wished we had this (blue)
- ■ Yes, we had this (green)

Role	Wished we had this	Yes, we had this
Usability Consultant	34%	16%
Graphic Designer	36%	30%
Community Liaison/ Evangelist	20%	18%
Project Manager	17%	45%
Professional Software Developer	31%	44%
Security Expert	26%	14%
Quality Assurance and Testing Expert	42%	15%

n=2,756 respondents or 98% of application creators

Science Gateways

Gateways can be thought of as a subset of software

- Similar challenges
  - Reward structure
  - Funding as infrastructure
  - Citation
  - Engineering approaches
    - Build for the long term
- Different challenges
  - A bit more difficult to incorporate community contributions into a specific gateway implementation
    - Contributions to frameworks are possible
  - Very diverse expertise often needed

Science
Gateways

Gateways subject of recent NSF award
5 years + 5 more possible

Press Release 16-088
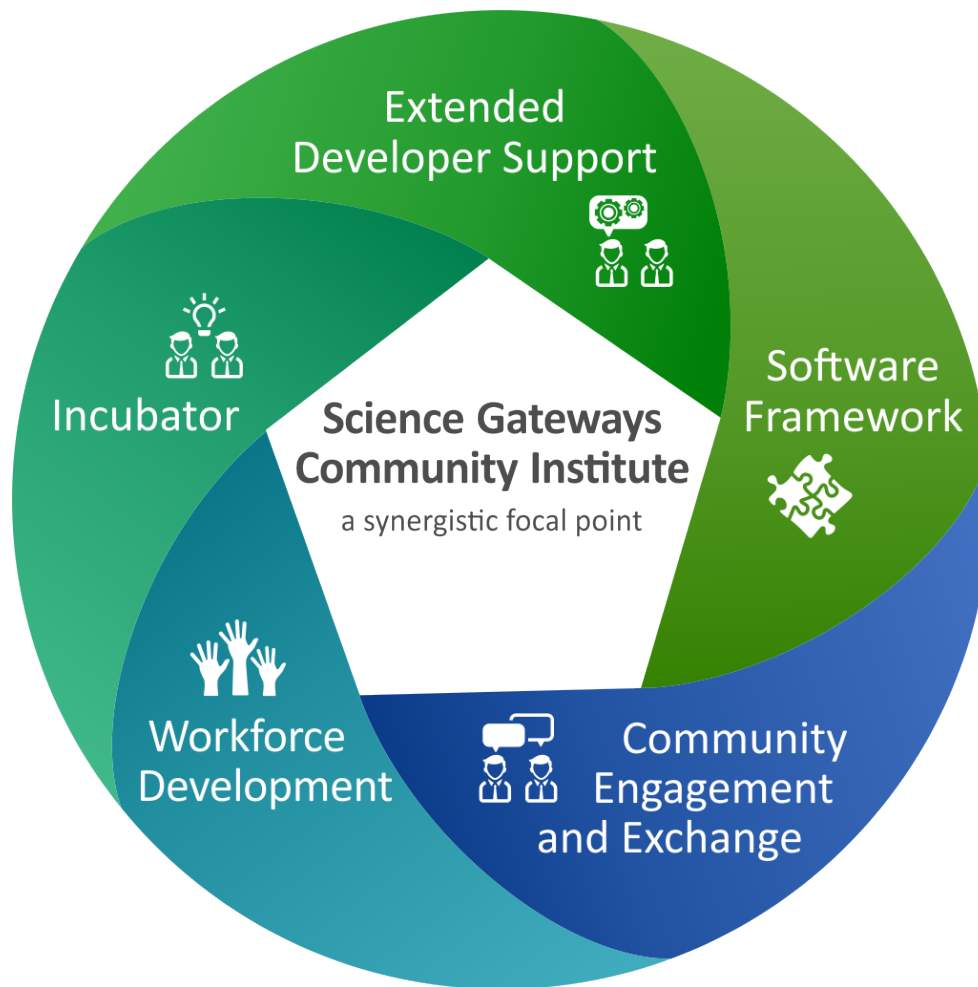
NSF commits $35 million to improve scientific software

Science Gateways Community Institute

The second award, led by the University of California, San Diego, establishes the Science Gateways Community Institute, a multi-institutional consortium that will increase the capabilities, number and sustainability of science gateways. Gateways are mobile or web-based applications that provide broad access to the nation's shared cyberinfrastructure to scientists and citizens alike.

"Gateways foster collaborations and the exchange of ideas among researchers and can democratize access, providing broad access to resources sometimes unavailable to those who are not at leading research institutions," said Nancy Wilkins-Diehr, associate director of the San Diego Supercomputer Center and principal investigator for the project. "Sharing expertise about basic infrastructure allows developers to concentrate on the novel, the challenging, and the cutting-edge development needed by their specific user community."

We've proposed the Science Gateways Community Institute
Est. Aug, 2016

- Diverse expertise on demand
- Longer term support engagements
- Software and visibility for gateways
- Information exchange in a community environment
- Student opportunities and more stable career paths

We're hitting the ground running

- Significant community interest
  - Many requests for service
  - Gateways 2016, Nov 2-3, 2016
- We're interested in folding best practices in software sustainability into SGCI
  - Look forward to talking at or after this BOF