



Connecting people and resources
to accelerate discovery by empowering
the science gateway community



Science Gateways Community Institute

Michael Zentner

Director, Science Gateways Community Institute

Director, Sustainable Scientific Software

Director, HUBzero Platform

San Diego Supercomputer Center

sciencegateways.org

Award Number
ACI-1547611





Pain Points

Connecting expensive resources & data to

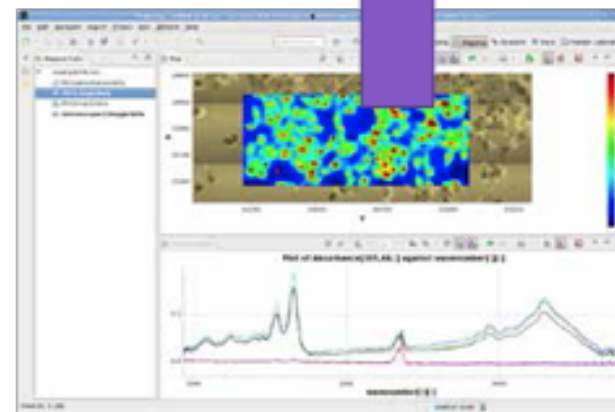
scientist authors that write codes to utilize them to

audiences that use those codes, data, and instruments en masse

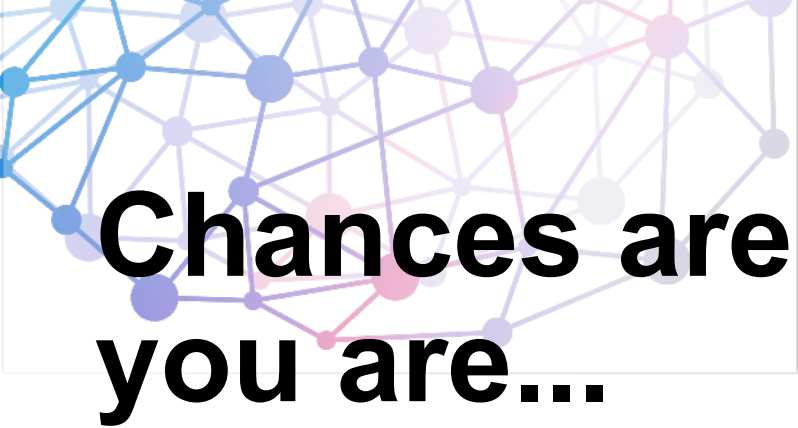
(expensive) Resources



Audience(s)



Collaborating Scientist
Software / Data
Authors



Chances are you are...

Developing advanced web interfaces to:

- Data collections
- Analysis capabilities
- Instruments
- Sensor data
- Citizen science projects
- Much more





We call these

science gateways /sī' əns gāt' wāz'/ *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.

Also known as: research platforms, virtual laboratories, virtual research environments, advanced web portals, etc.



**Fortunately
you are not
alone.**



hubzero



THE AGAVE PLATFORM
YOUR SCIENCE-AS-A-SERVICE API PLATFORM

Science Gateways Catalog

Save time — reuse gateway technologies or discover gateways and virtual research environments for research, teaching, and learning

Total Entries: 449



**UNFortunately
you are not
alone.**

Science Gateways Catalog

Galaxy

Save time — reuse gateway technologies or discover gateways and virtual research environments for research, teaching, and learning

THE AGAVE PLATFORM
YOUR SCIENCE-AS-A-SERVICE API PLATFORM



GenApp

Total Entries: 449

Search

hubzero



APACHE
AIRAVATA



UNFortunately
you are not
alone.

```
[disassembly]
=> 0x40063f <main+114>: jle 0x400675 <main+168>
0x400641 <main+116>: mov rax,QWORD PTR [rbp-0x30]
0x400645 <main+120>: add rax,0x8
0x400649 <main+124>: mov rax,QWORD PTR [rax]
0x40064c <main+127>: mov esi,0x4007bd
0x400651 <main+132>: mov rdi,rax
0x400654 <main+135>: call 0x4004a0 <strcmp@plt>
0x400659 <main+140>: test eax,eax
0x40065b <main+142>: jne 0x400675 <main+168>
0x40065d <main+144>: mov edi,0x4007c2
0x400662 <main+149>: call 0x400480 <puts@plt>
0x400667 <main+154>: add DWORD PTR [rbp-0x18],0x1
0x40066b <main+158>: add DWORD PTR [rbp-0x14],0x2
0x40066f <main+162>: add DWORD PTR [rbp-0x10],0x3
0x400673 <main+166>: jmp 0x400667 <main+154>
0x400675 <main+168>: cmp DWORD PTR [rbp-0x24],0x1
0x400679 <main+172>: jle 0x40066d <main+224>
0x40067b <main+174>: mov rax,QWORD PTR [rbp-0x30]
0x40067f <main+178>: add rax,0x8
0x400683 <main+182>: mov rax,QWORD PTR [rax]
0x400686 <main+185>: mov esi,0x4007d8

[odItsZaPc]
[ Jump (z || s==0) ]
RIP 00000000040063f ?.@..... => `main + 114 in section .text of /voltron/tests/inferior_linux`
RAX 0000000004006cd ..@..... => `main in section .text of /voltron/tests/inferior_linux`
RBX 0000000000000000 .....
RBP 00007FFFFFFF5c0 .....
RSP 00007FFFFFFF590 ..... => 0x7FFFFFFF6A8 => 0x7FFFFFFF8B6 => "/voltron/tests/inferior_lin
RDI 0000000000000001 .....
RSI 00007FFFFFFF6A8 ..... => 0x7FFFFFFF8B6 => "/voltron/tests/inferior_linux"
RDX 00007FFFFFFF6B8 ..... => 0x7FFFFFFF8D4 => "XDG_SESSION_ID=3"
RCX 0000000000000000 .....
R8 00007FFF7DD4E80 .N..... => `initial in section .bss of /lib/x86_64-linux-gnu/libc.so.6`
R9 00007FFF7DEA560 `..... => `_dl_fini in section .text of /lib64/ld-linux-x86-64.so.2`
R10 00007FFFFFFF450 P.....
R11 00007FFF7A36D0E .m..... => `__libc_start_main in section .text of /lib/x86_64-linux-gnu/lib
R12 0000000000040040 ..@..... => `_start in section .text of /voltron/tests/inferior_linux`
R13 00007FFFFFFF6A0 .....
R14 0000000000000000 .....
R15 0000000000000000 .....
CS 0033 DS 0000
ES 0000 FS 0000

0x0000000004005f9 14 int c=0,d=0,e=0;
(gdb)
16 if (argc > 1 && strcmp(argv[1], "sleep") == 0)
(gdb)
0x000000000400604 16 if (argc > 1 && strcmp(argv[1], "sleep") == 0)
(gdb)
21 else if (argc > 1 && strcmp(argv[1], "loop") == 0)
(gdb) si
0x00000000040063f 21 else if (argc > 1 && strcmp(argv[1], "loop") == 0)
(gdb)

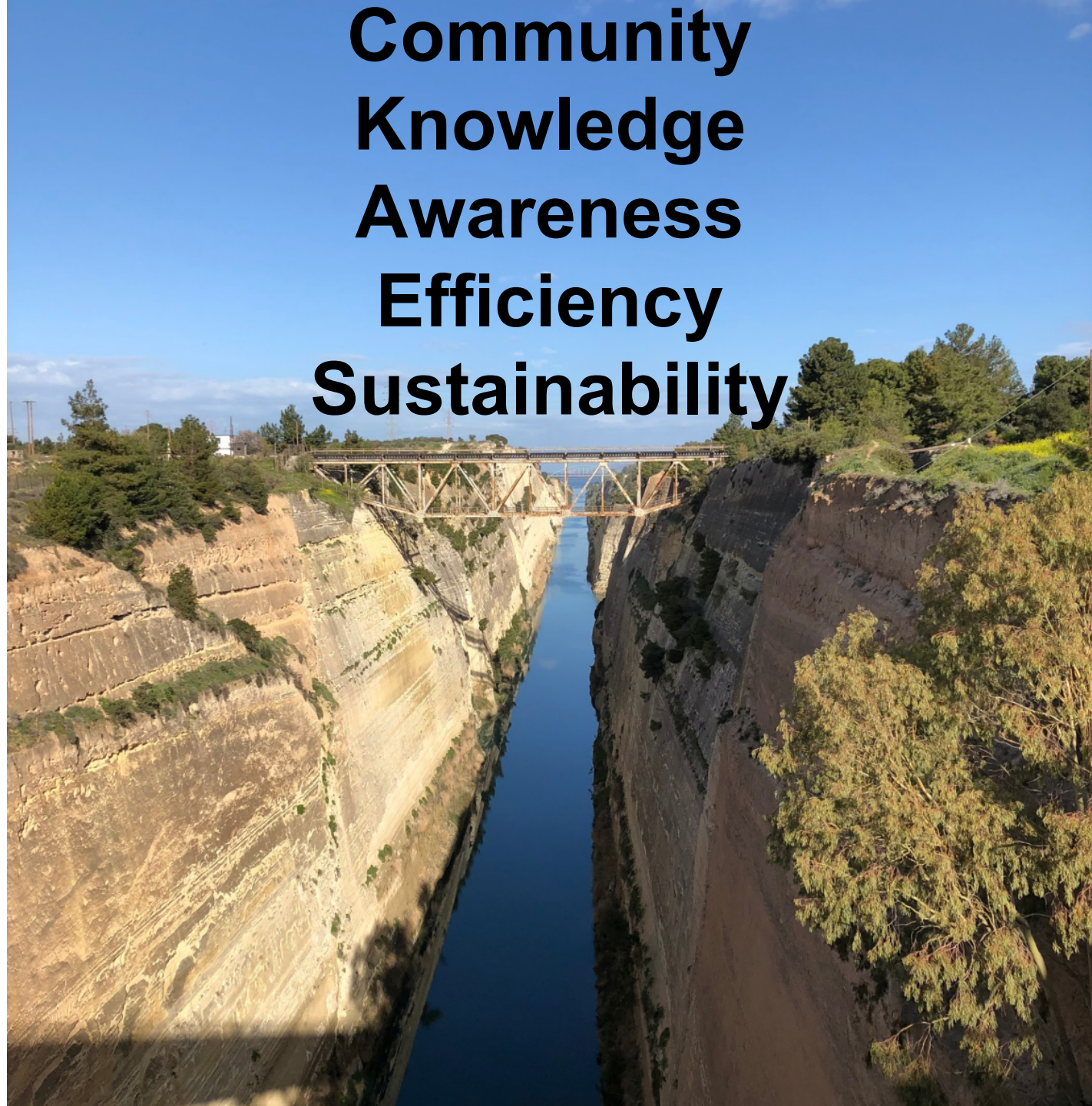
0x7FFFFFFF628: 51 13 7A 38 14 DA B5 7B | Q.z8...{
0x7FFFFFFF620: 51 13 20 2F AD CA B5 7B | Q. /...{
0x7FFFFFFF618: 00 00 00 00 00 00 00 00 | .....
0x7FFFFFFF610: 00 00 00 00 00 00 00 00 | .....
0x7FFFFFFF608: A0 E6 FF FF FF 7F 00 00 | .....
0x7FFFFFFF600: D0 04 40 00 00 00 00 00 | ..@.....
0x7FFFFFFF5F8: 51 13 80 E4 52 35 4A 84 | Q...R5J.
0x7FFFFFFF5F0: 00 00 00 00 00 00 00 00 | .....
0x7FFFFFFF5E8: CD 05 40 00 00 00 00 00 | ..@.....
0x7FFFFFFF5E0: 00 00 00 00 01 00 00 00 | .....
0x7FFFFFFF5D8: A8 E6 FF FF FF 7F 00 00 | .....
0x7FFFFFFF5D0: 00 00 00 00 00 00 00 00 | .....
0x7FFFFFFF5C8: C5 6E A3 F7 FF 7F 00 00 | .n.....
0x7FFFFFFF5C0: 00 00 00 00 00 00 00 00 | .....
0x7FFFFFFF5B8: 00 00 00 00 00 00 00 00 | .....
0x7FFFFFFF5B0: 00 00 00 00 00 00 00 00 | .....
0x7FFFFFFF5A8: 00 00 00 00 00 00 00 00 | .....
0x7FFFFFFF5A0: 00 07 40 00 00 00 00 00 | ..@.....
0x7FFFFFFF598: 00 00 00 00 01 00 00 00 | .....
0x7FFFFFFF590: A8 E6 FF FF FF 7F 00 00 | .....

0x7FFFFFFF6A0 => ""
0x4004d0 => `_start in section .text of /voltron/tests/inferior_linux`
0x4005cd => `main in section .text of /voltron/tests/inferior_linux`
0x7FFFFFFF6A8 => 0x7FFFFFFF8B6 => "/voltron/tests/inferior_linux"
0x7FFF7A36E5 => `__libc_start_main + 245 in section .text of /lib/x86_64-linux-gnu/libc.so.6`
0x400700 => `__libc_csu_init in section .text of /voltron/tests/inferior_linux`
0x7FFFFFFF6A8 => 0x7FFFFFFF8B6 => "/voltron/tests/inferior_linux"

[stack]
[0x00a8:00007FFFFFFF590]
```



**The formation of
an institute...
to institutionalize
best practices**



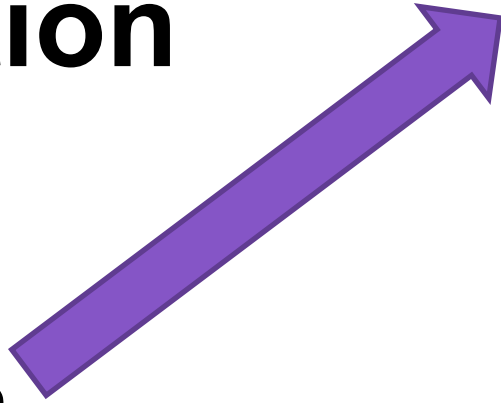
**Community
Knowledge
Awareness
Efficiency
Sustainability**



Our Products: Technology Consultation

- Technology selection, planning
- Development process implementation
- Co-developer placement
- Cybersecurity scanning, design & remediation
- Usability Assessment / Design

8.5x return





Our Products: Annual Conference

To be held in San Diego in conjunction with eScience

- Gateways 2019: 23-25 September
- eScience 2019: 24-27 September

Sign up for newsletter at
ScienceGateways.org

Learn and interact with the community of more than 100 gateway stakeholders.





Our Products: Gateway Catalog

Look for a gateway with a pattern you like, and emulate rather than re-invent:

- Comprehensive listing of > 500 gateways
- Information about gateway supporting frameworks / technologies



Our Products: Prototype Hosting Environment

Experiment with creating your gateways with minimal investment in hosting resources



Our Products: People

- Enroll in educational opportunities related to gateway development and usage
- Find an intern to assist with your project for a summer
- Compete for a Young Professional of the Year award
- Assist with / participate in a variety of hackathons



Our Products: Business Consultation

- Marketing approach development
- Communication assistance
- Funding / sustainability planning
- Graphic design
- Licensing issues
- Activity based budget development / resource planning
- Understanding your market
- Developing expertise on your campus





Our Products: Gateways Focus Week... a week long deep dive into your strategy



I have an idea!



Articulate the value of your gateway and how it's distinctively different from what already exists.

Who benefits?



Identify audience and stakeholder groups and consider how they impact your success.

Where does it fit in?



Establish where your gateway solution fits within the existing market landscape of partners and competitors.

How do I make it happen?



Define measurable goals for success and sustainability. Consider multiple needs such as technology, security, project management, usability, and funding.

How do I sell it?



Spread the word!
Plan how to tell the unique story of your gateway.

I have an idea!



Articulate the value of your gateway and how it's distinctively different from what already exists.

Who benefits?

Identify audience and stakeholder groups and consider how they impact your success.

Where does it fit in?



Establish where your gateway solution fits within the existing market landscape of partners and competitors.

How do I make it happen?



Define measurable goals for success and sustainability. Consider multiple needs such as technology, security, project management, usability, and funding.

How do I sell it?

Spread the word!
Plan how to tell the unique story of your gateway.

Focus Week Summary

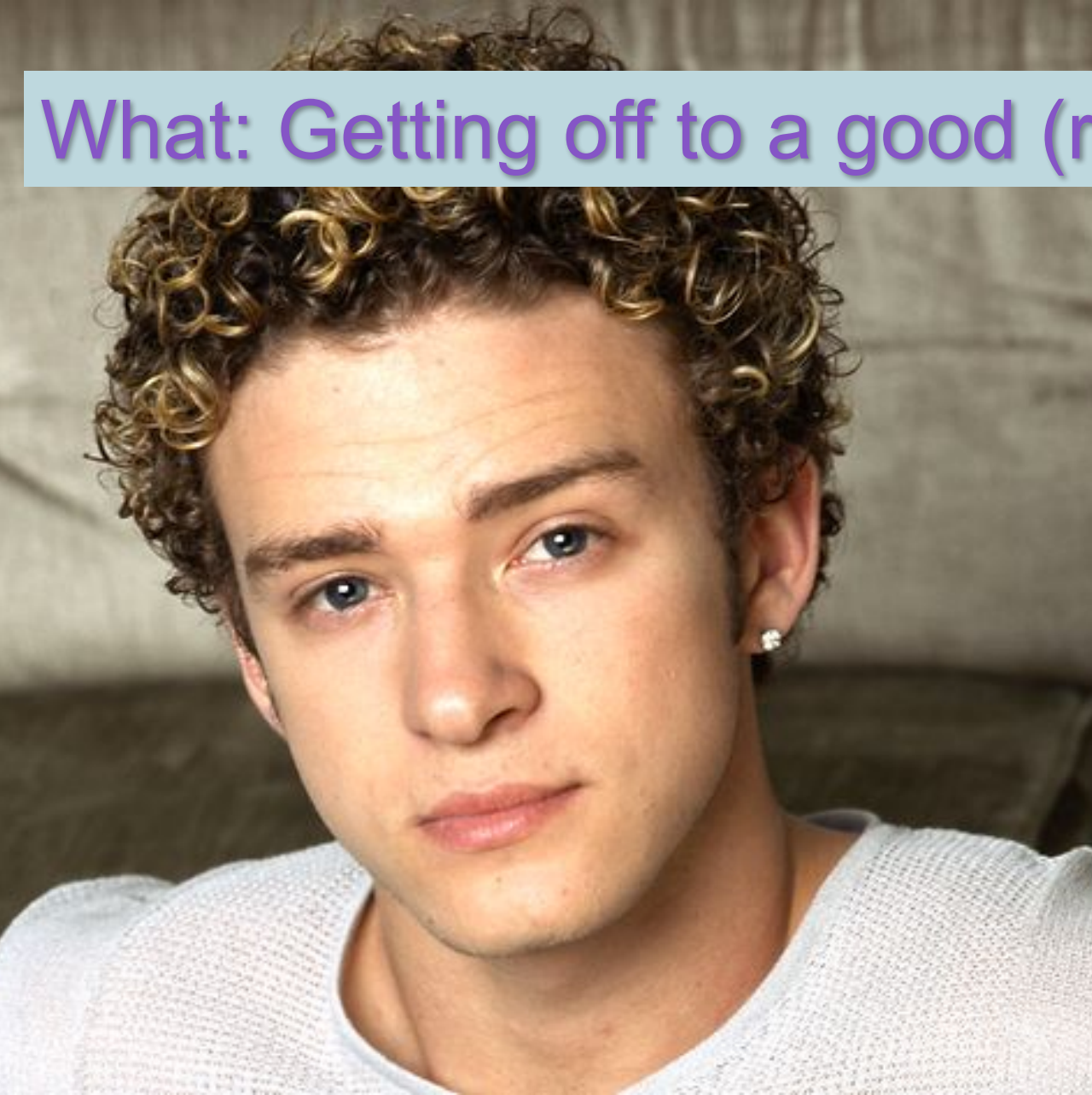
- Full 5 days
- Knowledge dissemination
- Interactivity
- Community formation
- Putting away the normal daily routine
- Homework



What: Getting off to a good start...



What: Getting off to a good (re)start...



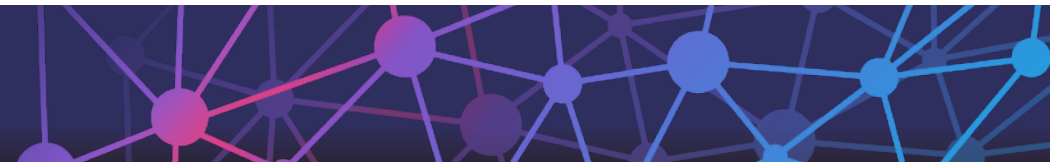
What: Knowing how to know if you have a good start...



(some of the) Key Elements to Cohort Formation

- Out of the ordinary
- Forced away time
- Extended period of time
- A common non-trivial task/ordeal
- Forced unfamiliar interactivity
- Common decompression time
- A deliverable
- An experience

*Feeling like it
is taking 115%
of your effort
to participate*

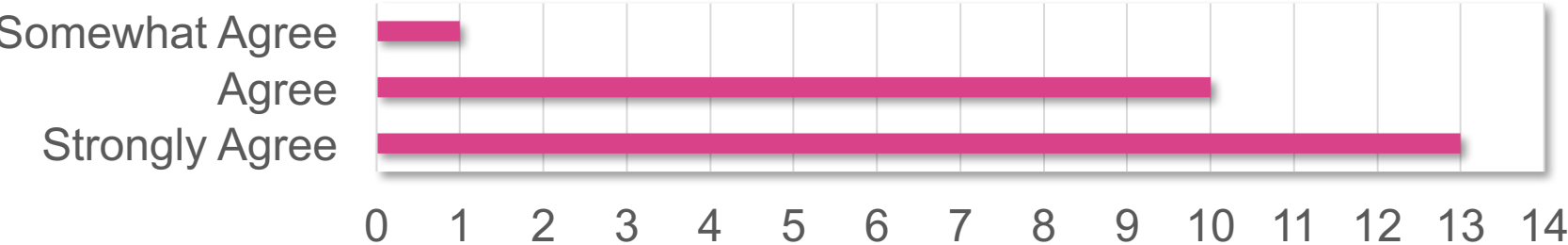




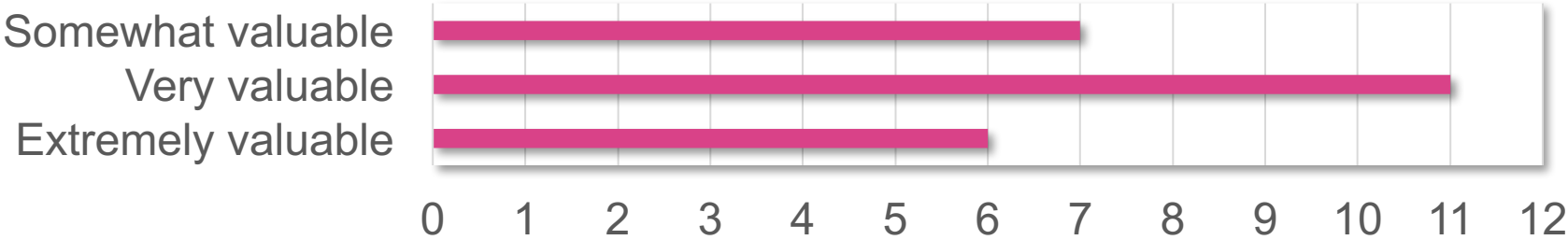


Quantitative Importance of Community

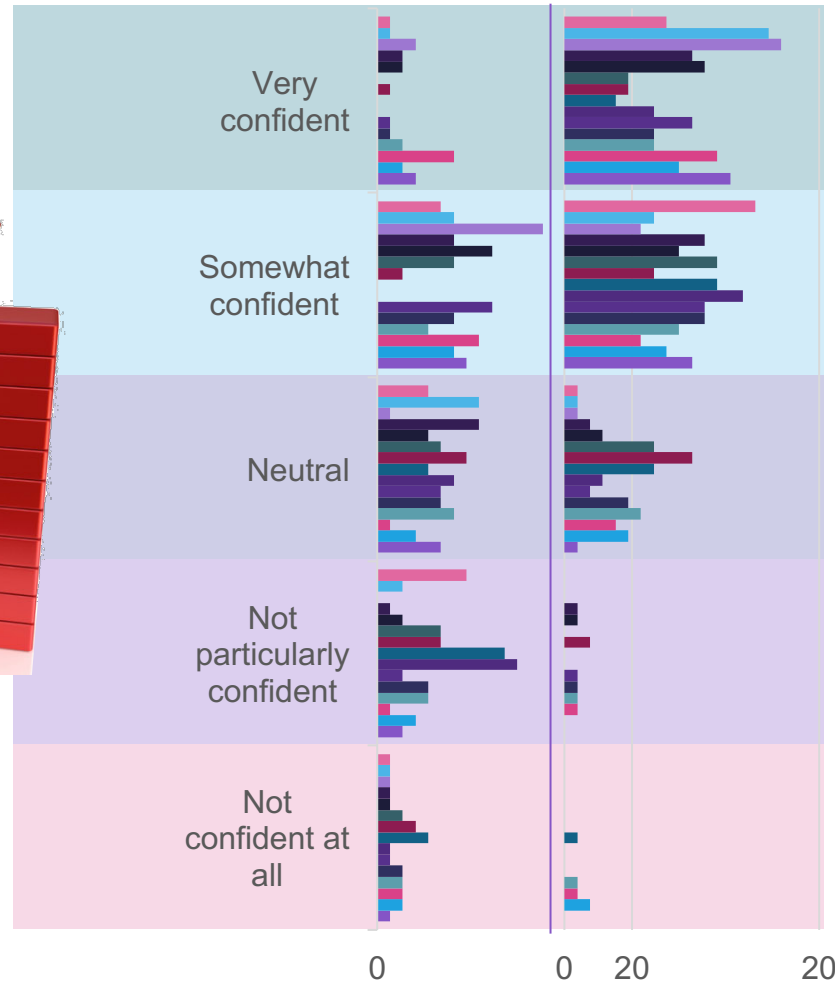
I made social connections at the Bootcamp that will be beneficial to my work with my gateway.



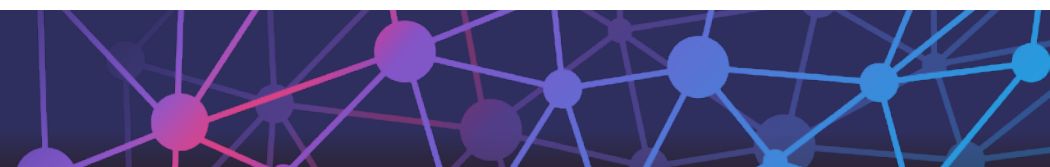
How valuable to the work of your gateway do you think it would be for you to keep in touch with members of this Bootcamp cohort?



Impact on Confidence in Ability to Perform



- Identify the key factors that make a project sustainable
- Define a value proposition that captures how our project delivers value to users
- Identify key audience segments
- Identify what motivates key audience segments to use our Gateway
- Identify relevant direct and indirect competitors to our Gateway
- Pinpoint measurable targets that will help our Gateway attain its mission
- Develop a budget that will allow us to support the activities needed to reach our goals
- Design a funding model that includes multiple sources of reliable, renewable support
- Employ marketing tools to reach and engage our Gateway's target audience
- Provide a positive user experience
- Obtain on-campus resources
- Devise a strategy for measuring impact in more than one way
- Make technology choices and open source decisions
- Identify cybersecurity best practices for our Gateway
- Effectively communicate what our gateway offers



Patterned after...



CORPS
NSF Innovation Corps



VillageCapital



ITHAKA S+R

PROJECT
LITERACY LAB

A PARTNERSHIP BETWEEN PEARSON + UNREASONABLE GROUP



PURDUE
FOUNDRY





**Our Products:
Gateways
Focus Week...
a week long
deep dive into
your strategy**

Next Focus Week:

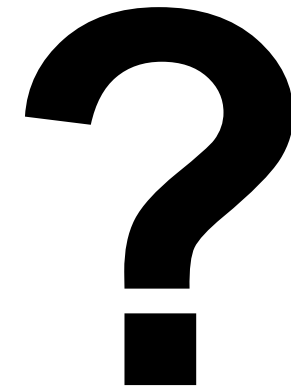
Announcement for 2 in 2020 coming soon

Sign up for our newsletter at sciencegateways.org to be informed





What's the catch?





What's the catch?





What's the catch?

One week business planning focus week (you cover travel)

Conference registration + travel

If you want services at greater than 25% FTE for 6-12 months, you can write our staff into your proposal

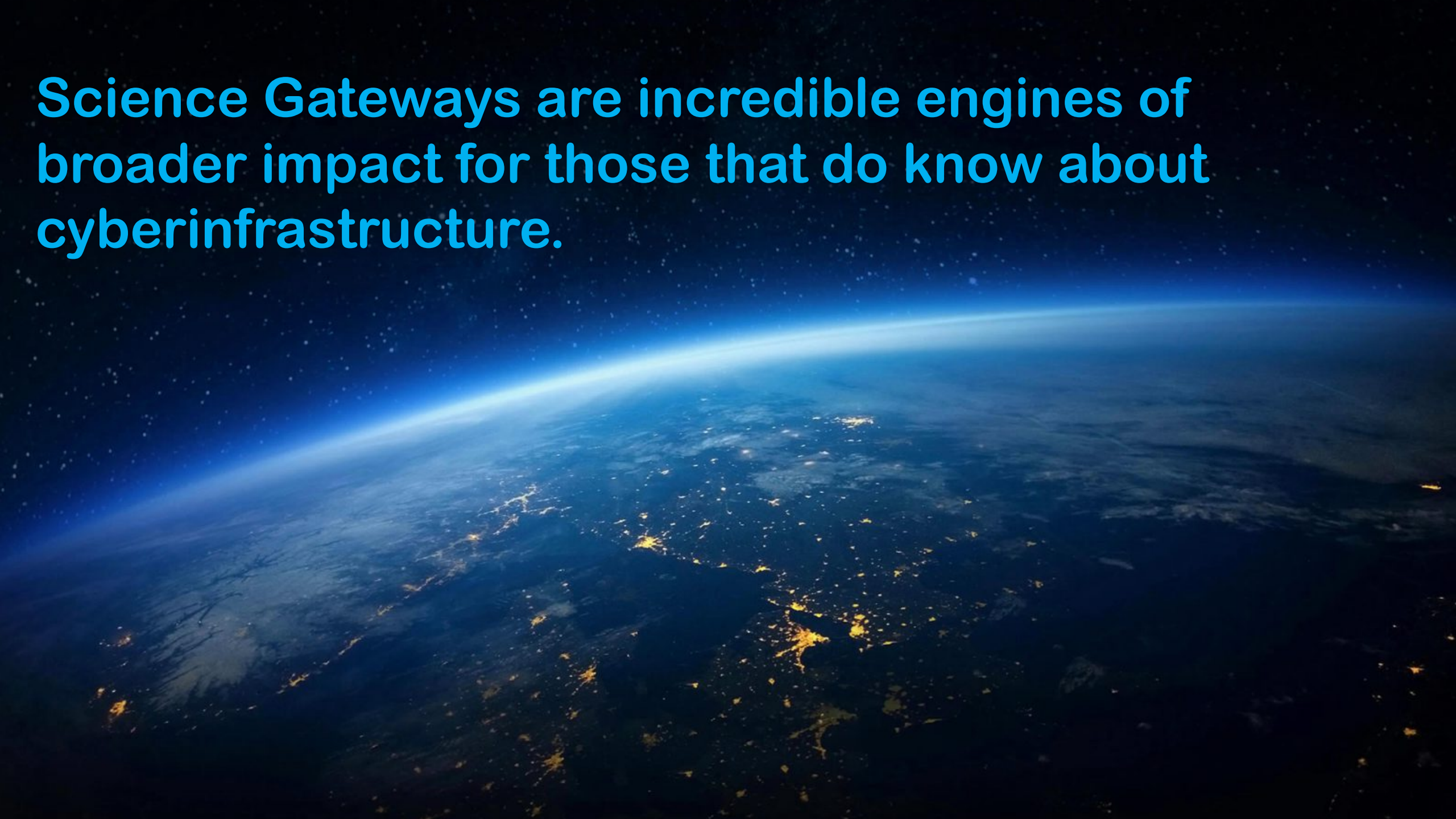
AND...your time. You need to care more about your gateway than anyone else to get the most out of your consultant.



The image features a crowd of people in silhouette against a bright, glowing sunset or sunrise. Many individuals have their arms raised, with hands open or pointing upwards, suggesting a celebratory or engaged atmosphere. The text is overlaid on the upper portion of the image in a light blue, sans-serif font with a subtle drop shadow.

Science Gateways are accessibility to cyberinfrastructure for those that would rather not know about cyberinfrastructure.

Science Gateways are incredible engines of broader impact for those that do know about cyberinfrastructure.





Science Gateways are sustainability habitats for scientific applications, their creators, and their users.

Sign up at ScienceGateways.org