CTSC

CENTER FOR TRUSTWORTHY
SCIENTIFIC CYBERINFRASTRUCTURE

The NSF Cybersecurity Center of Excellence

Today and Tomorrow: CTSC's Services and Vision

Von Welch, CTSC PI and Director
Jim Basney, Craig Jackson, Barton Miller, Jim Marsteller, Co-PIs

NSF Cybersecurity Summit
August 16th 2017

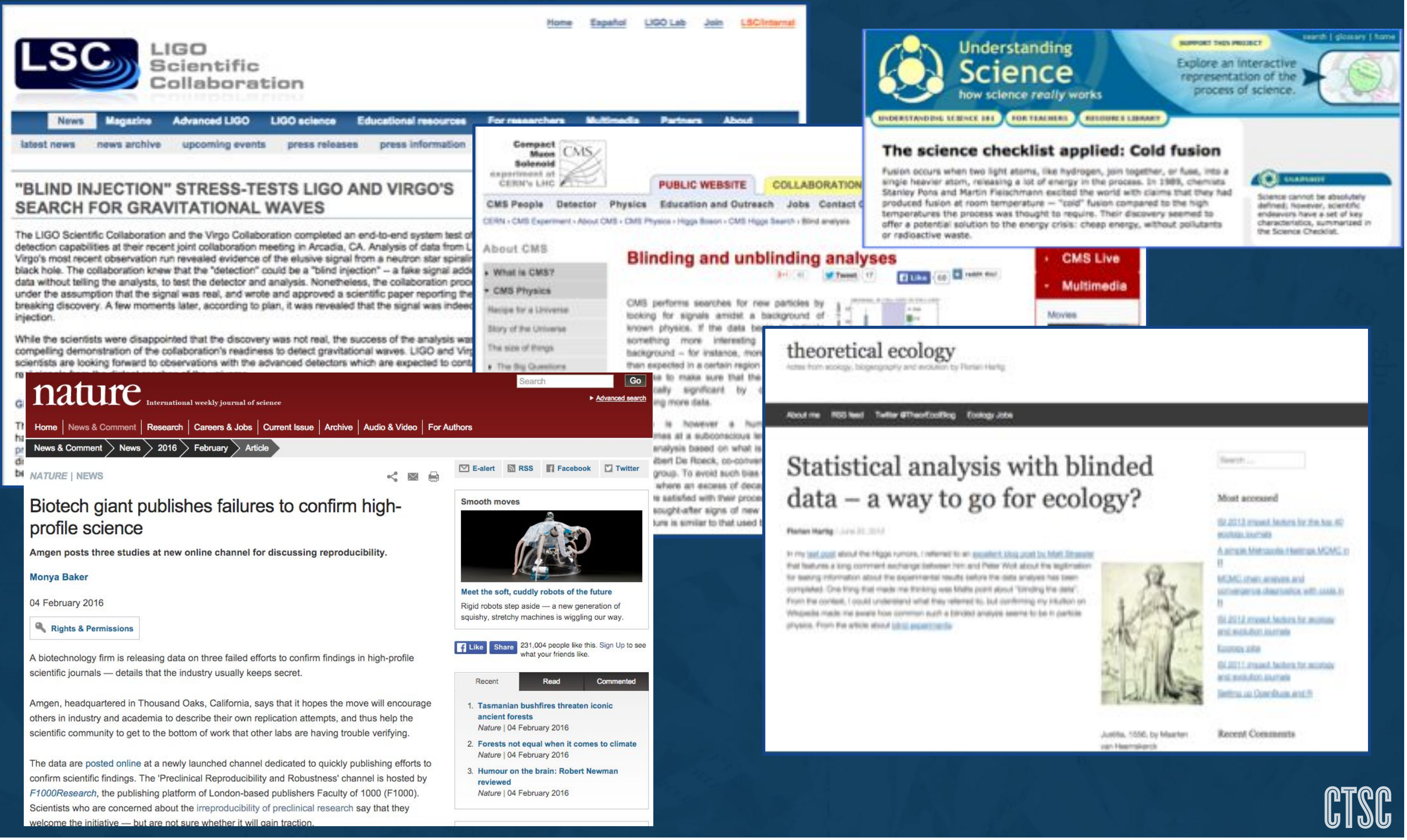
trustedci.org

Talk Outline

- The Value of Cybersecurity to Science
- Today: CCoE services to the NSF Community
- Progress and Looking Ahead

The Value of Cybersecurity to Science

Trusted and Reproducible Science



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LSC LIGO Scientific Collaboration

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"BLIND INJECTION" STRESS-TESTS LIGO AND VIRGO'S SEARCH FOR GRAVITATIONAL WAVES

The LIGO Scientific Collaboration and the Virgo Collaboration completed an end-to-end system test of detection capabilities at their recent joint collaboration meeting in Arcadia, CA. Analysis of data from L Virgo's most recent observation run revealed evidence of the elusive signal from a neutron star spirali black hole. The collaboration knew that the "detection" could be a "blind injection" -- a fake signal adde data without telling the analysts, to test the detector and analysis. Nonetheless, the collaboration proc under the assumption that the signal was real, and wrote and approved a scientific paper reporting the breaking discovery. A few moments later, according to plan, it was revealed that the signal was indeed injection.

While the scientists were disappointed that the discovery was not real, the success of the analysis was compelling demonstration of the collaboration's readiness to detect gravitational waves. LIGO and Vir scientists are looking forward to observations with the advanced detectors which are expected to cont re

Compact Muon Solenoid experiment at CERN's LHC

PUBLIC WEBSITE COLLABORATION

CMS People Detector Physics Education and Outreach Jobs Contact

CERN › CMS Experiment › About CMS › CMS Physics › Higgs Boson › CMS Higgs Search › Blind analysis

About CMS

- What is CMS?
- CMS Physics
- Recipe for a Universe
- Story of the Universe
- The size of things
- The Big Questions

Blinding and unblinding analyses

Tweet 17 Like 68 reddit this!

CMS performs searches for new particles by looking for signals amidst a background of known physics. If the data be something more interesting background – for instance, more than expected in a certain region … to make sure that the …cally significant by …ing more data.

… is however a hum… …mes at a subconscious le… analysis based on what is …lbert De Roeck, co-conven… group. To avoid such bias … where an excess of deca… …e satisfied with their proce… sought-after signs of new …ure is similar to that used

CMS Live

Multimedia

Movies

Understanding Science how science really works

SUPPORT THIS PROJECT

search | glossary | home

Explore an interactive representation of the process of science.

UNDERSTANDING SCIENCE 101 FOR TEACHERS RESOURCE LIBRARY

The science checklist applied: Cold fusion

Fusion occurs when two light atoms, like hydrogen, join together, or fuse, into a single heavier atom, releasing a lot of energy in the process. In 1989, chemists Stanley Pons and Martin Fleischmann excited the world with claims that they had produced fusion at room temperature — "cold" fusion compared to the high temperatures the process was thought to require. Their discovery seemed to offer a potential solution to the energy crisis: cheap energy, without pollutants or radioactive waste.

SNAPSHOT

Science cannot be absolutely defined. However, scientific endeavors have a set of key characteristics, summarized in the Science Checklist.

nature International weekly journal of science

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NATURE | NEWS

Biotech giant publishes failures to confirm high-profile science

Amgen posts three studies at new online channel for discussing reproducibility.

Monya Baker

04 February 2016

Rights & Permissions

A biotechnology firm is releasing data on three failed efforts to confirm findings in high-profile scientific journals — details that the industry usually keeps secret.

Amgen, headquartered in Thousand Oaks, California, says that it hopes the move will encourage others in industry and academia to describe their own replication attempts, and thus help the scientific community to get to the bottom of work that other labs are having trouble verifying.

The data are posted online at a newly launched channel dedicated to quickly publishing efforts to confirm scientific findings. The 'Preclinical Reproducibility and Robustness' channel is hosted by *F1000Research*, the publishing platform of London-based publishers Faculty of 1000 (F1000). Scientists who are concerned about the irreproducibility of preclinical research say that they welcome the initiative — but are not sure whether it will gain traction.

E-alert RSS Facebook Twitter

Smooth moves

Meet the soft, cuddly robots of the future

Rigid robots step aside — a new generation of squishy, stretchy machines is wiggling our way.

Like Share 231,004 people like this. Sign Up to see what your friends like.

Recent Read Commented

1. Tasmanian bushfires threaten iconic ancient forests
   Nature | 04 February 2016
2. Forests not equal when it comes to climate
   Nature | 04 February 2016
3. Humour on the brain: Robert Newman reviewed
   Nature | 04 February 2016

theoretical ecology

notes from ecology, biogeography and evolution by Florian Hartig

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Statistical analysis with blinded data – a way to go for ecology?

Florian Hartig | [illegible]

In my last post about the Higgs rumors, I referred to an excellent blog post by Matt Strassler that features a long comment exchange between him and Peter Woit about the legitimation for leaking information about the experimental results before the data analysis has been completed. One thing that made me thinking was Matts point about "blinding the data". From the context, I could understand what they referred to, but confirming my intuition on Wikipedia made me aware how common such a blinded analysis seems to be in particle physics. From the article about blind experiments

Justitia, 1556, by Maarten van Heemskerck

Search ...

Most accessed

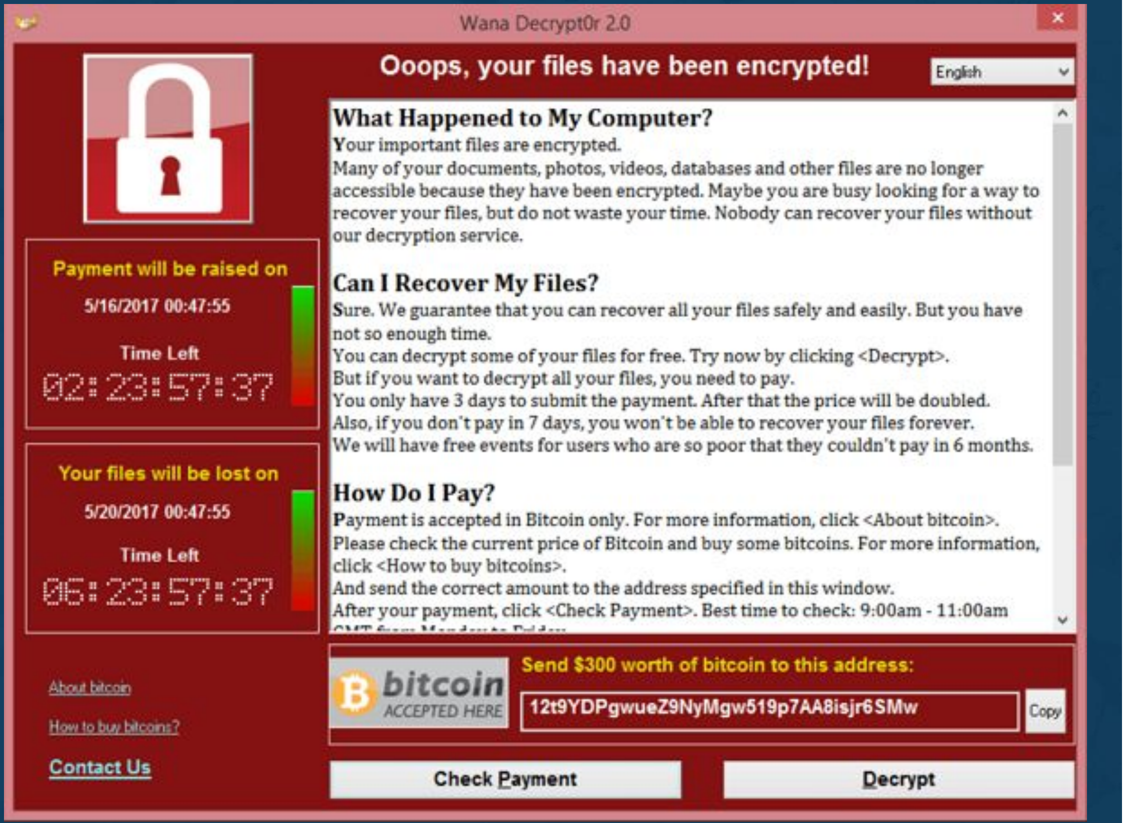
- ISI 2013 impact factors for the top 40 ecology journals
- A simple Metropolis-Hastings MCMC in R
- MCMC chain analysis and convergence diagnostics with coda in R
- ISI 2012 impact factors for ecology and evolution journals
- Ecology jobs
- ISI 2011 impact factors for ecology and evolution journals
- Setting up OpenBugs and R

Recent Comments

Do No Harm

NSF CI represents some impressive computing, networking, and data.

Keeping it available and preventing its use to harm others are key to our productivity and reputation.



Ooops, your files have been encrypted!

Payment will be raised on
5/16/2017 00:47:55
Time Left
02:23:57:37

Your files will be lost on
5/20/2017 00:47:55
Time Left
06:23:57:37

What Happened to My Computer?
Your important files are encrypted.
Many of your documents, photos, videos, databases and other files are no longer accessible because they have been encrypted. Maybe you are busy looking for a way to recover your files, but do not waste your time. Nobody can recover your files without our decryption service.

Can I Recover My Files?
Sure. We guarantee that you can recover all your files safely and easily. But you have not so enough time.
You can decrypt some of your files for free. Try now by clicking <Decrypt>.
But if you want to decrypt all your files, you need to pay.
You only have 3 days to submit the payment. After that the price will be doubled.
Also, if you don't pay in 7 days, you won't be able to recover your files forever.
We will have free events for users who are so poor that they couldn't pay in 6 months.

How Do I Pay?
Payment is accepted in Bitcoin only. For more information, click <About bitcoin>.
Please check the current price of Bitcoin and buy some bitcoins. For more information, click <How to buy bitcoins>.
And send the correct amount to the address specified in this window.
After your payment, click <Check Payment>. Best time to check: 9:00am - 11:00am

Send $300 worth of bitcoin to this address:
12t9YDPgwueZ9NyMgw519p7AA8isjr6SMw

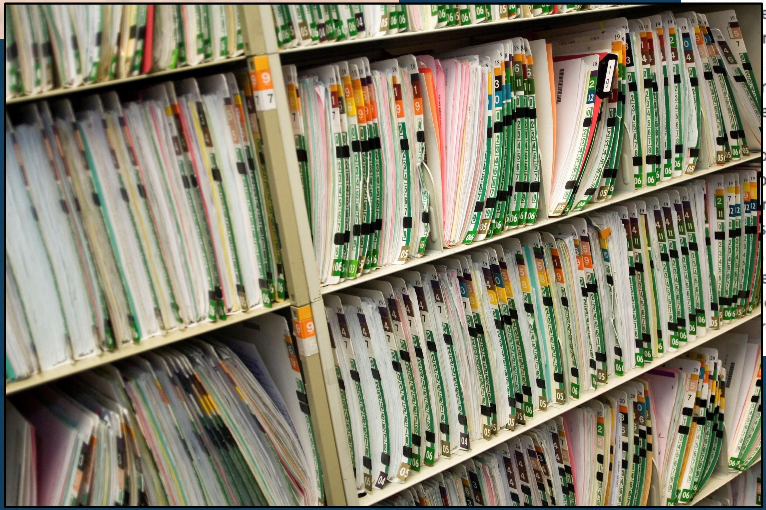
Enabling Collaboration

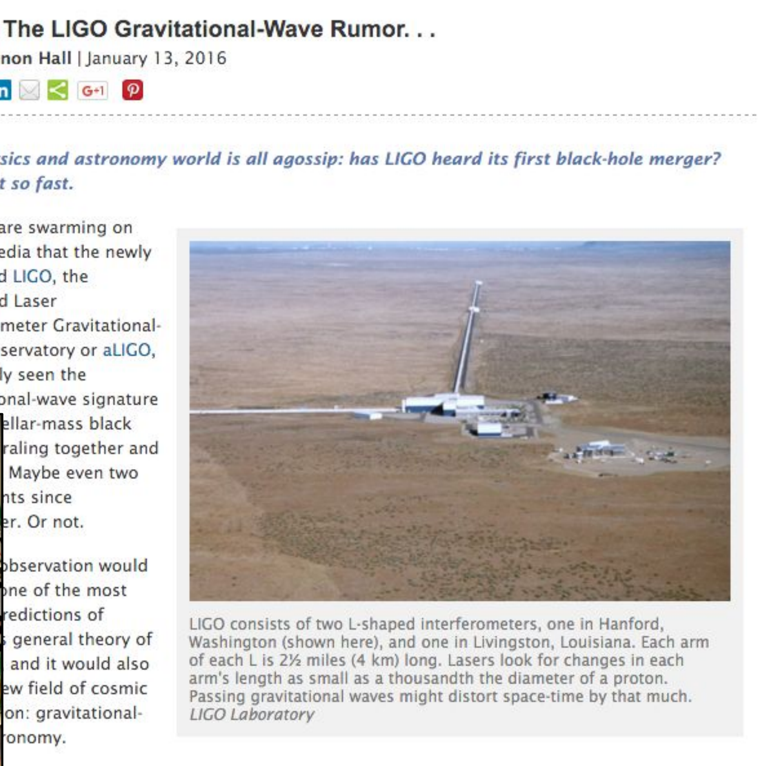
NSF science is increasingly collaborative - both inter-organizational and inter-disciplinary.

Security plays a role, sometimes subtle, in enabling collaboration between projects and organizations.

Science Domain and Project Concerns

(Yes, even for open science projects)





About The LIGO Gravitational-Wave Rumor. . .

By: **Shannon Hall** | January 13, 2016

The physics and astronomy world is all agossip: has LIGO heard its first black-hole merger? Well, not so fast.

Rumors are swarming on social media that the newly upgraded LIGO, the Advanced Laser Interferometer Gravitational-Wave Observatory or aLIGO, has finally seen the gravitational-wave signature ellar-mass black raling together and Maybe even two nts since er. Or not.

bservation would ne of the most redictions of general theory of and it would also ew field of cosmic on: gravitational-onomy.

LIGO consists of two L-shaped interferometers, one in Hanford, Washington (shown here), and one in Livingston, Louisiana. Each arm of each L is 2½ miles (4 km) long. Lasers look for changes in each arm's length as small as a thousandth the diameter of a proton. Passing gravitational waves might distort space-time by that much. *LIGO Laboratory*

http://www.skyandtelescope.com/astronomy-news/about-this-weeks-gravitational-wave-rumor/

CCoE services to the NSF Community

Center for Trustworthy Cyberinfrastructure
The NSF Cybersecurity Center of Excellence

Mission

Provide the NSF community a coherent understanding of cybersecurity's role in producing trustworthy science and the information and know-how required to achieve and maintain effective cybersecurity programs.

Andrew Adams, Kay Avila, Jim Basney, Robert Cowles, Jeannette Dopheide, Terry Fleury, Grayson Harbour, Randy Heiland, Elisa Heymann, Craig Jackson, Scott Koranda, Mark Krenz, Jim Marsteller, Prof. Barton Miller, Warren Raquel, Susan Sons, Amy Starzynski Coddens, Von Welch, John Zage

http://trustedci.org/who-we-are/

CENTER FOR APPLIED CYBERSECURITY RESEARCH
INDIANA UNIVERSITY
Pervasive Technology Institute

NCSA

PITTSBURGH SUPERCOMPUTING CENTER

THE UNIVERSITY of WISCONSIN MADISON

NSF

CCoE Thrusts

Building Community

NSF Cybersecurity Summit, Monthly Webinars, Blog, Email Lists, Partnerships, Benchmarking Survey

Sharing Knowledge

Guide to Developing Cybersecurity Programs for NSF Science and Engineering Projects, Identity Management Best Practices, Cyberinfrastructure Vulnerabilities, Training, OSCRP

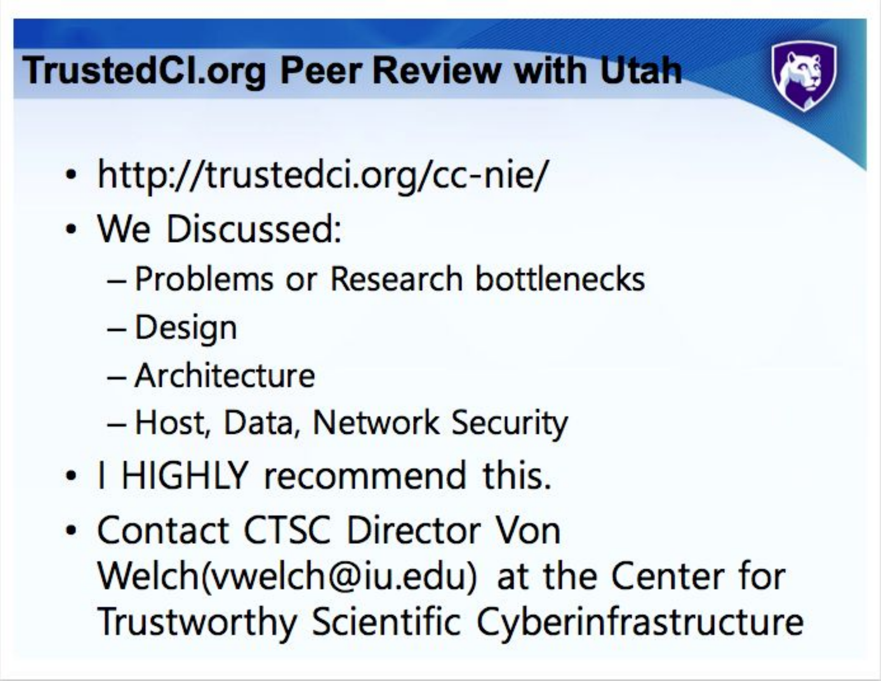
Collaboration to Tackle Challenges: Engagements

LIGO, SciGaP, IceCube, Pegasus, CC-NIE peer review, DKIST, LTERNO, DataONE, SEAD, CyberGIS, HUBzero, Globus, LSST, NEON, U. Utah, PSU, OOI, Gemini, Array of Things, IBEIS, SciGaP, US Antarctic Program...

Collaboration to Tackle Challenges: Engagements

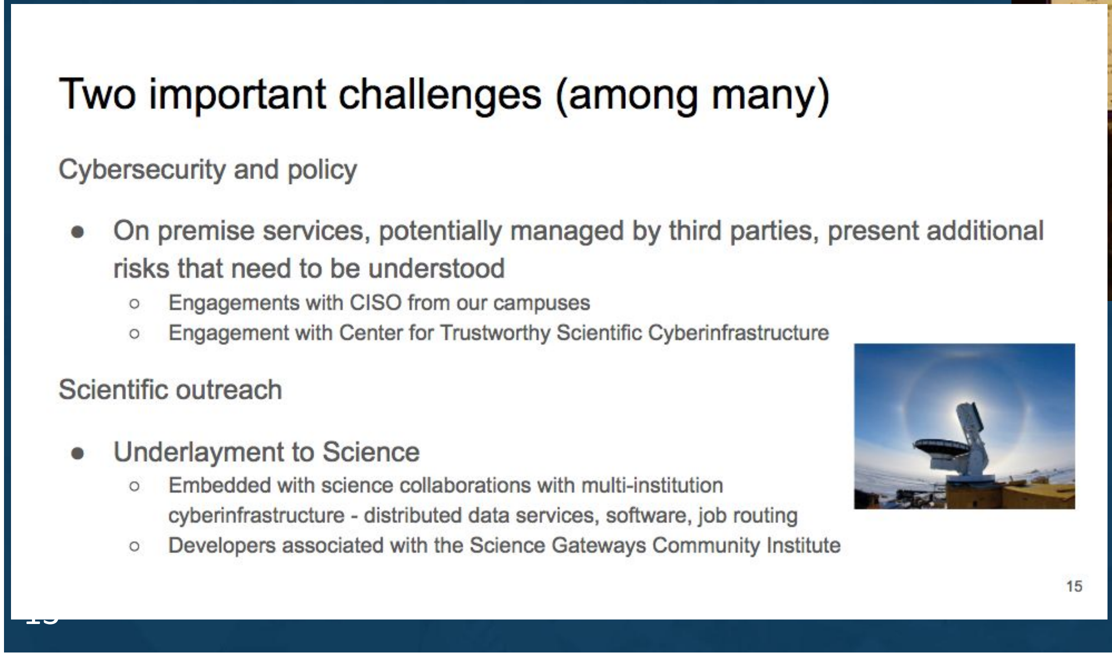
Engagements

Focused collaborations with one (or small group) of NSF projects to tackle a project's cybersecurity or identity and access management challenge.



TrustedCI.org Peer Review with Utah

- http://trustedci.org/cc-nie/
- We Discussed:
  - Problems or Research bottlenecks
  - Design
  - Architecture
  - Host, Data, Network Security
- I HIGHLY recommend this.
- Contact CTSC Director Von Welch(vwelch@iu.edu) at the Center for Trustworthy Scientific Cyberinfrastructure



Two important challenges (among many)

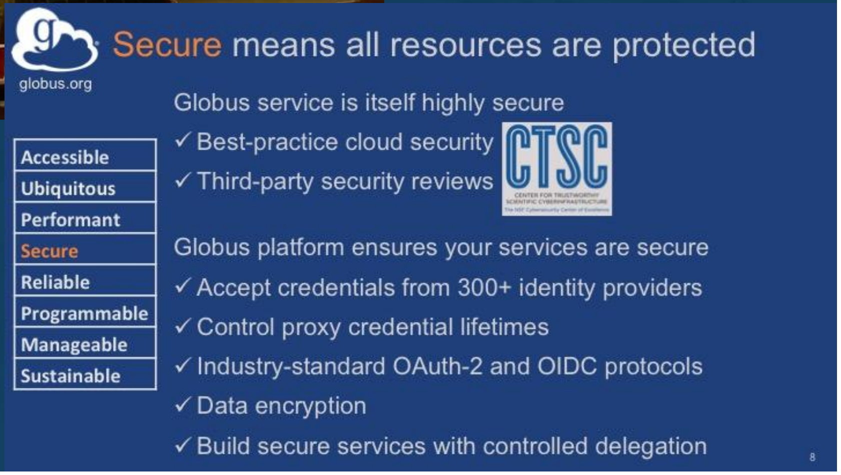
Cybersecurity and policy

- On premise services, potentially managed by third parties, present additional risks that need to be understood
  - Engagements with CISO from our campuses
  - Engagement with Center for Trustworthy Scientific Cyberinfrastructure

Scientific outreach

- Underlayment to Science
  - Embedded with science collaborations with multi-institution cyberinfrastructure - distributed data services, software, job routing
  - Developers associated with the Science Gateways Community Institute

15



Secure means all resources are protected

globus.org

- Accessible
- Ubiquitous
- Performant
- Secure
- Reliable
- Programmable
- Manageable
- Sustainable

Globus service is itself highly secure

✓ Best-practice cloud security

✓ Third-party security reviews

CTSC
CENTER FOR TRUSTWORTHY SCIENTIFIC CYBERINFRASTRUCTURE

Globus platform ensures your services are secure

✓ Accept credentials from 300+ identity providers

✓ Control proxy credential lifetimes

✓ Industry-standard OAuth-2 and OIDC protocols

✓ Data encryption

✓ Build secure services with controlled delegation

8

Any challenge is in scope!

Any Cybersecurity-related challenge in scope:

Drafting a Privacy Policy (AoT)

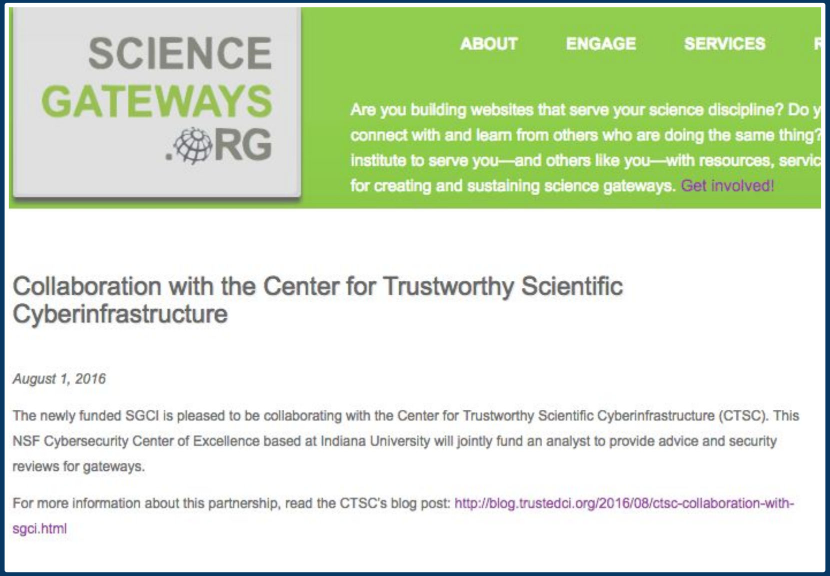
Security Officer search (LIGO)

Identity and Access Management: http://trustedci.org/iam/

Software Assurance: http://trustedci.org/software-assurance/

Science Gateways w/SGCI SI2 Institute:

http://sciencegateways.org/news/collaboration-ctsc/



Are you building websites that serve your science discipline? Do y
connect with and learn from others who are doing the same thing?
institute to serve you—and others like you—with resources, servic
for creating and sustaining science gateways. Get involved!

Collaboration with the Center for Trustworthy Scientific Cyberinfrastructure

August 1, 2016

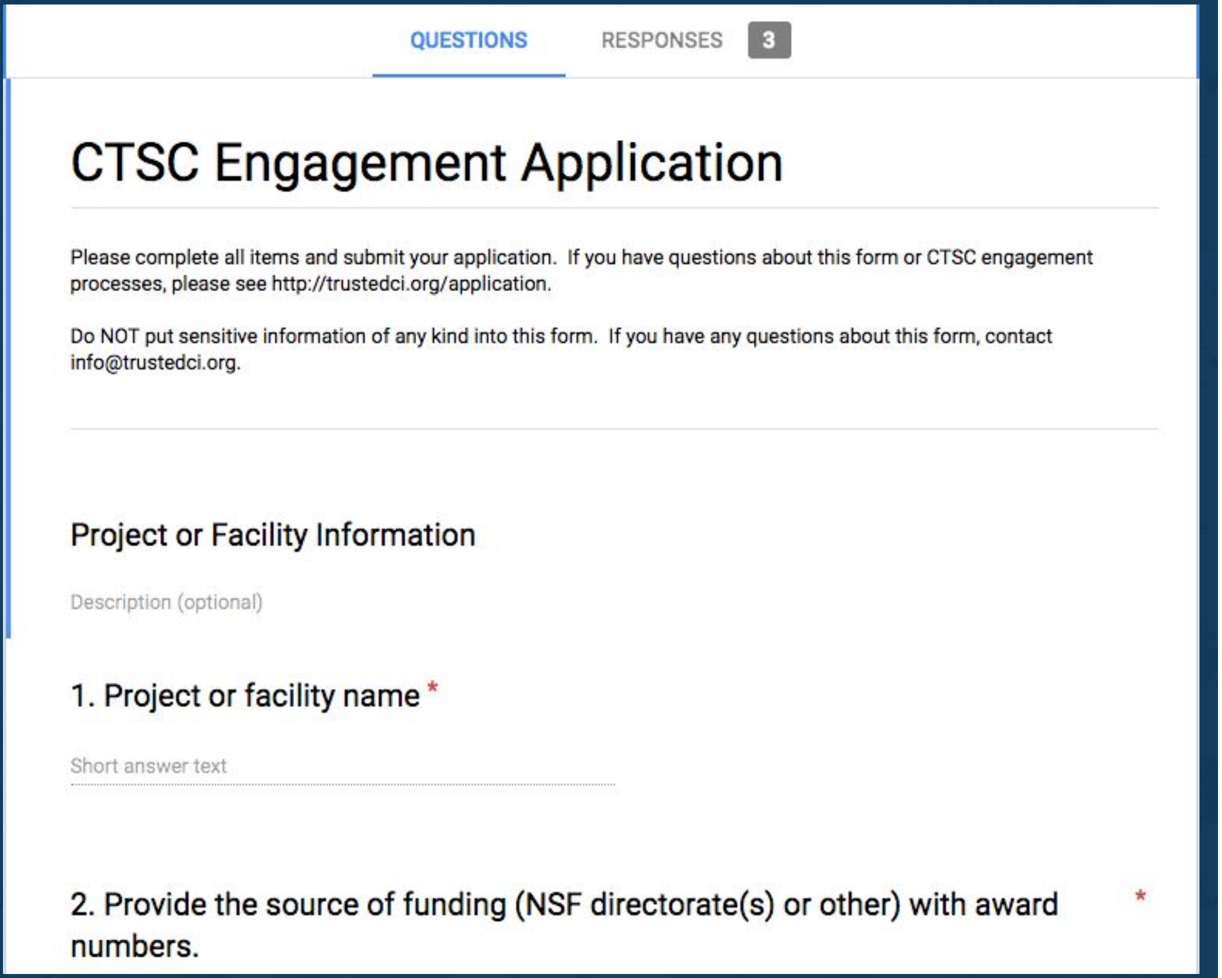
The newly funded SGCI is pleased to be collaborating with the Center for Trustworthy Scientific Cyberinfrastructure (CTSC). This NSF Cybersecurity Center of Excellence based at Indiana University will jointly fund an analyst to provide advice and security reviews for gateways.

For more information about this partnership, read the CTSC's blog post: http://blog.trustedci.org/2016/08/ctsc-collaboration-with-sgci.html

Apply now!

Current deadline for first half of 2018 is October 2nd.

Demand was 2x supply in last application window.



CTSC Engagement Application

Please complete all items and submit your application. If you have questions about this form or CTSC engagement processes, please see http://trustedci.org/application.

Do NOT put sensitive information of any kind into this form. If you have any questions about this form, contact info@trustedci.org.

Project or Facility Information

Description (optional)

1. Project or facility name *

Short answer text

2. Provide the source of funding (NSF directorate(s) or other) with award numbers. *

http://trustedci.org/application

Sharing Knowledge

Guides, Best Practices, Situational Awareness, Training

CI Vulnerability Alerts - Situational Awareness

Advise NSF CI community about relevant software vulnerabilities and provide guidance on mitigation.

Leverage NIST, US-CERT, EGI, OSG, XSEDE, REN-ISAC, and other sources of vulnerability information.

Subscribe to cv-announce@trustedci.org for alerts.

Contact alerts@trustedci.org to report vulnerabilities.

trustedci.org/vulnerabilities

Cybersecurity Guides and Tools

Addressing concerns unique to science

Operational Security (policy templates, guidance, etc.)

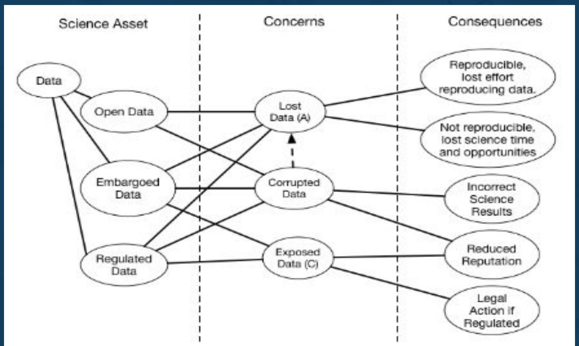
http://trustedci.org/guide

Identity Management Best Practices

http://trustedci.org/iam

Open Science Cyber Risk Profile

https://trustedci.org/oscrp/

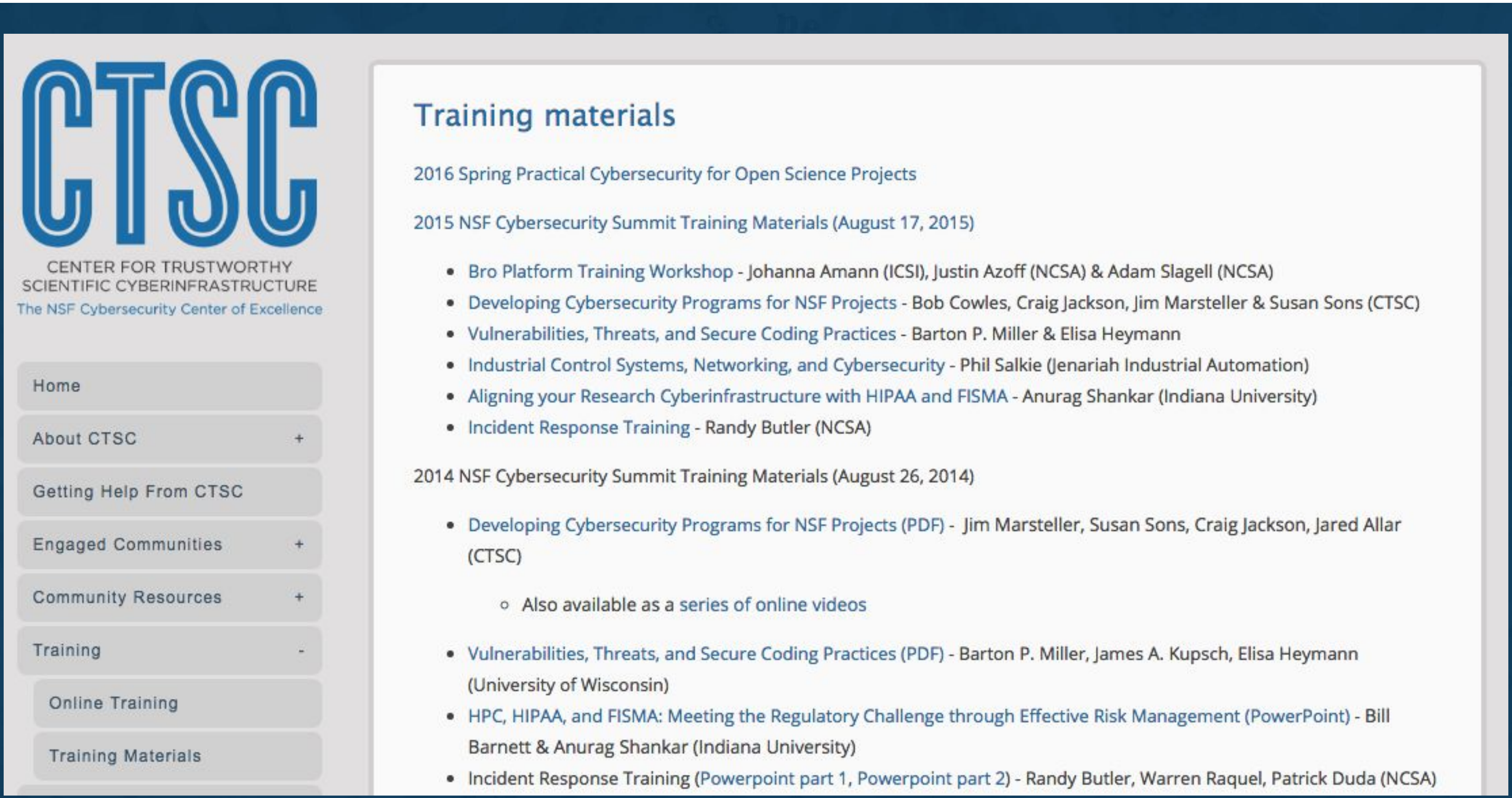

Science Asset
Concerns
Consequences
Data
Open Data
Embargoed Data
Regulated Data
Lost Data (A)
Corrupted Data
Exposed Data (C)
Reproducible, lost effort reproducing data.
Not reproducible, lost science time and opportunities
Incorrect Science Results
Reduced Reputation
Legal Action if Regulated

CTSC
CENTER FOR TRUSTWORTHY SCIENTIFIC CYBERINFRASTRUCTURE
Guide to Developing Cybersecurity Programs for
NSF Science and Engineering Projects
Version 1

CTSC
CENTER FOR TRUSTWORTHY SCIENTIFIC CYBERINFRASTRUCTURE
Securing Commodity IT in Scientific CI Projects
Baseline Controls and Best Practices
Version 2.0

CTSC
CENTER FOR TRUSTWORTHY SCIENTIFIC CYBERINFRASTRUCTURE
Identity Management Best Practices
A CTSC Blog Series
November 2015
For Public Distribution
Jim Basney
Identity Management Best Practices | CTSC 1

CTSC



CTSC

CENTER FOR TRUSTWORTHY SCIENTIFIC CYBERINFRASTRUCTURE

The NSF Cybersecurity Center of Excellence

Training materials

2016 Spring Practical Cybersecurity for Open Science Projects

2015 NSF Cybersecurity Summit Training Materials (August 17, 2015)

- Bro Platform Training Workshop - Johanna Amann (ICSI), Justin Azoff (NCSA) & Adam Slagell (NCSA)
- Developing Cybersecurity Programs for NSF Projects - Bob Cowles, Craig Jackson, Jim Marsteller & Susan Sons (CTSC)
- Vulnerabilities, Threats, and Secure Coding Practices - Barton P. Miller & Elisa Heymann
- Industrial Control Systems, Networking, and Cybersecurity - Phil Salkie (Jenariah Industrial Automation)
- Aligning your Research Cyberinfrastructure with HIPAA and FISMA - Anurag Shankar (Indiana University)
- Incident Response Training - Randy Butler (NCSA)

2014 NSF Cybersecurity Summit Training Materials (August 26, 2014)

- Developing Cybersecurity Programs for NSF Projects (PDF) - Jim Marsteller, Susan Sons, Craig Jackson, Jared Allar (CTSC)
  - Also available as a series of online videos
- Vulnerabilities, Threats, and Secure Coding Practices (PDF) - Barton P. Miller, James A. Kupsch, Elisa Heymann (University of Wisconsin)
- HPC, HIPAA, and FISMA: Meeting the Regulatory Challenge through Effective Risk Management (PowerPoint) - Bill Barnett & Anurag Shankar (Indiana University)
- Incident Response Training (Powerpoint part 1, Powerpoint part 2) - Randy Butler, Warren Raquel, Patrick Duda (NCSA)

NSF Cybersecurity Summit, XSEDE, SuperComputing, other locations by request.

Topics: Cybersecurity Program Development, Incident Response, Secure Coding, Software Engineering...

http://trustedci.org/trainingmaterials/

Building Community

NSF Cybersecurity Summit, Webinars, Blog, Email Lists, Partnerships

Large Facility Security Team

- Monthly virtual meetings facilitated by CTSC
- Topical discussions and opportunities to bring questions and issues to the table
- Current participation: 15 of 25 LFs
- Provide feedback and input on the Cybersecurity subsection of the Large Facilities manual
- Provide critical input on LF software requirements for software producers

CTSC Webinar Series

trustedci.org/webinars

Upcoming:

- *Aug 28: Two-Factor Authentication for CI*
- *Aug 30: CTSC Engagement Application Process*
- *Sep 25: Threat Intelligence Sharing*

Average # of Viewers: 35 live, 65 later on YouTube

Call for presentations: trustedci.org/webinars-cfp

Partnerships

Interoperability with and best practices from our global collaborators.

ESnet: Open Science Cyber Risk Profile

AARC: Identity Management with the EU

SGCI SI2 Institute: Science Gateway cybersecurity

Bro CoE: Training, network security

REN-ISAC: Situational Awareness

http://trustedci.org/partners/

Your Input Requested!

2017 NSF Community Cybersecurity Benchmarking Survey

Goals: Give the community a richer understanding of the environment and norms; additionally, provide a long-term measurement of our community's cybersecurity stance.

Annual community survey open to all NSF projects.

Reports capture each year's results.

Only contain information to maintain anonymity to respondents.

2016 survey report: http://hdl.handle.net/2022/21355

Note: ALL respondents said that they developed software.

2017 survey now open: trustedci.org/survey

Staying in contact with the CCoE

Got a quick question?

ask@trustedci.org

Join our email lists for discussions and updates:

http://trustedci.org/ctsc-email-lists/

Blog: http://blog.trustedci.org/

Twitter: @TrustedCI

Progress and Looking Ahead

Vision for the NSF Science Community

1. For the NSF science community to understand fully the role of cybersecurity in producing trustworthy science.

2. For all NSF projects and facilities to have the information and resources they need to build and maintain effective cybersecurity programs appropriate for their science missions, and responsive to evolving risks and requirements.

3. For all NSF Large Facilities to have highly effective cybersecurity programs.

Progress and Looking Ahead

Progress: A baseline cybersecurity program for a mature, operational CI project has clear components.

Progress/Looking Ahead: Expectations for secure software development / engineering are emerging.

Looking Ahead: Enable campus infosec to help research with the same strength they help enterprise.

Progress:

A baseline cybersecurity program for a mature, operational CI project has clear components.

Pillars of a Cybersecurity Program
Base Expectations of a Mature CI

1. Governance

   Roles, Processes, Policies, Requirements

2. Resources

   People, Infrastructure, and Security Tools…
   Money

3. Controls

   Procedural, technical, administrative safeguards and countermeasures

Pillars of a Cybersecurity Program
Base Expectations of a Mature CI

1. Governance

Roles, Processes, Policies, Requirements

Base Expectations:

- Leadership Engagement: clear responsibility for cybersecurity - PI or delegate.
- Master Information Security Policy and Procedures (MISPP)
- Acceptable Use Policy (AUP)
- Incident Response Policies & Procedures
- Access Control Policy

Pillars of a Cybersecurity Program

Base Expectations of a Mature CI

1. Invest in people
2. Give them a budget

2. Resources

People, Infrastructure, and Security Tools…

Money

Cybersecurity budgets: 3% to 12% of IT budgets.

(Higher for smaller projects.)

See 2016 NSF Cybersecurity Summit Report for details:

http://hdl.handle.net/2022/21161

Pillars of a Cybersecurity Program

Base Expectations of a Mature CI

1. Select a reasonably scoped, prioritized, and evidence-based baseline control set.

   E.g. CIS Critical Security Controls (aka the Top 20).
2. Determine the relevance, feasibility, and current implementation state of these controls.
3. Fill gaps (unique/unusual science CI) with analysis-based controls.

   E.g. https://trustedci.org/oscrp/

3. Controls

Procedural, technical, administrative safeguards and countermeasures

Pillars of a Cybersecurity Program

Base Expectations of a Mature CI

1. Governance

For more information see:

http://trustedci.org/guide

"Beyond the Beltway" talk this afternoon.

safeguards and countermeasures

Progress/Looking Ahead:

Expectations for secure software development / engineering are emerging.

Emerging Expectations for Secure Software Development: Basic Expectations

Basic secure software development expectations have emerged.

E.g. basic engineering practices:

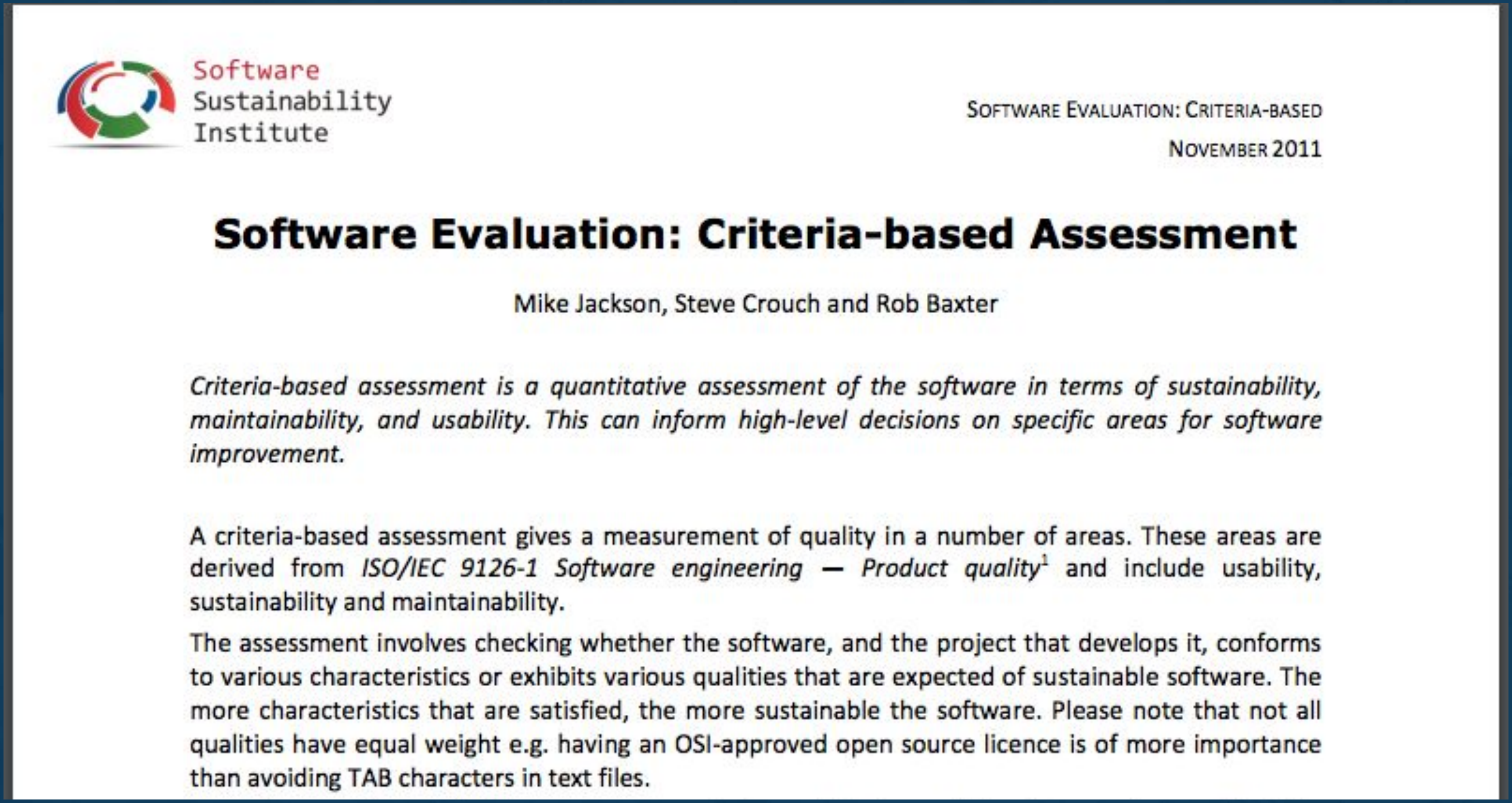
- Versioning
- Design for security
- Vulnerability management
- Patch release
- Developer awareness of security.

For more information see:

https://trustedci.org/software-assurance/

Todd Tannenbaum's talk

Emerging Expectations for Secure Software Development: See Also



Software Sustainability Institute

SOFTWARE EVALUATION: CRITERIA-BASED

NOVEMBER 2011

Software Evaluation: Criteria-based Assessment

Mike Jackson, Steve Crouch and Rob Baxter

Criteria-based assessment is a quantitative assessment of the software in terms of sustainability, maintainability, and usability. This can inform high-level decisions on specific areas for software improvement.

A criteria-based assessment gives a measurement of quality in a number of areas. These areas are derived from *ISO/IEC 9126-1 Software engineering — Product quality*[1] and include usability, sustainability and maintainability.

The assessment involves checking whether the software, and the project that develops it, conforms to various characteristics or exhibits various qualities that are expected of sustainable software. The more characteristics that are satisfied, the more sustainable the software. Please note that not all qualities have equal weight e.g. having an OSI-approved open source licence is of more importance than avoiding TAB characters in text files.

https://www.software.ac.uk/resources/guides-everything/software-evaluation-guide

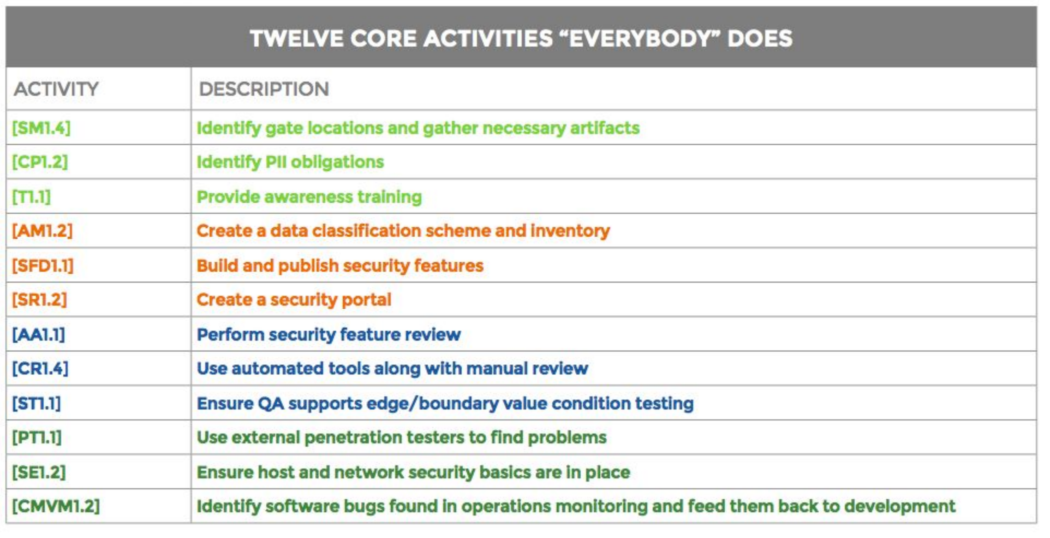
Emerging Expectations for Secure Software Development: Challenges

- What’s the right budget for software security?
- Which assurance tools to use (SAST, DAST, code review, etc.) and when?
- How to assess risk on large code bases?
- How do you verify what a software developer is doing or did with regards to security?
- How to deal with third party software of unknown risk?

Very large challenge. Need help from private sector, cybersecurity research, … everyone to address.

Emerging Expectations for Secure Software Development: Example Work in this Area

https://www.bsimm.com/



TWELVE CORE ACTIVITIES "EVERYBODY" DOES	
ACTIVITY	DESCRIPTION
[SM1.4]	Identify gate locations and gather necessary artifacts
[CP1.2]	Identify PII obligations
[T1.1]	Provide awareness training
[AM1.2]	Create a data classification scheme and inventory
[SFD1.1]	Build and publish security features
[SR1.2]	Create a security portal
[AA1.1]	Perform security feature review
[CR1.4]	Use automated tools along with manual review
[ST1.1]	Ensure QA supports edge/boundary value condition testing
[PT1.1]	Use external penetration testers to find problems
[SE1.2]	Ensure host and network security basics are in place
[CMVM1.2]	Identify software bugs found in operations monitoring and feed them back to development

https://continuousassurance.org/

Looking Ahead:

Enable campus infosec to help research with the same strength they help enterprise.

NSF's CI Community Scale

In 2016, NSF made over >300k awards

Over 500 awards were to $1m+ projects

https://www.nsf.gov/awardsearch/advancedSearch.jsp

Assuming 3-5 year awards and some CI in $1m+ projects, estimate 2000 CI projects currently funded.

To impact security across this many projects, CTSC needs a force multiplier.

Can Campus Infosec be that Force Multiplier?

Information Security (infosec) officers on campus are primarily focused on enterprise computing (cloud or on-prem), followed by regulated data (HIPAA, 800-171, FISMA, FERPA, etc.)

Open Science is heterogeneous, relatively fast moving, and has varying risks and rewards.

These factors makes it hard for campus infosec and CI to engage.

The Path Forward

Despite challenges, campus infosec seems the best available force to help meet scale of NSF science.

Need to educate and train them in cybersecurity for NSF science, both the How and the Why.

Strategy:

Start with “early adopters” - campuses embracing research computing strongly - and let them spread the word to their peers.

In Conclusion

Cybersecurity for science is critical: trustworthiness, preventing harm, collaboration, etc.

We’re here to help: https://trustedci.org/help/

Cybersecurity programs have base expectations

Software security expectations are emerging.

Scaling to size of NSF science is a challenge, look to engage with campus infosec.

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Thank You

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